



# Network Storage Agent 2.1 User's Guide

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Sun Microsystems, Inc.  
901 San Antonio Road  
Palo Alto, CA 94303-4900 U.S.A.  
650-960-1300

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# Preface

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The *Network Storage Agent 2.1 User's Guide* describes how to use the Network Storage Agent to collect data about the condition of various storage devices, such as:

- the Sun StorEdge™ T3 array;
- the Sun StorEdge A5x00 array;
- the Sun StorEdge A3500 FC array;
- the Sun StorEdge A1000 arrays; and the
- Sun StorEdge and Brocade switches.

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

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## How This Book Is Organized

This book contains the following topics:

**Chapter 1** provides an overview and general operating instructions for using the Network Storage Agent.

**Chapter 2** contains detailed installation and configuration information for the Network Storage Agent.

**Chapter 3** discusses the functionality of the Network Storage Agent. It also explains how to use the Network Storage Agent.

**Chapter 4** briefly describes the online help associated with the Network Storage Agent, including utilities, man pages, and GUI Help.

**Appendix A** contains an index of Network Storage Agent events currently generated, along with a description of the event.

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# Using UNIX Commands

This document may not contain information on basic UNIX<sup>®</sup> 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<sup>™</sup> online documentation for the Solaris<sup>™</sup> operating environment
- Other software documentation that you received with your system

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# Typographic Conventions

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

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# 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 | #                    |

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# Related Documentation

| Application                              | Title  | Part Number |
|--|--|-------------|
| Sun StorEdge T3 array                    | <i>Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual</i> | 816-0773-10 |
| Sun StorEdge T3 array                    | <i>Sun StorEdge T3 Disk Tray Administrator's Guide</i>                       | 816-0776-10 |
| Sun StorEdge T3 array                    | <i>Sun StorEdge T3 Disk Tray Configuration Guide</i>                         | 816-0777-10 |
| Sun StorEdge A5x00 array                 | <i>Sun StorEdge A5000 Configuration Guide</i>                                | 805-0264    |
| Sun StorEdge A3500FC array               | <i>Sun StorEdge A3500/A3500FC Configuration Guide</i>                        | 805-4981    |
| Sun StorEdge StorTools™ diagnostic tools | <i>Sun StorEdge StorTools 4.x User's Guide</i>                               | 806-6235    |

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# Overview of the Network Storage Agent

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The Network Storage Agent is a host-based online health and diagnostic monitoring tool for Storage Area Network (SAN) devices and direct-attached storage 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 Network Storage Agent remotely monitors Sun network storage devices. The Network Storage Agent can monitor host message files for errors, or connect directly on the “in-band” data path of Sun StorEdge devices, in order to obtain status information about each device being monitored.

To facilitate monitoring of this environment, the Network Storage Agent can be configured as a set of distributed agents, in a master/slave relationship, spread across a series of servers. A single agent is designated the role of master and acts as the aggregation point for events originating in the other slave agents.

You can use the Network Storage Agent to monitor the following types of storage devices:

- Sun StorEdge™ T3 arrays;
- Sun StorEdge A5x00 arrays;
- Sun StorEdge A3500 FC arrays;
- Sun StorEdge A1000 arrays;
- Sun StorEdge and Brocade switches; and
- Storage Area Network (SAN) topology.

More Sun storage products may be added as they become available. The design of the Network Storage Agent is such that new modules for the new products can be added easily and are fully functional with the existing health monitors and alert mechanisms. New device category selections may be added to the graphical user interface (GUI) whenever a new module is added.

# Network Storage Agent Features

The primary features of the Network Storage Agent are:

- Health Monitoring and Fault Detection—Reports on conditions that can impact the availability and operation of the storage devices.
- Alert Notification—Automatically sends event notifications to system administrators and other designated parties.
- Telemetry Stream—Sends out events and information to Sun that facilitates improved service and improved products.
- Web-based graphical user interface (GUI)—Simplifies administration by providing a point and click interface.
- Lightweight—The Network Storage Agent requires minimal resources in terms of disk space, compute cycles, and virtual memory footprint.
- Modular Architecture—Easy plug-in support for additional devices and functions.

The Network Storage Agent uses a variety of system tools to monitor various devices, including a collection of command line interfaces and SNMP and HTTP tokens. These system tools are executed by device-specific modules within the Network Storage Agent. All information generated by the Network Storage Agent is standardized to the common information model (CIM).

You can use the Network Storage Agent's transported data to create a representative database model of the storage devices being monitored. The model currently includes:

- Component information
- State information
- Availability
- Degradation index
- Alert information

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# How the Network Storage Agent Works

The Network Storage Agent 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 Network Storage Agent are simplified by the use of a web browser based graphical user interface (GUI).

The Network Storage Agent 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 characterize the operational behavior of the device. Some of these events may represent conditions that require service action, in which case the event is tagged as an alert.

The Network Storage Agent 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 Network Storage Agent can send events as a telemetry stream through the SRS NetConnect transport to a secure central repository at Sun. This allows the information to be used for product improvement, and allows Sun representatives to be more effective in providing service, both proactive and reactive.

## Monitoring Devices Using the Network Storage Agent

Monitoring varies from device to device, but usually consists of the following methods. The Network Storage Agent typically:

1. Finds a message log file for the device and reports new relevant entries.
2. Executes commands to probe the device for status, state, and statistics information.
3. For some devices that support remote access through the management path, probes the device remotely for the same information.
4. Packages and sends information deltas to the Network Storage Command Center (NSCC).

To minimize email transmission, the Network Storage Agent 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 of the master for handling are sent.

## Information Deltas

In general, information events are divided into two categories:

- **Deltas:** 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.
- **Nondeltas:** This category includes message logs, 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 array could be reported on every seven days.

Because the Network Storage Agent 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.

## Functions of the Network Storage Agent

For each device, the Network Storage Agent performs the following functions:

1. Verifies that the Sun StorEdge StorTools diagnostic tools are not running to avoid conflict with Sun StorEdge StorTools tests.
2. Through an interface with the transport mechanisms, the discovery event sends the information to the NSCC.

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**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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3. Reads the proper `/var/adm/messages` files, finds relevant entries, and reports them as events through the local email notification mechanism, if configured.
4. Connects to Sun storage devices directly through in-band data paths.
5. 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.
6. Categorizes all events by event types and then emails the events to the system administrator.

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**Note** – Refer to “Network Storage Agent Events” on page 83 for a list of event categories.

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7. Reads threshold information and reports errors when the frequency threshold reaches a high level.

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# Tasks You Can Perform Using the Network Storage Agent

Through the Network Storage Agent graphical user interface (GUI) , you can perform the tasks that are described in TABLE 1-1.

**TABLE 1-1** Functions of the Network Storage Agent

| Task                                   | Function   | Section Where Explained                         |
|--|--|---|
| Maintain host information              | <ul style="list-style-type: none"><li>• Supports the maintenance of host-specific information such as host name, location, and IP address</li><li>• Enables you to manually add a new slave.</li><li>• Tests the availability of the Network Storage Agent on each host using the Ping Slaves function.</li><li>• Enables you to push slave configuration to the corresponding slaves.</li></ul> | “To Maintain Hosts” on page 29                  |
| Add or update the master configuration | Supports the maintenance of customer information and master Network Storage Agent configuration information, including: <ul style="list-style-type: none"><li>• Customer name, contract number, and location information</li><li>• Default local message files</li><li>• Device category selection</li><li>• Monitoring frequency</li></ul>  | “To Update the Master Configuration” on page 31 |
| Discover a device                      | Requests the Network Storage Agent to probe the environments for the desired device types.   | “Device Discovery” on page 36                   |

**TABLE 1-1** Functions of the Network Storage Agent

|   |   |  |
|---|---|--|
| Maintain devices                          | <p>Supports the maintenance of device-specific information.</p> <ul style="list-style-type: none"> <li>• Enters each Sun StorEdge T3 array, including IP address, name, and primary host.</li> <li>• Enters each Sun StorEdge Network FC Switch-8 and Switch-16, including the IP address and name of the switch.</li> <li>• Requests that all Sun StorEdge T3 arrays be discovered by all slave agents and that the new Sun StorEdge T3 array discovered be automatically added to the device list.</li> <li>• Provides naming information and HBA-type selection for the Sun StorEdge A5x00 arrays and Sun StorEdge A3500-FC arrays.</li> </ul> | “Maintaining Devices” on page 39                   |
| Set up local email and pager notification | <p>Maintains local notification information.</p> <ul style="list-style-type: none"> <li>• Enables specific events to be emailed to local administrators. Events can be categorized by device type, severity level, and event type. Events can also be summarized and sent to a pager’s email address.</li> <li>• Automatically translates events from their internal encoded format to a human-readable format.</li> </ul>  | “Customizing Email Deliveries” on page 44          |
| Set up a Provider                         | Relays events generated by health monitors.   | “Using Network Storage Agent Providers” on page 46 |
| Control agent activity                    | Temporarily stops the Network Storage Agent from running on a selected host.  | “To Start or Stop Agent(s)” on page 50             |
| View instrumentation reports              | Enables you to review all FRU-level information of a selected device and its access components. Drilling down on one of the links displays the details.   | “Viewing Instrumentation Reports” on page 55       |

**TABLE 1-1** Functions of the Network Storage Agent

|  |  |  |
|--|--|--|
| Schedule Sun StorEdge StorTools Snapshot execution   | Schedules the execution of the configuration snapshot and displays the last run.   | "Using Sun StorEdge StorTools SnapShot" on page 58 |
| 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.  | "Using the SAN Functionality" on page 62           |
| View system logs by events or alerts   | Displays the most recent system errors saved by the Network Storage Agent.   | "Monitoring the Logs" on page 69                   |
| Monitor the system functions   | <ul style="list-style-type: none"> <li>• Changes time-out settings</li> <li>• Displays system errors</li> <li>• Erases device cache</li> <li>• Manually runs the Network Storage Agent</li> <li>• Displays thresholds</li> <li>• Configures email addresses</li> <li>• Changes security passwords</li> </ul> | "Monitoring the System" on page 73                 |

For specific instructions on how to use the Network Storage Agent functionality, refer to "Using the Network Storage Agent" on page 23.

# Installing and Configuring the Network Storage Agent

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This chapter presents instructions for installing and configuring the Network Storage Agent on your system. It includes the following topics:

- “Installation Checklist” on page 10
- “Host Requirements” on page 12
- “Installing the Network Storage Agent” on page 13
- “Starting the Network Storage Agent” on page 17
- “Upgrading or Removing the Network Storage Agent” on page 21
- “The Network Storage Agent Configuration File” on page 22

---

# Installation Checklist

Use this checklist to install the Network Storage Agent.

|                          | <b>Step</b> | <b>Action</b>   |
|--------------------------|-------------|---|
| <input type="checkbox"/> | 1           | <p>Download the latest compressed Network Storage Agent package from <a href="http://nsccl/RASAgent">http://nsccl/RASAgent</a>.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"><li>• You can download the latest Network Storage Agent package <i>internally</i> to Sun by accessing the SWAN machine NSCC with your browser or through the Network Storage Agent webpage (<a href="http://www.sun.com/storage/rasagent">http://www.sun.com/storage/rasagent</a>).</li><li>• You can download the Network Storage Agent <i>externally</i> by accessing <a href="http://www.sun.com">www.sun.com</a>, either through NetConnect (<a href="http://www.sun.com/srs/netconnect">http://www.sun.com/srs/netconnect</a>).</li><li>• You will be required to enter a username and a valid email address.</li></ul> |
| <input type="checkbox"/> | 2           | <p>Move the package to a temporary working directory and uncompress the downloaded image by typing:</p> <pre>uncompress zcat   tar -xvf</pre>   |
| <input type="checkbox"/> | 3           | <p>Install the SUNWrasagxx package by selecting it during the package add:</p> <pre># pkgadd -d .</pre>   |
| <input type="checkbox"/> | 4           | <p>Once you have completely and successfully installed the package, run the agent installation script.</p> <p>See "Installing the Network Storage Agent" on page 13 for details.</p>  |
| <input type="checkbox"/> | 5           | <p>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:</p> <pre>http://&lt;master-server.domain&gt;:7654</pre>   |
| <input type="checkbox"/> | 6           | <p>Log in to the Network Storage Agent.</p> <ul style="list-style-type: none"><li>• Login: ras</li><li>• Default password: agent</li></ul>  |

|                          |    |  |
|--------------------------|----|--|
| <input type="checkbox"/> | 7  | Set the configuration parameters. Note that fields with an asterisk (*) are mandatory.<br><br>Refer to “To Configure the Network Storage Agent Maintenance Functionality” on page 26.    |
| <input type="checkbox"/> | 8  | Request the Network Storage Agent to probe the environments for the desired device types.<br><br>Refer to “Device Discovery” on page 36.   |
| <input type="checkbox"/> | 9  | Customize the generation of emails to yourself or to other administrators at his or her company.<br><br>Refer to “Customizing Email Deliveries” on page 44.                              |
| <input type="checkbox"/> | 10 | Send a test email and a short message to yourself to verify the master instance of the Network Storage Agent’s mailing capability.<br><br>Refer to “To Send Test Email” on page 52.      |
| <input type="checkbox"/> | 11 | Update the slave by pushing the configuration. This is done to ensure that all instances of the master Agent are synchronized with every device the Network Storage Agent is monitoring. |
| <input type="checkbox"/> | 12 | Review the configuration to ensure that the Network Storage Agent is not missing required configuration information necessary for proper monitoring.                                     |
| <input type="checkbox"/> | 13 | Start the Network Storage Agent(s).<br><br>Refer to “To Start or Stop Agent(s)” on page 50   |

---

# Host Requirements

The Network Storage Agent package is installed on a host in the `/opt/SUNWrasag` directory. Servers running in the Solaris operating environment and Sun StorEdge devices are supported. Install the Network Storage Agent 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 message log, to where Sun StorEdge T3 device logs are sent. The name of the file is represented in the T3 message log configuration screen for each host.
- The host has access to the Sun StorEdge T3 arrays and/or the Sun StorEdge SAN Release 3.0 switches over TCP/IP.
- The master host can run a browser to complete and maintain the monitored configuration.
- For SAN datapath monitoring, the host must have access to the data path of the devices being monitored.
- The service processor (defined as a Solaris server host) must connect to Sun storage devices “out-of-band,” via ethernet.

---

**Note** – You can install the Network Storage Agent as a master on a service processor and have slave(s) report on it, *or* you can install the Network Storage Agent as a slave on a service processor and have the master report on it.

---

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.

Examples follow:

- The Sun StorEdge 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 the Network Storage Agent

This section contains the following subsections:

- “To Install the Network Storage Agent” on page 13
- “To Verify the Installation” on page 16

## ▼ To Install the Network Storage Agent

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

CODE EXAMPLE 2-1      Sample Installation

```
# pkgadd -d .

The following packages are available:
  1  SUNWrasag      Network Storage Agent (sparc) 2.1

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/SUNWrasag> as the package base directory.

## Processing package information.
## Processing system information.
  1 package pathname is already properly installed.
## 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 <SUNWrasag> [y,n,?] y

Installing RASAgent as <SUNWrasag>
## Installing part 1 of 1.
/opt/SUNWrasag/README
/opt/SUNWrasag/System/SW_Thresholds
/opt/SUNWrasag/System/Switches_ip_doc
/opt/SUNWrasag/System/checksum
/opt/SUNWrasag/System/last_config
/opt/SUNWrasag/System/password
/opt/SUNWrasag/System/rules
/opt/SUNWrasag/Test/TODO
...
(Continued on following page)
```

```

...
/opt/SUNWrasag/Test/a5000.log
/opt/SUNWrasag/Test/a5000_mess.txt
/opt/SUNWrasag/Test/cim.txt
/opt/SUNWrasag/Test/di.txt
/opt/SUNWrasag/Test/di2.txt
/opt/SUNWrasag/Test/drivutil.txt
/opt/SUNWrasag/Test/drivutil_d.txt
/opt/SUNWrasag/Test/drivutil_i.txt
/opt/SUNWrasag/Test/fwutil.txt
/opt/SUNWrasag/util/encrypt_test.out
/opt/SUNWrasag/util/encrypt_test.pl
/opt/SUNWrasag/util/hostname.pl
/opt/SUNWrasag/util/lhf
/opt/SUNWrasag/util/lhf.c
/opt/SUNWrasag/util/name2ip.pl
/opt/SUNWrasag/util/parse.pl
/opt/SUNWrasag/util/rasd.pl
/opt/SUNWrasag/util/t.pl
/opt/SUNWrasag/util/test_post.pl
/opt/SUNWrasag/util/tz.pl
/opt/SUNWrasag/util/x.pl
/opt/SUNWrasag/util/xmldump.pl
[ verifying class <none> ]
## Executing postinstall script.
-----
After the package is completely installed,
execute the program '/opt/SUNWrasag/bin/ras_install'
to install the Network Storage Agent service and cron.
You can run ras_install again in the future to start
the crons if you choose not to install it this time.
-----
# /opt/SUNWrasag/bin/ras_install

**** Installing the Network Storage Agent Server and Crons ****

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

This script will now add the Network Storage Agent service to the inetd config
file. When this scripts ends, go to the master agent IP-address, port 7654 with
a browser to complete the Network Storage Agent 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 the Network Storage Agent cron [C/P, default=C] : C

** Network Storage Agent cron is now installed.

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

*** It WORKED (xxxaxbxc).

Network Storage Agent installed properly!

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

## ▼ To Verify the Installation

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

```
# pkginfo -l SUNWrasag
```

---

# Starting the Network Storage Agent

This section contains the following subsections:

- “To Set the Environment Variables” on page 17
- “To Run the ras\_install Script” on page 18
- “To Start the Network Storage Agent Communications Services” on page 19

## ▼ To Set the Environment Variables

After installing the Network Storage Agent, you must set the environment variables `PATH` and `MANPATH` to include the Network Storage Agent directories `/opt/SUNWrasag/bin` and `/opt/SUNWrasag/man`.

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

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

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

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

## ▼ To Run the `ras_install` Script

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 the Network Storage Agent 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/SUNWrasag/bin/rasagent -c >> /opt/SUNWrasag/log/cron.log 2>&1
```

The `cron` starts the `rasagent` program every five minutes. Three configuration options affect the `rasagent` execution:

- The agent will not run unless you first activate it. Refer to “To Start or Stop Agent(s)” on page 50 for more information.
- To adjust the monitoring frequency, refer to “To Maintain Hosts” on page 29.
- Enable and disable the `cron` periodically to execute the `rasagent` program.

## ▼ To Start the Network Storage Agent Communications Services

- Use the `ras_install` command to start the Network Storage Agent services:

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

The `ras_install` script sets up the host as a slave or a master, establishes a Network Storage Agent entry in `crontab`, and restarts the `cron` daemon. It 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 Network Storage Agent.

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

## Installing Distributed Agents (Slaves)

When a server satisfies only some of the host requirements to monitor specific storage devices, you can optionally install the Network Storage Agent on multiple servers.

When you distribute the Network Storage Agent 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 this install and install the Network Storage Agent on the host to be configured as the master.

## ▼ To Set Up a Slave

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

```
**** Installing the Network Storage Agent Server and Crons ****
```

```
? Are you installing a Master or a Slave Network Storage 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/name of that master host will be the default selection.

---

- The Network Storage Agent will then verify that the master host is reachable.

---

# Upgrading or Removing the Network Storage Agent

This section contains the following subsections:

- “To Upgrade the Network Storage Agent Package” on page 21
- “To Remove the Network Storage Agent Package” on page 21

## ▼ To Upgrade the Network Storage Agent Package

---

**Note** – Upgrade the master first.

---

1. Remove the initial installation by using the `pkgrm(1M)` command:

```
# pkgrm SUNWrasag
```

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

## ▼ To Remove the Network Storage Agent Package

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

```
# pkgrm SUNWrasag
```

---

# The Network Storage Agent Configuration File

The Network Storage Agent configuration information is located in the file `/opt/SUNWrasag/DATA/rasagent.conf`. Information such as site location, hosts, devices, and local notifications that you enter into the Network Storage Agent GUI is stored in this file. This file remains on the system between upgrades, so that previously entered configuration information is not lost.

```
active=N
admin_email=yourself@yoursite
categories=message|host
contract=
cust_no=
customer=
email=rasagent@nsc.ccentral.sun.com
frequency=3
host_adapter=S
local_event_log=Y
log_months=
logfile=/var/adm/messages
mailer=/usr/bin/mail
ping=
pro.http.ip=http://system:2000/nsc30/InsertService
pro.netconnect.active=Y
pro.netconnect.maxsize=2000
production=Y
sdt=Sun 02:00 - Sun 02:00
shuttle=
st4logfile=/var/opt/SUNWvtsst/logs
t300logfile=/var/adm/messages.t3
timeout.http=30
timeout.luxadm=200
timeout.ping=6
timeout.rm6=200
timeout.snmp=20
version=2.1r3
```

## Using the Network Storage Agent

---

You can perform the administration of all Network Storage Agent functions from one centralized web page: the Network Storage Agent graphical user interface (GUI). The tasks that you'll configure the Network Storage Agent to perform using the GUI are highlighted in the following sections.

---

**Note –**

Before you use the GUI, you must completely install the Network Storage Agent. Running the `ras_install` program (`/opt/SUNWrasag/bin/ras_install`), you add a web server service to the host on port 7654. See Chapter 2, “Installation and Configuration” for instructions on how to install and configure the Network Storage Agent.

Do not confuse the functions supported by the Network Storage Agent GUI with functions you use to manage the devices for the UNIX operating system.

---

This chapter, which is divided into the following topics, discusses how to use the Network Storage Agent GUI.

- “Starting the Network Storage Agent” on page 24
- “Network Storage Agent Maintenance” on page 25
- “Monitoring Devices Using the Network Storage Agent” on page 54
- “Using the SAN Functionality” on page 62
- “Monitoring the Logs” on page 69
- “Monitoring the System” on page 73

---

# Starting the Network Storage Agent

The Network Storage Agent graphical user interface (GUI) is a browser-based tool that enables you to maintain and tune the Network Storage Agent functions. To maintain and tune the Network Storage Agent, point the browser to the host with the master instance of the Network Storage Agent.

The following sections explain how to use the GUI functionality.

## ▼ To Start the Network Storage Agent

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

2. **Log in to the Network Storage Agent by typing:**

Login: `ras`

Default password: `agent`

---

**Note** – To change the default security password for the Network Storage Agent GUI, refer to “To Change the Security Password” on page 78.

---

● **The Network Storage Agent home page appears.**

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

---

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

---

---

# Network Storage Agent Maintenance

The Maintenance section includes all the functions that are necessary for setting up the Network Storage Agent for the first time, or to make changes, as necessary, to ensure proper monitoring and notification.

Once you have configured the Network Storage Agent master and slave hosts, you should use the Maintenance section only occasionally to update email notifications or to update the monitored devices.

This section discusses the following maintenance functions that you can perform using the Network Storage Agent:

- “To Configure the Network Storage Agent Maintenance Functionality” on page 26
- “To Maintain Hosts” on page 29
- “To Update the Master Configuration” on page 31
- “To Add a New Slave” on page 33
- “To Start or Stop Agent(s)” on page 50
- “To Deactivate Monitoring on a Device-by-Device Basis” on page 51
- “To Send Test Email” on page 52
- “To Review the Configuration” on page 53

## ▼ To Configure the Network Storage Agent Maintenance Functionality

1. Click the Maintenance link in the upper right corner of the Network Storage Agent's GUI.

The Maintenance window appears.

2. Configure the Network Storage Agent using the maintenance functions and the information in TABLE 3-1.

Administration of all the Network Storage Agent instances can be done from one centralized web GUI. This interface is always accessed on **port 7654** of the **host** configured with the **Master** Network Storage 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.

|                             |  |
|-----------------------------|--|
| <b>[Maintain Hosts]</b>     | Used to enter customer information as well as configuring the selected hosts' instance of Rasagent to point to log files, device categories and execution frequency.   |
| <b>[Discovery]</b>          | Can be used to automatically and/or manually find devices physically attached to the host system or are accessible on the ethernet network.  |
| <b>[Maintain Devices]</b>   | 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.   |
| <b>[Email Notification]</b> | 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 Network Storage Agent. |
| <b>[Providers]</b>          | This selection determines the means by which the rasagent will relay events generated by the Health Monitors.  |
| <b>[Push Configs]</b>       | Has the same function as the <i>Push Slave Configs</i> in Maintain Hosts. Basically this will sync all slaves with the current configuration. There is no confirmation.  |
| <b>[Start/Stop Agent]</b>   | Can be used to temporarily stop rasagent 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.  |
| <b>[Start/Stop Devices]</b> | Allows for deactivating notifications on a device-by-device basis.   |
| <b>[Test Email]</b>         | Generate a canned email message to an email address(es) entered in the field supplied in the window. Multiple addresses can be entered delimited by either a comma or a space.   |
| <b>[Review Config]</b>      | will execute a query on the configuration and report the results and make available pointers to areas that require review.   |

TABLE 3-1 Maintenance Function Descriptions

---

| Function           | Description  |
|--------------------|--|
| Maintain Hosts     | Ensures proper tracking of the RAS information for the devices being monitored.  |
| Discovery          | <p>Enables the Network Storage Agent to probe the in-band data paths of the Sun StorEdge A5x00 arrays and the Sun StorEdge A3500 FC arrays, as well as the out-of-band management paths for the Sun StorEdge T3 arrays and Sun StorEdge SAN Release 3.0 switch.</p> <p><b>Note:</b> Agents on hosts with a T3 message log file will automatically find only Sun StorEdge T3 arrays that have made entries in that log file. You must enter the IP Address and the IP Name of the switch in the configuration file <code>/etc/fcswitch.conf</code> for the agent to automatically find only those switches that are to be monitored.</p> <p>In a cascaded switch configuration, only the first switches (IP address and name) should be entered into the <code>/etc/fcswitch.conf</code> file.</p> <p>The <code>/etc/fcswitch.conf</code> file must be copied to all hosts with an instance of the Network Storage Agent, and a data path connection to the switch.</p> |
| Maintain Devices   | Enables the Network Storage Agent to manually add devices or delete unwanted devices, and to change the agent's reference to the device(s) being monitored.  |
| Email Notification | <p>Enables the configuration of certain types of events for specific device types, which triggers an automatic email to a list of user's email addresses.</p> <p>This option can be fully customized to streamline notifications; for example, in addition to specifying email addresses, you can specify pager numbers.</p>   |
| Providers          | The selections you make here instruct the Network Storage Agent 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.  |

---

**TABLE 3-1** Maintenance Function Descriptions(Continued)

---

|                    |  |
|--------------------|--|
| Start/Stop Agent   | <p>Enables the Network Storage Agent to start or stop agents from executing.</p> <p>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 Network Storage Agent until the master agent is restarted.</p> |
| Start/Stop Devices | <p>Enables the Network Storage Agent to start or stop the alert notification of an event for the device(s) selected.</p> <p>This function does not stop the monitoring of the device and the interface to the provider.</p>  |
| Test Email         | <p>Enables the Network Storage Agent to generate a generic email and send it to the list of recipients configured in the Email Notification step.</p>  |
| Review Config      | <p>Enables the Network Storage Agent to verify all settings and display instructions for those that have been missed or for those that should be double-checked.</p>   |

---

## ▼ To Maintain Hosts

When the Network Storage Agent package is installed on a host, it registers with the master agent and an entry is added to this page.

---

**Note** – For this automatic registration to work, you must first install the master agent. Once all hosts are installed, you can access this page to change the configuration of each host.

See Chapter 2, “Installation and Configuration” for instructions on how to install and configure the Network Storage Agent.

---

To access the Maintain Hosts page:

1. Click the **Maintenance** link on the **Network Storage Agent** main window.
2. Click the **Maintain Hosts** link from the **Maintenance** menu.

The Maintain Hosts window is displayed.

**Maintain Hosts** [\[ Help \]](#)

This list contains the host configured as the Master and all registered hosts to this Master that have an instance of the Network Storage Agent configured as a Slave.

- [Add a new Slave] button will register a new Slave Host entry.
- [Ping Slaves] button instructs the Master Host to attempt a limited communication to each of its Slaves using the rashttp service on port 7654.
- [Push Slave Configs] button will transmit all modifications made with the GUI to all the Slave Hosts.

| HostName                         | Type   | HostID     | Host IP | Last Push | Active | Ping / Hostid |
|----------------------------------|--------|------------|---------|-----------|--------|---------------|
| <a href="#">&lt;hostname&gt;</a> | Master | <hostid-1> | <IP-1>  | N/A       | N      |               |

No registered slaves present.

**TABLE 3-2** Maintain Hosts field descriptions

| <b>Function</b>    | <b>Description</b>  |
|--------------------|---|
| Add a new Slave    | Use when a Network Storage Agent does not automatically register, which may occur if a previously installed instance is temporarily deleted from the configuration. Note that the Network Storage Agent for the slave is not active if manually added.  |
| Ping Slaves        | Verify that the Network Storage Agent at each host is up and running. The Network Storage Agent pings the slaves and requests their host ID to verify that the host is up and that the Network Storage Agent service is available.  |
| Push Slave Configs | Once all slaves have been updated, you can push the new configurations to the respective Network Storage Agent by using this function. Each instance of the Network Storage Agent has identical copies of the configuration file, but the administration of the Network Storage Agent slaves is done from the master. |

## ▼ To Update the Master Configuration

- From the Host Maintenance window, click an existing HostName link and update the fields as required.

The Master Configuration window appears. TABLE 3-3 describes the fields on the Network Storage Agent Master Configuration window.

**Note** – Fields with an asterisk (\*) are mandatory. If you leave a mandatory field blank and click Submit, the system will return a blank page.

The Categories to Monitor choices indicate Sun Microsystems network storage devices that are supported with *this instance* of the Network Storage Agent.

Network Storage Agent Maintenance | Monitor | SAN | Log | System | Help 2.1r7 nws5.central.sun.com

Customer Name:  \* is mandatory

StockMarket Symbol (ticker):

Customer No:  ContractNo:

**Enter Site Information**

Site Name:  \*

Site Address:

City:  \*

State:  ZipCode/PostalCode:  \*

Country:  \*

Contact:

Email:

Is this a production Site?: Yes

**Enter Default Storage Logfiles**

Message Log:

T3 Message Log:   
Warn: Cannot find /var/adm/messages.t3

Stortools4 Log Directory:

**Enter Local Network Storage Agent Information**

Log Network Storage Agent events locally: On (Log Events)

Categories to Monitor: :A1000/A3500 :A5K :BrocadeSwitch :SAN :STools4 :Sun\_Switch :T3 :Topology

Monitoring Frequency:

SE Series?:

Show OutOfBand devices in topology:

**TABLE 3-3** Master Configuration Input Fields

| Field                                    | Required Input  |
|--|---|
| Customer Name                            | Type your company name.   |
| StockMarketSymbol (ticker)               | Enter your company's stock market symbol so that the company name can be tracked accurately.  |
| Customer No.                             | Type your company's customer number.  |
| Contract No.                             | Type your company's contract number.  |
| Site Information                         | Type your site name and address. Include a contact person's name and email address.   |
| Message Log                              | Type the path for the message log (for example, <code>/var/adm/messages</code> ), which displays the history of status messages.  |
| T3 Message Log                           | Type the path for the host's Sun StorEdge T3 Array Message Log. This can be checked and verified by looking at the <code>/etc/syslog.conf</code> on the host.   |
| StorTools 4 Log Directory                | Type the path for the StorTools 4.x directory. The StorTools 4.1 log directory ( <code>/var/opt/SUNWvtsst/logs</code> ) is the default.   |
| Log Network Storage Agent events locally | Select OFF (no local logging) or ON (log events) from the menu.   |
| Categories to Monitor                    | Select from the available categories supported in this version of the Network Storage Agent. You must make at least one selection.<br><b>Note:</b> STools refers to StorTools Diagnostic Log.   |
| Monitoring Frequency                     | Select a variable between 5 and 120 minutes. This frequency variable affects how often the Network Storage Agent will execute.<br><br>Monitoring frequency does not affect the <code>cron</code> . The <code>cron</code> will initiate the Network Storage Agent's execution, but it is the Network Storage Agent's task to query this variable and test whether it is time for the Network Storage Agent to run. |
| SE Series                                | Enable the SE Series button if you are installing the Network Storage Agent on the service processor of an SE series storage solution.  |
| Show Out of Band Devices in Topology     | Enable this button if you wish to view devices on the topology of a host that are not accessible in-band by that host, but are monitored by that host. For example, you should enable this button for service processors.   |

## ▼ To Add a New Slave

If a Network Storage Agent does not automatically register, or you anticipate to registering in the future, you can add a new slave manually.

To access the Maintain Hosts: Add New Slave window:

1. Click the Maintenance link on the Network Storage Agent window.
2. Click the Maintain Hosts link from the Maintenance menu.
3. Click the Add a new Slave button.

The Maintain Hosts: Add New Slave window appears.

---

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

---

**Maintain Hosts: Add New Slave** [ Help ]

**Enter Host Information**

HostID:

Host Name:

Special Contract:

Categories to Monitor:  A1000/A3500  A5K  BrocadeSwitch  SAN  STools4  Sun\_Switch  T3  
 Topology

Monitoring Frequency:

SE Series?:

**Enter Logfiles Locations**

Message Log:

T3 Message Log:

Stortools4 Log Directory:

4. Complete the fields using the descriptions shown in TABLE 3-4.

- 5. Enter an 8-digit HostID (for example, 12345678 or 88888888); the Network Storage Agent 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 be able, at a minimum, to respond to a ping.

- 6. If you manually enter a slave host and no instance of the Network Storage Agent 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 Network Storage Agent will not be active.**

The Active state will depend on the slave configuration file (`rasagent.conf.push`) in the `/var/opt/SUNWrasag/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.

- 7. Click Add to add the new host.**

To return to the previous window, click Back.

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  |
|---------------------------|---|
| Host ID                   | Type the 8-digit alphanumeric host ID, which is the same as the system ID (for example, 123x45y6). You can use the <code>hostid</code> command on the host to obtain a valid Host ID.<br><br>If the Host ID is not available, you can enter a “dummy” number and later correct it. Note, however, that the Host ID cannot match any other previously-accepted Host ID.  |
| Host Name                 | Type the name of the host ( <code>hostname.domain</code> ).   |
| Categories to Monitor     | Choose the device the Network Storage Agent will monitor. The Categories to Monitor choices indicate Sun Microsystems network storage devices that are supported with <i>this instance</i> of the Network Storage Agent.<br><b>Note:</b><br><i>STools</i> refers to StorTools 4 Diagnostic Log: <code>activity_log = expert mode</code> ; <code>sunvts.info</code> and <code>sunvts.err</code> = functional, expert and connection modes. |
| Monitoring Frequency      | Select a variable between 5 and 120 minutes. This frequency variable affects how frequently the Network Storage Agent executes.<br><b>Note:</b><br>The <code>cron</code> continues to run every 5 minutes, but it checks this frequency setting before loading any modules.   |
| SE Series                 | Enable the SE Series button if you are installing the Network Storage Agent on the service processor of an SE series storage solution.  |
| Message Log               | Type the path for the message log (for example, <code>/var/adm/messages</code> ), which displays the history of the status messages.  |
| T3 Message Log            | Type the path for the T3 message log as it appears in the <code>/etc/syslog.conf</code> file on the host server you are configuring.  |
| StorTools 4 Log Directory | Type the path for the StorTools 4.x directory (for example, <code>/var/opt/SUNWvtsst/logs</code> ).   |

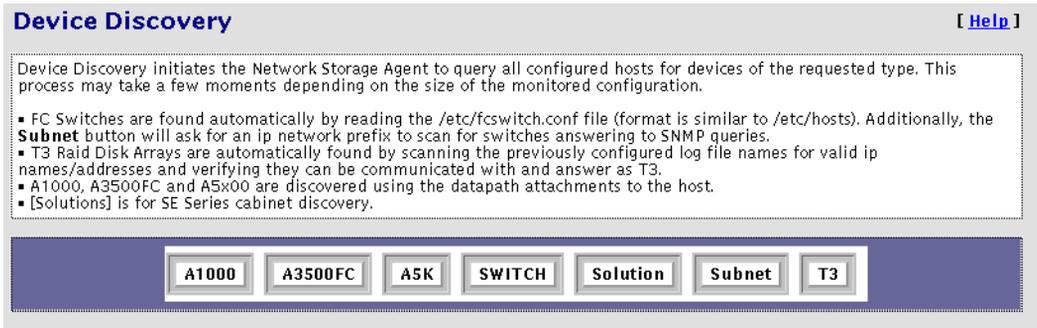
# Device Discovery

You can request the Network Storage Agent to probe the environments for the device types shown on the Device Discovery window.

## ▼ To Access the Device Discovery Window

1. Click the Maintenance link on the Network Storage Agent window.
2. Click the Discovery link from the Maintenance menu.

The Device Discovery window appears.



- The Network Storage Agent discovers the Sun StorEdge A5x00 arrays, Sun StorEdge A1000 arrays, and Sun StorEdge A3500-FC Raid Controllers on the data paths of the host to which they are physically attached.
- The Network Storage Agent discovers the Sun StorEdge SAN Release 3.0 switch devices by parsing the IP address from the `/etc/fcswitch.conf` file.
- The Network Storage Agent discovers the Sun StorEdge T3 arrays by filtering the T3 message log file (pre-configured in the host configuration window) for valid Sun StorEdge T3 array IP addresses.

---

**Note** – As long as there are valid T3 entries in this log file, the *auto-discovery* will find them and add them. You can avoid adding older, unwanted T3s 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 needs to be in the `/etc/fcswitch.conf` file. The Network Storage Agent will discover the cascaded switch when the first switch is discovered.

If a switch is not in the `/etc/fcswitch.conf` file, you can manually add it. Be aware, however, that the SAN topology will display the name *you give* to the switch when you enter it into the `/etc/fcswitch.conf` file, and not necessarily the switch's trademarked name.

---

**Note** – Once you have added a switch to the `/etc/fcswitch.conf` file, you must return to the Maintain Hosts window and select the host. The Master Configuration window will be displayed. Scroll down to the section *Enter Local Network Storage Agent Information* and click on the *Show OutOfBand devices in topology* button.

---

## ▼ To Discover a Solution Cabinet

Use the Solution button from the Device Discovery window to instruct the Network Storage Agent to query for a Solution cabinet. This function uses the local `/etc/hosts` file for discovery.

**Discover SE Series** [ Help ]

Select the rack that you want discovered.

Run on Host: Local

Turn Monitoring On:

Data Path Host: Same Host

Confirm SE Series Discovery

1. Select the host from the Run on Host menu.
2. Enable the Turn Monitoring On toggle button.
3. Select a host from the Data Path Host pull down menu. This host may be the same as or different from your local host.
4. Click SE Series Discovery.

---

**Note** – This functionality is new to the latest Network Storage Agent patch: 111893-03. With this release, the Network Storage Agent employs a direct fibre channel connection (in-band) to the Sun StorEdge T3 arrays and Sun StorEdge switch devices.

---

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

Use the Subnet button to search the LAN for Sun StorEdge SAN Release 3.0 switch devices and Sun StorEdge T3 arrays.

1. **Enter the address of the subnet you want searched.**
2. **Enter the prefix to call the name of the device.**

The Subnet functionality can search two subnets at a time (for example, Subnet 10.1.0 and Prefix 10.1Net, with Subnet 10.2.0 and Prefix 10.2Net).

All discovery results are sent back to the master agent, which stores them in the main configuration file.

## ▼ To Set Up Sun StorEdge T3 Array Message Monitoring

In order for the Network Storage Agent software package to monitor messages from a Sun StorEdge T3 array, you must mirror the Sun StorEdge T3 array's `/syslog` to a host with the Network Storage Agent installed and configured to monitor Sun StorEdge T3 arrays.

1. **Refer to the *Sun StorEdge T3 Disk Array Installation, Operation, and Service Manual* for procedures on how to set up the Sun StorEdge T3 array and the host to forward `/syslog` messages.**
2. **Refer to the “To Maintain Hosts” on page 29 section to configure each host with the name given to the T3 message log file.**

# Maintaining Devices

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

Be aware of the host's access method when making decisions about which devices the Network Storage Agent will monitor:

- Monitor Sun StorEdge A3500-FC arrays from a host that has a direct attachment through the Fibre Channel cables and can run the Sun StorEdge RAID Manager commands.
- Monitor Sun StorEdge A5x00 arrays from the host that has a direct attachment through the Fibre Channel cables.
- Monitor the Sun StorEdge SAN Release 3.0 switch on any host on the subnet, because the probing is done over the network.
- Monitor Sun StorEdge T3 arrays from the host that has access to the T3 message log file.
- Monitor Sun StorEdge A1000 arrays from a host that has a direct attachment through the Fibre Channel cables and can run the Sun StorEdge RAID Manager commands.
- Monitor Sun StorEdge Solutions cabinets from a host that has direct attachment through fibre channel cables to Sun StorEdge T3 arrays and Sun StorEdge SAN Release 3.0 switches.

---

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

The buttons indicate Sun Microsystem network storage devices that are supported with this instance of the Network Storage Agent.

---

- You can discover Sun StorEdge A5x00 arrays and Sun StorEdge A3500-FC arrays using the Device Discovery function, which is accessible from the main Network Storage Agent home page or through the Maintain Devices screen. See “Device Discovery” on page 36.
- Sun StorEdge T3 arrays and Sun StorEdge SAN Release 3.0 switch devices must be registered to specify the correct IP address. See “To Add a New Device” on page 43.
- The Update Slave Configs functionality is required to update a slave's configurations after you have changed one or more devices. See “To Deactivate Monitoring on a Device-by-Device Basis” on page 51.

## ▼ To Access the Maintain Devices Window

1. Click the **Maintenance** link on the **Network Storage Agent** window.
2. Click the **Maintain Devices** link from the **Maintenance** menu.

The **Maintain Devices** window is displayed.

**Maintain Devices** [ [Help](#) ]

This page is used to view and maintain each device's association to its monitoring host. There are additional functions to maintain the configuration of the agents across all the registered hosts.

- The 'Name' column typically represents the human reference to a device.
- The 'Primary Host' column represents a registered host doing the actual monitoring of the device.
- When the 'Monitor' column is 'On', the agent will do local Email Notification of an Alert. Use the **[Start/Stop Device]** function to change this if desired.
- 'Discovery' instructs the Network Storage Agent to go to each registered host and find any **NEW** devices to add to the list of "Existing Devices."
- 'Update Slave Configs' pushes the configuration files to each registered Slave host.
- 'Erase All Devices' deletes all monitored devices in the list of "Existing Devices."
- 'Add a new Device' allows the administrator to manually enter the selectable device types.
- Use **[Review Config]** to review the existing configuration and make suggestions.

---

**Add a new Device Manually**

Select: [A1000](#) | [A3500FC](#) | [A5K](#) | [BROCADE](#) | [SWITCH](#) | [T3](#)

---

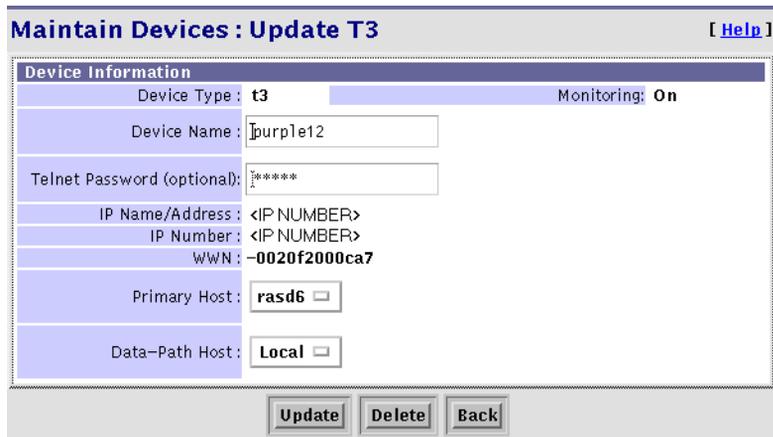
List Existing Devices Host:

| <a href="#">Primary Host</a>        | <a href="#">Name</a> | <a href="#">Type</a> | <a href="#">IP Address</a> | <a href="#">WWN</a> | <a href="#">Data-Host</a> | <a href="#">Monitor</a> |
|-------------------------------------|----------------------|----------------------|----------------------------|---------------------|---------------------------|-------------------------|
| No registered device(s) were found. |                      |                      |                            |                     |                           |                         |

---

## ▼ To Update a Device

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



The screenshot shows a window titled "Maintain Devices : Update T3" with a "[ Help ]" link in the top right corner. The window contains a "Device Information" section with the following fields:

|                             |                                       |             |    |
|-----------------------------|---------------------------------------|-------------|----|
| Device Type :               | t3                                    | Monitoring: | On |
| Device Name :               | <input type="text" value="purple12"/> |             |    |
| Telnet Password (optional): | <input type="text" value="*****"/>    |             |    |
| IP Name/Address :           | <IP NUMBER>                           |             |    |
| IP Number :                 | <IP NUMBER>                           |             |    |
| WWN :                       | -0020f200ca7                          |             |    |
| Primary Host :              | <input type="text" value="rasd6"/>    |             |    |
| Data-Path Host :            | <input type="text" value="Local"/>    |             |    |

At the bottom of the window, there are three buttons: "Update", "Delete", and "Back".

---

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

---

## ▼ 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.

1. **Click the Maintenance link on the Network Storage Agent main window.**
2. **Click the Maintain Devices link from 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 Host: Update Host window appears.

4. **Click Delete.**

Deleting a device from the configuration will not remove the access to the device instrumentation in cache immediately. This will, however, be cleared the next time the agent runs. State information for that device will also be maintained until the agent is executed. Therefore, a device can be removed from a configuration and still be viewed in the Topology and Instrumentation as a "snapshot in time" until the agent is once again executed.

5. **To temporarily *deactivate* a device from sending alerts to local notification(s), refer to “To Deactivate Monitoring on a Device-by-Device Basis” on page 51.**

## ▼ To Add a New Device

- From the Add a new Device section of the Maintain Devices window, select the type of device you want to add to the Network Storage Agent..

Complete the fields using the descriptions shown in TABLE 3-4.

**TABLE 3-5** Maintain Devices: Add a new Device

| Field  | Required Input   |
|--|--|
| Device Name  | Type the device name the Network Storage Agent will use to identify the device.  |
| Telnet Password (optional)   | Type the telnet password. This field applies only to the Sun StorEdge T3 array and is optional. For a more detailed analysis, enter the root password for the Sun StorEdge T3 (this enables a higher level of accessibility to the Sun StorEdge T3 array.) |
| Primary Host   | Select the Network Storage Agent's primary host that will perform the actual monitoring of the device.<br><b>Note:</b> The default is the host that automatically discovered the device.   |
| Data-Path Host   | Select the host to which the Fibre Channel cables are physically connected. This field applies only to the Sun StorEdge T3 array.  |
| IP Name/Address  | Type the 10-digit IP address that identifies the host to the network (for example, 123 . 45 . 67 . 890). This field applies only to the Sun StorEdge SAN Release 3.0 switch and the Sun StorEdge T3 array.   |
| HBA Type<br>(not shown on Maintain Devices:<br>Add T3 window, above) | Specify the HBA type: SBUS or PCI. This field applies only to the Sun StorEdge A5x00 array.  |

---

**Note** – To obtain the device name for the Sun StorEdge A3500-FC array and the Sun StorEdge A1000 array, use the RM6 command `drivutil -l devName`, where `devName` is derived from the RM6 command `/usr/lib/osa/bin/lad`.

---

## Customizing Email Deliveries

You can use the Email Notification 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 arrays, you can create a specialized notification for this instance only.

### ▼ 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 Network Storage Command Center (NSCC).

**Local Email/Pager Notifications** [ Help ]

This list of email addresses and filenames is used by the Network Storage Agent to generate local notification of Alerts.

| Existing Local Notifications       | Notif. Type | Email (Click to Update) | Category | EventType | Priority |
|------------------------------------|-------------|-------------------------|----------|-----------|----------|
| No Local Notifications were found. |             |                         |          |           |          |

Add Notification

You can customize the following local notification types:

- Specific device types
- Event types
- Alert severity
- Pager number

---

**Note** – The local email/pager notification feature is optional and does not affect the main transmission functions of the Network Storage Agent. The master instance of the Network Storage Agent is the only instance generating emails based on local notifications. Slave instances of the Network Storage Agent 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 Network Storage Agent, 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, via email.

## ▼ 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—choices include All Priorities (the default), High, Medium, Low, and High+Medium.
  - The Category list—devices include All Categories, A1000, A3500-FC, A5000, Brocade, Switch, T3, and Storage Agent.
  - The Event Type list—refer to Appendix A for a list of event types, categorized by device type.
3. Click Add.

The Network Storage Agent sends the specific event type messages, by device type, to the email address(es) you specified.

# Using Network Storage Agent Providers

Network Storage Agent providers encode data and interface with transport mechanisms, which transmit information to the NSCC about configured storage devices. The 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.

The provider's main responsibility 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.

## ▼ To Access the Notification Provider Maintenance Window

1. Click the **Maintenance** link on the Network Storage Agent main window.
2. Click the **Providers** link from the Maintenance menu.

The Notification Provider Maintenance window is displayed.

**Notification Provider Maintenance** [ Help ]

Http (Off) | Net Connect (On) | SRS (Off) | RSS (Off)

The Net Connect Provider is the transport mechanism for RAS information collected by the Network Storage Agent. The **Active** checkbox indicates the current status of the Provider.

**NetConnect Provider Information**

Active:

Max Size (Kbytes):

Update

## ▼ To Set Up Providers

1. While in the HTTP Provider window, manually enter the IP Address.
2. Enable the Active checkbox.

---

**Note** – You must enter an IP Address for the HTTP and SRS Providers. To activate the NetConnect or RSS Provider, simply enable the Active checkbox.

---

3. Click **Update**.

The Network Storage Agent supports four providers:

- HTTP
- NetConnect
- RSS
- SRS

## HTTP Provider

The HTTP Provider sends HTTP calls to an HTTP server and transfers CIM data in the appropriate format. This is used internally only, can support a Proxy server, and does *not* communicate through the Internet.

## 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.

---

## RSS Provider

The Network Storage Agent 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 Network Storage 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 Network Storage Agent RSS Provider is selected, but the RSS software is not installed or is not configured properly, expect to see the following error message:

---

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

## SRS Provider

FIGURE 3-1 shows where the Network Storage Agent has been deployed with SRS NetConnect. In this example, the storage agent Master is configured on the same host as the SRS NetConnect Relay.

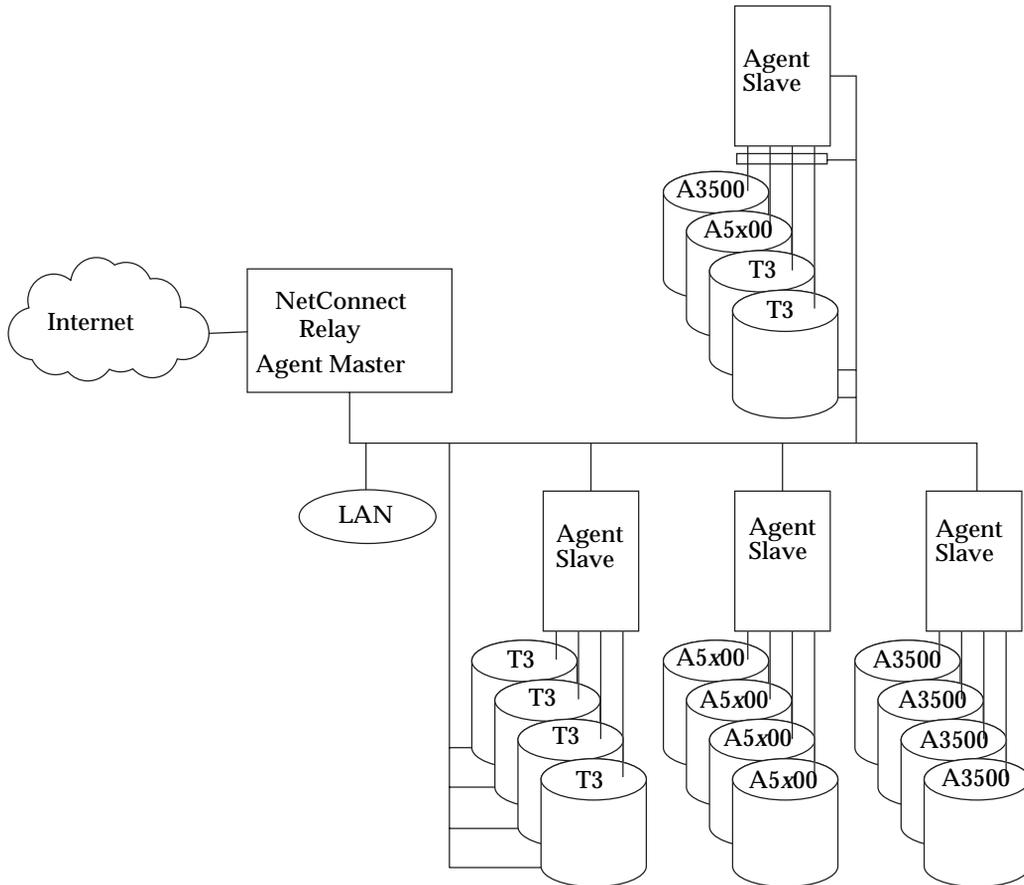


FIGURE 3-1 SRS NetConnect Relay Configuration

## *SRS NetConnect Relay Configuration*

The master agent has additional functions that enable it to work as a collection point for all the events generated by the slave agents. Periodically, the master polls each slave to ask for messages that need to be transported.

The SRS NetConnect Relay periodically polls the Master agent for messages to be transported, encrypts the messages, and transports them via the Internet.

## Push Configs

You will be prompted to push configurations whenever you change a configuration. Refer to “To Review the Configuration” on page 53 for a list of settings that you might have missed or you need to double-check.

---

**Note** – The Push Configs functionality 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 Network Storage Agent 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.

To access the Start/Stop Agents window:

1. Click the **Maintenance** link on the Network Storage Agent main window.
2. Click the **Start/Stop Agents** link from the Maintenance menu.

The Start/Stop Agents window is displayed.

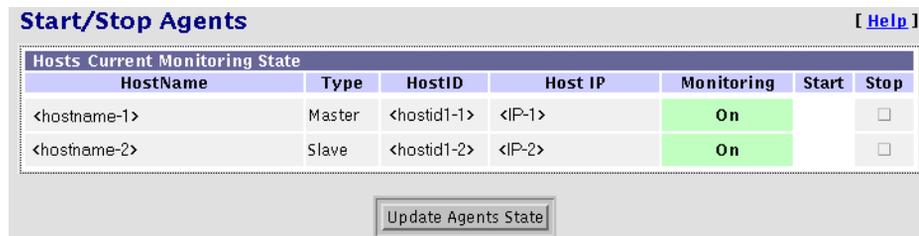
---

**Note** – 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 deselect a device category and stop monitoring for *multiple* types of devices on the host, see “To Maintain Hosts” on page 29.

To control email notifications for *specific* devices, refer to “To Deactivate Monitoring on a Device-by-Device Basis” on page 51.

---



- To automatically update the slave’s configurations and to verify that all slaves agree with the master configurations, click the **Push Configs** link from the Maintenance menu.

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

To access the Start/Stop Device Monitoring window:

1. Click the **Maintenance** link on the **Network Storage Agent** main window.
2. Click the **Start/Stop Device** link from the **Maintenance** menu.

The Start/Stop Device Monitoring window is displayed.

| Start/Stop Device Monitoring                  |      |      |             |            |       |      |
|---|------|------|-------------|------------|-------|------|
| Primary Host                                  | Name | Type | Address/WWN | Monitoring | Start | Stop |
| <input type="button" value="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 Network Storage Agent must update the configuration files on all the slave hosts configured with this master. To accomplish this, use the *Push Configs* function from the *Maintenance* section.

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 using the *Start/Stop Device Monitoring* window, above.**

---

**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 via the NetConnect / HTTP Providers, but not via 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 Network Storage Agent is installed and working properly.

To access the Test Email window:

1. Click the **Maintenance** link on the **Network Storage Agent** main window.
2. Click the **Test Email** link from the **Maintenance** menu.

The Test Email window is displayed

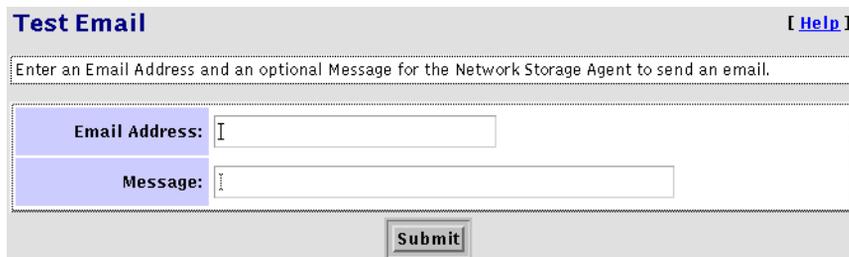
3. Type your email address into the **Email Address** text box.
4. Type a brief comment into the **Message** text box.

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

---

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

---



The screenshot shows a window titled "Test Email" with a "[ Help ]" link in the top right corner. Below the title bar is a text box containing the instruction: "Enter an Email Address and an optional Message for the Network Storage Agent to send an email." Below this are two input fields: "Email Address:" and "Message:". The "Email Address:" field is a single-line text box, and the "Message:" field is a multi-line text box. At the bottom center of the window is a "Submit" button.

## ▼ To Review the Configuration

1. Once you have completed your configuration, select the Review Configuration link to verify all settings.
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 <span style="float: right;">[ <a href="#">Help</a> ]</span> |  |
|--|--|
| No   | Details  |
| 1  | Warning: Master Agent is not active, activate in <a href="#">[Start/Stop Agents]</a> .   |
| 2  | Warning: No device has been entered or activated for monitoring, go to <a href="#">[Start/Stop Devices]</a> to active devices .  |
| 3  | Warning: No Provider has been activated, go to <a href="#">[Providers]</a> to activate one if so desired. Providers are external recipients for Network Storage Agent events and collected RAS information.  |
| 4  | Warning: No Email address has been entered for Local notification, go to <a href="#">[Notification]</a> to enter a local notification email.   |
| 4  | <p>– <b>ERROR: Network Storage Agent cron is missing:</b><br/>Verify the installation, possibly run 'ras_install' again. A cron entry for SUNwrasag's rasagent should be present for the rasagent program to run properly.</p> <p>– <b>OK: The cron daemon is running.</b></p> |

# Monitoring Devices Using the Network Storage Agent

This section discusses the following monitoring functions you can perform using the Network Storage Agent.

- “Viewing Instrumentation Reports” on page 55
- “Generating Reports Using Message Summary” on page 57
- “Using Sun StorEdge StorTools SnapShot” on page 58
- “Checking Revisions” on page 60

## ▼ To Access the Monitor Page

1. Click the Monitor link on the Network Storage Agent GUI main window.

The Monitor window is displayed.

The screenshot shows the Network Storage Agent GUI. The top navigation bar includes links for Maintenance, Monitor, SAN, Log, System, and Help. The left sidebar contains a navigation menu with the following items: Monitor, Instrumentation, Message Summary, Snapshot, Revision Checking, and Snapshot History. The main content area is titled "Monitor" and contains the following text:

The monitor section is used to look at the information that the Network Storage Agent is collecting about the storage devices and the system as a whole.

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 "Monitor" function.

|                            |  |
|----------------------------|--|
| <b>[Instrumentation]</b>   | Display the FRU level information of the selected device and supply a drill-down mechanism to wanted components. |
| <b>[Message Summary]</b>   | This command will scan /var/adm/message files and produce an error summary.                                      |
| <b>[Snapshot]</b>          | Use this function to schedule new snapshots and compare configurations.  |
| <b>[Revision Checking]</b> | Use this function to generate a revision checking report.  |
| <b>[Snapshot History]</b>  | Display a list of previously saved configuration snapshots.  |

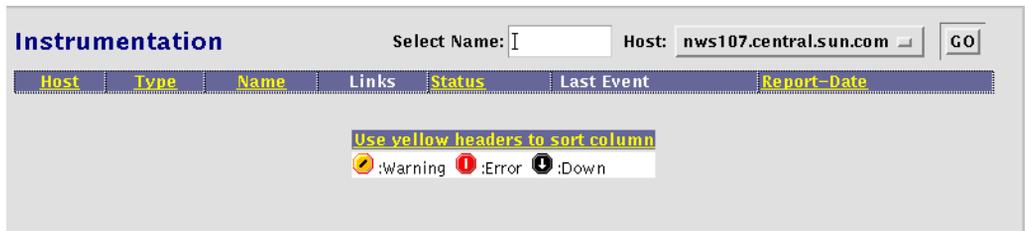
# Viewing Instrumentation Reports

You can use the 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 in the Log section of the Admin GUI.

## ▼ To View Instrumentation Reports

1. Click the Instrumentation link on the Monitor home page.



From the Select Hosts menu, select a specific host. From this menu, you can also sort by host, by type, or by name.

2. Enter a portion of the device name to display specific devices. Valid entry examples follow:

---

|          |  |
|----------|--|
| purple12 | device name starts with the word <i>purple12</i> |
| purple   | device name starts with the word <i>purple</i>   |
| purple*  | device name starts with the word <i>purple</i>   |
| *12      | device name ends with the numbers <i>12</i>      |
| *12*     | device name includes the numbers <i>12</i>       |

---

3. Choose a host from the [Host] 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 Report link from the Instrumentation window.**

A detailed list with identification, status, and revision level appears.

# Generating Reports Using Message Summary

The Message Summary window enables you to generate a report from the `/var/adm/messages` file. The last run is available for review.

This section discusses the following message summary functions you can perform using the Network Storage Agent.

- “To Manually Initiate and Save a New SnapShot” on page 57
- “To View an Error Summary” on page 58

## ▼ To Manually Initiate and Save a New SnapShot

To access the Message Summary window:

1. Click the **Monitor** link on the Network Storage Agent main window.
2. Click the **Message Summary** link from the Monitor menu.

The Message Summary window is displayed.

The screenshot shows the Message Summary window for host nws107. At the top, there is a title bar with the text "Message Summary (on nws107)" and buttons for "[Select Slave Host]", "GO", and "[ Help ]". Below the title bar, a message states: "This command will scan /var/adm/message files and produce an error summary. This may take a while, your /var/adm/message files are 36.2 K". The main area is titled "Last Run" and contains a "Run Message-Summary" section with the following fields and options:

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| Start Date (mm/dd/yyyy hh:mm:ss): | <input type="text"/>                  |
| End Date (mm/dd/yyyy hh:mm:ss):   | <input type="text"/>                  |
| Run Snapshot:                     | <input type="checkbox"/>              |
| Ignore T3 warnings:               | <input type="checkbox"/>              |
| Long Output:                      | <input type="checkbox"/>              |
| Message Directory:                | <input type="text" value="/var/adm"/> |
| Select a specific file:           | <input type="text"/>                  |
| Debug:                            | <input type="checkbox"/>              |

At the bottom of the window, there is a "RUN\_COMMAND" button.

3. Select the **Run Snapshot** checkbox from the **Message Summary** window.
4. Click **RUN\_COMMAND**.

For more information about this utility, refer to the instructions in “Using Sun StorEdge StorTools SnapShot” on page 58.

## ▼ To View an Error Summary

1. Click the **Message Summary** link on the **Monitor** home page.

---

**Note** – You can scan the T3 message log file either by checking the Long Output checkbox or by specifying the name only of the file in the Select a special file field.

---

2. Choose a host from the [Select Slave Hosts] menu, and click **GO**.

## Using Sun StorEdge StorTools SnapShot

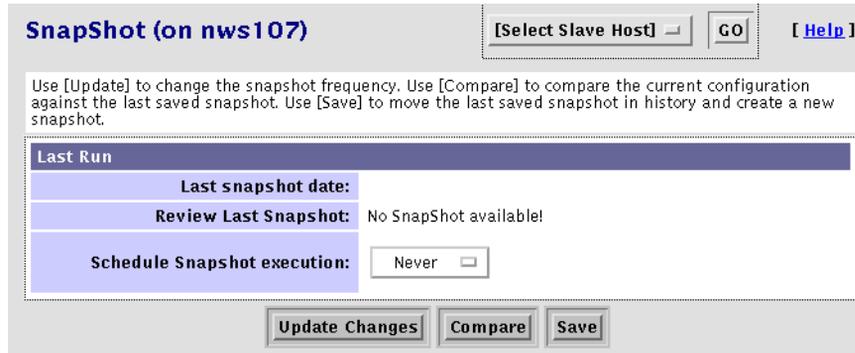
This section discusses the following SnapShot functions you can perform using the Network Storage Agent.

- “To Schedule Sun StorEdge StorTools SnapShot Execution” on page 59
- “To Check Current Software and Firmware” on page 60
- “To Review the Last Run” on page 60
- “To Access the SnapShot History Window” on page 61

To access the SnapShot window:

1. Click the Monitor link on the Network Storage Agent main window.
2. Click the SnapShot link from the Monitor menu.

The SnapShot window is displayed.



## ▼ To Schedule Sun StorEdge StorTools SnapShot Execution

1. Choose one of the frequency variables from the Schedule SnapShot execution menu.
2. Choose a host from the [Select Slave Host] menu and click GO.

- To obtain a new snapshot of the configuration, click Save.

This forces the Network Storage Agent to copy the old snapshot to a history file and creates a new configuration file. For instructions about viewing old Snapshots, refer to “Display SnapShot History” on page 61.

- To compare and display the most recently saved snapshot to the current configuration, click Compare.

# Checking Revisions

## ▼ To Check Current Software and Firmware

1. Click the **Monitor** link on the **Network Storage Agent** main window.
2. Click the **Revision Checking** link from the **Monitor** menu.

The Message Summary window is displayed.

The screenshot shows a web-based interface for 'SnapShot (on octothorp)'. At the top right, there is a '[Select Slave Host]' dropdown menu, a 'GO' button, and a '[ Help ]' link. Below this is a text box containing the message: 'This command will perform revision checking.' The main content area is divided into two sections. The first section, titled 'Last Run', displays 'Last Storstat Date: 2001-03-05 09:19:44', 'Last Storstat Output:', and 'Review Last Storstat Report: [Detailed Output](#)'. The second section, titled 'Run Revision Checking', shows 'Verbose Output: ' and 'Debug ON: '. At the bottom center, there is a 'RUN Revision Checking' button.

FIGURE 3-2 Revision Checking Window

## ▼ To Review the Last Run

- Choose a host from the **[Select Slave Host]** menu, and click **GO**.

---

**Note** – On Sun StorEdge A5x00 arrays, Revision Checking also checks for a valid minimum disk configuration. Only the last run is available for review.

---

# Display SnapShot History

You can display a list of previously-stored configuration snapshots, with the most recent SnapShot first.

## ▼ To Access the SnapShot History Window

1. Click the **Monitor** link.
2. Click the **SnapShot History** link.
3. To display SnapShot history, choose a host from the **[Select Slave Host]** menu and click **GO**.



4. Click the filename you want to display.

# Using the SAN Functionality

The Network Storage Agent's graphical 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.

In order to see a topology, you must first execute the `ras_install` command to start the Network Storage Agent services, as documented in "Installing and Configuring the Network Storage Agent" on page 9.

## ▼ To Configure the SAN Functionality

1. Click the SAN link in the upper right corner of the Network Storage Agent's GUI.

The screenshot shows the Network Storage Agent GUI. The top navigation bar includes links for Maintenance, Monitor, SAN, Log, System, and Help. The left sidebar contains a SAN Menu with options: Display Topology, Merge Topology, Clear Topology, FC Check, and FC Utilities. The main content area is titled "SAN" and contains the following text:

The SAN section is used to execute the functions for dealing with a **Storage Area Network (SAN)**. These functions, described below, will verify the health of a SAN and display **Topology** drawings of the fiber channel connections. These topology drawings will assist with the understanding of the physical connections that make up the Storage Area Network where they will also be used to track **link problems**.

The **SAN agents** collect counter information based on error messages and telemetry information they collect during each execution. This information will be used in the **Topology drawing** to indicate **link failures**. Physical connections and FRU's that have been detected with errors will be colored **red**.

Service personnel will be able to use the functions of this section to assist with understanding and isolating error conditions.

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 "SAN" function.

|                           |   |
|---------------------------|---|
| <b>[Display Topology]</b> | Display the Topology information of the selected host or previously configured selection of multiple hosts.   |
| <b>[Merge Topology]</b>   | Use this function to select multiple host topology drawings and combine them into one.  |
| <b>[Clear Topology]</b>   | Use this function to erase previously stored information about a host's topology there-by forcing the SAN agents to collect new information to draw new topologies.   |
| <b>[FC Check]</b>         | This functions purpose is to check the SAN for transient noise on the fiber channel connections. The agents will probe the storage devices (including switches) of the SAN for counter anomalies. The first pass will set a benchmark. The second pass will compare new counter information with the previously stored benchmark and report any failures it encounters. |
| <b>[FC Utilities]</b>     | The functions in this section are intended for service personnel. A trained service person will be able to graph the counter information to assist with the isolation and diagnosis of the error(s) on the SAN.<br><b>These utilities are password protected.</b>   |

With the SAN functionality, you can verify the health of your SAN and discover and display topology, as explained in the following sections.

## SAN Topology

Use the SAN Topology section to display a host-based topology and SAN-based topologies. SAN-based topologies are created by merging multiple host topologies. Basic host topologies include all devices that can be seen in-band, on the Fibre Channel connection, from that host. These topologies can be merged to construct a SAN-based topology.

### ▼ To Display Host-Based and SAN-based Topologies

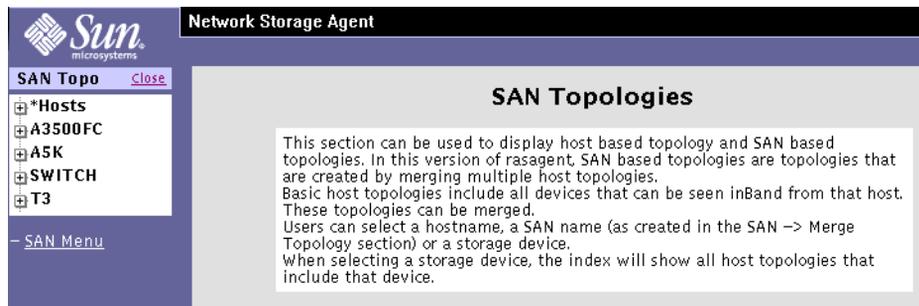
#### 1. Select Display Topology from the SAN Menu.

The SAN Topology menu appears.

---

**Note** – A “+” next to the device indicates that the device is attached to multiple hosts.

---



#### 2. From the SAN Topology menu, select a hostname, a SAN name (as created in the Merge Topology section) or a storage device.

When you select a storage device, the index displays all host topologies that include that device, as shown in the following example.

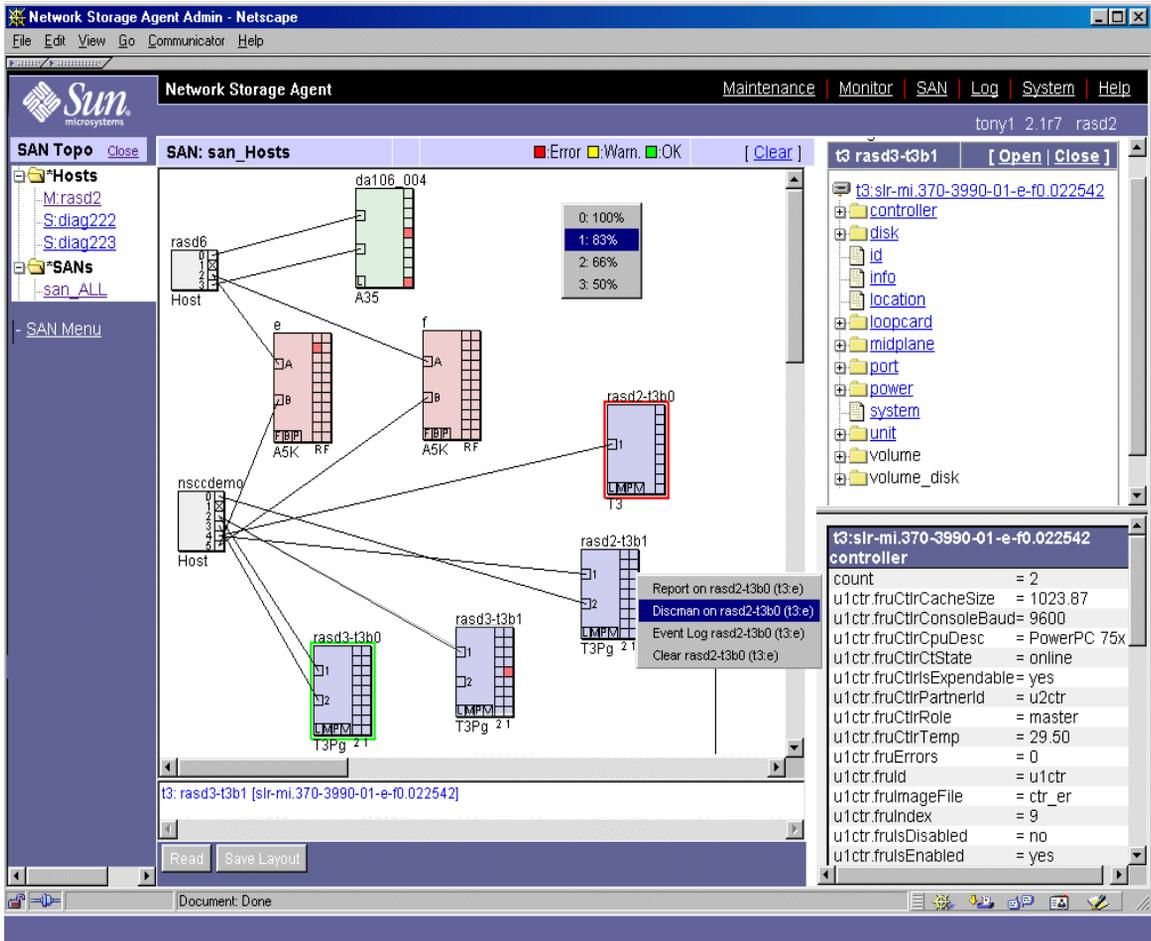


FIGURE 3-3 SAN-based Topology

## ▼ To Merge Topologies

1. To merge topologies, select two or more topologies and enable the corresponding Select checkboxes.
2. Enter a unique name for the merged topology. Click Create.

By merging topologies, multiple host topology drawings are combined into a single Topology drawing.

**SAN Merge Topologies** [\[ Help \]](#)

Merge the topologies

| Combined topologies      |         |                     |  |
|--------------------------|---------|---------------------|--|
| Delete                   | SanName | Created             | Components   |
| <input type="checkbox"/> | bigtopo | 2001-05-16 09:56:14 | diag242.central.sun.com, rasd6.central.sun.com, diag176.central.sun.com, nsccdemo.central.sun.com,                           |
| <input type="checkbox"/> | san2    | 2001-05-14 09:00:23 | diag242.central.sun.com, ccadieux.central.sun.com, rasd6.central.sun.com, diag176.central.sun.com, nsccdemo.central.sun.com, |
| <input type="checkbox"/> | san     | 2001-04-26 11:09:18 | nsccdemo.central.sun.com, nscc-test.central.sun.com,   |

| Available Topologies (select two or more to create a 'combined topology') |                          |                     |
|---|--------------------------|---------------------|
| Select  | HostName                 | Created             |
| <input type="checkbox"/>  | diag176.central.sun.com  | 2001-05-14 08:58:29 |
| <input type="checkbox"/>  | diag242.central.sun.com  | 2001-05-14 08:57:30 |
| <input type="checkbox"/>  | nsccdemo.central.sun.com | 2001-05-14 08:59:10 |
| <input type="checkbox"/>  | rasd6.central.sun.com    | 2001-05-14 08:59:13 |

Select Slaves and enter a name for this new multi-slave topology:

## ▼ To Clear Topologies

1. Choose a Topology and enable the corresponding Clear checkbox.
2. Click Clear Selected Topology.

By clearing previously-stored information about a host's topology, you force the SAN agents to collect new information and draw a new, updated topology.

### Clear Topologies [ [Help](#) ]

This function will delete the current topology for the selected host(s) from the database and force the agents to re-discover the topology information on the next scheduled run.

- Click in the **Clear** box to select/deselect the **Topology** to be erased.
- **Last Update** indicates the date and time the Topology agents last did a save to the database.

| Select Topology          |          |             |
|--------------------------|----------|-------------|
| Clear                    | Topology | Last Update |
| <input type="checkbox"/> | (Local)  |             |

# Fibre Channel Counters Check

Use the Fibre Channel Counters Check functionality to verify the quality of the Fibre Channel links of your system and to measure the activity of the FC link status counters.

FC Counters are used to isolate transient recoverable errors. If counters activity is within normal limits, you can turn on the SAN module using the Maintain Hosts functionality.

---

**Note** – FC Check does not validate connections. Use this functionality only to test for transient noise on the physical FC connectors and components.

---

- The test extracts counter information twice. The first pass sets a benchmark and the second pass compares with the benchmark and reports excessive increments.

To run the Fibre Channel Counters check, choose a host from the **[Select Slave Host]** menu and click **START FC Check**.

## Fibre Channel Counters Check (on nsccdemo.central.sun.com)

[Select Slave Host] ▾

GO

[ [Help](#) ]

The **FC Check** section is used to verify the quality of the Fibre Channel links of your system by measuring the activity of the FC link status counters.  
The test will extract counter information twice. The first pass sets a benchmark and the second pass will do a comparison to that benchmark and report excessive increments.  
FC counters are used to isolate transient recoverable errors. If counters activity is within limits, the SAN module can be turned on (in Maintenance → Maintain Hosts).

- This function will take a few minutes to complete.
- Your system should be connected and perceived to be working normally prior to executing this test.
- Link-status counters cannot be used to isolate permanent faults.
- Do not change the configuration of your host while this is running.

**START FC Check**

# FC Utilities

The FC Utilities window, which is password protected, allows you to graph counter information and isolate and diagnose SAN error(s).

---

**Note** – This function is available only to trained service personnel who have been granted access rights.

---

You can set a baseline for the counters in both graph and tabular format and have the page refresh automatically for the following Sun StorEdge products:

- **Sun StorEdge T3 array**
- **Sun StorEdge A5x00 array**—*A5K Analysis* displays FC errors found in `/var/adm/messages` on a graph of the FC loop. This graph can be used to isolate to the correct device on the loop.
- **Sun StorEdge SAN Release 3.0 switch**—*Verify Topology* validates a known topology against the rules for a Sun StorEdge SAN Release 3.0 switch configuration.



## ▼ To Use FC Utilities

1. Use the \*List (\*1) menu to select which device you wish to display in the report. You can display multiple devices by selecting them using the [Maintain List] functionality, which creates a predefined list, referred to as \*List in each report.
2. Select a specific HBA (\*2) for storage devices. FC counters are kept for each device and for each path of an enclosure. For example, a Sun StorEdge A5x00 array with 22 disk arrays and both interface boards can have 44 different CRC values.
3. Use Auto [ ] Refresh (\*3) to refresh the current report automatically. Enter a number of seconds in the field and press [Refresh].
4. Use [Set-Baseline] (\*4) 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 will only display counter increments. The tabular report will show the current value followed by the increment, if any. Both reports will also display the start time and the duration of the baseline.
5. Use [Total] (\*5) to erase the values saved by [Set-Baseline] and start displaying the total counters

6. Use [ClearCache] (\*6) to reset any luxadm values and ensure that the data is current. This is especially useful when you suspect that the Network Storage Agent is using old information to display the counters after major changes have been applied.

---

## Monitoring the Logs

This section discusses the following log monitoring functions you can perform using the Network Storage Agent.

- “To Review the Most Recent Entries on a Host” on page 70
- “To View the Event Log for a Host” on page 71
- “To View the Alert Log for a Host” on page 72
- “To Display Agent Errors” on page 72

### ▼ To Access the Log Page

- **Click the Log link on the Network Storage Agent’s GUI.**

The Log Monitoring window is displayed.

**Log**

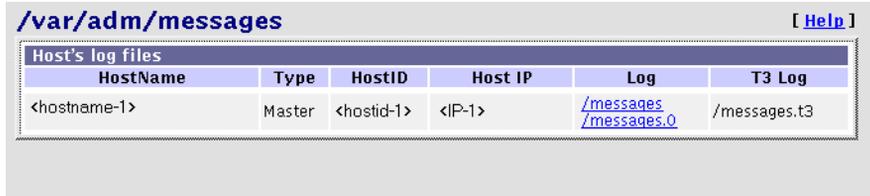
The log section is used to look at system logs or the logs of the Network Storage Agent itself.  
For these and all functions, additional information can be found in the [Help](#) section.

**<<– Use the buttons on the left to go to the appropriate “Log” function.**

|                            |   |
|----------------------------|---|
| <b>[/var/adm/messages]</b> | View the messages file for a selected host or the messages file for a T3 for a selected host (if applicable).<br><i>This display is in reverse order.</i> |
| <b>[Event Log]</b>         | This command will display all the events generated by the Network Storage Agent that have occurred for a selected host.                                   |
| <b>[Alert Log]</b>         | This command will display all the alerts generated by the Network Storage Agent that have occurred for a selected host.                                   |
| <b>[Agent Errors]</b>      | Use this function to see the log entries of errors that the Network Storage Agent has encountered.  |

## ▼ To Review the Most Recent Entries on a Host

You can review the content of the `/var/adm/messages` 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 Network Storage Agent must be functioning properly on each host for the `/var/adm/messages` function to work.

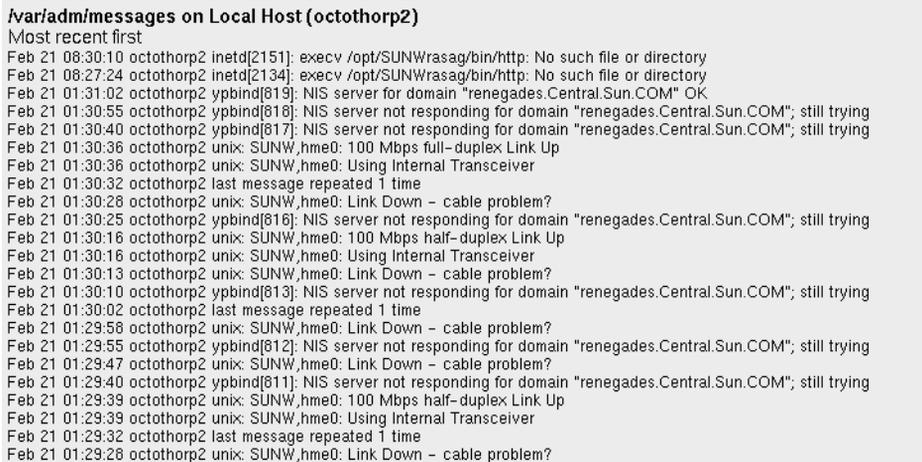


The screenshot shows a web interface for `/var/adm/messages` with a [ Help ] link. Below the title is a table titled "Host's log files". The table has columns for HostName, Type, HostID, Host IP, Log, and T3 Log. A single row is visible with placeholder text: <hostname-1>, Master, <hostid-1>, <IP-1>, [/messages](#) and [/messages.0](#), and /messages.t3.

| Host's log files |        |            |         |  |              |
|------------------|--------|------------|---------|--|--------------|
| HostName         | Type   | HostID     | Host IP | Log  | T3 Log       |
| <hostname-1>     | Master | <hostid-1> | <IP-1>  | <a href="#">/messages</a><br><a href="#">/messages.0</a> | /messages.t3 |

- 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.



The screenshot shows the output of `/var/adm/messages on Local Host (octothorp2)`. It lists the most recent log entries, starting with "Most recent first". The entries include system messages such as "execv /opt/SUNWrasag/bin/http: No such file or directory", "NIS server not responding for domain 'renegades.Central.Sun.COM'", and network status updates like "100 Mbps full-duplex Link Up" and "Link Down - cable problem?".

```
/var/adm/messages on Local Host (octothorp2)
Most recent first
Feb 21 08:30:10 octothorp2 inetd[2151]: execv /opt/SUNWrasag/bin/http: No such file or directory
Feb 21 08:27:24 octothorp2 inetd[2134]: execv /opt/SUNWrasag/bin/http: No such file or directory
Feb 21 01:31:02 octothorp2 ypbind[819]: NIS server for domain "renegades.Central.Sun.COM" OK
Feb 21 01:30:55 octothorp2 ypbind[818]: NIS server not responding for domain "renegades.Central.Sun.COM"; still trying
Feb 21 01:30:40 octothorp2 ypbind[817]: NIS server not responding for domain "renegades.Central.Sun.COM"; still trying
Feb 21 01:30:36 octothorp2 unix: SUNW,hme0: 100 Mbps full-duplex Link Up
Feb 21 01:30:36 octothorp2 unix: SUNW,hme0: Using Internal Transceiver
Feb 21 01:30:32 octothorp2 last message repeated 1 time
Feb 21 01:30:28 octothorp2 unix: SUNW,hme0: Link Down - cable problem?
Feb 21 01:30:25 octothorp2 ypbind[816]: NIS server not responding for domain "renegades.Central.Sun.COM"; still trying
Feb 21 01:30:16 octothorp2 unix: SUNW,hme0: 100 Mbps half-duplex Link Up
Feb 21 01:30:16 octothorp2 unix: SUNW,hme0: Using Internal Transceiver
Feb 21 01:30:13 octothorp2 unix: SUNW,hme0: Link Down - cable problem?
Feb 21 01:30:10 octothorp2 ypbind[813]: NIS server not responding for domain "renegades.Central.Sun.COM"; still trying
Feb 21 01:30:02 octothorp2 last message repeated 1 time
Feb 21 01:29:58 octothorp2 unix: SUNW,hme0: Link Down - cable problem?
Feb 21 01:29:55 octothorp2 ypbind[812]: NIS server not responding for domain "renegades.Central.Sun.COM"; still trying
Feb 21 01:29:47 octothorp2 unix: SUNW,hme0: Link Down - cable problem?
Feb 21 01:29:40 octothorp2 ypbind[811]: NIS server not responding for domain "renegades.Central.Sun.COM"; still trying
Feb 21 01:29:39 octothorp2 unix: SUNW,hme0: 100 Mbps half-duplex Link Up
Feb 21 01:29:39 octothorp2 unix: SUNW,hme0: Using Internal Transceiver
Feb 21 01:29:32 octothorp2 last message repeated 1 time
Feb 21 01:29:28 octothorp2 unix: SUNW,hme0: Link Down - cable problem?
```

## ▼ To View the Event Log for a Host

The screenshot shows the 'Event Log' window with a 'Help' link. It features two filter menus for 'Category' and 'Event', both set to 'All'. Below these is a 'Select a Host' section with a table:

| Select                              | HostName   | Type   | HostID     | Host IP |
|-------------------------------------|------------|--------|------------|---------|
| <input checked="" type="checkbox"/> | <hostname> | Master | <hostid-1> | <IP-1>  |

A 'Search Log' button is located at the bottom of the window.

1. Click on the host whose event log you want to view.
2. To search for events on a given device type, choose the device from the Category menu.  
All is the default.
3. Choose an event from the Event menu.  
All is the default.
4. Select HostName(s) and click Search Log.  
The corresponding event log window appears.

The screenshot shows the 'on Local Host (nsccl-test)' window with a 'Refresh | Host-List' link. The log messages are as follows:

| Date/Time           | Category | Event             | Description  |
|---------------------|----------|-------------------|--|
| 01/29/2001 11:16:59 | T3       | RemovalEvent      | Monitoring of t3 device (50020F230000CA7-purple1e2.Cent    |
| 01/25/2001 17:02:23 | A5K      | DiscoveryEvent    | Discovered a new A5K called e with wwn:508002000008a328    |
| 01/25/2001 17:01:38 | A5K      | DiscoveryEvent    | Discovered a new A5K called f with wwn:508002000008a710    |
| 01/25/2001 16:57:30 | A5K      | DiscoveryEvent    | Discovered a new A5K called e with wwn:508002000008a328    |
| 01/25/2001 16:56:45 | A5K      | DiscoveryEvent    | Discovered a new A5K called f with wwn:508002000008a710    |
| 01/25/2001 16:08:58 | Agent    | AlarmEvent        | System-errors:   |
| 01/25/2001 10:28:53 | A5K      | DiscoveryEvent    | Discovered a new A5K with WWN:508002000008a328             |
| 01/25/2001 10:28:08 | A5K      | DiscoveryEvent    | Discovered a new A5K with WWN:508002000008a710             |
| 01/25/2001 10:27:22 | Switch   | QuiesceEndEvent   | Quiesce End on device switch 100000c0dd00885d / 172.20.4   |
| 01/25/2001 10:27:22 | Switch   | QuiesceStartEvent | Quiesce Start on device switch 100000c0dd00885d / 172.20.4 |
| 01/25/2001 10:27:22 | Switch   | QuiesceEndEvent   | Quiesce End on device switch 100000c0dd008855 / 172.20.4   |
| 01/25/2001 10:27:21 | Switch   | QuiesceEndEvent   | Quiesce End on device switch 100000c0dd00885d / 172.20.4   |
| 01/25/2001 10:27:21 | Switch   | QuiesceStartEvent | Quiesce Start on device switch 100000c0dd008855 / 172.20.4 |
| 01/25/2001 10:27:21 | Switch   | QuiesceStartEvent | Quiesce Start on device switch 100000c0dd00885d / 172.20.4 |
| 01/25/2001 10:27:21 | Switch   | QuiesceStartEvent | Quiesce Start on device switch 100000c0dd00885d / 172.20.4 |
| 01/25/2001 10:27:21 | Switch   | RemovalEvent      | Monitoring of switch device (100000c0dd00885d-172.20.67)   |
| 01/25/2001 10:27:21 | Switch   | RemovalEvent      | Monitoring of switch device (100000c0dd008855-172.20.67)   |
| 01/25/2001 10:27:21 | Switch   | RemovalEvent      | Monitoring of switch device (100000c0dd008855-172.20.67)   |
| 01/25/2001 10:27:21 | Switch   | RemovalEvent      | Monitoring of switch device (100000c0dd00885d-172.20.67)   |
| 01/25/2001 10:27:21 | Switch   | RemovalEvent      | Monitoring of switch device (100000c0dd008855-172.20.67)   |
| 01/25/2001 10:27:21 | Switch   | RemovalEvent      | Monitoring of switch device (100000c0dd00885d-172.20.67)   |

FIGURE 3-4 Event Log Messages on Local Host Window

## ▼ To View the Alert Log for a Host

**Alert Log** [ Help ]

| Category | Event | Severity |
|----------|-------|----------|
| All      | All   | All      |

Select a Host

| Select                              | HostName     | Type   | HostID     | Host IP |
|-------------------------------------|--------------|--------|------------|---------|
| <input checked="" type="checkbox"/> | <hostname-1> | Master | <hostid-1> | <IP-1>  |

Search Log

- **Select the host whose alert log you want to view, and click Search Log.**

You can further customize the report using the following menus:

- **Category**—All is the default. The device types supported by the current Network Storage Agent version will be displayed in the pull-down menu.
- **Event**—All is the default. The event types supported by the current Network Storage Agent version will be displayed in the pull-down menu.
- **Severity**—All is the default. Other options 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 derive 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 Network Storage Agent System Errors window displays system errors that have occurred on a given host.

1. **To access the Network Storage Agent System Errors page, click [Agent Errors] from the System page.**

**Network Storage Agent System Errors** [ Help ]

Select an existing Host

| Host   | Hostid   | Location |
|--------|----------|----------|
| Master | <hostid> |          |

2. **Select an existing host.**

The corresponding Network Storage Agent Error Logfiles window appears.

---

# Monitoring the System

This section discusses the following system functions you can perform using the Network Storage Agent.

- “To Change System Time-out Settings” on page 74
- “To Erase a Device’s Cache” on page 75
- “To Run the Network Storage Agent Manually” on page 76
- “To View Thresholds” on page 76
- “To Email Configuration Information” on page 77
- “To Check Network Storage Agent Statistics” on page 78
- “To Change the Security Password” on page 78

## ▼ To Access the System Page

- Click the System link on the Network Storage Agent.

### System

The System section contains those tools specific to doing administration of the Network Storage Agent itself. These functions are not necessarily required and will most likely never be used.

For these and all functions, additional information can be found in the [Help](#) section.

**<<- Use the links on the left to go to the appropriate "System" function.**

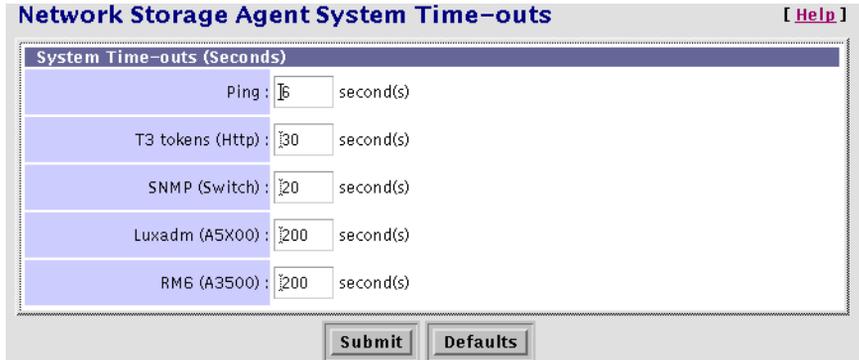
|                              |   |
|------------------------------|---|
| <b>[System Time-outs]</b>    | These are the values the Network Storage Agent uses to determine when it has waited long enough for responses from various utilities.   |
| <b>[Erase Cache]</b>         | This function will erase the last report generated by instrumentation modules for the listed devices. <b>There are NO safeguards for deleting this information.</b>   |
| <b>[RUN Agent]</b>           | Primarily used in test environments, this function has the capability to execute the rasagent on any specified host from the pull-down.   |
| <b>[Thresholds]</b>          | The thresholds are trigger mechanisms for alerts. This link will display a list of those thresholds.  |
| <b>[Email-Configuration]</b> | The Email Configuration option will prompt for a valid email address and send a detailed report of the entire Network Storage Agent configuration. It will include things like device categories and slave hosts configured to monitor those devices. |
| <b>[Change Password]</b>     | This function allows the administrator of the Network Storage Agent to modify the default password. Refer to the man page <a href="#">save_password(1M)</a> for additional information.   |

The System Monitoring window is displayed. The sections that follow explain how to perform Network Storage Agent administrative functions.

## ▼ To Change System Time-out Settings

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

1. Click [System Time-Out] from the System page.



The screenshot shows a web interface titled "Network Storage Agent System Time-outs" with a "[ Help ]" link in the top right. The main content area is titled "System Time-outs (Seconds)" and contains five rows of configuration options, each with a text input field and the unit "second(s)":

| System Time-outs (Seconds) | Value | Unit      |
|----------------------------|-------|-----------|
| Ping :                     | 16    | second(s) |
| T3 tokens (Http) :         | 30    | second(s) |
| SNMP (Switch) :            | 20    | second(s) |
| Luxadm (A5X00) :           | 200   | second(s) |
| RMB (A3500) :              | 200   | second(s) |

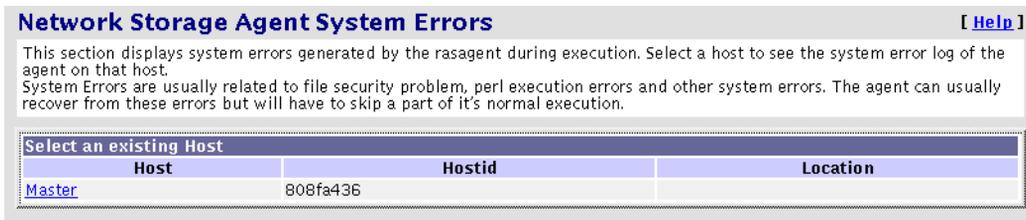
At the bottom of the form are two buttons: "Submit" and "Defaults".

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

## ▼ To View the System Error Log

The Network Storage Agent System Errors screen displays system errors generated by the Network Storage Agent during execution.

- Select and click an existing host to view that host's system error log.



The screenshot shows a web interface titled "Network Storage Agent System Errors" with a "[ Help ]" link in the top right. Below the title is a paragraph of text:

This section displays system errors generated by the rasagent during execution. Select a host to see the system error log of the agent on that host. System Errors are usually related to file security problem, perl execution errors and other system errors. The agent can usually recover from these errors but will have to skip a part of it's normal execution.

Below the text is a table with the heading "Select an existing Host". The table has three columns: "Host", "Hostid", and "Location".

| Host                   | Hostid   | Location |
|------------------------|----------|----------|
| <a href="#">Master</a> | 808fa436 |          |

## ▼ To Erase a Device's Cache

When you select an existing device, the last report in the cache for that device is erased. This forces the Network Storage Agent to regenerate discovery events.

**Erase Device Cache (on nws107.central.sun.com)** [Select Slave Host] GO [ Help ]

Selecting a device in this page will erase the last report generated by instrumentation for that device. Doing this will force the Network Storage Agent to re-discover the devices instrumentation upon next execution since it will have no old report to compare to. The device will still be monitored.

[Erase All Files] will delete the last report generated by instrumentation for **ALL** listed Devices.

**NOTE:** There is **NO WARNING** and **NO VERIFICATION** for these actions.

| Device Name (Click to erase) | Type |
|------------------------------|------|
| Nothing in the cache!        |      |

[ Erase All Files ]

1. Select a host from the [Select Slave Host] menu and click GO.
2. Click the device to erase its cache.

The device is removed from the list.



---

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

The [Erase All Files] function erases the cache of all the devices in the list. The list is removed once the erase has successfully completed. Although the device's cache is erased, the device will still be monitored.

---

## ▼ To Run the Network Storage Agent Manually

Although the Network Storage Agent is normally run from the `cron` facility, the `RUN` option enables you to run the Network Storage Agent manually.

**Run Agent manually (on nws107.central.sun.com)** [Select Slave Host]  [GO] [[Help](#)]

This option will run the `rasagent` program immediately unless it is already running. The Network Storage Agent is normally executed from the `cron` facility but this option allows you to run it manually.

[RUN]

1. Select a host from the [Select Slave Host] menu and click GO.
2. Click RUN.

## ▼ To View Thresholds

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

- Frequency is the number of alerts and hours required to generate a new message.
- Quiet is the quiet time in between messages, used to avoid sending too many messages at once.

**Thresholds** [[Help](#)]

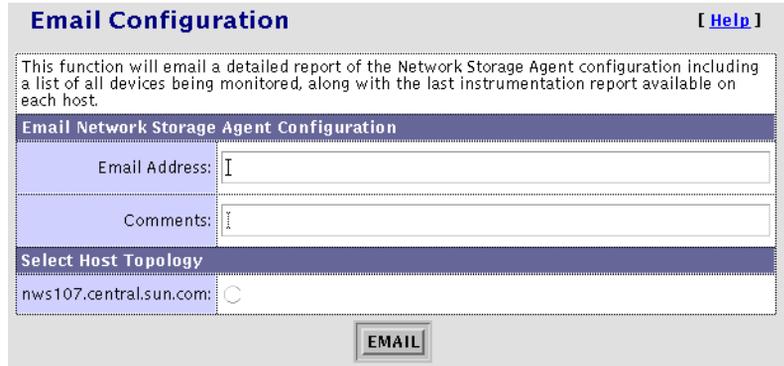
This page lists all threshold rules. The 'Frequency' is the number of alerts/hours required to generate a new message/email. The 'Quiet' value refers to the quiet time in between messages, used to avoid sending too many emails. Text in blue gives information about last message date or about the current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

| Name                  | Frequency    | Quiet   | Type    | Desc                              |
|-----------------------|--------------|---------|---------|-----------------------------------|
| fibres.FOFFL          | 10 / 24hours | 0hours  | Warning | social/ifp Offline                |
| fibres.SOFFLALERT     | 15 / 24hours | 0hours  | Error   | social/ifp Offline                |
| fibres.WARNSSD        | 5 / 24hours  | 0hours  | Warning | SSD Warning                       |
| fibres.ALERTSSD       | 20 / 24hours | 1hours  | Error   | SSD Alert                         |
| fibres.PFA            | 1 / 24hours  | 1hours  | Error   | Predictive Failure                |
| fibres.SFCRCWARN      | 10 / 24hours | 1hours  | Warning | CRC Warning                       |
| fibres.SFCRCALERT     | 15 / 24hours | 1hours  | Error   | CRC Alert                         |
| fibres.SFOFFTOWARN    | 5 / 24hours  | 1hours  | Warning | Offline Timeouts                  |
| fibres.SFDMAWARN      | 1 / 24hours  | 1hours  | Warning | SF DMA Warning                    |
| fibres.SFRESET        | 10 / 24hours | 1hours  | Warning | SF Reset                          |
| fibres.RETRYELS       | 10 / 24hours | 1hours  | Warning | ESL retries                       |
| fibres.RETRYSF        | 10 / 24hours | 1hours  | Warning | SF Retries                        |
| fibres.TOELS          | 10 / 24hours | 1hours  | Warning | ELS Timeouts                      |
| fibres.SFTOELS        | 10 / 24hours | 1hours  | Warning | SFTOELS Timeouts                  |
| fibres.DDOFFL         | 10 / 24hours | 1hours  | Warning | Offlines                          |
| fibres.QOFFLINE       | 1 / 5mins    | 0mins   | Error   | Loop Offline                      |
| fibres.QONLINE        | 1 / 5mins    | 0mins   | Error   | Loop Online                       |
| a3500.CTRL_FIRM       | 1 / 24hours  | 24hours | Warning | Controller firmware version error |
| switch.LinkFails      | 20 / 5mins   | 10mins  | Error   |                                   |
| switch.Total_LIP_Rcvd | 20 / 5mins   | 10mins  | Error   |                                   |

## ▼ To Email Configuration Information

You can forward a detailed report of the Network Storage Configuration via 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.

1. Click [Email-Configuration] from the System window.



The screenshot shows a dialog box titled "Email Configuration" with a "[ Help ]" link in the top right corner. The main text area contains the following text: "This function will email a detailed report of the Network Storage Agent configuration including a list of all devices being monitored, along with the last instrumentation report available on each host." Below this text are three sections: "Email Network Storage Agent Configuration" with an "Email Address:" label and an empty text input field; "Comments:" with an empty text input field; and "Select Host Topology" with a radio button and the text "nws107.central.sun.com:". At the bottom center of the dialog is a button labeled "EMAIL".

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

---

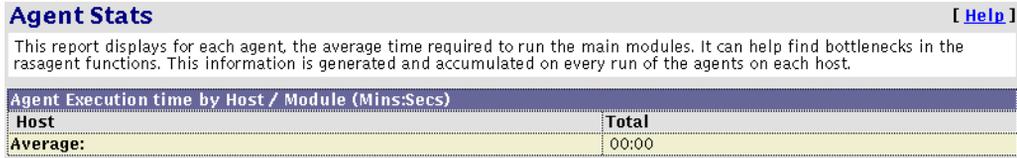
**Note** – The intent of the Email Configuration function is to enable Sun personnel to view customer information. Note, however, that in order to view the topology in an emailed configuration report, the browser must have access to SWAN.

---

## ▼ To Check Network Storage Agent Statistics

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

### 1. Click [Agent Stats] from the System window.



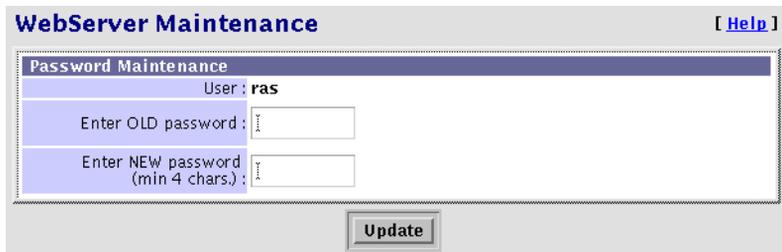
| Agent Execution time by Host / Module (Mins:Secs) |       |
|---|-------|
| Host  | Total |
| Average:  | 00:00 |

### 2. Select and click an existing host.

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

## ▼ To Change the Security Password

Use this window to change the security password for the Network Storage Agent GUI.



**WebServer Maintenance** [ Help ]

**Password Maintenance**

User : ras

Enter OLD password :

Enter NEW password (min 4 chars.) :

- You must know the current password. If the current password is lost, 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).

---

## Using Online Help

---

This chapter explains the command-line utilities help and the online help associated with the Network Storage Agent. The online help provides access to information on the Network Storage Agent command-line utilities, along with all the windows you use when working with the GUI.

---

### Command-Line Utilities Help

The explanations of the various utilities associated with the Network Storage Agent, shown in FIGURE 4-1, are available online while using the Network Storage Agent GUI.

---

**Note** – These utilities also have man(1M) pages.

---

| Network Storage Agent utilities  |  |
|----------------------------------|--|
| /opt/SUNWrasag/bin/testt3        | Verify that the tokens of a specific T3 are working. T3 token files <b>elemprop.html</b> and <b>sysprop.html</b> must be available for the Network Storage Agent probing capabilities to work properly. Running this utility from the command will require that the IP Address of the T3 being probed is known.<br><br>Usage: /opt/SUNWrasag/bin/testt3  |
| /opt/SUNWrasag/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 rasagent.<br><br>Usage: /opt/SUNWrasag/bin/clearcache  |
| /opt/SUNWrasag/bin/checkcron     | If executed from the command line, this executable program verifies that the executable program "rasagent" is entered in the crontab(1M) file.<br><b>Note:</b> You must be root to run this program.<br><br>Usage: /opt/SUNWrasag/bin/checkcron  |
| /opt/SUNWrasag/bin/save_password | Utility used by the system administrator to change the password to the Network Storage Agent'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.<br><br>Usage: /opt/SUNWrasag/bin/save_password  |
| /opt/SUNWrasag/bin/disk_inquiry  | Used by the Network Storage Agent to discover devices on the data-path that are using SCSI commands.   |
| /usr/sbin/luxadm                 | Manages the SENA, RSM, SPARCstorage Array subsystems and individual FC_AL devices. <b>luxadm(1M)</b> is used by the Network Storage Agent to retrieve the Sun StorEdge A5x00 array configuration and state information.  |
| /opt/SUNWrasag/bin/sandbox       | Utility used by the Network Storage Agent to gather Fibre Channel Switch information.  |
| /opt/SUNWrasag/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 mind however, if run from the command line, rasagent will first check that another process for rasagent is not already running.<br><br>Usage: /opt/SUNWrasag/bin/rasagent   |
| /opt/SUNWrasag/bin/ras_install   | This program will set-up the HTTP service, add a cron and register with the master rasagent 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.<br><br>Usage: /opt/SUNWrasag/bin/ras_install |

**FIGURE 4-1** Network Storage Agent Utilities

TABLE 4-1 provides descriptions for commands available for the Network Storage Agent.

**TABLE 4-1** Commands Available for the Network Storage Agent

---

|                                |  |
|--------------------------------|--|
| <code>checkcron(1M)</code>     | Verifies whether the Network Storage Agent main program is entered in the <code>crontab(1M)</code> file.   |
| <code>clearcache(1M)</code>    | Clears the Network Storage Agent cache files that contain the current report for each device being monitored.  |
| <code>disk_inquiry(1M)</code>  | Identifies devices on the data path that are using SCSI commands.  |
| <code>rasagent(1M)</code>      | Calls the modules for network storage devices supported by the Network Storage Agent. It is automatically executed by <code>cron</code> , or it can be run manually from the command line.                 |
| <code>ras_install(1M)</code>   | Sets up the HTTP service, adds a <code>cron</code> , and registers with the master agent during a slave install. It must be run manually upon executing the <code>pkgadd</code> command.                   |
| <code>sanbox(1M)</code>        | Displays Fibre Channel switch information.   |
| <code>save_password(1M)</code> | Changes the password to the Network Storage Agent GUI. This function can also be performed in the GUI itself. <code>save_password</code> is usually used if the system administrator forgets the password. |
| <code>testt3(1M)</code>        | Retrieves tokens from a Sun StorEdge T3 array. It verifies whether the IP address used is correct and whether the IP address points to a Sun StorEdge T3 array that can provide tokens.                    |

---

## ▼ To Access the Online Help

1. Click the **Help** link on the Network Storage Agent main window.
2. Click the topic for which you need information from the help list shown below.

|   |  |
|---|--|
| - <a href="#">Introduction</a>            | Help Introduction  |
| <b>Maintenance</b>                        |  |
| - <a href="#">Maintain Hosts</a>          | Enter customer and device information and configure host(s)  |
| - <a href="#">Discovery</a>               | Discover new devices   |
| - <a href="#">Maintain Devices</a>        | <a href="#">Add/Delete/Discover</a> device information   |
| - <a href="#">Email Notification</a>      | Configure Local Email Notification   |
| - <a href="#">Providers</a>               | Relay events generated by the health monitors  |
| - <a href="#">Push Configs</a>            | Update Slave Agent Configuration File  |
| - <a href="#">Start/Stop Agents</a>       | Control Agent activity   |
| - <a href="#">Start/Stop Device</a>       | Deactivate monitoring on a device-by-device basis  |
| - <a href="#">Test Email</a>              | Test Email functions   |
| - <a href="#">Review Config</a>           | Report results and make available pointers to areas that require review  |
| <b>Monitor</b>                            |  |
| - <a href="#">Instrumentation</a>         | Display FRU level information of the selected device and access components   |
| - <a href="#">Message Summary</a>         | Generate a report from the /var/adm/messages files   |
| - <a href="#">Snapshot</a>                | Schedule the execution of the StorTools configuration snapshot   |
| - <a href="#">Revision Checking</a>       | Check the current revision of software and firmware  |
| - <a href="#">Snapshot History</a>        | Show a list of previous Snapshot log files   |
| <b>SAN</b>                                |  |
| - <a href="#">Display Topology</a>        | Display topology drawings of SAN configurations  |
| - <a href="#">Merge Topology</a>          | Select multiple host topology graphs to be merged into a single view   |
| - <a href="#">Clear Topology</a>          | Delete the current topology from the database in order to force the discovery of a new topology information  |
| - <a href="#">FC Check</a>                | Test the condition of the SAN by gathering counter information twice and comparing the values. The SAN agents will look for counters that have incremented between the two runs and report it. |
| - <a href="#">FC Utilities</a>            | This page is reserved for trained service personnel and has been locked by your system administrator   |
| <b>Log</b>                                |  |
| - <a href="#">/var/adm/messages</a>       | Review the content of /var/adm/messages files from any host  |
| - <a href="#">Event Log</a>               | Search for events on a given log   |
| - <a href="#">Alert Log</a>               | Display events generated by the Network Storage Agent  |
| - <a href="#">Agent Errors</a>            | Displays and logs errors that the Network Storage Agent encounters   |
| <b>System</b>                             |  |
| - <a href="#">System Time-outs</a>        | Change the default settings for scheduled time-outs  |
| - <a href="#">Erase Cache</a>             | Erase cache and regenerate discovery events  |
| - <a href="#">RUN Agent</a>               | Manually run the rasagent program, rather than execute from the cron facility  |
| - <a href="#">Thresholds</a>              | List threshold rules for Sun StorEdge devices  |
| - <a href="#">Email-Configuration</a>     | Email a detailed report of the Agent configuration   |
| - <a href="#">Change Password</a>         | Change the security password for the Admin GUI   |
| <b>Online Help</b>                        |  |
| - <a href="#">Utilities Documentation</a> | Find online explanations of man(1M) pages  |
| - <a href="#">Help</a>                    | This page  |

FIGURE 4-2 Network Storage Agent GUI Online Help

## Network Storage Agent Events

---

This appendix lists all Network Storage Agent common information model (CIM) events currently generated, along with a text version of the event. The Network Storage Agent automatically generates the events. The events are organized as follows:

- “Sun StorEdge A3500 FC Arrays” on page 84
- “Sun StorEdge A5x00 Arrays” on page 84
- “Agent” on page 84
- “NWS\_Alert Indication” on page 85
- “Stools4” on page 86
- “Sun StorEdge network FC Switch-8 and Switch-16” on page 86
- “Sun StorEdge T3 Arrays” on page 87

---

## Sun StorEdge A3500 FC Arrays

- A35K.AlarmEvent.MessageLog
- A35K.AuditEvent
- A35K.CommunicationEstablishedEvent.A35K
- A35K.CommunicationLostEvent.A35K
- A35K.DiscoveryEvent
- A35K.StateChangeEvent.controller
- A35K.StateChangeEvent.disk
- A35K.Statistics
- A35K.TopologyEvent.disk-add
- A35K.TopologyEvent.disk-remove

---

## Sun StorEdge A5x00 Arrays

- A5K.AlarmEvent.MessageLog
- A5K.AuditEvent
- A5K.CommunicationEstablishedEvent.A5K
- A5K.CommunicationLostEvent.A5K
- A5K.DiscoveryEvent
- A5K.StateChangeEvent.disk\_front
- A5K.StateChangeEvent.interface\_board
- A5K.StateChangeEvent.power
- A5K.TopologyEvent.disk\_front-add
- A5K.TopologyEvent.disk\_front-remove
- A5K.TopologyEvent.disk\_rear-add
- A5K.TopologyEvent.disk\_rear-remove

---

## Agent

- Agent.AgentDeinstallEvent.host
- Agent.AgentInstallEvent.host
- Agent.AlarmEvent
- Agent.CommunicationLostEvent
- Agent.HeartbeatEvent

---

## NWS\_Alert Indication

- NWS\_AlertIndication.A35K.StateChangeEvent.controller
- NWS\_AlertIndication.A35K.TopologyEvent.disk-add
- NWS\_AlertIndication.A35K.TopologyEvent.disk-remove
- NWS\_AlertIndication.A5K.CommunicationEstablishedEvent
- NWS\_AlertIndication.A5K.CommunicationLostEvent
- NWS\_AlertIndication.A5K.StateChangeEvent.disk\_front
- NWS\_AlertIndication.A5K.StateChangeEvent.power
- NWS\_AlertIndication.A5K.TopologyEvent.disk\_front-add
- NWS\_AlertIndication.A5K.TopologyEvent.disk\_front-remove
- NWS\_AlertIndication.A5K.TopologyEvent.disk\_rear-add
- NWS\_AlertIndication.A5K.TopologyEvent.disk\_rear-remove
- NWS\_AlertIndication.Switch.CommunicationEstablishedEvent
- NWS\_AlertIndication.Switch.CommunicationLostEvent
- NWS\_AlertIndication.Switch.StateChangeEvent.port
- NWS\_AlertIndication.T3.AlarmEvent
- NWS\_AlertIndication.T3.CommunicationEstablishedEvent
- NWS\_AlertIndication.T3.CommunicationLostEvent.T3
- NWS\_AlertIndication.T3.StateChangeEvent.controller
- NWS\_AlertIndication.T3.StateChangeEvent.power
- NWS\_AlertIndication.T3.TopologyEvent.controller-add
- NWS\_AlertIndication.T3.TopologyEvent.controller-remove
- NWS\_AlertIndication.T3.TopologyEvent.disk-add
- NWS\_AlertIndication.T3.TopologyEvent.disk-remove
- NWS\_AlertIndication.T3.TopologyEvent.loopcard-add
- NWS\_AlertIndication.T3.TopologyEvent.loopcard-remove
- NWS\_AlertIndication.T3.TopologyEvent.power-add
- NWS\_AlertIndication.T3.TopologyEvent.power-remove
- NWS\_AlertIndication.T3.TopologyEvent

---

## Stools4

- STools4.DiagnosticTestComplete
- STools4.DiagnosticTestStarted

---

## Sun StorEdge network FC Switch-8 and Switch-16

- Switch.AlarmEvent
- Switch.AuditEvent
- Switch.CommunicationEstablishedEvent.Switch
- Switch.CommunicationLostEvent.Switch
- Switch.DiscoveryEvent
- Switch.RemovalEvent
- Switch.StateChangeEvent.port
- Switch.Statistics

---

# Sun StorEdge T3 Arrays

- T3.AlarmEvent.MessageLog
- T3.AuditEvent
- T3.CommunicationEstablishedEvent.T3
- T3.CommunicationLostEvent.T3
- T3.DiscoveryEvent
- T3.QuiesceEndEvent
- T3.RemovalEvent
- T3.StateChangeEvent.controller
- T3.StateChangeEvent.disk
- T3.StateChangeEvent.power
- T3.Statistics
- T3.TopologyEvent.controller-add
- T3.TopologyEvent.controller-remove
- T3.TopologyEvent.disk-add
- T3.TopologyEvent.disk-remove
- T3.TopologyEvent.loopcard-add
- T3.TopologyEvent.loopcard-remove
- T3.TopologyEvent.power-add
- T3.TopologyEvent.power-remove



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