SGI™ TP9400 RAID Administration Guide

007-4306-001

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About This Guide

This guide provides information on preparing, installing, configuring, and starting the Total Performance Storage System Manager 7 (TPSSM7) in an IRIX environment.

This is part of a document set that supports TPSSM7. To get the most out of this book, consult the following documentation first:

- readme file — Read this text file first. It contains late-breaking installation and user information about the storage management software.
- "TPSSM7 RAID Software Concepts Guide for TP9400" (007-4305-001) — Use this reference document to become familiar with new terminology and features of the storage management software.

When you have finished the entire installation process, refer to the following online Help systems, which contain information common to all operating environments. For information specific to IRIX, refer to this Administration Guide.

- Enterprise Management Window Help — Use this online Help system to learn more about working with the management domain.
- Array Management Window Help — Use this online Help system to learn more about managing Storage Arrays.

Audience

This guide is intended for system administrators. Use this guide to:

- Gain a basic understanding of the TPSSM7 software.
- Understand the two different storage array management methods.
- Learn about hardware and software requirements.
- Follow procedures to install the TPSSM7 software.

Structure of this Guide

This guide contains the following chapters:

- Chapter 1, “Introduction” — Introduces the Total Performance Storage System Manager 7 (TPSSM7) software and provides information about system requirements.
- Chapter 2, “Preparing for Installation” — Describes the two Storage Array management methods and the procedures necessary to prepare the TP9400 for installing the TPSSM7 software.
- Chapter 3, “Installing the TPSSM7 Software” — Describes the procedures for installing the TPSSM7 Agent and Client software.
- Chapter 4, “Operating System Support” — Describes the restrictions of using TPSSM7 in the IRIX environment, identifying volumes by device name, stopping and starting TPSSM7, and uninstalling specific software components.

Related Publications

This Administration Guide is part of a product book set. To get the most out of this guide, consult the following documentation before using this guide.

- “TPSSM7 RAID Software Concepts Guide for TP9400” (007-4305-001)
  This guide explains the terminology and features of the TPSSM7 storage management software for the TP9400.
- “SGI TP9400 RAID Owner’s Guide” (007-4304-001)
  A complete user guide for the TP9400 that gives an overview of all components of the rack. It contains procedures for replacing failed components and complete specifications.
- “SGI TP9400 RAID Installation and Upgrade Guide” (108-0292-001)
  This guide gives complete instructions on how to unpack, install, and configure the TP9400 and its components. It also contains component upgrade information.
- “SGI Storage Area Network Installation Instructions” (108-0252-003)
  This guide comes packed with the Fibre Channel switch and provides information on Storage Area Network installation and topologies.

- See also the SGI online technical bulletin TIB #200121 at:
  http://bits.csd.sgi.com/cgi-bin/site.cgi
  This describes the most recent procedures for controller replacement and controller hot swap procedures.

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Introduction

This chapter introduces the Total Performance Storage System Manager 7 (TPSSM7) software, and provides information about hardware, software, and operating system requirements for the installation.

TPSSM7 is a Java-based application for TP9400 RAID system. It provides a graphical interface for configuring and monitoring the RAID hardware subsystem.

About the Storage Management Software

The storage management software is composed of the following components:

- The client software
- The host-agent package

The Client Software

The TPSSM7 client provides the graphical user interface for managing Storage Arrays. It features the following components:

- **Enterprise Management Window —** Used to add, remove, and monitor Storage Arrays within the management domain.
- **Array Management Window —** Used to manage the various components of an individual Storage Array.

The Host-Agent Software

The TPSSM7 agent consists of two software components:

- **Host-agent software —** This software lets you manage Storage Arrays through the host's Fibre Channel connection. This is described in "Storage Array Management Methods" on page 7.
- **SM7devices utility —** This devices utility lets you associate Storage Array volumes with operating system device names. This is described in "Identifying Volumes by Operating System Device Names" on page 31.

Software Component Installation Requirements

Table 1-1 lists the hardware required for installing the storage management software components.

Table 1-1 Hardware Requirements for Software Components

Software Component	Hardware Requirement	Notes
TPSSM7 Client	- Management station - Host	Management stations: - If you install the client software on one or more management stations, you can use the direct managed method, the host-agent managed method, or a combination of both. Hosts: - If you install the client software on the host and only plan to manage the Storage Arrays connected to this host via the I/O (Fibre Channel) path, you do not need to connect to the network if the host-agent software is installed. - You must assign a static IP address to the host.
TPSSM7 Agent	- Host	Install the host-agent package, even if you will not manage the Storage Arrays with the agent software. The host-agent package includes the SM7devices utility, which you use to associate volumes with operating system device names.

Figure 1-1 shows an example of a typical Storage Array configuration.

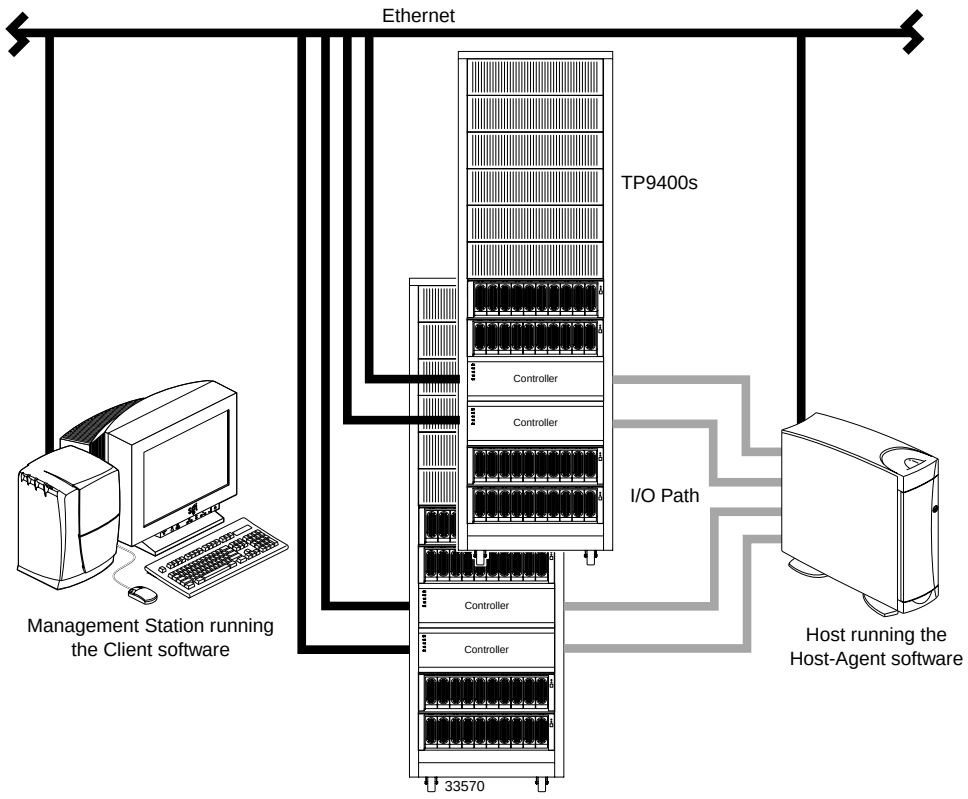

Figure 1-1 Typical Storage Management Configuration

System Requirements

This section provides information on the hardware, software, and operating system requirements for TPSSM7.

Table 1-2 lists the permissions, disk space, and operating system requirements for installing TPSSM7.

Table 1-2 Operating System Requirements

Requirement	Description
Permissions	Root (superuser) level permissions are required to install the client software and the host-agent package
Disk space	The disk space required for TPSSM7 client is 28 MB on `/opt`
Operating system	Each client station requires IRIX 6.5.9 Each host station requires IRIX 6.5.9

Table 1-3 lists the hardware required for installing TPSSM7.

Table 1-3 Hardware Requirements

Hardware Component	Requirements
A BOOTP server (for Direct Managed Storage Arrays only)	An IRIX® BOOTP server. Do a MAN BOOTP for setup
Storage Arrays	Storage Arrays with controllers running firmware version 4.00.02.02
Fibre Channel (FC) host adapters	The following supported FC host adapters with the storage management software: - QLogic cards, QL2200 or QL2200A (optical only)
Fibre Channel fabric switches (if needed for the desired configuration)	Brocade® SilkWorm® (2400 or 2800) FC switch, was tested with the storage management software (firmware 2.1.1)
Fibre Channel (FC) hubs	Not supported

Table 1-3 (continued) Hardware Requirements

Hardware Component	Requirements
Management station or host (for client software)	Minimum requirements are an SGI system with: - IRIX 6.5.9 - Java 1.2.2
Host systems	Octane Origin 200 Origin 2000 Origin 3000 Onyx 2 Onyx 3000
Host OS	Minimum requirements are an SGI system with: - IRIX 6.5.9 - Java 1.2.2

Preparing for Installation

This chapter describes the two Storage Array management methods and the procedures necessary to prepare the TP9400 for installing the TPSSM7 software.

The Installation Process

The installation process involves the following:

- Deciding on either a host-managed or direct managed Storage Array ("Storage Array Management Methods" in this chapter).
- Preparing for the installation ("Preparing for a Network Installation" in this chapter).
- Installing the TPSSM7 software ("TPSSM7 Software Installation Procedure" and "Completing the Installation" in Chapter 3).

Storage Array Management Methods

The storage management software provides two methods for managing Storage Arrays:

- Host-managed via agent and client over Fibre Channel path(s).
- Direct-managed via network (Ethernet) connections.

Depending upon your specific Storage Array configurations, you can use either or both methods.

Host-Agent (Fibre Channel) Managed

With this method, you manage Storage Arrays through a Fibre Channel connection to a host. The host-agent receives communication from the storage management software and passes it to the Storage Array controllers via a Fibre Channel I/O path.

Figure 2-1 shows a system in which Storage Arrays are managed through the host-agent.

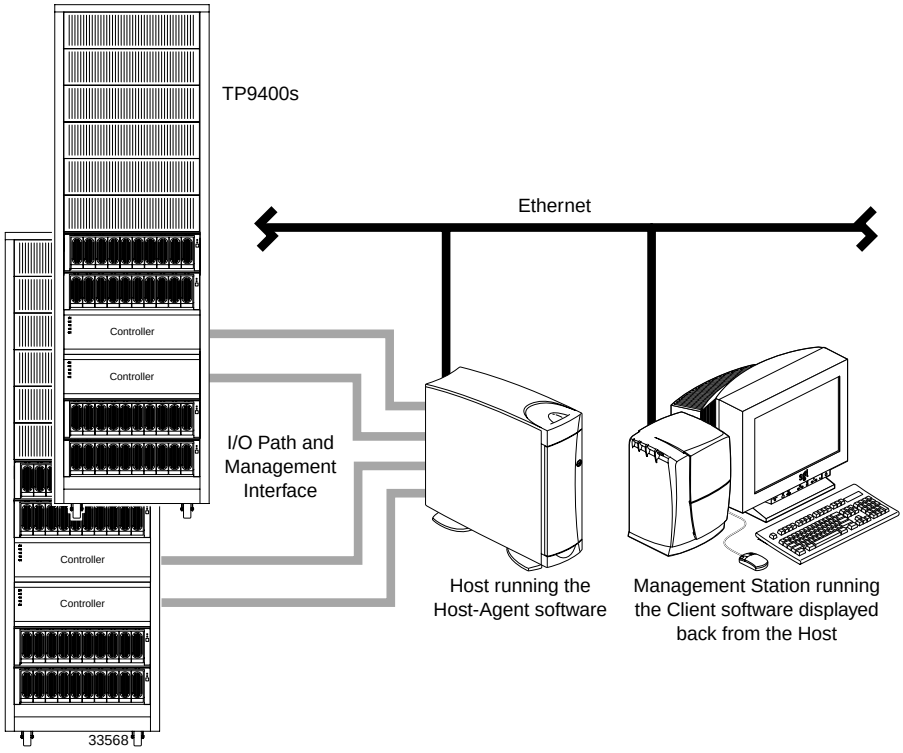

Figure 2-1 Host-Agent Managed Storage Arrays

The advantages of using the host-agent managed method include:

- Ethernet cables are not required to connect each controller to the network.
- A BOOTP server is not required to configure the controller to the network.
- Network configuration tasks for each controller are not required.

- Only a host name or IP address for the host must be specified when you add Storage Arrays (rather than the information for each controller in a Storage Array). After you have added a specific name or IP address of a host, the host-agent software will automatically discover any Storage Arrays attached to that host.

A disadvantage of using the host-agent managed method is:

- You are limited to one less logical unit number (LUN) than the maximum allowed by your operating system and host adapter. The host-agent requires a special Access Volume to communicate with the Storage Array controllers. The Access Volume uses LUN 31 as the default.

Direct (Ethernet) Managed

With this method, the Storage Array is managed directly over the network through each controller's Ethernet connection. To do this, you define each controller's IP address and host name, and attach a cable to each Ethernet connection on the controller enclosure.

The advantages of managing Storage Arrays directly include:

- You can use an IRIX management station to manage Storage Arrays connected to a host with an operating system other than that supported by the storage management software. Contact your customer support representative for more information.
- To manage the array, you can use an IRIX workstation (or Windows NT 4.0) to connect to an IRIX host.

The disadvantages of using the direct managed method include:

- Each controller requires an Ethernet cable for connection (two per controller enclosure).
- You will need to specify an IP address or host name for each controller whenever you add Storage Arrays.
- You will need to complete several network preparation tasks (refer to "Preparing for a Network Installation" on page 13 for a summary of the preparation tasks).
- You are limited to one less logical unit number (LUN) than the maximum allowed by your operating system and host adapter. The host-agent requires a special Access Volume to communicate with the Storage Array controllers. The Access Volume uses LUN 31 as the default.

Figure 2-2 shows a system in which Storage Arrays are managed directly.

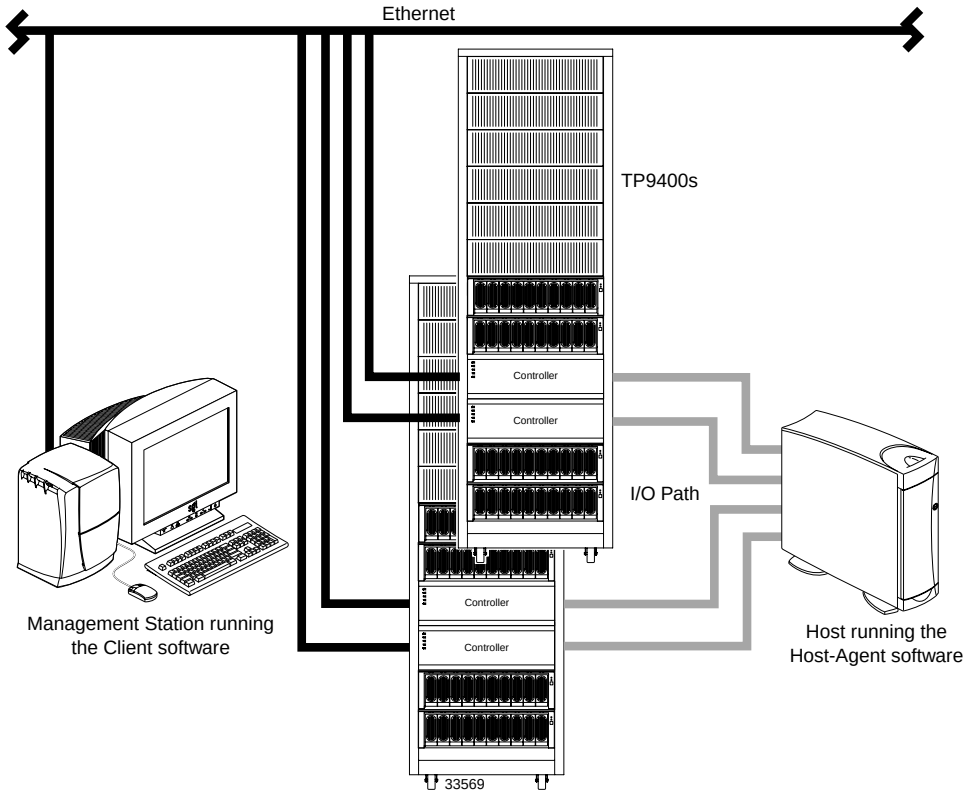

Figure 2-2 Direct Managed Storage Arrays

Integrating Your Storage Arrays Into a Network

You can manage Storage Arrays over the network using either or both of the Storage Array management methods described in “Storage Array Management Methods” on page 7.

1. Decide how you will manage your Storage Arrays. (See Figure 2-3 on page 12 for an example of a network that uses both types of management methods.)

   Network A — Directly Managed Storage Array installation with the following components:

   - BOOTP server
   - Host connected to a Storage Array via a Fibre Channel I/O path
   - Management station connected by Ethernet cables to the Storage Array controllers

   Network B — Host-Agent Managed Storage Array installation with the following components:

   - Host connected to a Storage Array via a Fibre Channel I/O path
   - Management station connected through the Ethernet network to the host to manage the Storage Array controllers

2. Continue to “Preparing for a Network Installation”.

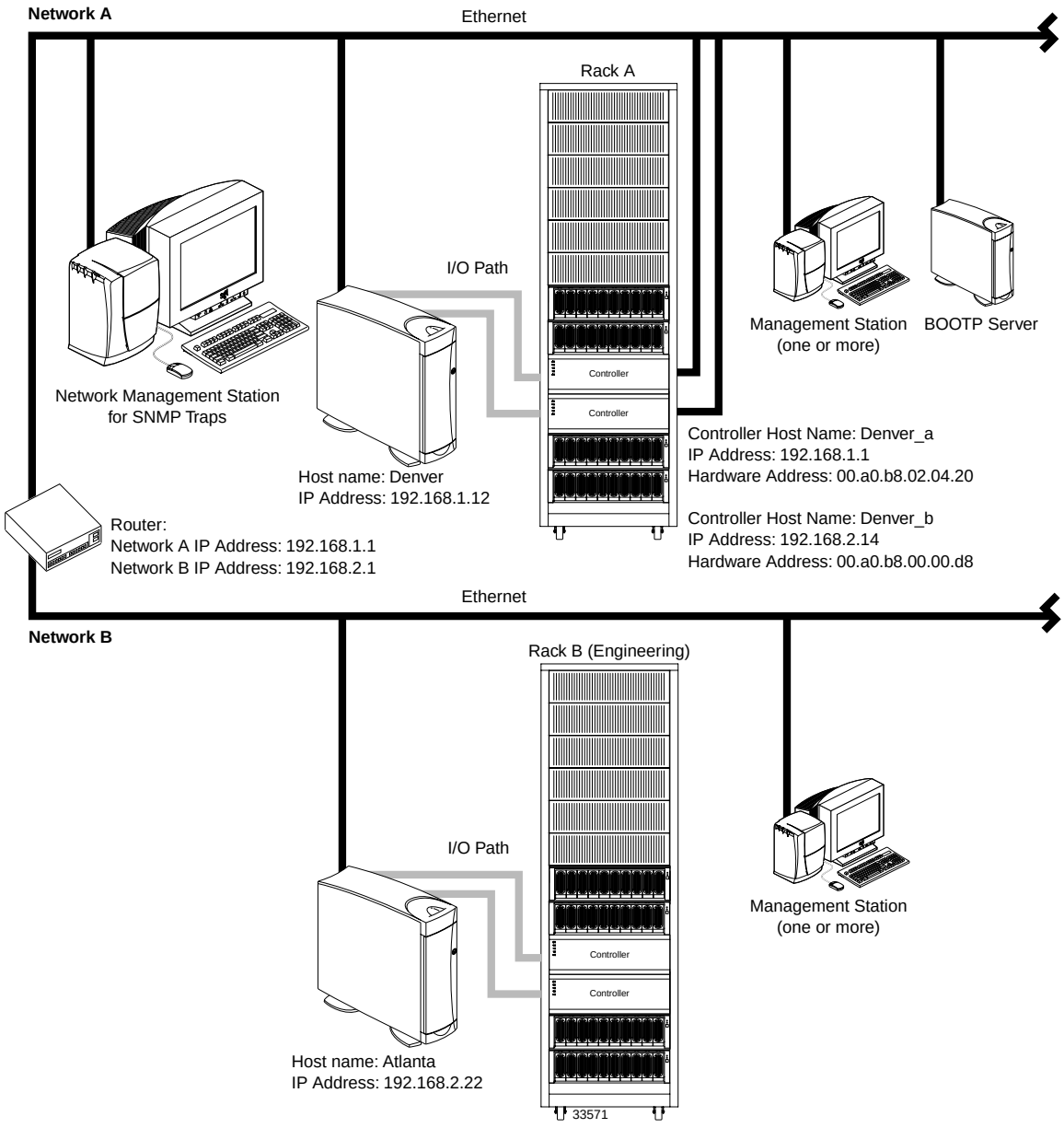

Figure 2-3 Example — Network Using Directly and Host-Agent Managed Storage Arrays

Preparing for a Network Installation

To ensure that you have installed and checked all network components and that you have obtained and recorded all required host and controller information (see the blank information record provided in Table 2-3 on page 15), you must complete all of the applicable installation preparation tasks listed in Table 2-1. (An example of a completed information record is provided in Table 2-2 on page 14.).

Table 2-1 Summary of Network Preparation Tasks

Management Method	Task	Purpose	Go To:
Direct and host-agent	**1.** Install Ethernet connection.	To establish the Ethernet connection.	N/A
Direct and host-agent	**2.** Establish and record a naming scheme for your Storage Arrays.	To add the Storage Arrays to the management domain after installing the software.	"Naming the Storage Arrays" on page 16.
Direct	**3.** Determine the hardware Ethernet address for each Storage Array's controllers.	To provide configuration information to set up the BOOTP server.	"Identifying the Controller Hardware Ethernet Address" on page 17.
Direct and host-agent	**4**. Obtain IP addresses and host names from the network administrator.	Host-agent management requires host IP addresses and host names. Direct management requires controller IP addresses and host names to set up the controllers with a BOOTP server and to set up the host (or DNS) table.	"Obtaining IP Addresses and Host Names" on page 18.
Direct	**5.** Set up the BOOTP server.	To allow the BOOTP server to provide network configuration information to the controllers.	"Setting Up the IRIX BOOTP Server" on page 19.
Direct and host-agent	**6.** Set up the host (or DNS) table.	To ensure that the management station can communicate with the host running host-agent software or with the controllers.	"Setting Up the DNS or Host Table" on page 20.
Direct and host-agent	**7**. Power up network devices	To ensure that all devices and links are operational.	The Installation Guide specific to each hardware component.

Table 2-2 shows a sample information record with entries for a directly managed Storage Array and a Host-Agent Managed Storage Array.

Table 2-2 Sample Information Record

Storage Array Name	Management Type	Controller A— Ethernet, IP Address, and Host Name	Controller B— Ethernet, IP Address, and Host Name	Host— IP Address and Host Name
Storage Array Name: **perf36**	**Direct**	Ethernet Address: **00a0b8020420** IP Address: **192.168.1.13** Host Name: **Denver_a**	Ethernet Address: **00a0b80000d8** IP Address: **192.168.1.14** Host Name: **Denver_b**	
Storage Array Name: **perf33**	**Host-Agent**			IP Address: **192.168.2.22** Host Name: **Atlanta**

Table 2-3 provides a blank information record. Photocopy the blank information record and complete the information for each network Storage Array and controller. This will help you to properly set up the BOOTP table for the network server and the host or DNS (Domain Name Server). It also will help you correctly add Storage Arrays after initial installation.

Table 2-3 Storage Array and Controller Information Record

Storage Array Name	Management Type (choose one)	Controller A—Ethernet, IP Address, and Host Name	Controller B—Ethernet, IP Address, and Host Name	Host—IP Address and Host Name
Name:	___ Direct ___ Host-Agent	Ethernet Address: IP Address: Host Name:	Ethernet Address: IP Address: Host Name:	IP Address: Host Name:
Name:	___ Direct ___ Host-Agent	Ethernet Address: IP Address: Host Name:	Ethernet Address: IP Address: Host Name:	IP Address: Host Name:
Name:	___ Direct ___ Host-Agent	Ethernet Address: IP Address: Host Name:	Ethernet Address: IP Address: Host Name:	IP Address: Host Name:
Name:	___ Direct ___ Host-Agent	Ethernet Address: IP Address: Host Name:	Ethernet Address: IP Address: Host Name:	IP Address: Host Name:

Naming the Storage Arrays

When planning your network configuration, consider how you will name the Storage Arrays. When you start the storage management software for the first time, all Storage Arrays in the management domain will be displayed as `<unnamed>`. You then can use the Array Management window to rename individual Storage Arrays.

Use the following procedure to name Storage Arrays.

1. Decide on a Storage Array naming scheme that makes sense for your enterprise. Here are some tips on naming Storage Arrays:
   - The software allows a 30-character limit. All leading and trailing spaces will be deleted.
   - Use a unique, meaningful naming scheme that is easy to understand and remember.
   - Avoid arbitrary names or names that would quickly lose their meaning in the future.
   - The software displays Storage Array names with the prefix "Storage Array." Therefore, if you rename a Storage Array "Engineering," it will display as "Storage Array Engineering."
2. Record the Storage Array names in the information record (Table 2-3 on page 15).

Depending on which management method or methods you will use, you might need to record your controller's hardware Ethernet addresses.

Do you plan to manage your Storage Arrays directly or with the host-agent software?

Direct Managed — Go to "Identifying the Controller Hardware Ethernet Address" on page 17.

Host-Agent Managed — Go to "Obtaining IP Addresses and Host Names" on page 18.

Identifying the Controller Hardware Ethernet Address

Use the following procedure if you plan to directly manage Storage Arrays through Ethernet connections to each controller.

1. Remove the front panel from the controller tray (Figure 2-4).

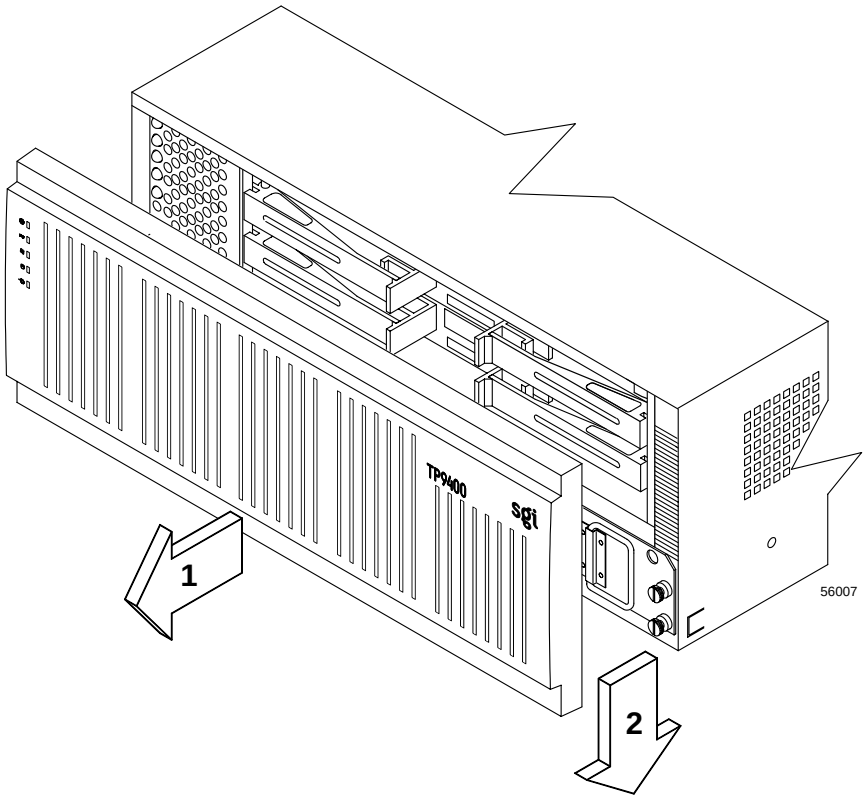

Figure 2-4 Removing the Front Panel of the Controller Enclosure

2. Look on the front of the controller canister for a label with the controller's hardware Ethernet address (Figure 2-5). The number will be in hexadecimal form (for example, 00.a0.b8.00.00.d8).

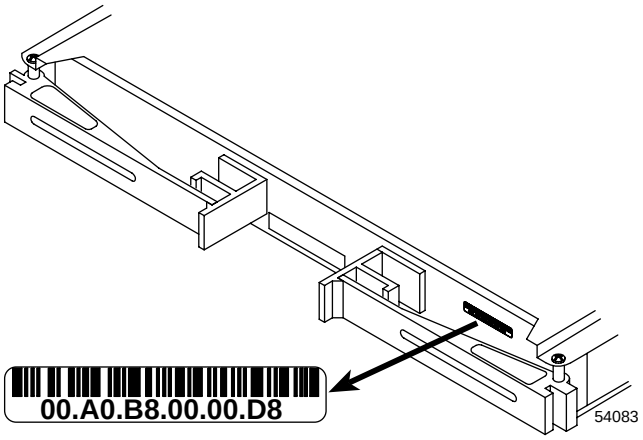

Figure 2-5 Identifying the Controller Ethernet Address

3. Record each Ethernet address in the information record (Table 2-3 on page 15).

Obtaining IP Addresses and Host Names

Depending on which management method or methods you will use, perform the following procedures to obtain IP addresses and host names. Within your enterprise, you might choose to manage some Storage Arrays directly and others with the host-agent software.

Table 2-4 Management Method

Direct Management Method	Host-Agent Management Method
1. Assign (or obtain from the network administrator) a unique IP address and associated host name for each Storage Array's controllers that you will manage directly. Record each controller IP address and host name in the information record (Table 2-3 on page 15). **2.** Go to "Setting Up the IRIX BOOTP Server" on page 19.	**1.** Assign (or obtain from the network administrator) a unique IP address and associated host name of each host that you will use to manage the Storage Array via the host-agent method. Record the IP address and host name in the information record (Table 2-3 on page 15). **2.** Go to "Setting Up the DNS or Host Table" on page 20.

Setting Up the IRIX BOOTP Server

Use the following procedure if you will directly manage Storage Arrays. Table 2-3 on page 15 and Table 2-5 provide information for setting up the BOOTP table and making the required entries to support the controllers in the Storage Arrays. Use a text editor to edit the bootptab file in the `/etc` directory.

Table 2-5 Required Entries for Setting Up the IRIX BOOTP Server

Entry	Description	Sample Format in BOOTP Server
subnet mask	Mask used to route packets to defined subnets	dot notation (sm=255.255.255.0)
router (when applicable)	IP address of machine that routes packets to networks	dot notation (gw=192.168.1.1)
host name	Host name associated with the controller	host name (perf36)
IP address	IP address of the controller	dot notation (ip=192.168.1.13)
Ethernet address	Controller's hardware Ethernet address	Hexadecimal notation (ha=00a0b8020420)

Note: Verify that BOOTP software is installed by typing `ls/usr/etc/bootp`.

The following example assumes that you are configuring an IRIX BOOTP server (see the server displayed on Network A as shown in Figure 2-3 on page 12).

```
s4.default:\ (common settings)
ht=ether:\
sm=255.255.255.0:\
gw=192.168.1.1:\
hn:
perf36:\
tc=s4.default:\ (refers to common settings)
ip=192.168.1.13:\
ha=00a0b8020420:perf33:\
tc=s4.default:\
ip=192.168.1.14:\
ha=00a0b80000d8:
```

- The `s4.default:\` entry denotes settings that are common to all controllers.
- The `tc=s4.default:\` entry associates this common setting group to a specific controller.

When you have finished setting up the BOOTP table, make sure the parameters in the BOOTP table take effect:

1. If the power to the Storage Arrays is on, turn the power off.
2. Turn on the power to the Storage Arrays.
3. Continue to "Setting Up the DNS or Host Table".

Setting Up the DNS or Host Table

Use the following procedure to set up the Domain Name Server (DNS) or host table. Make sure the controller host names correspond to the appropriate controller IP addresses.

1. Edit either the DNS or the host table (`/etc/hosts`) to add the IP address and host name for each network controller.

   For example, to set up the host table for the Network A controllers, (Figure 2-3 on page 12), use a text editor to create the following controller IP address and name entries:

Table 2-6 IP Address and Controller Host Name

IP Address	Controller Host Name
127.0.0.01	localhost
192.168.1.13	perf36
192.168.1.14	perf33

2. If you plan to manage Storage Arrays through a firewall, configure your firewall to open port 2463 to TCP data.
3. Go to Chapter 3, "Installing the TPSSM7 Software".

Installing the TPSSM7 Software

This chapter describes the process of installing the TPSSM7 Agent and Client software.

TPSSM7 Software Installation Procedure

If you are installing the software on the host, install both the agent and the client software. If you are installing the software on the client, install only the client software. (The default is both agent and client.)

1. Verify the version level of IRIX installed on the system. At the command prompt:

   Type `uname -Ra` and press Enter.

   This should display:

   ```
   IRIX perf36 6.5 6.5.9m
   ```

2. Verify the version level of Java installed on the system. Java version v1.2.2 is the required supported level for tp9400 software tools.

   Type `showprods java_eoe` and press Enter.

   This should display:

   ```
   Environment (Sun Java2 Runtime Environment v1.2.2)
   ```

3. If you do not have the correct version of Java, you will get the following message when trying to install the TPSSM7 software.

   ```
   tpssm7agent.sw.base cannot be installed because of missing
   prerequisites
   ```

Note: If you need to install Java 1.2.2, it can be downloaded from either:
`/cdrom/tp9400/irix/unbundled/java122`
or
`http://www.sgi.com/developers/devtools/languages/java.html`

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4. Type `perf36 10# inst -f /CDROM/bin/tpssm7/irix` and press Enter.

   This displays the main menu.

5. Type `list` and press Enter.

   This displays the TPSSM7 software components to be installed.

```
i  N  tpssm7.sw.base [d]                4620+  Base Software
i  N  tpssm7.sw.installscripts [d]      8+     Installation Control Scripts
i  N  tpssm7.sw.onlinehelp [d]          6512+  Online help and graphics
i  N  tpssm7agent.sw.base [d]           600+   Base Software
i  N  tpssm7agent.sw.installscripts [d] 4+     Installation Control Scripts
```

   Note: All files are installed by default. If installing on a client, you need only install the four TPSSM7 agent files.

6. Type `step` and press Enter.

   For each item you wish to remove, type `r` and Enter as it is displayed.

7. Type `conflicts` to verify that there are no software conflicts.

8. Type `go` and press Enter.

   The software will install. This might take several minutes.

9. Type `quit` and press Enter.

   At the end of the TPSSM7 installation process, a script will automatically run to configure the communication device and start the host software.

Completing the Installation

Use the following procedures to finish installing the TPSSM7 software.

Starting the Enterprise Management Window

To complete the installation procedure, you must initiate Storage Array discovery using the Enterprise Management window. Start the Enterprise Management window using this procedure:

1. Type `tpssm7` at a command prompt.

   The client software will start, displaying the Enterprise Management window and the Confirm Initial Automatic Discovery dialog box (Figure 3-1).

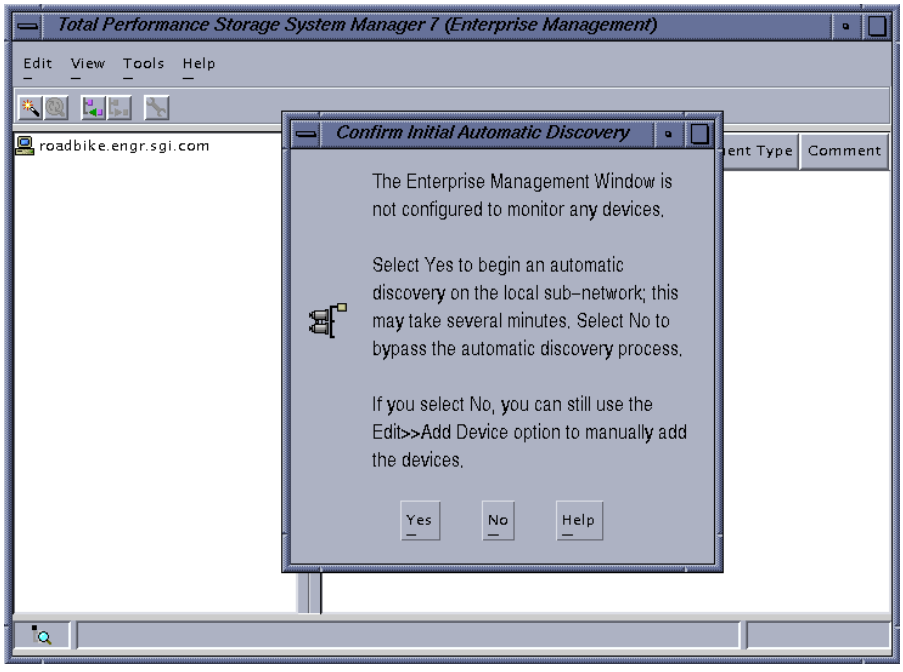

Figure 3-1 The Confirm Initial Enterprise Management Window and Automatic Discovery Dialog Box

Important: If `/usr/sbin` is not contained in the PATH environment variable, the full path name is required on the command line (`/opt/TP9400/bin`) to open the Enterprise Management window.

The Enterprise Management window might take several minutes to open. No wait cursor is displayed.

If you do not want to perform the initial automatic discovery, select `No`. You can use the `Edit >> Add Devices` pulldown menu option to add hosts and Storage Arrays. (See "Adding Devices" on page 26 for more information.)

2. Select `Yes` to begin an initial automatic discovery of hosts and Storage Arrays attached to the local subnetwork on which the management station is installed. This might take several minutes.

   The software sends a broadcast message across the local subnetwork where the management station is installed. It discovers host-agent managed Storage Arrays if the hosts that provide network management connections to the Storage Arrays respond to the broadcast. The software discovers directly managed Storage Arrays if the controllers in those Storage Arrays respond to the broadcast message.

   Note: It might take up to a minute for the Enterprise Management window to refresh after an initial automatic discovery.

   If you need to stop the automatic discovery operation for any reason, close the Enterprise Management window.

   When the initial automatic discovery is completed, you should see all of the hosts and Storage Arrays attached to the local subnetwork (Figure 3-2 on page 25).

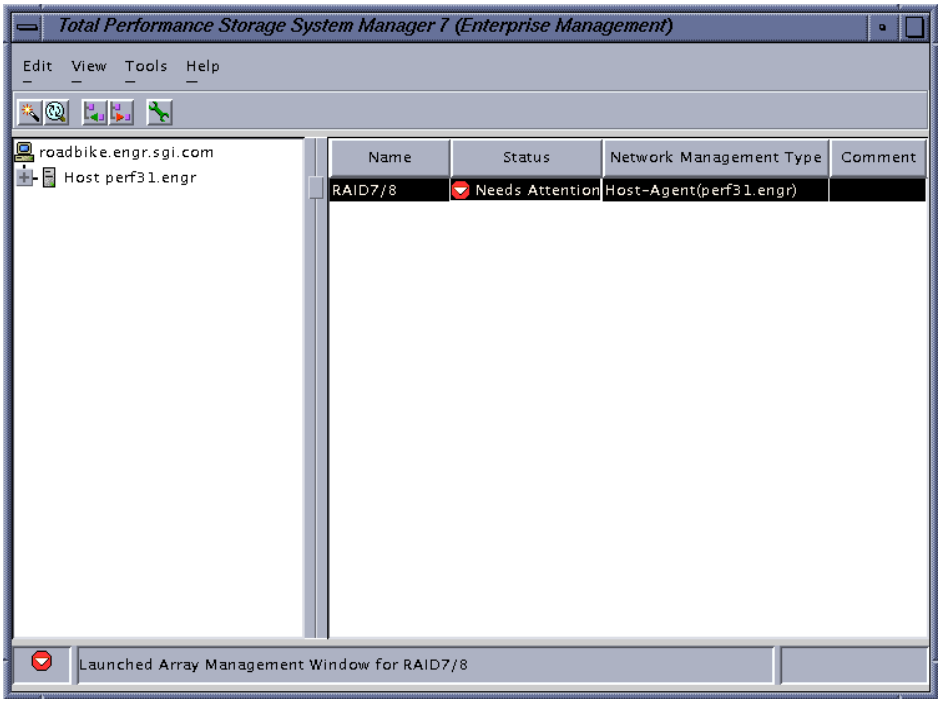

Figure 3-2 Enterprise Management Window

If you do not see all of the hosts and Storage Arrays you expected to see:

- Check the hardware and connections for possible problems (refer to the hardware documentation listed in "Related Publications" on page xii for specific procedures).
- Verify that the software is installed.
- Verify that TPSSM7 is running.
- Refer to the Enterprise Management window Help topic about discovering Storage Arrays.
- Make sure that the device is on the local subnetwork. If not, use the `Add Device` option.

If any device shows a status of `Unresponsive`, use the software to remove the device from the management domain and add it again. Refer to the Enterprise Management Window Help for instructions on removing and adding devices.

Note: A Storage Array might be duplicated in the Device Tree after an automatic discovery if the Storage Array is directly managed but is attached to a host with the host-agent software installed and running. In this case, remove the duplicate Storage Array icon from the Device Tree using the Remove Device option in the Enterprise Management window.

Adding Devices

You might want to add hosts or Storage Arrays outside the local subnetwork. To learn more about this option, refer to the Enterprise Management window Help.

Important: If you are managing Storage Arrays through the host-agent software and you physically add new Storage Arrays, you must stop and restart the host-agent software so it can recognize the new Storage Arrays (see "Stopping and Starting the Host-Agent Software" on page 32). Then go to the Enterprise Management window and select `Tools >> Rescan` to add the new Storage Arrays to the management domain.

Setting Up Alert Notifications

After you have added devices to the management domain, you should set up alert notification options to report critical events on the Storage Arrays. The following options are available for alert notification:

- Notification to designated e-mail addresses.
- Notification to designated alphanumeric pagers (when a third-party software package is used to convert e-mail messages).

The Enterprise Management window must remain open if you want to monitor the condition of Storage Arrays included in your management domain. If you close this window, you will not receive alert notifications. You can minimize the window.

Note: Refer to the Enterprise Management window Help for more information on alert notification options.

Starting the Array Management Window

Use this procedure to start an Array Management window for a selected Storage Array.

1. In the Enterprise Management window, select a Storage Array.
2. Select `Tools >> Manage Device`.

Note: Optionally, right-click the storage array and select `Manage Devices` to start an Array Management window.

The software displays the Array Management window for the selected Storage Array (Figure 3-3).

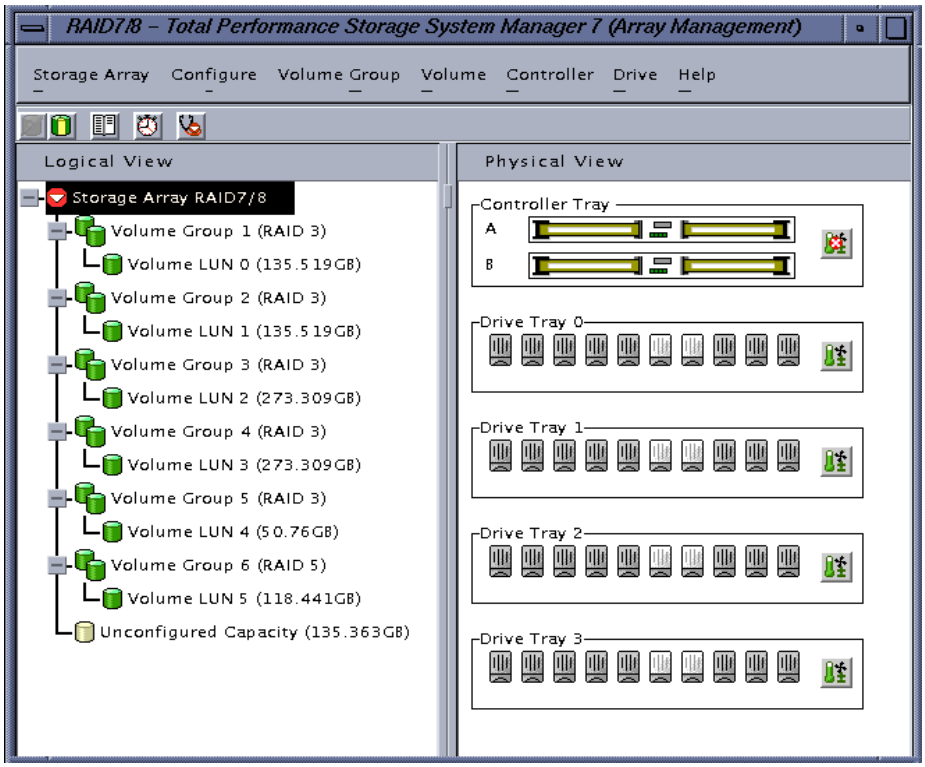

Figure 3-3 Array Management Window

Note: The Array Management window you opened lets you manage only the selected Storage Array. However, you can open multiple Array Management windows to manage other Storage Arrays.

Renaming Storage Arrays

When you start the storage management software for the first time, the Storage Arrays are unnamed. You must use the Array Management window to rename each Storage Array from `<unnamed>` to the name you want. Refer to the names you entered in the information record you created using Table 2-3 on page 15. Then, refer to the renaming Storage Arrays topic in the Array Management window Help. The Help topic provides detailed instructions for renaming Storage Arrays.

Other Storage Array Management Tasks

There are several other tasks you might want to perform at this time. These tasks include:

- Locating a Storage Array
- Viewing a Storage Array profile
- Configuring a Storage Array password
- Creating and managing volumes and volume groups
- Creating storage partitions (if applicable)

To create storage partitions, you must obtain the worldwide name or port name of each host adapter in each host connected to the Storage Array.

Note: To learn more about these and other Storage Array management tasks, refer to the appropriate topics in the Array Management window Help.

Operating System Support

This chapter describes the restrictions of using TPSSM7 in the IRIX environment, identifying volumes by device names, stopping and starting TPSSM7, and uninstalling specific software components.

Understanding the Restrictions

Table 4-1 provides information on the restrictions that apply to using TPSSM7 in the IRIX environment.

Note: Always check for a readme file on any installation media. This readme file might contain important, late-breaking information that was not available when this Administraion Guide was written.

Table 4-1 Restrictions for the IRIX Operating Environment

Restriction	Workaround
You cannot print topics from the Help systems.	The Help systems were developed with JavaHelp™ 1.0, which does not support printing. Printable versions of the Help systems are available on the installation CD in Adobe Acrobat Portable Document Format (PDF).
Clicking on the vertical scroll arrows (either up or down) causes the scroll box to move all the way to the opposite end of the scroll bar.	This is a known defect in the Java Runtime Environment. Click the scroll box and slide it until you reach the desired position in the window.

Table 4-1 (continued) Restrictions for the IRIX Operating Environment

Restriction	Workaround
If you are managing Storage Arrays with the host-agent software, do not download an NVSRAM configuration settings file with the `Access Volume Disabled` attribute. Doing so deletes the Access Volume on host-agent managed Storage Arrays, causing those Storage Arrays to become inaccessible.	If you download NVSRAM files to a host-agent managed Storage Array using the `Storage Array >> Download >> NVSRAM` option, select an NVSRAM file in the NVSRAM Download File Selection area, and then check the File Information to make sure that the file does not contain the `Access Volume Disabled` attribute. Important: If you accidentally delete the Access Volume, contact your customer support representative for assistance.
After trying to add a host device to the management domain of more than five clients, the host-agent managed Storage Arrays attached to that host become unresponsive.	A single instance of the host-agent software can only communicate with five or fewer clients.
When both ports of a dual-port Fibre Channel drive fail while the drive is part of a Storage Array, both A and B loops are brought down. You will lose access to the data on the storage devices. The probability of both ports failing on a single drive is remote. For example, based on 1.2 million hours MTBF, the likelihood for both ports to fail is 0.08%.	Shut down all drive tray(s) and the controller tray. Power up all of the drive tray(s) and then power up the controller tray. The drive with the port failures will not display in the Array Management window. Revive any failed drives caused by the drive failure (data integrity is preserved.) Replace the drive that does not display in the Array Management window with a good drive. Reconstruction begins and the volume is restored.
When using 73 GB drives, limit the number of drives used in a volume group to 29 or less.	None.
After pulling all drives from a Storage Array, the storage management software prompts you for a password when you start the software or when you perform protected operations. Any password you enter fails.	Password information is stored on a reserved area of each drive on the Storage Array. Each drive stores a mirrored copy of the password data. With no drives in the Storage Array, the storage management software does not find the password data when you attempt password protected operations. Add one of the drives to the Storage Array and reattempt the operation.

Table 4-1 (continued) Restrictions for the IRIX Operating Environment

Restriction	Workaround
If you configure a new Storage Array with a single controller, you must place the controller in the top slot (slot A). The controller firmware cannot recognize or talk to a single controller until slot A is populated. This restriction does not apply to Storage Arrays that were originally configured with two controllers.	None.
The Automatic Discovery option of the Enterprise Management window does not discover all of the appropriately configured Storage Arrays on a subnetwork.	Add the devices manually using the `Add Device` option. See the Enterprise Management Window Help for more information.
A controller fails during I/O transfer. The host hangs, and you might see an I/O error message.	Fix the controller, using the Recovery Guru. Restart the I/O application. No data corruption occurs.

Identifying Volumes by Operating System Device Names

The host-agent software includes a utility that lets you see which Storage Array volume is associated with a particular operating system device name. SM7device provides a detailed listing of IRIX device names to the Storage Array Volume names and their World Wide Name IDs. This capability is useful for operations such as data placement and volume deletion.

To use the utility:

1. At the command line, change to the `/opt/tp9400/bin` directory. Enter the following:

   ```
   SM7devices
   ```

The software displays device identification information. The table below shows an example output with a description of each column.

Table 4-2 Device Identification Information

Entry in IRIX	Controller Name	Volume Group	Vol. Name	World Wide Name of Device
/dev/scsi/sc11d1l8	[Storage Array RAID7/8,	Volume LUN 0,	LUN 0,	WWN <600a0b80000664d400000073396cd12f>]
/dev/scsi/sc11d1l1	[Storage Array RAID7/8,	Volume LUN 1,	LUN 1,	WWN <600a0b80000664d400000075396cd134>]
/dev/scsi/sc11d1l2	[Storage Array RAID7/8,	Volume LUN 2,	LUN 2,	WWN <600a0b80000664d400000077396cd138>]
/dev/scsi/sc11d1l3	[Storage Array RAID7/8,	Volume LUN 3,	LUN 3,	WWN <600a0b80000664d400000079396cd13c>]
/dev/scsi/sc11d1l4	[Storage Array RAID7/8,	Volume LUN 4,	LUN 4,	WWN <600a0b800000139600000833977470f>]
/dev/scsi/sc11d1l5	[Storage Array RAID7/8,	Volume LUN 5,	LUN 5,	WWN <600a0b800007b8370000000b39775aa1>]
/dev/scsi/sc11d1l31	[Storage Array RAID7/8,	Vol. Acc. volume,	LUN 31,	WWN <600a0b800007b837000000000000000>]
/dev/scsi/sc12d3l0	[Storage Array RAID7/8,	Volume LUN 0,	LUN 0,	WWN <600a0b80000664d400000073396cd12f>]
/dev/scsi/sc12d3l1	[Storage Array RAID7/8,	Volume LUN 1,	LUN 1,	WWN <600a0b80000664d400000075396cd134>]
/dev/scsi/sc12d3l2	[Storage Array RAID7/8,	Volume LUN 2,	LUN 2,	WWN <600a0b80000664d400000077396cd138>]
/dev/scsi/sc12d3l3	[Storage Array RAID7/8,	Volume LUN 3,	LUN 3,	WWN <600a0b80000664d400000079396cd13c>]
/dev/scsi/sc12d3l4	[Storage Array RAID7/8,	Volume LUN 4,	LUN 4,	WWN <600a0b800000139600000833977470f>]
/dev/scsi/sc12d3l5	[Storage Array RAID7/8,	Volume LUN 5,	LUN 5,	WWN <600a0b800007b8370000000b39775aa1>]
/dev/scsi/sc12d3l31	[Storage Array RAID7/8,	Vol. Acc. volume,	LUN 31,	WWN <600a0b800000139600000000000000000>]

Stopping and Starting the Host-Agent Software

Follow these procedures to stop and start the host-agent software installed on the host.

You must stop the host-agent software if you want to add Storage Arrays. When you restart the software, the host-agent discovers the new Storage Arrays and adds them to the management domain.

- To stop the host-agent software, type the following on the command line:

  ```
  /etc/init.d/tpssm7 stop
  ```

The host-agent software automatically starts after you reboot the host. However, you must start the software manually if you stop it to add Storage Arrays.

- To start the host-agent software, type the following on the command line:

  ```
  /etc/init.d/tpssm7 start
  ```

Uninstalling Storage Management Software Components

Before uninstalling software components, note the following:

- You must have root (superuser) privileges to remove any storage management software.
- No reboot is required after removing the client and agent software.
- The software removal process will not remove the configuration files (`emwdata.bin`, `emwback.bin`) which are created by the client in each user's home directory. Reinstalling the client will not overwrite these files.

Use the following procedure to remove software components:

1. Use the `inst` command to uninstall one or more of the components of TPSSM7.
2. Type `list` and press Enter.
3. Type `r` and press Enter.
4. Type `TPSSM7` and press Enter.
5. To remove the file, type `go` and press Enter.
6. Type `TPSSM7agent` and press Enter.
7. To remove the file, type `go` and press Enter.

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