SANtricity™ Storage Manager

Installation Guide for Version 8.3x

TI12762-E3, Third Edition

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Document Description

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This document describes version 8.3x of SANtricity™ Storage Manager and will remain the official reference source for all revisions/releases of this product until rescinded by an update.

Intended Readers

This book is intended for system and storage administrators who are responsible for installing software. Readers should have knowledge of RAID, SCSI, and Fibre Channel technology and working knowledge of the applicable operating systems used with the storage management software.

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Revision Record		
Edition or Revision	**Date**	**Affected Pages or Remarks**
First Edition	September 2002	New Book.
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Part Number: TI12762-E3

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Chapter 1

AIX Software Installation

This chapter contains procedures for installing the applicable software packages on one or more AIX storage management stations or hosts.

IMPORTANT Downgrades from SANtricity Storage Manager for version 8.3x to a previous version can cause data loss and are not supported.

IMPORTANT The storage management software has not been certified for use within a cluster environment for AIX. It is recommended that you install the storage management software on AIX operating systems only within a non-cluster environment.

Removing the Storage Management Software

This section contains procedures for removing the storage management software on one or more AIX storage management stations or hosts.

No reboot is required after removing a storage management software package. Existing disk subsystem mappings and storage partition configurations are retained during software removal and will be recognized by the new client software.

1 Are you installing a new version of the software?

- Yes – Ensure you have completed an AIX Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for removing the storage management software.
- No – Go to step 2.

2 Ensure you have root privileges, which are required to remove the software.

3 List all software installed on the current AIX system. At the prompt, type the following and press Enter:

```
lslpp -L
```

4 Remove the storage management software. At the prompt, type the following and press Enter:

```
installp -u component name
```

where *component name* is the name of the software package component you wish to remove.

Allow ample time for the system to complete the software package removal. Because the storage management software packages may be large, the system may appear to be unresponsive during package removal.

The machine will display a summary of the software removal, where Event is listed as Deinstall, and Result is listed as Successful. No reboot is required after removing a software package.

5 Repeat step 4 to remove each storage management software package.

6 Are you installing a new version of the software?

- Yes – Go to "Installing the Storage Management Software."
- No – You are finished with this procedure.

Installing the Storage Management Software

This section contains procedures for installing the storage management software on one or more AIX machines.

IMPORTANT Install SMruntime before installing SMclient. No reboot is required during the software installation process. The event monitor software is installed automatically during client software installation.

---

1. Ensure you have completed an AIX Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for installing the applicable software in the correct order on the storage management station or host.
2. Insert the installation CD and, if necessary, mount the CDROM drive. In the following procedure, the CDROM drive is mounted at /cdrom. Modify these instructions as required for your specific installation.
3. Install the storage management station software packages in the order in which they appear in the Installation Activity column, installing only those packages that correspond to your selections in the Pre-Installation Activity column of the AIX Installation Profile.
   a. Change to the client software directory. At the prompt, type the following and press Enter:

      ```
      cd /cdrom/clientinstall
      ```

   b. At the prompt, type the installation command for the software package and press Enter. Refer to Table 1-1.

Table 1-1 Storage Management Station Software Installation

Package	Installation Command
SMruntime	`installp -a -d smruntime.install.bff all`
SMclient	`installp -a -d smclient.install.bff all`

The installation process begins, during which various information is displayed. When the installation is finished, an Installation Summary is displayed. After the software has been installed successfully, the system returns to the prompt.

4 Verify the installation. At the prompt, type the verification command for the software package and press Enter. Refer to Table 1-2.

Table 1-2 Storage Management Station Software Verification Commands

Package	Verification Command
SMruntime	`lslpp -ah SMruntime.aix.rte`
SMclient	`lslpp -ah SMclient.aix.rte`

5 Choose one of the following, based on whether a failure was reported:

- The verification successfully returned a table with a software installation description – Repeat step 3 on page 1-3 and step 4 to install each applicable software package. When finished, go to step 6.
- The installation was interrupted – Type the following and press Enter, and then repeat the installation steps to install the applicable software package.

  ```
  installp -C packagename
  ```

- A failure was reported – Repeat step 3 on page 1-3 and step 4 for the package with the failed installation. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

6 Install the host software packages in the order in which they appear in the Installation Activity column, installing only those that correspond to your selections in the Pre-Installation Activity column of the AIX Installation Profile.

a Change to the host software directory. At the prompt, type the following and press Enter:

```
cd /cdrom/hostinstall
```

b At the prompt, type the installation command for the software package and press Enter. Refer to Table 1-3.

Table 1-3 Host Software Installation Commands

Package	Installation Command
SMruntime	`installp -a -d smruntime.install.bff all`
SMutil	`installp -a -d smutil.install.bff all`
SMagent	`installp -a -d smagent.install.bff all`
SMclient	`installp -a -d smclient.install.bff all`

The installation process begins, during which various information is displayed. When the installation is finished, an Installation Summary is displayed. After the software has been installed successfully, the system returns to the prompt.

7 Verify the installation. At the prompt, type the verification command for the software package and press Enter. Refer to Table 1-4.

Table 1-4 Host Software Verification Commands

Package	Verification Command
SMruntime	`lslpp -ah SMruntime.aix.rte`
SMutil	`lslpp -ah SMutil.aix.rte`
SMagent	`lslpp -ah SMagent.aix.rte`
SMclient	`lslpp -ah SMclient.aix.rte`

8 Choose one of the following, based on whether a failure was reported:

- The verification successfully return a table with a software installation description – Repeat step 6 and step 7 on page 1-5 to install each applicable software package. When finished, go to step 9.
- The installation was interrupted – Type the following and press Enter, and then repeat the installation steps to install the applicable software package.

  ```
  installp -C packagename
  ```

- A failure was reported – Repeat the installation steps for the package with the failed installation. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

9 Choose one of the following:

- Storage management software is required on other AIX machines – For each AIX machine, perform the software removal and installation procedures described in this chapter as applicable. Refer to the corresponding AIX Installation Profile for each machine to determine which software package to install first.
- Storage management software installation is completed on all AIX machines – Go to "Starting the Storage Management Software."

Starting the Storage Management Software

Use the following procedure to start the storage management software.

1 At the prompt, type the following and press Enter:

```
SMclient
```

A splash screen is displayed while the client software starts. When the client software has been loaded, the Enterprise Management Window and the Confirm Initial Automatic Discovery dialog is displayed (Figure 1-1). The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

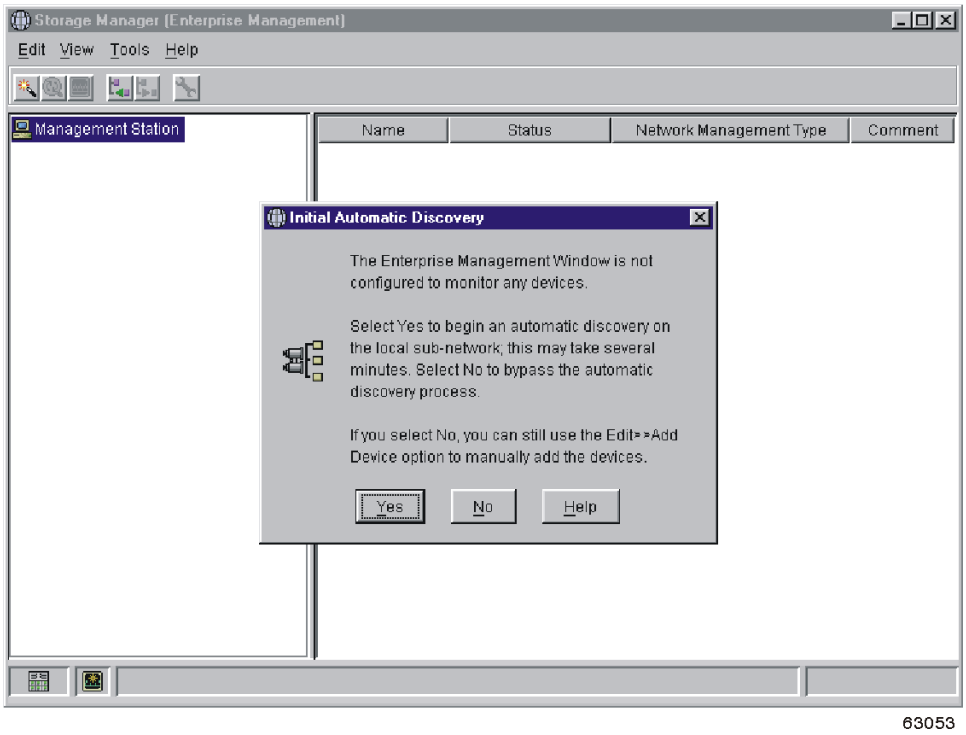

Figure 1-1 Confirm Initial Automatic Discovery Dialog

2 Select Yes to begin an initial automatic discovery of attached hosts and disk subsystems.

The software sends a broadcast message across the local subnetwork connected to the storage management station. It discovers host-agent managed disk subsystems if the respective *host* responds to the broadcast.

The software discovers direct managed disk subsystems if the *controllers* in the attached disk subsystems respond to the broadcast message. It may 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, all attached hosts and disk subsystems should appear in the Enterprise Management Window (Figure 1-2).

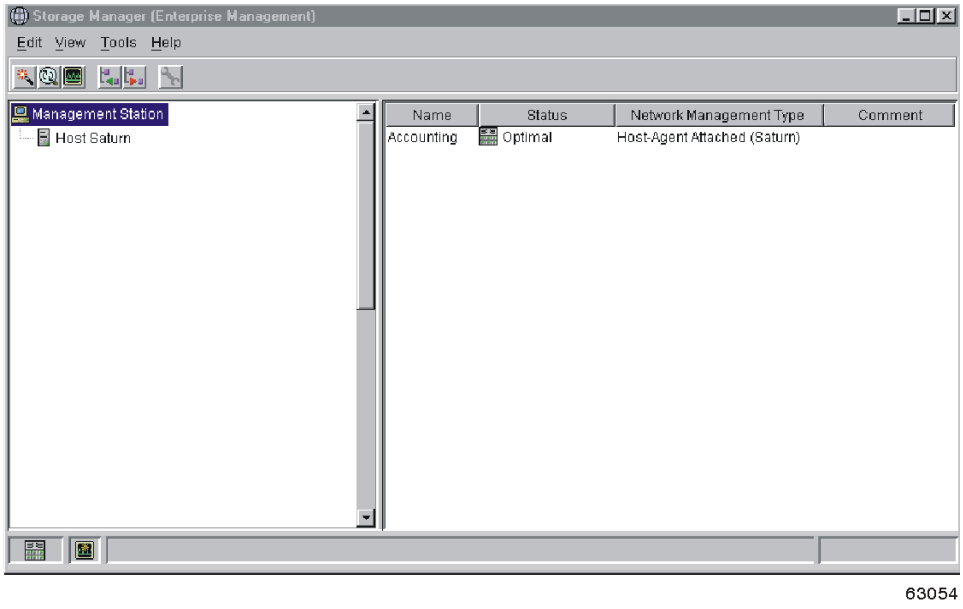

Figure 1-2 Enterprise Management Window

3 Verify all attached hosts and disk subsystems appear as expected. If they do not, do the following:

   a Check the hardware and connections for possible problems. Refer to the hardware documentation for specific procedures on troubleshooting interface problems.

   b Refer to the Enterprise Management Window Help topic on discovering disk subsystems and take the appropriate action provided.

   c Determine if the device is on the local subnetwork. If it is not, use the Add Device option to add it. Refer to the Enterprise Management Window Help topic on adding devices.

   d If a disk subsystem is duplicated in the Device Tree, remove the duplicate disk subsystem icon from the Device Tree using the Remove Device option in the Enterprise Management Window.

4 Verify the status of each disk subsystem is Optimal. If any device shows an Unresponsive status, do the following:

   a Remove the device from the management domain and add it again. Refer to the Enterprise Management Window Help topic on removing and adding devices.

   b If the device still shows an Unresponsive status, contact technical support.

5 Do you need to upgrade the controller firmware? Refer to your selection in the firmware upgrade requirements sections of the AIX Installation Profile.

   - Yes – Go to "Upgrading Controller Firmware" on page 1-10.
   - No – Go to "Completing the Installation" on page 1-16.

Upgrading Controller Firmware

Use the following procedure to upgrade controller firmware from version 4.01.02.30 to version 5.x. Refer to the *SANtricity Storage Manager Product Release Notes* for the required files to download from the installation CD.

IMPORTANT All controllers must be running firmware version 4.01.02.30 or higher to be *managed* with version 8.3x storage management software or to be *upgraded* to firmware version 5.3x.

IMPORTANT Upgrades to firmware version 4.01.02.30 – The installation CD for version 8.3x includes only 5.x firmware versions. To obtain version 4.01.02.30, contact technical support.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. Verify you have installed all required operating system patches. Refer to the *Storage System Planning Guide* for operating system specifications.

   The storage management software installation program will not install these patches. Some patches listed may be superseded by other patches. Refer to your operating system documentation or contact your operating system supplier for more information.
3. Ensure the storage management software is running. If necessary, refer to "Starting the Storage Management Software" on page 1-7 for procedures.
4. Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

   The Array Management Window is displayed (Figure 1-3).

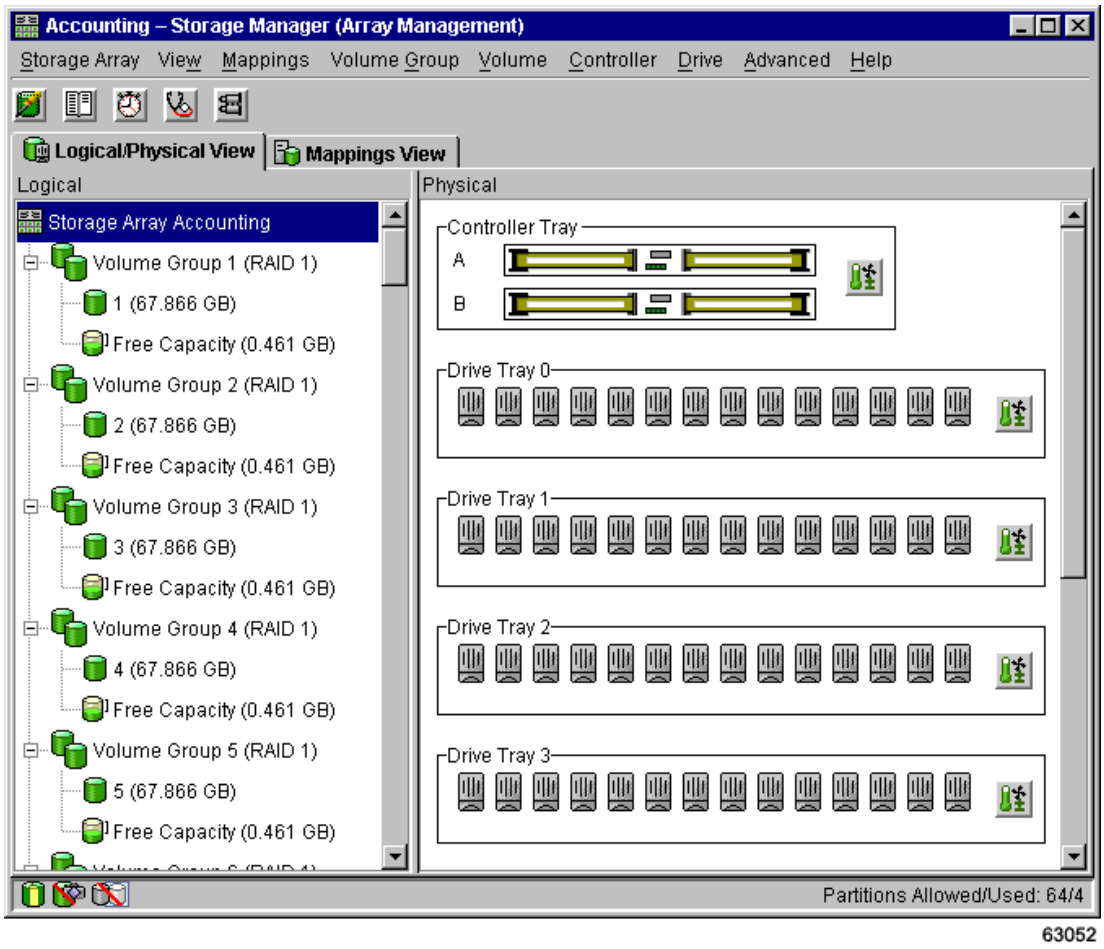

Figure 1-3 Array Management Window

5 Verify the Mode (state), cache size, and host I/O settings of each controller:

a Right-click Controller A and select Properties.

The Controller Properties window is displayed.

b Select the Base tab.

c Locate the Mode configuration and ensure the controller is in an Active state.

d Locate the Cache/processor size (MB) configuration and record the setting listed.

e Select the Interfaces tab.

f Locate the Fibre Channel host I/O interface settings, and record the number listed under Preferred ID for each port.

g Select Close.

6 Repeat step 5 for Controller B.

CAUTION Ensure both controllers are in an Active state and each controller owns at least one volume (LUN).

7 Verify the volume ownership of each controller:

a Right-click the disk subsystem in the Logical/Physical view and select View Profile.

The Disk Subsystem Profile window is displayed.

b Select the Volumes tab.

c Locate the Owned by controller in slot: information by each volume and ensure each controller owns at least one volume.

NOTE Use the Volume >> Change >> Ownership/Preferred Path option to transfer ownership of a volume, if needed.

d Locate the Status information and ensure the Status of each volume is Optimal.

8 Stop all I/O to the disk subsystem to prevent application errors.

9 From the menu, select Disk Subsystem >> Download >> Firmware.

The Firmware Download dialog is displayed.

10 In the File Selection area, select the CDROM drive and then the firmware folder. Either double-click the folder or type the folder name in the Enter File Name: text box.

11 Select the file that matches your controller type and select OK.

The Confirm Download dialog is displayed.

12 Select Yes to start the download.

13 Do one of the following, based on the dialog that is displayed after the download is completed.

- Firmware Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

14 After the download successfully completes, do the following:

a Close the dialogs and the current Array Management Window.

b Restart the Array Management Window by selecting a disk subsystem in the Enterprise Management Window and selecting Tools >> Manage Device.

The Array Management Window that uses the functionality of the new firmware will be displayed.

15 Go to "Downloading NVSRAM Configuration Settings."

Downloading NVSRAM Configuration Settings

Use the following procedure to download NVSRAM configuration settings. Refer to the *SANtricity Storage Manager Product Release Notes* for the name of the required files to download from the installation CD.

IMPORTANT Perform this procedure only after you have installed the SMclient and ensured the controller firmware is at version 4.01.02.30 or higher.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. On a storage management station, start the storage management software.
3. Select Tools >> Manage Device to open the Array Management Window.
4. From the menu, select Disk Subsystem >> Download >> NVSRAM.

   The NVSRAM Download dialog is displayed.
5. In the File Selection area, select the CDROM drive and then the nvsram folder. Either double-click the folder or type the folder name in the Enter File Name: text box.
6. Select the file that corresponds to the disk subsystem type and select OK.

   The Confirm Download dialog is displayed.
7. Select Yes to start the download.

IMPORTANT During the download, a dialog may appear stating "the firmware downloaded is not compatible with the current version of the Array Management Window." *Do not* select OK in this dialog until the Download Successful dialog is displayed.

---

8. Do one of the following, based on the dialog that is displayed after the download is completed.
   - Download Successful dialog – Select Done.
   - Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

IMPORTANT You *must* set the host type before rebooting the host. The host type defines how the controllers in the disk subsystem work with the host's operating system when the volumes are accessed. If the host type is not set, contact with the disk subsystem might be lost. Complete step 9 through step 12 in this procedure to set the host type.

9 To determine whether SANshare Storage Partitioning is enabled or disabled, from the menu, select Disk Subsystem >> Premium Features >> List.

The List Premium Features dialog is displayed.

10 Is SANshare Storage Partitioning enabled?

- Yes – Select Close, and go to step 11.
- No – Select Close, and go to step 12.

11 SANshare Storage Partitioning is enabled – Perform the following procedures, referring to the Array Management Window Help for procedures.

a Define storage partitioning topology (hosts and host ports) for the new hosts.

b Define the host types of the individual host ports:

1 Select the Mappings View Tab.

2 Select a host port in the left pane of the window and then select Change Host Type from the right-mouse pop-up menu.

3 Select the correct host type.

4 Select OK to save the changes.

5 Repeat steps 2 through 4 for each host port shown in the Mappings View.

6 Select Close to close the Mappings window.

c Set up storage partitioning mappings so that the new hosts you have defined can access existing volumes on the disk subsystem, when required.

d Go to step 13.

12 SANshare Storage Partitioning is disabled – Change the host type of the disk subsystem:

a From the menu, select Disk Subsystem >> Change >> Default Host Type.

b Select the correct host type.

c Select OK to save the changes.

13 If needed, run scripts to modify default configuration settings stored in NVSRAM on each disk subsystem to meet the needs of your specific configuration.

Refer to the *SANtricity Storage Manager Product Release Notes* more information.

14 Go to "Verifying Host I/O Interface Settings."

Verifying Host I/O Interface Settings

Use the following procedure to verify the host I/O interface settings after upgrading the firmware from any type of host.

1. On a storage management station, start the storage management software.
2. Select a disk subsystem in the Enterprise Management Window.
3. Select Tools >> Manage Device to open the Array Management Window.
4. In the Physical View, right-click Controller A and select Change >> Preferred Loop ID.

   The Change Preferred Loop ID dialog is displayed.
5. Verify the host I/O interface settings match those you recorded in step 5 on page 1-11 for each controller.
6. Do the controller settings match what you have recorded?
   - Yes – Select Close and go to step 10.
   - No – Select Close and go to step 7.
7. Correct the interface settings:
   a. Select a port in the Fibre Channel host I/O interfaces portion of the Interfaces tab.
   b. Select Change Preferred ID.

      The Change Preferred ID dialog is displayed.
   c. Change the number to match the value you recorded in step 5 on page 1-11.

      For example, if the value you recorded was 1/0xE8, you would select “1” in the Normal box. If the number you recorded was 126, select N-Port (126). If the original setting was 127, select Set During Loop Initialization (127).
   d. Select OK.
8. Repeat step 7 to correct the interface settings for each port.
9. Repeat step 4 through step 7 for Controller B.
10. Have you changed the interface settings?
    - Yes – Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power on for the new host I/O interface settings to take effect. When finished, go to step 11.
    - No – Go to step 11.
11. Remove the installation CD from the CDROM drive.
12. Go to “Completing the Installation” on page 1-16.

Completing the Installation

Use the following procedures to complete the installation process.

1. Configure alert notifications to receive e-mail or SNMP notifications of critical events that occur on the disk subsystems. Refer to the Enterprise Management Window Help for procedures. You can configure alert notifications to be sent to the following types of receiving devices:
   - Designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps – To configure the NMS for SNMP traps, go to step 2. Otherwise, go to step 3.
   - Designated e-mail address – Refer to the Enterprise Management Window Help for procedures. To send e-mail to LSI Logic Storage Systems, Inc., contact technical support. When finished, go to step 3.
   - Designated alphanumeric pager – A designated alphanumeric pager can receive alert notifications when third-party software is used to convert e-mail messages. When finished, go to step 3.
2. Configure the NMS for SNMP traps:
   a. Insert the installation CD into the NMS.
   b. Copy the mib directory from the installation CD to the appropriate MIB file on the NMS.
   c. Compile the MIB according to the procedure required by your NMS. For details, contact your network administrator or refer to your network management station documentation.

3 Start the Array Management Window.

You must open an Array Management Window to manage a selected disk subsystem. You can open multiple Array Management Windows to manage more than one disk subsystem at the same time.

From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Windows is displayed (Figure 1-4).

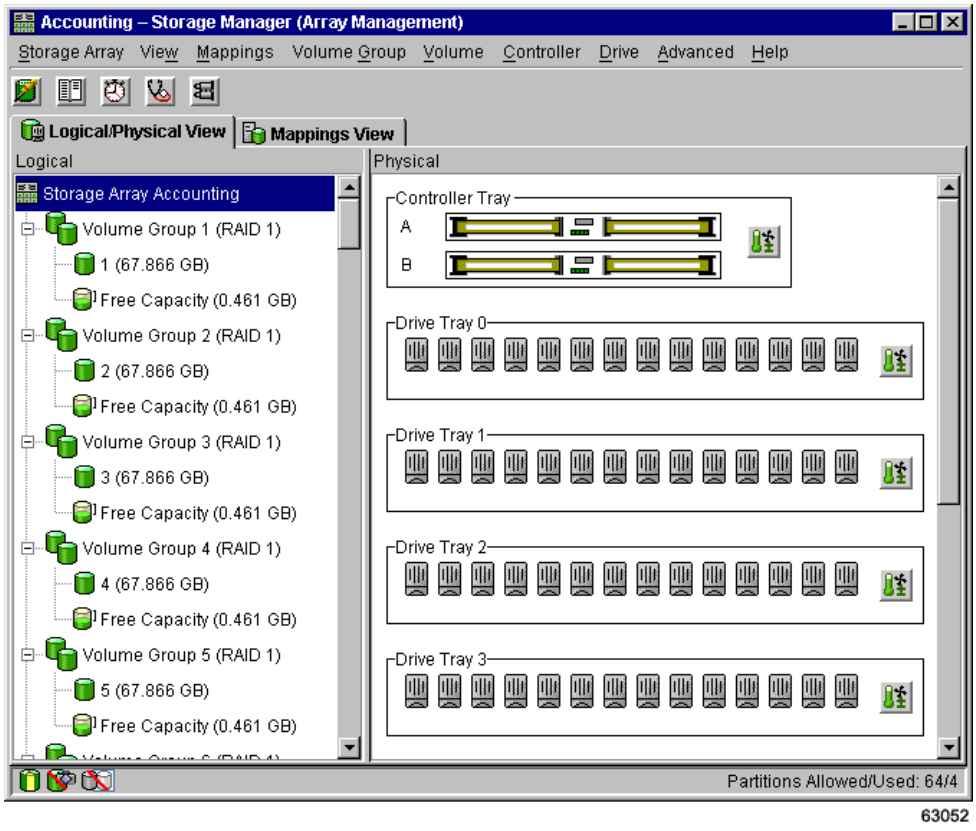

Figure 1-4 Array Management Window

4 Assign a unique name to the disk subsystem .

You must rename each disk subsystem to the name you entered on the AIX Installation Profile. For related topics and procedures, refer to the Array Management Window Help.

5 Enable any premium features on your disk subsystem. For related topics and procedures, refer to the Array Management Window Help.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

---

6 Is the client software running on two or more machines?

- Yes – Disable the event monitor on all but one machine. At the prompt, type the following and press Enter:

  ```
  SMmonitor stop
  ```

  When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

- No – Go to step 7.

7 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, Array Management Window Help, and to the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Refer to "Post-Installation Activities."

End Of Procedure

Post-Installation Activities

Use the following procedures to manage your disk subsystem from an AIX machine.

Disabling and Enabling the Event Monitor

The event monitor is packaged with the client software and is installed automatically when you install the client software. The event monitor handles disk subsystem error messages through e-mail or SNMP traps when the storage management software is inactive. You can disable and enable the event monitor while it is running, or you can permanently disable or enable the boot-time loading of the event monitor.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

Disabling the Event Monitor While the Software is Running

IMPORTANT If you disable the event monitor while the client software is running, it will start automatically at the next reboot.

At the prompt, type the following and press Enter:

```
SMmonitor stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

End Of Procedure

Enabling the Event Monitor While the Software is Running

At the prompt, type the following and press Enter:

```
SMmonitor start
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor started.
```

End Of Procedure

Disabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
rmitab "smmonitor"
```

You are returned to the prompt.

End Of Procedure

Enabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
mkitab "smmonitor:2:wait:/usr/sbin/SMmonitor start > /dev/
console 2>&1"
```

You are returned to the prompt.

End Of Procedure

Using the hot_add Utility

The hot_add utility is used to add new volumes dynamically without restarting the system. The utility registers the new volumes with the operating system so you can perform functions such as adding device names. The hot_add utility is installed as a part of the SMutil software.

Use the following procedure to run the hot_add utility from an AIX machine.

1 Ensure you have root or root-equivalent privileges.

2 At the prompt, type the following and press Enter:

```
hot_add
```

Several minutes may pass while the computer is accessing the drives. When the program is finished, a screen is displayed with the following:

```
Device nodes have been updated
```

The new volumes will be available to you through the operating system.

End Of Procedure

Identifying Volumes by Operating System Device Names

Use the following procedure to locate system devices from an AIX machine. The SMutil software includes a utility that allows you to see which disk subsystem volume is associated with a particular operating system device name. This capability is useful for operations such as data placement and volume deletion.

IMPORTANT If you are unsure whether new devices or volumes have been added to the system, it is recommended that you run hot_add first to ensure the devices are registered with the system. If the devices are not registered, they will not be displayed in the SMdevices output.

At the prompt, type the following and press Enter:

```
SMdevices
```

The software displays device identification information, similar to the following example, where:

- /dev/. . ./. . ./. . . = UNIX device node name
- Disk Subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume

```
/dev/hdisk2 [Disk Subsystem <name>, Volume Finance, LUN 0,
Volume WWN <600a0b80000cc986000008873cf4d5da>, Preferred Path
(Controller-A): In Use]
 /dev/hdisk3 [Disk Subsystem <name>, Volume Database, LUN 1,
Volume WWN <600a0b80000cc9dd0000030b3cf4d5ef>, Preferred Path
(Controller-A): In Use]
 /dev/hdisk4 [Disk Subsystem <name>, Volume Cobol, LUN 2,
Volume WWN <600a0b80000cc986000008893cf4d5fa>, Preferred Path
(Controller-A): In Use]
 /dev/hdisk5 [Disk Subsystem <name>, Volume 2-2, LUN 3, Volume
WWN <600a0b80000cc9dd0000030c3cf4d601>, Preferred Path
(Controller-A): In Use]
 /dev/hdisk6 [Disk Subsystem <name>, Volume Admin, LUN 4,
Volume WWN <600a0b80000cc9860000088b3cf4d60a>, Preferred Path
(Controller-A): In Use]
/dev/hdisk9 [Disk Subsystem <name>, Volume Access, LUN 7,
Volume WWN <600a0b80000cc9860000088e00000000>]
```

End Of Procedure

Stopping and Starting the Host-Agent Software

Use the following procedures to stop and restart the host-agent software on an AIX machine.

You will need to stop and restart the SMagent software whenever you:

- Download a NVSRAM file that enables an Access Volume or changes the LUN used for the Access Volume. Doing so allows detection of the new disk subsystems that will be managed by the host. If an Access Volume is not detected after a reboot, then the SMagent software will stop running automatically and you will need to restart it.
- Change the LUN number of the access volume in the Mappings View.

IMPORTANT If /usr/sbin is not included in the PATH environment variable, the full path name is required on the command line (/usr/SM8/agent/SMagent) to stop or start this software.

Stopping the Host-Agent Software

To add disk subsystems, you must stop the SMagent software. When you restart the software, the software detects the new disk subsystems and adds them to the management domain.

At the prompt, type the following and press Enter:

```
SMagent stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMagent stopped.
```

End Of Procedure

Starting or Restarting the Host-Agent Software

The SMagent software automatically starts after you reboot the host. However, you must start the software manually if you stop it to add disk subsystems.

At the prompt, type the following and press Enter:

```
SMagent start
```

The SMagent software may take a moment to initialize. The cursor is displayed, but the terminal window will not respond. When the program startup begins, a screen is displayed with the following:

```
SMagent started.
```

After the program startup is completed, a screen is displayed with text similar to the following example:

```
#SANtricity Storage Manager Agent, Version 08.3x.00.00
Built Wed Aug 15 16:54:46 CDT 2002
Copyright (C) LSI Logic Corp 2002. All rights reserved.
checking device /dev/rhdisk1: activating
checking device /dev/rhdisk2: activating
checking device /dev/rhdisk3: activating
checking device /dev/rhdisk4: skipping
Running...
```

An alternate restart procedure (without entering the start command) requires starting the SMagent software without performing a stop command. The SMagent software automatically detects older copies of the software and performs a stop and hot_add before restarting the software.

End Of Procedure

Chapter 2

HP-UX Software Installation

This chapter contains procedures for installing the applicable software packages on one or more HP-UX storage management stations or hosts.

IMPORTANT Downgrades from SANtricity Storage Manager for version 8.3x to a previous version can cause data loss and are not supported.

Removing the Storage Management Software

Use the following procedure to remove the storage management software for version 6.xx or 7.xx. Installation of version 8.3x will overwrite any previous version of 8.xx, so removal of version 8.xx is unnecessary.

IMPORTANT No reboot is required after removing a storage management software package. Existing disk subsystem mappings and storage partition configurations are retained during software removal and will be recognized by the new client software.

---

1. Are you installing a new version of the software?
   - Yes – Ensure you have completed an HP-UX Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for removing the storage management software.
   - No – Go to step 2.
2. Ensure you have root privileges, which are required to remove the software.
3. Remove the storage management software.
   a. At the prompt, type the following and press Enter:

      ```
      swremove &
      ```

      A screen is displayed showing all software currently installed on this machine.

   b. Select the packages you wish to remove: select Packages >> Actions >> Remove. Multiple packages can be selected by using the Shift key while clicking on individual packages.

      The Remove Analysis dialog is displayed.

   c. Verify the number of packages to be removed equals that which is represented in the products scheduled field, then select OK.

      The Remove dialog is displayed with a progress indicator.

   d. When the software removal process is completed, select Done.

   e. Select File >> Exit to close the Remove dialog.
4. Repeat step 3 to remove each storage management software package.
5. Are you installing a new version of the software?
   - Yes – Go to "Installing the Storage Management Software."
   - No – You are finished with this procedure.

Installing the Storage Management Software

This section contains procedures for installing the storage management software on one or more HP-UX machines.

IMPORTANT Install the runtime software before installing the client software. No reboot is required during the runtime, client, and client integration software installation process. The event monitor software is installed automatically during client software installation.

---

1. Ensure you have a completed an HP-UX Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for installing the applicable software in the correct order on the storage management station or host.
2. Insert the installation CD and ensure the folder in which the software will reside is empty.
3. Mount the CDROM drive using the following command line. In this step, the CDROM drive is mounted at /cdrom, thus, ensure /cdrom should be empty. Modify this location as required for your specific installation. Type the following and press Enter:

   ```
   mount -o cdcase /dev/dsk/c#t2d0 /cdrom
   ```

   where # is the location of the CDROM drive.

4 Install the storage management station software packages in the order in which they appear in the Installation Activity column of the *Storage System Planning Guide*, installing only those packages that correspond to your selections in the Pre-Installation Activity column of the HP-UX Installation Profile.

a At the prompt, type the installation command for the required software package and press Enter. Refer to Table 2-1.

A screen is displayed with the software package name.

Table 2-1 Storage Management Station Software Installation Commands

Package	Installation Command
SMruntime	`swinstall -s /cdrom/clientinstall/smruntime-install`
SMclient	`swinstall -s /cdrom/clientinstall/smclient-install`
SMHPovcl	`swinstall -s /cdrom/clientinstall/smovclient-install`

b Select the required software package.

c Select Actions >> Install >> OK to start the installation.

An Analysis window may be displayed to check the integrity of the file. Select OK when it is complete.

A window is displayed indicating the percentage of completion.

d When the installation is finished, select Done.

e Select File >> Exit to close the installation window.

5 At the prompt, type the verification command for the selected software package and press Enter. Refer to Table 2-2.

Table 2-2 Storage Management Station Software Verification Commands

Package	Verification Command
SMruntime	`swverify -v SMruntime`
SMclient	`swverify -v SMclient`
SMHPovcl	`swverify -v SMHPovcl`

6 Was the installation successful (no failure reported)?

- Yes – Repeat step 4 and step 5 to install each required storage management station software package. When finished, go to step 7.
- No – View the log file.

  The log file contains records of all recent software installations.

  Refer to the last entry in the log for records of this installation and follow the instructions provided. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

7 Install the host software packages in the order in which they appear in the Installation Activity column, installing only those that correspond to your selections in the Pre-Installation Activity column of the HP-UX Installation Profile.

a At the prompt, type the installation command for the host software package and press Enter. Refer to Table 2-3.

  A screen is displayed with the software package name.

Table 2-3 Host Software Installation Commands

Package	Installation Command
SMruntime	`swinstall -s /cdrom/hostinstall/smruntime-install`
SMutil	`swinstall -s /cdrom/hostinstall/smutil-install`
SMagent	`swinstall -s /cdrom/hostinstall/smagent-install`
SMclient	`swinstall -s /cdrom/hostinstall/smclient-install`
SMHPovcl	`swinstall -s /cdrom/hostinstall/smovclient-install`

b Select the required software package.

c Select Actions >> Install >> OK to start the installation.

  A window is displayed indicating the percentage of completion.

d When the installation is finished, select Done.

e Select File >> Exit to close the installation window.

8 At the prompt, type the verification command for the selected software package and press Enter. Refer to Table 2-4.

Table 2-4 Host Software Verification Commands

Package	Verification Command
SMruntime	`swverify -v SMruntime`
SMutil	`swverify -v SMutil`
SMagent	`swverify -v SMagent`
SMclient	`swverify -v SMclient`
SMHPovcl	`swverify -v SMHPovcl`

9 Was the installation successful (no failure reported)?

- Yes – Repeat step 7 on page 2-5 and step 8 to install each applicable host software package. When finished, go to step 10.
- No – View the log file.

  The log file contains records of all recent software installations.

  Refer to the last entry in the log for records of this installation and follow the instructions provided. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

10 Choose one of the following:

- Storage management software is required on other HP-UX machines – For each HP-UX machine, perform the software removal and installation procedures described in this chapter as applicable. Refer to the corresponding HP-UX Installation Profile for each machine to determine which software package to install first.
- Storage management software installation is completed on all HP-UX machines – Go to "Starting the Storage Management Software."

Starting the Storage Management Software

Use the following procedures to start the storage management software.

IMPORTANT Cluster configurations – Complete all applicable configuration procedures for each disk subsystem *before* booting the cluster server.

1 At the prompt, type the following and press Enter:

```
SMclient
```

A splash screen is displayed while the client software starts. When the client software has been loaded, the Enterprise Management Window and the Initial Automatic Discovery dialog are displayed (Figure 2-1). The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

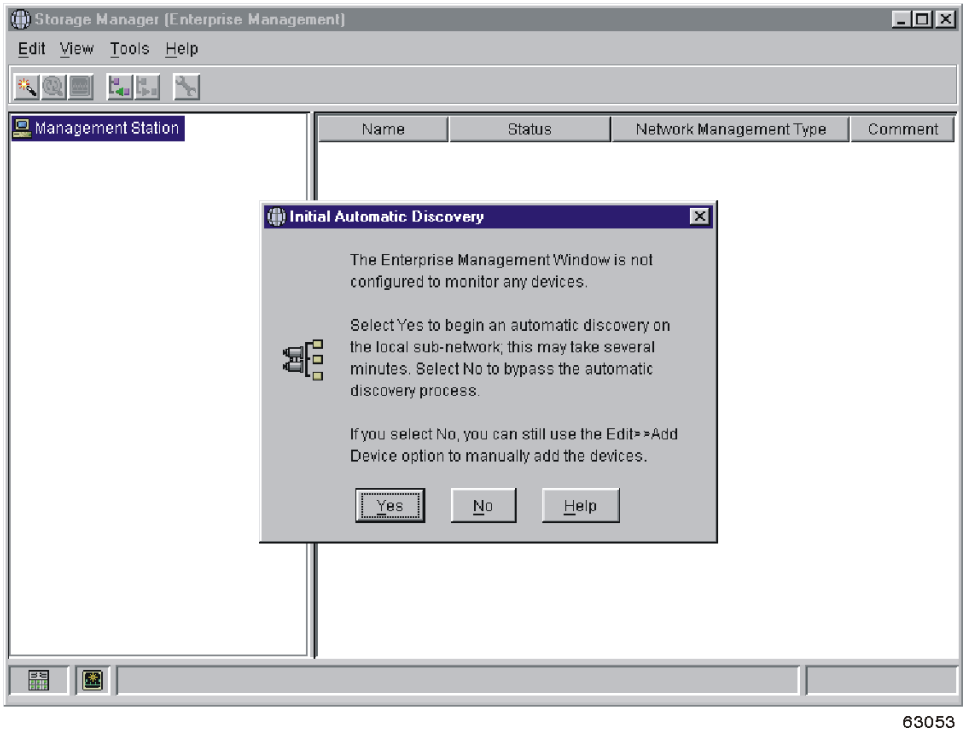

Figure 2-1 Confirm Initial Automatic Discovery Dialog

2 Select Yes to begin an initial automatic discovery of attached hosts and disk subsystems.

The software sends a broadcast message across the local subnetwork connected to the storage management station. It discovers host-agent managed disk subsystems if the respective *host* responds to the broadcast. The software discovers direct managed disk subsystems if the *controllers* in the attached disk subsystems respond to the broadcast message. It may 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, all attached hosts and disk subsystems should appear in the Enterprise Management Window (Figure 2-2).

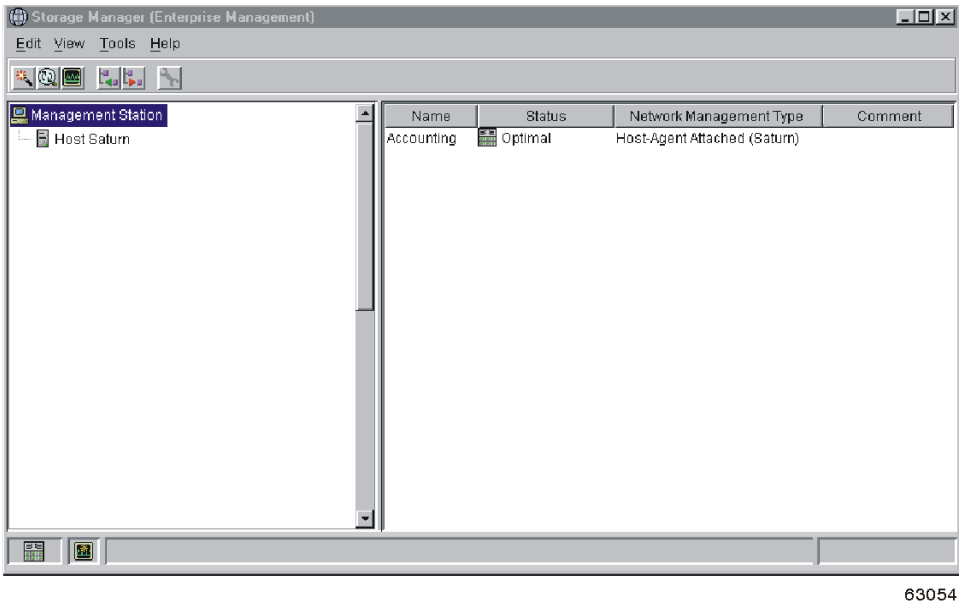

Figure 2-2 Enterprise Management Window

3 Verify all attached hosts and disk subsystems appear as expected. If they do not, do the following:

   a Check the hardware and connections for possible problems. Refer to the hardware documentation for specific procedures on troubleshooting interface problems.

   b Refer to the Enterprise Management Window Help topic on discovering disk subsystems and take the appropriate action provided.

   c Determine if the device is on the local subnetwork. If it is not, select Edit >> Add Device to add it. Refer to the Enterprise Management Window Help topic on adding devices.

   d If a disk subsystem is duplicated in the Device Tree, remove the duplicate disk subsystem icon from the Device Tree by selecting Edit >> Remove Device in the Enterprise Management Window.

4 Verify the status of each disk subsystem is Optimal. If any device shows an Unresponsive status, do the following:

   a Remove the device from the management domain by selecting Edit >> Remove Device.

   Refer to the Enterprise Management Window Help topic on removing devices.

   b Add the device by selecting Edit >> Add Device.

   Refer to the Enterprise Management Window Help topic on adding devices.

   c If the device still shows an Unresponsive status, contact technical support.

5 Do you need to upgrade the controller firmware? Refer to your selection in the firmware upgrade requirements sections of the HP-UX Installation Profile.

- Yes – Go to “Upgrading Controller Firmware” on page 2-10.
- No – Go to “Completing the Installation” on page 2-22.

Upgrading Controller Firmware

Use the following procedure to upgrade controller firmware from version 4.01.02.30 to version 5.x. Refer to the *SANtricity Storage Manager Product Release Notes* for the required files to download from the installation CD.

CAUTION The firmware upgrade automatically remaps the Access Volume to LUN 31. To prevent loss of disk subsystem access after the firmware upgrade, ensure LUN 31 is not being used for data storage.

IMPORTANT All controllers must be running firmware version 4.01.02.30 or higher to be *managed* with version 8.3x storage management software or to be *upgraded* to firmware version 5.x.

IMPORTANT Upgrades to firmware version 4.01.02.30 – The installation CD for version 8.3x includes only 5.x firmware versions. To obtain version 4.01.02.30, contact technical support.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. Verify you have installed all required operating system patches. Refer to the *Storage System Planning Guide* for operating system specifications.

   The storage management software installation program will not install these patches. Some patches listed may be superseded by other patches. Refer to your operating system documentation or contact your operating system supplier for more information.
3. Ensure the storage management software is running. If necessary, refer to "Starting the Storage Management Software" on page 2-7 for procedures.
4. Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

   The Array Management Window is displayed (Figure 2-3).

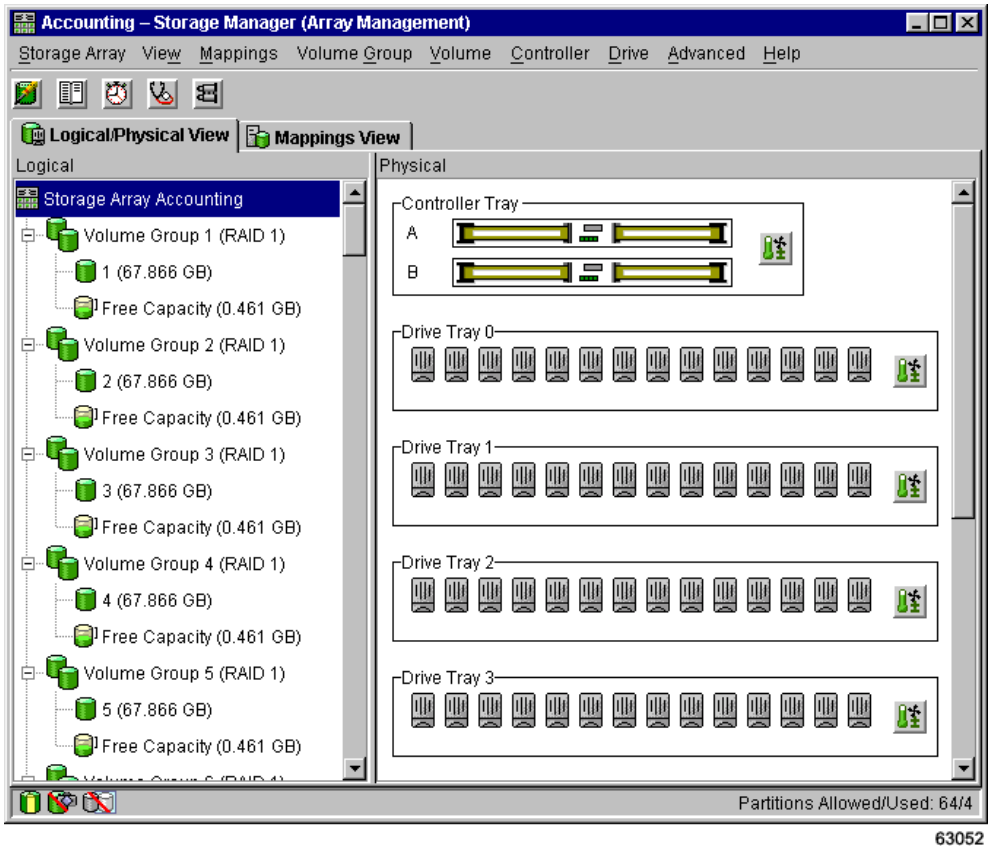

Figure 2-3 Array Management Window

5 Verify the Mode (state), cache size, and host I/O settings of each controller:

a Right-click Controller A and select Properties.

The Controller Properties dialog is displayed.

b Select the Base tab.

c Locate the Mode configuration and ensure the controller is in an Active state.

d Locate the Cache/processor size (MB) configuration and record the setting listed.

e Select the Interfaces tab.

f Locate the Fibre Channel host I/O interface settings, and record the number listed under Preferred ID for each port.

g Select Close.

6 Repeat step 5 for Controller B.

CAUTION Ensure both controllers are in an Active state and each controller owns at least one volume (LUN).

7 Verify the volume ownership of each controller:

a Right-click the disk subsystem and select View Profile.

The Disk Subsystem Profile window is displayed.

b Select the Volumes tab.

c Locate the Owned by controller in slot: information by each volume and ensure each controller owns at least one volume.

NOTE Use the Volume >> Change >> Ownership/Preferred Path option to transfer ownership of a volume, if needed.

d Locate the Status information and ensure the Status of each volume is Optimal.

8 Stop all I/O to the disk subsystem to prevent application errors.

9 Record any mount point information about the disk subsystem. At the prompt, type the following and press Enter:

```
bdf
```

10 At the prompt, type the following and press Enter:

```
vgdisplay -v /dev/vglabel
```

where *vglabel* is the label name on the HP Volume Group.

Device identification information for that device is displayed, similar to the following:

```
---Logical volumes ---
LV Name     /dev/vg08/lvol1
LV Status    Available/syncd
LV Size (Mbytes) 3008
Current LE   47
Allocated PE ‘47
Used PV      1
---Physical volumes ---
PV Name      */dev/dsk/c4t2d0
PV Name /dev/dsk/c5t3d0 Alternate Link
PV Status   Available
Total PE    63
```

11 Record the primary path and secondary path (Alternate Link), which you will need to identify when creating volume groups later in the upgrade procedure.

12 Unmount the file system. At the prompt, type the following and press Enter:

```
umount mount-point
```

where *mount-point* is the UNIX file system name.

13 Deactivate the HP Volume Group. Type the following and press Enter:

```
vgchange -a n /dev/vglabel
```

where *vglabel* is the label name on the HP Volume Group.

14 Export the HP Volume Group. Type the following and press Enter:

```
vgexport -v vglabel
```

where *vglabel* is the label name on the HP Volume Group.

After the HP Volume Group has been exported, you will see the following message:

```
Volume group name has been successfully removed.
```

15 Repeat step 12 through step 14 for all HP Volume Groups on the disk subsystem.

16 Identify the Controller ID numbers:

a On a storage management station, start the SMclient.

b Select Disk Subsystem.

c Select Tools >> Manage Device to open the Array Management Window.

d Select the Logical/Physical View tab.

e Select Controller A in the Physical View.

f Select Controller >> Properties.

The Controller Properties dialog is displayed (Figure 2-4).

g Select the Interfaces tab and view the Fibre Channel host I/O interfaces: field, which displays the NL-Port ID field.

h Record the controller ID number, which is displayed as the first number in the Current ID field. It also can consist of multiple numbers.

i Select Close.

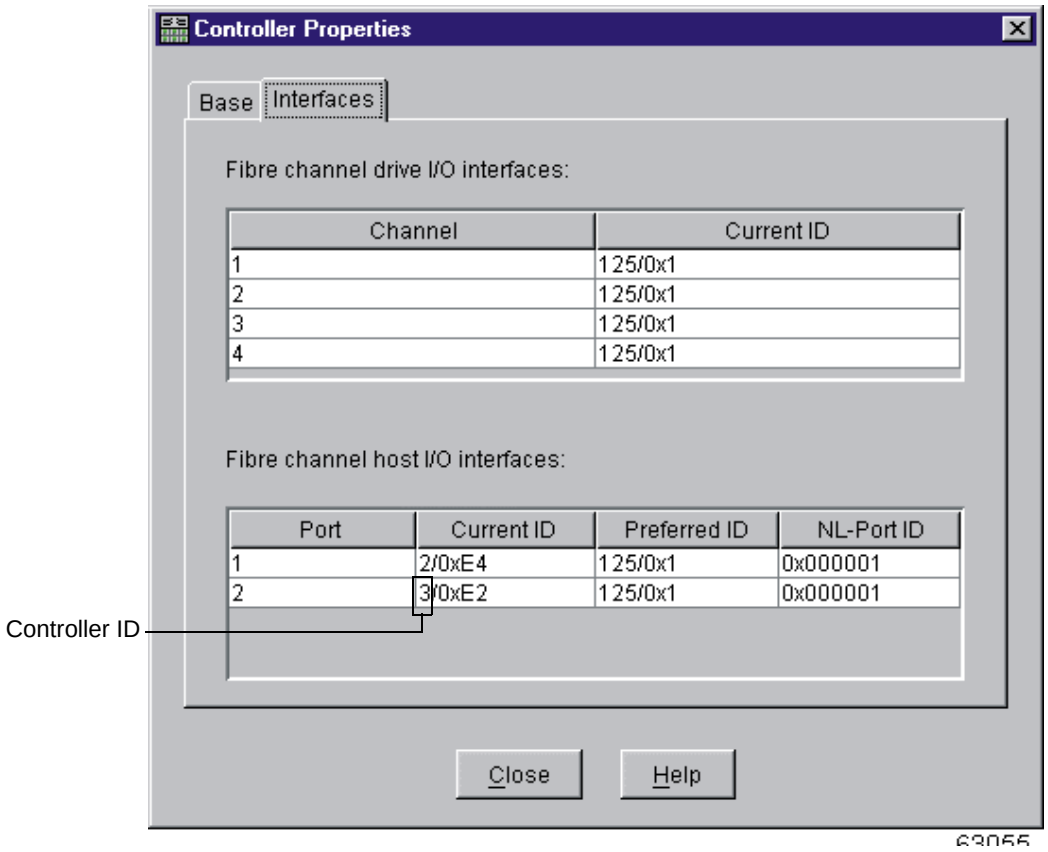

Figure 2-4 Controller Properties Dialog

17 Repeat step 16 for Controller B.

18 Select Disk Subsystem >> Download >> Firmware.

The Firmware Download dialog is displayed.

19 In the File Selection area, select the CDROM drive and the firmware folder on the CD. Either double-click the folder or type the folder name in the File name: text box.

20 Select the file that matches your controller type and select OK.

The Confirm Download dialog is displayed.

21 Select Yes to start the download.

22 Do one of the following, based on the dialog that is displayed after the download is completed.

- Firmware Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

23 After the download successfully completes, do the following:

a Close the dialogs and the current Array Management Window.

b Restart the Array Management Window by selecting a disk subsystem in the Enterprise Management Window and selecting Tools >> Manage Device.

The Array Management Window that uses the functionality of the new firmware will be displayed.

24 Go to "Downloading NVSRAM Configuration Settings" on page 2-16.

Downloading NVSRAM Configuration Settings

Use the following procedure to download NVSRAM configuration settings. Refer to the *SANtricity Storage Manager Product Release Notes* for the name of the required files to download from the installation CD.

IMPORTANT Perform this procedure only after you have installed the SMclient and ensure the controller firmware is at version 4.01.02.30 or higher.

---

1 Ensure the installation CD for version 8.3x is inserted in the CDROM drive.

2 On a storage management station, start the SMclient software.

3 Select a disk subsystem.

4 Select Tools >> Manage Device to open the Array Management Window.

5 Select Disk Subsystem >> Download >> NVSRAM.

The NVSRAM Download dialog is displayed.

6 In the File Selection area, select the CDROM drive and the nvsram folder. Either double-click the folder or type the folder name in the File name: text box.

7 Select the file that corresponds to the disk subsystem type and select OK.

The Confirm Download dialog is displayed.

8 Select Yes to start the download.

IMPORTANT During the download, a dialog may appear stating "the firmware downloaded is not compatible with the current version of the Array Management Window." *Do not* select OK in this dialog until the Download Successful dialog is displayed.

---

9 Do one of the following, based on the dialog that is displayed after the download is completed.

- Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

10 If you are using a host-agent and you get error 1005 after downloading NVSRAM, do the following. Otherwise, go to step 11.

a Close the storage management software.

b Type the following and press Enter:

```
hot_add
```

c Type the following and press Enter:

```
SMagent start
```

d Start the storage management software and select Tools >> Manage Device to open the Array Management Window.

IMPORTANT You *must* set the host type before rebooting the host. The host type defines how the controllers in the disk subsystem work with the host's operating system when the volumes are accessed. If the host type is not set, contact with the disk subsystem might be lost. Complete step 11 through step 14 in this procedure to set the host type.

---

11 Determine whether SANshare Storage Partitioning is enabled or disabled. Select Disk Subsystem >> Premium Features >> List.

The List Premium Features dialog is displayed.

12 Is SANshare Storage Partitioning is enabled?

- Yes – Select Close, and go to step 13.
- No – Select Close, and go to step 14.

13 SANshare Storage Partitioning is enabled – Change the host types of the individual host ports:

a Select the Mappings View Tab.

b Select a host port in the left pane of the window and then select Change Host Type from the right-mouse pop-up menu.

c Select the correct host type.

d Select OK to save the changes.

e Repeat step step b through step d for each host port shown in the Mappings View.

f Go to step 15 on page 2-18.

14 SANshare Storage Partitioning is disabled – Change the host type of the disk subsystem:

a Select Configure >> Change Disk Subsystem Host Type.

b Select the correct host type.

c Select OK to save the changes.

15 Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power back on for the new settings to take effect.

16 Find the newly created device node numbers. Type the following and press Enter:

```
ioscan -f
```

The Device Identification Information Screen is displayed (Figure 2-5).

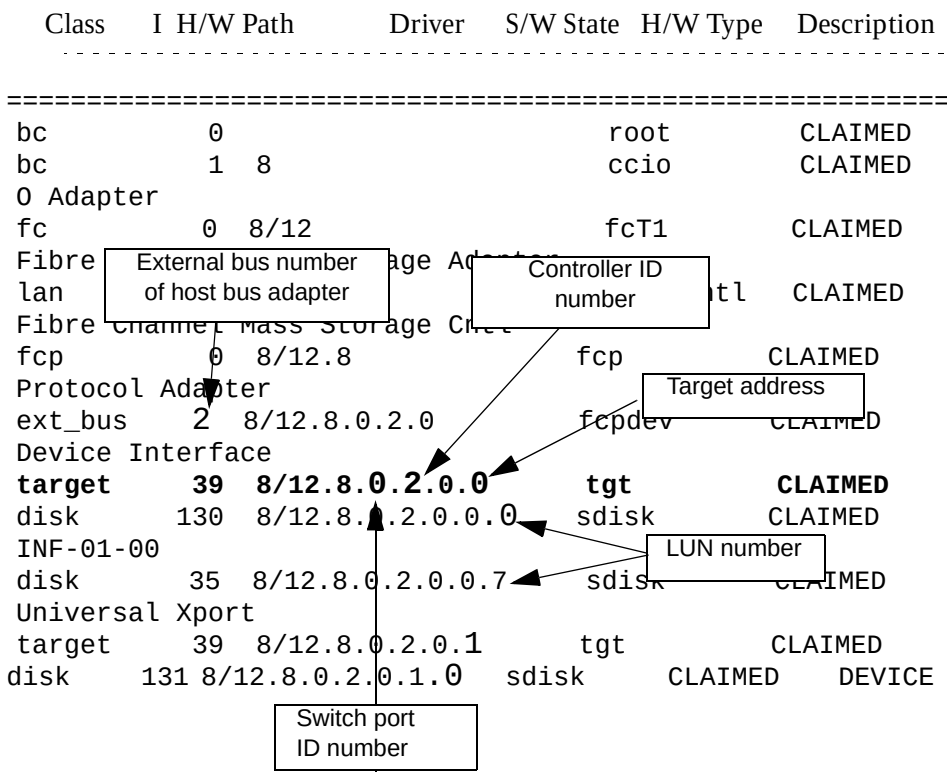

Figure 2-5 Example – Device Identification Information Screen

17 Record the external bus numbers.

To determine the device name for a given disk, combine the Controller ID number, target address, and LUN number in the following format: c <D> t <address> d <LUN>. LUN numbers range from 0 to 7 and target addresses range from 0 to 3. For example, from the information shown in Figure 2-5, the device name for disk 130 would be c2t0d0.

Each volume is viewed by the operating system as *one* drive. The device name for a volume usually indicates the path to the specific volume. If volume ownership is transferred between controllers, the device name is updated. To identify the HP-UX device name and Controller ID number for each volume in each disk subsystem, you will need the following numbers:

- LUN number used to access the volume
- Controller's ID Number (Either the SCSI ID or the Fibre Channel Loop ID of the controller port associated with the host interface)
- Target address
- External bus number of the host bus adapter connected to the controller

18 For each disk subsystem, select the disk subsystem node >> Mappings View Tab. Use the LUN numbers in the Mappings View to associate the volumes with their device names.

19 Run the following to generate the device nodes. Type the following and press Enter:

```
insf -e
```

20 Make a directory to store HP Volume Group information. Type the following and press Enter:

```
mkdir /dev/vglabel
```

where *vglabel* is the name of the HP Volume Group.

21 Change to that directory. Type the following and press Enter:

```
cd /dev/vglabel
```

where *vglabel* is the name of the HP Volume Group.

22 Create the definition for the HP Volume Group. Type the following and press Enter:

```
mknod /dev/vglabel/group c 64 0xZZ0000
```

where *vglabel* is the name of the HP Volume Group and *ZZ* is the unique identifier for that HP Volume Group.

23 Import the HP Volume Group. Type the following and press Enter:

```
vgimport -v /dev/vglabel /dev/dsk/device_node_for_primary_path
   /dev/dsk/device_node_for_secondary_path
```

where *vglabel* is the name of the HP Volume Group, *device_node_for_primary_path* and *device_node_for_secondary_path* are the device node numbers from the ioscan.

24 Activate the HP Volume Group. Type the following and press Enter:

```
vgchange -a y /dev/vglabel
```

where *vglabel* is the name of the HP Volume Group.

25 Remount the file system. Type the following and press Enter:

```
mount filesystem-label mount-point
```

where *filesystem-label* is the name of the file system and *mount-point* is the name of the mount point using information from the bdf command.

26 Repeat step 20 on page 2-19 through step 25 for each HP Volume Group.

27 You may need to run scripts to modify default configuration settings stored in NVSRAM on each disk subsystem to meet the needs of your specific configuration. Refer to the *SANtricity Storage Manager Product Release Notes* more information. When finished, go to "Verifying Host I/O Interface Settings."

Verifying Host I/O Interface Settings

Use the following procedure to verify the host I/O interface settings after upgrading the firmware from any type of host.

1. Ensure the installation CD for version 8.3x is inserted in the CDROM drive.
2. On a storage management station, start the SMclient software.
3. Select a disk subsystem.
4. Select Tools >> Manage Device to open the Array Management Window.
5. In the Logical/Physical View, right-click Controller A and select Change >> Preferred Loop ID.

   The Change Preferred Loop ID dialog is displayed.
6. Verify the settings match those you recorded in step 5 on page 2-11 for each controller.
7. Do the controller settings match what you have recorded?
   - Yes – Select Close and go to step 11.
   - No – Select Close and go to step 8.
8. Correct the interface settings:
   a. Select the port that does not match in the Fibre Channel host I/O interfaces portion of the Interfaces tab.
   b. Select Change Preferred ID.

      The Change Preferred ID dialog is displayed.
   c. Change the number to match the value you recorded in step 5 on page 2-11.

      For example, if the value you recorded was 1/0xE8, you would select “1” in the Normal box. If the number you recorded was 126, select N-Port (126). If the original setting was 127, select Set During Loop Initialization (127).
   d. Select OK.
9. Repeat step 8 to correct the interface settings for each port, if needed.
10. Repeat step 8 through step 9 for Controller B.
11. Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power back on for the new host I/O interface settings to take effect.
12. Remove the installation CD from the CDROM drive.
13. Go to “Completing the Installation” on page 2-22.

Completing the Installation

Use the following procedures to complete the installation process.

1 Configure alert notifications to receive e-mail or SNMP notifications of critical events that occur on the disk subsystems. Refer to the Enterprise Management Window Help for procedures. You can configure alert notifications to be sent to the following types of receiving devices:

- Designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps – To configure the NMS for SNMP traps, go to step 2. Otherwise, go to step 3.
- Designated e-mail address – Refer to the Enterprise Management Window Help for procedures. To send e-mail to LSI Logic Storage Systems, Inc., contact technical support. When finished, go to step 3.
- Designated alphanumeric pager – A designated alphanumeric pager can receive alert notifications when third-party software is used to convert e-mail messages. When finished, go to step 3.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

---

2 Configure the NMS for SNMP traps:

a Insert the installation CD into the NMS.

b Copy the MIB file from the installation CD to the appropriate MIB directory on the NMS.

c Compile the MIB according to the procedure required by your NMS. For details, contact your network administrator or refer to your network management station documentation.

3 Start the Array Management Window.

You must open an Array Management Window to manage a selected disk subsystem. You can open multiple Array Management Windows to manage more than one disk subsystem at the same time.

Select Tools >> Manage Device to open the Array Management Window for the selected disk subsystem.

The Array Management Window is displayed (Figure 2-6).

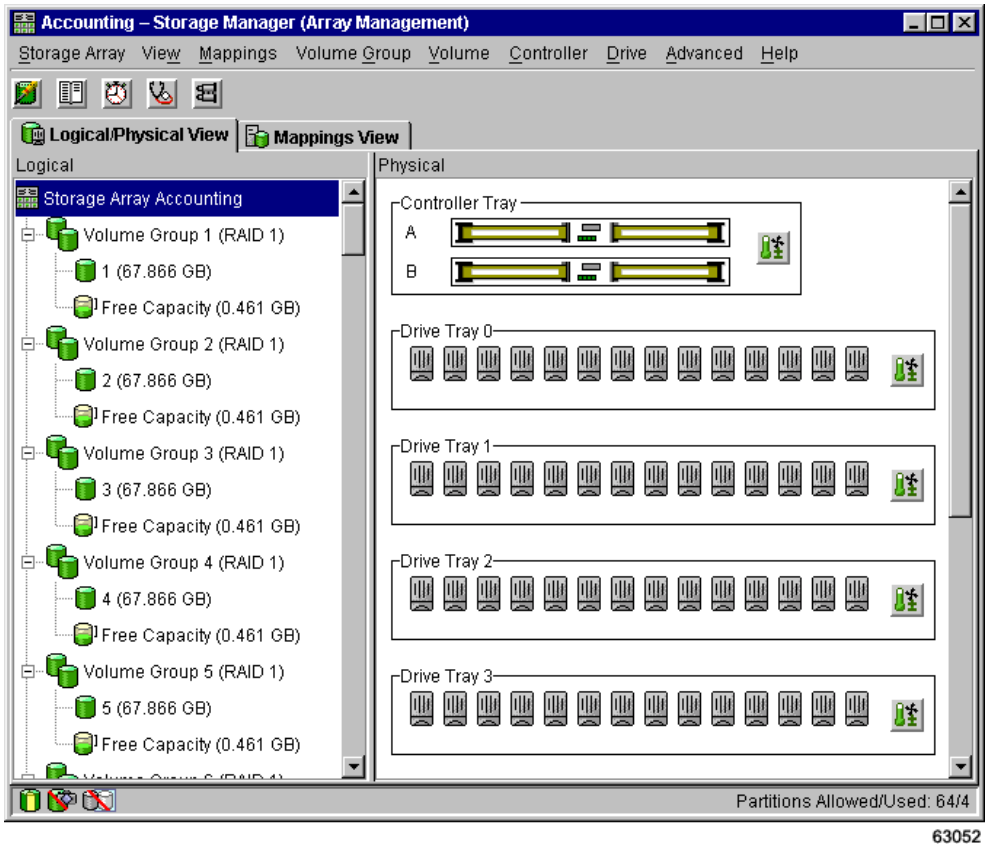

Figure 2-6 Array Management Window

4 Rename the disk subsystem.

You must rename each disk subsystem to the name you entered on the HP-UX Installation Profile. For related topics and procedures, refer to the Array Management Window Help.

5 Enable the premium features on your disk subsystem. For related topics and procedures, refer to the Array Management Window Help.

6 Is the client software running on two or more machines?

- Yes – Disable the event monitor on all but one machine to prevent receipt of duplicate event messages. At the prompt, type the following and press Enter:

  ```
  SMmonitor stop
  ```

  When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

- No – Go to step 7.

7 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, and Array Management Window Help and to the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Refer to "Post-Installation Activities."

End Of Procedure

Post-Installation Activities

Use the following procedures to manage your disk subsystem from an HP-UX machine.

Disabling and Enabling the Event Monitor

The event monitor is packaged with the client software and is installed automatically when you install the client software. The event monitor handles disk subsystem error messages through e-mail or SNMP traps when the storage management software is inactive.

IMPORTANT If you have configured alert notifications on multiple machines, you might receive duplicate error messages from the same disk subsystem. To prevent receipt of duplicate error messages, disable the event monitor on all but one machine. Run the event monitor on one machine that will run continually.

You can either disable and enable the event monitor either while the event monitor is running, or disable or enable the boot-time loading of the event monitor. If you disable the event monitor while it is running, it will start automatically at the next reboot.

Disabling the Event Monitor While the Monitor is Running

At the prompt, type the following and press Enter:

```
SMmonitor stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

End Of Procedure

Enabling the Event Monitor While the Software is Running

At the prompt, type the following and press Enter:

```
SMmonitor start
```

When the program startup begins, a screen is displayed with the following:

```
SMmonitor started.
```

End Of Procedure

Disabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
mv /sbin/rc2.d/S900SMmonitor /sbin/rc2.d/disabledS900SMmonitor
```

You are returned to the prompt.

End Of Procedure

Enabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
mv /sbin/rc2.d/disabledS900SMmonitor /sbin/rc2.d/S900SMmonitor
```

You are returned to the prompt.

End Of Procedure

Using the hot_add Utility

Use the following procedure to run the hot_add utility from an HP-UX machine.

The hot_add utility is used to add new volumes dynamically without restarting the system. The utility registers the new volumes with the operating system so you can perform functions such as adding device names. The hot_add utility is installed as a part of the SMutil software.

At the prompt, type the following and press Enter:

```
hot_add
```

Several minutes may pass while the computer is accessing the drives. When the program is finished, a screen is displayed with the following:

```
Device nodes have been updated
```

The new volumes will be available to you through the operating system.

After the hot_add procedure is completed, the software will automatically run the SMdevices utility and will display device identification information, similar to the following example:

```
/dev/rdsk/c2t5d0s2 [Disk Subsystem <name>, Volume AH1, LUN 0,
Volume WWN <600a0b80000600440000000d33801f4bb>, Preferred
Path:(Controller-A) In Use]
/dev/rdsk/c2t5d2s2 [Disk Subsystem <name>, Volume 2, LUN 2,
Volume WWN <600a0b80000600440000000db380b4073>, Alternate
Path:(Controller-B) Not In Use]
dev/utm/c2t5d7s2 [Disk Subsystem <name>, Volume Access, LUN 7,
Volume WWN <600a0b80000600440000000dd00000000>]
```

Where:

- /dev/. . ./. . . = UNIX device node name
- Disk Subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume

Access Volume device node names are stored in the /dev/utm folder.

End Of Procedure

Identifying Volumes by Operating System Device Names

Use the following procedure to locate system devices from an HP-UX machine.

The SMutil software includes a utility that allows you to see which volume is associated with a particular operating system device name. This capability is useful for operations such as data placement and volume deletion.

IMPORTANT If you are unsure whether new devices or volumes have been added to the system, it is recommended that you run hot_add first to ensure the devices are registered with the system. If the devices are not registered, they will not be displayed in the SMdevices output. For procedures, refer to "Using the hot_add Utility."

At the prompt, type the following and press Enter:

```
SMdevices
```

The software displays device identification information, similar to the following example:

```
/dev/rdsk/c101t0d0 [Disk Subsystem n124774, Volume V1, LUN 0,
Volume WWN <600a0b80000c3ee20000006e3c6925ba>, Alternate Path
(Controller-B): Not In Use]
/dev/rdsk/c101t3d0 [Disk Subsystem n124774, Volume V25, LUN 24,
Volume WWN <600a0b80000c3ee20000008f3c6927ac>, Alternate Path
(Controller-B): In Use]
/dev/rdsk/c101t3d7 [Disk Subsystem n124774, Volume Access, LUN
31, Volume WWN <600a0b80000c3ffc000000e000000000>]
```

Where:

- /dev/. . ./. . . = UNIX device node name
- Disk Subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume

End Of Procedure

Stopping and Starting the Host-Agent Software

Use the following procedures to stop and restart the host-agent software on an HP-UX machine.

You will need to stop and restart the SMagent software when you download a NVSRAM file that enables an Access Volume or changes the LUN used for the Access Volume. Doing so allows detection of the new disk subsystems that will be managed by the host. If an Access Volume is not detected after a reboot, then the SMagent software will stop running automatically and you will need to restart it.

Stopping the Host-Agent Software

To add disk subsystems, you must stop the SMagent software. When you restart the software, the software detects the new disk subsystems and adds them to the management domain.

At the prompt, type the following and press Enter:

```
SMagent stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMagent stopped.
```

End Of Procedure

Starting or Restarting the Host-Agent Software

The SMagent software automatically starts after you reboot the host. However, you must start the software manually if you stop it to add disk subsystems.

At the prompt, type the following and press Enter:

```
SMagent start
```

When the program startup begins, a screen is displayed with the following:

```
SMagent started.
```

An alternate restart procedure (without entering the start command) requires starting the SMagent software without performing a stop command. The SMagent software automatically detects older copies of the software and performs a stop and hot_add before restarting the software.

End Of Procedure

Creating Volume Groups

Use the following procedure to create volume groups and logical unit numbers (LUNs) from an HP-UX machine.

When creating volume groups, you must specify both the primary and alternate paths to ensure proper functioning of the Auto-Volume Transfer (AVT) feature. The primary path is the one to which the volume is assigned on the disk subsystem. The alternate path is the device ID for the same LUN through the other controller.

IMPORTANT Enter the primary path first. Otherwise, the disk subsystem will go into a continuous "Volume not on preferred path" error mode whenever any I/O is run to the volume. You must specify an alternate path, or else the same error will occur. In the following procedure, the primary path is denoted by *cxtxdx* and the secondary path is denoted by *cytydy*.

---

1. Configure your desired volumes in the Array Management Window.
2. Run hot_add, which automatically runs SMdevices at its conclusion.
3. Create physical volumes for use in the LVM (logical volume manager) volume group by typing the following and pressing Enter:

   ```
   pvcreate /dev/rdsk/cxtxdx
   ```

   ```
   pvcreate /dev/rdsk/cytydy
   ```

   After the physical volume has been created, a screen is displayed with the following:

   ```
   Physical volume "/dev/rdsk/cxtxdx" has been successfully
   created.
   Physical volume "/dev/rdsk/cytydy" has been successfully
   created.
   ```

   ---

4. Make a directory to store HP Volume Group information. Type the following and press Enter:

   ```
   mkdir /dev/vglabel
   ```

   where *vglabel* is the label name of the HP Volume Group.

5 Change to the newly created directory. Type the following and press Enter:

```
cd /dev/vglabel
```

where *vglabel* is the label name of the HP Volume Group.

For example, for volume group 01, you would type the following and press Enter:

```
cd /dev/vg01
```

6 Create the definition of the HP Volume Group. Type the following and press Enter:

```
mknod group /dev/vglabel/group c 64 0xZZ0000
```

where *vglabel* is the label name of the HP Volume Group, and *ZZ* is the unique identifier for the HP Volume Group.

For example, for volume group 01, you would type the following and press Enter:

```
mknod group /dev/vg01/group c 64 0x010000
```

7 Create the volume group containing the new physical volume. Type the following and press Enter:

```
vgcreate /dev/vglabel /dev/dsk/cxtxdx /dev/dsk/cytydy
```

where *vglabel* is the label name of the HP Volume Group, c*x*t*x*d*x* is the primary path, and c*y*t*y*d*y* is the secondary path.

For example, for volume group 01, you would type the following and press Enter:

```
vgcreate /dev/vg01 /dev/dsk/c1t0d0 /dev/dsk/c2t0d0
```

After the volume group directory and group node have been created, a screen is displayed with the following:

```
“Increased the number of physical extents per physical volume
to 17326
Volume Group /dev/vg01 has been successfully created
VOlume Group configuration for /dev/vg01 has been saved in
/etc/lvmconf/vg01.conf
```

8 Create the logical volume in the volume group. Type the following and press Enter:

```
lvcreate -L size /dev/vglabel
```

where *size* is the desired size of the logical volume and *vglabel* is the label name of the HP Volume Group.

For example, for logical volume 01, with size 60 MB, you would type the following and press Enter:

```
lvcreate -L 60000 /dev/vg01
```

After the logical volume has been created in the volume group, a screen is displayed with the following:

```
Logical volume “/dev/vg01/lvol1” has been successfully created
with character device “dev/vg01/rlvol1”.
```

---

9 Create a file system on the newly populated logical volume. Type the following and press Enter:

```
newfs -o largefiles /dev/vglabel /rlvol1
```

where *vglabel* is the label name of the HP Volume Group.

For example, to create a filesystem on Volume Group 01, volume 1, you would type the following and press Enter:

```
newfs -o largefiles /dev/vg01 /rlvol1
```

10 Create a mount point. Type the following and press Enter:

```
mkdir /mountpoint /mount_point
```

where *mount_point* is the drive to which you will mount the file system.

For example, to create a mountpoint on ar1, you would type the following and press Enter:

```
mkdir /mountpoint /ar1
```

11 Mount the file system to the mount point by typing the following and pressing Enter:

```
mount /dev/vg01/lvol1 /mountpoint
```

For example, to mount the filesystem on ar1, you would type the following and press Enter:

```
mount /dev/vg01/lvol1 /mountpoint/ar1
```

12 Verify the space expected is available to the system by typing the following and pressing Enter:

```
bdf
```

A screen is displayed showing a list of mounted file systems and available space.

End Of Procedure

Chapter 3

IRIX Software Installation

This chapter contains procedures for installing the applicable software packages on one or more storage management stations or hosts.

IMPORTANT Downgrades from SANtricity Storage Manager for version 8.3x to a previous version can cause data loss and are not supported.

IMPORTANT The storage management software has not been certified for use within a cluster environment for IRIX. It is recommended that you install the storage management software on IRIX operating systems only within a non-cluster environment.

Removing the Storage Management Software

This section contains procedures for removing the storage management software on one or more IRIX storage management stations or hosts.

No reboot is required after removing a storage management software package. Existing disk subsystem mappings and storage partition configurations are retained during software removal and will be recognized by the new client software.

IMPORTANT The storage management software for version 8.3x does not support RDAC. To prevent system problems, remove all RDAC components from any previous storage management software before proceeding.

---

1 Are you installing a new version of the software?

- Yes – Ensure you have completed an IRIX Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for removing the storage management software.
- No – Go to step 2.

2 Ensure you have root privileges, which are required to remove the software.

3 Mark each storage management software file and directory for removal:

a At the prompt, type the following and press Enter:

```
inst
```

The prompt (Inst>) is displayed.

b For each software file and directory, type the following and press Enter:

```
r package-name
```

where *package-name* is the name of the component you want to remove.

4 Start the software removal. Type the following and press Enter:

```
go
```

5 Verify all storage management software directories and files have been removed. If necessary, manually delete any that remain by typing the following and pressing Enter:

```
rm filename
```

where *filename* is the name of the file you wish to delete.

6 When all storage management software directories and files have been removed, type the following and press Enter to exit the shell:

```
quit
```

7 Are you installing a new version of the software?

- Yes – Go to "Installing the Storage Management Software" on page 3-4.
- No – You are finished with this procedure.

Installing the Storage Management Software

This section contains procedures for installing the applicable storage management software packages on one or more IRIX machines

IMPORTANT The SMruntime package must be installed before installing the SMclient. No reboot is required during the runtime, client, and client integration software installation process. The event monitor software is installed automatically during client software installation. The storage management software for version 8.3x does not support RDAC. Ensure you have removed all RDAC components from any previous version of the storage management software before proceeding.

1. Ensure you have a completed an IRIX Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for installing the applicable software in the correct order on the storage management station or host.
2. Insert the installation CD and, if necessary, mount the CDROM drive. In the following procedure, the installation CD is mounted at /CDROM. Modify this procedure as needed for your specific installation.
3. Install the storage management station software packages in the order in which they appear in the Installation Activity column, installing only those packages that correspond to your selections in the Pre-Installation Activity column of the IRIX Installation Profile.
   a. At the prompt, type the following and press Enter:

      ```
      cd /CDROM/clientinstall
      ```

   b. At the prompt, type the installation command for the SMruntime software and press Enter. Refer to Table 3-1.

Table 3-1 Storage Management Station Software Installation Commands

Package	Installation Command
SMruntime	`inst -f. -I SMruntime -a`
SMclient	`inst -f. -I SMclient -a`

The software installation begins. When the installation is finished, a message is displayed indicating the installation was successful. You are returned to the prompt.

4 At the prompt, type the verification command for the SMruntime software and press Enter. Refer to Table 3-2.

Table 3-2 Storage Management Station Software Verification Commands

Package	Verification Command
SMruntime	`showprods -v SMruntime`
SMclient	`showprods -v SMclient`

5 Was the installation successful (no failure reported)?

- Yes – Repeat step 3 and step 4 to install SMclient software. When finished, go to step 6.
- No – Repeat step 3 and step 4 for the package with the failed installation. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

6 Install the host software packages in the order in which they appear in the Installation Activity column, installing only those that correspond to your selections in the Pre-Installation Activity column of the IRIX Installation Profile.

a At the prompt, type the following and press Enter:

```
cd /CDROM/hostinstall
```

b At the prompt, type the installation command for the software package and press Enter. Refer to Table 3-3.

Table 3-3 Host Software Installation Commands

Package	Installation Command
SMruntime	`inst -f. -I SMruntime -a`
SMutil	`inst -f. -I SMutil -a`
SMagent	`inst -f. -I SMagent -a`
SMclient	`inst -f. -I SMclient -a`

The installation begins. When the installation is finished, a message is displayed indicating the installation was successful. You are returned to the prompt.

7 At the prompt, type the verification command for the software package and press Enter. Refer to Table 3-4.

Table 3-4 Host Software Verification Commands

Package	Verification Command
SMruntime	`showprods -v SMruntime`
SMutil	`showprods -v SMutil`
SMagent	`showprods -v SMagent`
SMclient	`showprods -v SMclient`

8 Was the installation successful (no failure reported)?

- Yes – Repeat step 6 on page 3-5 and step 7 to install each applicable software package. When finished, go to step 9.
- No – Repeat step 6 on page 3-5 and step 7 for the package with the failed installation. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

9 Choose one of the following:

- Storage management software is required on other IRIX machines – For each IRIX machine, perform the software removal and installation procedures described in this chapter as applicable. Refer to the corresponding IRIX Installation Profile for each machine to determine which software package to install first.
- Storage management software installation is completed on all IRIX machines – Go to "Starting the Storage Management Software."

Starting the Storage Management Software

Use the following procedures to start the storage management software.

1 At the prompt, type the following and press Enter:

```
SMclient
```

A splash screen is displayed while the client software starts. When the client software has been loaded, the Enterprise Management Window and the Confirm Initial Automatic Discovery dialog is displayed (Figure 3-1). The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

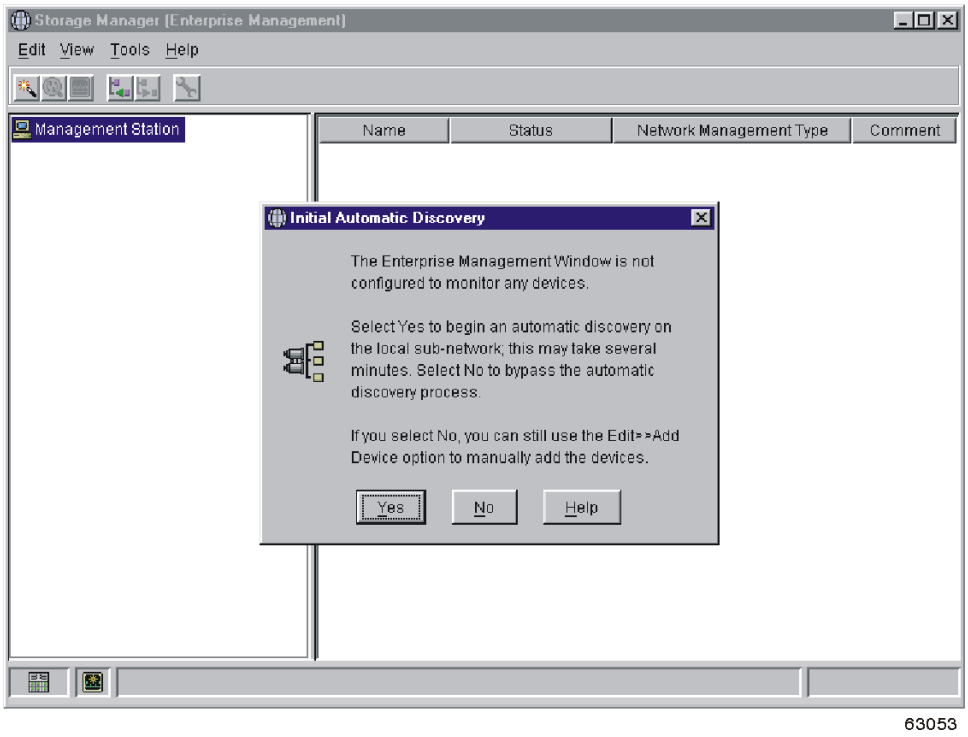

Figure 3-1 Confirm Initial Automatic Discovery Dialog

2 Select Yes to begin an initial automatic discovery of attached hosts and disk subsystems.

The software sends a broadcast message across the local subnetwork connected to the storage management station. It discovers host-agent managed disk subsystems if the respective *host* responds to the broadcast.

The software discovers direct managed disk subsystems if the *controllers* in the attached disk subsystems respond to the broadcast message. It may 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, all attached hosts and disk subsystems should appear in the Enterprise Management Window (Figure 3-2).

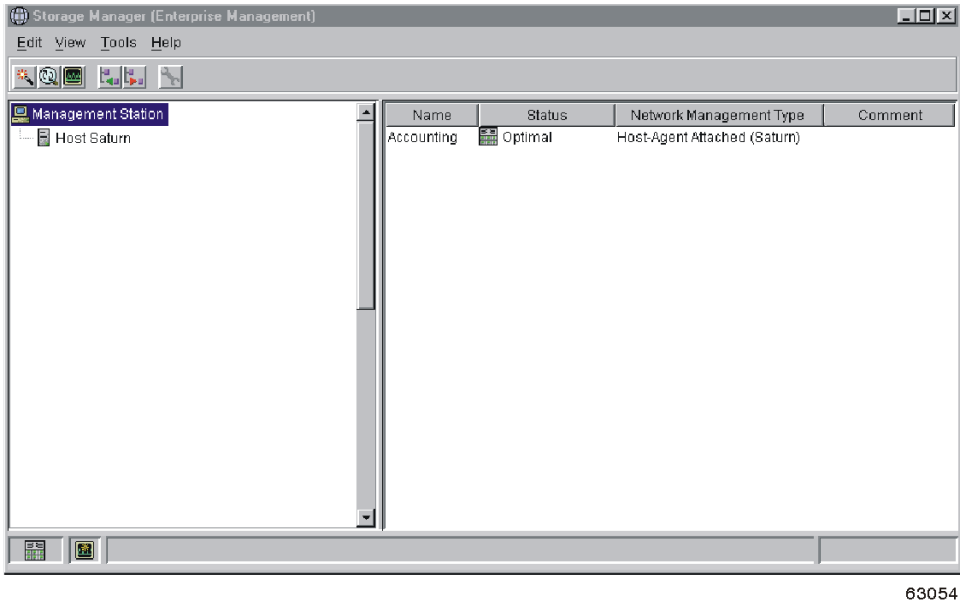

Figure 3-2 Enterprise Management Window

3 Verify all attached hosts and disk subsystems appear as expected. If they do not, do the following:

   a Check the hardware and connections for possible problems. Refer to the hardware documentation for specific procedures on troubleshooting interface problems.

   b Refer to the Enterprise Management Window Help topic on discovering disk subsystems and take the appropriate action provided.

   c Determine if the device is on the local subnetwork. If it is not, use the Add Device option to add it. Refer to the Enterprise Management Window Help topic on adding devices.

   If a disk subsystem is duplicated in the Device Tree, remove the duplicate disk subsystem icon using the Edit >> Remove Device option in the Enterprise Management Window.

4 Verify the status of each disk subsystem is Optimal. If any device shows an Unresponsive status, do the following:

   a Remove the device from the management domain and add it again. Refer to the Enterprise Management Window Help topic on removing and adding devices.

   b If the device still shows an Unresponsive status, contact technical support.

5 Do you need to upgrade the controller firmware? Refer to your selection in the firmware upgrade requirements sections of the IRIX Installation Profile.

   - Yes – Go to “Upgrading Controller Firmware” on page 3-10.
   - No – Go to “Completing the Installation” on page 3-16.

Upgrading Controller Firmware

Use the following procedure to upgrade controller firmware from version 4.01.02.30 to version 5.x. Refer to the *SANtricity Storage Manager Product Release Notes* for the required files to download from the installation CD.

IMPORTANT All controllers must be running firmware version 4.01.02.30 or higher to be *managed* with version 8.3x of the storage management software or to be *upgraded* to firmware version 5.x.

IMPORTANT Upgrades to firmware version 4.01.02.30 – The installation CD for version 8.3x includes only 5.x firmware versions. To obtain version 4.01.02.30, contact technical support.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. Verify you have installed all required operating system patches. Refer to the *Storage System Planning Guide* for operating system specifications.

   The storage management software installation program will not install these patches. Some patches listed may be superseded by other patches. Refer to your operating system documentation or contact your operating system supplier for more information.
3. Ensure the storage management software is running. If necessary, refer to "Starting the Storage Management Software" on page 3-7 for procedures.
4. Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

   The Array Management Window is displayed (Figure 3-3).

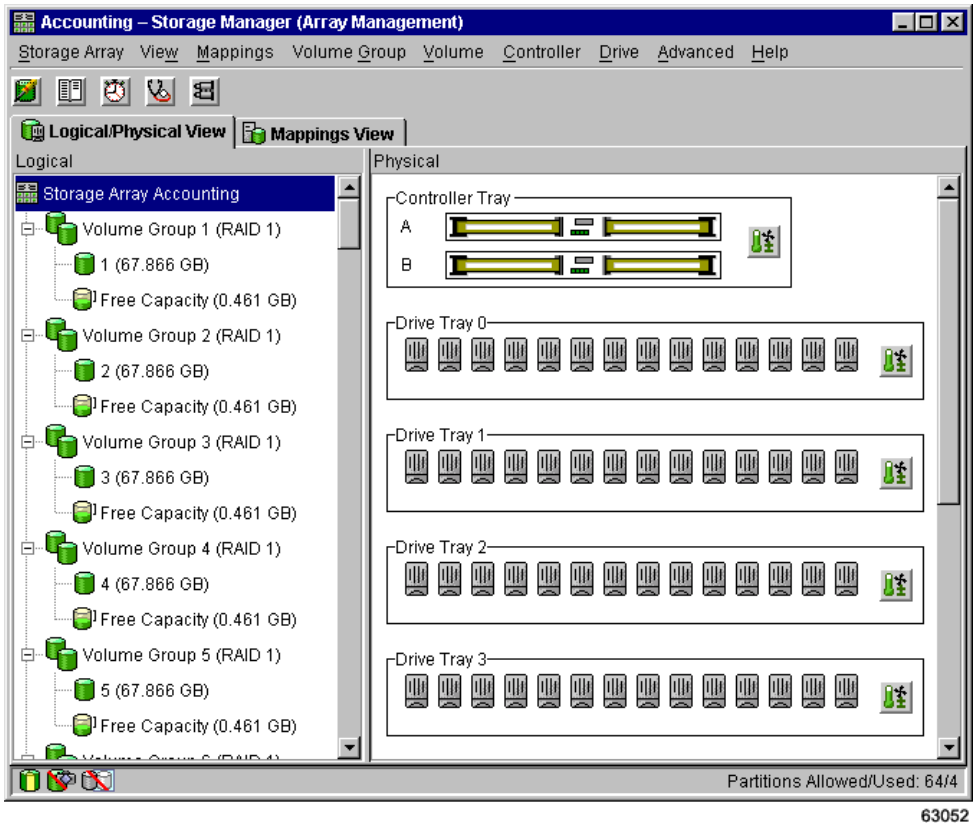

Figure 3-3 Array Management Window

5 Verify the Mode (state), cache size, and host I/O settings of each controller:

a Right-click Controller A and select Properties.

The Controller Properties window is displayed.

b Select the Base tab.

c Locate the Mode configuration and ensure the controller is in an Active state.

d Locate the Cache/processor size (MB) configuration and record the setting listed.

e Select the Interfaces tab.

f Locate the Fibre Channel host I/O interface settings, and record the number listed under Preferred ID for each port.

g Select Close.

6 Repeat step 5 for Controller B.

CAUTION Ensure both controllers are in an Active state and each controller owns at least one volume (LUN).

7 Verify the volume ownership of each controller:

a Right-click the disk subsystem in the Logical/Physical view and select View Profile.

The Disk Subsystem Profile window is displayed.

b Select the Volumes tab.

c Locate the Owned by controller in slot: information by each volume and ensure each controller owns at least one volume.

NOTE Use the Volume >> Change >> Ownership/Preferred Path option to transfer ownership of a volume, if needed.

d Locate the Status information and ensure the Status of each volume is Optimal.

8 Stop all I/O to the disk subsystem to prevent application errors.

9 From the menu, select Disk Subsystem >> Download >> Firmware.

The Firmware Download dialog is displayed.

10 In the File Selection area, select the CDROM drive and then the firmware folder. Either double-click the folder or type the folder name in the Enter File Name: text box.

11 Select the file that matches your controller type and select OK.

The Confirm Download dialog is displayed.

12 Select Yes to start the download.

13 Do one of the following, based on the dialog that is displayed after the download is completed.

- Firmware Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

14 After the download successfully completes, do the following:

a Close the dialogs and the current Array Management Window.

b Restart the Array Management Window by selecting a disk subsystem in the Enterprise Management Window and selecting Tools >> Manage Device.

The Array Management Window that uses the functionality of the new firmware is displayed.

15 Go to "Downloading NVSRAM Configuration Settings."

Downloading NVSRAM Configuration Settings

Use the following procedure to download NVSRAM configuration settings. Refer to the *SANtricity Storage Manager Product Release Notes* for the name of the required files to download from the installation CD.

IMPORTANT Perform this procedure only after you have installed the SMclient and ensured the controller firmware is at version 4.01.02.30 or higher.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. On a storage management station, start the storage management software.
3. Select Tools >> Manage Device to open the Array Management Window.
4. Select Disk Subsystem >> Download >> NVSRAM.

   The NVSRAM Download dialog is displayed.
5. In the File Selection area, select the CDROM drive and then the nvsram folder. Either double-click the folder or type the folder name in the Enter File Name: text box.
6. Select the file that corresponds to the disk subsystem type and select OK.

   The Confirm Download dialog is displayed.
7. Select Yes to start the download.

IMPORTANT During the download, a dialog may appear stating "the firmware downloaded is not compatible with the current version of the Array Management Window." *Do not* select OK in this dialog until the Download Successful dialog is displayed.

---

8. Do one of the following, based on the dialog that is displayed after the download is completed.
   - Download Successful dialog – Select Done.
   - Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

IMPORTANT You *must* set the host type before rebooting the host. The host type defines how the controllers in the disk subsystem work with the host's operating system when the volumes are accessed. If the host type is not set, contact with the disk subsystem might be lost. Complete step 9 through step 12 in this procedure to set the host type.

9 To determine whether SANshare Storage Partitioning is enabled or disabled, select Disk Subsystem >> Premium Features >> List.

The List Premium Features dialog is displayed.

10 Is SANshare Storage Partitioning enabled?

- Yes – Select Close, and go to step 11.
- No – Select Close, and go to step 12.

11 SANshare Storage Partitioning is enabled – Perform the following procedures, referring to the Array Management Window Help for procedures.

a Define storage partitioning topology (hosts and host ports) for the new hosts.

b Define the host types of the individual host ports:

1 Select the Mappings View Tab.

2 Select a host port in the left pane of the window and then select Change Host Type from the right-mouse pop-up menu.

3 Select the correct host type.

4 Select OK to save the changes.

5 Repeat steps 2 through 4 for each host port shown in the Mappings View.

6 Select Close to close the Mappings window.

c Set up storage partitioning mappings so that the new hosts you have defined can access existing volumes on the disk subsystem, when required.

d Go to step 13.

12 SANshare Storage Partitioning is disabled – Change the host type of the disk subsystem:

a Select Disk Subsystem >> Change >> Default Host Type.

b Select the correct host type.

c Select OK to save the changes.

13 If needed, run scripts to modify default configuration settings stored in NVSRAM on each disk subsystem to meet the needs of your specific configuration.

Refer to the *SANtricity Storage Manager Product Release Notes* more information.

14 Go to "Verifying Host I/O Interface Settings."

Verifying Host I/O Interface Settings

Use the following procedure to verify the host I/O interface settings after upgrading the firmware from any type of host.

1. On a storage management station, start the client software.
2. Select a disk subsystem in the Enterprise Management Window.
3. Select Tools >> Manage Device to open the Array Management Window.
4. In the Physical View, right-click Controller A and select Change >> Preferred Loop ID.

   The Change Preferred Loop ID dialog is displayed.
5. Verify the settings match those you recorded in step 5 on page 3-11 for each controller.
6. Do the controller settings match what you have recorded?
   - Yes – Select Close and go to step 10.
   - No – Go to step 7.
7. Correct the interface settings:
   a. Select a port in the Fibre Channel host I/O interfaces portion of the Interfaces tab.
   b. Select Change Preferred ID.

      The Change Preferred ID dialog is displayed.
   c. Change the number to match the value you recorded in step 5 on page 3-11.

      For example, if the value you recorded was 1/0xE8, you would select “1” in the Normal box. If the number you recorded was 126, select N-Port (126). If the original setting was 127, select Set During Loop Initialization (127).
   d. Select OK.
8. Repeat step 7 to correct the interface settings for each port.
9. Repeat step 4 through step 7 for Controller B.
10. Have you changed the interface settings?
    - Yes – Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power on for the new host I/O interface settings to take effect. When finished, go to step 11.
    - No – Go to step 11.
11. Remove the installation CD from the CDROM drive.
12. Go to “Completing the Installation” on page 3-16.

Completing the Installation

Use the following procedures to complete the installation process.

1. Configure alert notifications to receive e-mail or SNMP notifications of critical events that occur on the disk subsystems. Refer to the Enterprise Management Window Help for procedures. You can configure alert notifications to be sent to the following types of receiving devices:

   - Designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps – To configure the NMS for SNMP traps, go to step 2. Otherwise, go to step 3.
   - Designated e-mail address – Refer to the Enterprise Management Window Help for procedures. To send e-mail to LSI Logic Storage Systems, Inc., contact technical support. When finished, go to step 3.
   - Designated alphanumeric pager – A designated alphanumeric pager can receive alert notifications when third-party software is used to convert e-mail messages. When finished, go to step 3.

2. Configure the NMS for SNMP traps:

   a. Insert the installation CD into the NMS.

   b. Copy the mib directory from the installation CD to the appropriate MIB file on the NMS.

   c. Compile the MIB according to the procedure required by your NMS. For details, contact your network administrator or refer to your network management station documentation.

3 Start the Array Management Window.

You must open an Array Management Window to manage a selected disk subsystem. You can open multiple Array Management Windows to manage more than one disk subsystem at the same time.

From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Window is displayed (Figure 3-4).

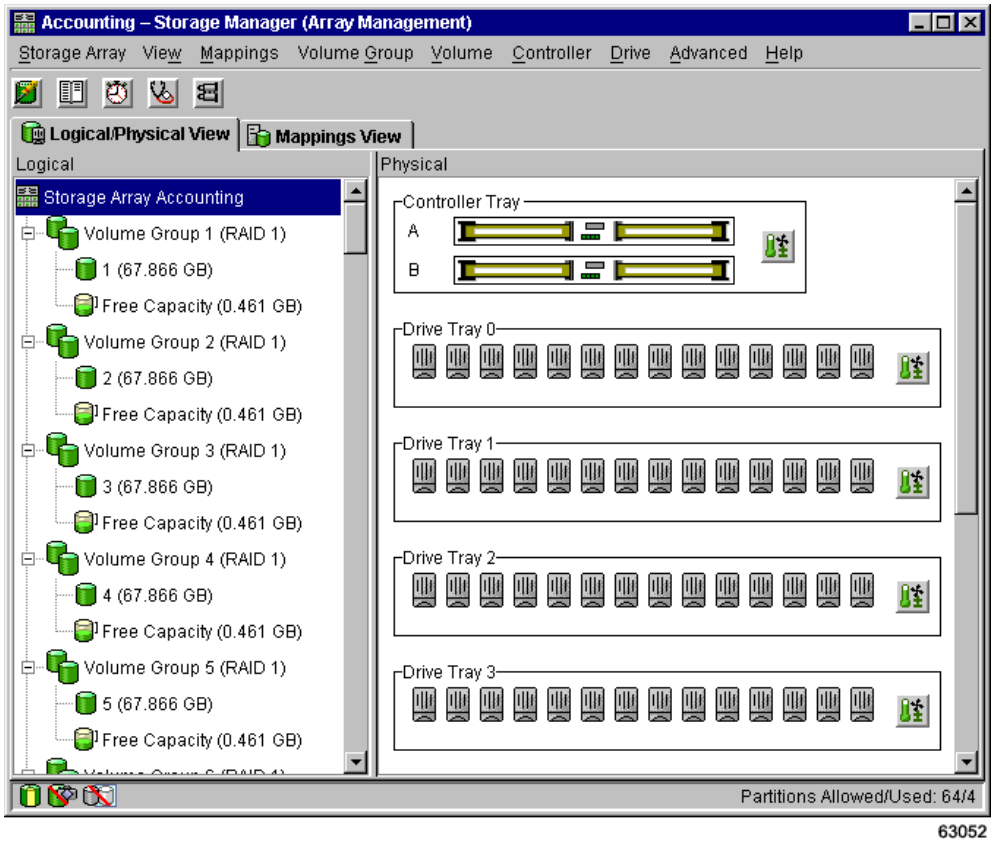

Figure 3-4 Array Management Window

4 Assign a unique name to the disk subsystem.

You must rename each disk subsystem to the name you entered on the IRIX Installation Profile. For related topics and procedures, refer to the Array Management Window Help.

5 Enable any premium features on your disk subsystem. For related topics and procedures, refer to the Array Management Window Help.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

---

6 Is the client software running on two or more machines?

- Yes – Disable the event monitor on all but one machine. At the prompt, type the following and press Enter.

  ```
  SMmonitor stop
  ```

  When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

- No – Go to step 7.

7 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, and Array Management Window Help and to the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Refer to "Post-Installation Activities."

End Of Procedure

Post-Installation Activities

Use the following procedures to manage your disk subsystem from an IRIX machine.

Disabling and Enabling the Event Monitor

The event monitor is packaged with the client software and is installed automatically when you install the client software. The event monitor handles disk subsystem error messages through e-mail or SNMP traps when the storage management software is inactive. You can disable and enable the event monitor while it is running, or you can permanently disable or enable the boot-time loading of the event monitor.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

Disabling the Event Monitor While the Software Is Running

IMPORTANT If you disable the event monitor while the software is running, it will start automatically at the next reboot.

At the prompt, type the following and press Enter:

```
SMmonitor stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

End Of Procedure

Enabling the Event Monitor While the Software Is Running

At the prompt, type the following and press Enter:

```
SMmonitor start
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor started.
```

End Of Procedure

Disabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
chkconfig -f SMmonitor off
```

You are returned to the prompt.

End Of Procedure

Enabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
chkconfig -f SMmonitor on
```

You are returned to the prompt.

End Of Procedure

Adding New Volumes

Use the following procedure to add new volumes to the disk subsystem from an IRIX machine. This procedure lets you add volumes dynamically without restarting the system. The utility registers the new volumes with the operating system so you can perform functions such as adding device names.

1 At the prompt, type the following and press Enter:

```
hinv
```

A hardware inventory screen is displayed, containing information similar to the following example. From this information, you can determine which controllers do not have disk drives or which volumes are recognized. The following example indicates that controllers 41 and 42 have no volumes listed.

```
Secondary unified instruction/data cache size: 4 Mbytes
Integral SCSI controller 41: Version Fibre Channel QL2200A
Integral SCSI controller 42: Version Fibre Channel QL2200A
Disk drive: unit 2 on SCSI controller 42
Disk drive: unit 2, lun 1 on SCSI controller 42
Disk drive: unit 2, lun 2 on SCSI controller 42
Disk drive: unit 2, lun 3 on SCSI controller 42
Disk drive: unit 2, lun 31 on SCSI controller 42
Integral SCSI controller 43: Version Fibre Channel QL2200A
```

2 Perform a loop probe of each controller without listed volumes to detect and connect any available volumes to the operating system. At the prompt, type the following and press Enter:

```
scsiha -rp controller ID controller ID
```

where *controller ID* is the hardware ID of the controller.

Using the example above, the controller ID's are 41 and 42. No visual cue is displayed indicating the command completed successfully.

3 Run the I/O configuration command to assign device names to the new volumes. At the prompt, type the following and press Enter:

```
ioconfig -f /hw
```

4 At the prompt, type the following and press Enter:

```
hinv
```

A hardware inventory screen is displayed.

5 Confirm the volumes have been attached. The new volumes should now be available through the IRIX format command.

End Of Procedure

Identifying Volumes by Operating System Device Names

Use the following procedure to locate system devices from an IRIX machine. The SMutil software includes a utility that allows you to see which disk subsystem volume is associated with a particular operating system device name. This capability is useful for operations such as data placement and volume deletion.

IMPORTANT If you are unsure whether new devices or volumes have been added to the system, it is recommended that you run hot_add first to ensure the devices are registered with the system. If the devices are not registered, they will not be displayed in the SMdevices output.

At the prompt, type the following and press Enter:

```
SMdevices
```

The software displays device identification information, similar to the following example, where:

- /dev/. . ./. . ./. . . = UNIX device node name
- Disk Subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume

```
/dev/scsi/201800a0b807b03c/lun0/c8p1 [Disk Subsystem <name>,
Volume, LUN 0, Volume WWN
<600a0b8000066e4900000042396ef21c>,Preferred Path:(Controller-
A) In Use]
/dev/scsi/201800a0b807b03c/lun31/c8p1 [Disk Subsystem <name>,
Volume Access, LUN 31, Volume WWN
<600a0b8000066e490000004100000000>]
dev/scsi/200600a0b807b054/lun0/c8p1 [Disk Subsystem
<name>,Volume, LUN 0, Volume
WWN<600a0b800007b054000000cc396ef238>, Alternate
Path:(Controller-B) Not In Use]
```

End Of Procedure

Stopping and Starting the Host-Agent Software

Use the following procedures to stop and start the host-agent software from an IRIX machine.

You will need to stop and restart the SMagent software whenever you have:

- Downloaded a NVSRAM file that enables an Access Volume or changes the LUN used for the Access Volume. Doing so allows detection of the new disk subsystems that will be managed by the host. If an Access Volume is not detected after a reboot, then the SMagent software will stop running automatically and you will need to restart it.
- Changed the LUN number of the access volume in the Mappings View.

Stopping the Host-Agent Software

To add disk subsystems, you must stop the SMagent software.When you restart the software, the host software detects the new disk subsystems and adds them to the management domain.

At the prompt, type the following and press Enter:

```
SMagent stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMagent stopped.
```

End Of Procedure

Starting or Restarting the Host-Agent Software

The SMagent software automatically starts after you reboot the host. However, you must start the software manually if you stop it to add disk subsystems.

At the prompt, type the following and press Enter:

```
SMagent start
```

When the program startup begins, a screen is displayed with the following:

```
SMagent started.
```

End Of Procedure

Chapter 4

Linux Software Installation

This chapter contains procedures for installing the applicable software packages on one or more storage management stations or hosts.

IMPORTANT Downgrades from SANtricity Storage Manager for version 8.3x to a previous version can cause data loss and are not supported.

IMPORTANT The storage management software has not been certified for use within a cluster environment for Linux. It is recommended that you install the storage management software on Linux operating systems only within a non-cluster environment.

Removing the Storage Management Software

This section contains command line interface procedures for removing the storage management software from one or more Linux storage management stations or hosts. The software removal procedures also can be performed using an rpm-compatible, GUI-based package manager.

No reboot is required after removing a storage management software package. Existing disk subsystem mappings and storage partition configurations are retained during software removal and will be recognized by the new client software.

1 Are you installing a new version of the software?

- Yes – Ensure you have completed a Linux Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for removing the storage management software.
- No – Go to step 2.

2 Logon as root or superuser.

3 Remove the SMutil package.

a At the prompt, type the following and press Enter:

```
rpm -e SMutil
```

When the software have been removed, the system will return to the prompt.

b At the prompt, type the following and press Enter:

```
rpm -qi SMutil
```

The following message is displayed:

```
Package SMutil is not installed.
```

4 Remove the SMclient package.

a At the prompt, type the following and press Enter:

```
rpm -e SMclient
```

When the software have been removed, the system will return to the prompt.

b At the prompt, type the following and press Enter:

```
rpm -qi SMclient
```

The following message is displayed:

```
Package SMclient is not installed.
```

5 Remove the SMruntime package.

a At the prompt, type the following and press Enter:

```
rpm -e SMruntime
```

When the software packages have been removed, the system returns to the prompt.

b At the prompt, type the following and press Enter:

```
rpm -qi SMruntime
```

The following message is displayed:

```
Package SMruntime is not installed.
```

6 Are you installing a new version of the software?

- Yes – Go to "Installing the Storage Management Software" on page 4-4.
- No – You are finished with this procedure.

Installing the Storage Management Software

This section contains CLI procedures for installing the storage management software on one or more Linux machines. The software installation procedures also can be performed using an rmp-compatible GUI-based package manager.

IMPORTANT Install SMruntime before installing SMclient. No reboot is required during the software installation process. The event monitor software is installed automatically during client software installation.

---

1 Logon as root or superuser.

2 Insert the installation CD and, if necessary, mount the CDROM drive. In the following procedure, the CDROM drive is mounted at /cdrom. Modify these instructions as required for your specific installation.

3 Install the storage management station software packages in the order in which they appear in the Installation Activity column, installing only those packages that correspond to your selections in the Pre-Installation Activity column of the Linux Installation Profile.

a Change to the client software directory. At the prompt, type the following and press Enter:

```
cd /cdrom/clientinstall
```

b At the prompt, type the installation command for the SMruntime package and press Enter. Refer to Table 4-1.

Table 4-1 Linux Storage Management Station Software Installation Commands

Package	Installation Command
SMruntime	`rpm -ivh smruntime.install.i386.rpm`
SMclient	`rpm -ivh smclient.install.i386.rpm`

A progress bar is displayed during installation. When the installation has completed successfully, a message is displayed accordingly.

4 Repeat step 3 to install the SMclient package. When finished, go to step 5.

5 Install the host software packages in the order in which they appear in the Installation Activity column, installing only those that correspond to your selections in the Pre-Installation Activity column of the Linux Installation Profile.

a Change to the host software directory. At the prompt, type the following and press Enter:

```
cd /cdrom/hostinstall
```

b At the prompt, type the installation command for the SMruntime package and press Enter. Refer to Table 4-2.

Table 4-2 Linux Host Software Installation Commands

Package	Installation Command
SMruntime	`rpm -ivh smruntime.install.i386.rpm`
SMutil	`rpm -ivh smutil.install.i386.rpm`
SMclient	`rpm -ivh smclient.install.i386.rpm`

A progress bar is displayed during installation. When the installation has completed successfully, a message is displayed accordingly.

6 Repeat step 5 to install the other required packages. Refer to your completed Linux Installation Profile. When finished, go to step 7.

7 Choose one of the following:

- Storage management software is required on other Linux machines – For each Linux machine, perform the applicable software removal and installation procedures as described in this chapter. Refer to the corresponding Linux Installation Profile for each machine to determine which software package to install first.
- Storage management software installation is completed on all Linux machines – Go to "Starting the Storage Management Software" on page 4-6.

Starting the Storage Management Software

Use the following procedures to start the storage management software.

1 At the prompt, type the following and press Enter:

```
SMclient
```

A splash screen is displayed while the client software starts. When the client software has been loaded, the Enterprise Management Window and the Confirm Initial Automatic Discovery dialog is displayed (Figure 4-1). The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

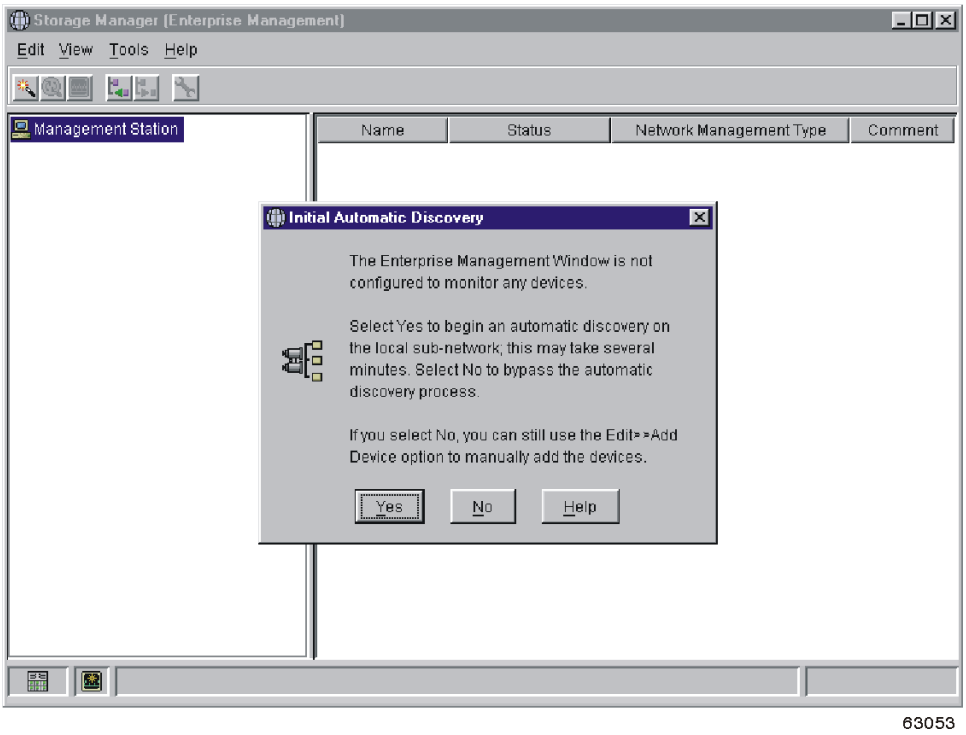

Figure 4-1 Confirm Initial Automatic Discovery Dialog

2 Select Yes to begin an initial automatic discovery of attached hosts and disk subsystems.

The software sends a broadcast message across the local subnetwork connected to the storage management station. It discovers host-agent managed disk subsystems if the respective *host* responds to the broadcast.

The software discovers direct managed disk subsystems if the *controllers* in the attached disk subsystems respond to the broadcast message. It may 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, all attached hosts and disk subsystems should appear in the Enterprise Management Window (Figure 4-2).

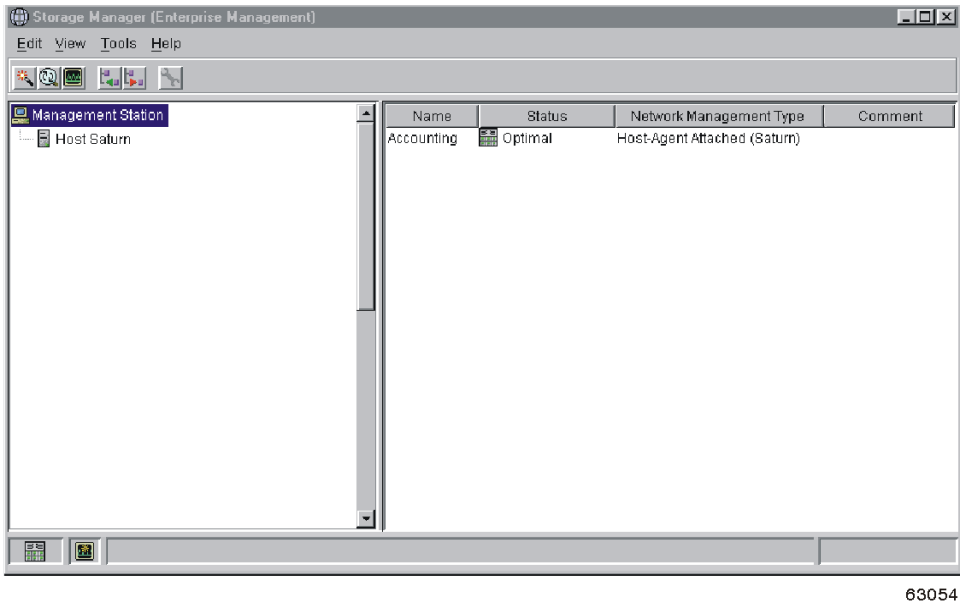

Figure 4-2 Enterprise Management Window

3 Verify all attached hosts and disk subsystems appear as expected. If they do not, do the following:

   a Check the hardware and connections for possible problems. Refer to the hardware documentation for specific procedures on troubleshooting interface problems.

   b Refer to the Enterprise Management Window Help topic on discovering disk subsystems and take the appropriate action provided.

   c Determine if the device is on the local subnetwork. If it is not, use the Add Device option to add it. Refer to the Enterprise Management Window Help topic on adding devices.

   d If a disk subsystem is duplicated in the Device Tree, remove the duplicate disk subsystem icon from the Device Tree using the Remove Device option in the Enterprise Management Window.

4 Verify the status of each disk subsystem is Optimal. If any device shows an Unresponsive status, do the following:

   a Remove the device from the management domain and add it again. Refer to the Enterprise Management Window Help topic on removing and adding devices.

   b If the device still shows an Unresponsive status, contact technical support.

5 Do you need to upgrade the controller firmware? Refer to your selection in the firmware upgrade requirements sections of the Linux Installation Profile.

   - Yes – Go to "Upgrading Controller Firmware."
   - No – Go to"Completing the Installation" on page 4-15.

Upgrading Controller Firmware

Use the following procedure to upgrade controller firmware from version 4.01.02.30 to version 5.x. Refer to the *SANtricity Storage Manager Product Release Notes* for the required files to download from the installation CD.

IMPORTANT All controllers must be running firmware version 4.01.02.30 or higher to be *managed* with version 8.3x of the storage management software or to be *upgraded* to firmware version 5.x.

IMPORTANT Upgrades to firmware version 4.01.02.30 – The installation CD for version 8.3x includes only firmware 5.x versions. To obtain version 4.01.02.30, contact technical support.

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. Verify you have installed all required operating system patches. Refer to the *Storage System Planning Guide* for operating system specifications.

   The storage management software installation program will not install these patches. Some patches listed may be superseded by other patches. Refer to your operating system documentation or contact your operating system supplier for more information.
3. Ensure the storage management software is running. If necessary, refer to "Starting the Storage Management Software" on page 4-6 for procedures.

4 Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Window is displayed (Figure 4-3).

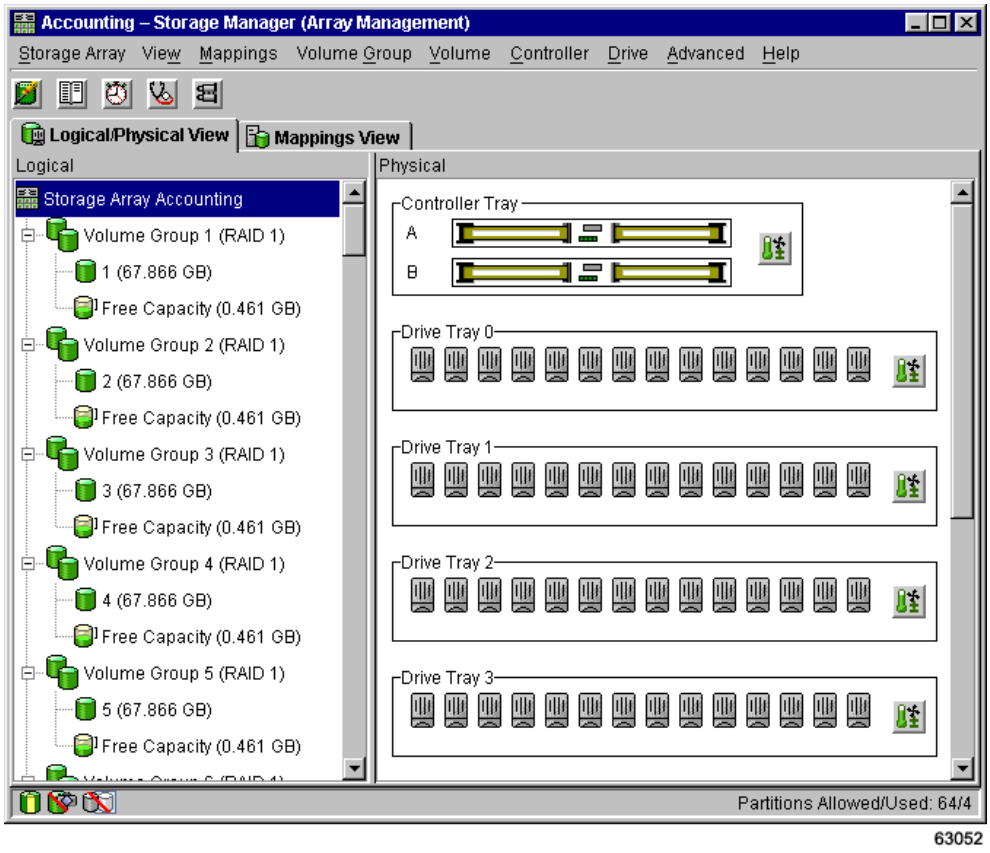

Figure 4-3 Array Management Window

5 Verify the Mode (state), cache size, and host I/O settings of each controller:

a Right-click Controller A and select Properties.

The Controller Properties window is displayed.

b Select the Base tab.

c Locate the Mode configuration and ensure the controller is in an Active state.

d Locate the Cache/processor size (MB) configuration and record the setting listed.

e Select the Interfaces tab.

f Locate the Fibre Channel host I/O interface settings, and record the number listed under Preferred ID for each port.

g Select Close.

6 Repeat step 5 for Controller B.

CAUTION Ensure both controllers are in an Active state and each controller owns at least one volume (LUN).

---

7 Verify the volume ownership of each controller:

a Right-click the disk subsystem in the Logical/Physical view and select View Profile.

The Disk Subsystem Profile window is displayed.

b Select the Volumes tab.

c Locate the Owned by controller in slot: information by each volume and ensure each controller owns at least one volume.

NOTE Use the Volume >> Change >> Ownership/Preferred Path option to transfer ownership of a volume, if needed.

d Locate the Status information and ensure the Status of each volume is Optimal.

8 Stop all I/O to the disk subsystem to prevent application errors.

9 From the menu, select Disk Subsystem >> Download >> Firmware.

The Firmware Download dialog is displayed.

10 In the File Selection area, select the CDROM drive and then the firmware folder. Either double-click the folder or type the folder name in the Enter File Name: text box.

11 Select the file that matches your controller type and select OK.

The Confirm Download dialog is displayed.

12 Select Yes to start the download.

13 Do one of the following, based on the dialog that is displayed after the download is completed.

- Firmware Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

14 After the download successfully completes, do the following:

a Close the dialogs and the current Array Management Window.

b Restart the Array Management Window by selecting a disk subsystem in the Enterprise Management Window and selecting Tools >> Manage Device.

The Array Management Window that uses the functionality of the new firmware will be displayed.

15 Go to "Downloading NVSRAM Configuration Settings" on page 4-12.

Downloading NVSRAM Configuration Settings

Use the following procedure to download NVSRAM configuration settings. Refer to the *SANtricity Storage Manager Product Release Notes* for the names of the required files to download from the installation CD.

IMPORTANT Perform this procedure only after you have installed the SMclient and ensured the controller firmware is at version 4.01.02.30 or higher.

---

1 Ensure the installation CD for version 8.3x is in the CDROM drive.

2 On a storage management station, start the storage management software.

3 Select Tools >> Manage Device to open the Array Management Window.

4 From the menu, select Disk Subsystem >> Download >> NVSRAM.

The NVSRAM Download dialog is displayed.

5 In the File Selection area, select the CDROM drive and then the nvsram folder. Either double-click the folder or type the folder name in the Enter File Name: text box.

6 Select the file that corresponds to the disk subsystem type and select OK.

The Confirm Download dialog is displayed.

7 Select Yes to start the download.

IMPORTANT During the download, a dialog may appear stating "the firmware downloaded is not compatible with the current version of the Array Management Window." *Do not* select OK in this dialog until the Download Successful dialog is displayed.

---

8 Do one of the following, based on the dialog that is displayed after the download is completed.

- Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

IMPORTANT You *must* set the host type before rebooting the host. The host type defines how the controllers in the disk subsystem work with the host's operating system when the volumes are accessed. If the host type is not set, contact with the disk subsystem might be lost. Complete step 9 through step 12 in this procedure to set the host type.

9 To determine whether SANshare Storage Partitioning is enabled or disabled, from the menu, select Disk Subsystem >> Premium Features >> List.

The List Premium Features dialog is displayed.

10 Is SANshare Storage Partitioning enabled?

- Yes – Select Close, and go to step 11.
- No – Select Close, and go to step 12.

11 SANshare Storage Partitioning is enabled – Perform the following procedures, referring to the Array Management Window Help for procedures.

a Define storage partitioning topology (hosts and host ports) for the new hosts.

b Define the host types of the individual host ports:

1 Select the Mappings View Tab.

2 Select a host port in the left pane of the window and then select Change Host Type from the right-mouse pop-up menu.

3 Select the correct host type.

4 Select OK to save the changes.

5 Repeat steps 2 through 4 for each host port shown in the Mappings View.

6 Select Close to close the Mappings window.

c Set up storage partitioning mappings so that the new hosts you have defined can access existing volumes on the disk subsystem, when required.

d Go to step 13.

12 SANshare Storage Partitioning is disabled – Change the host type of the disk subsystem:

a Select Disk Subsystem >> Change >> Default Host Type.

b Select the correct host type.

c Select OK to save the changes.

13 If needed, run scripts to modify default configuration settings stored in NVSRAM on each disk subsystem to meet the needs of your specific configuration.

Refer to the *SANtricity Storage Manager Product Release Notes* more information.

14 Go to "Verifying Host I/O Interface Settings" on page 4-14.

Verifying Host I/O Interface Settings

Use the following procedure to verify the host I/O interface settings after upgrading the firmware from any type of host.

1. On a storage management station, start the client software.
2. Select a disk subsystem in the Enterprise Management Window.
3. Select Tools >> Manage Device to open the Array Management Window.
4. In the Physical View, right-click Controller A and select Change >> Preferred Loop ID.

   The Change Preferred Loop ID dialog is displayed.
5. Verify the settings match those you recorded in step 5 on page 4-10 for each controller.
6. Do the controller settings match what you have recorded?
   - Yes – Select Close and go to step 10.
   - No – Select Close and go to step 7.
7. Correct the interface settings:
   a. Select a port in the Fibre Channel host I/O interfaces portion of the Interfaces tab.
   b. Select Change Preferred ID.

      The Change Preferred ID dialog is displayed.
   c. Change the number to match the value you recorded in step 5 on page 4-10.

      For example, if the value you recorded was 1/0xE8, you would select “1” in the Normal box. If the number you recorded was 126, select N-Port (126). If the original setting was 127, select Set During Loop Initialization (127).
   d. Select OK.
8. Repeat step 7 to correct the interface settings for each port.
9. Repeat step 4 through step 7 for Controller B.
10. Have you changed the interface settings?
    - Yes – Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power on for the new host I/O interface settings to take effect. When finished, go to step 11.
    - No – Go to step 11.
11. Remove the installation CD from the CDROM drive.
12. Go to “Completing the Installation.”

Completing the Installation

Use the following procedures to complete the installation process.

1. Configure alert notifications to receive e-mail or SNMP notifications of critical events that occur on the disk subsystems. Refer to the Enterprise Management Window Help for procedures. You can configure alert notifications to be sent to the following types of receiving devices:

   - Designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps – To configure the NMS for SNMP traps, go to step 2. Otherwise, go to step 3 on page 4-16.
   - Designated e-mail address – Refer to the Enterprise Management Window Help for procedures. To send e-mail to LSI Logic Storage Systems, Inc., contact technical support. When finished, go to step 3 on page 4-16.
   - Designated alphanumeric pager – A designated alphanumeric pager can receive alert notifications when third-party software is used to convert e-mail messages. When finished, go to step 3 on page 4-16.

2. Configure the NMS for SNMP traps:

   a. Insert the installation CD into the NMS.

   b. Copy the mib directory from the installation CD to the appropriate MIB file on the NMS.

   c. Compile the MIB according to the procedure required by your NMS. For details, contact your network administrator or refer to your network management station documentation.

3 Start the Array Management Window.

You must open an Array Management Window to manage a selected disk subsystem. You can open multiple Array Management Windows to manage more than one disk subsystem at the same time.

From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Window is displayed (Figure 4-4).

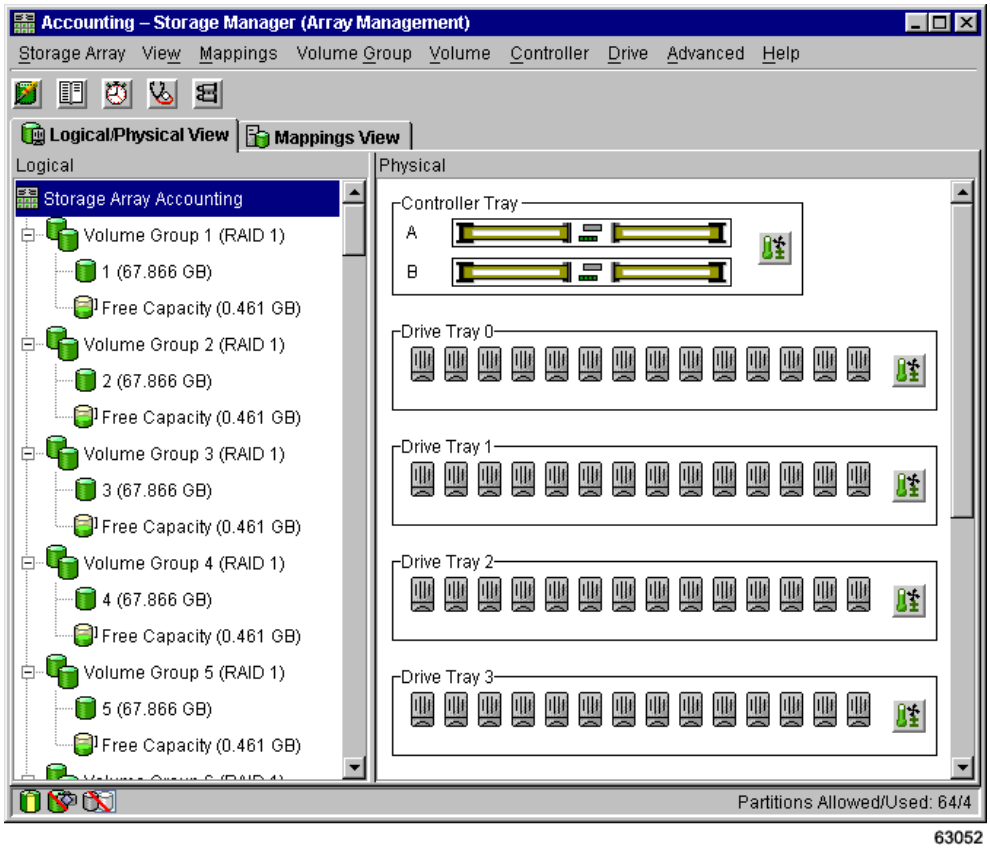

Figure 4-4 Array Management Window

4 Assign a unique name to the disk subsystem.

You must rename each disk subsystem to the name you entered on the Linux Installation Profile. For related topics and procedures, refer to the Array Management Window Help.

5 Enable any premium features on your disk subsystem. For related topics and procedures, refer to the Array Management Window Help.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

---

6 Is the client software running on two or more machines?

- Yes – Disable the event monitor on all but one machine. At the prompt, type the following and press Enter:

  ```
  SMmonitor stop
  ```

  When the program shutdown is completed, a screen is displayed with the following:

  ```
  SMmonitor stopped.
  ```

- No – Go to step 7.

7 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, and Array Management Window Help and to the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Refer to "Post-Installation Activities" on page 4-18.

End Of Procedure

Post-Installation Activities

Use the following procedures to manage your disk subsystem from an Linux machine.

Disabling and Enabling the Event Monitor

The event monitor is packaged with the client software and is installed automatically when you install the client software. The event monitor handles disk subsystem error messages through e-mail or SNMP traps when the storage management software is inactive. You can disable and enable the event monitor while it is running, or you can permanently disable or enable the boot-time loading of the event monitor.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

Disabling the Event Monitor While the Software is Running

IMPORTANT If you disable the event monitor while the client software is running, it will start automatically at the next reboot.

At the prompt, type the following and press Enter:

```
SMmonitor stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

End Of Procedure

Enabling the Event Monitor

At the prompt, type the following and press Enter:

```
SMmonitor start
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor started.
```

End Of Procedure

Adding Volumes

After adding volumes, you must reboot the host. Doing so registers the new volumes with the operating system so you can perform functions such as adding devices.

IMPORTANT When adding new volumes, ensure you map each new volume consecutively, starting with zero, 1, 2, and so forth. Any non-consecutively numbered volume will be inaccessible to the host.

Identifying Volumes by Operating System Device Names

The SMutil software includes a utility that allows you to see which disk subsystem volume is associated with a particular operating system device name. This capability is useful for operations such as data placement and volume deletion.

At the prompt, type the following and press Enter:

```
SMdevices
```

The software displays device identification information, similar to the following example, where:

- /dev/... = Linux device node name
- Disk Subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume

```
/dev/sdb (/dev/sgc)[Disk Subsystem <name>, Volume 1, LUN 0,
Volume WWN<600a0b8000091c9c000000df3bcedaae>, Preferred
Path:(Controller-A) In Use]
/dev/sdc (/dev/sgc) [Disk Subsystem <name>, Volume 2, LUN 1,
Volume WWN <600a0b8000091c9c000000e33bcedb05>, Alternate
Path:(Controller-B)
Not In Use]
/dev/sdd (/dev/sgc)[Disk Subsystem <name>, Volume 3, LUN 2,
Volume WWN <600a0b8000091c9c000000e73bcedb5c>, Alternate Path:
In Use]
```

End Of Procedure

Chapter 5

NetWare Software Installation

This chapter contains procedures for installing the applicable software packages on one or more storage management stations or hosts.

IMPORTANT Downgrades from SANtricity Storage Manager 8.3x to a previous version can cause data loss and are not supported.

IMPORTANT The storage management software has not been certified for use within a cluster environment for NetWare. It is recommended that you install the storage management software on NetWare operating systems only within a non-cluster environment.

Removing the Storage Management Software

This section contains procedures for removing the storage management software on one or more NetWare hosts.

No reboot is required after removing a storage management software package. Existing disk subsystem mappings and storage partition configurations are retained during software removal and will be recognized by the new client software.

1. Are you installing a new version of the software?
   - Yes – Ensure you have completed a NetWare Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for removing the storage management software.
   - No – Go to step 2.
2. Ensure you have root privileges, which are required to remove the software.
3. From the Graphical Console screen, select Novell >> Install.

   The Installed Products selection window is displayed.
4. Remove the storage management software:
   a. Select the component you want to remove from the list of programs.
   b. Select Delete.

      The Confirm Product Deletion dialog is displayed.
   c. Select OK to start the remove process.

      When the software removal is completed, the Installed Products selection window will return.
5. Repeat step 4 to remove each software package.
6. Are you installing a new version of the software?
   - Yes – Go to "Installing the Storage Management Software."
   - No – You are finished with this procedure.

Installing the Storage Management Software

This section contains procedures for installing the applicable storage management software packages on one or more NetWare machines.

IMPORTANT You can install two separate applications. Install the host software on the host server, and install the client software on a Windows storage management station. Refer to Chapter 7, "Windows Software Installation" for information on installing the Windows client software.

IMPORTANT No reboot is required during the client software installation process. The event monitor software is packaged with the client software and is installed automatically during the client software installation process.

Installing the NetWare Host Software

1. Ensure you have a completed a NetWare Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for installing the applicable software in the correct order on the storage management station or host.
2. Ensure the host is running the QLogic host bus adapter failover driver. For procedures on verifying the installation, refer to the user documentation shipped with the host bus adapter failover driver.
3. Close all other programs before installing this software.
4. Insert the installation CD and, if necessary, mount the CDROM from the System Console screen by typing the following and pressing Enter:

   ```
   Load CDROM
   ```

5. Install the host software packages in the order in which they appear in the Installation Activity column, installing only those packages that correspond to your selections in the Pre-Installation Activity column of the NetWare Installation Profile.
   a. From the Graphical Console screen, select Novell >> Install.

      The Install Products dialog is displayed.

   b. Select Add.

      The Source Path dialog is displayed.

   c. Select the Directory Tree button.

      The Source Path browsing window is displayed.

d Double-click the CDROM drive in the left-hand panel.

e Select the /hostinstall folder.

f Select the /utilities folder.

g In the right-hand panel, select the product.ni file and select OK.

h Select OK when the Source Path is displayed.

The Please Wait dialog is displayed several times and then the License Agreement dialog is displayed.

i Select Accept to continue.

The Summary dialog is displayed.

j Select Finish to complete the installation.

The Progress dialog is displayed. When the installation is finished, the Installation Complete dialog is displayed.

k Select Close.

l Select Novell >> Install and verify the software is displayed in the Program list.

6 Was the installation successful (no failure reported)?

- Yes – Go to step 7.
- No – Repeat step 5 on page 5-3 for the package with the failed installation. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

7 Choose one of the following:

- Storage management software is required on other NetWare machines – For each NetWare machine, perform the software removal and installation procedures described in this chapter as applicable. Refer to the corresponding NetWare Installation Profile for each machine to determine which software package to install first.
- Storage management software installation is completed on all NetWare machines – Go to "Starting the Storage Management Software."

Starting the Storage Management Software

Use the following procedures to start the storage management software.

1 At the prompt, type the following and press Enter:

```
SMclient
```

A splash screen is displayed while the client software starts. When the client software has been loaded, the Enterprise Management Window and the Confirm Initial Automatic Discovery dialog is displayed (Figure 5-1). The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

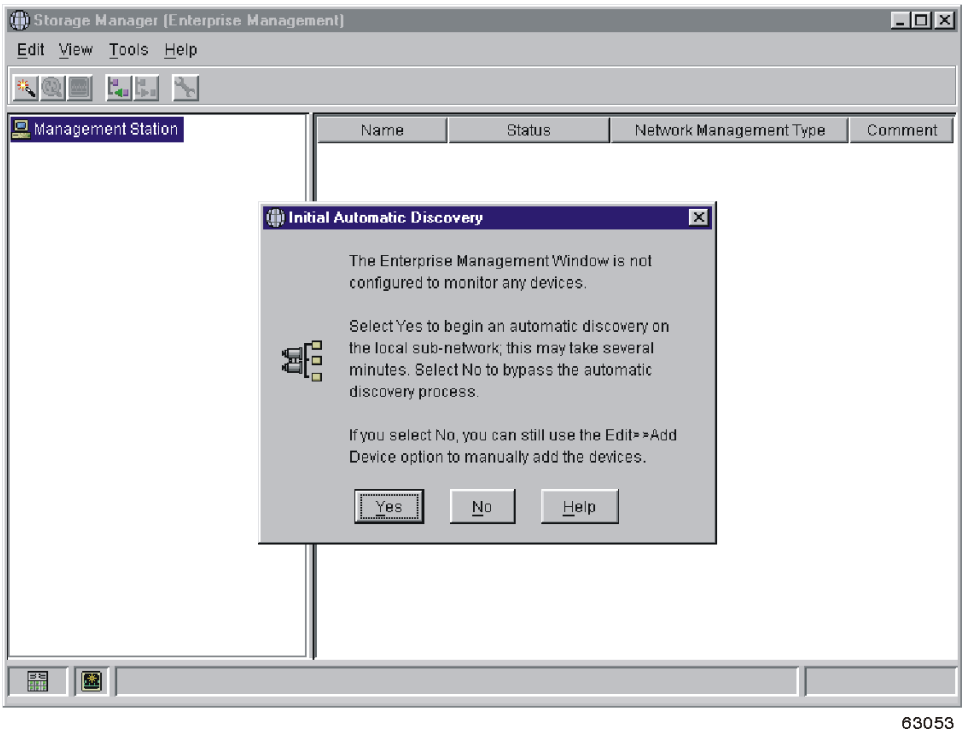

Figure 5-1 Confirm Initial Automatic Discovery Dialog

2 Select Yes to begin an initial automatic discovery of attached hosts and disk subsystems.

The software sends a broadcast message across the local subnetwork connected to the storage management station. It discovers host-agent managed disk subsystems if the respective *host* responds to the broadcast.

The software discovers direct managed disk subsystems if the *controllers* in the attached disk subsystems respond to the broadcast message. It may 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, all attached hosts and disk subsystems should appear in the Enterprise Management Window (Figure 5-2).

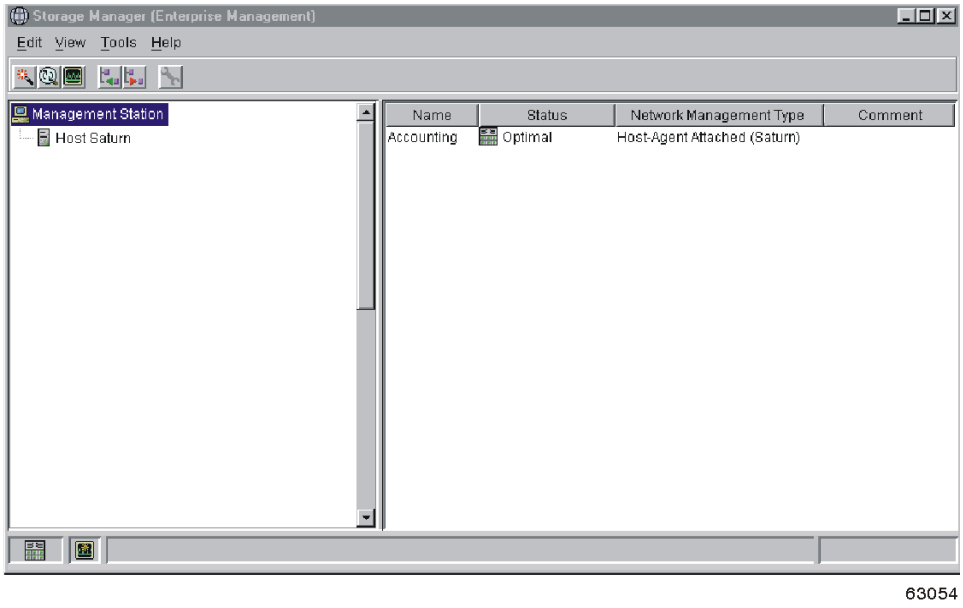

Figure 5-2 Enterprise Management Window

3 Verify all attached hosts and disk subsystems appear as expected. If they do not, do the following:

   a Check the hardware and connections for possible problems. Refer to the hardware documentation for specific procedures on troubleshooting interface problems.

   b Refer to the Enterprise Management Window Help topic on discovering disk subsystems and take the appropriate action provided.

   c Determine if the device is on the local subnetwork. If it is not, use the Add Device option to add it. Refer to the Enterprise Management Window Help topic on adding devices.

   d If a disk subsystem is duplicated in the Device Tree, remove the duplicate disk subsystem icon from the Device Tree using the Remove Device option in the Enterprise Management Window.

4 Verify the status of each disk subsystem is Optimal. If any device shows an Unresponsive status, do the following:

   a Remove the device from the management domain and add it again. Refer to the Enterprise Management Window Help topic on removing and adding devices.

   b If the device still shows an Unresponsive status, contact technical support.

5 Do you need to upgrade the controller firmware? Refer to your selection in the firmware upgrade requirements sections of the NetWare Installation Profile.

   - Yes – Go to “Upgrading Controller Firmware” on page 5-8.
   - No – Go to “Completing the Installation” on page 5-14.

Upgrading Controller Firmware

Use the following procedure to upgrade controller firmware from version 4.01.02.30 to version 5.x. Refer to the *SANtricity Storage Manager Product Release Notes* for the required files to download from the installation CD.

IMPORTANT All controllers must be running firmware version 4.01.02.30 or higher to be *managed* with version 8.3x of the storage management software or to be *upgraded* to firmware version 5.x.

IMPORTANT Upgrades to firmware version 4.01.02.30 – The installation CD for version 8.3x includes only firmware 5.x versions. To obtain version 4.01.02.30, contact technical support.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. Verify you have installed all required operating system patches. Refer to the *Storage System Planning Guide* for operating system specifications.

   The storage management software installation program will not install these patches. Some patches listed may be superseded by other patches. Refer to your operating system documentation or contact your operating system supplier for more information.
3. Ensure the storage management software is running. If necessary, refer to "Starting the Storage Management Software" on page 5-5 for procedures.
4. Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

   The Array Management Window is displayed (Figure 5-3).

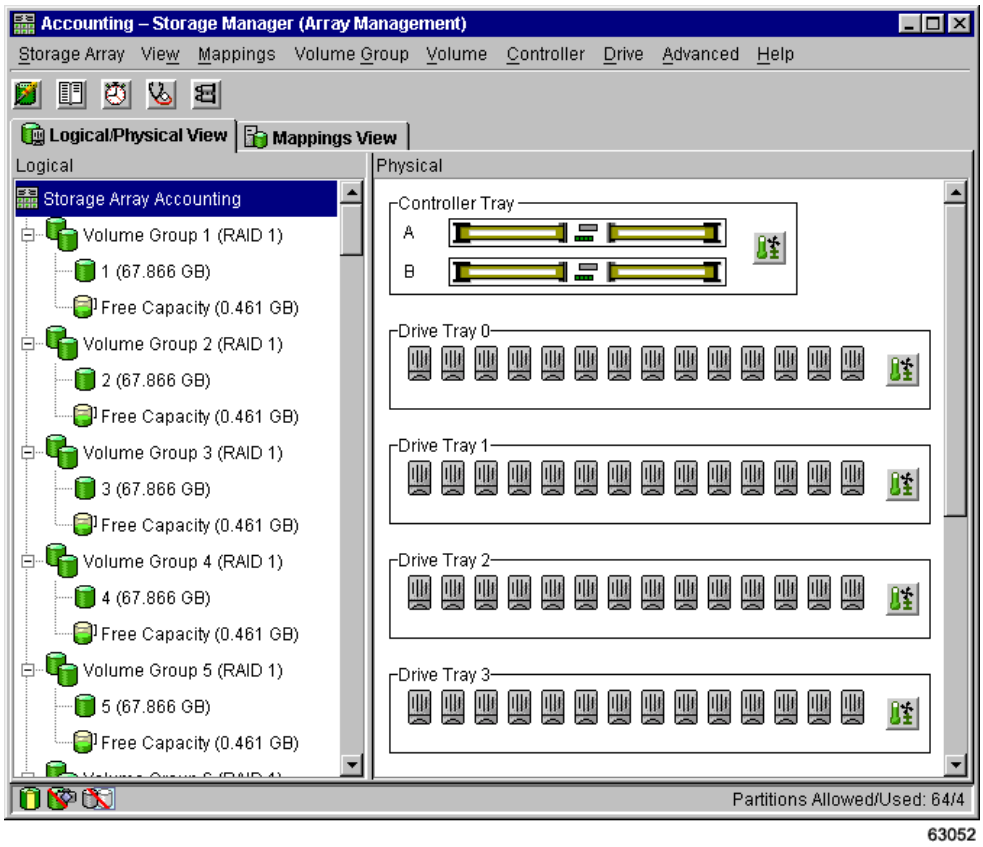

Figure 5-3 Array Management Window

5 Verify the Mode (state), cache size, and host I/O settings of each controller:

a Right-click Controller A and select Properties.

The Controller Properties window is displayed.

b Select the Base tab.

c Locate the Mode configuration and ensure the controller is in an Active state.

d Locate the Cache/processor size (MB) configuration and record the setting listed.

e Select the Interfaces tab.

f Locate the Fibre Channel host I/O interface settings, and record the number listed under Preferred ID for each port.

g Select Close.

6 Repeat step 5 for Controller B.

CAUTION Ensure both controllers are in an Active state and each controller owns at least one volume (LUN).

7 Verify the volume ownership of each controller:

a Right-click the disk subsystem in the Logical View and select View Profile.

The Disk Subsystem Profile window is displayed.

b Select the Volumes tab.

c Locate the Owned by controller in slot: information by each volume and ensure each controller owns at least one volume.

NOTE Use the Volume >> Change >> Ownership/Preferred Path option to transfer ownership of a volume, if needed.

d Locate the Status information and ensure the Status of each volume is Optimal.

8 Stop all I/O to the disk subsystem to prevent application errors.

9 From the menu, select Disk Subsystem >> Download >> Firmware.

The Firmware Download dialog is displayed.

10 In the File Selection area, select the CDROM drive and then the firmware folder. Either double-click the folder or type the folder name in the Enter File Name: text box.

11 Select the file that matches your controller type and select OK.

The Confirm Download dialog is displayed.

12 Select Yes to start the download.

13 Do one of the following, based on the dialog that is displayed after the download is completed.

- Firmware Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

14 After the download successfully completes, do the following:

a Close the dialogs and the current Array Management Window.

b Restart the Array Management Window by selecting a disk subsystem in the Enterprise Management Window and selecting Tools >> Manage Device.

The Array Management Window that uses the functionality of the new firmware will be displayed.

15 Go to "Downloading NVSRAM Configuration Settings."

Downloading NVSRAM Configuration Settings

Use the following procedure to download NVSRAM configuration settings. Refer to the *SANtricity Storage Manager Product Release Notes* for the names of the required files to download from the installation CD.

IMPORTANT Perform this procedure only after you have installed the SMclient and ensured the controller firmware is at version 4.01.02.30 or higher.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. On a storage management station, start the storage management software.
3. Select Tools >> Manage Device to open the Array Management Window.
4. From the menu, select Disk Subsystem >> Download >> NVSRAM.

   The NVSRAM Download dialog is displayed.
5. In the File Selection area, select the CDROM drive and then the nvsram folder. Either double-click the folder or type the folder name in the Enter File Name: text box.
6. Select the file that corresponds to the disk subsystem type and select OK.

   The Confirm Download dialog is displayed.
7. Select Yes to start the download.

IMPORTANT During the download, a dialog may appear stating "the firmware downloaded is not compatible with the current version of the Array Management Window." *Do not* select OK in this dialog until the Download Successful dialog is displayed.

---

8. Do one of the following, based on the dialog that is displayed after the download is completed.
   - Download Successful dialog – Select Done.
   - Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

IMPORTANT You *must* set the host type before rebooting the host. The host type defines how the controllers in the disk subsystem work with the host's operating system when the volumes are accessed. If the host type is not set, contact with the disk subsystem might be lost. Complete step 9 through step 12 in this procedure to set the host type.

9 To determine whether SANshare Storage Partitioning is enabled or disabled, from the menu, select Disk Subsystem >> Premium Features >> List.

The List Premium Features dialog is displayed.

10 Is SANshare Storage Partitioning enabled?

- Yes – Select Close, and go to step 11.
- No – Select Close, and go to step 12.

11 SANshare Storage Partitioning is enabled – Perform the following procedures, referring to the Array Management Window Help for procedures.

a Define storage partitioning topology (hosts and host ports) for the new hosts.

b Define the host types of the individual host ports:

1 Select the Mappings View Tab.

2 Select a host port in the left pane of the window and then select Change Host Type from the right-mouse pop-up menu.

3 Select the correct host type.

4 Select OK to save the changes.

5 Repeat steps 2 through 4 for each host port shown in the Mappings View.

6 Select Close to close the Mappings window.

c Set up storage partitioning mappings so that the new hosts you have defined can access existing volumes on the disk subsystem, when required.

d Go to step 13.

12 SANshare Storage Partitioning is disabled – Change the host type of the disk subsystem:

a Select Disk Subsystem >> Change >> Default Host Type.

b Select the correct host type.

c Select OK to save the changes.

13 If needed, run scripts to modify default configuration settings stored in NVSRAM on each disk subsystem to meet the needs of your specific configuration.

Refer to the *SANtricity Storage Manager Product Release Notes* more information.

14 Go to "Verifying Host I/O Interface Settings."

Verifying Host I/O Interface Settings

Use the following procedure to verify the host I/O interface settings after upgrading the firmware from any type of host.

1. On a storage management station, start the client software.
2. Select a disk subsystem in the Enterprise Management Window.
3. Select Tools >> Manage Device to open the Array Management Window.
4. In the Physical View, right-click Controller A and select Change >> Preferred Loop ID.

   The Change Preferred Loop ID dialog is displayed.
5. Verify the settings match those you recorded in step 5 on page 5-9 for each controller.
6. Do the controller settings match what you have recorded?
   - Yes – Select Close and go to step 10.
   - No – Select Close and go to step 7.
7. Correct the interface settings:
   a. Select a port in the Fibre Channel host I/O interfaces portion of the Interfaces tab.
   b. Select Change Preferred ID.

      The Change Preferred ID dialog is displayed.
   c. Change the number to match the value you recorded in step 5 on page 5-9.

      For example, if the value you recorded was 1/0xE8, you would select “1” in the Normal box. If the number you recorded was 126, select N-Port (126). If the original setting was 127, select Set During Loop Initialization (127).
   d. Select OK.
8. Repeat step 7 to correct the interface settings for each port.
9. Repeat step 4 through step 7 for Controller B.
10. Have you changed the interface settings?
    - Yes – Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power on for the new host I/O interface settings to take effect. When finished, go to step 11.
    - No – Go to step 11.
11. Remove the installation CD from the CDROM drive.
12. Go to “Completing the Installation” on page 5-14.

Completing the Installation

Use the following procedure to complete the installation process.

1. Configure alert notifications to receive e-mail or SNMP notifications of critical events that occur on the disk subsystems. Refer to the Enterprise Management Window Help for procedures. You can configure alert notifications to be sent to the following types of receiving devices:

   - Designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps – To configure the NMS for SNMP traps, go to step 2. Otherwise, go to step 3.
   - Designated e-mail address – Refer to the Enterprise Management Window Help for procedures. To send e-mail to LSI Logic Storage Systems, Inc., contact technical support. When finished, go to step 3.
   - Designated alphanumeric pager – A designated alphanumeric pager can receive alert notifications when third-party software is used to convert e-mail messages. When finished, go to step 3.

2. Configure the NMS for SNMP traps:

   a. Insert the installation CD into the NMS.

   b. Copy the mib directory from the installation CD to the appropriate MIB file on the NMS.

   c. Compile the MIB according to the procedure required by your NMS. For details, contact your network administrator or refer to your network management station documentation.

3 Start the Array Management Window.

You must open an Array Management Window to manage a selected disk subsystem. You can open multiple Array Management Windows to manage more than one disk subsystem at the same time.

Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Window is displayed (Figure 5-4).

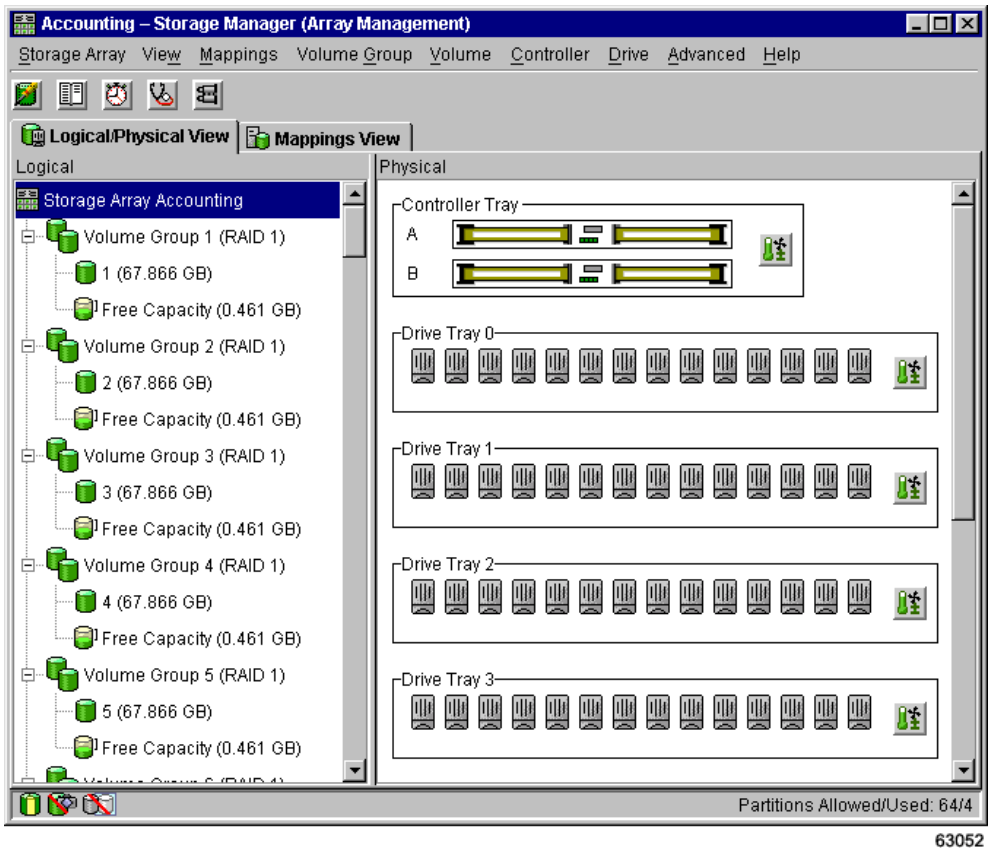

Figure 5-4 Array Management Window

4 Assign a unique name to the disk subsystem.

You must rename each disk subsystem to the name you entered on the NetWare Installation Profile. For related topics and procedures, refer to the Array Management Window Help.

5 Enable any premium features on your disk subsystem. For related topics and procedures, refer to the Array Management Window Help.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

---

6 Is the client software running on two or more machines?

- Yes – Disable the event monitor on all but one machine. At the prompt, type the following and press Enter:

  ```
  SMmonitor stop
  ```

  When the program shutdown is completed, a screen is displayed with the following:

  ```
  SMmonitor stopped.
  ```

- No – Go to step 7.

7 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, and Array Management Window Help and to the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Refer to "Post-Installation Activities."

End Of Procedure

Post-Installation Activities

Use the following procedures to manage your disk subsystem from a NetWare machine.

Disabling and Enabling the Event Monitor

The event monitor is packaged with the client software and is installed automatically when you install the client software. The event monitor handles disk subsystem error messages through e-mail or SNMP traps when the storage management software is inactive. You can disable and enable the event monitor while it is running, or you can permanently disable or enable the boot-time loading of the event monitor.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

Disabling the Event Monitor

1. Go to the System Console by pressing Ctrl+Esc and then selecting System Console.
2. At the prompt, type the following and press Enter:

   ```
   java -show
   ```

   Record the process ID for devmgr.pmlauncher.NetWareLauncher.
3. Type the following and press Enter:

   `java -kill`*`xxxx`*

   where *xxxx* is the process ID.

End Of Procedure

Enabling the Event Monitor Manually

You must start the event monitor software manually when the system boots or if you have stopped it in order to perform other functions.

1. From the System Console screen, type the following and press Enter:

   ```
   sys:/sm/SMmon
   ```

   The screen will go blank.

2. Press Ctrl+Esc and select X Server >> Graphical Console to return to ConsoleOne.

End Of Procedure

Enabling the Event Monitor to Start Automatically

Use the following procedure to configure the event monitor to start automatically when you boot the host.

1. Open the autoexec.ncf file in a text editor.
2. If there is a line that loads the Java Runtime Environment, such as STARTX.NCF or LOAD JAVA, then add the following line at the end of the file:

   ```
   sys: \sm\SMmon.ncf
   ```

   Otherwise, add the following lines at the end of the file:

   ```
   load java

   sys:\sm\SMmon.ncf
   ```

3. Save and close the autoexec.ncf file.

End Of Procedure

Using the hot_add Utility

The hot_add utility allows you to add new volumes dynamically without restarting the system. The utility registers the new volumes with the operating system so you can perform functions such as adding device names. The hot_add utility is installed as a part of the SMutil software.

1. Go to the System Console by pressing Ctrl+Esc and then selecting System Console.
2. At the prompt, type the following and press Enter:

   ```
   hot_add
   ```

   After detecting drives, a screen is displayed that lists the drives the hot_add utility has added to the system. The new volumes will be available through the operating system.

End Of Procedure

Identifying Volumes by Operating System Device Names

Use the following procedure to locate system devices from a NetWare machine.

The SMutil software includes a utility that allows you to see which disk subsystem volume is associated with a particular operating system device name. This capability is useful for operations such as data placement and volume deletion.

IMPORTANT If you are unsure whether new devices or volumes have been added to the system, it is recommended that you run hot_add first to ensure the devices are registered with the system. If the devices are not registered, they will not be displayed in the SMdevices output.

---

1 Go to the System Console by pressing Ctrl+Esc and then select System Console.

2 At the prompt, type the following and press Enter:

```
SMdevices
```

Go to the Logging Screen. The software displays device identification information, similar to the following example, where:

- V596-AX-DX:*xx* = device node name
- Disk Subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume
- Path = current path

```
V591-A2-D0:5 [Disk Subsystem <name>, Volume Financial, LUN 5,
Volume WWN <600a0b80000753cc000003db000000000> Preferred
Path:(Controller-A)In Use]
V591-A2-D0:6 [Disk Subsystem <name>, Volume Financial, LUN 6,
Volume WWN <600a0b80000754dc000004af100000000> Alternate
Path:(Controller-B)Not In Use]
V591-A2-D0:7 [Disk Subsystem <name>, Volume Access,
LUN 7, Volume WWN <600a0b800007b054000000cc396ef2380>]
```

---

3 Press Ctrl+Esc and select X Server >> Graphical Console to return to ConsoleOne.

End Of Procedure

Chapter 6

Solaris Software Installation

This chapter contains procedures for installing the applicable software packages on one or more Solaris storage management stations or hosts.

IMPORTANT Downgrades from SANtricity Storage Manager version 8.3x to a previous version can cause data loss and are not supported.

Removing the Storage Management Software

Use the following procedure to remove the storage management software from one or more Solaris storage management stations or hosts.

No reboot is required after removing a storage management software package. Existing disk subsystem mappings and storage partition configurations are retained during software removal and will be recognized by the new client software.

1. Are you installing a new version of the software?
   - Yes – Ensure you have completed a Solaris Installation Profile from the *Storage System Planning Guide* for each Solaris machine on which you are installing the software. You will use the profile during the installation process as a guide for removing the storage management software.
   - No – Go to step 2.
2. Ensure you have root privileges, which are required to remove the software.
3. Remove the storage management software:
   a. At the prompt, type the following and press Enter:

      ```
      pkgrm
      ```

      A screen is displayed showing a numbered list of all software installed on this machine.

   b. Note the numbers of the packages you wish to remove.
      - Press Enter to display additional pages of software, if needed.
      - Press Ctrl+D to stop listing additional pages when all packages have been noted.

      The following prompt is displayed:

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

   c. Type the numbers associated with the packages you wish to remove, separated by commas, and press Enter.

   d. One or more confirmation messages may appear. For each message, type the following and press Enter:

      ```
      y
      ```

      The prompt returns when all selected packages have been removed successfully.
4. Repeat step 3 to remove each additional software package. When finished, go to step 5.

IMPORTANT A reboot is required using the boot -r command after removing the RDAC package.

5 Are you installing a new version of the software?

- Yes – Go to "Installing the Storage Management Software" on page 6-4.
- No – You are finished with this procedure.

Installing the Storage Management Software

Use the following procedure to install the storage management software packages on one or more Solaris machines.

IMPORTANT Install SMruntime before installing SMclient. No reboot is required during the software installation process. The event monitor software is installed automatically during client software installation.

---

1. Ensure you have completed a Solaris Installation Profile from the *Storage System Planning Guide* for each Solaris machine on which you are installing the software. You will use the profile during the installation process as a guide for installing the appropriate software in the correct order on the storage management station.
2. Are you installing the software on a system with existing disk subsystems running Veritas Volume Manager DMP?
   - Yes – You must remove Veritas Volume Manager before installing RDAC to prevent loss of access to configured volumes. Contact technical support for assistance. Then go to step 3
   - No – Go to step 3.
3. Insert the installation CD and, if necessary, mount the CDROM drive. In the following procedure, the CDROM drive is mounted at /cdrom. Modify these instructions as required for your specific installation.
4. Install the storage management station software packages in the order in which they appear in the Installation Activity column, installing only those packages that correspond to your selections in the Pre-Installation Activity column of the Solaris Installation Profile.
   a. At the prompt, type the following and press Enter:

      ```
      pkgadd -d /cdrom/volume-name/clientinstall
      ```

      where *volume-name* is the volume name of the installation CD.

The command line displays information about packages that can be installed from the specified directory, similar to the following:

```
The following packages are available:
1 SMOVclnt     SANtricity Storage Manager Integration-Open View
Network Node Manager
               (sparc) <version number>
2 SMclient     SANtricity Storage Manager Client
               (sparc) <version number>
3  SMruntime      SANtricity Storage Manager Runtime
               (sparc) <version number>
Select package(s) you wish to process (or 'all' to process all
packages). (default:all) [?,??,q]:
```

b Using your completed Solaris Installation Profile as a guide, type the number next to the SMruntime package first, followed by the number next to the SMclient package, and optionally, the number next to the SMOVclnt package. Ensure the numbers are separated by commas and press Enter.

IMPORTANT If you select *all*, the software packages will install in alphabetical order and you may encounter installation errors. Ensure you install SMruntime first, followed by SMclient and, optionally, SMOVclnt.

The installation process begins, and the following prompt is displayed:

```
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
<packagename>
[y, n, ?]
```

where *packagename* is the software package you selected for installation.

c Type the following and press Enter:

```
y
```

The installation process continues. After each package installation is finished, the following message is displayed and the command prompt returns.

```
Installation of <packagename> was successful.
```

where *packagename* is the software package you selected for installation.

5 Was the installation for the selected package successful (no failure reported)?

- Yes – Repeat step 4 on page 6-4 for each applicable software package. When finished, go to step 6.
- No – Repeat step 4 on page 6-4 for the package with the failed installation. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

6 Install the host software packages in the order in which they appear in the Installation Activity column, installing only those that correspond to your selections in the Pre-Installation Activity column of the Solaris Installation Profile.

a Change to the host software directory. At the prompt, type the following and press Enter:

```
pkgadd -d /cdrom/volume-name/hostinstall
```

where *volume-name* is the volume name of the installation CD.

The command line displays information about packages that can be installed from the specified directory, similar to the following:

```
The following packages are available:
1  RDAC            Redundant Disk Array Controller
                  (sparc) <version number>
2 SMOVclnt      SANtricity Storage Manager Integration-Open View
Network Node Manager
                  (sparc) <version number>
3  SMagent         SANtricity Storage Manager Agent
                  (sparc) <version number>
4  SMclient        SANtricity Storage Manager Client
                  (sparc) <version number>
5  SMruntime       SANtricity Storage Manager Runtime
                  (sparc) <version number>
6  SMutil          SANtricity Storage Manager Utilities
                  (sparc) <version number>
Select package(s) you wish to process (or ‘all’ to process all
packages). (default:all) [?,??,q]:
```

IMPORTANT If you select "*all*," the software packages will install in alphabetical order and you may encounter installation problems. Ensure you install SMruntime first and install RDAC before installing SMagent.

b Using your completed Solaris Installation Profile as a guide, type the numbers for the applicable software packages, separated by commas, and press Enter.

The installation process begins, and the following prompt is displayed:

```
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
<packagename>
[y, n, ?]
```

where *packagename* is the software package you selected for installation.

c Type the following and press Enter:

```
y
```

The installation process continues. After each package installation is finished, the following message is displayed and the command prompt returns.

```
Installation of <packagename> was successful.
```

where *packagename* is the software package you selected for installation.

d Was the installation successful (no failure reported)?

- Yes – Repeat step 6 for each applicable software package. When finished, go to step 7.
- No – Repeat step 6 to install the package with the failed installation. If the failure persists, refer to the *SANtricity Storage Manager Product Release Notes* or contact technical support.

7 Shut down the system. Type the following and press Enter:

```
/etc/shutdown -y -i0 -g0
```

8 Reboot the system. Type the following and press Enter:

```
boot -r
```

CAUTION Cluster environments – The storage management software has been certified to support a maximum of two hosts per cluster server.

9 Choose one of the following:

- Storage management software is required on other Solaris machines – For each Solaris machine, perform the software removal and installation procedures described in this chapter as applicable. Refer to the corresponding Solaris Installation Profile for each machine to determine which software package to install first.
- Storage management software installation is completed on all Solaris machines – Go to "Starting the Storage Management Software."

Starting the Storage Management Software

Use the following procedures to start the storage management software.

IMPORTANT Cluster configurations – Complete all applicable configuration procedures for each *before* booting the cluster server.

1 At the prompt, type the following and press Enter:

```
SMclient
```

A splash screen is displayed while the client software starts. When the client software has been loaded, the Enterprise Management Window and the Confirm Initial Automatic Discovery dialog is displayed (Figure 6-1). The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

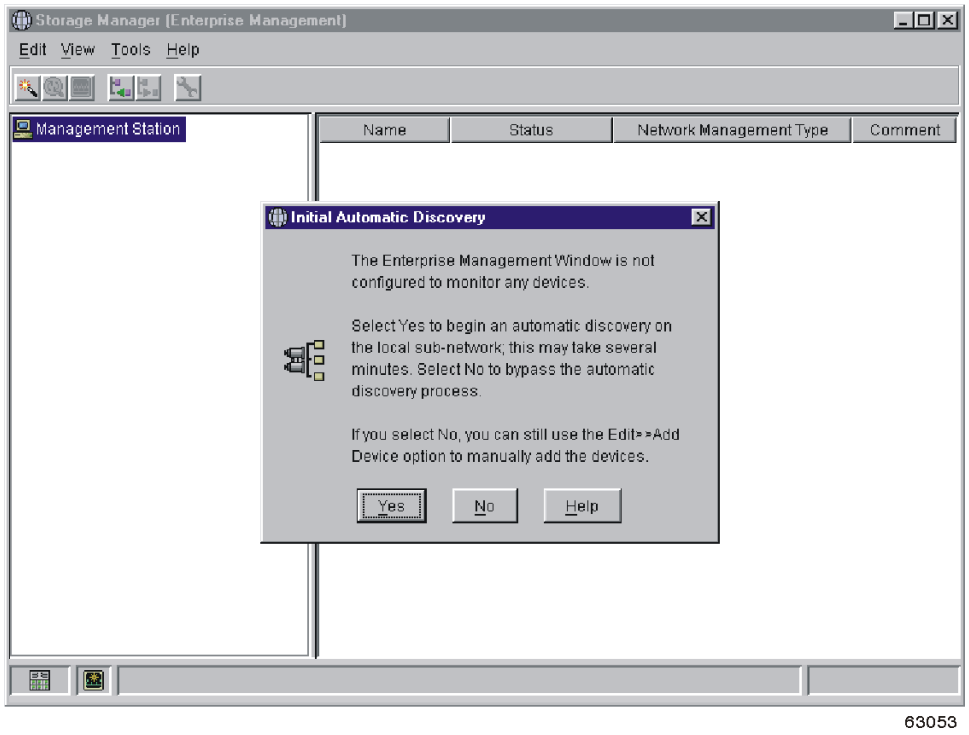

Figure 6-1 Confirm Initial Automatic Discovery Dialog

2 Select Yes to begin an initial automatic discovery of attached hosts and disk subsystems.

The software sends a broadcast message across the local subnetwork connected to the storage management station. It discovers host-agent managed disk subsystems if the respective *host* responds to the broadcast.

The software discovers direct managed disk subsystems if the *controllers* in the attached disk subsystems respond to the broadcast message. It may 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, all attached hosts and disk subsystems should appear in the Enterprise Management Window (Figure 6-2).

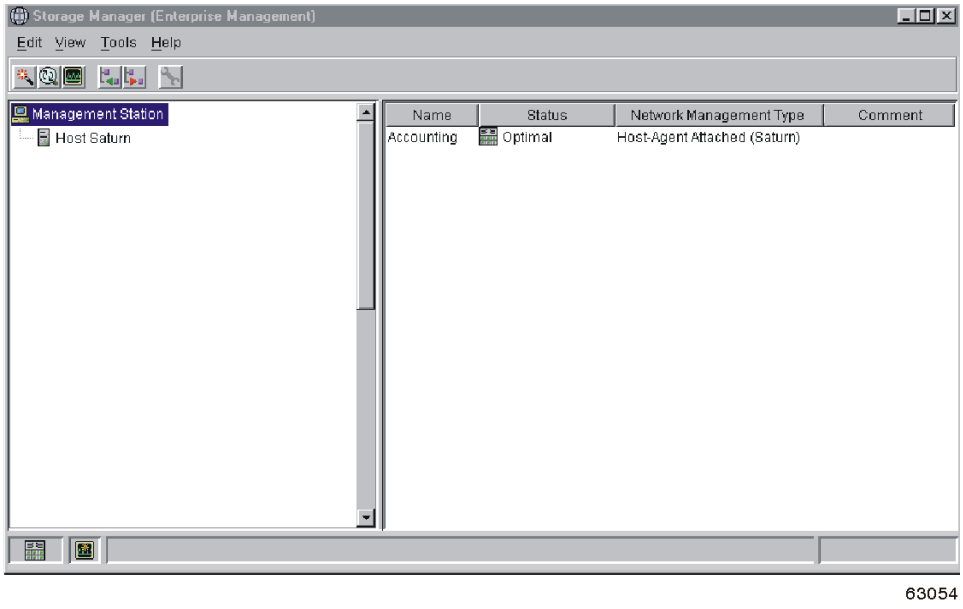

Figure 6-2 Enterprise Management Window

3 Verify all attached hosts and disk subsystems appear as expected. If they do not, do the following:

   a Check the hardware and connections for possible problems. Refer to the hardware documentation for specific procedures on troubleshooting interface problems.

   b Refer to the Enterprise Management Window Help topic on discovering disk subsystems and take the appropriate action provided.

   c Determine if the device is on the local subnetwork. If it is not, use the Add Device option to add it. Refer to the Enterprise Management Window Help topic on adding devices.

   d If a disk subsystem is duplicated in the Device Tree, remove the duplicate disk subsystem icon from the Device Tree using the Remove Device option in the Enterprise Management Window.

4 Verify the status of each disk subsystem is Optimal. If any device shows an Unresponsive status, do the following:

   a Remove the device from the management domain and add it again. Refer to the Enterprise Management Window Help topic on removing and adding devices.

   b If the device still shows an Unresponsive status, contact technical support.

5 Do you need to upgrade the controller firmware? Refer to your selection in the firmware upgrade requirements sections of the Solaris Installation Profile.

   - Yes – Go to “Upgrading Controller Firmware” on page 6-12.
   - No – Go to “Completing the Installation” on page 6-19.

Upgrading Controller Firmware

Use the following procedure to upgrade controller firmware from version 4.01.02.30 to version 5.x. Refer to the *SANtricity Storage Manager Product Release Notes* for the required files to download from the installation CD.

IMPORTANT All controllers must be running firmware version 4.01.02.30 or higher to be *managed* with version 8.3x of the storage management software or to be *upgraded* to firmware version 5.x.

IMPORTANT Upgrades to firmware version 4.01.02.30 – The installation CD for version 8.3x includes only firmware 5.x versions. To obtain version 4.01.02.30, contact technical support.

1. Ensure the version 8.3x installation CD is in the CDROM drive.
2. Verify you have installed all required operating system patches. Refer to the *Storage System Planning Guide* for operating system specifications.

   The storage management software installation program will not install these patches. Some patches listed may be superseded by other patches. Refer to your operating system documentation or contact your operating system supplier for more information.
3. Ensure the storage management software is running. If necessary, refer to "Starting the Storage Management Software" on page 6-9 for procedures.
4. Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

   The Array Management Window is displayed (Figure 6-3).

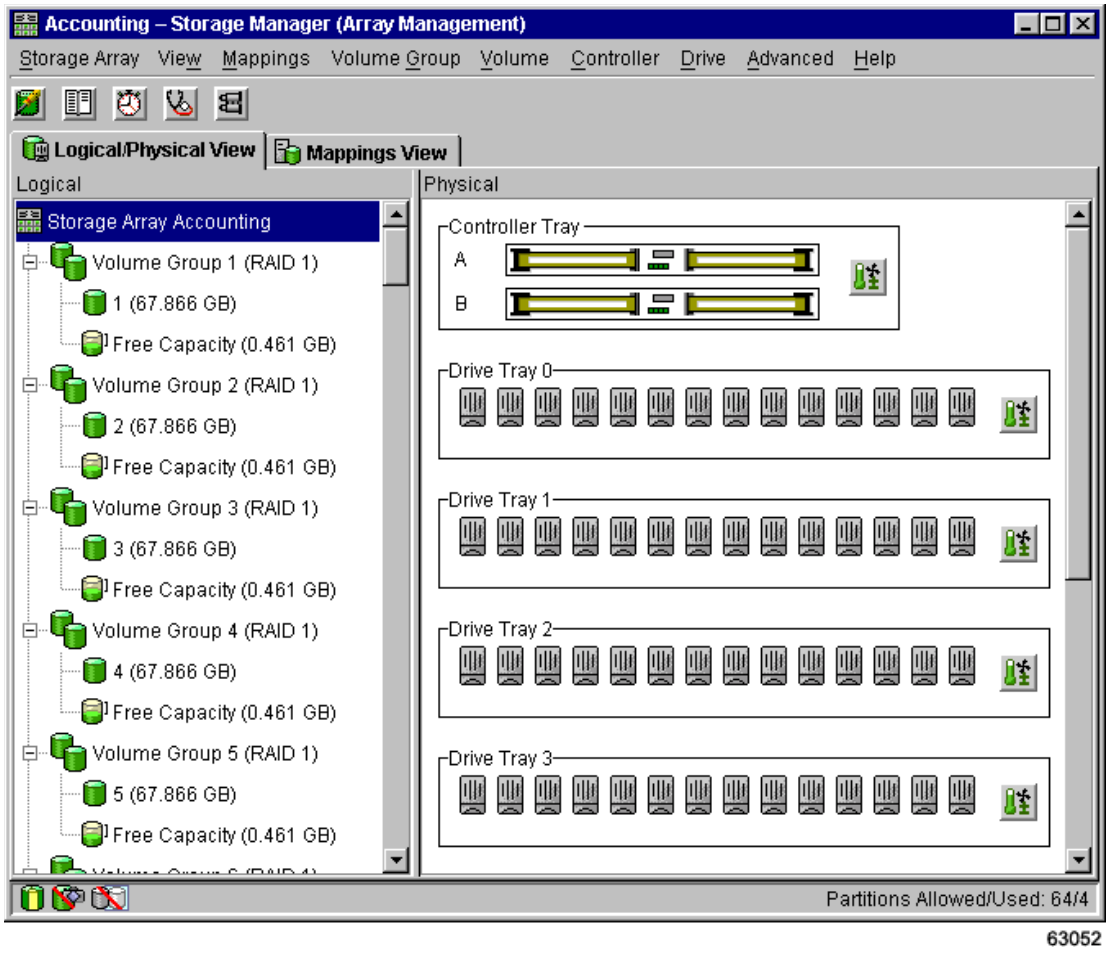

Figure 6-3 Array Management Window

5 Verify the Mode (state), cache size, and host I/O settings of each controller:

a Right-click Controller A and select Properties.

The Controller Properties window is displayed.

b Select the Base tab.

c Locate the Mode configuration and ensure the controller is in an Active state.

d Locate the Cache/processor size (MB) configuration and record the setting listed.

e Select the Interfaces tab.

f Locate the Fibre Channel host I/O interface settings, and record the number listed under Preferred ID for each port.

g Select Close.

6 Repeat step 5 for Controller B.

CAUTION Ensure both controllers are in an Active state and each controller owns at least one volume (LUN).

7 Verify the volume ownership of each controller:

a Right-click the disk subsystem in the Logical View and select View Profile.

The Disk Subsystem Profile window is displayed.

b Select the Volumes tab.

c Locate the Owned by controller in slot: information by each volume and ensure each controller owns at least one volume.

NOTE Use the Volume >> Change >> Ownership/Preferred Path option to transfer ownership of a volume, if needed.

d Locate the Status information and ensure the Status of each volume is Optimal.

8 Stop all I/O to the disk subsystem to prevent application errors.

9 From the menu, select Disk Subsystem >> Download >> Firmware.

The Firmware Download dialog is displayed.

10 In the File Selection area, select the CDROM drive and the firmware folder. Either double-click the folder or type the folder name in the Enter File Name: text box.

11 Select the file that matches your controller type and select OK.

The Confirm Download dialog is displayed.

12 Select Yes to start the download.

13 Do one of the following, based on the dialog that is displayed after the download is completed.

- Firmware Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

14 After the download successfully completes, do the following:

a Close the dialogs and the current Array Management Window.

b Restart the Array Management Window by selecting a disk subsystem in the Enterprise Management Window and selecting Tools >> Manage Device.

The Array Management Window that uses the functionality of the new firmware is displayed.

15 Go to "Downloading NVSRAM Configuration Settings."

Downloading NVSRAM Configuration Settings

Use the following procedure to download NVSRAM configuration settings. Refer to the *SANtricity Storage Manager Product Release Notes* for the name of the required files to download from the installation CD.

IMPORTANT Perform this procedure only after you have installed the SMclient and ensured the controller firmware is at version 4.01.02.30 or higher.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. On a storage management station, start the SMclient software.
3. Select Tools >> Manage Device to open the Array Management Window.
4. From the menu, select Disk Subsystem >> Download >> NVSRAM.

   The NVSRAM Download dialog is displayed.
5. In the File Selection area, select the CDROM drive and the nvsram folder. Either double-click the folder or type the folder name in the Enter File Name: text box.
6. Select the file that corresponds to the disk subsystem type and select OK.

   The Confirm Download dialog is displayed.
7. Select Yes to start the download.

IMPORTANT During the download, a dialog may appear stating "the firmware downloaded is not compatible with the current version of the Array Management Window." *Do not* select OK in this dialog until the Download Successful dialog is displayed.

---

8. Do one of the following, based on the dialog that is displayed after the download is completed.
   - Download Successful dialog – Select Done.
   - Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

IMPORTANT You *must* set the host type before rebooting the host. The host type defines how the controllers in the disk subsystem work with the host's operating system when the volumes are accessed. If the host type is not set, contact with the disk subsystem might be lost. Complete step 9 through step 12 in this procedure to set the host type.

9 To determine whether SANshare Storage Partitioning is enabled or disabled, select Disk Subsystem >> Premium Features >> List.

The List Premium Features dialog is displayed.

10 Is SANshare Storage Partitioning enabled?

- Yes – Select Close, and go to step 11.
- No – Select Close, and go to step 12.

11 SANshare Storage Partitioning is enabled – Perform the following procedure, referring to the Array Management Window Help for procedures.

a Define storage partitioning topology (hosts and host ports) for the new hosts.

b Define the host types of the individual host ports:

1 Select the Mappings View Tab.

2 Select a host port in the left pane of the window and then select Change Host Type from the right-mouse pop-up menu.

3 Select the correct host type.

4 Select OK to save the changes.

5 Repeat steps 2 through 4 for each host port shown in the Mappings View.

6 Select Close to close the Mappings window.

c Set up storage partitioning mappings so that the new hosts you have defined can access existing volumes on the disk subsystem, when required.

d Go to step 13.

12 SANshare Storage Partitioning is disabled – Change the host type of the disk subsystem:

a Select Disk Subsystem >> Change >> Default Host Type.

b Select the correct host type.

c Select OK to save the changes.

13 If needed, run scripts to modify default configuration settings stored in NVSRAM on each disk subsystem to meet the needs of your specific configuration.

Refer to the *SANtricity Storage Manager Product Release Notes* more information.

14 Go to "Verifying Host I/O Interface Settings."

Verifying Host I/O Interface Settings

Use the following procedure to verify the host I/O interface settings after upgrading the firmware from any type of host.

1. On a storage management station, start the client software.
2. Select a disk subsystem in the Enterprise Management Window.
3. Select Tools >> Manage Device to open the Array Management Window.
4. In the Logical/Physical View, right-click Controller A and select Change >> Preferred Loop ID.

   The Change Preferred Loop ID dialog is displayed.
5. Verify the host I/O interface settings match those you recorded in step 5 on page 6-13 for each controller.
6. Do the controller settings match what you have recorded?
   - Yes – Select Close and go to step 10.
   - No – Select Close and go to step 7.
7. Correct the interface settings:
   a. Select a port in the Fibre Channel host I/O interfaces portion of the Interfaces tab.
   b. Select Change Preferred ID.

      The Change Preferred ID dialog is displayed.
   c. Change the number to match the value you recorded in step 5 on page 6-13.

      For example, if the value you recorded was 1/0xE8, you would select “1” in the Normal box. If the number you recorded was 126, select N-Port (126). If the original setting was 127, select Set During Loop Initialization (127).
   d. Select OK.
8. Repeat step 7 to correct the interface settings for each port.
9. Repeat step 4 through step 7 for Controller B.
10. Have you changed the interface settings?
    - Yes – Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power on for the new host I/O interface settings to take effect. When finished, go to step 11.
    - No – Go to step 11.
11. Remove the installation CD from the CDROM drive.

End Of Procedure

12 Choose one of the following:

- Standard environment – Go to step 13.
- Cluster environment – Ensure you have installed the SMclient software on both hosts, powered up either host, and powered off the other host. When finished, go to step 13.

13 Are you installing the Solaris boot device on a disk subsystem?

- Yes – Go to "Boot Device Installation" on page 6-27.
- No – Go to step 14.

14 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, Array Management Window Help, and the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Go to "Completing the Installation."

End Of Procedure

Completing the Installation

Use the following procedures to complete the installation process.

1 Configure alert notifications to receive e-mail or SNMP notifications of critical events that occur on the disk subsystems. Refer to the Enterprise Management Window Help for procedures. You can configure alert notifications to be sent to the following types of receiving devices:

- Designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps – To configure the NMS for SNMP traps, go to step 2. Otherwise, go to step 3.
- Designated e-mail address – Refer to the Enterprise Management Window Help for procedures. To send e-mail to LSI Logic Storage Systems, Inc., contact technical support. When finished, go to step 3.
- Designated alphanumeric pager – A designated alphanumeric pager can receive alert notifications when third-party software is used to convert e-mail messages. When finished, go to step 3.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

---

2 Configure the NMS for SNMP traps:

a Insert the installation CD into the NMS.

b Copy the mib directory from the installation CD to the appropriate MIB file on the NMS.

c Compile the MIB according to the procedure required by your NMS. For details, contact your network administrator or refer to your network management station documentation.

3 Start the Array Management Window.

You must open an Array Management Window to manage a selected disk subsystem. You can open multiple Array Management Windows to manage more than one disk subsystem at the same time.

Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Window is displayed (Figure 6-4).

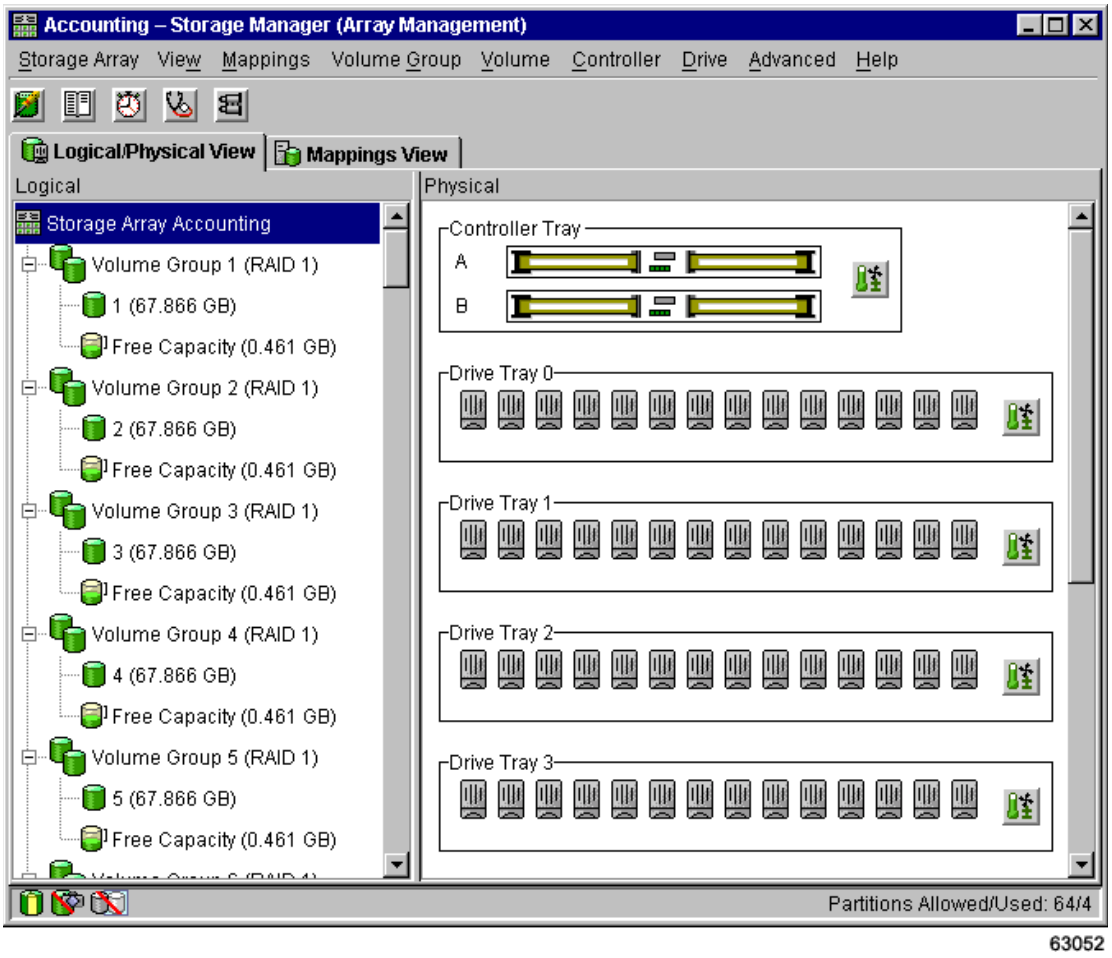

Figure 6-4 Array Management Window

4 Assign a unique name to the disk subsystem.

You must rename each disk subsystem to the name you entered on the Solaris Installation Profile. For related topics and procedures, refer to the Array Management Window Help.

5 Enable any premium features on your disk subsystem. For related topics and procedures, refer to the Array Management Window Help.

6 Is the client software running on two or more machines?

- Yes – Disable the event monitor on all but one machine to prevent receipt of duplicate event messages. At the prompt, type the following and press Enter:

  ```
  SMmonitor stop
  ```

  When the program shutdown is completed, a screen is displayed with the following:

  ```
  SMmonitor stopped.
  ```

- No – Go to step 7.

7 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, and Array Management Window Help and to the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Refer to "Post-Installation Activities" on page 6-22.

End Of Procedure

Post-Installation Activities

Use the following procedures to manage your disk subsystem from a Solaris machine.

Disabling and Enabling the Event Monitor

The event monitor is packaged with the client software and is installed automatically when you install the client software. The event monitor handles disk subsystem error messages through e-mail or SNMP traps when the storage management software is inactive. You can disable and enable the event monitor while it is running, or you can permanently disable or enable the boot-time loading of the event monitor.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

Disabling the Event Monitor While the Monitor is Running

At the prompt, type the following and press Enter:

```
SMmonitor stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMmonitor stopped.
```

End Of Procedure

Enabling the Event Monitor While the Software is Running

At the prompt, type the following and press Enter:

```
SMmonitor start
```

When the program startup begins, a screen is displayed with the following:

```
SMmonitor started.
```

End Of Procedure

Disabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
mv /sbin/rc2.d/S99SMmonitor /sbin/rc2.d/disabledS99SMmonitor
```

You are returned to the prompt.

End Of Procedure

Enabling Boot-time Loading of the Event Monitor

At the prompt, type the following and press Enter:

```
mv /sbin/rc2.d/disabledS99SMmonitor /sbin/rc2.d/S99SMmonitor
```

You are returned to the prompt.

End Of Procedure

Using the hot_add Utility

Use the following procedure to run the hot_add utility from a Solaris machine.

The hot_add utility is used to add new volumes dynamically without restarting the system. The utility registers the new volumes with the operating system so you can label the volume and create partitions using the Solaris format command. The hot_add utility is installed as a part of the SMutil package. For more information, read the hot_add man page.

IMPORTANT If you add volumes without assigning labels to the volumes, the time required to subsequently restart the host-agent can take longer than expected. To reduce the time required for the Solaris machine to open and read volume information, use labels whenever adding volumes.

At the prompt, type the following and press Enter:

```
hot_add
```

Several minutes may pass while the computer is accessing the drives. When the program is finished, the screen returns to the prompt and the new volumes will be available through the operating system.

End Of Procedure

Identifying Volumes by Operating System Device Names

Use the following procedure to locate system devices from a Solaris machine.

The SMutil software includes a utility that allows you to see which disk subsystem volume is associated with a particular operating system device name. This capability is useful for operations such as data placement and volume deletion.

Manually changing the volume mapping to different LUN numbers may cause SMdevices to disconnect from the volume because dual LUN connections to the same volume are not permitted. To reconnect the volumes using the new mappings, perform a reconfiguration reboot.

IMPORTANT If you are unsure whether new devices or volumes have been added to the system, it is recommended that you run hot_add first to ensure the devices are registered with the system. If the devices are not registered, they will not be displayed in the SMdevices output. For procedures, refer to "Using the hot_add Utility" on page 6-24.

At the prompt, type the following and press Enter:

```
SMdevices
```

The software displays device identification information, similar to the following example, where:

- /dev/.../... = UNIX device node name
- Disk subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume

The Access Volume device node names are stored in the /dev/utm folder.

```
/dev/rdsk/c2t5d0s2 [Disk subsystem <name>, Volume AH1, LUN 0,
Volume WWN <600a0b80000600440000000d33801f4bb>, Preferred
Path:(Controller-A) In Use]
/dev/rdsk/c2t5d2s2 [Disk subsystem <name>, Volume 2, LUN 2,
Volume WWN <600a0b80000600440000000db380b4073>, Alternate Path:
(Controller-B)Not In Use]
/dev/utm/c2t5d7s2 [Disk subsystem <name>, Volume Access, LUN
7, Volume WWN <600a0b80000600440000000dd00000000>]
```

End Of Procedure

Stopping and Starting the Host-Agent Software

You will need to stop and restart the SMagent software when you download a NVSRAM file that enables an Access Volume or changes the LUN used for the Access Volume. Doing so allows detection of the new disk subsystems that will be managed by the host. If an Access Volume is not detected after a reboot, then the SMagent software will stop running automatically and you will need to restart it.

IMPORTANT If /usr/sbin is not included in the PATH environment variable, the full path name is required on the command line (/opt/SM8/agent/SMagent) to stop, start, or restart the SMagent software.

Stopping the Host-Agent Software

To add disk subsystems, you must stop the SMagent. When you restart the SMagent, the software detects the new disk subsystems and adds them to the management domain.

At the prompt, type the following and press Enter:

```
SMagent stop
```

When the program shutdown is completed, a screen is displayed with the following:

```
SMagent stopped.
```

End Of Procedure

Starting or Restarting the Host-Agent Software

The SMagent software automatically starts after you reboot the host. However, you must start the software manually if you stop it to add disk subsystems.

At the prompt, type the following and press Enter:

```
SMagent start
```

When the program startup begins, a screen is displayed with the following:

```
SMagent started.
```

End Of Procedure

Boot Device Installation

Preparing the Disk Subsystem

You can install a boot device on a disk subsystem that is controlled either by a JNI or an LSI Logic host bus adapter. Either host bus adapter will let you boot and run the Solaris operating system from the disk subsystem by way of an arbitrated loop or fabric switch configuration.

To configure a disk subsystem as the boot device from a Sparc workstation, ensure the following conditions are met:

- The workstation has either a Solaris 2.6, Solaris 7, or Solaris 8 operating system installed.
- The storage management software is installed and you are managing the disk subsystem either directly or with SMagent software.
- A host bus adapter card and the necessary host bus driver software is installed. Some host bus adapters do not support boot devices. Refer to the *SANtricity Storage Manager Product Release Notes* for more information.
- The Solaris host detects the Fibre Channel drives.
- The disk subsystem has an unused volume with sufficient capacity to load the Solaris operating system.

This installation process requires you to identify the controller and target of the Solaris installation. The target ID must range from 0 to 9.

IMPORTANT Solaris sometimes changes the instance number of the adapter and the controller during a boot -r. If the target for the root file system is set to c2t0d0s0 in /etc/vfstab, but the reboot changes the controller number to c3, the boot will fail. Before installing Solaris on a Fibre Channel drive, ensure the adapter is the first listed (fca0 or fcaw0). This may require a boot -ar to initialize the /etc/path_to_inst file.

Go to "Binding the World Wide Name for JNI" on page 6-28.

Binding the World Wide Name for JNI

World wide name binding is required only for disk subsystems connected by way of a fabric switch configuration. If you are using an LSI Logic or Emerald host bus adapter, refer to the *SANtricity Storage Manager Product Release Notes* for information on world wide name binding.

The RDAC software package includes a utility to automate the world wide name binding process. To use it, you must have the JNI host bus adapter driver version 2.3.0.07 or later installed. To bind world wide names to target IDs, you must first verify that the JNI driver is configured for a fabric-switch mode using the following procedure:

1. Edit the /kernel/drv/*xxxx*.conf file:

   where *xxxx*.conf is either fca.conf, fcaw.conf, or jnic.conf.

2. Ensure the fca_nport parameter is set to 1.

3. Were changes made to the file?

   - Yes – Save the file and exit. Go to step 4.
   - No – Exit the file and go to step 4.

4. Type the following and press Enter:

   ```
   Run /etc/raid/bin/genscsiconf
   ```

5. Go to "Choosing a Boot Device."

Choosing a Boot Device

Use SMdevices to find the Solaris device name of the disk subsystem that you will assign as the boot device. When finished, go to "Partitioning the Target."

Partitioning the Target

Use the format command to ensure that the target will accommodate the partitions on the Solaris operating system and to configure the swap space on the target drive. When finished, go to "Verifying File Systems."

Verifying File Systems

Use the following procedure to verify that the partitions on the installation target are large enough to copy the current operating system partitions.

1. To examine the partitions where Solaris currently resides, type the following and press Enter:

   ```
   format
   ```

   A list of drives is displayed.

2. Select the current boot drive by entering its number. Type the following and press Enter:

   ```
   0
   ```

3. To determine the partition sizes of your current boot disk, type the following and press Enter after each command:

   ```
   p
   ```

   ```
   p
   ```

   The partition information screen is displayed, similar to the following:

   ```
   part     tag         cyl            size
   0           root        -0-3335        124.69 MB
   1           swap        336-792        169.59 MB
   2           backup      0-5846         2.12 BG
               unassigned
   6           usr         739-2305       561.4 MB
   7           home        2306-5846      1.28 GB
   ```

4. To quit the disk format script, type the following and press Enter after each command:

   ```
   q
   ```

   ```
   q
   ```

5. To create partitions on the target volume that are identical to the current boot disk, type the following and press Enter:

   ```
   format
   ```

6. Select the target drive with the correct Solaris device name and press Enter. If prompted, select Yes to label the disk.

7 To display partition information, type the following and press Enter after each command:

```
p

p
```

WARNING If the swap partition is not properly defined, the system will not save panic dumps to the swap space.

If necessary, repartition the target drive to make the partitions identical to the partitions on the current boot drive.

8 Ensure the flag is wm and the sizes are defined at a value other than 0.

```
Part  Tag      Flag  Cylinders      Size     Blocks
1        swap     wm    68-459         298.3MB  (402/0/0)611040
```

9 Use the label option from partition to write the label to the drive. When you are finished, quit the disk format script.

10 Go to "Creating File Systems."

Creating File Systems

You must create file systems on the required partitions.

For example, suppose you want to copy the Solaris operating system to target 3 of the Fibre Channel drives connected through Controller 1.

- To use a different controller, change "c1" to "cx" (where *x* = controller number).
- To use a different target, change "t3" to "t*y*" (where *y* = target id).

The root partition (slice 0) must be created. Other partitions such as /usr /export/home, /var, or /opt can be created to mirror the current layout, but are not required.

IMPORTANT Do not create a file system for the swap partition.

1 To create the desired file systems, use the newfs command. For example, type the following and press Enter to create a new file system on each partition (0, 6, and 7):

```
newfs /dev/rdsk/c1t3d0s0
newfs /dev/rdsk/c1t3d0s6
newfs /dev/rdsk/c1t3d0s7
```

2 Go to "Installing a BOOTBLK."

Installing a BOOTBLK

Use the following procedure to install a bootblk on the root partition of the volume on the disk subsystem:

1 To determine system architecture, type the following and press Enter:

```
uname -a
```

This will determine the directory in /usr/platform where the bootblk will be found. You will see information similar to the following example displayed on the screen:

```
SunOS patriot 5.6 Generic  sun4u sparc SUNW,Ultra-1
```

This example lists “sun4u” as the architecture and subdirectory for /usr/platform.

2 To install a bootblk on the volume, type all of the following on *one* command line and press Enter:

```
/usr/sbin/installboot /usr/platform/sun4u/lib/fs/ufs
bootblk /dev/rdsk/c1t3d0s0
```

where *c1t3d0s0* is the device name of the volume.

3 Go to “Copying Files.”

Copying Files

For each partition except swap and backup, use the ufsdump and ufsrestore commands to copy the required files and directories from the current system to the Fibre Channel target.

1 Mount the root directory of the Fibre Channel target. For example, type the following and press Enter:

```
mount /dev/dsk/c1t3d0s0 /mnt
```

where *c1t3d0s0* is the device name of the target array volume.

2 Use the following command to create the required directory structure on the new target and copy the files. In this example the current OS is located on /dev/dsk/c0t0d0.

```
ufsdump 0f - /dev/dsk/c0t0d0 | (cd /mnt; ufsrestore rf -)
```

where *dev/dsk/c0t0d0s0* is the device on which the current OS is located.

The ufsdump command is using the raw device. When the command completes processing, the target (c1t3d0s0) will have the complete image of the root partition.

3 In the /mnt/etc directory, update the vfstab file to indicate the Fibre Channel target to be mounted during boot. Modify all partitions that will be located on the Fibre Channel target. Type the following and press Enter after each command line:

```
cd /mnt/etc
```

```
vi vfstab
```

4 Using the following examples of an original vfstab screen and an updated vfstab screen, examine the changes that were made to c(x)t(y)d0s0, then save and exit the editor. When operating with Solaris 7 and above, it also may be necessary to edit the /mnt/etc/dumpadm.conf file to configure the core dump location in case of system panics.

```
#device device   mount     FS   fsck mount     mount
#to mount to fsck point      type pass at boot   options
#
/dev/dsk/c0t0d0s1   -    -    swap -    no   -
/dev/dsk/c0t0d0s0   /dev/rdsk/c0t0d0s0  /    ufs  1    no   -
/dev/dsk/c0t0d0s6   /dev/rdsk/c0t0d0s6  /usr    ufs  1    no   -
swap -    /tmp tmpfs     -    yes  -
```

```
#device   device        mount         FS   fsck mount    mount
#to mount to fsck        point          type pass at boot
options
#
/dev/dsk/c1t3d0s1   -    -    swap -    no   -
/dev/dsk/c1t3d0s0   /dev/rdsk/c1t3d0s0  /    ufs  1    no   -
/dev/dsk/c1t3d0s6   /dev/rdsk/c1t3d0s6  /usr    ufs  1    no   -
swap -    /tmp tmpfs     -    yes  -
```

5 To unmount the root partition, type the following and press Enter:

```
umount /mnt
```

6 Once the root partition is copied and configured, you may continue until you have copied all files/directories to the Fibre Channel target that you need to use.

a Mount the next partition of the Fibre Channel target. For example, type the following and press Enter:

```
mount   /dev/dsk/c1t3d0s6 /mnt
```

b To create the required directory structure on the new target and copy the files, type all of the following on one line and press Enter:

```
ufsdump 0f - /dev/dsk/c0t0d0s6 | (cd /mnt; ufsrestore rf -)
```

In this example the /usr partition is located on /dev/dsk/c0t0d0s6.

c Repeat steps a and b for each partition, if needed.

d To unmount the /mnt partition, type the following and press Enter:

```
umount /mnt
```

When the command completes processing, the target (c1t3d0s6) will have the complete image of the /usr partition.

7 Go to "Making Required Modifications to Files."

Making Required Modifications to Files

1 Mount the root partition. For example, type the following and press Enter:

```
mount /dev/dsk/c1t3d0s0 /mnt
```

2 Edit the system file. Type the following and press Enter:

```
vi /mnt/etc/system
```

3 If RDAC is enabled, include the rootdev parameter to tell RDAC which drive is being booted. Locate the section within the file that contains the boot device configuration, and type the following and press Enter:

```
rootdev:/pseudo/rdnexus@n/rdriver@m,0:a
```

where *m* is the rdnexus bus number of the home path and *m* is the target ID of the home path. This information is available on the first screen output from the format command, similar to the following:

```
Searching for disks ... done
AVAILABLE DISK SELECTIONS:
   0. c0t0d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
   /sbus@2,0/SUNW,socal@d,10000/sf@0,0/ssd@w21000020372bf035,0
   1. c0t1d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
   /sbus@2,0/SUNW,socal@d,10000/sf@0,0/ssd@w21000020372bf10a,0
   2. c0t2d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
   /sbus@2,0/SUNW,socal@d,10000/sf@0,0/ssd@w21000020372bf01d,0
   3. c0t3d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
   /sbus@2,0/SUNW,socal@d,10000/sf@0,0/ssd@w2100002037332410,0
   4. c1t3d0 <drive type unknown>
   /pseudo/rdnexus@2/rdriver@3,0
Specify disk (enter its number):
```

4 Exit the text editor.

5 Unmount the root partition. Type the following and press Enter:

```
unmount /mnt
```

6 Go to "Determining the Target Identification" on page 6-34.

Determining the Target Identification

IMPORTANT If you are using an LSI Logic host bus adapter on the boot disk subsystem, the following procedure does not apply. Go to "Making OpenBoot Modifications."

To proceed, it is necessary to collect some information that is specific to your configuration.

1 To determine the time of the last system boot, type the following and press Enter:

```
who -b
```

2 Type the following and press Enter:

```
vi /var/adm/messages
```

3 Find the last system boot in /var/adm/messages and search forward from that point for a line with the string:

fcaxxxxN: Target Y:

where *fcaxxxxN* is the host bus adapter to which the desired boot device is attached at Target Y. An example of this line would be as follows:

```
Jul 14 15:26:59 solera unix: fca-pci0: Target 4 Lun 0:
Port 0112e4 (200200a0b8061878:200200a0b8061879) present.
```

The remainder of this line is configured as:

Port <*controller-port-name*><(*wwnn:wwpn*) present.

where *controller-port-name* is the name of the controller port and (*wwnn:wwpn*) is the controller world wide node name and world wide port name.

4 Copy or save the world wide port name. You will need this information to configure the EEPROM settings later in this procedure.

5 Exit the admin messages file.

6 Go to "Making OpenBoot Modifications."

Making OpenBoot Modifications

1 To halt the system and go to the OpenBoot environment, type the following and press Enter:

```
init 0
```

You are now in the OpenBoot environment.

2 Go to "Creating a Device Alias."

Creating a Device Alias

Use this procedure to create an OpenBoot alias used to boot from the Fibre Channel drive.

1 To see the default boot device in the environment variables, type the following and press Enter:

```
printenv
```

An example of the information displayed is:

```
boot-device    disk      disk
```

2 To see the device associated with the alias for the default boot device, type the following and press Enter:

```
devalias
```

An example of the information displayed is:

```
disk    /sbus/SUNW,fas@e,8800000/sd@0,0
```

3 To see the device name of the host bus adapter, type the following and press Enter:

```
show-devs
```

The device name for a JNI host bus adapter will be similar to:

```
sbus@1f,0/fca@1/sd
```

The device name for an LSI Logic host bus adapter will be similar to:

```
/pci@1f,40000/IntraServer,fc@2/disk
```

4 Choose one of the following to create a similar alias for other host bus adapters:

- Fibre Channel drive using a JNI host bus adapter – Type the following and press Enter:

  ```
  nvalias   fcadisk   /sbus@1f,0/fca@1/sd@3,0
  ```

  where sd@3,0 indicates target 3, lun 0.

- Fibre Channel drive using an LSI Logic host bus adapter – Type the following and press Enter:

  ```
  nvalias   fcadisk   /pci@1f,4000/IntraServer,fc@2/disk@3,0
  ```

5 To save the alias, type the following and press Enter:

```
nvstore
```

6 To verify the alias is saved, type the following and press Enter:

```
reset-all
```

7 Go to "Setting the Target Identification."

Setting the Target Identification

1 Choose one of the following:

- If using an LSI Logic host bus adapter on the boot disk subsystem, or if the host bus adapter or target configuration is an arbitrated loop – The preparation process is complete. Go to "Booting from the Drive" on page 6-38.
- The adapter or target configuration is through a fabric switch – You must set the world wide name of the target as a property on the JNI adapter. Go to step 2.

2 To view the device names, type the following and press Enter:

```
show-devs
```

3 To change the world wide name of the target using the wwpn, type the following and press Enter:

```
" /sbus@2,0/fcaw@1,0" select-dev
```

The following message is displayed:

```
nport init complete
```

4 Store the world wide name of the boot target in the EEPROM on the adapter. Choose one of the following, depending on the host bus adapter type you are using:

- Emerald host bus adapter – Type the following and press Enter:

```
set-bootn-wwn
```

- LSI Logic host bus adapter – Type the following and press Enter:

```
set-bootn0-wwn
```

The following message is displayed:

```
Current boot device: ff ff ff ff ff ff ff ff
Sure you want to change it?
```

5 Enter the world wide name of the device according to the system prompts.

6 To have the new value read by the OpenBoot EEPROM, type the following and press Enter:

```
reset-all
```

When the bootn0-wwn property is set, the host bus adapter will recognize only the device with that wwn in the OpenBoot environment. The command probe-scsi-all will not run in a switched topology. Once the system is booted to Solaris, all SCSI devices present on the switch will be recognized.

During the system boot, a series of PLOGI ACC are displayed. The system then will continue with a normal Solaris boot.

7 Go to "Booting from the Drive" on page 6-38.

Booting from the Drive

If the Fibre Channel drive will be the permanent boot drive, you must make it the default boot device. To boot from the Fibre Channel drive using the alias:

1 To begin the boot process, type the following and press Enter:

```
boot fcadisk -r
```

2 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, Array Management Window Help, and the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Go to "Completing the Installation" on page 6-19.

End Of Procedure

Chapter 7

Windows Software Installation

This chapter contains procedures for installing the applicable software packages on one or more Windows storage management stations or hosts.

IMPORTANT Downgrades from SANtricity Storage Manager for version 8.3x to a previous version can cause data loss and are not supported.

Removing the Storage Management Software

This section contains procedures for removing the storage management software on one or more Windows storage management stations or hosts.

1 Are you installing a new version of the software?

- Yes – Ensure you have completed a Windows NT or Windows 2000 Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for removing the storage management software.
- No – Go to step 2.

IMPORTANT *Before* removing the storage management software, save the emwdata.bin and emwback.bin file to a directory that will be unaffected by the software removal. Otherwise, if you are managing the disk subsystems remotely, you will have to manually add each device to the Enterprise Management Window and reconfigure alert notification settings. Existing storage partitions are retained during software removal.

---

2 Save the emwdata.bin and emwback.bin files to a machine that will be unaffected by the new installation.

a From the storage management station, navigate to the C:\Program Files\SM8\client\data directory. If you installed the storage management software in a different directory, modify the path accordingly.

b Select the emwdata.bin and emwback.bin files and select Edit >> Copy.

c Choose one of the following, based on your Windows operating system:

- Windows NT – Locate a directory of your choice that will not be affected by the new software and then select Paste to copy the files to that directory.
- Windows 2000 – Copy the files either to a machine not affected by the new software or to a floppy disk.

3 Is the Windows boot device on a disk subsystem?

- Yes – Complete step 4 for every storage management software package except for the RDAC package. Then go to "Removing RDAC in a Root Boot Environment" on page 7-3 and complete the procedure to remove the RDAC package. When finished, go to "Installing the Storage Management Software" on page 7-5.
- No – Go to step 4.

4 Remove the software packages:

a Select Start >> Settings >> Control Panel >> Add/Remove Programs.

The Add/Remove Programs Properties dialog is displayed.

b Select the storage management component you want to remove from the list of programs.

c Choose one of the following, based on your Windows operating system:

- Windows NT – Select Add/Remove.
- Windows 2000 – Select Change/Remove.

The confirmation dialog is displayed.

d Select Yes to start the software removal process.

e When the software removal is completed, do one of the following:

- Windows NT – Select Finish.
- Windows 2000 – Select Close.

5 Repeat step 4 to remove each storage management software component.

6 Are you installing a new version of the software?

- Yes – Go to "Installing the Storage Management Software" on page 7-5.
- No – You are finished with this procedure.

Removing RDAC in a Root Boot Environment

1 Remove the RDAC software package. When the software removal is completed, do one of the following:

- Windows NT – Select Finish.
- Windows 2000 – Select Close.

2 Shut down the host machine.

IMPORTANT Because RDAC is removed, there should only be a single path to the disk subsystem. The path should be to the controller that owns the boot volume.

3 Ensure there is a single path to the disk subsystem.

There are two methods to ensure that the alternate path to the disk subsystem is removed. Choose either method.

- Method 1 – Remove the cable to the alternate path.
- Method 2 – Modify NVSRAM to temporarily disable RDAC multipath functionality at the disk subsystem.

a Select the disk subsystem in the Enterprise Management Window.

b Select Tools >> Execute Script.

The Script Editor window is displayed.

c In the Script View window in the upper half of the screen, type the following commands:

Table 7-1 Windows NT and 2000 RDAC and AVT Scripts

Operating System	Type the Following Script

Windows NT	set controller[a] HostNVSRAMByte[0,0x11]=0x20,0x20;
	set controller[b] HostNVSRAMByte[0,0x11]=0x20,0x20;
	set controller[a] HostNVSRAMByte[0,0x16]=0x20,0x20;
	set controller[b] HostNVSRAMByte[0,0x16]=0x20,0x20;
	set controller[a] HostNVSRAMByte[0,0x20]=0x01,0x00;
	set controller[b] HostNVSRAMByte[0,0x20]=0x01,0x00;

Windows 2000	set controller[a] HostNVSRAMByte[1,0x16]=0x20,0x20; set controller[b] HostNVSRAMByte[1,0x16]=0x20,0x20;

d Select Tools >> Execute Only.

e For the NVSRAM modifications to take effect, turn the power off to the control module, wait 30 seconds for the control module to power down, then turn the power back on.

4 Start the host machine.

End Of Procedure

Installing the Storage Management Software

This section contains procedures for using the CD Browser to install the applicable storage management software packages on one or more Windows NT or Windows 2000 machines.

The CD Browser is a Graphic User Interface (GUI)-based utility that provides links to the setup utility for each required storage management software package. It also provides links for learning about related topics and links to other documents that support the storage management software.

1. Ensure you have completed a Windows Installation Profile from the *Storage System Planning Guide* for each machine on which you are installing the software. You will use the profile during the installation process as a guide for installing the applicable software in the correct order.
2. Ensure the local hard drive has approximately 60 MB of disk space available for temporary files. The 60 MB is in addition to the disk space requirement for the software.
3. Close all other programs before installing the storage management software.
4. Insert the installation CD in the CDROM drive.

   If the CD Browser does not start automatically when you insert the CD, navigate to the CDROM drive using Windows Explorer and select setup.exe.

IMPORTANT Microsoft Virtual Machine installation – If the storage management software is not running the required minimum version of Microsoft Virtual Machine, a message will be displayed during installation to update or install the virtual machine package.

Event monitor installation – Configure the event monitor on *only one* storage management station to prevent receipt of duplicate event messages.

---

5 Install the storage management station software packages in the order in which they appear in the Installation Activity column in the *Storage System Planning Guide*, installing only those packages that correspond to your selections in the Pre-Installation Activity column of the Windows Installation Profile. For more information, select Getting Started >> Storage Management Stations and Hosts.

a Select the Installation tab on the CD Browser.

b Select Storage Management Station installation packages.

c Select the applicable storage management station software.

Using your completed Windows Installation Profile, select only those packages in the Storage Management Station column that correspond with your selections in the Configuration Information column. Each time you select a package on the CD Browser, the InstallShield Wizard is displayed to install the package. Follow the InstallShield Wizard directions to install the package.

IMPORTANT Do not reboot during the installation process. You will reboot after installing all storage management software components.

d Repeat step c to install the applicable storage management station software packages, making sure you install the appropriate software packages in the order in which they appear in the Installation Activity column.

6 Are you installing the Windows boot device on a disk subsystem?

- Yes – Go to "Boot Device Installation" on page 7-36 and complete all boot device installation procedures. When finished, continue with the software installation at step 7.
- No – Go to step 7.

7 Install the host software packages in the order in which they appear in the Installation Activity column, installing only those that correspond to your selections in the Pre-Installation Activity column of the Windows Installation Profile. For more information about hosts, select Getting Started >> Storage Management Stations and Hosts.

   a Select the Installation tab >> Host installation packages.

   b Select the applicable host software.

   Using your completed Windows Installation Profile, select only those packages in the Host column that correspond with your selections in the Configuration Information column. Each time you select a package on the CD Browser, the InstallShield Wizard is displayed to install the package. Perform the InstallShield Wizard directions to install the package.

   IMPORTANT Do not reboot during the installation process. You will reboot after installing all storage management software components.

   c Repeat step b to install each applicable host software package, making sure you install the appropriate software packages in the order in which they appear in the Installation Activity column.

8 Select Exit to close the CD Browser.

9 Remove the installation CD from the CDROM drive.

10 Are you installing in a Root-Boot environment?

- Yes – Go to step 11.
- No – Go to step 15 on page 7-8.

11 Do one of the following to *enable* the alternate path to the disk subsystem, based on the method you used to *disable* the alternate path in step 3 on page 7-4 or step 15 on page 7-41.

- Removed the cable to the disk subsystem – Reattach the host interface cable to the alternate controller. Go to step 15 on page 7-8.
- Modified NVSRAM to temporarily disable RDAC multipath functionality at the disk subsystem – Go to step 12.

12 Do you need to download new controller firmware and NVSRAM to the disk subsystem after host software installation?

- Yes – The new NVSRAM file is preconfigured to enable RDAC multipath functionality. Go to step 15 on page 7-8.
- No – Go to step 14 on page 7-8.

13 Start the Enterprise Management Window using the procedure in "Starting the Storage Management Software" on page 7-11.

14 Select the disk subsystem in the Enterprise Management Window.

a Select Tools >> Execute Script.

The Script Editor dialog is displayed.

b In the Script View window in the upper half of the screen, type the following commands:

Table 7-2 Windows NT and 2000 RDAC and AVT Scripts

Operating System	Type the Following Script

Windows NT	set controller[a] HostNVSRAMByte[0,0x11]=0x20,0x00;
	set controller[b] HostNVSRAMByte[0,0x11]=0x20,0x00;
	set controller[a] HostNVSRAMByte[0,0x16]=0x20,0x00;
	set controller[b] HostNVSRAMByte[0,0x16]=0x20,0x00;
	set controller[a] HostNVSRAMByte[0,0x20]=0x01,0x01;
	set controller[b] HostNVSRAMByte[0,0x20]=0x01,0x01;

Windows 2000	set controller[a] HostNVSRAMByte[1,0x16]=0x20,0x00; set controller[b] HostNVSRAMByte[1,0x16]=0x20,0x00;

c Select Tools >> Execute Only.

d For the NVSRAM modifications to take effect, turn off the power to the control module, wait 30 seconds for the control module to power down, then turn the power back on.

15 Reboot the host system.

16 Choose one of the following, based on your Windows operating system, to set the path for the command line interface (CLI), if needed. Otherwise, go to step 19.

- Windows NT – Go to step 17.
- Windows 2000 – Go to step 18.

17 Windows NT – Set the path for the command line interface (CLI):

a Select Start >> Settings >> Control Panel >> System to display the System Properties dialog.

b Select the Environment tab.

c In the System Variables dialog, select Path.

d In the Value: field at the bottom of the dialog, type the following at the end of the current value:

```
;<Full path to SMclient install directory>
```

For example:

```
%SystemRoot%\system32;%SystemRoot%;C:\Program Files\SM8\client;
```

e Select Set.

f Select OK.

g Go to step 19.

18 Windows 2000 – Set the path for the command line interface (CLI):

a Select Start >> Settings >> Control Panel >> System to display the System Properties dialog.

b Select the Advanced tab.

c Select Environment Variables.

d In the System Variables dialog, select Path, and then select Edit.

The Edit System Variable dialog is displayed.

e In the Variable Value: field, type the following at the end of the current value:

```
;<Full path to smclient install directory>
```

For example:

```
%SystemRoot%\system32;%SystemRoot%;C:\Program Files\SM8\client;
```

f Select OK three times.

19 Choose one of the following:

- Standard environment – For each Windows machine, perform the software installation procedures described in this chapter as applicable. Refer to the corresponding Windows Installation Profile for each machine to determine which software packages to install and in which order. When you have completed the installation on all machines, go to step 21 on page 7-10.
- Cluster environment – Go to step 20 on page 7-10.

20 Cluster environment – Do the following:

a Install the host software on a second host in the cluster, using its corresponding Windows Installation Profile to determine which software package to install first.

b Power up either host and power off the other host.

IMPORTANT Do not install the cluster server software at this time. You will be instructed when to install the cluster software after completing the installation.

21 Go to "Starting the Storage Management Software."

Starting the Storage Management Software

Use the following procedures to start the storage management software.

IMPORTANT Cluster configurations – Complete all applicable configuration procedures for each *before* booting the cluster server.

1 Select Start >> Programs >> SANtricity Storage Manager Client.

A splash screen is displayed while the client software starts. When the client software has been loaded, the Enterprise Management Window and the Initial Automatic Discovery dialog are displayed (Figure 7-1). The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

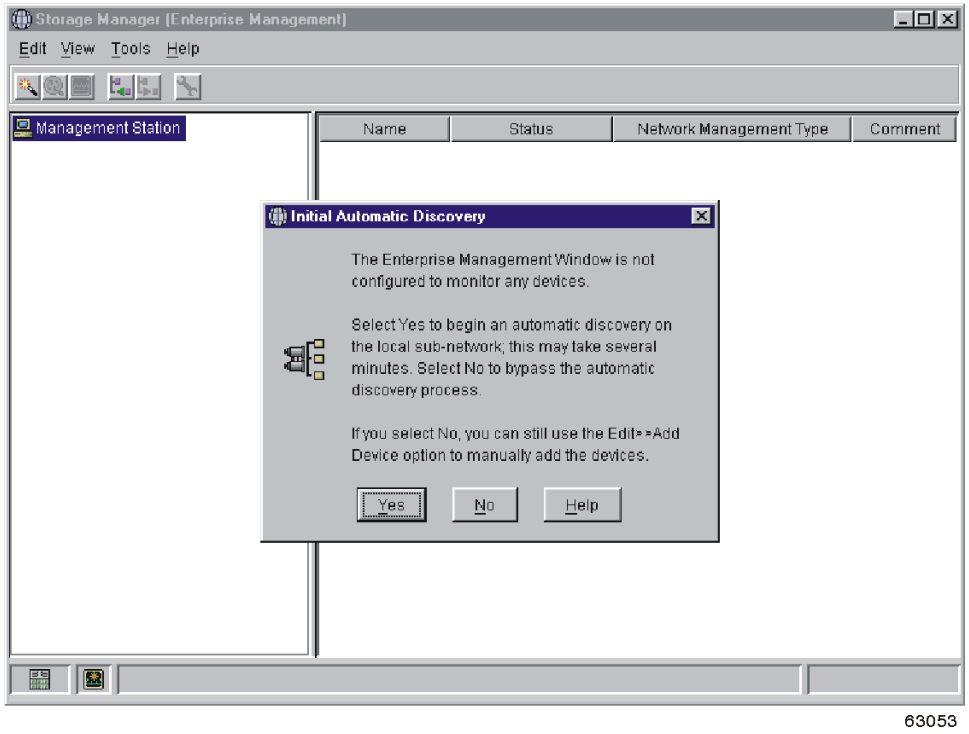

Figure 7-1 Confirm Initial Automatic Discovery Dialog

2 Select Yes to begin an initial automatic discovery of attached hosts and disk subsystems.

The software sends a broadcast message across the local subnetwork connected to the storage management station. It discovers host-agent managed disk subsystems if the respective *host* responds to the broadcast.

The software discovers direct managed disk subsystems if the *controllers* in the attached disk subsystems respond to the broadcast message. It may 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, all attached hosts and disk subsystems should appear in the Enterprise Management Window (Figure 7-2).

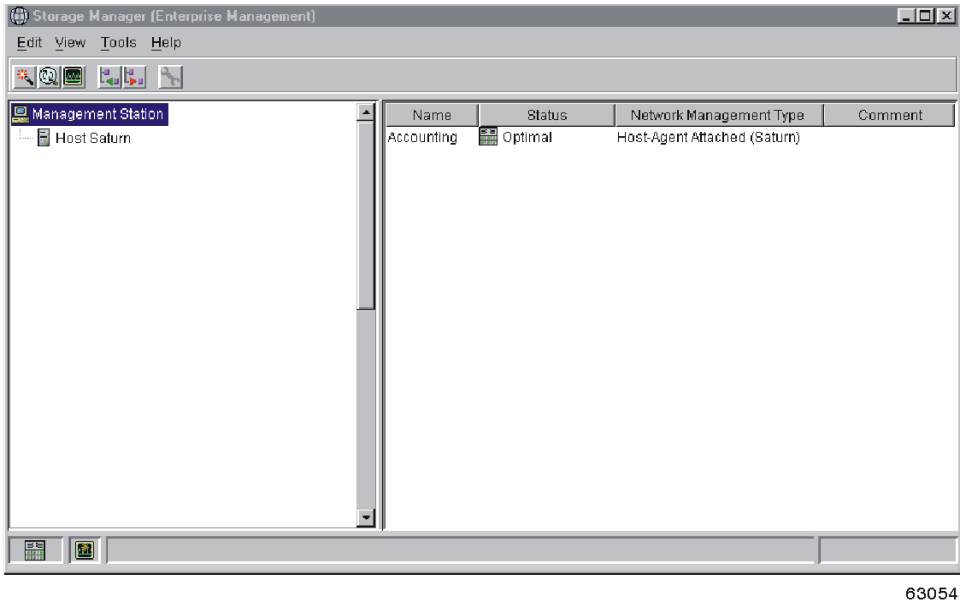

Figure 7-2 Enterprise Management Window

3 Verify all attached hosts and disk subsystems appear as expected. If they do not, do the following:

   a Check the hardware and connections for possible problems. Refer to the hardware documentation for specific procedures on troubleshooting interface problems.

   b Refer to the Enterprise Management Window Help topic on discovering disk subsystems and take the appropriate action provided.

   c Determine if the device is on the local subnetwork. If it is not, select Edit >> Add Device to add it. Refer to the Enterprise Management Window Help topic on adding devices.

   d If a disk subsystem is duplicated in the Device Tree, remove the duplicate disk subsystem icon from the Device Tree by selecting Edit >> Remove Device in the Enterprise Management Window.

4 Verify each disk subsystem is Optimal. If any device shows an Unresponsive status, do the following:

   a Remove the device from the management domain by selecting Edit >> Remove Device.

   Refer to the Enterprise Management Window Help topic on removing devices.

   b Add the device by selecting Edit >> Add Device.

   Refer to the Enterprise Management Window Help topic on adding devices.

   c If the device still shows an Unresponsive status contact technical support.

5 Do you need to upgrade the controller firmware? Refer to your selection in the firmware upgrade requirements sections of the Windows Installation Profile.

- Yes – Go to “Upgrading Controller Firmware” on page 7-14.
- No – Go to “Preparing for Cluster Server Software Installation” on page 7-25.

Upgrading Controller Firmware

Use the following procedure to upgrade controller firmware from version 4.01.02.30 to version 5.x. Refer to the *SANtricity Storage Manager Product Release Notes* for the required files to download from the \firmware folder on the installation CD.

IMPORTANT All controllers must be running firmware version 4.01.02.30 or higher to be *managed* with version 8.3x storage management software or to be *upgraded* to firmware version 5.x.

IMPORTANT Upgrades to firmware version 4.01.02.30 – The installation CD for version 8.3x includes only 5.x firmware versions. To obtain version 4.01.02.30, contact technical support.

---

1 Ensure the version 8.3x installation CD is in the CDROM drive.

2 Verify you have installed all required operating system patches. Refer to the *Storage System Planning Guide* for operating system specifications.

The storage management software installation program will not install these patches. Some patches listed may be superseded by other patches. Refer to your operating system documentation or contact your operating system supplier for more information.

3 Ensure the storage management software is running. If necessary, refer to "Starting the Storage Management Software" on page 7-11 for procedures.

4 Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Window is displayed (Figure 7-3).

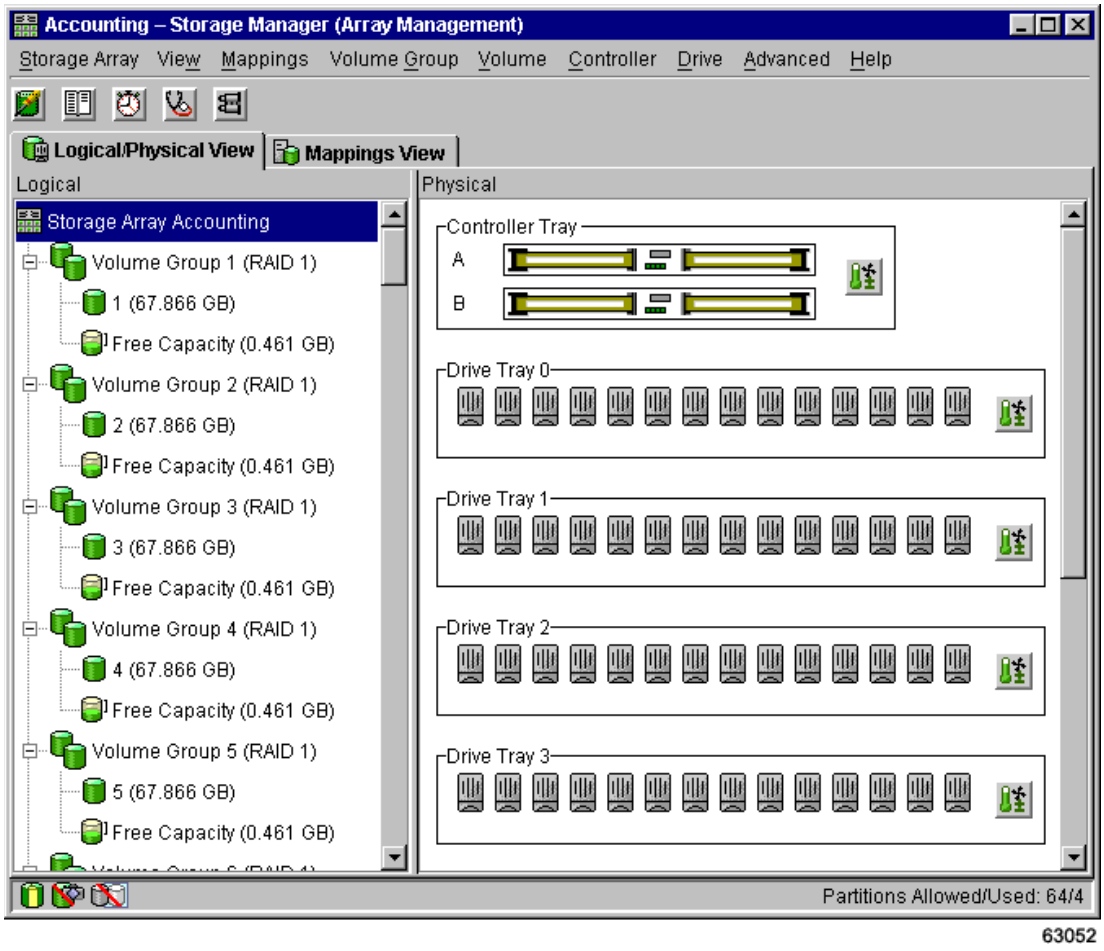

Figure 7-3 Array Management Window

5 Verify the Mode (state), cache size, and host I/O settings of each controller:

a Right-click Controller A and select Properties.

The Controller Properties dialog is displayed.

b Select the Base tab.

c Locate the Mode configuration and ensure the controller is in an Active state.

d Locate the Cache/processor size (MB) configuration and record the setting listed.

e Select the Interfaces tab.

f Locate the Fibre Channel host I/O interface settings, and record the number listed under Preferred ID for each port.

g Select Close.

6 Repeat step 5 for Controller B.

CAUTION Ensure both controllers are in an Active state and each controller owns at least one volume (LUN).

7 Verify the volume ownership of each controller:

a Right-click the disk subsystem and select View Profile.

The Disk Subsystem Profile dialog is displayed.

b Select the Volumes tab.

c Locate the Owned by controller in slot: information by each volume and ensure each controller owns at least one volume.

NOTE Use the Volume >> Change >> Ownership/Preferred Path option to transfer ownership of a volume, if needed.

d Locate the Status information and ensure the Status of each volume is Optimal.

8 Stop all I/O to the disk subsystem to prevent application errors.

9 Select Disk Subsystem >> Download >> Firmware.

The Firmware Download dialog is displayed.

10 In the File Selection area, select the CDROM drive and the firmware folder on the CD. Either double-click the folder or type the folder name in the File name: text box.

11 Select the file that matches your controller type and select OK.

The Confirm Download dialog is displayed.

12 Select Yes to start the download.

13 Do one of the following, based on the dialog that is displayed after the download is completed.

- Firmware Download Successful dialog – Select Done.
- Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

14 After the download successfully completes, do the following:

a Close the dialogs and the current Array Management Window.

b Restart the Array Management Window by selecting a disk subsystem in the Enterprise Management Window and selecting Tools >> Manage Device.

The Array Management Window that uses the functionality of the new firmware will be displayed.

15 Go to "Downloading NVSRAM Configuration Settings."

Downloading NVSRAM Configuration Settings

Use the following procedure to download NVSRAM configuration settings. Refer to the *SANtricity Storage Manager Product Release Notes* for the name of the required files to download from the installation CD.

IMPORTANT Perform this procedure only after you have installed the SMclient and ensured the controller firmware is at version 4.01.02.30 or higher.

---

1. Ensure the installation CD for version 8.3x is in the CDROM drive.
2. On a storage management station, start the SMclient software.
3. Select a disk subsystem.
4. Select Tools >> Manage Device to open the Array Management Window.
5. Select Disk Subsystem >> Download >> NVSRAM.

   The NVSRAM Download dialog is displayed.
6. In the File Selection area, select the CDROM drive and the nvsram folder. Either double-click the folder or type the folder name in the File name: text box.
7. Select the file that corresponds to the disk subsystem type and select OK.

   The Confirm Download dialog is displayed.
8. Select Yes to start the download.

IMPORTANT During the download, a dialog may appear stating "the firmware downloaded is not compatible with the current version of the Array Management Window." *Do not* select OK in this dialog until the Download Successful dialog is displayed.

---

9. Do one of the following, based on the dialog that is displayed after the download is completed.
   - Download Successful dialog – Select Done.
   - Error dialog – Read the information in the dialog and run Recovery Guru to obtain recovery procedures.

IMPORTANT You *must* set the host type before rebooting the host. The host type defines how the controllers in the disk subsystem work with the host's operating system when the volumes are accessed. If the host type is not set, contact with the disk subsystem might be lost. Complete step 10 through step 13 in this procedure to set the host type.

10 To determine whether SANshare Storage Partitioning is enabled or disabled, select Disk Subsystem >> Premium Features >> List.

The List Premium Features dialog is displayed.

11 Is SANshare Storage Partitioning enabled?

- Yes – Select Close, and go to step 12.
- No – Select Close, and go to step 13.

12 SANshare Storage Partitioning is enabled – Perform the following procedures, referring to the Array Management Window Help for procedures.

a Define storage partitioning topology (hosts and host ports) for the new hosts.

b In a cluster environment, define a host group for each server cluster that contains each server in the cluster.

c Define the host types of the individual host ports:

1 Select the Mappings View Tab.

2 Select a host port in the left pane of the window and then select Change Host Type from the right-mouse pop-up menu.

3 Select the correct host type.

4 Select OK to save the changes.

5 Repeat steps 2 through 4 for each host port shown in the Mappings View.

6 Select Close to close the Mappings dialog.

d Set up storage partitioning mappings so that the new hosts you have defined can access existing volumes on the disk subsystem, when required.

IMPORTANT If you are installing a boot device, do not use LUN 0 for any standard volume-to-LUN mappings. The volume containing the Windows operating system is required to be mapped to LUN 0.

e Go to step 14.

13 SANshare Storage Partitioning is disabled – Change the host type of the disk subsystem:

   a Select Disk Subsystem >> Change >> Default Host Type.

   b Select the correct host type.

   c Select OK to save the changes.

14 If needed, run scripts to modify default configuration settings stored in NVSRAM on each disk subsystem to meet the needs of your specific configuration.

   Refer to the *SANtricity Storage Manager Product Release Notes* more information.

15 Go to "Verifying Host I/O Interface Settings."

Verifying Host I/O Interface Settings

Use the following procedure to verify the host I/O interface settings after upgrading the firmware from any type of host.

1 On a storage management station, start the client software.

2 Select a disk subsystem.

3 Select Tools >> Manage Device to open the Array Management Window.

4 In the Logical/Physical View, right-click Controller A and select Change >> Preferred Loop ID.

   The Change Preferred Loop ID dialog is displayed.

5 Verify the host I/O interface settings match those you recorded in step 5 on page 7-15 for each controller.

6 Do the controller settings match what you have recorded?

   - Yes – Select Close, and go to step 11 on page 7-20.
   - No – Go to step 7.

7 Correct the interface settings:

   a Select the port that needs to be changed in the Fibre Channel host I/O interfaces portion of the Interfaces tab.

   b Select Change Preferred ID.

      The Change Preferred ID dialog is displayed.

   c Change the number to match the value you recorded in step 5 on page 7-15.

      For example, if the value you recorded was 1/0xE8, you would select "1" in the Normal box. If the number you recorded was 126, select N-Port (126). If the original setting was 127, select Set During Loop Initialization (127).

   d Select OK.

8 Repeat step 7 on page 7-19 to correct the interface settings for each port.

9 Repeat step 4 on page 7-19 through step 7 on page 7-19 for Controller B.

10 Select Close.

11 Turn off the power to both controllers, wait 30 seconds for the control module to power down, then turn the power back on for the new host I/O interface settings to take effect.

12 Remove the installation CD from the CDROM drive.

13 Go to "Completing the Installation."

Completing the Installation

Use the following procedures to complete the installation process.

1 Configure alert notifications to receive e-mail or SNMP notifications of critical events that occur on the disk subsystems. Refer to the Enterprise Management Window Help for procedures. You can configure alert notifications to be sent to the following types of receiving devices:

- Designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps – To configure the NMS for SNMP traps, go to step 2. Otherwise, go to step 3.
- Designated e-mail address – Refer to the Enterprise Management Window Help for procedures. To send e-mail to LSI Logic Storage Systems, Inc., contact technical support. When finished, go to step 3.
- Designated alphanumeric pager – A designated alphanumeric pager can receive alert notifications when third-party software is used to convert e-mail messages. When finished, go to step 3.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

---

2 Configure the NMS for SNMP traps:

a Insert the installation CD into the NMS.

b Copy the MIB file from the installation CD to the appropriate MIB directory on the NMS.

c Compile the MIB according to the procedure required by your NMS. For details, contact your network administrator or refer to your network management station documentation.

3 Start the Array Management Window.

You must open an Array Management Window to manage a selected disk subsystem. You can open multiple Array Management Windows to manage more than one disk subsystem at the same time.

Select the disk subsystem on which you will perform the firmware upgrade. From the Enterprise Management Window, double-click the disk subsystem, or select Tools >> Manage Device.

The Array Management Window is displayed (Figure 7-4 on page 7-22).

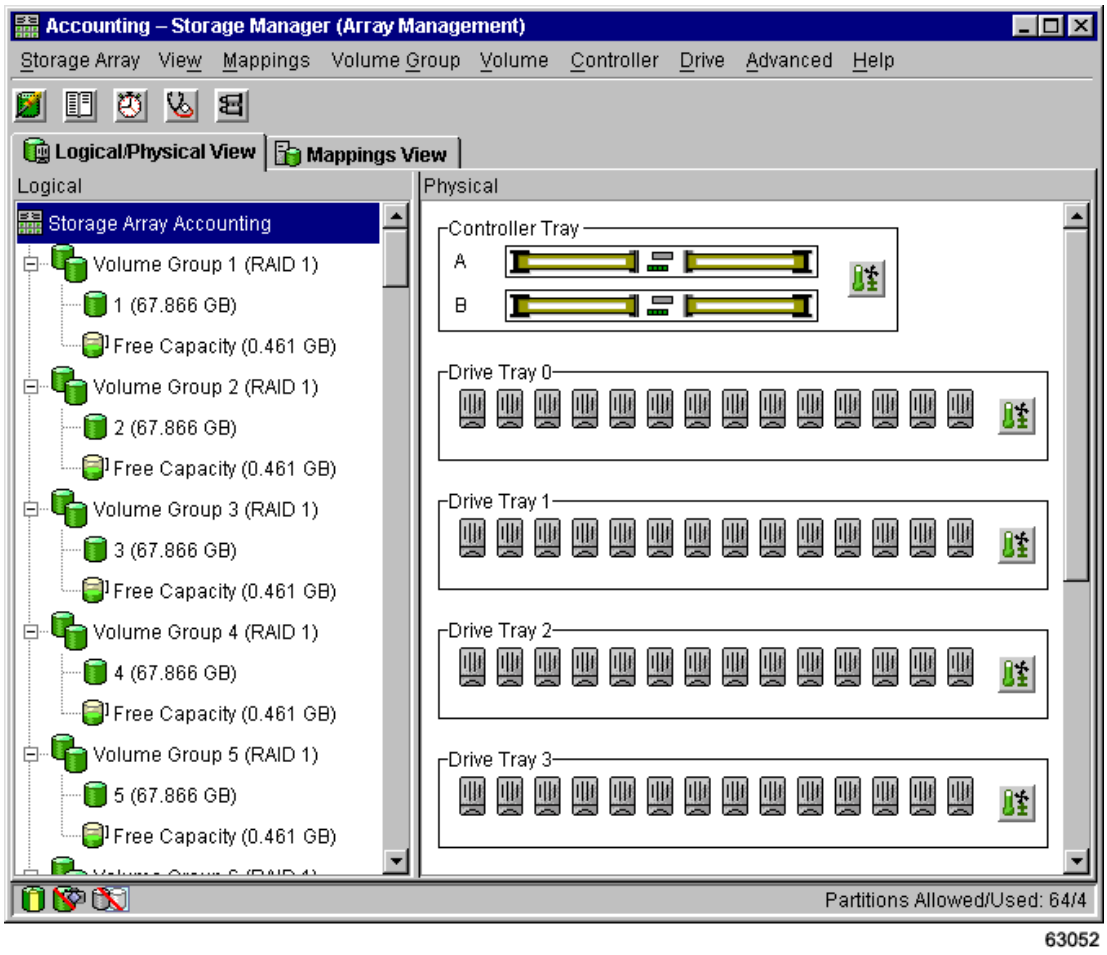

Figure 7-4 Array Management Window

4 Rename the disk subsystem by selecting Disk Subsystem >> Rename.

You must rename each disk subsystem to the name you entered on the Windows Installation Profile. For related topics and procedures, refer to the Array Management Window Help.

5 Refer to the *Storage System Planning Guide* and enable the premium features on your disk subsystem. For related topics and procedures, refer to the Array Management Window Help.

6 Is the client software running on two or more machines?

- Yes – Go to step 7.
- No – Go to step 9 on page 7-24.

7 Disable the event monitor on all but one machine to prevent receipt of duplicate event messages. Complete the appropriate procedure, based on your operating system:

- Windows NT – To disable the event monitor:
  a Select Start >> Settings >> Control Panel.
  b Double-click the Services icon to open the Services program.
  c Select Storage Manager Event Monitor.
  d Select Startup.
  The Startup dialog is displayed.
  e Select Disabled.
  f Select OK.
  g Select Close to exit the Services dialog.
- Windows 2000 – To disable the event monitor:
  a Select Start >> Programs >> Administrative Tools >> Services.
  The Services dialog is displayed.
  b Select Storage Manager Event Monitor.
  c Select Action >> Properties.
  The Properties dialog is displayed.
  d Select the Startup Type drop-down menu.
  e Select Disabled.
  f Select OK.

8 Choose one of the following, based on whether the Windows machine will operate in a standard or cluster environment:

- Standard (non-cluster) environment – Go to step 9.
- Windows-only cluster environment – Ensure you have created at least one volume and have defined the host type of the volume to either Windows NT Clustered or Windows 2000 Clustered. When finished, go to "Preparing for Cluster Server Software Installation."
- Heterogeneous cluster host environment – Ensure you have defined a host group for each server cluster, using the SANshare Storage Partitioning feature. Ensure that any volumes that hosts in the server cluster need to access are mapped to the defined host group, with a Windows NT Clustered or Windows 2000 Clustered host type. Refer to step 10 through step 13 of "Downloading NVSRAM Configuration Settings" on page 7-17 for the correct procedures. When finished, go to "Preparing for Cluster Server Software Installation."

9 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help and Array Management Window Help and to the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Refer to "Post-Installation Activities" on page 7-29.

End Of Procedure

Preparing for Cluster Server Software Installation

Use the following procedure to configure a Windows NT or Windows 2000 cluster server or host for Microsoft Cluster Server installation. The cluster server software is required for Windows NT or Windows 2000 cluster server environments.

CAUTION Do not perform this procedure unless you have installed the necessary storage management software on two cluster servers or hosts. The storage management software has been certified to support a maximum of two hosts per cluster.

---

1. Ensure Host A is powered up and Host B is powered off.
2. Choose one of the following, based on the host type on which you are installing the cluster software:
   - Windows NT – Go to step 3.
   - Windows 2000 – Go to step 5.
3. Windows NT – Create and format Windows partitions on the disks you will use in the cluster, using the following procedure. Windows disk partitions are distinct from disk subsystem partitions.
   a. Select Start >> Programs >> Administrative Tools >> Disk Administrator.

      The Disk Administrator screen is displayed.

   b. Scroll to an area of free space on the desired disk, right-click, and select Format.
   c. Enter the desired disk capacity in the Capacity field.
   d. Select NTFS in the File System field.
   e. If desired, enter a name for the volume in the Volume Label field.
   f. Select Quick Format in the Format Options field.
   g. Select Start.
   h. Select OK.
   i. Select Yes to create the partition.
   j. Select Partition >> Commit Changes Now and select Yes to save the partition.

      A partition is created, during which a drive letter is assigned.

   k. To change the assigned drive letter, right-click the new partition, select Assign Drive Letter, scroll to the desired letter, and select OK.
   l. Record the drive letter of the new partition.

4 Repeat step 3 for each disk you want to include in the cluster. When finished, go to step 7.

5 Windows 2000 – Create and format Windows partitions on the disks you will use in the cluster, using the following procedure. Windows disk partitions are distinct from disk subsystem partitions.

a Select Start >> Programs >> Administrative Tools >> Computer Management, and then select Storage >> Disk Management.

The Computer Management screen is displayed.

b Choose one of the following, based on the label of the disk you are formatting:

- The disk is labeled “Unallocated” – Scroll to the desired disk, right-click an area of unallocated space and select Action >> All Tasks >> Create Partition. When the Create Partition Wizard Welcome dialog is displayed, go to step c.
- The disk is labeled “Unknown” – Select Action >> All Tasks >> Write Signature. When the Signature dialog is displayed, select OK to write the signature. When finished, go to step c.

c Select Next.

The Select Partition Type dialog is displayed.

d Select the type of partition you want to create, then select Next.

The Specify Partition Size dialog is displayed.

e Select a partition size, then select Next.

The Assign Drive Letter or Path dialog is displayed.

f Assign a new drive letter, if desired, then select Next.

The Format Partition dialog is displayed.

g Select NTFS in the File System to use field.

h Enter a volume name, if desired, in the Volume Label field.

i Select Perform a Quick Format.

j Select Next and then select Finish.

A Summary screen is displayed.

k Record the drive letter assigned to the disk and then select Finish.

6 Repeat step 5 for each disk you want to include in the cluster. When finished, go to step 7.

7 Power off Host A and power up Host B.

8 Choose one of the following and verify the drive letters assigned to the Windows disk partitions for Host B match those of Host A. If the drive letters do not match, Host B will not detect the same disks as Host A.

- Windows NT – Refer to the drive letters you recorded in step 3 on page 7-25.
- Windows 2000 – Refer to the drive letters you recorded in step 5.

9 Do the drive letters need to be adjusted?

- Windows NT:
  - Yes – Go to step 10.
  - No – Go to step 12.
- Windows 2000:
  - Yes – Go to step 11.
  - No – Go to step 12.

10 Windows NT – Adjust drive letters:

a Select Start >> Programs >> Administrative Tools (Common) >> Disk Administrator.

The Disk Administrator dialog is displayed.

b Right-click the partition, select Assign Drive Letter, scroll to the desired letter, and select OK.

A new drive letter is assigned to the partition.

c Repeat step b for each assigned drive letter that does not match its corresponding partition on Host A.

d Go to step 12.

11 Windows 2000 – Adjust drive letters:

a Select Start >> Programs >> Administrative Tools >> Computer Management >> Storage >> Disk Management.

The Computer Management screen is displayed.

b Right-click a drive and select Change Drive Letter and Path.

The Change Drive Letter dialog is displayed.

c Select Edit and select the desired drive letter, then select OK and then select Yes.

d Select Yes.

e Repeat step b and step c for each drive letter that does not match the assigned drive letter on Host A.

12 Go to "Installing the Cluster Server Software."

Installing the Cluster Server Software

1 Install the cluster software on Host B.

Refer to the cluster software documentation for specific installation procedures. During Host B installation, select Form A New Cluster.

2 After the cluster software is successfully installed, reboot Host B, as needed.

3 Power up Host A.

4 Install the cluster software on Host A.

During the cluster software installation on Host A, select Join The Existing Cluster. After the software is successfully installed, leave Host A in operation.

5 Verify the software installation:

a On either host (A or B), select Start >> Programs >> Administrative Tools (Common) and select Cluster Administrator.

b In the Cluster or Server Name field, type either the cluster name, the host name, or the IP address of either node.

The names of both hosts should appear on the left side of the Cluster Administrator Window.

6 Did the names of both hosts appear in the Cluster Administrator Window?

- Yes – Go to step 7.
- No – A problem may have occurred. Repeat step 1 through step 5 to reinstall the cluster software. If the problem persists, contact technical support.

7 You are finished with the installation process. Choose one of the following, based on the type of information you are seeking:

- Configuration tasks, troubleshooting, and servicing – Refer to the Enterprise Management Window Help, Array Management Window Help, and the supporting documentation shipped with the storage management software or hardware.
- Procedures specific to the host operating system – Go to "Post-Installation Activities" on page 7-29.

End Of Procedure

Post-Installation Activities

Use the following procedures to manage your disk subsystem from a Windows machine.

Disabling and Enabling the Event Monitor

The event monitor is packaged with the client software.

- During installation of the SMclient, you are asked whether you wish to install the event monitor.
- During installation of the SMdirectorclient package, the event monitor will be installed automatically.

The event monitor handles disk subsystem error messages through e-mail or SNMP traps when the storage management software is inactive.

IMPORTANT If you have installed the client software and configured alert notifications on multiple machines, you may receive duplicate error messages from the same disk subsystem. To prevent duplicate error messages, disable the event monitor on all but one machine. It is recommended that you run the event monitor on one machine that will run continually.

You can disable and enable the event monitor either while the event monitor is running, or you can permanently disable or enable the boot-time loading of the event monitor. If you disable the event monitor while it is running, it will start automatically at the next reboot.

Windows NT

1. Select Start >> Settings >> Control Panel.
2. Open the Services program (double-click the Services icon).
3. Select Storage Manager Event Monitor.
4. Select Startup.

   The Startup screen is displayed.
5. Select Automatic to have the event monitor start when the system reboots or select Manual to prevent the event monitor from starting when the system reboots.
6. Select OK.
7. Select Close to exit the Services dialog.

End Of Procedure

Windows 2000

1 Select Start >> Programs >> Administrative Tools >> Services.

The Services dialog is displayed.

2 Select Storage Manager Event Monitor.

3 Select Action >> Properties.

The Properties screen is displayed.

4 Select the Startup Type drop-down menu.

5 Select Automatic to have the event monitor start when the system reboots or select Manual to prevent the agent or event monitor from starting when the system reboots.

6 Select OK.

End Of Procedure

Using the hot_add Utility

Use the following procedure to run the hot_add utility from a Windows machine.

The hot_add utility is used to add new volumes dynamically without restarting the system. The utility registers the new volumes with the operating system so you can use Disk Administrator to create partitions, assign drive letters, and add device names. The hot_add utility is installed as a part of the SMutil software.

After creating all desired volumes on a particular disk subsystem, go to the attached host and do the following:

1. Select Start >> Programs >> Accessories >> Command Prompt.
2. Change to the \util directory. Type the following and press Enter:

   ```
   cd C:\Program Files\SM8\util
   ```

3. Type the following and press enter:

   ```
   hot_add
   ```

Several minutes may pass while the computer is accessing the drives. When the program is finished, the following message is displayed:

```
Device nodes have been updated
```

The new volumes will be available to you through Disk Administrator.

End Of Procedure

Identifying Volumes by Operating System Device Names

The SMutil software includes a utility that allows you to see which disk subsystem volume is associated with a particular operating system device name. This capability is useful for operations such as data placement and volume deletion.

IMPORTANT If you are unsure whether new devices or volumes have been added to the system, it is recommended you run hot_add first to ensure the devices are registered with the system. If the devices are not registered, they will not be displayed in the SMdevices output. For procedures, refer to "Using the hot_add Utility."

If you installed the software in a directory other than the default directory, modify the path accordingly in this procedure.

1 Select Start >> Programs >> Accessories >> Command Prompt.

2 Change to the \util directory. Type the following and press Enter:

```
cd C:\Program Files\SM8\util
```

3 Type the following and press enter:

```
SMdevices
```

A screen is displayed showing device identification information, similar to the following:

```
\\.\PHYSICALDRIVE0 [Disk Subsystem <name>, Volume 8, LUN 0,
Volume WWN <600a0b80000602860000000382060eb>, Preferred
Path:(Controller-A) In Use]
\\.\PHYSICALDRIVE1 [Disk Subsystem <name>, Volume 9, LUN 1,
Volume WWN <600a0b70006028600000000392060eb>, Alternate Path:
(Controller-B) Not In Use]
\\.\SYMsmUTMLun0 [Disk Subsystem <name>, Volume Access, LUN 7,
Volume WWN <600a0b800006000000000038000000>]
```

Where:

- PHYSICALDRIVE*x* = Disk*x* in Disk Administrator
- Disk Subsystem = disk subsystem name
- Volume = volume name
- LUN = logical unit number associated with the volume
- WWN = world wide name for the volume

The Access Volume disk names are identified by the UTM designation.

End Of Procedure

Stopping and Starting the Host-Agent Software

Use the following procedures to stop and start the host-agent software from a Windows machine. You will need to stop and restart the SMagent software when you download a NVSRAM file that enables an Access Volume or changes the LUN used for the Access Volume. Doing so allows detection of the new disk subsystems that will be managed by the host. If an Access Volume is not detected after a reboot, then the SMagent software will stop running automatically and you will need to restart it.

To add disk subsystems, you must stop the SMagent software. When you restart the SMagent, it detects the new disk subsystems and adds them to the management domain.

The SMagent automatically starts after you reboot the host. However, you must restart the software manually if you have stopped it to add disk subsystems.

Windows NT

1. Select Start >> Settings >> Control Panel.
2. Double-click Services.

   The Services screen is displayed.
3. Select Storage Manager Agent.
4. Select the Startup button.
5. Select Automatic to have the agent start when the system boots or select Manual to prevent the agent from starting at bootup.
6. Select OK.

   The Services screen is displayed.
7. Select Storage Manager Agent >> Start or Stop.

End Of Procedure

Windows 2000

1 Select Start >> Programs >> Administrative Tools >> Services.

The Services dialog is displayed.

2 Select Storage Manager Agent.

3 Select Action >> Properties.

The Startup type drop-down menu is displayed.

4 Select Automatic to have the agent start when the system reboots or select Manual to prevent the agent from starting when the system reboots.

5 Select OK.

The Services screen is displayed.

6 Select Storage Manager Agent.

7 Select Action >> Stop or Start.

End Of Procedure

Adding New Volumes To a Cluster

Use the following procedures to add volumes to a Windows cluster from an existing disk subsystem or to add volumes from a newly attached disk subsystem.

1. Choose one of the following, based on whether you are adding new volumes to a new or existing disk subsystem:
   - Adding volumes to a new disk subsystem – Connect the new disk subsystem to the cluster host. When finished, go to step 2.
   - Adding volumes to an existing disk subsystem – Configure the new volumes on the disk subsystem. For procedures on configuring volumes, refer to the Array Management Window online help. When finished, go to step 2.
2. Map the new volumes to the cluster group. For procedures on mapping volumes, refer to the Array Management Window online help.
3. Reboot Cluster Host B.

   The reboot should cause all resources to move to cluster Host A and cause Host B to detect the new disks after the reboot.
4. Choose one of the following, based on the operating system running on Host B.
   - Windows NT –
     a. Select Start >> Programs >> Administrative Tools (Common) >> Disk Administrator.
     b. Select the volume to be formatted.
     c. Select Tools >> Format and label the new disks.
   - Windows 2000 –
     a. Select Start >> Programs >> Administrative Tools >> Computer Management.
     b. Expand Storage.
     c. Select Disk Management.
     d. Select the volume to be formatted.
     e. Select Action >> All tasks >> Format.
5. Reboot cluster Host A.

   The reboot should cause all resources to move to cluster Host B and cause Host A to detect the new disks after the reboot.
6. On Host A, from Cluster Administrator, use the Add New Resources Wizard to add the new physical disk resources to the cluster.

End Of Procedure

Boot Device Installation

Overview

This section provides procedures for installing a Windows NT or Windows 2000 boot device on a disk subsystem. Installing the boot device on a disk subsystem requires the following procedures:

- Preparing a disk subsystem volume and a host for the boot device installation
- Verifying controller information
- Installing the Windows operating system
- Installing the host software components on the attached hosts

Before proceeding, do the following:

- Verify you have installed the client software on a storage management station attached to the disk subsystem.
- Check your host documentation to verify your specific host supports booting from an external device.
- Contact technical support if you have questions or concerns about the installation procedures.

When ready to proceed, go to "Disk Subsystem and Host Preparation" on page 7-37.

Disk Subsystem and Host Preparation

You must prepare the disk subsystem and host *before* installing storage management software components on the host. Refer to the *SANtricity Storage Manager Product Release Notes* for information on host bus adapters that support disk subsystems as boot devices.

CAUTION To ensure failover protection, verify the disk subsystem you are assigning as a boot device is running dual controllers connected to two host bus adapters. If the disk subsystem has a single controller or dual controllers connected to the *same* host bus adapter (host path), you do *not* have failover protection and could lose the boot device if the controller fails or has connection problems. For this reason, you should *not* use these type of controller configurations with a boot device installation.

IMPORTANT You must have administrator privileges to access this software. Also, you *must* use the volume mapped to LUN 0 as the boot device because Windows NT and Windows 2000 support booting only from LUN 0.

To prepare the disk subsystem as a boot device, complete the following procedures in the order given:

- "Starting the Client Software" on page 7-38.
- "Configuring the Boot Volume on the Disk Subsystem" on page 7-40.
- "Preparing the Host" on page 7-42.

Starting the Client Software

1 Go to the storage management station on which you installed the client software.

2 Select Start >> Programs >> SANtricity Storage Manager Client.

The Enterprise Management Window may take several minutes to open. No wait cursor, such as an hourglass, is displayed.

The client software starts and the Enterprise Management Window and the Confirm Initial Automatic Discovery dialog are displayed (Figure 7-5).

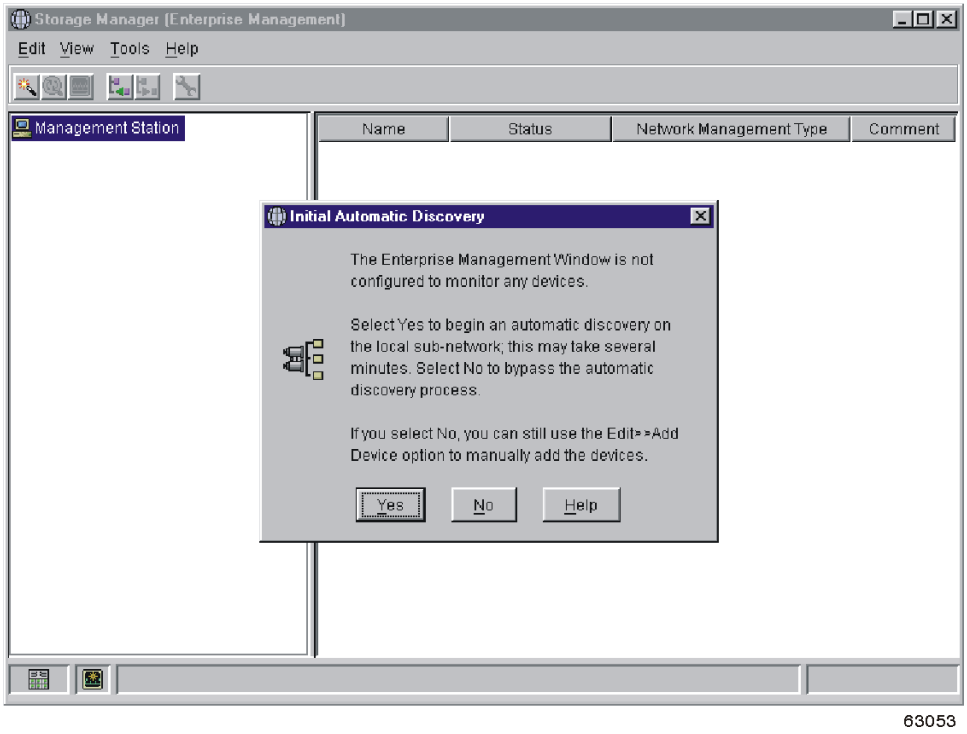

Figure 7-5 Confirm Initial Automatic Discovery Dialog

3 Select No.

4 Select Edit >> Add Device.

5 Add the IP addresses or host names of the controllers in the disk subsystem.

You will have to add the IP addresses or host names of the controllers one at a time. Refer to the Enterprise Management Window Help for more information.

The disk subsystem that you plan to use as the boot device should be displayed in the Enterprise Management Window (Figure 7-6).

6 Go to "Configuring the Boot Volume on the Disk Subsystem."

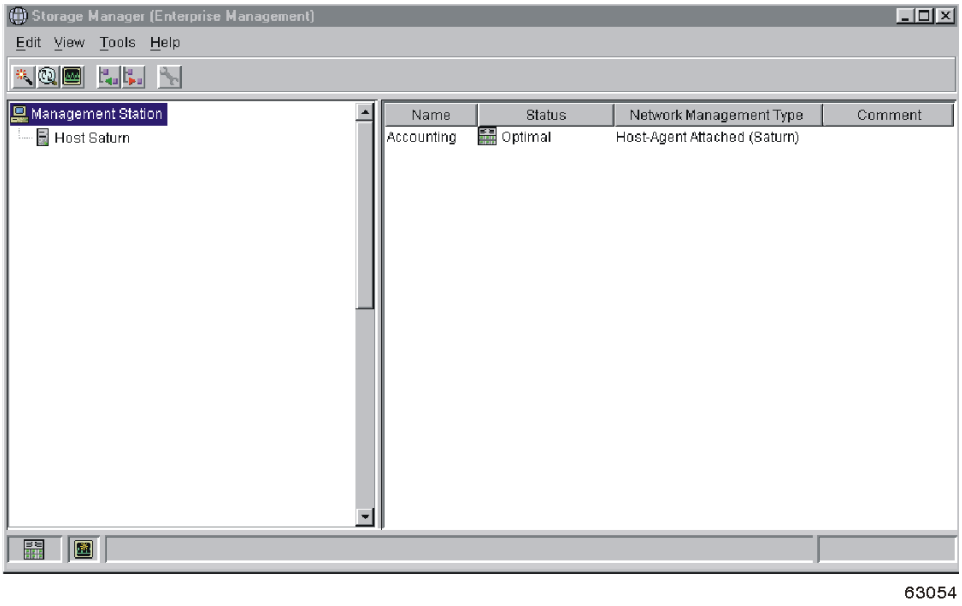

Figure 7-6 The Enterprise Management Window

Configuring the Boot Volume on the Disk Subsystem

1. Select the disk subsystem.
2. Select Tools >> Manage Device.

   The Array Management Window for the selected disk subsystem is displayed.
3. Select the Logical/Physical View tab.
4. Right-click the Unconfigured Capacity node and select Create Volume.

   The Default Host Type dialog is displayed.
5. Select the host type from the drop-down list and then select OK.

   The Create Volume Wizard dialog is displayed.
6. Select the Unconfigured capacity (create new volume) radio button and then select Next.

   The Specify Volume Group Parameter dialog is displayed.
7. Specify the RAID level and capacity you want for the volume group.

   A two-drive, RAID 1 volume group is recommended. However, you can use more drives and RAID levels 3 or 5.
8. Select Next.
9. Specify the boot volume capacity.

   A capacity of no more than 4 GB is recommended for the boot volume; however, 2 GB should be sufficient capacity.
10. Name the volume to identify it as the boot volume.
11. Select the Use recommended settings radio button.
12. Select Finish to create the volume and volume group.

    The Create Volume Wizard – Creation Successful dialog is displayed.
13. Select No and then select OK.
14. Use the SANshare Storage Partitioning premium feature to map the volume to the Windows host, using LUN 0. Refer to the Array Management Window Help for more information.

15 Ensure there is only a single path to the disk subsystem. The path should be configured to the controller that owns the boot volume.

NOTE If you removed a previously installed version of RDAC in a root boot environment, you performed this action in step 3 on page 7-4 and do not need to perform it again.

There are two methods to ensure that the alternate path to the disk subsystem is removed. Choose either method.

- Method 1 – Remove the cable to the alternate path. Go to step 16.
- Method 2 – Modify NVSRAM to temporarily disable RDAC multipath functionality at the disk subsystem.

  a Select the disk subsystem in the Enterprise Management Window.

  b Select Tools >> Execute Script.

  The Script Editor dialog is displayed.

  c In the Script View dialog in the upper half of the screen, type the following commands:

Table 7-3 Windows NT and Windows 2000 RDAC and AVT Scripts

Operating System	Type the Following Script

Windows NT	set controller[a] HostNVSRAMByte[0,0x11]=0x20,0x20;
	set controller[b] HostNVSRAMByte[0,0x11]=0x20,0x20;
	set controller[a] HostNVSRAMByte[0,0x16]=0x20,0x20;
	set controller[b] HostNVSRAMByte[0,0x16]=0x20,0x20;
	set controller[a] HostNVSRAMByte[0,0x20]=0x01,0x00;
	set controller[b] HostNVSRAMByte[0,0x20]=0x01,0x00;

Windows 2000	set controller[a] HostNVSRAMByte[1,0x16]=0x20,0x20; set controller[b] HostNVSRAMByte[1,0x16]=0x20,0x20;

  d Select Tools >> Execute Only.

  e For the NVSRAM modifications to take effect, turn the power off to the control module, wait 30 seconds for the control module to power down, then turn the power on.

16 Reboot the host machine.

17 Go to "Preparing the Host."

Preparing the Host

CAUTION Risk of losing access to the boot device and the operating system. After installing the boot device, never delete the volume mapped to LUN 0 or use Configure >> Reset Configuration. Doing so will cause loss of access to the boot device and the operating system.

In the following procedure, the default boot path refers to Controller A, which owns the boot volume. The alternate boot path refers to Controller B.

1. Enable the BIOS on the host bus adapter connected to the default boot path.
   a. Consult the host system and host bus adapter documentation for procedures on enabling the host bus adapter BIOS.
   b. Verify that the host bus adapter with enabled BIOS is connected to the default boot path (controller A) and the host bus adapter with disabled BIOS is connected to the alternate boot path (controller B).
   c. Press F6 to install drivers manually for your host bus adapters during the installation process.
2. On the host, install the Windows operating system to the boot volume you created on the disk subsystem. Refer to the *SANtricity Storage Manager Product Release Notes* for information on host bus adapter drivers.
3. Perform the setup procedures provided on screen.

   If the system locks up during the setup procedure, reboot the host. During the reboot, press F7 when the F6 message is displayed. You will still need to press F6 to manually install drivers.
4. After the installation is completed, restart Windows.
5. From the root directory of your 32-bit host, view the Windows *boot.ini* file and verify that the default ARC (Advanced RISC Computing) entry begins with a "*multi*" designator.

   An entry similar to the following example is displayed:

   ```
   multi(0)disk(0)rdisk(0)partition(1)\WINNT="Windows.NT Server
   1.00.01"
   ```

   If it does not appear, verify the BIOS is enabled properly, using the procedure in step 1.
6. Continue the software installation procedures by returning to step 7 of "Installing the Storage Management Software" on page 7-5. As you complete the procedure, "Installing the Storage Management Software," you will enable the alternate path to the disk subsystem in step 11 on page 7-7.

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