

IBM FAStT Storage Manager
Version 7.10 for HP-UX and Solaris



Installation and Support Guide

IBM FAStT Storage Manager
Version 7.10 for HP-UX and Solaris



Installation and Support Guide

Note:

Before using this information and the product it supports, read the information in "Notices" on page 51.

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About this book

This book provides information about setting up, installing, configuring, and working with the IBM FASTT Storage Manager Version 7.10 in the HP-UX and Solaris environments.

Use this book to:

- Determine the hardware and software that is required to install the storage management software.
- Integrate the necessary hardware components into your network.
- Install the storage management software.
- Upgrade controller firmware, if necessary.
- Identify storage management features that are unique to your specific installation.

New features in this release are designated with a (I) on the left side of the page.

Who should read this book

This book is intended for system administrators 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 that are used with the storage management software.

How this book is organized

“Chapter 1. Introduction” on page 1 provides an overview of this book, the documentation set to which it belongs, and features of the software.

“Chapter 2. Installing Storage Management station software” on page 5 provides step-by-step instructions for installing the HP-UX or Solaris software on a storage management station.

“Chapter 3. Installing host software” on page 13 provides step-by-step instructions for installing the HP-UX or Solaris storage management software on a host.

“Chapter 4. Upgrading the software” on page 19 provides step-by-step instructions for installing the migrate utility and for upgrading firmware. Use the procedures in this chapter if you have existing storage subsystems that are running firmware version 3.x or later that you want to manage with IBM FASTT Storage Manager 7.10.

“Chapter 5. Specific information for HP-UX operating systems” on page 33 provides information about the HP-UX operating system.

“Chapter 6. Specific information for Solaris operating systems” on page 39 provides information about the Solaris operating system.

“Chapter 7. Post-installation tasks” on page 41 provides step-by-step instructions for performing post-installation tasks.

“Chapter 8. IBM FASTT Storage Manager with high availability cluster services” on page 49 provides information about the high availability clustering system. The IBM

FAST Storage Manager Version 7.10 is certified for use with MC/Service Guard releases A.11.09 and A.11.12 on HP-UX systems and Veritas Cluster Server 1.3 on Solaris systems.

Related publications

The following publications are available in Adobe Acrobat portable document format (PDF) on the IBM FAST Storage Manager CD and on the world-wide Web at:

www.ibm.com/pc/support/

Note: The publication that is denoted by an asterisk (*) in the list is printed and comes with the IBM FAST200 and FAST200 High Availability (HA) storage servers.

- *IBM FAST Storage Manager Version 7.10 Installation and Support Guide* (this book)
- *IBM FAST Storage Manager Version 7.10 for Microsoft® Windows NT® and Windows® 2000 Installation and Support Guide*
- *IBM FAST Host Adapter Installation and User's Handbook*
- *IBM FAST200 and FAST200 HA Storage Servers Installation and User's Guide**
- *IBM Netfinity FAST500 RAID Controller Enclosure Unit Installation Guide*
- *IBM Netfinity FAST500 RAID Controller Enclosure Unit User's Reference*
- *IBM FAST Storage Manager Concepts Guide*
- *IBM Fibre Channel FAST MSJ User's Guide*
- *IBM Netfinity Fibre Channel RAID Controller Unit User's Handbook*

When you complete the tasks in this *Installation and Support Guide*, see the following online help systems:

- IBM FAST Storage Manager Version 7.10 Enterprise Management online help. Use this help system for more information about working with the management domain.
- IBM FAST Storage Manager Version 7.10 Subsystem Management online help. Use this help system for more information about managing storage subsystems.

You can access the help systems from the Enterprise Management and Subsystem Management windows in the IBM FAST Storage Manager Version 7.10. Click **Help** on the toolbar or press F1.

The help systems contain operating information that is common to all operating environments. See this *Installation and Support Guide* for information that is specific to HP-UX and Solaris.

You also can order publications through the IBM Publications Ordering System at the following web site:

www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi

Chapter 1. Introduction

This *Installation and Support Guide* provides information on how to prepare, install, configure, and start the IBM FAStT Storage Manager Version 7.10 in an HP-UX and Solaris operating system environment. This book is for system administrators. Before beginning the installation of this product, consult the following documentation:

README.txt file

Read this text file first. It is located in the root directory on the CD, and contains the latest installation and user information about the storage management software and hardware components.

IBM Netfinity Fibre Channel Storage Manager Concepts Guide

Use this reference document to become familiar with the terminology and features of the IBM FAStT Storage Manager Version 7.10 software.

When you have completed the entire installation process, see the following online help systems. These help systems contain information that is common to all operating system environments. For installation information specific to HP-UX or Solaris, see the following help systems:

Enterprise Management Help window

Use this online help system to learn more about working with the entire management domain.

Subsystem Management Help window

Use this online help system to learn more about managing individual storage subsystems.

Other references

This book provides planning, installation, operation, and servicing information for the IBM FAStT Storage Manager 7.10 software, the controller enclosures (SYM1000E, SYM1200), the drive enclosures (SYM2000 LVD, SYM2200, FC2500), and the storage systems (SHV2200, SHV2500). The following sections describe the documentation that is included in this set.

General documentation

See the following documents for additional information:

index.pdf

This file lists all the PDFs and has links to them.

Product release notes for IBM FAStT Storage Manager

This document contains important information about the CD contents, known restrictions, workarounds, and last-minute updates to the product documentation. This book is shipped in printed form only.

Hardware documentation

See the following documents for information about the controller enclosures and the drive enclosures:

Controller Enclosure Site Preparation Guide

This book contains site requirements and other technical information for preparing the site for a controller enclosure installation.

Drive Enclosure Site Preparation Guide

This book contains site requirements and other technical information for preparing the site for a drive enclosure or storage system installation.

Controller Enclosure and Drive Enclosure Installation Guide

This book contains step-by-step instructions for installing deskside and rack mount controller enclosures, drive enclosures, and storage systems. It includes switch setting information and cabling routing examples.

Controller Enclosure User Guide

This book contains model specifications and step-by-step instructions for operating, upgrading, maintaining, and servicing the controller enclosure and its components.

Drive Enclosure User Guide

This book contains technical specifications and step-by-step instructions for operating, upgrading, maintaining, and servicing drive enclosures, storage systems, and their components.

Software documentation

See the following documents for information about the software.

IBM FAStT Storage Manager Concepts Guide

This book contains explanations of the storage management software terminology, concepts, and features.

Enterprise Management help

This help system contains information and procedures for working with the entire management domain. This is one of two online help systems that support the IBM FAStT Storage Manager 7.10.

Subsystem Management help

This help system contains information and procedures for managing individual storage subsystems. This is one of two online help systems that support the IBM FAStT Storage Manager 7.10.

Features of the software

This section describes the features in this version of the software.

Event monitoring

Event monitoring gives you the ability to monitor storage subsystems, even when the Enterprise Management Window is not open. A toolbar button and option, **Tools —> Update monitor**, are included in the interface to allow updates to the monitor if changes have occurred to your storage subsystem configuration.

Heterogeneous hosts

The heterogeneous hosts with the storage partitioning feature gives you the ability to connect hosts that are running different operating systems to a single storage subsystem. The host types can be different operating systems (like Solaris and Microsoft® Windows NT®) or variants of the same operating systems (like Windows NT, clustered and Windows NT, non-clustered).

Configuration replication

Configuration replication allows you to save the logical configuration of a storage subsystem and then load it on an identical storage subsystem. This

feature can be used to replicate a logical configuration from one storage subsystem to another, or to save a storage subsystem configuration for backup purposes.

Auto-volume transfer

Auto-volume transfer allows individual volumes on a storage subsystem to be owned by different controllers in the storage subsystem. Previous firmware versions allowed ownership at the array level only. If a problem occurs along a path between a host and a volume, the multipath driver can move that volume to the other active controller.

Command-line interface

A command-line interface supports the use of a command line to issue commands to the storage subsystems. The command line interface is based on the script engine commands found in the script editor. See the SM7cli.txt file on the installation CD for usage information. There is also a reference to this file in the online help file called Command Line Interface (CLI).

Controller diagnostics

The controller diagnostics are available from the **Controller** menu in the storage management software. These diagnostics are used to test the host- and drive-side fibre-channel loops.

Access volume mapping allowed

Access volume mapping allowed gives you the ability to assign and change the logical unit number (LUN) assignment for the access volume. An access volume is required for communicating within a host-agent managed environment using the fibre-channel I/O path. An access volume is not required for a directly-managed storage subsystem that is connected through the Ethernet cable connection to a storage subsystem.

High availability cluster services

A high availability clustering system allows application services to continue when a hardware or software failure occurs. This system protects you from software failures as well as from the failure of a CPU, disk, or local area network (LAN) component. If a component fails, the redundant component takes over cluster services and coordinates the transfer between components.

Chapter 2. Installing Storage Management station software

This chapter provides instructions for installing the applicable storage management software packages on one or more storage management stations. Typically, a storage management station is a remote system, connected to an Ethernet network, that is used to manage one or more storage subsystems.

A storage management station can also be a host that is connected to the storage subsystem using a fibre-channel I/O path that you use to manage the attached storage subsystems. Even though you can install the storage management software on a host, the host still uses the transmission control protocol/internet protocol (TCP/IP) to communicate with the host agent. The agent communicates with the controllers over the fibre-channel connection through the access volume.

Attention: Before proceeding, make sure you have completed a storage management station installation profile from the *IBM FASTT Storage System Planning Guide*, a printed document that is shipped with the storage management software. During the installation, use the completed profile as a guide for installing the appropriate software in the correct order on the storage management station.

Initial configuration of IBM FASTT Storage Manager Subsystems under HP-UX

Read the following before continuing:

- All FASTT systems ship with nonvolatile storage random access memory (NVSRAM) that is configured for Windows NT hosts and that has access volume set to LUN 31.
- If the controllers are shipped with a firmware release prior to version 04.01.02.02 and an NVSRAM release prior to NV3542R710NT006, they do not work under HP-UX and must be upgraded. Read the README file that is shipped with the product to ensure that the latest information is available.

Note: Versions of firmware and NVSRAM that ship with this product can be later releases than those described in this document.

Complete the following procedure to configure the FASTT Storage Manager for HP-UX.

1. To set up the storage subsystem for HP-UX, the subsystem must be physically configured, at least initially, for direct management through the Ethernet connections on each controller as well as the fibre-host connection. The IBM FASTT Storage Manager software (SM7client, SM7util and SM7agent) should be installed before configuring the subsystem.

Note: See the *IBM FASTT Storage Manager Planning Guide* for information about assigning IP addresses to the controllers and configuring the bootstrap protocol (BOOTP) server that is required to configure the controllers on the network.

2. After the array is configured on the network, run the SM7client software on either the host server, if it is on the same network as the storage subsystem, or on another machine on the network that has the IBM FASTT Storage Manager software installed.

3. In the Enterprise Management window, click **Edit** → **Add Device**. In the Add Device window type the IP address of the first controller in the storage subsystem. Click **Add**. Then type the IP address of the second controller, and click **Add** → **Close**.
4. The storage subsystem is shown as a direct network attachment. In the Subsystem Management window, click **Storage Subsystem** → **Profile** and review the summary portion of the output.
 - If the firmware version is below version 04.01.02.02 or the NVSRAM is below version NV3542R710NT006, you must upgrade the firmware and NVSRAM. Continue with step 5.

Note: This upgrade is necessary to support heterogeneous hosting and access volume LUN changes on the HP-UX operating system.

- If the version numbers that are installed on the storage subsystem are current then go to step 8.
5. Locate the following files on the installation CD:
 - SNAP_04010202.dlp (firmware)
 - NV3542R710NT006.dlp (NVSRAM)

To configure the host type on the storage subsystem as HP-UX, both the firmware and NVSRAM must be updated.

Note: You must first upgrade the firmware, and then upgrade the NVSRAM.

6. Complete the following steps to upgrade the firmware.
 - a. Click **Download** → **Firmware**.
 - b. Go to the directory where the firmware resides.
 - c. Highlight the SNAP_04010202.dlp file and click **Update** → **OK**.

The firmware is downloaded to the controllers. After the download is complete, the storage subsystem goes unresponsive and you are returned to the Enterprise Management window.

7. Complete the following steps to upgrade the NVSRAM.
 - a. Rescan the storage subsystem, and select **Manage the Device** to return to the Subsystem Management window.
 - b. Click **Storage Subsystem** → **Download** → **NVSRAM**.
 - c. In the NVSRAM window, go to the directory where the NV3542R710NT006.dlp file resides.
 - d. Highlight the NV3542R710NT006.dlp file, and click **Update** → **OK**.
 - e. When the NVSRAM download is complete, cycle power to the storage subsystem in the following sequence and then restart the HP-UX host.
 - 1) Turn off both controllers.
 - 2) Turn off any attached drive enclosures.
 - 3) Wait at least 30 seconds.
 - 4) Turn on any additional drive enclosures.
 - 5) Turn on both controllers.

The host restart process should start after the storage subsystem has been turned off, if required.

8. Click **Configure** → **View Volume-To-LUN Mappings** from the Subsystem Management window.

9. In the Mappings window, create a new host group by clicking **Configure** → **Topology** → **Define New Host Group**.
10. Type the name of the new host group (for example, HP-UX). Click **Add** → **Close**.
11. Highlight the new host group and click **Configure** → **Topology** → **Define New Host**.
12. Define the new host. Type the name of the HP-UX host to which the storage subsystem is attached.
 - a. Click **Add** and then click **Close**.
 - b. Highlight the host just added and click **Configure** → **Topology** → **Define New Host Port**.
 - c. Select the desired host port for the first HBA, then change the host type to HP-UX and click **Add**.
 - d. Choose the host port for the second HBA and click **Add** → **Close**.
 - e. Click **File** → **Exit Subsystem Management** → **Exit**.
 - f. On the HP-UX host, type the following command to obtain the device name for each HBA.

```
ioscan -fn
```

- g. Type the following command to obtain the N-port port world-wide name (WWN).

```
fcmsutil <device name>
```

where <device name> is the name of the device, for example, /dev/td1. The port world-wide name is equal to the Host port identifiers that are presented in the New Host Port window.

13. On the HP-UX host, run the hot_add utility. The resulting SM7devices display shows the two UTM LUNs which are, by default, set to 31.
14. Run the SM7client at a shell prompt. If the client is unable to recognize the storage subsystem, close the client and type the following command at a shell prompt:

```
/sbin/init.d/SM7agent start
```

The SM7client is now able to connect to the storage subsystem.

Initial configuration of IBM FASTT Storage manager subsystems under Solaris

Read the following before continuing:

- All FASTT systems ship with NVSRAM configured for Windows NT hosts and that has access volume set to LUN 31. This should not present any problems for Solaris in recognizing the storage subsystem.
- If the controllers are shipped with a firmware release prior to Version 04.01.02.02 and an NVSRAM release prior to NV3542R710NT006, they do not work under Solaris and must be upgraded. Read the README file that is shipped with the product to ensure that the latest information is available.

If an upgrade is necessary, perform the following steps:

1. First upgrade the firmware and then upgrade the NVSRAM. In the Subsystem Management window, click **Storage Subsystem** → **Download** → **Firmware**.
2. Go to the directory where the firmware resides.
3. Highlight the SNAP_04010202 file and click **Update** → **OK**.
The firmware is downloaded to the controllers. After the download is complete, the firmware goes unresponsive and you are returned to the Enterprise Management window.
4. Rescan the storage subsystem and click **Manage the Device** to return to the Subsystem Management window.
5. Click **Storage Subsystem** → **Download** → **NVSRAM**.
6. In the NVSRAM window, go to the directory where the NV3542R710NT006.dlp file resides.
7. Highlight the NV3542R710NT006.dlp file, and click **Update** → **OK**.
8. When the NVSRAM download is complete, cycle power to the storage subsystem in the following sequence and then restart the Solaris host.
 - a. Turn off both controllers.
 - b. Turn off any attached drive enclosures.
 - c. Wait at least 30 seconds.
 - d. Turn on any additional drive enclosures.
 - e. Turn on both controllers.

The host is now able to detect the storage subsystem.

HP-UX – Installing the client software

Use the following procedure to install the client software on an HP-UX storage management station or on an HP-UX host acting as a storage management station.

Prerequisites

Do the following before proceeding:

1. Complete a Storage Management Station Installation Profile (see the *IBM FASTT Storage Manager Planning Guide*) for this machine.
2. Using the completed installation profile, ensure that this machine meets the requirements of the following tasks.
 - Task 1 - This machine is the storage management station that you have identified (see the Configuration Information column).
 - Task 2 - This machine is running an HP-UX operating system.
 - Task 4 - You have selected either:
 - “HP OpenView Node Network Manager” in the Configuration Information column, as well as “Install SM7client” and “Install HP OpenView Client Integration” in the Installation Activity column,
 - or
 - “No frameworks application” in the Configuration Information column and “Install SM7client” in the Installation Activity column.
 - Task 5 - You have selected “Verify specifications” and “Completed” in the Installation Activity column.

Procedure

In the following procedure, the installation CD is mounted at `/dev/cdrom`. Adjust these instructions as required for your specific installation. No restart is required during the client installation process.

1. Insert the HP-UX installation CD in the CD-ROM drive.
2. At the prompt, type the following command and press Enter.

```
swinstall -s /cdrom/clientinstall/SM7client-install
```

The Software Selection window opens, displaying the following:

```
SM7client  
JRE
```

3. Select the SM7client. The Java™ runtime environment (JRE) is automatically installed during the client software installation whether or not you click **all**.
4. From the toolbar, click **Actions** → **Install (Analysis)**.
If you did not select the JRE, a message is displayed indicating that it will be automatically installed.
5. Click **OK** when the analysis is complete.
6. At the Confirmation window, click **Yes** to start the installation.
7. When the installation is completed, click **Done** in the Install window and exit the application.

Note: You must close the **swinstall** command before running the **swverify** command.

8. Verify that the installation was successful by typing the following command and pressing Enter.

```
swverify -v SM7client
```

9. If no failure is reported, continue with step 10. If a failure is reported, follow the instructions in the following log file.

```
/var/adm/sw/swagent.log
```

10. Choose one of the following options, based on your response to Task 4 in the Configuration Information column on the Storage Management Station Installation Profile.

HP OpenView Node Network Manager

Continue with step 11.

No frameworks applications

You are finished with the client software installation on this HP-UX storage management station. Select “Completed” in the Installation Activity column, Task 4, and go to step 19 on page 10.

11. Install the SM7client for HP OpenView Network Node Manager on the storage management station. Type the following command and press Enter.

```
swinstall -s /cdrom/clientinstall/SM70Vclient
```

The following message is displayed:

```
SM70Vclient
```

12. Select the SM70Vclient.
13. From the tool bar, click **Actions** → **Install** → **OK**.
An Installation Analysis window opens.
14. Click **OK**.
A message is displayed indicating that the installation is starting.
15. Click **Yes** to start the installation.
16. Click **Done** when the installation is completed.

Note: You must close the **swinstall** command before running the **swverify** command.

17. To verify that the installation was successful, type the following command and press Enter.

```
swverify -v SM70Vclient
```

18. You are finished with the client software installation on this HP-UX storage management station. Select “Completed” in the Installation Activity column, Task 4.
19. Remove the installation CD from the CD-ROM drive.
20. Choose one of the following options:

Storage management software is required on additional storage management stations

Repeat step 1 on page 9 through step 19, using the corresponding Installation Profile for each storage management station as a guide.

If you have installed the client software on a host that is acting as a storage management station, see your completed Host Installation Profile to determine which software package to install next.

Storage management software installation is completed on all storage management stations

You are now ready to install the host software. Go to “Chapter 3. Installing host software” on page 13.

Note for a cluster environment: To ensure redundancy, you must install the client software on at least one additional management station or cluster server.

Solaris – Installing the client software

Use the following procedure to install and integrate the client software on a Solaris storage management station. Optionally, after installing the client software, you can run HP OpenView Client Integration, which displays a menu option for the IBM FAST Storage Manager 7.10 on the HP OpenView Network Node Manager application.

Prerequisites

Do the following before proceeding:

1. Complete a Storage Management Station Installation Profile (see the *IBM FAST Storage Manager Planning Guide*) for this machine.

2. Using the completed installation profile, ensure that this machine meets the requirements of the following tasks.
 - Task 1 - This machine is the storage management station that you have identified (see the Configuration Information column).
 - Task 2 - This machine is running a Solaris operating system.
 - Task 4 - You have selected either:
 - “HP OpenView Node Network Manager” in the Configuration Information column, as well as “Install SM7client” and “Install HP OpenView Client Integration” in the Installation Activity column.
 - or
 - “No frameworks application” in the Configuration Information column and “Install SM7client” in the Installation Activity column.
 - Task 5 - You have selected “Verify specifications” and “Completed” in the Installation Activity column.

Procedure

In the following procedure, the installation CD is mounted at /cdrom. Adjust these instructions as required for your specific installation location. No restart is required during the client installation process.

1. Insert the Solaris installation CD in the CD-ROM drive.
2. At the system prompt, type the following command and press Enter.

```
pkgadd -d /cdrom/clientinstall
```

Information about packages that can be installed in the specified directory is displayed on the command line. The following is an example of what you might see displayed.

```
1. SM7client          IBM FASTT Storage Manager 7 Client
                        (sparc) <version number>
2. HP OpenView       HP OpenView Network Node Manager
                        (sparc) <version number>
Select package(s) you wish to process (or 'all' to process all
packages). (default:all) [?,??,q]:
```

3. Type the value of the package that you are installing and press Enter.

The installation process begins. 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 <SM7client>

[y, n, ?]
```

4. Type y and press Enter.

The installation process continues. When the client software installation is complete, the following message is displayed:

```
Installation of <SM7client> was successful.
```

5. After the installation of the client software, enter the following command at a shell prompt to verify that the installation was successful:

pkgchk SM7client

6. Choose one of the following options, based on your selection for Task 4 in the Configuration Information column on the Storage Management Station Installation Profile.

HP OpenView client integration

Repeat steps 3 on page 11 and step 4 on page 11 to install the SM7client for HP OpenView Client Integration. When finished, select “Completed” in the Installation Activity column, Task 4, and continue with step 7.

No frameworks application

You are finished with the client software installation on this Solaris storage management station. Select “Completed” in the Installation Activity column, Task 4 and continue with step 7.

7. Remove the installation CD from the CD-ROM drive.
8. Choose one of the following options:

Storage management software is required on additional storage management stations

Repeat step 1 on page 11 through step 7, using the corresponding installation profile for each storage management station as a guide.

If you have installed the client software on a host that is acting as a storage management station, see your completed Host Installation Profile to determine which software package to install next.

Storage management software installation is completed on all storage management stations

You are now ready to install the host software. Go to “Chapter 3. Installing host software” on page 13.

Note for a cluster environment: To ensure redundancy, you must install the client software on at least one additional management station or cluster server.

Chapter 3. Installing host software

This chapter provides instructions for installing the applicable storage management software packages on hosts that are attached to the storage subsystem.

Attention: Before proceeding, make sure you have completed a host installation profile, located in the *IBM FASTT Storage Manager Planning Guide*, for each host. During the installation, use the completed profile to determine which installation procedure to perform on each host and in which sequence.

HP-UX – Installing the utility software

Perform the following procedures to install the utility software.

Prerequisites

Do the following before proceeding:

1. Complete a Host Installation Profile (see the *IBM FASTT Storage Manager Planning Guide*) for this machine.
2. Using the completed Host Installation Profile, ensure that this machine meets the requirements of the following tasks:
 - Task 1 - This machine is the host that you have identified in the Configuration Information column.
 - Task 2 - This machine is running an HP-UX operating system (see the Configuration Information column).
 - Task 3 - You have selected “Yes” because the host lacks all requirements for coexistence, and you have selected “Uninstall SYM 6.22” in the Installation Activity column.

Attention: If the host does not meet all requirements for coexistence, uninstall the SYM 6.22 software before proceeding. For instructions, see the user guide that was shipped with the SYM 6.22 storage management software.

- Task 4 - You have indicated whether this host will operate in a cluster environment (see the Configuration Information column).
- Task 7 - You have selected “Install SM7util” in the Installation Activity column.
- Task 12 - You have selected “Verify specifications” and “Completed” in the Installation Activity column.

Procedure

In the following procedure, the installation CD is mounted at /cdrom. Adjust these instructions as necessary for your specific installation location.

1. Insert the HP-UX installation CD in the CD-ROM drive.
2. At the prompt, type the following command and press Enter:

```
swinstall -s /cdrom/hostinstall/SM7util-install
```

The following message is displayed in the Software Selection window:

```
SM7util
```

3. Click **SM7util**.

4. From the tool bar, click **Actions** → **Install (Analysis)**.
5. Click **OK** after the analysis is complete.
6. At the Confirmation window, click **Yes** to start the installation.
7. When the installation is complete, click **Done** in the Install window and exit the application.

Note: You must close the **swinstall** command before running the **swverify** command.

8. Verify that the installation was successful by typing the following command and pressing Enter.

```
swverify -v SM7util
```

If no failure is reported, continue with step 9. If a failure is reported, follow the instructions in the following log file.

```
/var/adm/sw/swagent.log
```

9. Select “Completed” in the Installation Activity column, Task 7.
10. Choose one of the following options, based on whether you selected “Install SM7agent” in the Installation Activity column, Task 8.
 - Yes** Go to “HP-UX – Installing the host-agent software”.
 - No** Continue with step 11.
11. Choose one of the following options, based on whether you selected “Install SM7client” in the Installation Activity column, Task 9.
 - Yes** Go to “HP-UX – Installing the client software” on page 8.
 - No** Continue with step 12.
12. Choose one of the following options based on whether you selected “Install SM7migrate” in the Installation Activity column, Task 10.
 - Yes** Go to “Chapter 4. Upgrading the software” on page 19.
 - No** Continue with step 13.
13. Remove the installation CD from the CD-ROM drive.
14. Choose one of the following options:
 - Host software installation is required on other hosts**
See Task 3 and any other Host Installation Profiles that you have completed. For each additional host, see its corresponding Host Installation Profile to determine which software package to install first.
 - Host software installation is completed on all hosts**
Go to “Chapter 7. Post-installation tasks” on page 41.

HP-UX – Installing the host-agent software

Use the following procedures to install the host-agent software.

Prerequisites

Using the completed Host Installation Profile (see the *IBM FAS/T Storage Manager Planning Guide*), ensure that this machine meets the requirements of the following tasks:

- Task 7 - You have installed the SM7util software on this host and have selected “Completed” in the Installation Activity column.
- Task 8 - You have selected “Install SM7agent” in the Installation Activity column.

Procedure

Use the following procedure to install the SM7agent software on each attached HP-UX host or server. In this procedure, the installation CD is mounted at /cdrom. Adjust these instructions as required for your specific installation.

1. Insert the HP-UX installation CD in the CD-ROM drive.
2. At the system prompt, type the following command and press Enter.

```
swinstall -s /cdrom/hostinstall/SM7agent-install
```

The following message is displayed in the Software Selection window.

```
SM7agent
```

3. Click **SM7agent**. In addition to the SM7agent, the Java runtime environment (JRE) is also installed.
4. From the tool bar, click **Actions** → **Install (Analysis)**.
5. When the analysis is complete click **OK**.
6. In the Confirmation window click **Yes** to start the installation.
7. When the installation is complete, click **Done** in the Install window and exit the application.

Note: You must close the **swinstall** command before running the **swverify** command.

8. To verify that the installation was successful, type the following command and press Enter.

```
swverify -v SM7agent
```

9. If the verification process returns a message that a failure occurred, read the following log file and perform the indicated action before continuing:

```
/var/adm/sw/swagent.log
```

10. Select “Completed” in the Installation Activity column, Task 8.
11. Choose one of the following options, based on whether you selected “Install SM7client” in Task 9 of the Installation Activity column:

Yes Go to “HP-UX – Installing the client software” on page 8.

No Continue with step 12.

12. Remove the installation CD from the CD-ROM drive.
13. Choose one of the following options:

Host software installation is required on other hosts

See Task 3 to determine if you are installing the software in a cluster environment, and see any other Host Installation profiles that you have completed. For each additional host, see its corresponding Host Installation Profile to determine which software packages to install first.

Host software installation is completed on all hosts

Go to “Chapter 7. Post-installation tasks” on page 41.

Solaris – Installing the host software

Note: Do not proceed with the following procedure if you are using this Solaris host to install the boot device on a storage subsystem.

Perform the following procedures to install the host software.

Prerequisites

Do the following before proceeding:

1. Complete a Host Installation Profile (see the *IBM FAStT Storage Manager Planning Guide*) for this machine.
2. Using the completed Host Installation Profile, ensure that this machine meets the requirements of the following tasks:
 - Task 1 - This machine is the host that you have identified in the Configuration Information column.
 - Task 2 - This machine is running a Solaris operating system (see the Configuration Information column).
 - Task 3 - If you selected “Yes” because the host lacks all requirements for coexistence, and you have selected “Uninstall SYM 6.22” (see the Installation Activity column).
 - Task 4 - You have indicated whether this host will operate in a cluster environment (see the Configuration Information column).
 - Task 6 - You have selected “Install RDAC” in the Installation Activity column.
 - Task 7 - You have selected “Install SM7util” in the Installation Activity column.
 - Task 8 - If you have selected “Yes” in the Configuration Information column, then you have selected “Install SM7agent” in the Installation Activity column.
 - Task 9 - If you have selected “Yes” in the Configuration Information column, then you have selected “Install SM7client” in the Installation Activity column.
 - Task 11 - If you have selected “Yes” in the Configuration Information column, do not proceed with the procedures in this chapter.
 - Task 12 - You have selected “Verify specifications” and “Completed” in the Installation Activity column.

Procedure

In the following procedure, the installation CD is mounted at /cdrom. Adjust these instructions as required for your specific installation location.

1. Choose one of the following options, based on whether you selected “Uninstall SYM 6.22” in the Installation Activity column, Task 3.

Yes

- a. If you have not done so already, uninstall the IBM FAStT Storage Manager for Version 6.22. (See the user documentation that was shipped with that version for instructions.)
- b. Select “Completed” in the Installation Activity column, Task 3, and go to step 2.

No Continue with step 2.

2. Insert the Solaris installation CD in the CD-ROM drive.

3. At the system prompt, type the following command and press Enter.

```
pkgadd -d /cdrom/<volume name>/hostinstall
```

where <volume name> is the volume name of the installation.

Information about packages that can be installed in the specified directory is displayed on the command line. The following is an example of what you might see displayed.

```
The following packages are available:

1 RDAC                Redundant Disk Array Controller
                      (sparc) <version number>

2 SM7agent            FASSt Storage Manager 7 Agent
                      (sparc) <version number>

3 SM7util             FASSt Storage Manager 7 Utility

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

4. Type the value of the package that you want to install and press Enter.

To install all of the packages, type `all` and press Enter.

The installation process begins.

The messages and prompts that are displayed depend on whether IBM FASSt Storage Manager 6.22 is installed. See Task 6 on the Host Installation Profile. If you have checked the box next to coexisting storage subsystems, then the IBM FASSt Storage Manager 7.10 redundant dual active controller (RDAC) package is shared between both versions of the storage management software. The new RDAC package replaces the IBM FASSt Storage Manager 6.22 RDAC files.

The software automatically checks for package conflicts. If any conflicts are detected, a message is displayed indicating that some files are already installed and are in use by another package.

The following prompt is displayed:

```
Do you want to install these conflicting files [y, n, ?]
```

5. Type `y` and press Enter.

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

6. Type `y` and press Enter.

The installation continues. After the RDAC package has been successfully installed, the following message is displayed:

```
Installation of <RDAC> was successful.
```

When the SM7util software is installed, 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 <SM7util>

[y, n, ?]
```

7. Type y and press Enter.

When the SM7util software has been successfully installed, the following message is displayed:

```
Installation of <SM7util> was successful.
```

If you chose the SM7agent (see your response in Task 8) then 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 <SM7agent>

[y, n, ?]
```

8. Type y and press Enter.

When the host-agent has been successfully installed, the following message is displayed:

```
The IBM FAStT Storage Manager 7 Agent has been started and will
be started after every system reboot.

Installation of <SM7agent> was successful.
```

9. Type cd/ to get into the root directory.

Then, type the following command to shut down the system:

```
./etc/shutdown -y -i0 -g0
```

10. Type boot -r to restart the system.

11. Select “Completed” in the Installation Activity column, Tasks 6 and 7. If you also installed the SM7agent software, select “Completed” in the Installation Activity column, Task 8.

12. Choose one of the following options, based on whether you selected “Install SM7client” in the Installation Activity column, Task 9.

Yes Go to “Solaris – Installing the client software” on page 10.

No Continue with step 13.

13. Choose one of the following options, based on whether you selected “Install SM7migrate” in the Installation Activity column, Task 10.

Yes Go to “Chapter 4. Upgrading the software” on page 19.

No Continue with step 14.

14. Remove the installation CD from the CD-ROM drive.

Chapter 4. Upgrading the software

This chapter provides instructions for upgrading existing storage subsystems from the IBM FAStT Storage Manager Version 6.22 and the IBM FAStT Storage Manager Version 7.0.

IBM FAStT Storage Manager Version 7.10 supports storage subsystems that use a 4.01.00.x controller firmware version. To enable all features of the IBM FAStT Storage Manager Version 7.10, you must be running controller firmware Version 4.01.00.x.

To upgrade from the IBM FAStT Storage Manager Version 6.22, use the migrate utility and upgrade the controller firmware and configuration settings.

To upgrade from the IBM FAStT Storage Manager Version 7.0, download the controller Version 4.01 firmware and upgrade the NVSRAM configuration settings.

Migrate utility – overview

The migrate utility contains the software to upgrade existing storage subsystems from IBM FAStT Storage Manager Version 6.22.

If you have a previous installation containing 4766 controllers, use the migrate utility to upgrade the controller firmware and configuration settings.

Note: Complete the upgrade and download procedures in the following order:

1. Upgrade the firmware from Version 3.x to Version 3.01.03.
2. Download the new default configuration settings to NVSRAM.
3. Upgrade the firmware from Version 3.01.03 to Version 4.01.00.x.

HP-UX – Installing and using the migrate utility

This section provides procedures for installing the IBM FAStT Storage Manager 7.10 migrate software on HP-UX hosts or cluster servers. It also provides procedures for upgrading new controller firmware and downloading NVSRAM configuration settings on those attached hosts or servers.

Attention: Verify that you have installed all the required patches (see the *IBM FAStT Storage Manager Planning Guide*). The storage management software installation program does not check for required patches. Some patches that are listed might be superseded by other patches. See your operating system documentation or contact your operating system supplier for more information.

Prerequisites

If you need to upgrade the controller firmware, see Task 10 on the completed Host Installation Profile and ensure that you have indicated the version to which you will upgrade your firmware, and that you have selected “Install SM7migrate” in the Installation Activity column.

Procedure

Installing the SM7migrate software

Use the following procedure to install the SM7migrate software. In this procedure, the installation CD is mounted at /cdrom. Adjust these instructions as required for your specific installation.

1. Unmount all file systems from the storage subsystem on which you are performing the migrate procedure.
2. Ensure that each controller owns at least one logical drive and that both controllers are in an active state.

Attention: Use the migrate utility to upgrade controller firmware only if both controllers are in an active state.

3. Insert the installation CD in the CD-ROM drive.
4. At the system prompt, type the following command and press Enter.

```
swinstall -s /cdrom/hostinstall/SM7migrte-install
```

The following message is displayed in the Software Selection window.

```
SM7migrate
```

5. Click **SM7migrate**.
6. From the tool bar, click **Actions** → **Install (Analysis)**.
7. When the analysis is complete, click **OK**.
8. In the Confirmation window, click **Yes** to start the installation.
9. When the installation is complete, click **Done** in the Install window and exit the application.

Note: You must close the **swinstall** command before running the **swverify** command.

10. Verify that the installation was successful by typing the following command and pressing Enter.

```
swverify -v SM7migrate
```

11. If the verification message is displayed, continue with step 12. If the verification message is not displayed, a failure might have occurred. Repeat step 3 through step 10. If the failure persists, contact your customer service representative.
12. Select "Completed" in the Installation Activity column, Task 10.
13. The migrate software is only required on one host machine. Continue with "Upgrading firmware Version 3.x to Version 3.01.03".

Upgrading firmware Version 3.x to Version 3.01.03

Use the following procedure to upgrade the controller firmware from Version 3.x to Version 3.01.03.

Attention: Do not use the SM7migrate software to upgrade firmware directly to 4.01.00.x from any Version other than 3.01.03. Doing so could cause loss of communication with the storage subsystem controllers.

1. Stop all I/O to the storage subsystem to prevent application errors.

- From the command line, type the following and press Enter.

```
/opt/SM7migrate/SM7migrate /user/lib/raidfw/fw_03010301.d1p
```

Information about each storage subsystem that is attached to the host running the migrate utility is displayed. For example, you might see:

```
1) JASON_001:c1t2d0
2) JASON_001:c1t3d0
3) FRED_001:c1t4d0
4) FRED_001:c1t5d0
```

The first part of the displayed information refers to the storage subsystem name (JASON_001). The second part of the displayed information refers to the storage subsystem controller IDs (c1t2d0).

The following options are also displayed.

```
Make Selection: (A)ll Modules, E(x)it, or Module Index Number
```

- Select an option and press Enter.

Attention: After the firmware is downloaded and the controllers are restarted, the WWN of each controller changes to avoid duplicating names. If your fibre-channel host adapter driver tracks controllers by port name or node name, the host might not be able to locate the controllers. Restart the host to restore the connection.

- To remove any unnecessary files that are generated by the firmware migration, at the system prompt, type the following command and press Enter.

```
/opt/SM7migrate/SM7migrateCleanup
```

- You are finished with this procedure. Continue with “Downloading new configuration settings to NVSRAM”.

Downloading new configuration settings to NVSRAM

Use the following procedure to download the new NVSRAM configuration settings. The installation CD provides a file of default settings for controller networking capabilities in a heterogeneous environment.

- Stop all I/O to the storage subsystem to prevent application errors.
- From the command line, type the following command and press Enter.

```
/opt/SM7migrate/SM7migrate NVSRAM
```

Information about each storage subsystem that is attached to the host running SM7migrate is displayed. For example, you might see:

- 1) JASON_001:c1t2d0
- 2) JASON_001:c1t3d0
- 3) FRED_001:c1t4d0
- 4) FRED_001:c1t5d0

The first part of the displayed information refers to the storage subsystem name (JASON_001). The second part of the displayed information refers to the storage subsystem controller IDs (c1t2d0).

The following options are also displayed.

```
Make Selection: (A)ll Modules, E(x)it, or Module Index Number
```

3. Select an option and press Enter.
4. You are finished with this procedure. Continue with "Upgrading firmware from Version 3.01.03 to Version 4.01.00.x".

Upgrading firmware from Version 3.01.03 to Version 4.01.00.x

Use the following procedure to upgrade the controller firmware from Version 3.01.03 to Version 4.01.

1. Stop all I/O to the storage subsystem to prevent application errors.
2. From the UNIX[®] command line, type the following command and press Enter.

```
/opt/SM7migrate/SM7migrate /usr/lib/raidfw/fw_04010003.dlp
```

Attention: If you are running IBM FAStT Storage Manager Version 7.10 in coexistence with IBM FAStT Storage Manager Version 6.22, you must restart the system for the changes to take effect.

Information about each storage subsystem that is attached to the host that is running SM7migrate is displayed. For example, you might see:

- 1) JASON_001:c1t2d0
- 2) JASON_001:c1t3d0
- 3) FRED_001:c1t4d0
- 4) FRED_001:c1t5d0

The first part of the displayed information refers to the storage subsystem name (JASON_001). The second part of the displayed information refers to the storage subsystem controller IDs (c1t2d0).

The following options are also displayed.

```
Make Selection: (A)ll Modules, E(x)it, or Module Index Number
```

3. Select an option and press Enter.

4. You are finished with this procedure. Go to “Chapter 7. Post-installation tasks” on page 41.

Solaris – Installing and using the migrate utility

This section provides procedures for installing the IBM FAStT Storage Manager 7.10 migrate software on Solaris hosts or cluster servers that are attached to storage subsystems that require migration. It also provides procedures for upgrading the new controller firmware and downloading the NVSRAM configuration settings on those attached hosts or servers.

Prerequisites

If you need to upgrade the controller firmware, see Task 10 on the completed Host Installation Profile and ensure that you have indicated the version to which you will upgrade your firmware, and that you have selected “Install SM7migrate” in the Installation Activity column.

Procedure

Perform the following procedure to install the SM7migrate software.

Installing the SM7migrate software

Use the following procedure to install the SM7migrate software. In this procedure, the installation CD is mounted at /cdrom. Adjust these instructions as required for your specific installation. Because of the 9-character package name limitation in Solaris, the SM7migrate package name is *SM7migrte*.

1. Unmount all file systems from the storage subsystem on which you are performing the migrate procedure.
2. Ensure that each controller owns at least one logical drive and that both controllers are in an active state.
Attention: Use the migrate utility to upgrade the controller firmware only if both controllers are in an active state.
3. Stop all I/O to the storage subsystem to prevent application errors.
4. Insert the installation CD in the CD-ROM drive.
5. At the system prompt, type the following command and press Enter.

```
pkgadd -d /cdrom/<volume name>/hostinstall/migrate
```

Information about packages that can be installed in the specified directory is displayed on the command line. The following is an example of what you might see displayed.

```
The following packages are available:
1 SM7migrte          FAStT Storage Manager 7 Migrate
                    (sparc) <version number>

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

6. Type `all` and press Enter.

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 <SM7migrte>
[y, n, ?]
```

7. At this prompt, type y and press Enter.

After the migrate package has been installed successfully, the following message is displayed:

```
Installation of <SM7migrte> was successful.
```

8. A message similar to the one shown in step 6 on page 23 is displayed for each firmware and NVSRAM package that is being installed. At each prompt, type y and press Enter. Check for an Installation was successful message for each package.

9. Select “Completed” in the Installation Activity column, Task 10.

10. The migrate software is only required on one host machine. Continue with “Upgrading firmware from Version 3.x to Version 3.01.03”.

Upgrading firmware from Version 3.x to Version 3.01.03

Use the following procedure to upgrade the controller firmware from Version 3.x to Version 3.01.03 on a Solaris host.

Note: Complete the upgrade and download procedures in the following order:

1. Upgrade the firmware from Version 3.x to Version 3.01.03.
2. Download the new default configuration settings to NVSRAM.
3. Upgrade the firmware from Version 3.01.03 to Version 4.01.00.x.

Attention: Do not use the SM7migrate software to upgrade firmware directly to Version 4.01.00.x from any version other than 3.01.03. Doing so could cause loss of communication with the storage subsystem controllers.

Attention: Use the SM7migrate program to upgrade the controller firmware only if both controllers are in an active state and that each controller owns at least one logical drive (LUN).

1. Stop all I/O to the storage subsystem to prevent application errors.
2. On the command line, type the following command and press Enter.

```
SM7migrate /usr/lib/raidfw/fw_03010301.dlp
```

Information about each storage subsystem that is attached to the host running SM7migrate is displayed. For example, you might see:

```
1) JASON_001:c1t2d0
2) JASON_001:c1t3d0
3) FRED_001:c1t4d0
4) FRED_001:c1t5d0
```

The first part of the displayed information refers to the storage subsystem name (JASON_001). The second part of the displayed information refers to the storage subsystem controller IDs (c1t2d0).

The following options are also displayed.

```
Make Selection: (A)ll Modules, E(x)it, or Module Index Number
```

3. Select an option and press Enter.

Attention: After the firmware is downloaded and the controllers are restarted, the WWN of each controller changes to avoid duplicating names. If your fibre-channel host adapter driver tracks controllers by port name or node name, the host might not be able to locate the controllers. Restart the host to restore the connection.

4. Remove any unnecessary files that are generated by the firmware migration by running the ClearLocks script located in the /opt/SM7migrate directory.
5. You are finished with this procedure. Continue with "Downloading new configuration settings to NVSRAM".

Downloading new configuration settings to NVSRAM

Use the following procedure to download new configuration settings to NVSRAM on a Solaris host. The installation CD provides a file of default settings that enable controller networking capabilities in a heterogeneous environment.

1. Stop all I/O to the storage subsystem to prevent application errors.
2. On the command line, type the following command and press Enter.

```
SM7migrate /usr/lib/raidfw/<filename>.d1p
```

where <filename> is the file you want to download.

Information about each storage subsystem that is attached to the host running the migrate utility is displayed. For example, you might see:

```
1) JASON_001:c1t2d0
2) JASON_001:c1t3d0
3) FRED_001:c1t4d0
4) FRED_001:c1t5d0
```

The first part of the displayed information refers to the storage subsystem name (JASON_001). The second part of the displayed information refers to the storage subsystem controller IDs (c1t2d0).

The following options are also displayed:

```
Make Selection: (A)ll Modules, E(x)it, or Module Index Number
```

3. Select an option and press Enter.
4. Use the hot_add utility to register the access logical drive dynamically without restarting the system.

From the command line, type hot_add and press Enter.

5. You are finished with this procedure. Continue with “Upgrading firmware from Version 3.01.03 to Version 4.01.00.x”.

Upgrading firmware from Version 3.01.03 to Version 4.01.00.x

Follow this procedure to upgrade the controller firmware from Version 3.01.03 to Version 4.01.

1. Stop all I/O to the storage subsystem to prevent application errors.
2. Check the *Product Release Notes* document to determine which file you should download.
3. On the command line, type the following command and press Enter.

```
SM7migrate /usr/lib/raidfw/fw_04010003.dlp
```

Information about each storage subsystem that is attached to the host running SM7migrate is displayed. For example, you might see:

```
1) JASON_001:c1t2d0
2) JASON_001:c1t3d0
3) FRED_001:c1t4d0
4) FRED_001:c1t5d0
```

The following options are also displayed.

```
Make Selection: (A)ll Modules, E(x)it, or Module Index Number
```

4. Select an option and press Enter.
5. Remove any unnecessary files that are generated by the firmware migration by running the ClearLocks script located in the /opt/SM7migrate directory.

Attention: If you are using IBM FASTT Storage Manager Version 7.10 to manage the storage subsystem in coexistence with one that is managed with IBM FASTT Storage Manager Version 6.22, manually edit the mnf. file in the IBM FASTT Storage Manager Version 6.22 installation directory. Remove any lines of text that refer to the storage subsystems that are managed with IBM FASTT Storage Manager Version 7.10. Alternatively, you can simply delete the mnf. file, and IBM FASTT Storage Manager Version 6.22 recreates it with references only to those subsystems which it manages.

6. Uninstall the migrate package by typing the following command and pressing Enter.

```
pkgrm SM7migrte
```

7. Go to “Chapter 7. Post-installation tasks” on page 41.

Upgrading IBM FASTT Storage Manager Version 7.10 for HP-UX

If you are upgrading from the IBM FASTT Storage Manager Version 7.0 to the IBM FASTT Storage Manager Version 7.10 on the HP-UX operating system, perform the following procedures to download controller Version 4.01.00.x firmware and upgrade the NVSRAM configuration settings.

Prerequisites

Before proceeding, make sure that you have:

- Installed the SM7client software. The SM7client software does not recognize any storage subsystems with controllers running Version 3.x firmware. (See “HP-UX – Installing the client software” on page 8 for more information.)
- Installed the SM7migrate software if you are upgrading firmware from Version 3.x to Version 4.x. (See “HP-UX – Installing and using the migrate utility” on page 19.)

Procedure

To start the upgrade procedure, continue with “Upgrading controller firmware from Version 4.00.02.x to Version 4.01.00.x”.

Note: Complete the procedures in the following order:

1. Upgrade the firmware from Version 4.00.02.x to Version 4.01.00.x.
2. Upgrade NVSRAM configuration settings.

Upgrading controller firmware from Version 4.00.02.x to Version 4.01.00.x

Follow this procedure to upgrade the software from Version 4.00.02.x to Version 4.01.00.x.

1. Record any mount point information about the storage subsystem. At the system prompt type bdf and press Enter.

A list of mount points is displayed including entries for your storage subsystem. For example, if you had logical drives named ar8, ar1, and ar2, you would see the following entries.

Filesystem	kbytes	used	avail	%used	Mounted on
/dev/vg08/lvo11	3080192	1856	2885947	0%	/ar8
/dev/vg01/lvo11	3080192	1856	2885947	0%	/ar1
/dev/vg02/lvo11	3080192	1856	2885947	0%	/ar2

2. Record information about the primary and secondary paths to the storage subsystem logical drives. At the system prompt type the following command and press Enter.

```
vgdisplay -v /dev/<vglabel>
```

where <vglabel> is the label name on the HP array.

Note: For an example showing where to find this information, see “Identifying the primary and secondary paths to the storage subsystem logical drives” on page 33.

3. Stop all I/O to the storage subsystem to prevent application errors.
4. Unmount the file system. Typing the following command and press Enter.

```
umount <mount point>
```

where <mount point> is the name of the file system on the UNIX system.

5. Deactivate the HP array. Type the following command and press Enter.

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

where <vglabel> is the label name on the HP array.

6. Export the HP array. Type the following command and press Enter.

```
vgexport -v <vglabel>
```

where <vglabel> is the label name on the HP array.

After successfully removing the HP array, the following message is displayed.

```
Array <name> has been successfully removed.
```

7. Repeat step 5 and step 6 for all HP arrays on the storage subsystem.
 8. On a storage management station, start the client software and select a storage subsystem.
 9. Click **Tools** → **Manage Device** to open the Subsystem Management window.
 10. In the Physical View window, highlight Controller A. Click **Controller** → **Properties**.
- The Controller Properties window opens.
11. Select the **Interfaces** tab. In the **Fibre channel host I/O interfaces** field, write down the number under the **Preferred ID** for each port. (See “Identifying the controller ID numbers” on page 33.)
 12. Repeat step 10 and step 11 for Controller B.
 13. Click **Storage Subsystem** → **Download** → **Firmware** to open the Firmware Download window.
 14. In the **File Selection** field, select the directory in which the file to download resides by either clicking on the folder to open it or by typing the folder name in the File name: text box. Then, select the file and click **OK**. In the following window, click **Yes** to continue or **No** to exit the download.

The file is downloaded to the storage subsystem.

Attention: If you are using a host-agent, you might get error 1005 after downloading firmware. Use the following procedure to recover from this error.

15. If you are not using a host-agent, go to step 16. If you are using a host-agent, complete the following procedure:
 - a. Close the storage management software.
 - b. Run the hot_add utility. Change to the /opt/SM7util directory and type hot_add.
 - c. Restart the agent software by typing the following command.

```
/sbin/init.d/SM7agent start
```

- d. Start the storage management software and reopen the Subsystem Management window.
16. Monitor the progress and completion status of the download.

When the firmware download is successfully completed, a window opens and a message is displayed stating that the firmware downloaded is not compatible with the current version of the Subsystem Management window that is running.

To load the version of the Subsystem Management Window that is compatible with this firmware download, close this window and select **Tools —> Manage Device**.

If there is a problem and the firmware file does not successfully download, read the information in the window and then run Recovery Guru to determine the next course of action.

17. Continue with “Upgrading NVSRAM configuration settings”.

Upgrading NVSRAM configuration settings

Use the following procedure to upgrade NVSRAM configuration settings on the controllers.

Attention: This procedure should only be performed after you have installed the IBM FAStT Storage Manager 7 Client package for the IBM FAStT Storage Manager Version 7.10 and have upgraded the controller firmware to Version 4.01.00.x.

1. On a storage management station, start the client software and select a storage subsystem.
2. Click **Tools —> Manage Device** to open the Subsystem Management window.
3. Click **Storage Subsystem —> Download —> NVSRAM** to open the Download NVSRAM window.
4. In the **File Selection** field, select the directory in which the file to download resides by either clicking on the folder to open it or by typing the folder name in the File name: text box. Select the file and then click **OK**.

The file is downloaded to the storage subsystem.

5. Monitor the progress and completion status of the download.

If there is a problem and the NVSRAM file does not successfully download, read the information in the window and then run Recovery Guru to determine the next course of action.

Attention: If you are using a host-agent, you might get error 1005 after downloading NVSRAM. Use the following procedure to recover from this error.

6. If you are not using a host-agent, go to step 7. If you are using a host-agent, complete the following procedure:
 - a. Close the storage management software.
 - b. Run the hot_add utility. Change to the /opt/SM7util directory and type hot_add.
 - c. Restart the agent software by typing the following command:

```
/sbin/init.d/SM7agent start
```

- d. Start the storage management software and reopen the Subsystem Management window.

Attention: You must set the host type before restarting the host. If the host type is not set, the connection to the storage subsystem might be lost.

7. If storage partitioning is not enabled, follow this procedure to change the host type of the storage subsystem:
 - a. Click **Configure —> Change Storage Subsystem Host Type**.
 - b. Select the correct host type.
 - c. Click **OK** to save the changes.
 - d. Close the Mappings window.
8. If storage partitioning is enabled, follow this procedure to change the individual host types of the host ports:

- a. Click **Configure** → **Storage Partitioning** to open the Mappings window.
 - b. Select a host port in the left pane of the window and click **Configure** → **Topology** → **Change Host Type** from the pull-down menu or right-click the host port and select **Change Host Type**.
 - c. Select the correct host type.
 - d. Click **OK** to save the changes.
 - e. Repeat step 8b through step 8d for each host port that is shown in the Mappings window.
 - f. Close the Mappings window.
9. In the Physical View window, highlight Controller A and click **Controller** → **Properties**.
The Controller Properties window opens.
 10. Select the **Interfaces** tab. In the **Fibre Channel Host I/O Interfaces** field, verify that the settings match those that you wrote down in step 11 on page 28. If the settings do not match, do the following:
Attention: After changing the settings on the **Interfaces** tab, a window opens and a message is displayed, stating that the controller must be turned off and then back on. Do not cycle the power until after you have changed all the numbers on both controllers.
 - a. Select a port in the **Fibre-Channel Host I/O Interfaces** field of the **Interfaces** tab.
 - b. Select **Change Preferred ID**.
The Change Preferred ID window opens.
 - c. Change the number to match the value that you wrote down. (For example, if the value you recorded was 1/0xE8, then select 1 in the Normal box.)
 - d. Repeat step 10a through step 10c for each port.
 - e. Click **Close** to exit the Controller Properties window.
 11. Repeat step 10 for the second controller.
 12. Turn off the power to both controllers, then turn the power back on for the new settings to take effect.
Attention: You must restart the host for the changes in the NVSRAM to take effect.
 13. Restart the host.
 14. Run the **ioscan** command to find the newly-created device node numbers. Type the following command and press Enter.

```
ioscan -f
```

Record the external bus numbers (refer to Figure 3 on page 35).

15. Type `insf -e` and press Enter to generate the device nodes.
16. Make a directory to store HP array information. Type the following command and press Enter.

```
mkdir /dev/<vglabel>
```

where <vglabel> is the name of the HP array.

17. Change to that directory. Type the following command and press Enter.

```
cd /dev/<vglabel>
```

where <vglabel> is the name of the HP array.

18. Create the definition for the HP array. Type the following command and press Enter.

```
mkknod /dev/<vglabel>/group c 64 0xZZ0000
```

where <vglabel> is the name of the HP array and ZZ is the unique identifier for that HP array.

19. Import the HP array. Type the following command and press Enter.

```
vgimport -v /dev/<vglabel> /dev/dsk/<devicenode  
for primary path> /dev/dsk/<device node for secondary path>
```

where <vglabel> is the name of the HP array, <device node for primary path> and <device node for secondary path> are the device node numbers from the ioscan.

20. Activate the HP array. Type the following command and press Enter.

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

where <vglabel> is the name of the HP array.

21. Remount the file system. Type the following command and press Enter.

```
mount <filesystem label> <mount point>
```

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

22. Repeat step 16 on page 30 through step 21 for each HP array.

23. Continue with “Modifying configuration settings in NVSRAM”.

Modifying configuration settings in NVSRAM

You might need to run scripts to modify the default configuration settings that are stored in NVSRAM on each storage subsystem to meet the needs of your specific configuration (for example: turning off auto-volume transfer, or disabling failover).

Use the following procedure to modify the appropriate configuration settings and to complete the firmware download process.

1. Insert the installation CD in the CD-ROM driver of the storage management station.
2. Highlight a storage subsystem in the Enterprise Management Window and click **Tools → Execute Script**.
3. Load and run the desired scripts, using the following procedure. (See the *Product Release Notes* document for more information about the available modification scripts.)
 - a. Click **File → Load Script**.

The Load Script window opens.

- b. Select the appropriate script from the \Scripts directory on the CD.
- c. Click **Open** to load the script.
- d. Click **Tools** → **Execute Only**.

Wait until the Script Execution Complete message is displayed.

- e. Repeat steps 3a on page 31 through 3d to run other scripts as necessary.
4. Restart the host for all changes to take effect.
5. You are finished with this procedure.

Chapter 5. Specific information for HP-UX operating systems

Identifying the primary and secondary paths to the storage subsystem logical drives

After the operating system device names are found, the names must be correlated to their primary and secondary paths to the logical drives.

To view the arrays and their associated information, type the following command and press Enter.

```
vgdisplay -v /dev/<vglabel>
```

where <vglabel> is the name of the HP array.

The identification information for that device is displayed by the utility. Figure 1 shows the information that you need to record:

```
--- Logical volumes ---
LV Name                /dev/vg08/lvo11
LV Status              available/syncd
LV Size (Mbytes)      3008
Current LE            47
Allocated PE          47
Used PV               1

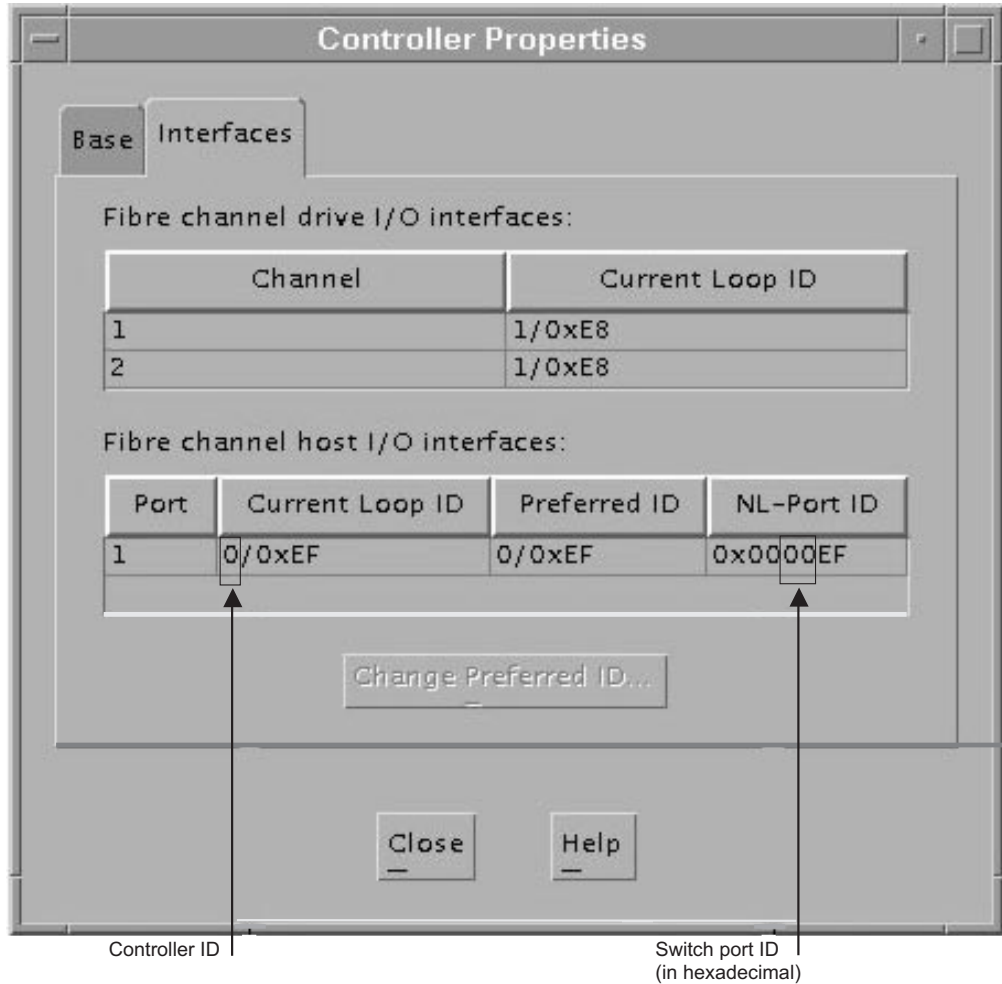
--- Physical volumes ---
PV Name                /dev/dsk/c4t2d0
PV Name                /dev/dsk/c5t3d0
PV Status              available
Total PE              63
Free PE               16
```

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Figure 1. Array path information

Identifying the controller ID numbers

1. Select a controller in the Physical View of the Subsystem Management window.
2. Click **Controller** → **Properties** → **Interfaces**. The Controller Properties window opens, as shown in Figure 2 on page 34.



BT000102

Figure 2. Controller Properties window

3. The first number in the **Current Loop ID** field is the controller ID. The ID can be one or two digits. For hubs and directly-connected subsystems, the controller ID number and the switch port ID can be found in the same window by converting the middle hexadecimal number to a decimal number.
4. Determine the entries for the logical drives using the controller ID and LUN number that was previously identified. Find the ext_bus row above the logical drive listing and note the bus number in the I column.

Identifying device names and bus numbers

Use the `ioscan` utility to determine the full device names of data logical drives in the storage subsystem. This information allows you to determine the host adapter external bus numbers and the controller IDs of the controllers that the host adapters are connected to.

1. To view the operating system list of devices, type the following command and press Enter.

```
ioscan -f
```

2. The identification information for every device is displayed. See Figure 3 .

Class	I	H/W Path	Driver	S/W State	H/W Type	Description
bc	0		root	CLAIMED	BUS_NEXUS	
bc	1	8	ccio	CLAIMED	BUS_NEXUS	I/O Adapter
fc	0	8/12	fcT1	CLAIMED	INTERFACE	HP Fibre Channel
Stora						
lan						
Storage Cntl				CLAIMED	INTERFACE	HP Fibre Channel
fc	0	8/12.8	fc		INTERFACE	FCP Protocol Adapter
ext_bus	2	8/12.8.0.2	fcpdev	CLAIMED	INTERFACE	FCP Device Interface
target	39	8/12.8.0.2.0.0	tgt	CLAIMED	DEVICE	
disk	130	8/12.8.0.2.0.0.0	sdis		DEVICE	LSI INF-01-00
disk	35	8/12.8.0.2.0.0.7	sdisk	CLAIMED	DEVICE	LSI Universal Xport
target	39	8/12.8.0.2.0.1	tgt	CLAIMED	DEVICE	
disk	131	8/12.8.0.2.0.1.0	sdisk	CLAIMED	DEVICE	LSI INF-01-00

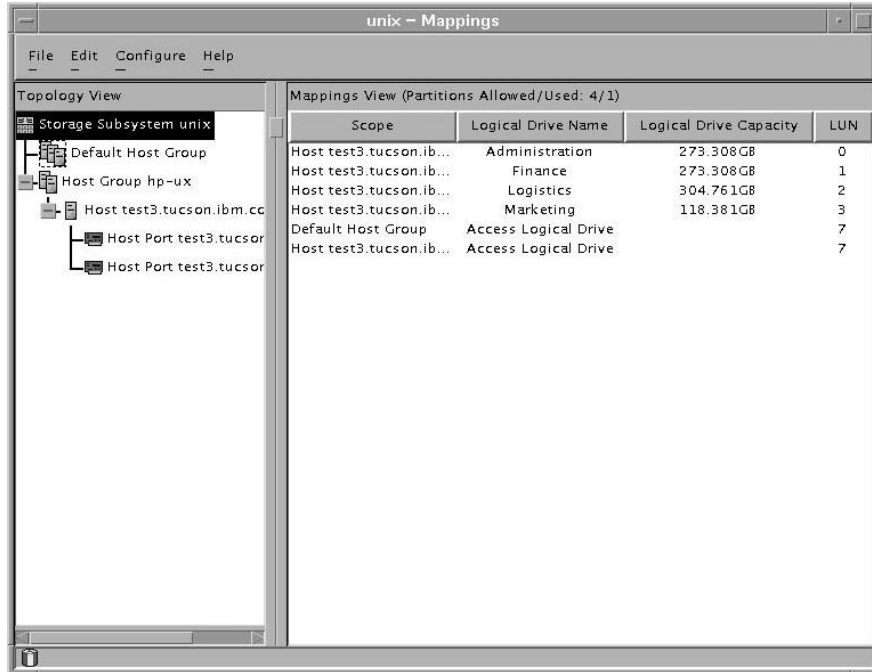
Annotations in the table:

- External bus number of the host adapter: points to the 'I' column value '2' for the 'ext_bus' row.
- Controller ID number: points to the 'H/W Path' column value '8/12.8.0.2' for the 'ext_bus' row.
- Target address: points to the 'H/W Path' column value '8/12.8.0.2.0.0' for the 'target' row.
- LUN number: points to the 'H/W Path' column value '8/12.8.0.2.0.0.0' for the 'disk' row.
- Switch port ID number: points to the 'H/W Path' column value '8/12.8.0.2.0.1.0' for the 'disk' row.

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Figure 3. Device identification information

- Examine the information. You can determine the device name for a given disk by combining the external bus number, the target address, and the LUN number. For example, the device name for disk 130 would be c2t0d0 as shown in Figure 3. LUN numbers range from 0 - 7 and target addresses range from 0 - 3.
- For each storage subsystem, use the Mappings window (see Figure 4 on page 36). Click **Subsystem Management** → **Configure** → **View Logical Drive to LUN Mappings**.
 - Select the storage subsystem node in the Topology View to see a list of all logical drives in the Mappings View.
 - Use the LUN numbers in the Mappings View to associate the logical drives with their device names.



BT000103

Figure 4. Mappings window

Identifying logical drives by operating system device names

Figure 5 on page 37 presents the view of the logical drives as seen through a host with two host bus adapters, required for the access vector table. This view, as seen in SM7devices, shows each logical drive twice, once on its primary path and once on its alternate path.

Each logical drive is recognized by the operating system as one drive. The device name for a logical drive usually indicates the path to the specific logical drive.

If the logical drive ownership is transferred between controllers, the device name is updated.

There are four pieces of information that are required to identify the HP-UX device name and controller ID number for each logical drive in each storage subsystem:

- The LUN number that is used to access the logical drive.
- The controller ID number (either a SCSI ID or the fibre-channel loop ID of the controller port that is associated with the host interface).
- The target address.
- The external bus number of the host adapter that is connected to the controller.

HP-UX device names are presented in the following format: c<x>t<y>d<z> where:

<x>

Represents the external bus number of the host adapter that is connected to the controller

<y>
Represents the target address

<z>
Represents the LUN number

For example, c6t0d0. See Figure 5 for examples of device names.

Notice the correlation between characters 12 - 16 in the world-wide name (WWN) of a logical drive and characters 12 - 16 in the WWN of the access logical drive. Where they match indicates the primary path.

The corresponding device name for the same LUN that is grouped under the other controller indicates the alternate path.

When building arrays on the host, the array has to be created using the primary path and then extended with the alternate path. Running the **vgdisplay** command with the -v option shows the primary and alternate paths.

```
IBM FASTT Storage Manager 7 Devices, Version 07.10.G5.00
Built Thu Feb 22 15:07:38 CST 2001
Copyright (C) IBM Corp 2001. All rights reserved.

/dev/rdisk/c13t0d0 [Storage Subsystem unix, Logical Drive Administration, LUN 0,
Logical Drive WWN <600a0b80000b11f6000000b43ad43902>]
/dev/rdisk/c6t0d0 [Storage Subsystem unix, Logical Drive Administration, LUN 0,
Logical Drive WWN <600a0b80000b11f6000000b43ad43902>]
/dev/rdisk/c6t0d7 [Storage Subsystem unix, Logical Drive Access volume, LUN 7,
Logical Drive WWN <600a0b80000b11f6000000b700000000>]
/dev/rdisk/c6t0d1 [Storage Subsystem unix, Logical Drive Finance, LUN 1,
Logical Drive WWN <600a0b8000075720000000703ad43904>]
/dev/rdisk/c6t0d2 [Storage Subsystem unix, Logical Drive Logistics, LUN 2,
Logical Drive WWN <600a0b80000b11f6000000b63ad43970>]
/dev/rdisk/c6t0d3 [Storage Subsystem unix, Logical Drive Marketing, LUN 3,
Logical Drive WWN <600a0b8000075720000000723ad43969>]
/dev/rdisk/c13t0d1 [Storage Subsystem unix, Logical Drive Finance, LUN 1,
Logical Drive WWN <600a0b8000075720000000703ad43904>]
/dev/rdisk/c13t0d2 [Storage Subsystem unix, Logical Drive Logistics, LUN 2,
Logical Drive WWN <600a0b80000b11f6000000b63ad43970>]
/dev/rdisk/c13t0d3 [Storage Subsystem unix, Logical Drive Marketing, LUN 3,
Logical Drive WWN <600a0b8000075720000000723ad43969>]
/dev/rdisk/c13t0d7 [Storage Subsystem unix, Logical Drive Access volume, LUN 7,
Logical Drive WWN <600a0b80000757200000007300000000>]
```

Figure 5. Device names

For additional information, refer to the man pages for each script that is installed with the RDAC.

Failover delay settings for JNI cards

Select one of the following options to set the failover delay.

- If FCE-1063 cards are installed, the `/kernel/fca-pci.conf` file must be modified. The Failover Delay variable must be uncommented and the variable set by typing the following command:

```
failoverDelay=30
```

- If FCI-1063 cards are installed, the `/kernel/drv/fca-pci.conf` file must be modified. The failover variable must be uncommented and the variable set by typing the following command:

```
failoverDelay=30
```

- If FC64-1063 cards are installed, the `/kernel/drv/fcaw.conf` file must be modified. The failover variable must be uncommented and the variable set by typing the following command:

```
failoverDelay=30
```

Importance of setting the host type on Solaris

After you install the IBM FASTT Storage Manager software, you must set the host type to Solaris for the operating system to work properly with the storage subsystem. This should have been done automatically, but should also be verified.

Select one of the following options:

- If partitioning is not enabled: In the Subsystem Management window click **Configure** → **Change Storage Subsystem Host Type** and ensure that the host type is set to Solaris (Sparc).
- If partitioning is enabled: In the Subsystem Management window click **Configure** → **View Logical Drive-To-LUN Mappings**.

In the Mappings window:

1. Create a new host group.
2. Add the host to the newly created host group.
3. Add each port to the host and ensure that the host type is set to Solaris (Sparc).

Chapter 7. Post-installation tasks

Failover protection

Failover protection is available by using multipath drivers with or without auto-volume transfer (AVT) in conjunction with your storage management software. A multipath driver is an I/O path failover driver that is installed on host computers that access the storage subsystem. AVT is a built-in feature of the controller firmware that allows logical drive-level failover rather than controller-level failover. The following failover settings are available:

- Multipath driver software on the host or hosts and AVT enabled on the storage subsystem
- Multipath driver software on the host or hosts and AVT disabled on the storage subsystem
- No multipath driver software on the host or hosts and AVT enabled on the storage subsystem (no failover)

Before using the storage management software for the first time, be aware of the failover options that are available for each operating system.

Table 1 shows the failover options that are supported by each operating system.

Table 1. Failover options by operating system

Operating system	Multipath driver name	Supported failover options		
		Multipath driver with AVT enabled	Multipath driver with AVT disabled	No multipath driver with AVT enabled
Solaris	FAStT Storage Manager RDAC	X (See Note.)	X	
HP-UX	HP Logical Volume Manager (LVM)	X		

Note: Disable AVT if a large number of logical drives in a Solaris-only environment causes long start-up times.

Multipath driver with AVT enabled

In this scenario, a pair of active controllers is located in a storage subsystem. When you create a logical drive, you assign a controller to own the logical drive (called the preferred controller) and to control the I/O between the logical drive and the application host along the I/O path. The preferred controller normally receives the I/O requests to the logical drive. But, if a problem along the data path (like a component failure) causes an I/O to fail, the multipath driver issues the I/O to the alternate controller.

When AVT is enabled and used in conjunction with a host multipath driver, it ensures that an I/O data path is available for the storage subsystem logical drives. The AVT feature changes the ownership of the logical drive that is receiving the I/O to the alternate controller. After the I/O data path problem is corrected, the preferred controller reestablishes ownership of the logical drive as soon as the multipath driver detects that the path is working again.

Attention: AVT is enabled on the storage subsystem, so its setting applies for every host that connects to the storage subsystem. Keep this in mind if you are using heterogeneous hosts with your storage subsystem. (Hosts in a heterogeneous environment should not share logical drives.) For more information about heterogeneous hosts, see *Understanding IBM FAStT Storage Manager Concepts Guide for Version 7.10*.

No multipath driver with AVT enabled

In this scenario, storage subsystems have no failover protection. A pair of active controllers might still be located in a storage subsystem and each logical drive on the storage subsystem might be assigned a preferred controller. However, logical drives do not move to the alternate controller because there is no multipath driver installed. When a component in the I/O path fails, such as a cable or the controller itself, I/O cannot get through to the storage subsystem. The component failure must be corrected before I/O can resume. (Switching logical drives to the alternate controller in the pair must be done manually.)

Hosts that are using operating systems without failover capability should be connected to the storage subsystem so that each host adapter has only one path to the controller. For a cabling diagram, see the *Controller Enclosure and Drive Enclosure Installation Guide*.

With no multipath driver and AVT enabled, you do not have multiple host bus adapters in the host server. AVT in this instance is something that could be enabled or disabled on the storage subsystem. You would disable AVT if you only had one controller. See the SM7client online help for additional information.

Disabling AVT

On a new storage subsystem, AVT is enabled by default. Use the following procedure to disable AVT:

1. Insert the installation CD in the storage management station CD-ROM drive.
2. Start the storage management software.
3. In the Enterprise Management window, highlight the storage subsystem on which you want to disable AVT.
4. Click **Tools** → **Execute Script**.
The Script Editor window opens.
5. Click **File** → **Load Script**.
The Load Script window opens.
6. Select `avtdisable.scr` from the `\scripts` directory on the CD.
7. Click **Open** to load the script.
8. Click **Tools** → **Execute Only**.
The script runs. A Script Execution Complete message is displayed when the script is complete.
9. Turn off the power to the controllers, then turn the power back on.
10. Go to “Changing the host type” on page 43.

Attention: If you have defined a host array in which more than one host is concurrently accessing the same array on a storage subsystem, you might want to disable AVT. If AVT remains enabled in this situation, the storage subsystem still functions, but if path failover occurs there are undesirable effects on performance.

For example, say two hosts share access to a logical drive. If one of the hosts experiences a path failure, the controller ownership of the logical drive switches from the original controller owner to the second controller in the pair. Meanwhile, the second host continues to send I/O to the original controller owner, unaware of the path problem that the other host is experiencing. If the I/O path problem (experienced by the first host) is not related to the controller itself and the I/O reaches the storage subsystem, controller ownership transfers back to the original controller owner. As long as there is a path problem, the hosts continue to transfer controller ownership back and forth with every I/O sent, significantly degrading storage subsystem performance.

Enabling AVT

If AVT has been disabled on a storage subsystem, use the following procedure to enable it.

Attention: Refer to Table 1 on page 41 before enabling AVT on a storage subsystem.

1. Insert the installation CD in the storage management station CD-ROM drive.
2. Start the storage management software.
3. In the Enterprise Management window, highlight the storage subsystem on which you want to enable AVT.
4. Click **Tools** → **Execute Script**.
The Script Editor window opens.
5. Click **File** → **Load Script**.
The Load Script window opens.
6. Select `avtenable.scr` from the `\scripts` directory on the CD.
7. Click **Open** to load the script.
8. Click **Tools** → **Execute Only**.
The script runs. A Script Execution Complete message is displayed when the script is complete.
9. Turn off the power to the controllers, then turn the power back on.
10. Continue with “Changing the host type”.

Changing the host type

The host type defines how the controllers in the storage subsystem work with the particular operating system on the hosts that are connected to it.

When using the storage management software, you must set the correct host type by clicking **Configure** → **Change Storage Subsystem Host Type** in the Subsystem Management window.

If partitioning is enabled, click **Configure** → **View Logical Drive-to-LUN Mappings**. Select the desired host port in the left window and click **Configure** → **Topology** → **Change Host Type**.

For more information, see Changing a Storage Subsystem's Host Type in the Subsystem Management window online help.

If the operating system on your host is HP-UX, see the procedures in the *Product Release Notes for FASiT Storage Manager 7.10*. If the Storage Partitioning feature is enabled, you must change the host type that is associated with each host port in the Mappings window. (For more information, see Changing an Individual Host Port's Host Type in the Subsystem Management window online help.)

When you have selected the host type, continue with "Configuring the storage subsystems".

Configuring the storage subsystems

Use the following procedures to start the client software from either the storage management station or from a host that is acting as a storage management station (a host with the client software installed). Use the client software to configure each attached storage subsystem.

Attention: For cluster configurations, complete all applicable configuration procedures for each storage subsystem *before* installing the storage management software on a second host or cluster server.

Starting the Enterprise Management window

Use this procedure to start the Enterprise Management window from the storage management station where you have installed the client software.

1. If running the client software from Windows, click **Start** → **Programs** → **FASiT Storage Manager 7 Client**; or type `SM7client` at a shell prompt.

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 window opens (see Figure 6 on page 45).

Note: The Enterprise Management window can take several minutes to open. No wait cursor, such as an hourglass, is displayed.



BT000104

Figure 6. Initial Automatic Discovery window

2. Click **Yes** to begin an initial automatic discovery of all attached hosts and storage subsystems that are attached.

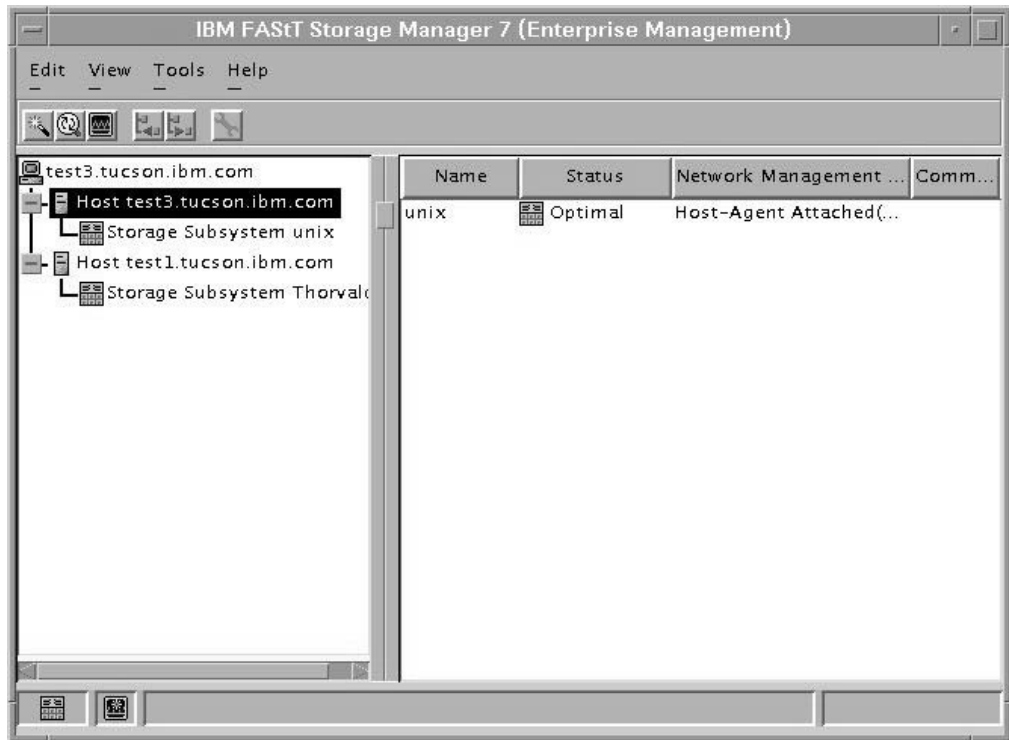
The software sends a broadcast message across the local subnetwork that is connected to the storage management station. It discovers host-agent managed storage subsystems if the respective hosts respond to the broadcast. The software discovers directly-managed storage subsystems if the controllers in the attached storage subsystems respond to the broadcast message.

It can take up to one 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 complete, all attached hosts and attached storage subsystems are displayed in the Enterprise Management window (see Figure 7 on page 46).

3. Make sure that all attached hosts and storage subsystems are displayed as expected. If not, do the following:
 - a. Check the hardware and connections for possible problems (see the hardware documentation for specific procedures).
 - b. See the Enterprise Management window help topic on discovering storage subsystems and take the appropriate action that is indicated.
 - c. Make sure that the device is on the local subnetwork. If it is not, use the Add Device option to add it. See the Enterprise Management window help topic on adding devices.
 - d. If a storage subsystem is duplicated in the device tree after an automatic discovery, remove the duplicate storage subsystem icon from the device tree using the Remove Device option in the Enterprise Management window.
4. Make sure that the status of each storage subsystem is Optimal.

- If any device shows a status of Unresponsive, remove the device from the management domain and then add it again. See the Enterprise Management window help topic on removing and adding devices.
 - If the device still shows an unresponsive status, contact your customer service representative.
5. Continue with “Configuring alert notifications”.



BT000105

Figure 7. The Enterprise Management window

Configuring alert notifications

After you have added devices to the management domain, it is recommended that you set up alert notification options to report critical events on the storage subsystems. The following alert notification options are available:

- Alert notifications are sent to a designated network management station (NMS) using simple network management protocol (SNMP) traps.
- Alert notifications are sent to a designated e-mail address. See the Enterprise Management window help for specific procedures. To send e-mail to IBM, contact your customer service representative.
- Alert notifications are sent to a designated alphanumeric pager when third-party software is used to convert e-mail messages. See the Enterprise Management window help for specific procedures.

For more information about notification options, see *Understanding IBM FAST Storage Manager Concepts Guide for Version 7.10*.

Setting up the NMS for SNMP notification

To set up alert notifications using SNMP traps, first copy a management information base (MIB) file to the designated NMS. Use the following procedure to set up the MIB on the storage management station. You only need to set up the designated management station once.

1. Make sure that the installation CD is inserted in the CD-ROM drive on your designated NMS.
2. From the installation CD, copy the SM7_10.MIB file from the SM7mib directory to the NMS.
3. Follow the steps required by your NMS to compile the MIB. For details, contact your network administrator or see the documentation that is specific to the storage management product that you are using.
4. Continue with “Starting the Subsystem Management window”.

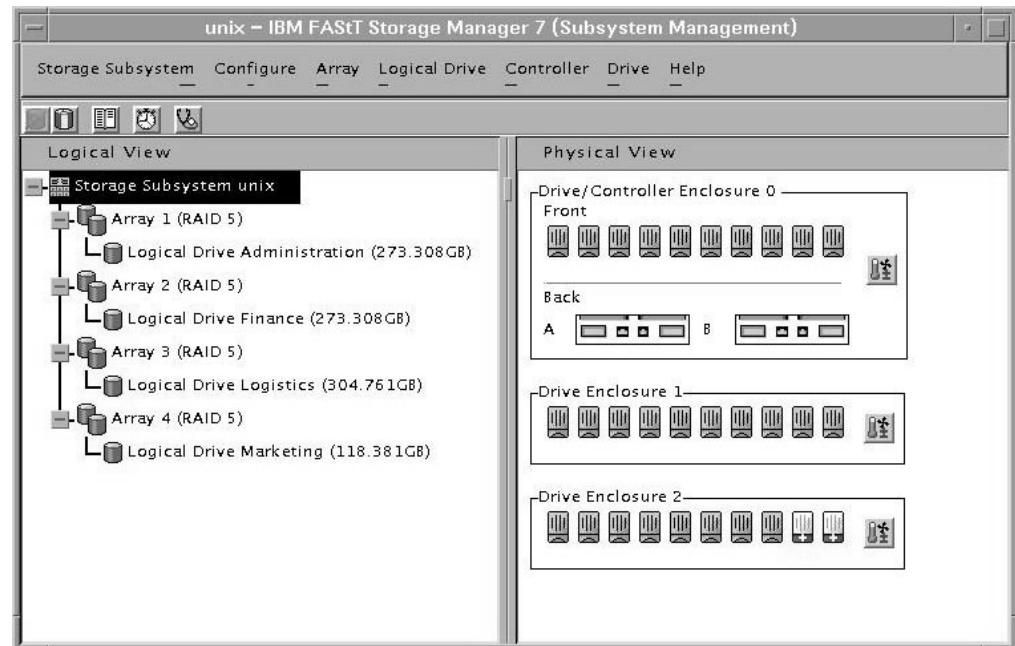
Starting the Subsystem Management window

Use this procedure to start a Subsystem Management window for a selected storage subsystem.

1. In the Enterprise Management window, select a storage subsystem.
2. Click **Tools** → **Manage Device**, or right-click the storage subsystem and choose **Manage Device**, or double-click the storage system.

The Subsystem Management window for the selected storage subsystem opens (see Figure 8).

Note: You can manage only the storage subsystem that you selected in the Subsystem Management window. However, you can open multiple Subsystem Management windows to manage other storage subsystems.



BT000106

Figure 8. Subsystem Management window

Renaming storage subsystems

When you start the storage management software for the first time, the storage subsystems are unnamed. Use the following procedure to rename the storage subsystems:

1. In the Subsystem Management window, rename each storage subsystem from <unnamed> to the name that you want, using the names that you entered in the information record from the *IBM FAStT Storage Manager Planning Guide*.
Click **Subsystem Management** → **Storage Subsystem** → **Rename**. For more information, see the topic on renaming storage subsystems in the Subsystem Management window help.
2. Continue with “Performing optional subsystem management tasks”.

Performing optional subsystem management tasks

Optionally, you can perform other subsystem management tasks at this time. To perform the following tasks and other storage subsystem management tasks, see the appropriate topics in the Subsystem Management window help.

- Locate a storage subsystem
- View a storage subsystem profile
- Configure a storage subsystem password
- Create and manage arrays and array groups
- Use the performance monitor
- Create storage partitions (if applicable)

See your selection in Task 4 on the Host Installation Profile. If you are installing the storage management software in a cluster environment, repeat all applicable client software installation procedures for a second storage management station and for all applicable host software on a second host. See “Chapter 2. Installing Storage Management station software” on page 5 for installation instructions.

Setting the IBM SAN Fibre Channel Switch 2109

This section contains information about setting the IBM SAN Fibre-Channel Switch 2109 to work correctly with the IBM FAStT Storage Manager and applies to both HP-UX and Solaris operating systems.

The primary references for configuring the IBM SAN Fibre-Channel Switch 2109 Model S16 are the *IBM SAN Fibre Channel Switch 2109 Model S16 Installation and Service Guide*, SC26-7352 and the *IBM SAN Fibre Channel Switch 2109 Model S16 User's Guide*, SC26-7351.

It is important to remember the following items when configuring the settings on the fibre-channel switch.

- Ensure that the switch is set with an IP address. The IP address can either be set using the Ethernet port of the switch or on the front panel of the switch. Steps to accomplish this are fully detailed in the *IBM SAN Fibre Channel Switch 2109 Model S16 User's Guide*, SC26-7351.
- It is essential that the Java Runtime Environment (JRE) is installed on the server or workstation that will be used to manage the switch.
- Zoning must be used to set up a SAN with heterogeneous hosts. In setting up the zone, members must be specified using the port name rather than the world-wide name. This is important because the world-wide name is subject to change on a host restart.

Chapter 8. IBM FAST Storage Manager with high availability cluster services

A high availability clustering system allows application services to continue when a hardware or software failure occurs. This system protects you from software failures as well as from the failure of a CPU, disk, or LAN component. If a component fails, the redundant component takes over cluster services and coordinates the transfer between components.

General information

The IBM FAST Storage Manager Version 7.10 is certified for use with MC/Service Guard releases A.11.09 and A.11.12 on HP-UX systems and Veritas Cluster Server 1.3 on Solaris systems.

It is beyond the scope of this document to detail the installation and setup of cluster services. See the installation and setup guides furnished with the respective products as well as the most current release notes.

Prerequisites for HP-UX

There are numerous configurations that can be used to set up clustering on an HP-UX system. A minimum configuration consists of two servers configured with both a primary and standby LAN and one server for the data or heartbeat LAN.

Fibre connections to the storage subsystem should be through dual switches that provide the necessary redundant data path for the hosts. Each server should have dual HP Tachyon A5158A host bus adapters.

Prerequisites for Solaris and Veritas Cluster Server 1.3

The following sections contain general hardware requirements and additional information about the cluster services.

General hardware requirements

Each system in the cluster should have the following hardware:

- At least three Ethernet ports. One port is used for the heartbeat 1 connection, one port is used for the heartbeat 2 connection, and one port is used for the public network connection.
- Two fibre host bus adapters for connection to the storage subsystem.
- A SCSI connection for operating system disks.
- Each Veritas Cluster Server system requires at least 128 MB of RAM and 35 MB of free disk space.

Additional information

An important concept when setting up cluster services is to eliminate single points of failure as much as possible. A single point of failure makes a cluster only as strong as its weakest component. The storage subsystem should be set up for shared storage, for example, all the nodes in the cluster have to recognize the same storage and ensure that the host types are set correctly.

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Glossary

This glossary includes terms for the IBM FAST Storage Manager Version 7.10 for HP-UX and Solaris.

agent. A server program that receives virtual connections from the network manager (the client program) in an SNMP-TCP/IP network managing environment. The interface to a managed device.

auto-volume transfer (ATV). Provides automatic failover in case of controller failure on a storage subsystem.

AVT. See auto-volume transfer.

bootstrap protocol (BOOTP). A TCP/IP protocol used by a diskless workstation or network computer to obtain its IP address and other network information such as server address and default gateway. Upon startup, the client station sends out a BOOTP request in a UDP packet to the BOOTP server, which returns the required information. Unlike RARP, which uses only the layer 2 (Ethernet) frame for transport, the BOOTP request and response use an IP broadcast function that can send messages before a specific IP address is known.

BOOTP. See *bootstrap protocol*.

client. A computer system or process that requests a service of another computer system or process that is typically referred to as a server. Multiple clients can share access to a common server.

internet protocol (IP). In the Internet suite of protocols, a connectionless protocol that routes data through a network or interconnected networks and acts as an intermediary between the higher protocol layers and the physical network.

IP. See *internet protocol*.

JRE. Java runtime environment.

LUN. Logical unit number

man pages. Manual pages. UNIX command. To find out more information about commands, for example, the **ls** command, enter **man ls**.

management information base (MIB). The information that is on an agent. It is an abstraction of configuration and status information.

MIB. See *management information base*.

NMS. Network management station.

NVSRAM. Nonvolatile storage random access memory.

PDF. Portable document format.

RDAC. See *redundant dual active controller*.

redundant dual active controller (RDAC). Provides a multipath driver for a storage subsystem. Used with Sun Solaris.

router. A computer algorithm that determines the path of least resistance for traffic on a computer network.

SAN. See *storage area network*.

storage area network (SAN). Dedicated, high-speed networks of directly connected storage elements designed to move large amounts of data between host-independent distributed storage devices.

server. A functional hardware and software unit that delivers shared resources to workstation client units on a computer network.

simple network management protocol (SNMP). A TCP/IP protocol that generally uses the user datagram protocol (UDP) to exchange messages between a management information base and a management client residing on a network. Because SNMP does not rely on the underlying communication protocols, it can be made available over other protocols, such as UDP/IP. In the Internet suite of protocols, a network management protocol that is used to monitor routers and attached networks. SNMP is an application layer protocol. Information on devices that are managed is defined and stored in the application's management information base (MIB).

SNMP. See *simple network management protocol* and *SNMPv1*.

SNMPv1. The original standard for SNMP is now referred to as SNMPv1.

subnet. A part of a network that is identified by a portion of an IP address.

TCP. A communications protocol used in the Internet and in any network that follows the Internet Engineering Task Force (IETF) standards for internetwork protocol. TCP provides a reliable host-to-host protocol between hosts in packed-switched communications networks and in interconnected systems of such networks. It uses the Internet Protocol (IP) as the underlying protocol.

TCP/IP. See *transmission control protocol/internet protocol*.

transmission control protocol/internet protocol (TCP/IP). A set of communication protocols that support peer-to-peer connectivity functions for both local and wide-area networks.

trap. A mechanism for SNMP agents to notify the SNMP management station of significant events.

world-wide name (WWN). A unique identifier for a switch on local and global networks.

WWN. See *world-wide name*.

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Installation and Support Guide

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