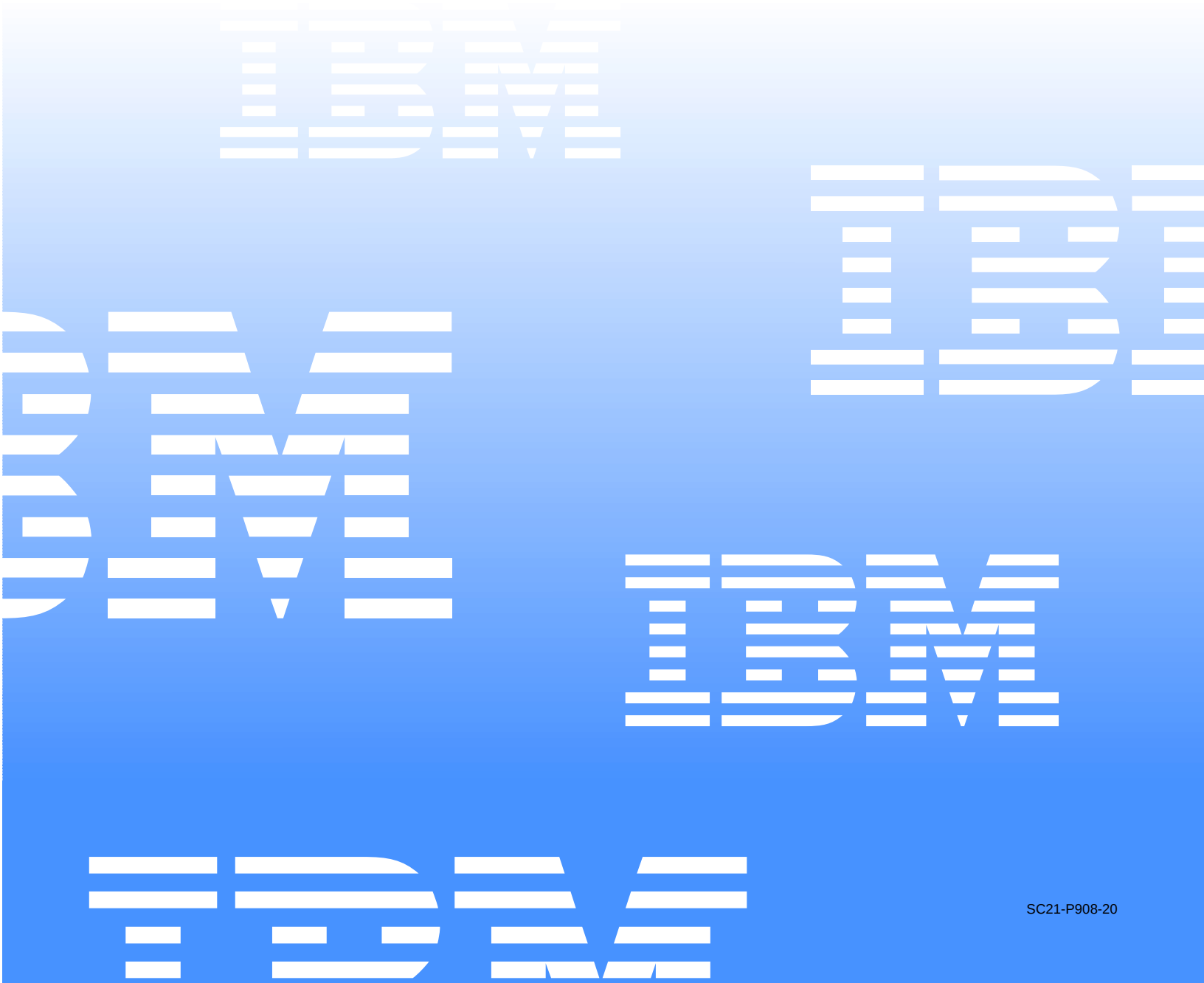
IBM® FAStT Storage Manager Version
7.02 for Novell NetWare

Installation and Support Guide



SC21-P908-20

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NOTE

Before using this information and the product it supports, be sure to read the general information in Appendix B, “Notices,” on page 49.

First Edition (January 2001)

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Preface

About this book

This book provides information about setting up, installing, configuring, and working with IBM® FAStT Storage Manager Version 7.02 in a Novell NetWare operating system environment. This *Installation and Support Guide* is for system administrators. Use this guide to:

- Determine the hardware and software that are 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 NetWare.

How this book is organized

Chapter 1, “Introduction,” on page 1 provides an overview of IBM FAStT Storage Manager Version 7.02 and describes storage-subsystem management methods, configuration types, types of installations, and installation requirements.

Chapter 2, “Preparing for installation,” on page 13 discusses preparing for a network installation, including setting up a Microsoft® DHCP server or a UNIX BOOTP server, and describes other setup tasks.

Chapter 3, “Installing software in a standard configuration,” on page 27 describes the procedure for installing the software in a standard environment.

Chapter 4, “Completing the installation,” on page 33 describes Enterprise Management and Subsystem Management, changing NVSRAM configuration settings, and completing the installation tasks.

Chapter 5, “Operating system support,” on page 41 contains information that is related to operating the storage-management software with Novell NetWare.

Appendix A, “Storage subsystem/controller information record,” on page 47 provides a data sheet that you can copy and use to record information about your hardware devices.

Appendix B, “Notices,” on page 49 provides product notices and trademark information.

Notices used in this book

This book contains notices to highlight information or provide safety information:

- **Notes**

  These notices provide important tips, guidance, or advice.

- **Important**

  These notices provide information that might help you avoid inconvenient or problem situations.

- **Attention**

  These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.

- **Caution**

  These notices indicate situations that can be potentially hazardous to you. A caution notice is placed just before a description of a potentially hazardous procedure step or situation.

Related publications

The following publications are available in Adobe Acrobat Portable Document Format (PDF) on the IBM FAStT Storage Manager CD and on the World Wide Web at http://www.ibm.com/pc/support/.

Note: The items that are denoted by an asterisk (*) in the list are publications that are printed and come with the IBM FAStT200 and FAStT200 High Availability (HA) Storage Servers.

- *IBM FAStT Storage Manager Version 7.02 for Novell NetWare Installation and Support Guide (this book)*
- *IBM Netfinity FAStT Storage Manager Version 7.02 for Windows 2000 Installation and Support Guide*
- *IBM Netfinity FAStT Storage Manager Version 7.02 for Windows NT Installation and Support Guide*
- *IBM Netfinity FAStT Host Adapter Installation and User's Handbook*
- *IBM FAStT200 and FAStT200 HA Storage Servers Installation and User's Guide**
- *IBM Netfinity FAStT500 RAID Controller Enclosure Unit Installation Guide*
- *IBM Netfinity FAStT500 RAID Controller Enclosure Unit User's Reference*
- *IBM Netfinity Fibre Channel Storage Manager Concepts Guide*
- *IBM Netfinity Fibre Channel RAID Controller Unit User's Handbook*

When you complete the tasks in this *Installation and Support Guide*, refer to the following online Help systems:

- IBM FAStT Storage Manager Version 7.02 Enterprise Management online Help. Use this help system for more information about working with the management domain.
- IBM FAStT Storage Manager Version 7.02 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 IBM Netfinity Fibre Channel Storage Manager. Click **Help** on the toolbar or press F1.

The help systems contain operating information that is common to all operating environments. Refer to this *Installation and Support Guide* for information that is specific to Novell NetWare.

Additional publications are available for purchase from IBM. For a list of publications that are available in your country:

- In the U.S. and Puerto Rico, call 1-800-426-7282.
- In the United Kingdom, call 01705-565000 or 0161-9056001.
- In Canada, call 1-800-465-1234.
- In other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

Chapter 1. Introduction

IBM FAStT Storage Manager Version 7.02 for Novell NetWare is a Java™-based tool that simplifies the management of the IBM Fibre Array Storage Technology (FAStT)200 and FAStT200 HA Storage Servers, Netfinity FAStT500 RAID Controller Enclosure Unit, and Netfinity Fibre Channel RAID Controller Unit. Previous versions of IBM FAStT Storage Manager Version 7.02 were known as Netfinity Fibre Channel Storage Manager 7.

The FAStT Storage Manager Version 7.02 software presents an interface for storage management that is based on information that is supplied by the storage subsystem controllers. You can install the storage-management software on a management station, which is the system that is responsible for managing all, or a portion of, a network. The management station communicates with network management agents that reside in the managed node by means of a network management protocol, such as Simple Network Management Protocol (SNMP). When you manage a storage subsystem that uses the client software that is installed on a management station, commands are sent to the storage subsystem controllers. The controller firmware contains the necessary information to carry out the storage-management commands. The controller is responsible for validating and running the commands and providing status and configuration information back to the client software.

Throughout this book, the terms storage-management software and Storage Manager 7.02 refer to the IBM FAStT Storage Manager Version 7.02 for Novell NetWare software. Individual components of the storage-management software are identified by name.

Terms to know

If you are upgrading from a previous version of the storage-management software, you will find that some of the terms you are familiar with have changed. It is important that you familiarize yourself with the new terminology. Table 1 provides a list of machine type and storage-management software requirements. Table 2 on page 2 provides a list of some of the old and new terms. For more information, refer to the *IBM Netfinity Fibre Channel Storage Manager Concepts Guide*.

Table 1. Machine type and storage-management software requirements

Product name	Machine type	Model	Product release and firmware version	Released storage-management software version
IBM FAStT200	3542	1RU	4.x	7.02
IBM FAStT200 HA	3542	2RU	4.x	7.02
Netfinity Fibre Channel RAID Controller Unit	3526	1RU	3.x, 4.x	6.22, 7.02
Netfinity FAStT500 RAID Controller Enclosure Unit	3552	1RU	4.x	7.02

Table 2. Old and new terminology

Term used in previous versions	New term
RAID module	Storage subsystem
Drive group	Array
Logical unit number (LUN)[1]	Logical drive

[1] In Storage Manager 7.02, the term *logical unit number (LUN)* refers to a logical address that is used by the host to access a particular logical drive.

It is important to understand the distinction between the following two terms when reading this document.

Management station
A management station is a system that is used to manage the storage subsystem. This system does not need to be attached to the storage subsystem through the Fibre Channel I/O path.

Host and host computer
The terms *host* and *host computer* are used interchangeably throughout this book. Both terms refer to a system that is directly attached to the storage subsystem through a Fibre Channel I/O path. This system is used to serve data (typically in the form of files) from the storage subsystem.

Note: A system can be both a management station and a host computer at the same time.

Software components

Storage Manager 7.02 contains the following software components:

- Client software
- Host-agent package

Client software

The Storage Manager 7.02 client (SM7client) component provides the graphical user interface for managing storage subsystems through the Ethernet network or from the host. The SM7client contains two main components:

- **Enterprise Management**. You can use the Enterprise Management component for adding, removing, and monitoring storage subsystems within the management domain.
- **Subsystem Management**. You can use the Subsystem Management component for managing the components of an individual storage subsystem.

Host-agent package

The Storage Manager 7.02 agent (SM7agent) package consists of three software components:

- **Host-agent software.** You can use the host-agent software to manage storage subsystems through the host Ethernet connection. The host-agent software takes requests from a management station that is connected to the host through an Ethernet connection and passes the requests to the storage subsystem controllers through the Fibre Channel I/O path. For more information about managing storage subsystems through the host-agent, see “Host-agent managed method” on page 3.

- **SM7devices utility.** You can use the SM7devices utility to associate storage subsystem logical drives with operating system device names. For more information about using SM7devices, see “Using the SM7devices utility” on page 45.
- **Hot Add utility.** You can use the hot add utility to register newly created logical drives without restarting the operating system. For information on using the hot add utility, see “Using the Hot Add utility” on page 45.

Storage subsystem management methods

The storage-management software provides two methods for managing storage subsystems — the host-agent managed method and the directly managed method. Depending on your specific storage subsystem configurations, you can use either or both methods.

Host-agent managed method

When you use this method, you manage the storage subsystems through the Fibre Channel I/O path to the host. The storage subsystem is managed from the host computer or management station that is attached to the host through an Ethernet connection.

Managing storage subsystems through the host-agent has these advantages:

- You do not have to run Ethernet cables to the controllers.
- You do not need a BOOTP server to connect to the network.
- You do not need to perform the controller network configuration tasks that are described in Chapter 2, “Preparing for installation,” on page 13.
- When adding devices, you have to specify a host name or IP address only for the host instead of for the individual controllers in a storage subsystem. Storage subsystems that are attached to the host are automatically discovered.

Managing storage subsystems through the host-agent method has these disadvantages:

- You are limited to configuring one less logical unit number (LUN) than the maximum number that is allowed by the operating system and the host adapter that you are using.
- The host-agent requires a special logical drive, called an *access volume*, to communicate with the controllers in the storage subsystem.

Note: The access volume uses one of the LUNs. NetWare allows a maximum number of LUNs depending on which Service Pack is installed and which host adapter you are using. For more information, see “Number of supported logical drives” on page 42.

Important: If your host system is configured with the maximum number of LUNs, you must give up a LUN to be used as an access volume.

Figure 1 shows a system in which storage subsystems are managed through the host-agent.

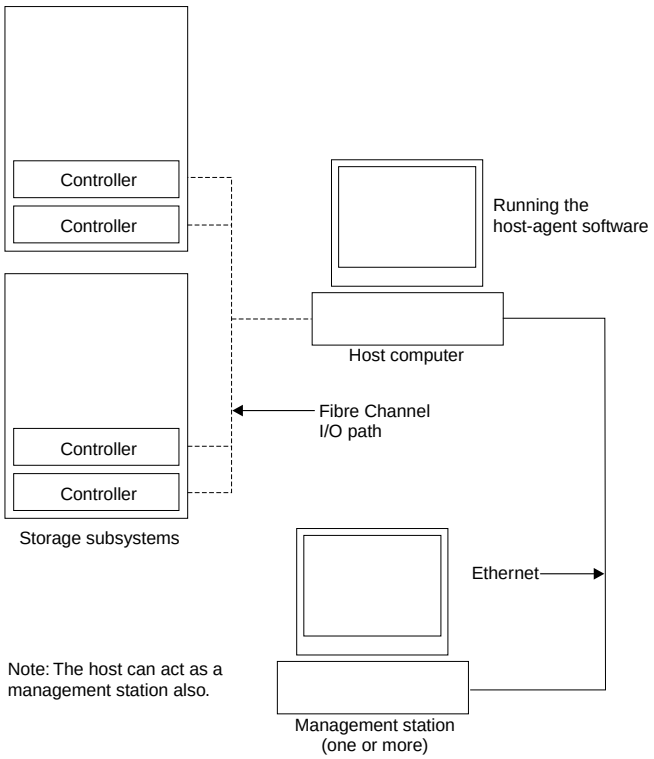

Figure 1. Host-agent managed storage subsystems

Directly managed method

When you use the directly managed method, you manage storage subsystems directly over the network through the Ethernet connection to each controller. To manage the storage subsystem through these Ethernet connections, you must define the IP address and host name for each controller and attach a cable to the Ethernet connectors on the storage subsystem controllers.

Managing storage subsystems directly has these advantages:

- The Ethernet connections to the controllers enable a management station running SM7client to manage storage subsystems that are connected to a host running NetWare or other operating systems that are supported by Storage Manager 7.02.
- You do not need to use an access volume to communicate with the controllers as you do if you are running the host-agent software. You can configure the maximum number of LUNs that are supported by the operating system and the host adapter that you are using.

Managing storage subsystems directly has these disadvantages:

- It requires two Ethernet cables to connect both storage subsystem controllers to a network.
- When adding devices, you must specify an IP address or host name for each controller.
- A BOOTP server and network preparation tasks are required. For a summary of the preparation tasks, see Table 8 on page 14.

Figure 2 shows a system in which storage subsystems are managed directly.

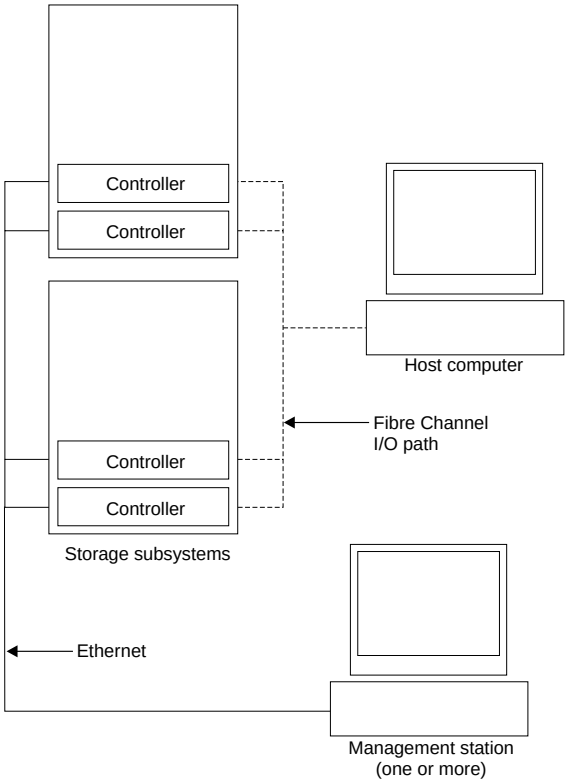

Figure 2. Directly managed storage subsystems

Installation types

To install Storage Manager 7.02, choose the installation type in the following list that represents the setup of your enterprise.

- **New storage subsystem environment.** You do not have existing storage subsystems. In this case, you are installing new storage subsystems with machine type 3526, 3542, or 3552 controllers using firmware version 4.00.0x and intend to manage these new storage subsystems using Storage Manager 7.02. To proceed with this installation, go to “System requirements” on page 10.
- **Existing storage subsystem environment.** You have existing storage subsystems. Table 3 on page 6 explains your options for managing these existing storage subsystems.

Table 3. Configurations for existing storage subsystems

Existing storage subsystems with:	Options
Machine type 3526 controllers running firmware version 3.x	**Option 1 —**Upgrade the controller firmware to version 4.x and manage the storage subsystems with Storage Manager 7.02. Go to “System requirements” on page 10. **Option 2 —**Install new storage subsystems and attach them to the same host as the existing storage subsystems. These existing and new storage subsystems are referred to as coexisting storage subsystems. See “Managing new and existing storage subsystems attached to the same host” for more information. **Option 3 —**Continue to use version 6.22 of the storage-management software to manage these storage subsystems if they are attached to separate hosts from those that are attached to storage subsystems managed with Storage Manager 7.02. Go to “System requirements” on page 10.

Managing new and existing storage subsystems attached to the same host

When installing Storage Manager 7.02, you must determine how you will use any existing storage subsystems. Existing storage subsystems are coexisting storage subsystems when they are attached to the same host as storage subsystems managed with Storage Manager 7.02, and when the conditions in Table 4 are met.

Table 4. Coexisting storage subsystems requirements

Existing storage subsystems	New or upgraded storage subsystems
• Use 3.01.x firmware • Are managed with version 6.22 of the storage-management software **Note:** Firmware and software levels are the minimum levels required for machine type 3526 controllers to coexist with new or upgraded storage subsystems.	• Use 4.00.0x firmware • Are managed with Storage Manager 7.02

Figure 3 shows an example of an environment that includes coexisting storage subsystems.

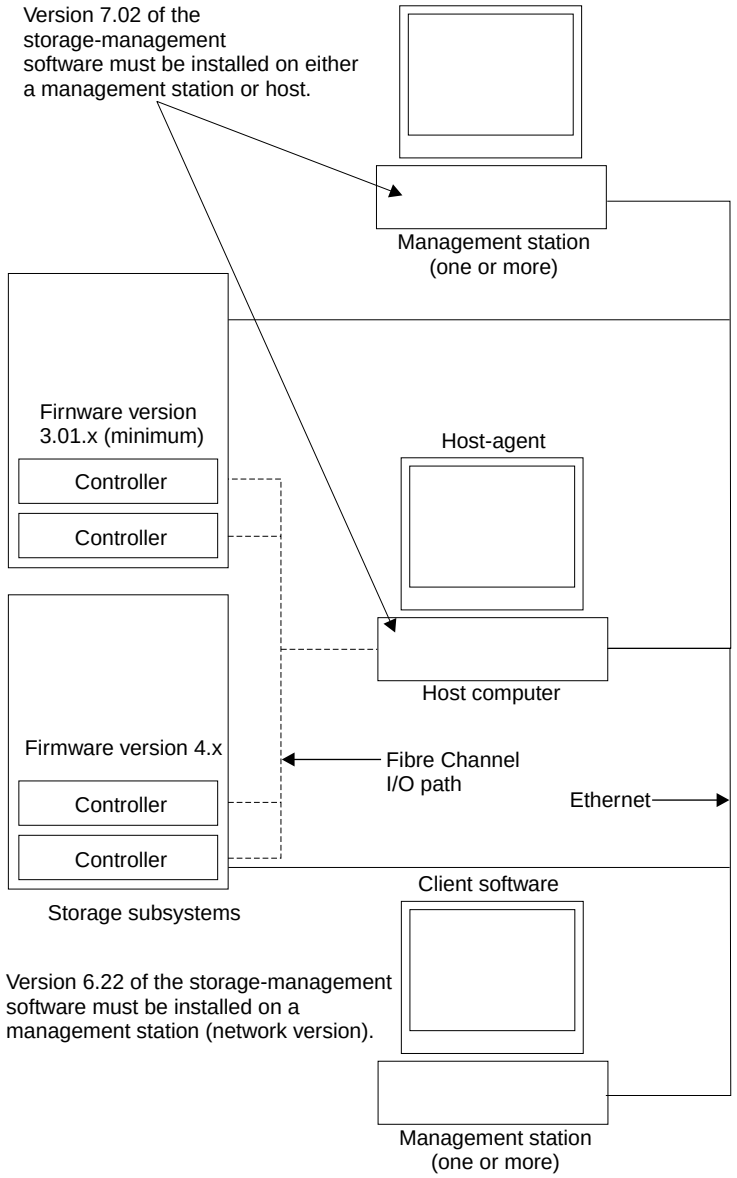

Figure 3. Sample coexistence installation

Standard configuration

You can install Storage Manager 7.02 in a standard configuration. Table 5 describes where the storage-management software components are installed in a standard configuration (not a cluster server configuration).

Table 5. Where to install software components in a standard configuration

Software component	Where installed	Notes
Storage Manager 7.02 client (SM7client)	You can install the SM7client package on either of the following: • Management station (for direct or host-agent management) • Host computer (for direct or host-agent management)	• **Management stations** If you install the SM7client software on one or more management stations, you can choose to manage storage subsystems directly through Ethernet connections to the controllers, over the network through the host-agent, or a combination of both methods. • **Host computer in a networked controller configuration** If you install the SM7client software on the host computer, you can use the directly managed method, the host-agent managed method or a combination of both. The host computer does not need to be connected to a network if the host-agent software is installed. However, the host computer must have the TCP/IP software installed and you must assign a static IP address to the host. • **Host computer in a non-networked controller configuration** If you install the SM7client software in an alternative, non-networked controller configuration, you can manage the storage subsystems that are connected to the host computer through the Fibre Channel I/O path. To set up a non-networks configuration, perform the following steps: 1. Install the host-agent package. 2. Install the TCP/IP software on the host computer. 3. Assign a static IP address to the host computer.
Storage Manager 7.02 agent (SM7agent)	Host server	You must install the SM7agent software even if you choose not to manage storage subsystems with the host-agent software. The host-agent package contains important utilities that are necessary for operating the storage-management software.

The following figure shows an example of a standard configuration, including a management station. You can install the SM7client on a stand-alone host computer if that host has the TCP/IP software installed and the host has a static IP address.

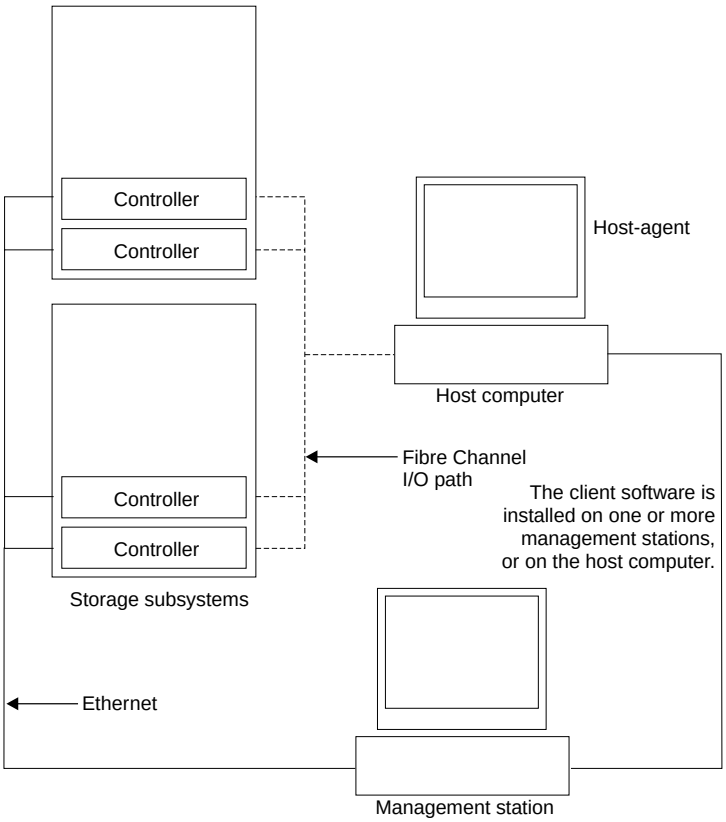

Figure 4. Sample standard configuration

System requirements

This section provides detailed information about the hardware, software, and operating requirements for Storage Manager 7.02.

Hardware requirements

The following table lists the hardware that is required for installing Storage Manager 7.02. For the latest information about host adapters and host adapter drivers, see the README file on the IBM FAStT Storage Manager Version 7.02 for Novell NetWare installation CD or on the IBM web site at: http://www.ibm.com/pc/support.

Table 6. Hardware requirements for the storage-management software

Hardware component	Requirements
A BOOTP server (for only directly managed storage subsystems)	• UNIX® BOOTP server or • Novell DNS/DHCP services for NetWare 5 or greater • Microsoft BOOTP-compatible DHCP2 server for Windows NT® Server 4.0 with Service Pack 5 or later
Storage subsystems (one or more)	Storage subsystems with controllers running firmware version 4.00.0x. **Note:** Before you begin, make sure that you read “Storage subsystem management methods” on page 3 for information on managing these storage subsystems when existing storage subsystems are physically connected to the same host that you will connect to the new storage subsystems.
Fibre Channel host adapters	The IBM FAStT Host Adapter (part number: 00N6881) has been tested with the storage-management software. For information on specific host adapter requirements: • Refer to the README file in the \Netware51\Host_Adapter directory on the installation CD. • Read the documentation that comes with your host adapter. • Refer to the IBM support Web page at http://www.ibm.com/pc/support
Fibre Channel fabric switches (if needed for the desired configuration)	The following Fibre Channel fabric switches were tested with the storage-management software: • IBM 8-port Fibre Channel switch (machine type 2109-S08) • IBM 16-port Fibre Channel switch (machine type 2109-S16) For specific Fibre Channel switch setup requirements: • Read the documentation that comes with your switch. • Refer to the IBM products Web page at http://www.ibm.com/products
Fibre Channel managed hub (if needed for the desired configuration)	The IBM Fibre Channel managed hub (machine type: 3534) has been tested with the storage-management software. For specific Fibre Channel managed hub setup requirements: • Read the documentation that comes with your managed hub. • Refer to the IBM Web site, http://www.ibm.com/products

Table 6. Hardware requirements for the storage-management software

Hardware component	Requirements
Management station or host (for client software)	Your management station or host computer will require: • Intel® Pentium® or Pentium-equivalent microprocessor (133 MHz or faster) • CD-ROM drive • Mouse or similar pointing device. • A minimum of 64 MB system memory (128 MB preferred). • AGP or PCI video card (AGP preferred), ISA cards are not supported. • Monitor setting of 1024 x 768 pixels with 64 000 colors. The minimum display setting that is allowed is 800 x 600 pixels with 256 colors. If you are using a monitor setting of 256 colors, you might experience display problems when scrolling up or down in the online help windows. Use the Page Up and Page Down keys or click in the scroll area above or below the scroll bar. Do not use the Up Arrow or Down Arrow keys or click on the scroll bar to move it for scrolling the online help windows. • Hardware-based Windows® acceleration • 60 MB of free hard disk space • Ethernet network interface card **Note:** Desktop computers that use system memory for video memory are not preferred for use with the storage-management software. **Important:** Many PC-based servers are not designed to run graphic intensive software. If your server has difficulty running the storage-management software smoothly without video artifacts, you might need to upgrade the server's video card. The following microprocessors are preferred for the optimal use of laptop computers as management stations: • Intel, 366 MHz or faster • AMD, 400 MHz or faster

Firmware requirements

Storage Manager 7.02 operates with only controller machine type 3526, 3542, and 3552 and firmware version 4.00.0x.

Software requirements

The following table contains the installation requirements for each of the software packages.

Table 7. Installation requirements by software package

Requirement	**Software**	
	SM7client	**SM7agent**
Available disk space	60 MB	1 MB
Administrator privileges	Not required	Required
Minimum display settings	800 x 600 pixels, 256 colors	640 x 480 pixels, 256 colors[1]

[1] These settings are for the InstallShield installation of the software.

Operating system requirements

For management stations, install one of the following operating systems:

- Windows NT Server 4.0 with Service Pack 5 or later
- Windows NT Workstation 4.0 with Service Pack 5 or later
- Windows NT 4.0 Enterprise Edition with Service Pack 5 or later
- Windows 2000 Server
- Windows 2000 Professional
- Windows 2000 Advanced Server

For hosts, install Novell NetWare version 5.1 operating system with Service Pack 1.

Chapter 2. Preparing for installation

This chapter provides information to help you plan and prepare for installing the storage-management software.

Deciding how to manage storage subsystems

If you have not already done so, see Chapter 1, “Introduction,” on page 1 for information about the following two methods for managing storage subsystems:

- **Direct management** through an Ethernet connection to each controller on the storage subsystem
- **Host-agent management** through the host-agent software that is installed on the host computer that is connected to the storage subsystem

You can use one or both methods. However, because many of the preparation tasks for installation depend on which method you use, before you begin, decide how you want to manage the storage subsystems on your network.

Figure 5 on page 14 shows an example of a directly managed storage subsystem network setup (see network A). This network contains the following components:

- BOOTP server
- Management station for Simple Network Management Protocol (SNMP) traps
- Host that is connected to a storage subsystem through a Fibre Channel I/O path
- Management station connected by Ethernet cable to the storage subsystem controllers

Figure 5 on page 14 shows an example of a host-agent managed storage subsystem network setup (see network B). This network contains the following components:

- A host that is connected to a storage subsystem through a Fibre Channel I/O path
- A management station that is connected by Ethernet cable to the host

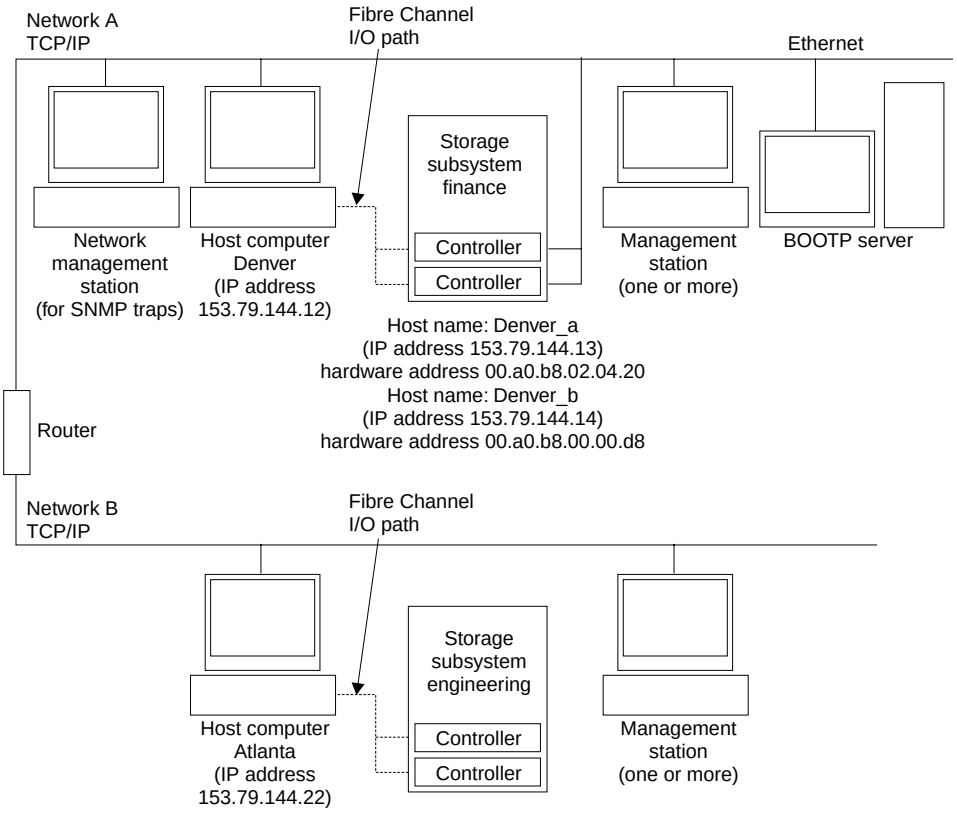

Figure 5. Sample network

Preparing for a network installation

Before you install the storage-management software, make sure that the network components are set up and operating properly, and that you have all the host and controller information that is needed for the software to operate correctly. To do this, perform the tasks that are summarized in Table 8 (referring to the appropriate procedures). Use Table 13 on page 47 as a data sheet to record storage subsystem and controller information.

Table 8. Network preparation task summary

Task to perform	For direct or host-agent?	Why perform this task?	For instructions, see
Step 1- Install all hardware components (host computers, storage subsystems, cables, and so on) that you want to connect to the network.	Both	To ensure that the network hardware is present.	The installation guide that is specific to the hardware components.
Step 2 - Establish and record a naming convention for the storage subsystems that are connected to the network.	Both	To add the storage subsystems to the management domain after installing the software.	“Deciding how to name the storage subsystems” on page 16.

Table 8. Network preparation task summary

Task to perform	For direct or host-agent?	Why perform this task?	For instructions, see
Step 3 - Determine the hardware Ethernet address for each controller in all storage subsystems that are connected to the network.	Direct	To set up the BOOTP server to provide network configuration information to the controllers.	"Identifying the hardware Ethernet address for each controller" on page 17.
Step 4 - Obtain IP addresses and host names from the network administrator.	Both	For host-agent management, you need the IP addresses and host names of the host on which the host-agent software will run. For direct management, you need the IP addresses of each controller in the storage subsystems. The IP addresses are used to configure the BOOTP server so that it can provide network configuration information to the controllers. Also, you use the IP addresses of the controllers to set up the host or Domain Name System (DNS) table.	"Obtaining IP addresses for hosts and controllers" on page 18.
Step 5 - Set up the BOOTP server to provide network configuration information for a specific controller.	Direct	To provide network configuration information to the controllers, using the BOOTP server.	"Setting up the BOOTP server" on page 19.
Step 6 - Verify that the TCP/IP software is installed and set up the host or DNS table.	Direct	Installing the client software on a management station ensures that the management station is configured to reach the controllers over the network. If the client software is installed on the host, the TCP/IP software is still necessary for successful communication between the client software and the controllers.	"Verifying the TCP/IP software and setting up the host or DNS table" on page 27.
Step 7 - Power on the devices that are connected to the network.	Both	To ensure that all devices and links are operational.	The installation guide that is specific to the hardware components.

Table 9 shows an example of an information record with entries for a directly managed storage subsystem and a host-agent managed storage subsystem.

Table 9. Sample information record

Storage subsystem name (see page 16)	Management type (see page 13)	Controllers—Ethernet and IP addresses, and host name (see pages 17 and 18)		Host—IP address and host name (see page 18)
Storage Subsystem Finance	Direct	Hardware Ethernet address = 00a0b8020420	Hardware Ethernet address = 00a0b80000d8	
		IP address = 153.79.144.13	IP address = 153.79.144.14	
		Host = Denver_a	Host = Denver_b	
Storage Subsystem Engineering	Host-agent			IP address = 153.79.111.22
				Host = Atlanta

Table 13 on page 47 provides a data sheet on which you can record storage subsystem names, management types, hardware Ethernet addresses, and IP addresses. Make a copy of this table and complete the information for your storage subsystems and controllers. Use the information that is recorded in Table 13 on page 47 to set up the BOOTP table for the network server and the host or Domain Name System (DNS) table. The information in Table 13 on page 47 helps you add storage subsystems after initial installation. The column headings show a page reference for detailed instructions about obtaining the information. For an example of an information record, see Table 9.

Deciding how to name the storage subsystems

As you set up your network, decide on the naming convention for the storage subsystems. After you install the storage-management software and start it for the first time, all storage subsystems in the management domain are displayed as `<unnamed>`. Use the Subsystem Management window to rename the individual storage subsystems.

The following list provides tips for naming storage subsystems:

- There is a 30-character limit. All leading and trailing spaces are deleted from the name.
- Use a unique, meaningful naming scheme that is easy to understand and remember.
- Avoid arbitrary names or names that would quickly lose their meanings in the future.
- The software displays storage-subsystem names with the prefix Storage Subsystem. Therefore, if you rename a storage subsystem to Engineering, it is displayed as:

  ```
  Storage Subsystem Engineering
  ```

After you decide on a naming scheme, record the storage subsystem names in the information record (Table 13 on page 47).

If you are directly managing your storage subsystem, go to “Identifying the hardware Ethernet address for each controller”. If you are going to manage your storage subsystem through the host-agent, go to “Obtaining IP addresses for hosts and controllers” on page 18.

Identifying the hardware Ethernet address for each controller

Use the following procedure if you plan to directly manage storage subsystems through Ethernet connections to each controller. If you plan to manage storage subsystems using the host-agent software, skip this procedure and go to “Obtaining IP addresses for hosts and controllers” on page 18.

1. Remove the front bezel (machine types 3526 and 3552), from the controller unit, as shown in Figure 6. Carefully pull the bottom of the bezel out to release the pins **1** ; then slide the bezel down **2** .

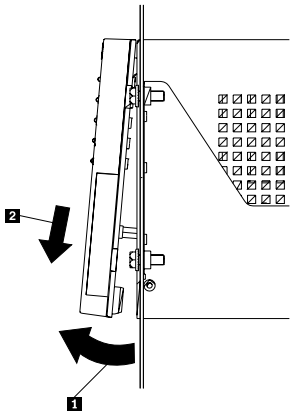

Figure 6. Removing the controller-unit bezel (machine types 3526 and 3552)

2. Unlock and open the levers on the RAID controllers, models 3526 and 3552.

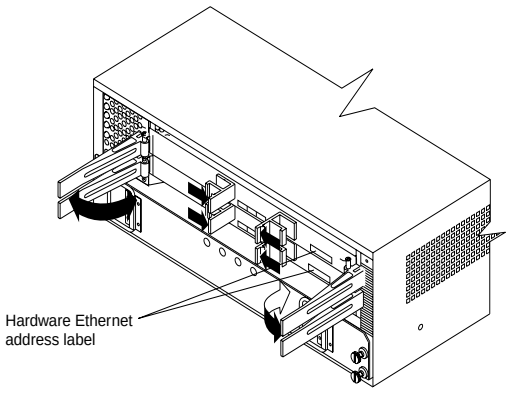

Figure 7. Location of the hardware Ethernet address (machine types 3526 and 3552)

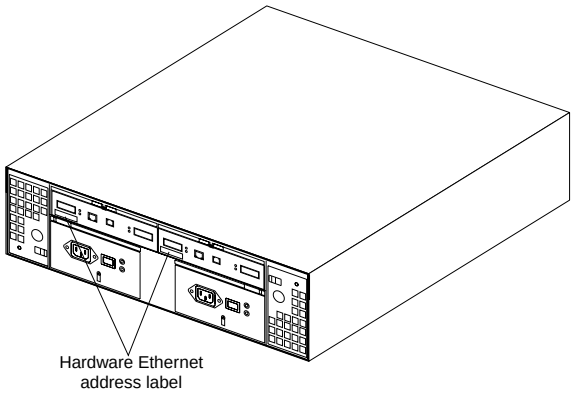

Figure 8. Location of the hardware Ethernet address (machine type 3542)

3. The controller hardware Ethernet address labels are located on the front of each controller, as shown in Figure 7 on page 17 and Figure 8.

   The number is in the form xx.xx.xx.xx.xx.xx (for example, 00.a0.b8.00.00.d8).

4. Record each Ethernet address in the information record (Table 13 on page 47).
5. To replace the bezel (machine types 3526 and 3552), slide the top edge under the lip on the chassis **1** ; then, push the bezel bottom until the pins snap into the mounting holes **2** , as shown in Figure 9.

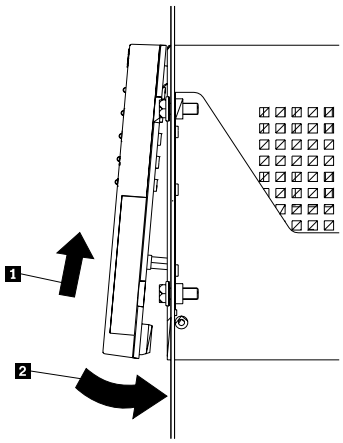

Figure 9. Replacing the controller-unit bezel (machine types 3526 and 3552)

6. Continue with “Obtaining IP addresses for hosts and controllers”.

Obtaining IP addresses for hosts and controllers

If you plan to manage your storage subsystems directly, assign (or obtain from your network administrator) a unique IP address and associated host name for each controller in every storage subsystem on the network. Record the IP address and host name for each controller in the information record (Table 13 on page 47). Then, go to “Setting up the BOOTP server” on page 19.

Setting up the BOOTP server

If you plan to directly manage storage subsystems through the Ethernet connection to each controller, select the procedure that you plan to use for setting up the BOOTP server:

- If you are using a NetWare BOOTP-compatible DHCP server, go to “Using NetWare DHCP as a BOOTP-compatible server”.
- If you are using a Microsoft BOOTP-compatible DHCP server, go to “Using Microsoft DHCP as a BOOTP-compatible server” on page 21.
- If you are using a UNIX BOOTP server, go to “Using a UNIX BOOTP server” on page 27.

If you plan to manage storage subsystems using the host-agent software, go to “Verifying the TCP/IP software and setting up the host or DNS table” on page 27.

Using NetWare DHCP as a BOOTP-compatible server

To use a DHCP server, you must have a DHCP Manager installed.

Before you begin:

Yo must complete the following steps before setting up DHCP:

1. Install NetWare version 5.1 on the selected server or servers.
2. Install the Novell Client software delivered with NetWare version 5.1 on client computers that you will use to administer DNS and DHCP.
3. Install the DNS/DHCP Management Console on client computers that you will use to administer DNS and DHCP.

Installing DHCP services during the NetWare 5.1 server installation

Use the following procedure to install DHCP services:

1. From the Installation Options window, select **Custom**.
2. From the Components window, select the Novell DNS/DHCP Services check box.
3. Follow the on-screen instructions to complete the NetWare version 5.1 server installation.

Launching the DHCP management console

To launch the DNS/DHCP Management Console, double-click its icon. You can install the DNS/DHCP Management Console on a client workstation, or you can access it from the Tools menu of the NetWare Administrator utility.

After the DNS/DHCP Management Console is installed, you are prompted to enter the DNS Tree Name where you want to set up DHCP.

Creating a DHCP server object

Use the DHCP Management Console to create and set up a DHCP server

object. A DHCP server object is created or located under any of the following

objects:

Organization (O)
Organization Unit (OU)
Country (C)
Locality (L)

Complete the following steps to create and set up a DHCP server object:

1. Click the DHCP Service tab of the DHCP Management Console.

   The Our Network object is the only object displayed on the DHCP Management Console's left pane.

2. Click **Create** on the tool bar.

   The Create New DHCP Object window opens, enabling you to create a DHCP server object, a subnet object, or a subnet pool object.

3. Select DHCP Server and click **OK**.

   The Create DHCP Server window opens, prompting you to select a server object.

4. Use the browse button to select a server, then click **Create**.

   This creates the DHCP server object in NDS, called DHCP_servername.

   In the DHCP Management Console, locate the icon for the DHCP server at the bottom of the DHCP Service tab. The server object will display with a red line through it. The red line indicates that DHCP server NLM and related NLMs have not been installed.

Creating a subnet object

You use the DNS/DHCP Management Console to create and set up a DHCP subnet object for each of the subnets to which you will assign addresses.

You must complete the following steps to create and set up a subnet object:

1. Click the DHCP Service tab of the DNS/DHCP Management Console.

   The Our Network object is the only object displayed on the DNS/DHCP Management Console's left pane.

2. Click **Create** on the tool bar.

   The Create New DHCP Object window opens enabling you to create a DHCP server, a subnet, or a subnet pool object.

3. Select **Subnet** and click **OK**.

   The Create Subnet window opens. For each subnet you create, enter the following information in the fields provided: subnet name, NDS context, subnet address, and subnet mask. If you have setup a default DHCP server, its name is displayed and can be changed.

   Click the Define Additional Properties check box to provide more detailed configuration, including DHCP options specific to each subnet.

4. Enter the required information, then click **Create**.

   The DHCP subnet object is created and displayed in the left pane of the DNS/DHCP Management Console.

Creating subnet address ranges

You use the DNS/DHCP Management Console to create and set up subnet address range objects for each pool of addresses you want to be dynamically assigned by DHCP.

To create and set up a subnet address range object, complete the following steps:

1. Click the DHCP Service tab from the DNS/DHCP Management Console.
2. Select the subnet object under which you want to create the subnet address range object, then click **Create**.

The Create New DHCP Record window opens.

3. Select **Subnet Address Range** and click **OK**.

   The Create New Subnet Address Range window opens.

4. Enter a name for the subnet address range, specify the range's starting and ending address, then click **Create**.

   If you click the Define Additional Properties check box, the range's detailed information window is displayed, enabling you to provide more detailed configuration information.

Creating IP address objects

You use the DNS/DHCP Management Console to create and set up any IP address

objects to be assigned to specific devices or to be excluded from dynamic assignment. Create an IP address object for each such device or address. Assigning a specific address to a client requires you to specify the client's media-access control (MAC) address or Client ID.

If you have set up subnets and subnet address ranges, you are not required to set up individual IP addresses unless you want to perform manual address assignment or exclude addresses from assignment.

To create and set up an IP address object, complete the following steps:

1. Click the DHCP Service tab of the DNS/DHCP Management Console.
2. Select the subnet object of the target IP address, then click **Create** on the tool bar.

   The Create New DHCP Object window opens.

3. Select **IP Address** and click **OK**.

   The Create IP Address window opens.

4. Enter the IP address to be assigned or excluded, select the assignment type, then click **Create**.

   If you choose Manual Assignment Type, you must provide information for either the Client Identifier or the MAC Address fields. You can also specify the MAC Type by clicking in the field; the default is FF Any.

Starting the DHCP server

After you create and set up a DHCP server and configure the NDSTM objectsrequired for DHCP, type the following command at the DHCP server console:

```
LOAD DHCPSRVR
```

After you install DHCPSRVR.NLM, the DHCP server can respond to client requests and assign IP addresses.

Note: For additional information about setting up, configuring, or using Novell DNS/DHCP Services, refer to the NetWare 5.1 documentation, located on the Novell Documentation CD or at http://www.novell.com/documentation.

Using Microsoft DHCP as a BOOTP-compatible server

You must use a version of DHCP that supports BOOTP static addressing. To use a DHCP server, you must have a DHCP Manager installed. If a DHCP Manager is installed on the system, go to "Setting up a DHCP server" on page 22. If a DHCP Manager is not installed, use the following installation procedure.

Installing the DHCP manager

Use the following procedure to install the DHCP Manager:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network** icon.
3. In the Network window that opens, click the **Services** tab.
4. Click **DHCP Server Network Services** → **Add**.
5. Reinstall Windows NT Service Pack 5 or later to get the new DHCP settings or information that is associated with the service pack.
6. Continue with “Setting up a DHCP server”.

Setting up a DHCP server

Use the following procedure, along with Table 13 on page 47, to set up the DHCP server.

Note: The following steps and window examples assume that you are configuring a Windows NT DHCP server using its DHCP Manager.

1. Click **Start** → **Programs** → **Administrative Tools** → **DHCP Manager**.

   The DHCP Manager window opens.

2. Create a scope. A scope defines a group of controllers that you want to configure using the DHCP server:

   a. Click **Local Machine**.

   b. Click **Scope** → **Create**.

      The Create Scope window opens.

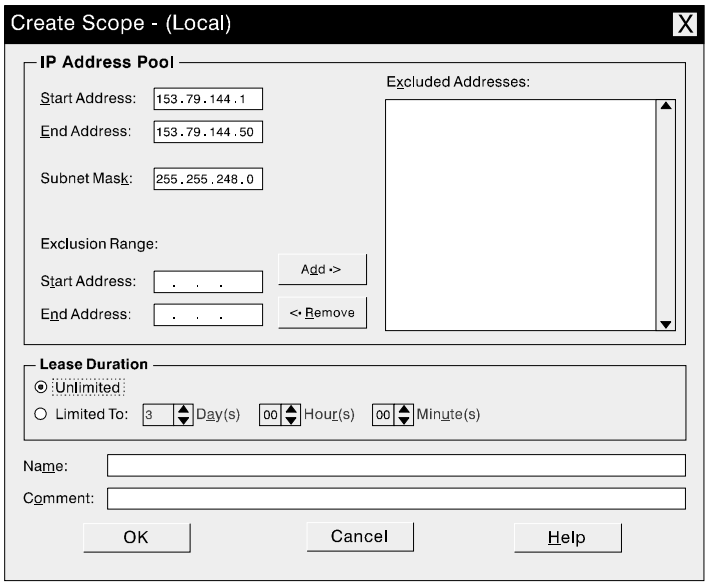

Figure 10. Create scope - (Local) window

   c. Type the starting and ending IP addresses of the controllers that you are configuring on the network.

      For example, if you are configuring 50 controllers on a 153.79.144.0 subnet, set the starting address to 153.79.144.1, and set the ending address to 153.79.144.50.

Note: If each field does not contain at least three characters, press the period (.) key to advance to the next field. If you have only one controller, type its address for both the starting and ending addresses.

d. Type the subnet mask (obtained from your network administrator).

e. Set the Lease Duration to **Unlimited**. This makes the DHCP connection permanent.

f. Type a scope name and comment.

g. Click **OK**.

h. When the scope is successfully completed, click **Yes** to activate it.

You return to the DHCP Manager window.

3. Use the following procedure to configure global scope options. You can use the scope options to configure settings that are applicable to all controllers. To determine which parameters to apply to the entire group, see Table 8 on page 14.

Note: You can apply options to specific controllers later using step 5 on page 24.

a. Click **DHCP Options** → **Global**.

The DHCP Options: Global window opens.

Note: The Remote Management Station (RMS) and Network Management Station (NMS) entries used in previous versions of storage-management software version 6.22, are not required when using Storage Manager 7.02 to manage storage subsystems with controllers running firmware version 4.00.0x.

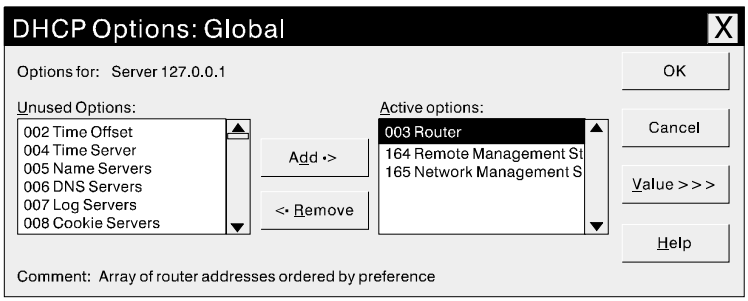

Figure 11. DCHP Options window

b. Select an item in the Unused Options list, and click **Add** to move it to the Active Options list. Each option is preceded by its tag number.

c. Click **Value** to assign a value to the active option.

If Value is not selectable, the Edit Array option window opens in the lower part of the window.

d. If you need to add an IP address, click **Edit Array**.

The IP Address Array Editor window opens.

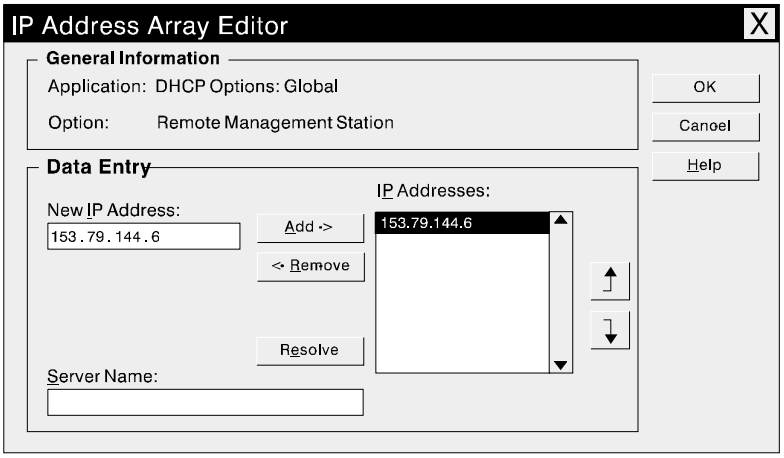

Figure 12. IP Address Array Editor window

Figure 12 shows an example of adding the IP address for a management station.

If you do not need to add an IP address, go to step 4..

e. Type the unique IP address for the option that you added.

f. Click **Add** to move the New IP Address to the IP Addresses list.

g. Click **OK**.

You return to the DHCP Options: Global window.

h. Repeat step 3d through step 3g until all global options are added.

When you finish adding the Global Scope Options, click **OK** at the DHCP Options: Global window.

You return to the DHCP Manager window.

4. Use the following procedure to create a reservation for each controller. Use the data sheet that you created from Table 13 on page 47 to make sure that you include all of the controllers for every storage subsystem on the network.

a. Click **Scope** → **Add Reservations**.

b. In the **IP Address** field, type the IP address for the first controller on your data sheet.

c. In the **Unique Identifier** field, type the controller hardware Ethernet address.

d. In the **Client Name** field, type the eight-character controller name.

e. Click **Add**.

f. Repeat step 4b through step 4e for each controller that is listed in your data sheet. See Table 13 on page 47.

g. When you finish typing the information for all of the controllers, click **Close**.

You return to the DHCP Manager window.

5. Use the following procedure to configure controller-specific options. By creating a controller-specific option, you can associate a controller configuration entry with a specific controller that you added in step 4.

Note: If you set an option as **Global Scope**, it applies to every controller in this group and does not need to be added again.

a. Click **Scope** → **Active Leases**.

The Active Leases window opens.

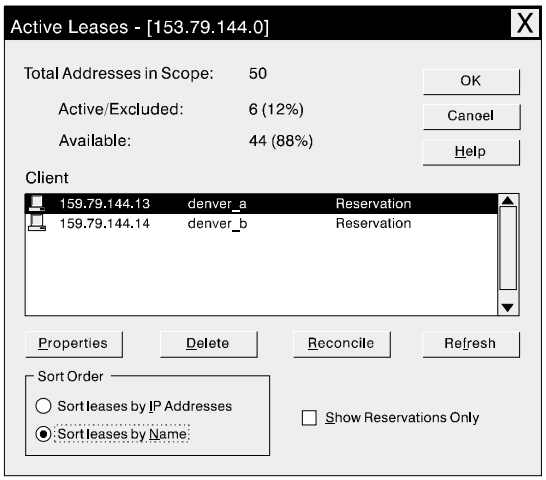

Figure 13. Active Leases window

b. Select a controller in the list.

c. Click **Properties**.

   The Unique Identifier is the hardware Ethernet address that you added in step 4c.

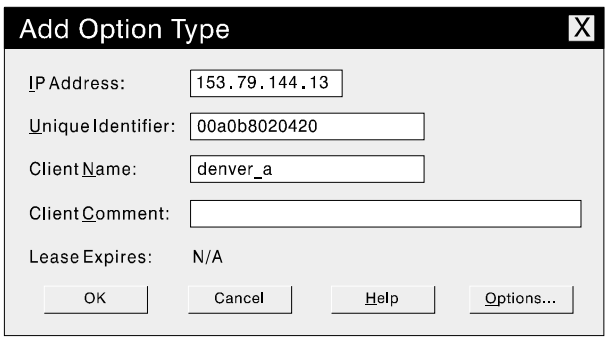

Figure 14. Add Option Type window

d. Click **Options**.

   The DHCP Options: Reservations window opens.

e. Select an entry in the Unused Options list, and click **Add** to move it to the Active Options list.

f. Click **Value** to assign a value to the active option.

g. Type the information for the value of the option.

   For example, for the host name, type the host name for the controller (from your data sheet, see Table 13 on page 47) in the string field. Click **Edit** if the value that you need to add is an IP address for a router.

h. Repeat step 5e through step 5g until you finish adding specific options for this controller.

i. Click **OK**.

   You return to the Add Option Type window.

j. Click **OK**.

   You return to the Active Leases window.

k. Repeat step 5b through step 5j until you finish adding controller-specific options for every controller.

   When you finish adding specific options for all controllers, click **OK** at the Active Leases window.

   You return to the DHCP Manager window.

6. Continue with “Verifying the TCP/IP software and setting up the host or DNS table” on page 27.

Using a UNIX BOOTP server

Table 10 and Table 13 on page 47 provide information for setting up the BOOTP table and making the required entries to support the controllers in the storage subsystems. Use a text editor to edit the bootptab file in the /etc directory.

Table 10. Required entries for setting up the UNIX BOOTP server

Entry	Description	Sample format in BOOTP server
Subnet mask	Mask that is used to route packets to defined subnets	dot notation (sm=255.255.248.0)
Router	IP address of the host computer that routes packets to networks	dot notation (gw=153.79.144.2)
Host name for the controller	Host name that is associated with the controller (see Table 13 on page 47)	host name (Denver_a)
IP address	IP address of the controller (see Table 13 on page 47)	dot notation (ip=153.79.144.13)
Ethernet address	The Ethernet address of the controller hardware (see Table 13 on page 47)	hexadecimal notation (ha=00a0b8020420)

The following example of a BOOTP table assumes that you are configuring a UNIX BOOTP server, such as a server on Network A, as shown in Figure 5 on page 14. The s4.default:\ entry denotes settings that are common to all controllers. The tc=s4.default:\ entry associates this common setting group to a specific controller.

```
s4.default:\ (common settings)
ht=ether:\
sm=255.255.248.0:\
gw=153.79.144.2:\
hn:
denver_a:\
tc=s4.default:\ (refers to common settings)
ip=153.79.144.13:\
ha=00a0b8020420:
denver_b:\
tc=s4.default:\
ip=153.79.144.14:\
ha=00a0b80000d8"
```

When you finish setting up the BOOTP table, use the following procedure:

1. Turn on power to the storage subsystems so that the parameters in the BOOTP table take effect.
2. After you finish setting up the BOOTP table, go to “Verifying the TCP/IP software and setting up the host or DNS table”.

Verifying the TCP/IP software and setting up the host or DNS table

Make sure that the host names for the controllers correspond to the appropriate IP addresses for the controllers. Use the following procedure to verify that the TCP/IP

software is installed on the management station and to set up the host or Domain Name System (DNS) table.

Note: You can use the Windows Internet Name Service (WINS) rather than DNS.

1. Click **Start** → **Settings** → **Control Panel** → **Network** → **Protocols** to verify that the TCP/IP software is installed and configured property.

   Note: If the TCP/IP software was not installed properly, install it from the Windows NT 4.0 installation CD. Click **Start** → **Settings** → **Control Panel** → **Network** → **Protocols** → **Add** → **Have Disk**.

2. Update either the host or DNS table to specify a host name to associate with an IP address. If you do not have a DNS, edit the two host tables that are found in the following directories:

   `c:\winnt\system32\drivers\etc\hosts`

   `c:\winnt\system32\drivers\etc\imhosts`

   For example, to set up the host tables for the controllers that are connected to Network A (Figure 5 on page 14), use a text editor to create the following IP address and controller-name entries.

IP Address	Host name for the controller
127.0.0.01	localhost
153.79.144.13	denver_a
153.79.144.14	denver_b

3. If you want to manage storage subsystems through a packet-filtering firewall, configure the firewall to open port 2463 to TCP data. Otherwise, go to Chapter 3, “Installing software in a standard configuration,” on page 27.

Chapter 3. Installing software in a standard configuration

This chapter describes how to install the storage-management software in a standard configuration.

Important: Always check for a README file on any installation media. This README file might contain important information that was not available when this *Installation and Support Guide* was prepared.

There are two configurations in which you can install the storage-management software:

- You do *not* have existing storage subsystems. In this situation, you are installing new storage subsystems with machine type 3526, 3542, or 3552 controllers using firmware version 4.00.0x and will manage these new storage subsystems using Storage Manager 7.02. If this is your situation, go to “Installation process” on page 28.
- You do have existing storage subsystems with machine type 3526, 3542, or 3552 controllers. In this situation, you can do one of the following:
  - — Upgrade the controller firmware on the existing storage subsystems to version 4.00.0x and manage them with Storage Manager 7.02.
  - — Continue to manage the storage subsystems with version 6.22 of the storage-management software. You might manage these storage subsystems in coexistence with new storage subsystems that you are managing with Storage Manager 7.02. To determine if you have coexisting storage subsystems, see “Installation types” on page 5.

Use Table 11 to determine your installation process.

Table 11. Determining your installation process in a standard configuration

Current environment	Planned environment	Action
Existing storage subsystems with controllers using firmware version 3.x	Upgrade to firmware version 4.00.0x.	Refer to the README file located in the \Netware51\ directory on the installation CD for more information.
No existing storage subsystems	New storage subsystems with controllers that will use version 4.00.0x firmware and will be managed with Storage Manager 7.02.	Go to “Installation process” on page 28.
Existing storage subsystems with controllers that have firmware versions 4.00.00 through 4.00.01	Upgrade storage subsystems with controllers that will use version 4.00.0x firmware and will be managed with Storage Manager 7.02.	1. Go to “Installation process” on page 28. 2. Update the NVSRAM and firmware to version 4.00.0x using the storage-management software online help.
	Continue to use your existing versions 4.00.00 through 4.00.01 controller firmware and will be managed with Storage Manager 7.02. Refer to the README file located in the \Netware51\ directory on the installation CD for more information.	Go to “Installation process” on page 28.

Installation process

The following installation process applies to:

- New installations
- When installing with existing storage subsystems

Begin the installation of the storage-management software with “Installing the SM7client package”. Continue the process until you have completed “Installing the host-agent package” on page 30.

Figure 15 shows a flowchart of the installation process.

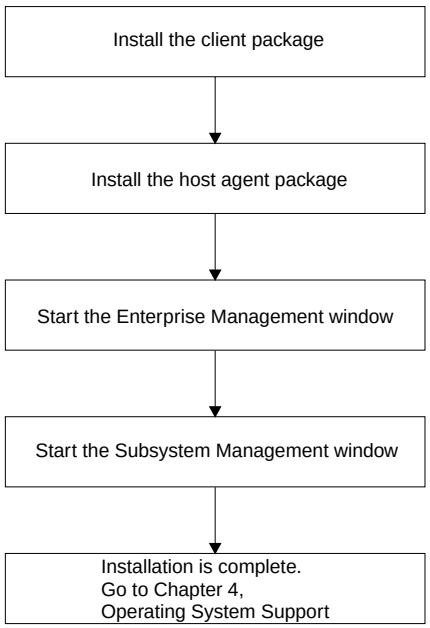

Figure 15. Installation process

Installing the SM7client package

Use the following procedure to install the SM7client on a management station that is configured with Novell NetWare 5.1 with Service Pack 1.

To install the SM7client on a management station that is configured with one of the following operating systems, refer to the IBM FAStT Storage Manager Version 7.02 for Windows NT Installation and Support Guide or IBM FAStT STorage Manager Version 7.02 for Windows 2000 Installation and Support Guide for installation instructions.

- Windows NT Server 4.0 with Service Pack 5 or later
- Windows NT 4.0 Enterprise Edition with Service Pack 5 or later
- Windows NT Workstation 4.0 with Service Pack 5 or later
- Windows 2000 Advanced Server
- Windows 2000 Professional
- Windows Advanced Server

Notes:

- If you are configuring only a network management station, you need to install only the SM7client.
- If you want to install SM7client on a stand-alone host and manage storage subsystems through the Fibre Channel I/O path rather than over the network, you must install the TCP/IP software on the host and assign a static IP address to the host.

Installation instructions for NetWare 5.1

Before you install the NetWare SM7client software, make sure that:

- The management station has at least 60 MB of available disk space.
- The monitor properties are set to a minimum screen resolution of 800 x 600 pixels and a palette of 256 colors or more.
- You close all other programs.

Perform the following steps if you are installing the SM7client package on a management station running NetWare 5.1 operating system software:

1. Insert the IBM FAStT Storage Manager installation CD into the CD-ROM drive and type:

   ```
   load cdrom
   ```

2. Mount the volume.
3. Click **Novell** → **Install**.
4. Click **Add**, and follow the instructions on the screen.
5. Click the **Directory Tree** button.

   The Directory Tree window opens.
6. Select the CD-ROM volume.
7. Select the \Netware51\SM7client directory.
8. Select the program.ni file, and then click **OK**.
9. Click **OK**.

   After the files are copied, the License Agreement window opens.
10. Click **Accept** to continue.

    The copying files message window opens.
11. When the installation is complete, click **Finish**.

Use the following procedure to verify that the installation was successful:

1. Click **Novell** → **Programs**.
2. Verify that the Netfinity Fibre Channel Storage Manager client appears in the list of programs.
3. Go to “Installing the host-agent package” on page 30.

Note: You must install the host-agent package even if you are installing SM7client only on a management station.

Installing the host-agent package

Use the following procedure to install the host-agent package on each host computer that is connected to one or more storage subsystems. The SM7agent consists of the following components:

- The host-agent software that is necessary for host-agent management of the storage subsystems.
- The hot-add utility for dynamically adding logical drives to the operating system. See “Using the Hot Add utility” on page 45.
- The SM7devices utility that is used to display the relationship of logical drives to operating system device names. For more information, see “Using the SM7devices utility” on page 45.

Important: You must install the host-agent package even if you do not intend to manage storage subsystems through the host-agent software. The host-agent package contains utilities that are required to manage storage subsystems.

Before you install the software, make sure that:

- The host computer is configured with Novell NetWare 5.1 and Service Pack 1.
- The host computer has at least 20 MB of available disk space.
- The monitor properties are set to a minimum screen resolution of 640 x 480 pixels and a palette of 256 colors or more.
- You close all other programs

If you are using the host-agent management method for the storage subsystem, set the maximum LUN value to 32 for the host bus adapter. By default, the Universal Transport Module (UTM) LUNs are set to 31 and must be reported to the operating system so that the SM7agent can identify and link to the UTM. For more information, refer to the README in the Netware51/host_adapter directory of the IBM FAStT Storage Manager installation CD.

Perform the following steps to install the host-agent package:

1. Insert the IBM FAStT Storage Manager installation CD into the CD-ROM drive and type:

   ```
   load cdrom
   ```

2. Mount the CD volume.
3. Click **Novell** → **Install**.
4. Click **Add**, and follow the instructions on the screen.
5. Click the **Directory Tree** button.

   The Directory Tree window opens.
6. Select the CD-ROM volume.
7. Select the \Netware51\SM7agent directory.
8. Select the product.ni file, and then click **OK**.
9. Click **OK**.

   After the files are copied, the License Agreement window opens.
10. Click **Accept** to continue.

    The files are copied.
11. When the installation is complete, click **Finish**.

Note: To enable SM7agent at server startup, an autoexec.ncf entry can now be made.

Use the following procedure to load SM7agent and verify that the installation was successful:

1. Toggle to the Server Console window and at the command prompt, type:

   ```
   Load SM7agent
   ```

   The agent will start and displays the following message when UTM LUNs are being scanned:

   ```
   Activating
   ```

For additional information refer to “Starting the host-agent automatically” on page 33.

Chapter 4. Completing the installation

This chapter contains procedures for starting Enterprise Management and Subsystem Management and for completing the installation tasks.

Stopping and starting the host-agent

Perform the procedures in the folowing sections to stop and start the host-agent software that is installed on the host computer.

Note: If an access volume is not detected, the host-agent software will automatically stop running. If you download an NVSRAM file that enables an access volume or changes the LUN that is used for the access volume, you must stop and restart the host-agent software or restart the host computer to enable the discovery of host-agent managed storage subsystems.

Stopping the host-agent

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

Use the following procedure to stop the host-agent software:

1. From the system console, press Ctrl+Esc and then, select **System Console**.
2. At the prompt, type:

   ```
   unload sm7agent
   ```

3. Press **Enter**.
4. Return to ConsoleOne. Press Ctrl+Esc and then, select **Xserver** –– **Graphical Console**.

Starting the host-agent manually

The host-agent software must be started manually when the system is started or if it is stopped to add storage subsystems.

Use the following procedure to start the host-agent manually:

1. From the system console, press Ctrl+Esc and then, select **System Console**.
2. At the Prompt type:

   ```
   sm7agent
   ```

3. Press **Enter**.
4. The window will go blank when the define (NLM) space has been created.
5. Return to ConsoleOne. Press Ctrl+Esc and then, select **Xserver** –– **Graphical Console**.

Starting the host-agent automatically

To configure the host-agent software automatically at startup, use the following procedure:

1. Open the autoexec.ncf file in a file editing program.
2. Locate the section that describes loading the Java Runtime Environment. Type the following line after the string:

   ```
   sys:system/sm7agent
   ```

3. Save and close the edited autoexec.ncf file.

Starting the Enterprise Management window

The Enterprise Management window is the first window that opens when you start the software. Use the Enterprise Management window to:

- Add and discover the storage subsystems that you want to manage.
- Provide a comprehensive view of all storage subsystems in your management domain.
- Perform batch storage-subsystem management tasks using the Script Editor.

Use the following procedure to start the Enterprise Management window:

1. If you are using the SM7agent, start the SM7agent at the Server Console window.

   At the Server Console, type:

   ```
   Load SM7agent
   ```

2. From the Xserver Graphical Console, click **Novell** → **Programs**.
3. Click **Netfinity Fibre Channel Storage Manager 7 client**.

   The client software starts, and the Enterprise Management window and the Confirm Initial Automatic Discovery window open, as shown in Figure 16.

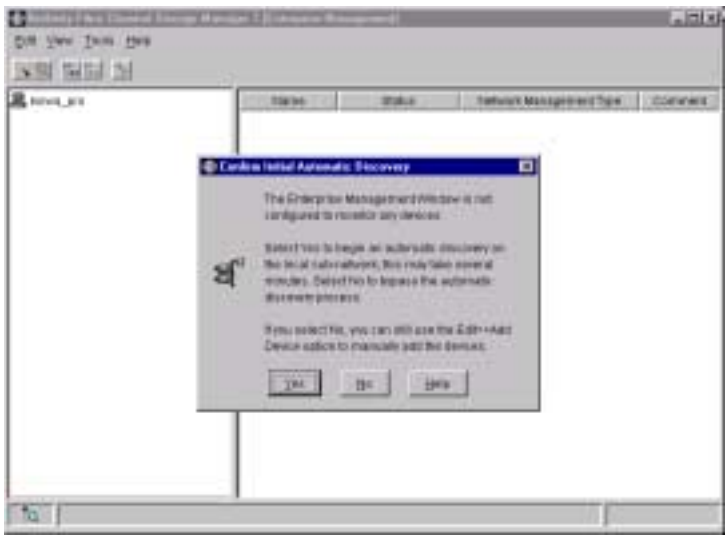

Figure 16. Confirm Initial Automatic Discovery window

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

If you do not want to perform the initial automatic discovery, click **No**. You can use the **Edit** → **Add Device** menu option to add hosts and storage subsystems. For more information, see “Adding devices” on page 36.

4. Click **Yes** to begin an initial automatic discovery of hosts and storage subsystems that are attached to the local subnetwork on which the management station is installed.

   The software sends a broadcast message across the local subnetwork where the management station is installed. It discovers host-agent managed storage

subsystems if the hosts that provide network management connections to the storage subsystems respond to the broadcast. The software discovers directly managed storage subsystems if the controllers in those storage subsystems respond to the broadcast message.

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

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

When the initial automatic discovery is complete, you can see all hosts and storage subsystems that are attached to the local subnetwork, as shown in Figure 17.

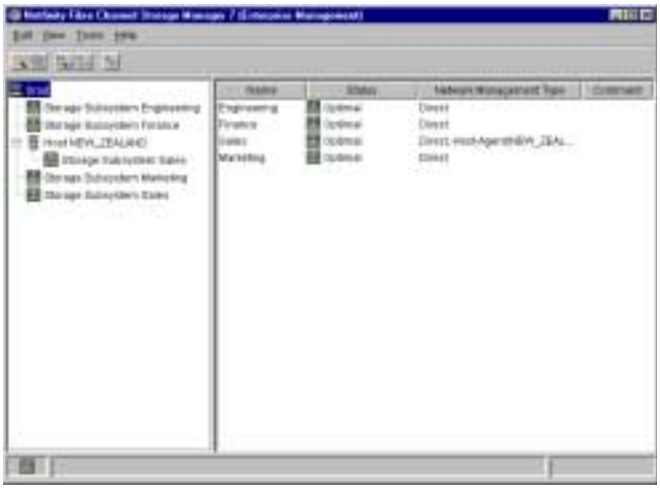

Figure 17. Enterprise Management window

If you do not see all hosts and storage subsystems:

- Check the hardware and connections for possible problems (refer to the hardware documentation for specific procedures).
- Refer to the Enterprise Management Help topic about discovering storage subsystems.
- Make sure that the device is on the local subnetwork. If it is not, you must use the **Add Device** option.

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

A storage subsystem might be duplicated in the device tree after an automatic discovery, if the storage subsystem is directly managed but is attached to a host with the host-agent software installed and running. In this case, you can remove the duplicate storage-management icon from the device tree using the **Remove Device** option in the Enterprise Management window.

Continue with “Adding devices” on page 36.

Adding devices

You can add more hosts or storage subsystems outside the local subnetwork. For more information about this option, refer to the Enterprise Management window online Help.

Important: If you are managing storage subsystems through the host-agent software and you physically add new storage subsystems, you must stop and restart the host-agent service so that it can recognize the new storage subsystems. Then, go to the Enterprise Management window and click **Tools** → **Rescan** to add the new storage subsystems to the management domain.

Continue with “Monitoring storage subsystems”.

Monitoring storage subsystems

To monitor the condition of storage subsystems in your management domain, you must start Enterprise Management. For more information about monitoring storage subsystems, refer to the Enterprise Management online Help.

Setting up alert notifications

After you add devices to the management domain, set up alert notification options to report critical events on the storage subsystems. The following options are available for alert notification:

- Notification to a designated network management station (NMS) using Simple Network Management Protocol (SNMP) traps (see “Setting up the NMS for SNMP notification” for more information)
- Notification to designated e-mail addresses
- Notification to designated alphanumeric pagers (when a third-party software package is used to convert e-mail messages)

Note: The Enterprise Management window must remain open if you want to monitor the condition of storage subsystems that are included in your management domain. You might want to minimize the window. If you close this window, you will not receive alert notifications. Refer to the Enterprise Management online Help for more information on alert notification options.

Setting up the NMS for SNMP notification

If you choose to set up alert notification using SNMP traps, you must first copy a management information base (MIB) file to the designated network management station. Use this procedure to set up the MIB file on the network management station.

Important: You need to set up your designated NMS only one time.

1. From the \Netware51\SM7mib directory on the IBM FAStT Storage Manager installation CD, copy the Arrayman.mib file to the network management station.
2. Follow the steps that are required by your specific network management station to compile the MIB file.

   Note: For details on the required steps, see your network administrator or the documentation that is specific to the NMS product that you are using.

Configuring alert destinations

Configure SNMP trap destinations and e-mail destinations for alert notifications using Enterprise Management. Refer to the Enterprise Management online Help for specific procedures.

Starting Subsystem Management

The Subsystem Management window enables you to manage selected subsystems.

Use the following procedure to open a Subsystem Management window for a selected storage subsystem:

1. In the Enterprise Management window, select a storage subsystem.
2. Click **Tools** → **Manage Device**.

   The software displays the Subsystem Management window for the selected storage subsystem, as shown in Figure 18.

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

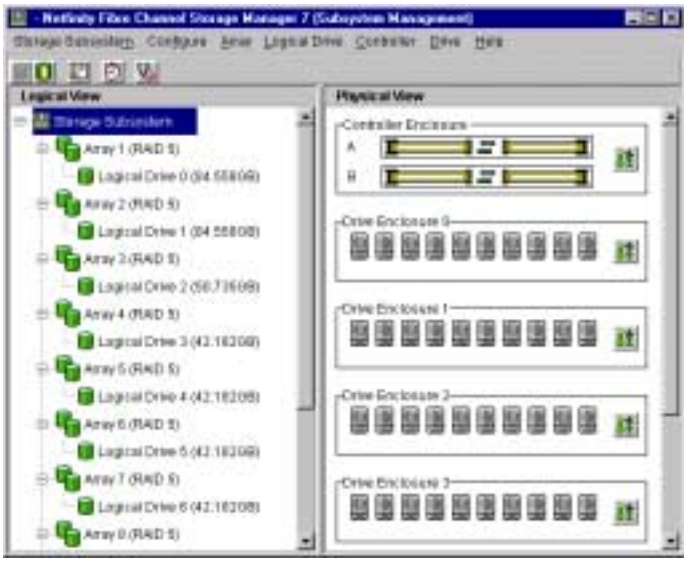

Figure 18. Subsystem Management window (models 3526 and 3552)

Figure 19. Subsystem Management window (model 3542)

Renaming storage subsystems

When starting Storage Manager 7.02 for the first time, the storage subsystems are unnamed. You must use the Subsystem Management window to rename each storage subsystem from <unnamed> to the name that you want. Refer to the names that you entered in the information record that you created using Table 13 on page 47. Then, refer to the topic about renaming storage subsystems in the Subsystem Management online Help. The Help topic provides detailed instructions for renaming storage subsystems.

Performing other storage-subsystem management tasks

You can perform the following storage-subsystem management tasks:

- Downloading controller firmware
- Downloading controller NVSRAM
- Locating a storage subsystem
- Viewing a storage subsystem profile
- Typing or changing a storage subsystem password
- Creating and managing logical drives and arrays
- Using the Performance Monitor
- Creating storage partitions (if applicable)

Note: To create storage partitions, you must obtain the worldwide name or port name of each host adapter in each host that is connected to the storage subsystem.

For more information about these and other storage-subsystem management tasks, refer to the appropriate topics in the Subsystem Management online Help.

Continue with “Modifying configuration settings in NVSRAM” on page 39.

Modifying configuration settings in NVSRAM

Run the NVSRAM configuration scripts to configure the storage subsystem for use with NetWare hosts in a standard noncluster environment. Use the following procedure to apply these scripts:

1. Insert the IBM FAStT Storage Manager installation CD into the CD-ROM drive.
2. From the Xserver Graphical Console, type:

   ```
   load cdrom
   ```

3. Mount the CD volume.
4. From the Xserver Graphical Console, click **Novell** → **Netfinity Fibre Channel Storage Manager 7**.
5. From the Confirm Initial Automatic Discovery window, click Yes.

   If you click **No**, you can still add devices manually using the **Edit** → **Add Device** option.

   The storage subsystems that are at firmware level 4.x are automatically discovered.
6. In the right pane of the Netfinity Fibre Channel Storage Manager 7 (Enterprise Management) window, right-click on a storage subsystem, and click **Execute Script** from the menu.

   The Script Editor window opens.
7. From the Script Editor window menu, click **File** → **Load Script**.

   If you are prompted to save changes to newscript.scr, click **No**.
8. From the Load Script window, select the <*CD-ROM volume*> \Netware51\scripts\Netware5.scr file and select **Open**.
9. From the Script Editor window menu, click **Tools** → **Verify and Execute**.

   The message:

   ```
   Script execution complete
   ```

   is displayed in the lower pane of the Script Editor window.
10. From the Script Editor window, click **File** → **Load Script**.

    If you are prompted to save changes to newscript.scr, click **No**.
11. From the Load Script window, select the <*CD-ROM volume*> \Netware51\scripts\NW_mpio.scr file and then, select **Open**.
12. From the Script Editor window, select **Tools** → **Verify and Execute**.

    ```
    Script execution complete
    ```

    will be displayed in the lower pane of the Script Editor window.
13. Restart the controller for changes to take effect.

Chapter 5. Operating system support

This chapter contains information about operating the storage-management software with Novell NetWare.

Novell NetWare limitations

Important: Always check for a README file on any installation media. This README file might contain important information that was not available when this *Installation and Support Guide* was prepared.

Table 12 explains the limitations that apply when you use the FAStT Storage Manager Version 7.02 with Novell NetWare.

Table 12. Novell NetWare limitations and workarounds.

Limitation	Workaround
Clicking a vertical scroll arrow (either up or down) causes the scroll box to move all the way to the opposite end of the scroll bar.	This is a known defect in the Java Runtime Environment. Click the scroll box and slide it until you reach the desired position in the Help window.
Logical drive migration (removing a set of drives that are configured with logical drives from one storage subsystem to insert in another storage subsystem) is not supported because it could cause loss of configuration.	Call for service.
If you manage storage subsystems through the host-agent software and use the storage-management software to download controller firmware, the download process can take up to 10 minutes to complete.	None.
If you configure a new storage subsystem with a single controller, you must place the controller in slot A. The controller firmware cannot recognize or communicate with a single controller until slot A is populated. This restriction does not apply to storage subsystems that were originally configured with two controllers.	None.
A public loop configuration (managed hubs that are attached to switches) is not supported.	None.
If you remove a fan or power supply customer replaceable unit (CRU) from a storage subsystem while the system is running, the storage-management software does not report an error message, and the component is not reported as missing. **Note:** Fan and power-supply CRU failures are reported.	Replace the missing fan or power-supply CRUs immediately to ensure redundancy. Make sure that the fan or power-supply CRU is properly seated in the controller unit.

Number of supported logical drives

The supported logical drive limits are as follows:

- When using Novell Storage Management Services (SMS) you can configure up to 256 LUNs, or the maximum available for the model of the host adapter that you have in your system.
- Host adapters support a maximum number of logical drives. Refer to the host-adapter documentation for specific information.
- The host-agent management method uses a special logical drive, called an access volume, to communicate with the controllers on the storage subsystem. The access volume uses one of the allowable logical drives. Therefore, managing storage subsystems with the host-agent software limits you to one fewer LUN than the maximum number that is supported by Novell NetWare and the host adapter.

Creating logical drives

A *logical drive* is a logical object that is the basic structure that you create to store data on the storage subsystem. A logical drive is configured for an array with a specific RAID level to meet application needs for data availability and Fibre Channel I/O performance. A logical drive is recognized by the operating system as one drive.

You can add or delete logical drives in a standard configuration.

When you create new logical drives with the storage-management software, you must add the new logical drives to Novell NetWare. Refer to the Novell NetWare documentation for details about adding a drive. Remember that each logical drive (not array) is recognized by Novell NetWare as one drive. After creating logical drives, run the Hot Add and SM7devices utilities that are provided with the storage-management software. The Hot Add utility adds newly created logical drives to the operating system, and the SM7devices utility identifies logical drives by their associated operating system device names. For information about using these utilities, see “Using the Hot Add utility” on page 45 and “Using the SM7devices utility” on page 45.

Before either deleting logical drives with the storage-management software or using **Configure** → **Reset Configuration**, stop all input and output activity to the affected storage subsystem. Then dismount any NetWare volumes that are associated with the logical drives.

Installing QLogic Management Suite Java

The QLogic Management Suite Java (QMSJ) software includes the QLogic GUI device driver that is required for failover support. You can use the GUI to configure LUNs, storage, and failover.

Note: For additional information, refer to the online Help.

Perform the following steps to install QLogic Management Suite Java:

1. Insert the IBM FAStT Storage Manager installation CD into the CD-ROM Drive.
2. Map a drive to the SYS volume of the NetWare server.
3. Select the Netware51\qlremote directory.
4. Click **install.exe**.

   The Introduction window opens.
5. Click **Next**.

   The Important Information window opens. Read the QMSJ application notes.
6. Click **Next**.

   The Choose Install Folder window opens.
7. Click **Next**.

   The Choose Install Set window opens.
8. To install the QMSJ Java GUI only, select **QMSJ GUI**.
9. To install the QMSJ Novell NetWare 5.x Agent, select **QMSJ Novell NetWare 5**.
10. To install the Java GUI and Novell NetWare Agent, click **Customize**.
11. Click **Next**.

    If you choose to select customize, the Customize Install window opens.
12. Set the Current Install Sets to **Custom Set**.
13. Select **QMSJ GUI**, **QMSJ Novell NetWare 5.x Agent**, and **Help** check boxes.
14. Click **Install**.

    The Novell NetWare Disk Selection window opens.
15. Select or type the drive letter that is mapped to the SYS volume of your NetWare server.

    The Install Complete window opens.
16. Click **Done**.
17. Restart your NetWare server to start the QMSJ agent.

Configuration example for QLogic Management Suite Java

Refer to the following example when configuring device and LUN mapping.

1. Open QLogic Management Suite Java. The Host Bus Adapter View window opens.
2. Click **Connect**.

   The Connect to Host window opens.
3. Type the host name or IP address.

   Note: If a connection is not established by typing the host name, an entry in the host file or DNS table is required.
4. Click **Configure**.

The Fibre Channel Port Configuration window opens.

5. Click **Tools** → **Auto Configure**.
6. Click **Tools** → **Load Balance** → **All LUNs**.
7. Right click on Device Node Name.

   The device Information and Configure LUN mask options display.
8. Select **Configure LUN Mask**.

   Note: The default configuration maps all LUNs to the first FAStT host adapter. You can use the Fibre Channel Port Configuration window to configure your host bus adapter for failover and load balancing.

   The Fibre Channel LUN Configuration window opens. You can configure your preferred paths, alternate paths, and make changes to the LUN configuration from the Fibre Channel LUN Configuration window.

9. Click on any path and the available configuration options display. For specific configuration information, refer to the online Help.

Note: Your LUNs might need to have their preferred paths changed to match the configuration of the FAStT storage subsystem.

10. Click **OK**.

    The Fibre Channel Port Configuration window opens.

11. The configuration is complete. Click **Apply**.

    The Security Check window opens.

12. Click **OK**.

    The Apply Configuration window opens.

13. Click **OK**.

Using the Hot Add utility

The host-agent software includes a utility called Hot Add that you can use to add new logical drives dynamically without restarting the system. The utility registers the new logical drives with the operating system so that you can use Disk Administrator to create partitions, add device names, and so on. The Hot Add utility is installed as part of the host-agent package.

After you finish creating the logical drives on a particular storage subsystem, go to the host that is attached to that storage subsystem and perform the following steps to use the Hot Add utility:

1. From the Xserver Graphical Console, type:

   ```
   hot_add
   ```

2. Press Enter.

   The new logical drives are available through the Disk Administrator.

Using the SM7devices utility

The SM7agent software includes a utility called SM7devices that you can use to view the storage subsystem logical drive that is associated with a particular operating system device name. This capability is helpful when you want to create drives, volumes, or a combination of both for the logical drive using nwconfig.

After you finish creating the logical drives on a particular storage subsystem, go to the host that is attached to that storage subsystem and perform the following steps to use SM7devices:

1. From the Server Console type:

   ```
   SM7devices
   ```

2. Press Enter.

   The software displays device identification information. For example, you might see:

   ```
   V596-A3-D0:0[Storage Subsystem MARKETING, Logical Drive DEBIT, LUN 0,
   WWN <600a0b800007545c0000008d3a308b6e>]

   V596-A3-D0:1 [Storage Subsystem MARKETING, Logical Drive DEBIT, LUN 1,
   WWN <600a0b80000756ec000000a93a307d2a>]

   V596-A3-D0:1F [Storage Subsystem MARKETING, Logical Drive Access volume,
   LUN 31, WWN <600a0b800007545c0000009000000000>]

   Where V596-A3-D0:0;
   ```

The numbers at the beginning of each line comprise the device name. The device name identifies the adapter or device as follows:

Vendor number [V596]. A unique number specific to the device vendor.

Adapter number [A3]. The instance number of an adapter registered with NWPA. In the example, A3 identifies the first instance of an adapter installed in the server.

Device number [D0]. The number of the disk or other device.

Logical unit number [0,1,1F]. The LUN identifies individual devices when more than one device is attached to one bus.

Storage Subsystem x = the storage subsystem name

Logical Drive x = the logical drive name

LUN x = the logical unit number associated with the logical drive

WWN x = the worldwide name for the logical drive

Uninstalling storage-management software components

Use the following procedure if you need to uninstall one or more of the components of Storage Manager 7.02.

1. From the Xserver Graphical Console, click **Novell** → **Install**.

   The Add/Remove Programs Properties window opens.

2. From the list of programs, select the component that you want to uninstall.

   For example, select **Fibre Channel Storage Manager 7 Client**.

3. Click **Add/Remove**.

   The Confirm File Deletion window opens.

4. Click **Yes** to start the uninstallation process.

5. When the uninstallation is completed, click **OK**.

Appendix A. Storage subsystem/controller information record

Table 13 provides a data sheet on which you can record storage subsystem names, management types, hardware Ethernet addresses, and IP addresses. Make a copy of this table and complete the information for your storage subsystems and controllers. Use the information that is recorded in Table 13 to set up the BOOTP table for the network server and the host or Domain Name System (DNS) table. The information in Table 13 helps you add storage subsystems after initial installation. The column headings show a page reference for detailed instructions about obtaining the information. For a sample information record, see Figure 5 on page 14.

Table 13. Storage subsystem and controller information record

Storage subsystem name (see page 16)	**Management type (see page 13)**	**Controllers—Ethernet and IP addresses, and host name (see pages 17 and 18)**		**Host—IP address and host name (see page 18)**
Storage subsystem name:				
Storage subsystem name:				
Storage subsystem name:				
Storage subsystem name:				
Storage subsystem name:				
Storage subsystem name:				
Storage subsystem name:				
Storage subsystem name:				

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