

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® 2000



Installation and Support Guide

NOTE

Before using this information and the product it supports, be sure to read the general information in Appendix A, “Notices,” on page 61.

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About this book

This book provides information about installing, setting up, and working with IBM® Netfinity® FASTT Storage Manager Version 7.02 in a Microsoft® Windows® 2000 operating system environment. This *Installation and Support Guide* is written for system administrators. Use this guide to:

- Determine the hardware and software 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 unique to Windows 2000.

How this book is organized

Chapter 1, “Introduction,” on page 1 provides an overview of IBM Netfinity 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 gives the procedure for installing the software in a standard (noncluster) environment.

Chapter 4, “Installing software in a cluster server environment,” on page 35 gives the procedure for installing the software in a cluster server environment.

Chapter 5, “Completing the installation,” on page 47 describes Enterprise Management and Subsystem Management, changing NVSRAM configuration settings, and completing the installation tasks.

Chapter 6, “Operating system support,” on page 55 discusses Windows 2000 restrictions, using the SM7devices utility, and other software features.

Appendix A, “Notices,” on page 61 provides product notices and trademark information.

Appendix B, “Storage subsystem/controller information record,” on page 63 provides a data sheet template that you use to create a controller information record.

Notices used in this book

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

- **Note:** These notices provide important tips, guidance, or advice.
- **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.
- **Important:** These notices provide information that might help you avoid inconvenient or problem situations.

Related publications

The following publications are available in Adobe Acrobat Portable Document Format (PDF) on the IBM Netfinity FAStT Storage Manager Version 7.02 CD and on the World Wide Web at <http://www.ibm.com/pc/support/>

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

- *IBM Netfinity FAStT Storage Manager Version 7.02 for Windows 2000 Installation and Support Guide* (this book)
- *IBM Netfinity FAStT Storage Manager Version 7.02 for Windows NT Installation and Support Guide*
- *IBM FAStT200 and FAStT200 HA Storage Servers Installation and User's Guide**
- *IBM Netfinity Fibre Channel Storage Manager Concepts Guide*

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

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

The help systems contain operating information common to all operating environments. Refer to this *Installation and Support Guide* for information specific to Windows 2000.

Additional publications are available for purchase from IBM. For a list of publications 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

This installation and support guide provides information on preparation, installation, configuration, and starting the IBM Netfinity FAStT Storage Manager Version 7.02 in a Windows 2000 environment. This book applies to system administrators. Before you begin 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 Concepts Guide - Use this reference document to become familiar with terminology and features of the storage-management software.

When you have finished the entire installation process, refer to the following online Help systems, which contain information common to all operating system environments. For installation information specific to Windows 2000, refer to this book.

- Enterprise Management window Help - Use this online Help system to learn more about working with the entire management domain.
- Subsystem Management window Help - Use this online Help system to learn more about managing individual storage subsystems.

Terminology

Throughout this book, the term *storage-management software* and *Storage Manager 7.02* refer to IBM Netfinity FAStT Storage Manager Version 7.02 as a whole. This book identifies by name the individual components of the storage-management software. Refer to the following table for product information status at the time of the Storage Manager 7.02 release.

Product name	Product release firmware version	Released storage-management software version	Machine type	Model
Netfinity FAStT200	4.x	7.02	3542	1RU
Netfinity FAStT200 HA	4.x	7.02	3542	2RU
Netfinity Fibre Channel RAID Controller Unit	3.x, 4x	7.01, 7.02	3526	1RU
Netfinity FAStT500 RAID Controller Enclosure Unit	4.x	7.01, 7.02	3552	1RU

Note: Product firmware must be at version 4.x to be compatible with Storage Manager 7.02.

It is important that you become familiar with the new terminology. For a complete list of the new terms, refer to *IBM Netfinity Fibre Channel Storage Manager Concepts Guide*.

Installation process overview

The installation involves the following main process:

- Reading the entire contents of this chapter.
- Chapter 2, “Preparing for installation,” on page 13.
- Chapter 3, “Installing software in a standard configuration,” on page 27 or Chapter 4, “Installing software in a cluster server environment,” on page 35.
- Chapter 5, “Completing the installation,” on page 47.

About the storage-management software

The storage-management software contains the following components:

- Client software
- Host-agent package
- RDAC package

Client software

The Storage Manager 7.02 client software provides the graphical user interface (GUI) for managing storage subsystems. It features two main components:

- **Enterprise Management window.** Use this window to add, remove, and monitor all storage subsystems within the management domain.
- **Subsystem Management window.** Use this window to manage individual storage subsystem components.

Host-agent package

The Storage Manager 7.02 host-agent package consists of two 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 58.

RDAC package

The Redundant Disk Array Controller (RDAC) package consists of the following software component:

RDAC multi-path device driver. The RDAC multi-path device driver provides failover support to the other controller if a component along the Fibre Channel I/O path fails.

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 upon 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 can be managed from the host computer or management station that is attached to the host through an Ethernet connection.

The advantages of managing storage subsystems through the host-agent include:

- 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.

The disadvantage of using the host-agent method include:

- 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 logical unit numbers (LUNs). Windows NT 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 logical drives supported” on page 56.

If you are upgrading controllers from firmware version 3.x to version 4.x and your host system has already configured its maximum number of LUNs, you must give up a LUN to be used as an access volume.

Important: Windows 2000 allows a maximum number of LUNs, depending on your host adapter. If your host already has the maximum number of LUNs configured, either use the directly managed method or give up a LUN for use as the access volume. For information on your specific configuration, see “Number of logical drives supported” on page 56. Contact IBM support for additional assistance.

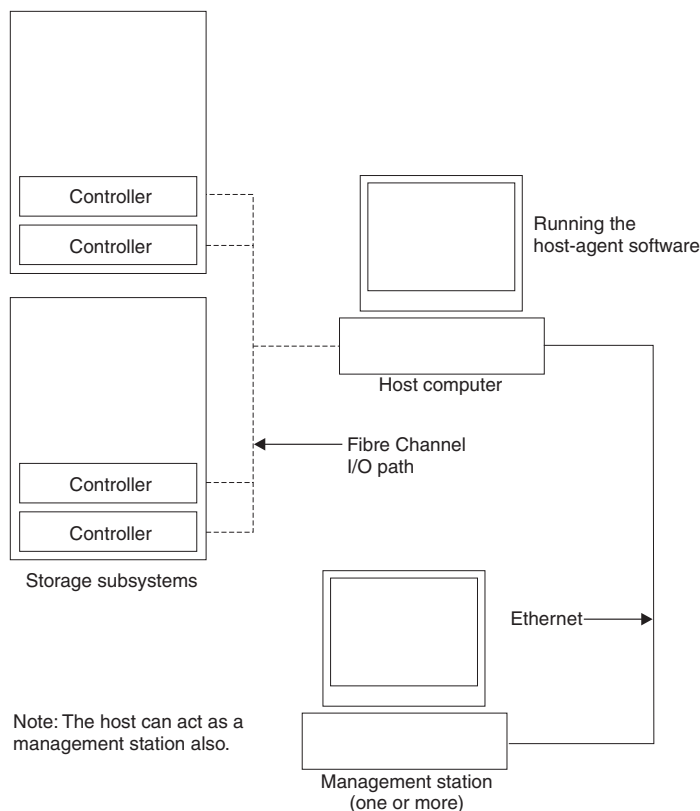


Figure 1. Host-agent managed storage subsystems

Directly managed method

In this method, you use storage management client software to manage the storage subsystem directly over the network through each controller's Ethernet connection, see Figure 2 on page 5. To do so, you must attach a cable to each Ethernet connection on the controller tray and define each controller's IP address and host name.

The advantages of using the directly managed method include:

- You can use a Windows 2000 management station to manage storage subsystems connected to a host that is using an operating system not supported by the storage-management software. Contact IBM support for more information.
- You can configure the maximum number of LUNs (logical unit numbers) supported by your operating system and host adapters. The directly managed method does not require an access volume and does not require the use a LUN.

The disadvantages of using this method directly include:

- Two Ethernet cables are required to connect both storage subsystem controllers to a network.
- You must specify an IP address or host name for each controller when you add storage subsystems.

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

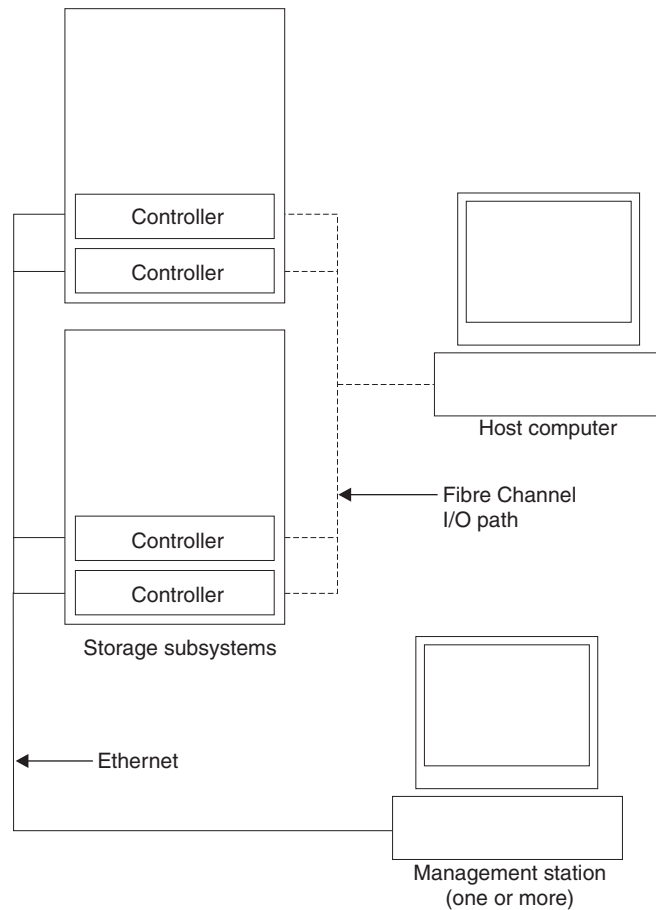


Figure 2. Directly managed storage subsystem

Configuration types

You can install Storage Manager 7.02 in one of two configurations:

- Standard (noncluster) configuration. Refer to Table 1 on page 6.
- Cluster server configuration. Refer to Table 2 on page 8.

Standard (noncluster) configuration

Table 1 on page 6 indicates where the storage-management software components are installed in a standard (noncluster) configuration. Figure 3 on page 7 shows a sample standard (noncluster) configuration.

Table 1. Where to install software components in a standard (noncluster) configuration

Software component	Where installed	Notes
Storage Manager 7.x client (SM7client)	<p>You can install the client package on either of the following:</p> <ul style="list-style-type: none"> • Management station (for direct or host-agent management) • Host computer (for a non-network configuration similar to previous versions of the storage-management software) 	<ul style="list-style-type: none"> • 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 If you install the SM7client software on the host computer, the host computer does not need to be connected to a network as long as 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.
RDAC	Host	The RDAC component is required for controller failover support and for installing and using the host-agent software. Make sure you install RDAC on each host connected to the storage subsystem.
Storage Manager 7.02 Agent (SM7agent)	Host	You must install the SM7agent software even if you choose not to manage storage subsystems with the host-agent software. The host-agent contains important utilities that are necessary for operating the storage-management software.

The following figure shows an example of a standard (noncluster) configuration.

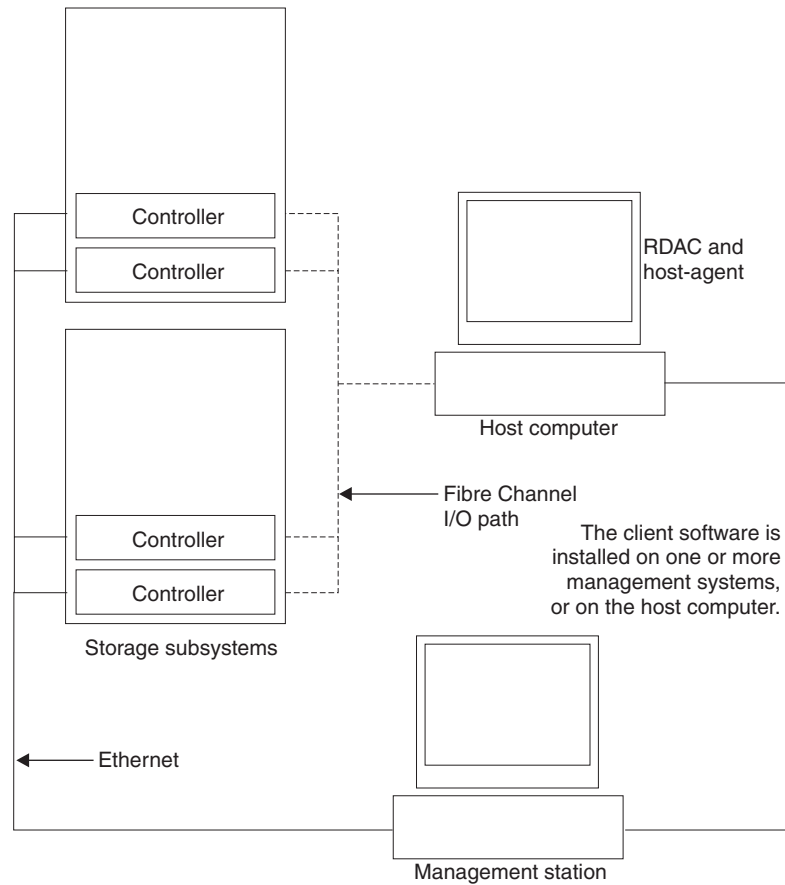


Figure 3. Sample standard (noncluster) configurations

Cluster server configuration

The following table describes the storage-management software components that are installed in a cluster server environment. Refer to Figure 4 on page 9 for a sample cluster configuration.

Important: Be sure to install all storage-management software components on each server in your cluster.

Table 2. Where to install software components in a cluster server configuration

Software component	Where installed	Notes
Storage Manager 7.02 client (SM7client)	<p>You can install the SM7client package on either of the following:</p> <ul style="list-style-type: none"> • Management station (for direct or host-agent management) • Nodes A and B (for direct or host-agent management) 	<ul style="list-style-type: none"> • 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. • Nodes A and B If you install the SM7client on the cluster servers (nodes A and B), the server does not need to be connected to a network as long as 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 cluster server.
RDAC	Nodes A and B	RDAC is required for controller failover support and for installing and using the host-agent software. Make sure that you install RDAC on <i>each</i> host connected to the storage subsystem.
Storage Manager 7.02 agent (SM7agent)	Nodes A and B	You must install the host-agent even if you choose not to manage storage subsystems with the host-agent software. The host-agent contains important utilities that are necessary for operating the storage-management software.

Figure 4 shows an example of a cluster server configuration.

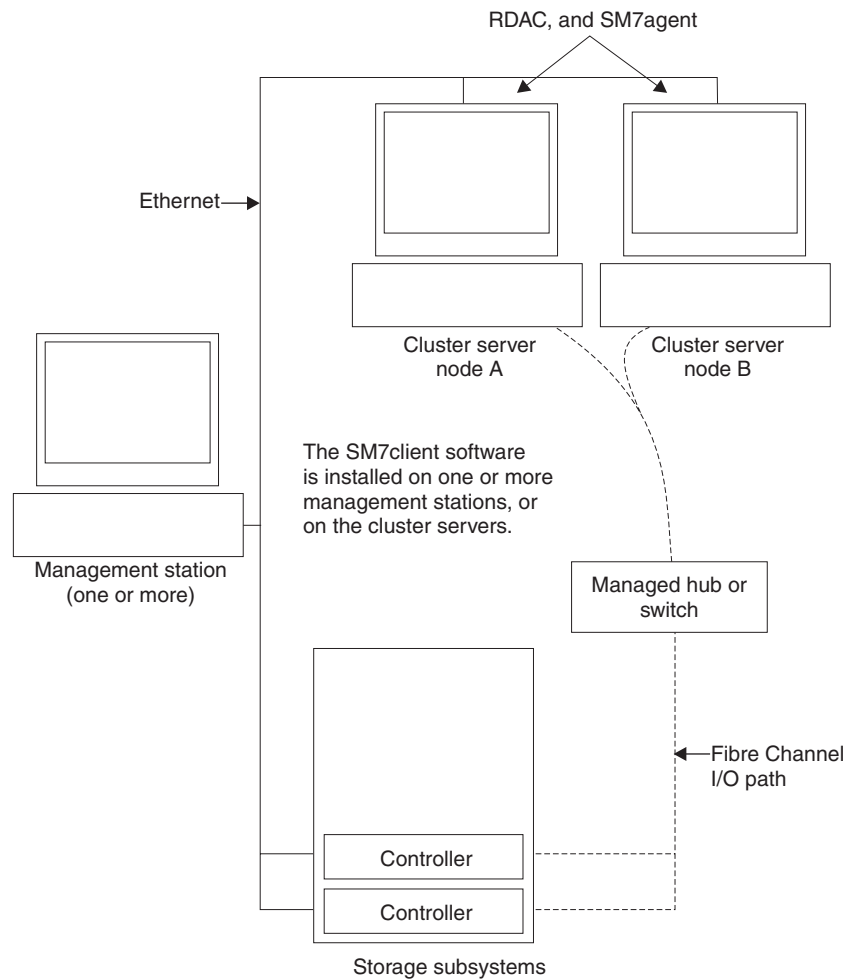


Figure 4. Sample cluster server configuration

Installation types

You can install the storage-management software in two types of hardware environments:

- **New storage subsystem environment.** You are installing new storage subsystems with controllers that are using firmware version 4.00.02, and that you will manage with Storage Manager 7.02. Go to "System requirements" on page 10.
- **Existing storage subsystem environment.** You are installing the storage-management software in an environment with existing storage subsystems. Refer to Table 3 on page 10 for your installation options in an environment with existing storage subsystems.

Table 3. Configurations for existing storage subsystems

Existing storage subsystems with:	Options
Controllers (machine types: 3526 and 3552) running firmware versions from 4.00.00 through 4.00.01	<p>Option 1 — Be sure to uninstall the previous version of the storage-management software before installing version 7.02. Then, install Storage Manager 7.02 and upgrade the controller firmware from versions 4.00.00 through 4.00.01 to version 4.00.02. You will manage the existing storage subsystems with Storage Manager 7.02. Go to “System requirements”.</p> <p>Option 2 — Continue using your existing version 4.00.00 through 4.00.01 controller firmware. Be sure to uninstall the previous version of the storage-management software before installing version 7.02. You can manage these existing storage subsystems through Storage Manager 7.02, which includes components that are compatible with these older firmware versions. The functional differences between your existing controller firmware and the controller firmware (4.00.02) is provided on the installation CD. Refer to the README file located in the \W2K\ directory on the installation CD for more information. Go to “System requirements”.</p>
Controller (machine type: 3526) running firmware version 3.x	<p>Option 1 — If upgrading from Windows NT 4.0 to Windows 2000, use the Windows NT migration process to upgrade the controllers to firmware version 4.00.02; then, upgrade your operating system from Windows NT to Windows 2000. For more information refer to Table 9 on page 27.</p>

System requirements

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

Hardware requirements

Table 4 lists the hardware required for installing Storage Manager 7.02.

Table 4. Hardware requirements for the storage-management software

Hardware component	Requirements
A BOOTP server (for directly managed storage subsystems only).	<ul style="list-style-type: none"> • Microsoft BOOTP-compatible DHCP server for Windows® • UNIX® BOOTP server
Storage subsystems (one or more).	<p>Storage subsystems with controllers running firmware version 4.00.00 through 4.00.02</p> <p>Note: Make sure that you read “Installation types” on page 9 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.</p>
Fibre Channel (FC) host adapters.	<p>The following Fibre Channel host adapters were tested with the storage-management software:</p> <ul style="list-style-type: none"> • IBM Netfinity FASTT host adapter (part number: 00N6881) <p>For information on specific host adapter requirements:</p> <ul style="list-style-type: none"> • Refer to \W2K\Host_Adapter directory on the installation CD. • Read the host adapter documentation. • Refer to the IBM Web site, http://www.ibm.com/pc/support

Table 4. Hardware requirements for the storage-management software

Hardware component	Requirements
Fibre Channel (FC) fabric switches (if needed for the desired configuration).	<p>The following Fibre Channel fabric switches were tested with the storage-management software:</p> <ul style="list-style-type: none"> • IBM 8-port Fibre Channel switch (machine type: 2109-S08) • IBM 16-port Fibre Channel switch (machine type: 2109-S16) <p>For specific Fibre Channel switch setup requirements:</p> <ul style="list-style-type: none"> • Read the switch documentation. • Refer to the IBM Web site, http://www.ibm.com/products
Fibre Channel (FC) managed hub (if needed for the desired configuration).	<p>The following managed hub was tested with the storage-management software:</p> <ul style="list-style-type: none"> • IBM Fibre Channel managed hub (machine type: 3534) <p>For specific Fibre Channel managed hub setup requirements:</p> <ul style="list-style-type: none"> • Read the managed hub documentation. • Refer to the IBM Web site, http://www.ibm.com/products

Disk space and administrators privilege requirements

Table 5 lists the disk space and administrator privileges required for installing the new version of the storage-management software.

Table 5. Disk space and administrator privileges requirements

Package	Disk space requirement	Administrator privilege
Client	35 MB	Not required
RDAC	1 MB	Required
Host-agent	1 MB	Required

Operating system requirements

Each management station, host computer, or cluster server requires one of the following operating systems:

Management stations and host computers. Install one of the following operating systems:

- Windows 2000 Server
- Windows 2000 Professional
- Windows 2000 Advanced Server (required for a cluster environment).

Cluster servers. Install the Windows 2000 Advanced Server operating system.

If you are upgrading from Windows NT 4.0 to Windows 2000 in a standard (noncluster) configuration, go to “Upgrading from Windows NT 4.0 to Windows 2000 in a standard configuration” on page 13.

If you are upgrading from Windows NT 4.0 to Windows 2000 in a cluster configuration, go to “Upgrading from Windows NT 4.0 to Windows 2000 in a cluster configuration” on page 13.

If you are not upgrading from Windows NT to Windows 2000, go to “Deciding how to manage storage subsystems” on page 14.

Chapter 2. Preparing for installation

This chapter helps you plan and prepare for installing the storage-management software.

Upgrading from Windows NT 4.0 to Windows 2000 in a standard configuration

If you already have Windows 2000 installed as your operating system, go to “Deciding how to manage storage subsystems” on page 14.

Important: To avoid possible data loss, you must follow the instructions to uninstall any previous versions of the storage-management software, including RDAC, before upgrading from Windows NT 4.0 to Windows 2000.

You cannot upgrade from Windows NT to Windows 2000 if your storage subsystem is the boot device.

Note: Controllers *must* be running firmware 4.x prior to upgrade.

Follow these steps to upgrade from Windows NT 4.0 to Windows 2000:

1. Be sure that the storage subsystem contains no system-dependent files or directories, such as paging files.
Note: All configuration information is deleted during the uninstall process. You will need to install the storage-management software as if it is a first time installation.
2. Uninstall the storage-management software using the uninstall procedure that came with the version of the storage-management software that you are currently using. Do *not* use the procedure given in this book.
3. Use Microsoft’s instructions to upgrade to Windows 2000.
4. Install Storage Manager 7.02 as a new installation by following the instructions beginning at “Deciding how to manage storage subsystems” on page 14.

Upgrading from Windows NT 4.0 to Windows 2000 in a cluster configuration

If you already have Windows 2000 installed as your operating system, go to “Deciding how to manage storage subsystems” on page 14.

Note: To avoid losing access to a cluster, you need to do a rolling upgrade. A rolling upgrade means upgrading so that the services and resources offered by the cluster are always available, even though the nodes being upgraded are not available.

If you have applications installed in the cluster environment that do not support a rolling upgrade, then you will have to either:

- Put those resources offline before the upgrade, and then put them back online afterwards, or
- Use a different upgrade method

Follow these steps to upgrade from Windows NT 4.0, Enterprise Edition, to Windows 2000 Advanced Server:

1. After you install the cluster server, reinstall the latest Service Pack for NT 4.0 (Service Pack 5.0 or greater).
2. On node A, open Cluster Administrator.
3. Highlight node A, then pause the node (**File** → **Pause Node**).
4. Double-click on the Active Groups folder in the right window of Cluster Administrator.
5. Select each group listed, and move it to node B.
6. Uninstall all storage-management software components from node A. Do *not* use the procedure given in this book. Uninstall the storage-management software using the uninstall procedure that came with the version of the storage-management software that you are currently using.
7. Follow Microsoft's instructions to upgrade node A from Windows NT to Windows 2000 Advanced Servers.

Note: During the upgrade, the existing cluster server installation will be detected, and clustering for Windows 2000 Advanced Server will be installed. After the upgrade is finished, node A will rejoin the cluster, but it will still be paused.

8. Verify that the Host Bus Adapter (HBA) driver versions are correct. If they are not the certified version, use the README file in \W2K\Host_Adapter directory on the installation CD to upgrade the driver versions before continuing.
9. Verify that node A was successfully upgraded to Windows 2000 Advanced Server.
10. Install RDAC for Windows 2000 onto node A.
11. Install Storage Manager 7.02 for Windows 2000 components (SM7client and SM7agent)
12. Run Cluster Administrator, and resume the node (**File** → **Resume Node**).
13. Repeat steps 1 through 12 on node B.
14. Install Storage Manager 7.02 as a new installation by following the instructions beginning at "Deciding how to manage storage subsystems".

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.

Reviewing a sample network

Figure 5 on page 15 shows an example of a directly managed storage subsystem network setup (see network A). This network contains the following components:

- BOOTP server

- Management station (NMS) 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 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

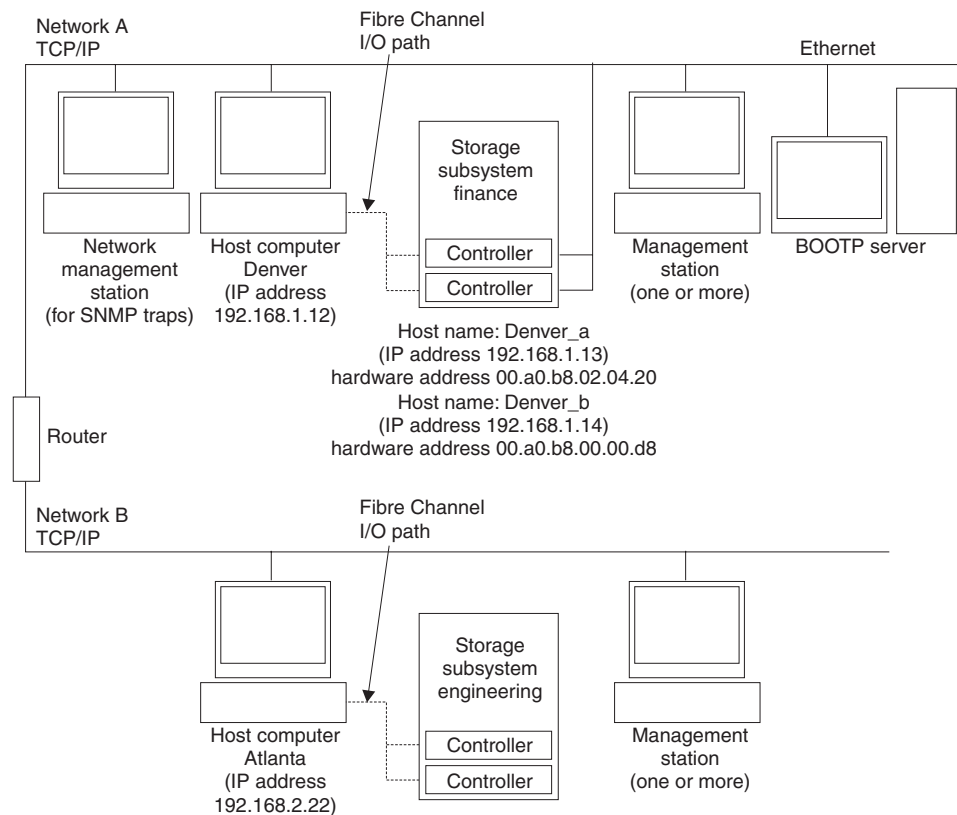


Figure 5. Sample network using directly and host-agent managed storage subsystems

Go to “Preparing for a network installation”.

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 needed for the software to operate correctly. To do this, perform the tasks summarized in Table 6 on page 16 (referring to the appropriate procedures). Use Table 12 on page 63 as a data sheet to record storage subsystem and controller information. An example of a completed information record is shown in Table 7 on page 17.

Table 6. 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.	Direct and host-agent	To ensure that the network hardware is present.	The installation guide specific to the hardware components.
Step 2 - Establish and record a naming convention for the storage subsystems connected to the network.	Direct and host-agent	To add the storage subsystems to the management domain after installing the software.	"Deciding how to name the storage subsystems" on page 17.
Step 3 - Determine the hardware Ethernet address for each controller in all storage subsystems 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 18.
Step 4 - Obtain IP addresses and host names from the network administrator.	Direct and host-agent	<p>For host-agent management, you need the IP addresses and host names of the host on which the host-agent software will run.</p> <p>For direct management, you need the IP addresses of each controller in the storage subsystems to configure the BOOTP server. The BOOTP server can then provide network configuration information to the controllers. Also, you use the IP addresses of the controllers to set up the host or DNS table.</p>	"Obtaining IP addresses for hosts and controllers" on page 20
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 20.
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.	"Verify the TCP/IP protocol and set up the host or DNS table" on page 24.
Step 7 - Power on the devices connected to the network.	Direct and host-agent	To ensure that all devices and links are operational.	The installation guide specific to the hardware components.

The following table shows a sample information record with entries for a directly managed storage subsystem and a host-agent managed storage subsystem.

Table 7. Sample information record

Storage subsystem name (see page 17)	Management type (see page 14)	Controllers—Ethernet and IP addresses, and host name (see pages 18 and 20)		Host—IP address and host name (see page 20)
		Controller A	Controller B	
Storage subsystem name: Finance	Direct	Hardware Ethernet address = 00a0b8020420	Hardware Ethernet address = 00a0b80000d8	
		IP address = 192.168.1.13	IP address = 192.168.1.14	
		Host = Denver_a	Host = Denver_b	
Storage subsystem name: Engineering	Host-agent			IP address = 192.168.2.22
				Host = Atlanta

Table 12 on page 63 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 recorded in Table 12 to set up the BOOTP table for the network server and the host or DNS (Domain Name System) table. The information in Table 12 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 Table 7.

Completing the preparation tasks

In addition to the task information outlined in Table 6 on page 16, the following list contains tasks that you might need to perform before you are ready to install Storage Manager 7.02.

- “Deciding how to manage storage subsystems” on page 14.
- “Identifying the hardware Ethernet address for each controller” on page 18.
- “Obtaining IP addresses for hosts and controllers” on page 20.
- “Setting up the BOOTP server” on page 20.
- “Verify the TCP/IP protocol and set up the host or DNS table” on page 24.
- “Enabling ports for operation through a firewall” on page 24.

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 display 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 meaning in the future.
- The software displays storage-subsystem names with the prefix Storage Subsystem. Therefore, if you rename a storage subsystem Engineering it displays as Storage Subsystem Engineering.

When you have decided on a naming scheme, record the storage subsystem names in the information record (Table 12 on page 63).

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 20.

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 20.

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

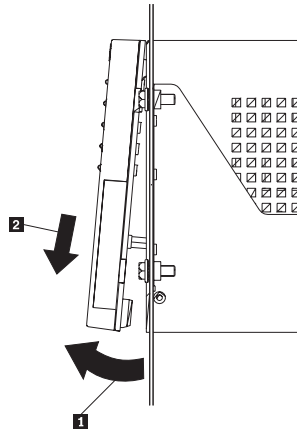


Figure 6. Removing the controller-unit bezel from machine types 3526 and 3552

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

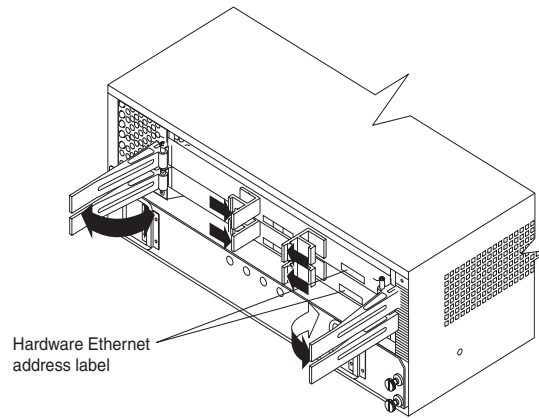


Figure 7. Location of the hardware Ethernet address on machine types 3526 and 3552

3. The hardware Ethernet address labels are located on the front of each controller, as shown in Figure 7 and Figure 8.
The number will be in the form xx.xx.xx.xx.xx.xx (for example, 00.a0.b8.00.00.d8).

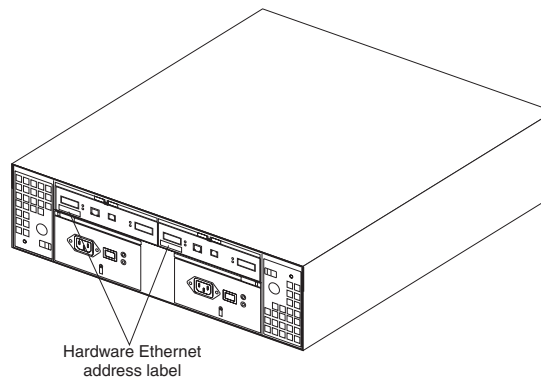


Figure 8. Location of the hardware Ethernet address on machine type 3542

4. Record each Ethernet address in the information record (Table 12 on page 63).
5. To replace the bezel on 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 on page 20.

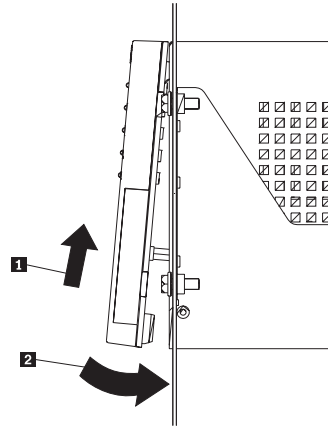


Figure 9. Replacing the controller-unit bezel on models 3526 and 3552

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

Obtaining IP addresses for hosts and controllers

If you	Go to
Manage storage subsystems directly	Step 1
Manage storage subsystems with the host-agent	Step 2

Note: If you intend to manage some storage subsystems directly and others with the host-agent software, complete both of the following steps.

1. Assign (or obtain from your network administrator) a unique IP address and the 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 12 on page 63). Then, go to “Setting up the BOOTP server”.
2. Contact your network administrator to obtain the IP address and host name for each host on which you plan to install the host-agent software for managing storage subsystems. Record the IP address and host name for the host in the information record (Table 12 on page 63). Then, go to “Verify the TCP/IP protocol and set up the host or DNS table” on page 24.

Setting up the BOOTP server

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

Select the appropriate procedure for setting up the BOOTP server.

- When using a Microsoft BOOTP-compatible DHCP server, go to “Using Microsoft DHCP as a BOOTP-compatible server” on page 21.
- When using a UNIX BOOTP server, go to “Using a UNIX BOOTP server” on page 22.

If you plan to manage storage subsystems using the host-agent software, go to “Verify the TCP/IP protocol and set up the host or DNS table” on page 24.

Using Microsoft DHCP as a BOOTP-compatible server

You must use a version of Dynamic Host Configuration Protocol (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”. If a DHCP Manager is not installed, use the following installation procedure.

Use the following procedure to install the DHCP Manager:

1. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**
2. In the Network window that opens, scroll to and click the **Networking Services** → **Details**.
3. Under Subcomponents of Networking Services, check the box next to Dynamic Host Configuration Protocol, and click **OK**.
4. If prompted, type the full path to the Windows 2000 distribution files and click **Continue**.

The required files will be copied to your hard drive. The server software can be used after restarting the system.

5. Continue with “Setting up a DHCP server”.

Note: After installing the DHCP Manager, you can refer to its online help for additional information.

Setting up a DHCP server

Use the following procedure to create a scope and to set up the DHCP server. A scope defines a group of controllers by their IP addresses. You must create and configure a scope so that dynamic IP addresses can be assigned to controllers on your network. Refer to the information that you provided in Table 12 on page 63. Before you begin, read through the instructions to determine what information is required, and then, request the information from your network administrator.

Note: The following steps and window example assume that you are configuring a Windows 2000 DHCP server using its DHCP Manager.

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

The DHCP Manager window opens.

2. Highlight the server you want to configure.

The add a scope window opens. Use the following instructions.

- a. Enter a scope name and description.

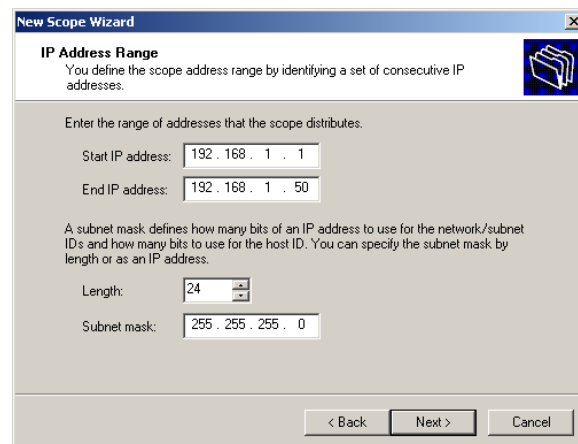


Figure 10. Create scope - (Local) window

- b. 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 192.168.1.0 subnet, set the starting address to 192.168.1.1, and set the ending address to 192.168.1.50.

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.

- c. Type the subnet mask (obtained from your network administrator).
- d. Using the Add Exclusions screen, enter IP addresses that need to be excluded from the beginning and ending addresses that you just entered in step b, then click **Add**.
- e. Set the Lease Duration (obtained from your network administrator).
- f. Configure the DHCP options:

Note: Be sure that you configure the DHCP options now. If you want to configure the options later, go to the DHCP screen and open the directory structure for the Scope that you created in step 2. Right-click **Scope Options** → **Configure Options** and follow the instructions.

- (1) To configure the DHCP options, begin by adding an IP address for a router.
- (2) Add the domain name and DNS servers.
- (3) Enter the server name and IP address in the WINS Servers window.
- (4) When the scope has successfully completed, click **Yes** to activate it.

You return to the DHCP Manager window.

3. Open the directory structure below the scope you created in step a on page 21.
4. Right-click on Reservation, select **New Reservation** and follow the instructions.

Important: At the bottom of the New Reservations window, make a selection under Supported Type. Be sure that you select both.

- a. Click **General Tab**. Scroll through the list and select **Host Name**.
 - b. Type a specific host name for each controller. Be sure that you use the same name assigned as the reservation name.
 - c. Repeat step 4 until you have added the host names for all of the controllers.
 - d. When you finish typing the information for all of the controllers, click **Close**.
5. When you have finished setting up the DHCP server, you must recycle the power before any modifications in the DHCP will take effect.

If the storage subsystem is powered up, to recycle the power, power down the storage subsystems. Then, power up the storage subsystems

6. Continue with “Verify the TCP/IP protocol and set up the host or DNS table” on page 24.

Using a UNIX BOOTP server

Table 8 and Table 12 on page 63 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 8. 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=255.255.255.0)
Router	IP address of the host computer that routes packets to networks.	dot notation (gw=192.168.1.1)
Host name for the controller	Host name that is associated with the controller (see Table 12 on page 63).	host name (Denver_a)
IP address	IP address of the controller (see Table 12 on page 63).	dot notation (ip=192.168.1.13)
Ethernet address	The Ethernet address of the controller hardware (see Table 12 on page 63).	hexadecimal notation (ha=00a0b8020420)

Note: The RMS and NMS entries used in previous versions of the 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.x.

Example for editing a UNIX BOOTP table

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 15. 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=192.168.1.1:\

hn:

denver_a:\

tc=s4.default:\ (refers to common settings)

ip=192.168.1.13:\

ha=00a0b8020420:

denver_b:\

tc=s4.default:\

ip=192.168.1.14:\

ha=00a0b80000d8:
```

When you finish setting up the BOOTP table, perform the following:

1. If the storage subsystem power is on, power down the subsystem, then, power up the storage subsystems.

You must cycle the power to the storage subsystems for the parameters in the BOOTP table to take affect.

2. Go to “Verify the TCP/IP protocol and set up the host or DNS table”.

Verify the TCP/IP protocol and set up the host or DNS table

Make sure that the host names for the controller correspond to the appropriate IP addresses for the controllers. Use the following procedure to verify that the TCP/IP-protocol software is installed on the management station and to set up the host or DNS (Domain Name System) table.

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

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

Note: If the TCP/IP software is not installed, install it from the Windows 2000 Installation CD. Click **Start** → **Settings** → **Control Panel** → **Network** → **Properties** → **Install** → **Protocols** → **Add**.

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 (or WNS), edit the two host tables found in the following directories.

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

c:\winnt\system32\drivers\etc\lmhosts

For example, to set up the host tables for the controllers connected to Network A (Figure 5 on page 15), 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
192.168.1.13	denver_a
192.168.1.14	denver_b

Important: Potential security risks occur when you open ports to your network.

3. If you want to manage storage subsystems through a firewall, continue with “Enabling ports for operation through a firewall”.

Enabling ports for operation through a firewall

If you plan to manage storage subsystems through a packet-filtering firewall, configure the firewall to open port 2463 to TCP data.

Preparing to install the storage-management software

You have completed the preparations tasks and are now ready to install the storage-management software. The installation process you follow depends on how you want to configure the system.

If you	Go to
Install the software in a standard (non-cluster) configuration	Chapter 3, "Installing software in a standard configuration," on page 27.
Install the software in a cluster server environment	Chapter 4, "Installing software in a cluster server environment," on page 35.

Chapter 3. Installing software in a standard configuration

This chapter describes how to install the storage-management software in a standard (noncluster) 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.

Pre-installation process

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

- You do *not* have existing storage subsystems.
- You do have existing storage subsystems.

Use Table 9 to determine an installation process.

Table 9. Determining your installation process in a standard (noncluster) configuration

Current environment	Planned environment	Action
No existing storage subsystems	New storage subsystems with controllers that will use version 4.00.02 firmware and will be managed with Storage Manager 7.02.	Go to "New installation process" on page 28.
(machine type 3526) Existing storage subsystems with controllers that have firmware version 3.x, and Storage Manager version 6.22 Running on a Windows NT 4.0 operating system.	Upgrade from Windows NT to Windows 2000. Upgrade storage subsystems with controllers that will use version 4.00.02 firmware and will be managed with Storage Manager 7.02 for Windows 2000.	To upgrade controller firmware from 3.x to 4.00.02, use the migration process defined in Netfinity FAS <i>T</i> Storage Manager Version 7.02 for Windows NT Installation and Support Guide. Note: You must upgrade controller firmware from version 3.x to 4.00.02 before upgrading the operating system from Windows NT to Windows 2000. To upgrade Windows NT to Windows 2000, go to "Upgrading from Windows NT 4.0 to Windows 2000 in a standard configuration" on page 13.
(machine types 3526 and 3552) Existing storage subsystems with controllers that have firmware versions 4.00.00 through 4.00.01. running Windows NT 4.0 operating system.	Upgrade from Windows NT to Windows 2000 with storage subsystems that will be managed with Storage Manager 7.02.	Go to "Upgrading from Windows NT 4.0 to Windows 2000 in a standard configuration" on page 13.

Table 9. Determining your installation process in a standard (noncluster) configuration

Current environment	Planned environment	Action
(machine types 3526 and 3552) 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 4.00.02 firmware and will be managed with Storage Manager 7.02.	<ol style="list-style-type: none"> 1. Uninstall Storage Manager version 7.0 or 7.01. 2. Go to “New installation process”. 3. Update the NVSRAM and controller firmware to version 4.00.02 using the storage-management software online help.

New installation process

Begin the installation of the storage-management software with “Installing the SM7client package”. Continue the process until you have completed “Installing the SM7agent package” on page 31.

Figure 11 shows a flowchart of the installation process.

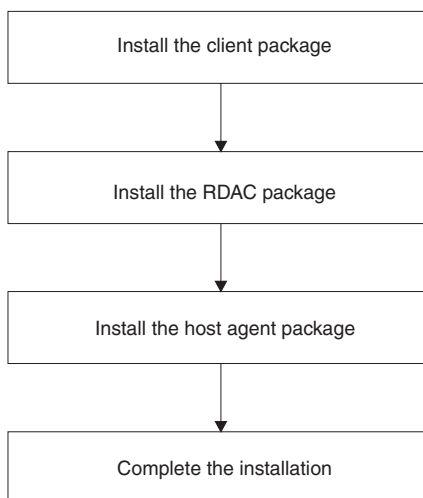


Figure 11. New installation process

Installing the SM7client package

Use the following procedure to install the SM7client on each management station that is configured with one of the following:

- Windows 2000 Server
- Windows 2000 Professional
- Windows 2000 Advanced Server (required for a cluster environment)

Important: 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. The host operating system must be running Windows 2000 Server, Windows 2000 Professional, or Windows 2000 Advanced Server (required for a cluster environment).

Installation instructions

Before you install the software, make sure that:

- The management station has at least 35 MB of available disk space.
- The display 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.

To install the SM7client package:

1. Insert the IBM Netfinity FASiT Storage Manager CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**.
The Add/Remove Programs Properties window opens.
3. Click **Install**, and follow the instructions on the screen.
4. Click **Browse**.
5. Select the CD-ROM drive.
6. Select the \W2K\SM7client directory.
7. Select the setup.exe file, and then click **Open**.
8. Click **Next**.
The setup program Welcome window opens.
9. Click **Next** to begin the installation.
The Choose Destination Location window opens.
10. Click **Browse** if you want to change the destination location.
11. Click **Next**.
12. When the installation is complete, click **Finish**.

Verifying the SM7client installation

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

1. Click **Start** → **Programs**.
2. Verify that the Netfinity Fibre Channel Storage Manager 7 client appears in the list of programs.
3. If you are installing SM7client on only a management station. Go to Chapter 5, “Completing the installation,” on page 47. Otherwise, go to “Installing the RDAC package”.

Installing the RDAC package

Use the following procedure to install the RDAC package on a host computer that is connected to one or more storage subsystems.

RDAC contains the multipath device driver that is necessary for controller failover support.

Important: You must install RDAC before installing the SM7agent package.

Use the following procedure to install RDAC on each host computer that has at least 1 MB of available disk space and is configured with one of the following:

- Windows 2000 Server
- Windows 2000 Professional

- Windows 2000 Advanced Server (required for a cluster environment)

Assigning drive letters

Note: If you are installing the RDAC software on an existing configuration, go to “Installation instructions”.

The installation procedure installs the RDAC device driver before the Windows 2000 device driver. This is necessary to enable the RDAC. However, this means that the system recognizes the storage subsystem logical drives before it recognizes any local drives, and assigns drive letters accordingly.

Note: *Before* you install this software, you *must* have static drive letters assigned to the existing local drives.

Use the following procedure to determine if you need to assign static drive letters and to assign them, if necessary:

1. Power off the storage subsystem to prevent Disk Administrator (WINDISK) from locking up while you are assigning drive letters and installing the RDAC device driver.
2. Click **Start** → **Programs** → **Administrative Tools** → **Computer Management** → **Storage** → **Disk Management** to view the disk configuration and check the number of partitions.
 - If you have only one partition, go the step 4.
 - If you have two partitions, go to step 3.
3. If you have at least two partitions (the boot partition and one other partition) and both of the following conditions apply, go to “Installation instructions”.
 - The last partition that you created was created with Disk Management.
 - The partition has a drive letter assigned and has a status of Unknown or has a file system on it (that is, it has a status other than Unformatted).
4. Use the following procedure to create a new partition.
 - a. Select a drive containing free disk space, and then, right-click on that drive. The Write Signature and upgrade disk window opens.
 - b. Click **Partition** → **Create**. The partition is created (a drive letter is assigned, and the partition status is unformatted).
 - c. Click **Partition** → **Commit Changes Now**. The partition status changes to Unknown, and static drive letters are assigned to all existing partitions.
5. Continue with “Installation instructions”.

Installation instructions

Before you install the software, make sure that:

- You have Administrator privileges on the host computer.
- The host computer is configured with Windows 2000 Server, Windows 2000 Professional or Windows 2000 Advanced Server.
- The host computer has at least 1 MB of available disk space.
- The display 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.

Install the RDAC package:

1. Insert the IBM Netfinity FASTT Storage Manager CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**.
The Remove Programs Properties window opens.
3. Click **Install**, and follow the instructions on the screen.
4. Click **Browse**.
The Browse window opens.
5. Select the CD-ROM drive.
6. Select the \W2K\RDAC directory.
7. Select the setup.exe file, and then click **Open**.
8. Click **Next**.
The setup program Welcome window opens.
9. Click **Next** to begin the installation.
When RDAC is installed, the Setup Complete window opens.
10. Click **No, I will restart my computer later**; then, click **Finish**.
11. Go to “Installing the SM7agent package”.

Installing the SM7agent package

Use the following procedure to install SM7agent on each host computer 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 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 58.

Important: You cannot install SM7agent unless RDAC is installed.

You must install SM7agent even if you do not intend to manage storage subsystems through the SM7agent software.

Installation instructions

Before you install the software, make sure that:

- You have Administrator privileges on the host computer.
- The host computer is configured with Windows 2000 Server, Windows 2000 Professional or Windows 2000 Advanced Server (required for a cluster environment).
- The host computer has at least 1 MB of available disk space.
- The display properties are set to a minimum screen resolution of 640 x 480 pixels and a palette of 256 or more.
- You installed RDAC.
- You close all other programs.

Install the SM7agent:

1. Insert the IBM Netfinity FASTT Storage Manager CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**.
The Add/Remove Programs Properties window opens.
3. Click **Install**, and follow the instructions on the screen.
4. Click **Browse**.
The Browse window opens.
5. Select the CD-ROM drive.
6. Select the \W2K\SM7agent directory.
7. Select the setup.exe file, and then click **Open**.
8. Click **Next**.
The setup program Welcome window opens.
9. Click **Next** to begin the installation.
When SM7agent is installed, the Setup Complete window opens.
10. You must restart the host to ensure that all changes take effect. Click **Finish** to restart the host.

Verifying the RDAC installation

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

Note: Make sure that all storage subsystems are connected to the host and powered on.

1. Right-click on My Computer.
2. Click **Manage** → **System Tools** → **System Information** → **Software Environment** → **Drivers**. The Services window opens.
3. Scroll through the list of drivers until you find *rdacfltr*.
4. Rdacfltr must be displayed with the state type Running and status OK. Otherwise, reinstall RDAC.

Verifying the SM7agent installation

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

Note: Make sure that all storage subsystems are connected to the host and powered on.

1. Click **Start** → **Programs** → **Administrative Tools** → **Services**. The Services window opens.
2. Scroll through the list of services until you find the Netfinity Fibre Channel Storage Manager 7 agent.
3. SM7agent must be displayed with the startup type Automatic and status Started. Otherwise, reinstall SM7agent.
4. If you are upgrading from an earlier version of the storage-management software, use the procedure in the storage-management software online help for downloading the latest version of NVSRAM and controller firmware. Otherwise, go to step 5.
5. If you plan to use the host-agent software to manage one or more storage subsystems, go to Chapter 5, "Completing the installation," on page 47.

6. If you do not plan to use the host-agent software to manage one or more storage subsystems, disable the host-agent service in the following procedure.
 - a. Select **Start** → **Programs** → **Administrative Tools** → **Services**.
 - b. From the list of displayed services, right-click on the host-agent.
 - c. Select **Properties** → **Startup Type** → select **Manual** from the drop-down menu.
 - d. Select **OK**.
7. Go to Chapter 5, “Completing the installation,” on page 47.

Chapter 4. Installing software in a cluster server environment

This chapter describes how to install the storage-management software in the multi-host configuration, using cluster server software. The installation process you will use depends on your storage subsystem environment. Refer to Table 10.

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. To ensure proper installation, make sure you have read the entire contents of chapter 1, including all supporting documentation listed in Chapter 1, “Introduction,” on page 1. You must complete all preparation tasks described in Chapter 2, “Preparing for installation,” on page 13.

Pre-installation process

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

- You do not have existing storage subsystems.
- You do have existing storage subsystems.

Use Table 10 to determine an installation process.

Table 10. Determining your installation process in a cluster server configuration

Current environment	Planned environment	Action
No existing storage subsystems	New storage subsystems with controllers that will use version 4.00.02 firmware and will be managed with Storage Manager Version 7.02.	Go to “New installation process” on page 28.
Existing storage subsystems with controllers that have firmware version 3.x, and storage-management software version 6.22 running on a Windows NT 4.0 operating system. (machine type 3526)	Upgrade from Windows NT to Windows 2000. Upgrade storage subsystems with controllers that will use version 4.00.02 firmware and will be managed with Storage Manager Version 7.02 for Windows 2000.	To upgrade controller firmware from 3.x to 4.00.02, use the migration process for cluster configuration defined in <i>Netfinity FAST Storage Manager Version 7.02 for Windows NT Installation and Support Guide</i> . Note: You must upgrade controller firmware from version 3.x to 4.00.02 before upgrading the operating system from Windows NT to Windows 2000. To upgrade Windows NT to Windows 2000, go to “Upgrading from Windows NT 4.0 to Windows 2000 in a standard configuration” on page 13.

Table 10. Determining your installation process in a cluster server configuration

Current environment	Planned environment	Action
Existing storage subsystems with controllers that have firmware versions 4.00.00 through 4.00.01. (machine types 3526 and 3552)	Upgrade from Windows NT to Windows 2000 with storage subsystems that will be managed with Storage Manager Version 7.02.	Go to “Upgrading from Windows NT 4.0 to Windows 2000 in a cluster configuration” on page 13.
	Upgraded storage subsystems with controllers that will use version 4.00.02 firmware and will be managed with Storage Manager Version 7.02.	<ol style="list-style-type: none"> 1. Uninstall Storage Manager version 7.0 or 7.01. 2. Go to “New installation process” on page 28. 3. Update the NVSRAM and firmware to version 4.00.02 using the storage-management software online help.

New installation

Before you begin an installation with existing storage subsystems, refer to your hardware installation documentation for the specific configuration required for your hardware to support operating the storage-management software in a cluster configuration.

If you have a management station connected to an Ethernet network, install the SM7client and complete the install for a host installation. Refer to Figure 12 for the new installation process.

Important: After connecting the storage subsystems to both nodes, do not start Windows 2000 on both nodes at the same time until you install the cluster software on at least one node. To suspend Windows 2000 startup on node B, press the spacebar at the operating system (OS) startup. Do not install the cluster software until instructed to do so.

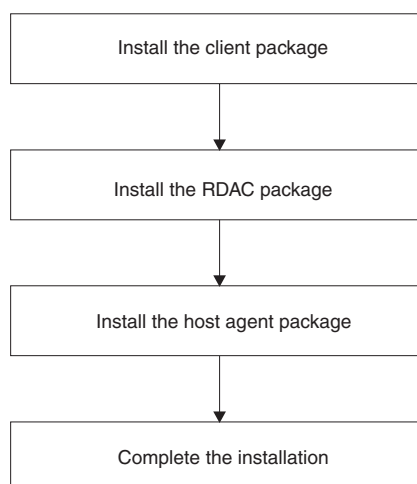


Figure 12. Process for a new installation

Installing the SM7client package

Install the SM7client package on each management station. The package can be installed on a host, node A or node B, or on both node A and node B configured with Windows 2000 Advanced Server.

Install the TCP/IP software on the host computer and assign a static IP address. Be sure that the SM7client is installed on each management station that is configured with one of the following:

- Windows 2000 Server
- Windows 2000 Professional
- Windows 2000 Advanced Server (required for a cluster environment)

Important: 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. The host operating system must be running Windows 2000 Advanced Server, Windows 2000 Professional, or Windows 2000 Advanced Server (required for a cluster environment).

If you are installing SM7client on only a management station go to Go Chapter 5, “Completing the installation,” on page 47.

Installation Instructions

Before you install the software, make sure that:

- Each management station has at least 35 MB of available disk space.
- The display 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.

Install the SM7client:

1. Insert the IBM Netfinity FAStT Storage Manager installation CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**.
The Add//Remove Programs Properties window opens.
3. Click **Install**, and follow the instructions on the screen.
4. Click **Browse**.
The Browse window opens.
5. Select the CD-ROM drive.
6. Select the \W2K\SM7client directory.
7. Select the setup.exe file, and then click **Open**.
8. Click **Next**.
The setup program Welcome window opens.
9. Click **Next** to begin the installation.
The Choose Destination Location window opens.
10. Click **Browse** if you want to change the destination location.
11. Click **Next** to begin the installation.
12. When the installation is complete, click **Finish**.

Verifying the SM7client installation

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

1. Click **Start** → **Programs**.
2. Verify that Netfinity Fibre Channel Storage Manager 7 client appears in the list of programs.
3. If you are installing SM7client on only a management station go to Go Chapter 5, “Completing the installation,” on page 47.

Installing the RDAC package

Use the procedures in the following sections to install the RDAC package on each host computer that is connected to one or more storage subsystems. Make sure that each host computer has at least 1 MB of available disk space and is configured with Windows 2000 Advanced Server (required for a cluster environment).

RDAC contains the multipath device driver that is necessary for controller failover support.

Assigning drive letters

The installation procedure installs the RDAC device driver before the Windows 2000 device driver. This is necessary to enable the RDAC. However, this means that the system recognizes the storage subsystem logical drives before it recognizes any local drives, and assigns drive letters accordingly.

Note: *Before* you install this software, you *must* have static drive letters assigned to the existing local drives.

Use the following procedure to determine if you need to assign static drive letters and to assign them, if necessary:

1. Power off the storage subsystem to prevent Disk Administrator (WINDISK) from locking up while you are assigning drive letters and installing the RDAC device driver.
2. Click **Start** → **Programs** → **Administrative Tools** → **Computer Management** → **Storage** → **Disk Management** to view the disk configuration and check the number of partitions.
 - If you have only one partition, go the step 4.
 - If you have two partitions, go to step 3.
3. If you have at least two partitions (the boot partition and one other partition) and both of the following conditions apply, go to “Installation instructions” on page 39.
 - The last partition that you created was created with Disk Management, and
 - The partition has a drive letter assigned and has a status of Unknown or has a file system on it (that is, it has a status other than Unformatted).
4. Use the following procedure to create a new partition.
 - a. Select a drive containing free disk space; then, right-click on that drive. The Write Signature and Upgrade Disk window opens.
 - b. Click **Partition** → **Create**. The partition is created (a drive letter is assigned, and the partition status is Unformatted).
 - c. Click **Partition** → **Commit Changes Now**. The partition status changes to Unknown, and static drive letters are assigned to all existing partitions.
5. Continue with “Installation instructions” on page 39.

Installation instructions

Before you install the software, make sure that:

- You have Administrator privileges on the host computer.
- The host computer is configured with Windows 2000 Advanced Server.
- The host computer has at least 1 MB of available disk space.
- The display 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.

Install the RDAC package:

1. Insert the IBM Netfinity FAStT Storage Manager CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**.
The Remove Programs Properties window opens.
3. Click **Install**, and follow the instructions on the screen.
4. Click **Browse**.
The Browse window opens.
5. Select the CD-ROM drive.
6. Select the \W2K\RDAC directory.
7. Select the setup.exe file, and then click **Open**.
8. Click **Next**.
The setup program Welcome window opens.
9. Click **Next** to begin the installation.
When RDAC is installed, the Setup Complete window opens.
10. If you are installing the host-agent package, go to “Installing the SM7agent package”.
11. Click **No, I will restart my computer later**; then, click **Finish**.
12. Go to “Installing the SM7agent package”.

Installing the SM7agent package

Use the following procedure to install SM7agent on each host computer in your planned cluster that is connected to one or more storage subsystems. The SM7agent consists of the following components:

- The Storage Manager 7 Agent software that is necessary for host-agent management of the storage subsystems.
- The SM7devices utility that is necessary for relating logical drives to operating system device names. For more information, see “Using the SM7devices utility” on page 58.

Important: You cannot install SM7agent unless RDAC is installed.

You must install SM7agent even if you do not intend to manage storage subsystems through the SM7agent software.

Installation instructions

Before you install the software, make sure that:

- You have Administrator privileges on the host computer.
- The host computer is configured with Windows 2000 Advanced Server (required for a cluster environment).
- The host computer has at least 1 MB of available disk space.
- The display properties are set to a minimum screen resolution of 640 x 480 pixels and a palette of 256 or more.
- You installed RDAC.
- You close all other programs

Install the SM7agent:

1. Insert the IBM Netfinity FASTT Storage Manager CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**.
The Add/Remove Programs Properties window opens.
3. Click **Install**, and follow the instructions on the screen.
4. Click **Browse**.
The Browse window opens.
5. Select the CD-ROM drive.
6. Select the \W2K\SM7agent directory.
7. Select the setup.exe file, and then click **Open**.
8. Click **Next**.
The setup program Welcome window opens.
9. Click **Next** to begin the installation.
When SM7agent is installed, the Setup Complete window opens.
10. You must restart the host to ensure that all changes take effect. Click **Finish** to restart the host.

Verifying the RDAC installation

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

Note: Make sure that all storage subsystems are connected to the host and powered on.

1. Right-click on My Computer.
2. Click **Manage** → **System Tools** → **System Information** → **Software Environment** → **Drivers**. The Services window opens.
3. Scroll through the list of drivers until you find rdacfltr.
4. Rdacfltr must be displayed with the state type Running and status OK. Otherwise, reinstall RDAC.
5. Go to “Verifying the SM7agent installation”.

Verifying the SM7agent installation

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

Note: Make sure that all storage subsystems are connected to the host and are powered on.

1. Click **Start** → **Programs** → **Administrative Tools** → **Services**. The Services window opens.
2. Scroll through the list of services until you find the Netfinity Fibre Channel Storage Manager 7 agent.
3. SM7agent must be displayed and have the startup type Automatic and status Started. Otherwise, reinstall SM7agent.
4. If you are upgrading from an earlier version of storage-management software, Use the procedure in the storage-management software online help for downloading the latest version of NVSRAM and controller firmware. Otherwise, go to step 5.
5. If you plan to use the host-agent software to manage one or more storage subsystems, go to “Continuing the installation”. Otherwise, you can disable the host-agent service by using the following procedure:
 - a. Select **Start** → **Programs** → **Administrative Tools** → **Services**.
 - b. From the list of displayed services, right-click on the host-agent.
 - c. Select **Properties** → **Startup Type** → select **Manual** from the drop-down menu.
 - d. Select **OK**.

Continuing the installation

If you installed the storage-management software on node A, go to “Setting up the storage subsystems”. If you installed the storage-management software on node B, go to “Verifying drive letters” on page 42.

Setting up the storage subsystems

Use the procedures in Chapter 5, “Completing the installation,” on page 47 to perform the following tasks:

1. Start Enterprise Management and perform an Initial Automatic Discovery of storage subsystems on the local subnetwork. See “Starting Enterprise Management” on page 47.
2. Add other devices to the management domain as necessary. For more information, see “Adding devices” on page 48.
3. Create all of your planned arrays and logical drives on each storage subsystem connected to your cluster, see “Creating arrays and logical drives” on page 49
4. Open a Subsystem Management window for each storage subsystem and configure the storage subsystem as much as possible. You do not have to completely configure the storage subsystems. However, any changes you make later must be made known to Node B, see “Performing other storage subsystem management tasks” on page 51.
5. Modify configuration settings in NVSRAM by running the appropriate scripts required for your configuration, see “Modifying configuration settings in NVSRAM” on page 51
6. After you complete the procedure in Chapter 5, “Completing the installation,” on page 47, continue with step 7.
7. If you installed the storage-management software on node A, go to “Shutting down node A” on page 42. If you installed the storage-management on node B, go to “Verifying drive letters” on page 42.

Verifying drive letters

Important: Do not perform this procedure until you have installed the necessary storage-management software components on both node A and node B.

1. Select **Start** → **Programs** → **Administrator Tools** → **Computer Management** → **Storage** → **Disk Management** to verify that the drive letters that are assigned to the configured logical drives are the same as those that are assigned to node A.
2. Continue with “Shutting down node B”.

Shutting down node A

1. Shut down Windows 2000, but leave node A running (do *not* turn off the node).
2. Return to “Installing the SM7client package” on page 37 and repeat the installation procedures to install the necessary software components on node B.

Shutting down node B

1. Shut down Windows 2000, but leave node B running (do *not* turn off the node).
2. Continue with the next section, “Installing the cluster server software”.

Installing the cluster server software

Use the following procedure to install the cluster server software on nodes A and B.

Important: Before you install the cluster server software, make sure that you have installed the storage-management software on both nodes of the cluster server.

1. Install the cluster server software on node A, as follows:
 - a. Refer to the appropriate Microsoft Cluster Server (MSCS) documentation for the correct procedure to install the cluster server software.
Note: During installation, specify that you want to Form a New Cluster.
 - b. Install the cluster on node A. After the system restarts, leave node A running.
 2. Install the cluster server software on node B. After the system restarts, leave node B running.
 - a. Refer to the appropriate MSCS documentation for the correct procedure to install the Cluster Server software.
Note: During installation, specify that you want to Join The Existing Cluster.
 - b. After the system restarts, leave node B up and running.
- Important:** When the installation of the MSCS is complete, be sure to reinstall the latest supported Service Pack.
3. Verify the software installation, as follows:
 - a. On either node (A or B), click **Start** → **Programs** → **Administrative Tools (Common)**.
 - b. Click Cluster Administrator.
 - c. In the Cluster or Server Name field, type either the name of the cluster or the name or IP address of one of the nodes.
 - d. If the installation is successful, the computer names of both nodes appear on the left side of the Cluster Administrator window.

4. If both node names appear, go to “Completing final tasks” on page 52. Otherwise, reinstall the cluster server software.

Upgrading from a previous version of the storage-management software in a cluster server configuration

Be sure that you are familiar with the steps required in a new installation process before you continue with the following upgrade procedures.

You may choose from one of the following two procedures to upgrade your existing storage subsystem to Storage Manager 7.02 and your controller firmware to version 4.00.02.

- **Performing a scheduled upgrade:** A scheduled upgrade means scheduling down time on your cluster server to upgrade the controller firmware and storage-management software. The scheduled upgrade is the preferred procedure for upgrading a cluster server configuration.
- **Performing a rolling upgrade:** A rolling upgrade means upgrading the controller firmware and storage-management software so that the services and resources offered by the cluster are available, while the node that is being upgraded is not available.

Important: After the storage subsystem controller firmware has been upgraded to 4.00.02, you will not be able to communicate with the controller until you have upgraded to Storage Manager 7.02 software on your management station and host. Previously installed versions of the storage-management client or host-agent software will not recognize controllers running version 4.00.02 firmware.

Performing a scheduled upgrade from storage-management software version 7.0 or 7.01 to Storage Manager 7.02

Complete the following steps to upgrade from storage-management software version 7.0 or 7.01 to Storage Manager 7.02.

1. Before installing the storage-management software, do the following:
 - a. Click **Start** → **Programs** → **Administrative Tools** → **Services**. The services window opens.
 - b. From the list of displayed services, right-click on the Cluster Server. Then, click **Manual**.
 - c. Stop cluster server on all nodes in the cluster configuration.
2. Shutdown all but node A in the cluster configuration.
3. From node A, to uninstall the components from the previous version of the storage-management software, use the uninstall procedure that came with the version of the storage-management software that you are running.
4. Verify that the IBM host bus adapter driver versions are current. If they are not current, refer to the README file located in the \W2K\Host_Adapter directory on the installation CD to upgrade the driver versions before continuing.
5. To install the Storage Manager 7.02 SM7client package, refer to the procedure in “Installing the SM7client package” on page 37.
6. To install the Storage Manager 7.02 RDAC package, refer to the procedure in “Installing the RDAC package” on page 38.
7. To install the Storage Manager 7.02 SM7agent package, refer to the procedure in “Installing the SM7agent package” on page 39.

8. Upgrade the controller NVSRAM and controller firmware to version 4.00.02. Then, modify the appropriate configuration settings in NVSRAM using the procedure in “Modifying configuration settings in NVSRAM” on page 51.
Note: You can continue to use your existing versions 4.00.00 through version 4.00.01 controller firmware. You can manage the existing storage subsystems through the Storage Manager 7.02.
9. Shutdown the node.
10. On node B, repeat step 3 on page 43 through step 7 on page 43; then, repeat step 9.
11. All nodes should be shutdown. Start up one node at a time and complete the following:
 - a. Click **Start** → **Programs** → **Administrative Tools** → **Services**. The services window opens.
 - b. From the list of displayed services, right-click on the Cluster Server. Click Automatic to change the cluster server startup option.
 - c. Start the cluster server on node B.

Performing a rolling upgrade from storage-management software version 7.0 or 7.01 to Storage Manager 7.02.

Note: To avoid losing access to a cluster, you need to perform a rolling upgrade. A rolling upgrade means upgrading so that the services and resources offered by the cluster are always available, even though the node being upgraded is not available.

If you have applications installed in the cluster server environment that do not support a rolling upgrade, then you will have to either of the following:

- Put those resources offline before the upgrade; then put them back online after the upgrade or,
- Use a different upgrade method

Complete the following steps to perform a rolling upgrade from storage-management software version 7.0 or 7.01 to Storage Manager 7.02.

1. From node A, open cluster administrator.
2. Select node A, and select **File** → **Pause Node** to pause the node.
3. Double-click on the Active Groups folder in the right window of cluster administrator.
4. Select each group listed and move your selection to node B.
5. From node A, to uninstall the components from the previous version of the storage-management software, use the uninstall procedure that came with the version of the storage-management software that you are running.
6. Verify that the IBM host bus adapter driver versions are current. If they are not at the current versions, refer to the README file located in the W2K\Host_Adapter directory on the installation CD to upgrade the driver versions before continuing.
7. To install the Storage Manager 7.02 SM7client package, refer to the procedure in “Installing the SM7client package” on page 37.
8. To install the Storage Manager 7.02 RDAC package, refer to the procedure in “Installing the RDAC package” on page 38.
9. To install the Storage Manager 7.02 SM7agent package, refer to the procedure in “Installing the SM7agent package” on page 39.

10. Upgrade the controller firmware to version 4.00.02. Then, modify the appropriate configuration settings in NVSRAM. Refer to the procedure in “Modifying configuration settings in NVSRAM” on page 51.
Note: You can continue to use your existing versions 4.00.00 through version 4.00.01 controller firmware. You can manage the existing storage subsystems through the Storage Manager 7.02.
11. Run Cluster Administrator, and resume the node by selecting **File** → **Resume Node**.
12. On node B, repeat step 1 on page 44 through step 9 on page 44; then, repeat step 11.

Chapter 5. Completing the installation

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

Starting Enterprise Management

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

- Add and discover the storage subsystems 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. Click **Start** → **Programs**.
2. Click **Netfinity Fibre Channel Storage Manager 7 client**.

The client software starts, displaying the Enterprise Management window and the Confirm Initial Automatic Discovery window, as shown in Figure 13.

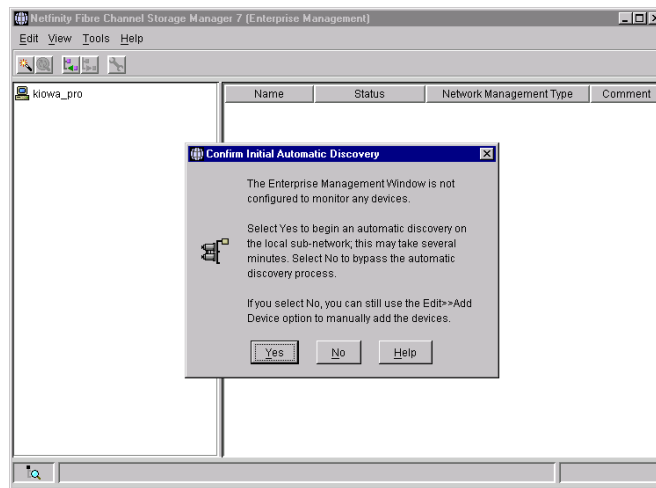


Figure 13. Confirm Initial Automatic Discovery window

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** pull-down menu option to add hosts and storage subsystems. For more information, see “Adding devices” on page 48.

3. Click **Yes** to begin an initial automatic discovery of hosts and storage subsystems 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.

Important: 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 attached to the local subnetwork, as shown in Figure 14.

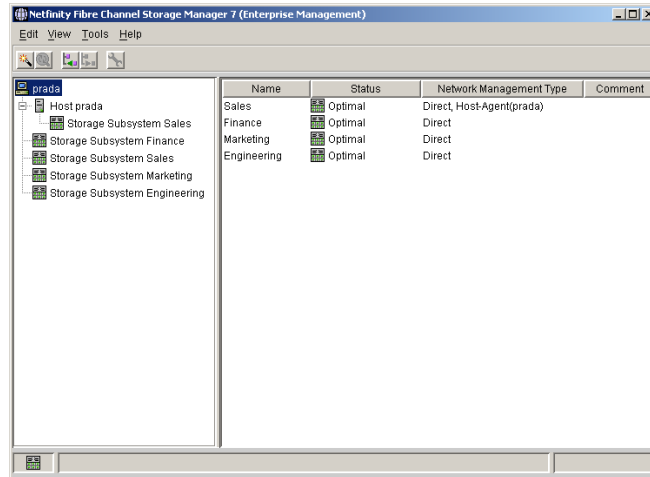


Figure 14. Enterprise Management window

If you do not see all hosts and storage subsystems, do the following:

- Check the hardware and connections for possible problems (refer to the hardware documentation for specific procedures).
- Refer to the Enterprise Management online 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”.

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 it can recognize the new storage subsystems (see “Stopping the host-agent service” on page 52). Then, go to the Enterprise Management window and click **Tools** → **Rescan** to add the new storage subsystems to the management domain.

Continue with “Creating arrays and logical drives”.

Creating arrays and logical drives

To create an array or logical drive, perform the following procedure:

1. Highlight a storage subsystem in the Enterprise Management window and select **Tools** → **Manage Device** to start a Subsystem Management window for that storage subsystem.
2. Create all of your planned arrays and logical drives on this storage subsystem using the **Configure** → **Create Array/Logical Drive option**.
3. Repeat the arrays/logical drive configuration for each storage subsystem connected to your cluster.

Note: If you make any other logical drive additions or deletions, you must make them known to node B in a cluster configuration.

4. Go to “Setting up alert notifications”.

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 included in your management domain. You may want to minimize the window. If you close this window, you will not receive alert notifications. Refer to the Enterprise Management window 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 on the network management station.

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

1. Copy the Arrayman.mib file from the \W2K\SM7mib directory on the Installation CD to the network management station.
2. Follow the steps required by your specific network management station to compile the MIB.

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

Configuring alert destinations

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

Go to “Starting the subsystem management”.

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 15.

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.

3. Go to “Renaming storage subsystems”.

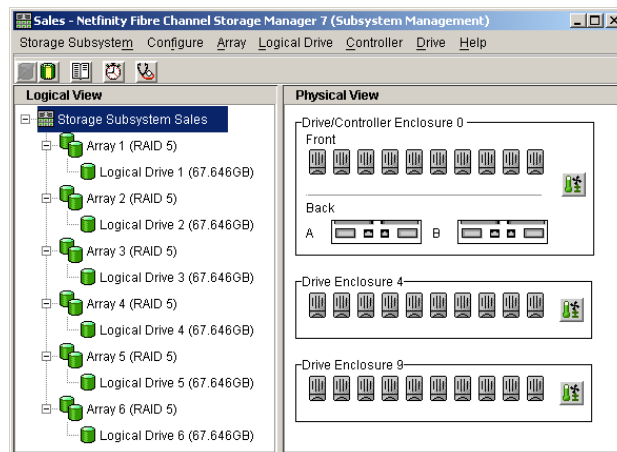


Figure 15. Subsystem Management window

Renaming storage subsystems

When you start 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 you want. Refer to the names you entered in the information record you created using Table 12 on page 63. Then, refer to the renaming storage subsystems topic in the Subsystem Management online Help. The Help topic provides detailed instructions for renaming storage subsystems.

Performing other storage subsystem management tasks

The storage subsystem management tasks you can perform include the following:

- Downloading controller firmware
- Downloading controller NVSRAM
- Locating a storage subsystem
- Viewing a storage subsystem profile
- Entering or changing a storage subsystem password
- Creating and managing logical drives and subsystems
- 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 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.

Go to “Modifying configuration settings in NVSRAM”.

Modifying configuration settings in NVSRAM

Depending on the operating system, management method (host-agent or direct) and configuration (cluster or noncluster) that you are using, you might need to run scripts to modify configuration settings stored in NVSRAM on each storage subsystem you are managing with Storage Manager 7.02.

Use the following procedure to modify the appropriate configuration settings.

1. Insert the IBM Netfinity FAS*T* Storage Manager installation CD into the CD-ROM drive on the management station.
2. Go to the \W2K\Scripts directory and read the README file in that directory.
3. Highlight a storage subsystem in the Enterprise Management window and click **Tools** → **Execute Script**.
4. Did you install the storage-management software in a standard (noncluster) configuration? Refer to the following table.

Yes	No
<p>Run the scripts to enable the Windows 2000 operating system.</p> <ol style="list-style-type: none"> 1. To install and run the Windows 2000 script: <ol style="list-style-type: none"> a. Select File → Load Script. The Load Script window opens. b. Select the appropriate script from the \W2K\Scripts directory on the installation CD. c. Select Open to install the script. d. Select Tools → Execute Only. Wait until the Script Execution Complete message displays. <p>Go to step 5 on page 52.</p>	<p>Run the scripts to enable the Windows 2000 operating system and clustering. If you are not managing storage subsystems directly, run the script to disable networking.</p> <ol style="list-style-type: none"> 1. To install and run the Windows 2000 script: <ol style="list-style-type: none"> a. Select File → Load Script. The Load Script window opens. b. Select the appropriate script from the \W2K\Scripts directory on the installation CD. c. Select Open to install the script. d. Select Tools → Execute Only. Wait until the Script Execution Complete message displays. 2. To install and run the disable networking script: <ol style="list-style-type: none"> a. Click File → Load Script. The Load Script window opens. b. To disable networking, select the appropriate script from the \W2K\Scripts directory on the installation CD. c. Click Open to install the script. d. Click Tools → Execute Only. Wait until the Script Execution Complete message displays. e. Go to step 5 on page 52. <p>Note: The default NVSRAM has clustering enabled. After you run the Clustering Off script, you must run the Clustering On script to enable clustering.</p>

5. Repeat the procedures in step 3 on page 51 through step 4 on page 51 for each storage subsystem that you are managing with the storage-management software.
6. If you have a standard configuration, go to “Completing final tasks”. Otherwise, go to step 7.
7. If you have a cluster configuration, go to step 6 in “Setting up the storage subsystems” on page 41.

Completing final tasks

If you want to manage storage subsystems using the direct method only, go to “Stopping the host-agent service”. Otherwise, go to Chapter 6, “Operating system support,” on page 55.

Note: You can manage storage subsystems using both the direct and host-agent management methods.

Stopping the host-agent service

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

1. Click **Start** → **Programs** → **Administrative Tools** → **Services**.
2. Click **Netfinity Fibre Channel Storage Manager 7 Agent** service.
3. Click **Stop**.
4. Click **Startup**.

The Service window opens.

5. Under Startup Type, click **Manual**.
6. Click **OK**.
7. Click **Close** to close the Services window, and then close the Control Panel.
8. Go to Chapter 6, "Operating system support," on page 55.

Chapter 6. Operating system support

This chapter contains information related to operating the storage-management software in a Windows 2000 environment.

Understanding the Windows 2000 restrictions

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

Table 11 explains the restrictions that apply when using Storage Manager 7.02 with Windows 2000.

Table 11. Windows 2000 restrictions and notes

Restriction	Workaround
In the online help, clicking on the vertical scroll arrows (either up or down) causes the scroll box to move all the way to the opposite end of the scroll bar.	This is a known defect in the JavaHelp runtime environment. Click the scroll box and slide it until you reach the desired position in the Help window.
After trying to add a host device to the management domain of more than five clients, the host-agent managed storage subsystems attached to that host become unresponsive.	A single instance of the host-agent software can only communicate with five or fewer clients.
There are limits to how much drive space capacity you can have in a single logical drive group. For example, with 73.4 GB drives, the maximum number of drives that can be configured in a single logical drive group is 29.	None.
Password information is stored on a reserved area of each drive on the storage subsystem. Each drive stores a mirrored copy of the password data. With no drives in the storage subsystem, the storage-management software does not find the password data when you attempt password protected operations. Add one of the drives to the storage subsystem and try the operation again.	Password information is stored on a reserved area of each drive on the storage subsystem. Each drive stores a mirrored copy of the password data. With no drives in the storage subsystem, the storage-management software does not find the password data when you attempt password protected operations. Add one of the drives to the storage subsystem and reattempt the operation.
Array migration is not supported because it could cause loss of configuration. Array migration is when you remove a set of drives configured with arrays from one storage subsystem and insert them into another storage subsystem.	Call IBM service for assistance.
A stand-alone (non-networked) configuration, in which the Windows 2000 host does not have the TCP/IP software installed, is not supported.	Install the TCP/IP software on the Windows 2000 host and assign the host a static IP address.
If you configure a new storage subsystem with a single controller, you must place the controller in the top slot (slot A) for machine types 3552 and 3526 or in the left slot for machine type 3542. The controller firmware cannot recognize or communicate to a single controller until slot A is populated. This restriction does not apply to storage subsystems that were originally configured with two controllers.	None.

Table 11. Windows 2000 restrictions and notes

Restriction	Workaround
<p>A controller failover occurs in an active/active controller pair and ownership of arrays transfer from the failed preferred owner to the other controller of the pair. The failed controller is replaced and brought online, until array ownership is transferred back to the preferred controller owner.</p>	<p>Immediately after replacing the controller, select the storage subsystem → Redistribute Arrays option in the Subsystem Management window to redistribute Arrays back to their preferred controller owners.</p> <p>For more information, see the Subsystem Management window online Help.</p>
<p>After installing the host-agent software, you see an error message with "Service Error 100" on the host.</p>	<p>Causes include:</p> <p>The host-agent software does not find any controllers with firmware version 4.x.</p> <p>Controllers with firmware version 4.x have the access volume disabled with NVSRAM configuration settings.</p> <p>The NVSRAM on controllers in a storage subsystem you are attempting to manage contains an access volume logical unit number that is already in use by another logical drive.</p> <p>The NVSRAM on controllers in a storage subsystem you are attempting to manage contains an access volume logical unit number that is not supported by the operating system and installed patches. For example, the access volume is configured at LUN 32, but the operating system and service packs only support 8 LUNs.</p>
<p>A possibility of file system corruption exists when resources are moved back and forth multiple times between cluster nodes using Microsoft Cluster Server running under Windows 2000 Advanced Server.</p> <p>When the cluster resource is moved, the owning node flushes cache and then releases the reservation to one or more logical drives. The other node then reserves one or more logical drives. In some instances, file system reads and writes do not finish before the release. This results in a reservation conflict and file system corruption. Trying to recover using the chkdsk command causes the file system information to be corrected in such a way that some files are no longer accessible.</p>	<p>None. The problem is highly unlikely to occur during normal failover situations.</p>

Number of logical drives supported

There are limits on how many logical unit numbers (LUNs) you can use to access the logical drives on a single storage subsystem. Supported logical drive limits are as follows:

- Windows 2000 supports up to 8 logical drives per storage subsystem (LUNs 0–7).
- Windows 2000 supports up to 32 logical drives per storage subsystem (LUNs 0–31) if the host adapter also supports large LUNs and is configured correctly.
- 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 less LUN than the maximum number supported by Windows 2000 and the host adapter.

Creating logical drives

A *logical drive* is a logical object that is the basic structure you create to store data on the storage subsystem. A logical drive is configured across a subsystem 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 (noncluster) configuration and in a cluster server environment.

Standard (noncluster) configuration

When you create new logical drives with the storage-management software, you must add the new logical drives to the Windows 2000 operating system. Remember that each logical drive (not array) is recognized by Windows 2000 as one drive.

You can use the SM7devices utility to identify logical drives by their associated operating system device names. For more information refer to “Cluster server environment”.

1. Use the storage-management software to create a new logical drive. For specific instructions, refer to the Subsystem Management online Help.
2. To add logical drives to node A:
 - a. Select **Start** → **Programs** → **Administrator Tools** → **Computer Management Storage** → **Disk Management**.
 - b. In System Tools click **Device Manager**.
 - c. Right click **Disk Drives** to scan for hardware changes.
3. Select **Start** → **Programs** → **Administrator Tools** → **Computer Management** → **Storage** → **Disk Management** (local) to format the new logical drive on node A.

Attention: 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, use Disk Management to delete any partitions and to unassign drive letters associated with the logical drives. If you do *not* use Disk Management first, registry information will be damaged. Restart the system to remove configuration information.

Cluster server environment

When you create logical drives on one node in a cluster server environment, you must assign the same drive letter on the other node as well.

You can use the SM7devices utility to identify logical drives by their associated operating system device names.

1. Use the storage-management software to create a new logical drive. For specific instructions, refer to the Subsystem Management online Help.
2. To add logical drives to node A:
 - a. Select **Start** → **Programs** → **Administrator Tools** → **Computer Management Storage** → **Disk Management**.
 - b. In System Tools click **Device Manager**.
 - c. Right click **Disk Drives** to scan for hardware changes.
3. Select **Start** → **Programs** → **Administrator Tools** → **Computer Management** → **Storage** → **Disk Management** (local) to format the new logical drive on node A.

Use the following procedure to add logical drives in a cluster server environment:

1. Use the storage-management software to create a new logical drive. For specific instructions, refer to the Subsystem Management online Help.
2. To add logical drives to node B:
 - a. Select **Start** → **Programs** → **Administrator Tools** → **Computer Management Storage** → **Disk Management**.
 - b. In System Tools click **Device Manager**.
 - c. Right click **Disk Drives** to scan for hardware changes.
3. To format the new logical drive on node B:
 - a. Select **Start** → **Programs** → **Administrator Tools** → **Computer Management** → **Storage** → **Disk Management** to format the new logical drive on node B.
4. Start the Cluster Administrator on node B and use it to stop the cluster service.
5. Click **Node B** → **File Stop** → **Cluster Service**.
6. In Cluster Administrator, click **Node B**, and then click **File** → **Evict Cluster Node**.
7. Restart node A.
8. On node A, use Cluster Administrator either to create a new subsystem or select an existing subsystem to which you can add the new logical drive.
9. Highlight the logical drive group and click **File** → **New** → **Resource**.
10. Name the new resource and click **Physical Disk** as the resource type.
11. Click **Next**.
12. Click **node A** as the disk resource owner, and then click **Next**.
13. Specify any dependencies (other resources that Cluster Administrator must bring online) before this new disk resource is brought online.
14. Select the new disk from the drive parameter list, and then click **Finish**.
15. Uninstall the Cluster Server software from node B.
16. Re-install the Cluster Server software on node B and join the existing cluster that includes node A.

Important: Edit the properties of the new disk to allow node B to be a possible owner of the resource. You can redistribute the cluster resources between nodes A and B and edit the properties of all cluster resources to include node B. Move any cluster resources belonging to node B from node A back to node B.

Using the SM7devices utility

The SM7agent software includes a utility called SM7devices that enables you 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 drive letters or partitions for the logical drive using Disk Administrator.

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

1. From a DOS command prompt, change to the \Program Files\SM7agent directory.
2. Type:
SM7devices

3. Press **Enter**.

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

```
\\.\PHYSICALDRIVE0 [Storage Subsystem Finance, Logical Drive DEBIT, LUN  
0, WWN <600a0b800006028600000000382060eb>]  
\\.\PHYSICALDRIVE1 [Storage Subsystem Finance, Logical Drive CREDIT, LUN  
1, WWN <600a0b70006028600000000392060eb>]
```

where PHYSICALDRIVE x = Diskx in Disk Management

Storage Subsystem = the storage subsystem name

logical drive = the logical drive name

LUN = the logical unit number associated with the logical drive

WWN = the world wide name for the logical drive

Stopping and starting the host-agent

Use the procedure in the following sections to stop and start the host-agent software installed on the host.

Note: If an access volume is not detected after a restart, then the host-agent software will automatically stop running. Restart the host so that new host-agent managed storage subsystems can be discovered.

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. To stop the host-agent:

1. Select **Start** → **Settings** → **Control Panel** → **Services**.
The Services dialog box appears
2. Select Netfinity Fibre Channel Storage Manager 7 Agent.
3. Select **Stop**.

Starting the host-agent

The host-agent software automatically starts after you restart the host. However, you must start the software manually if you stop it to add storage subsystems.

To start the host-agent:

1. Select **Start** → **Settings** → **Control Panel** → **Services**.
The Services dialog box appears
2. Select Netfinity Fibre Channel Storage Manager 7 Agent.
3. Select **Start**.

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.

Important: Do not uninstall the RDAC component unless instructed by a service representative. The host-agent package requires RDAC to function properly. If you uninstall RDAC in a coexistence environment, you will lose Fibre Channel I/O path failover support for both the version 7.02 and version 6.22 systems.

1. Click **Start** → **Settings** → **Control Panel** → **Add/Remove Programs**.
The Add/Remove Programs Properties window opens.
2. Select the component you want to uninstall from the list of programs.
For example, Netfinity Fibre Channel Storage Manager 7 Client.
3. Select **Add/Remove**.
The Confirm File Deletion window opens.
4. Click **Yes** to start the uninstallation process.
5. When the uninstallation is completed, click **OK**.

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Appendix B. Storage subsystem/controller information record

Table 12 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 12 to set up the BOOTP table for the network server and the host or Domain Name System (DNS) table. The information in Table 12 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 Table 7 on page 17.

Table 12. Storage subsystem and controller information record

Storage subsystem name (see page 17)	Management type (see page 14)	Controllers—Ethernet and IP addresses, and host name (see pages 17)		Host—IP address and host name (see page 20)
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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