

IBM® Netfinity® HA  
4500R Cluster



# Installation Guide



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4500R Cluster



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**Note!**

**Before using this information and the product it supports, be sure to read the general information under Appendix B, “Product notices” on page B-45.**

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# Contents

<b>Safety Information</b> .....	v
<b>About this book</b> .....	vii
<b>Chapter 1. Introduction</b> .....	1
Netfinity HA 4500R cluster components .....	1
<b>Chapter 2. Installing the Netfinity HA 4500R Cluster hardware</b> .....	3
Unpacking the cluster components .....	3
Inventory checklist .....	3
Preinstallation procedures .....	4
Handling static-sensitive devices .....	4
Tool requirements .....	4
Installing the 4500R cluster components .....	5
Cabling the 4500R cluster components .....	9
<b>Chapter 3. Configuring the Netfinity HA 4500R cluster</b> .....	13
Configuring the servers using Windows 2000 Advanced Server .....	13
Configuring server 1 .....	13
Configuring the server as a member of an existing domain .....	15
Configuring server 2 .....	16
Configuring the servers using Windows NT 4.0 Enterprise Edition .....	18
Recording Information Necessary for this Procedure .....	18
Preparing the Customer Environment for the Cluster .....	19
Installing and Configuring Windows NT 4.0 Enterprise Edition .....	20
Assigning Permanent Drive Letters to Shared Disks .....	24
Microsoft Cluster Server Setup .....	28
Installing Netfinity Director Agent and UM Server Extensions .....	31
<b>Chapter 4. Troubleshooting and initial system settings</b> .....	33
Windows 2000 Advanced Server initial software configuration settings .....	33
Windows 2000 Advanced Server Recovery Procedures .....	33
Restoring the servers original images .....	33
Restoring server 1 .....	33
Restoring server 2 .....	34
Configuration after restoring the image .....	34
Server 1 .....	34
Server 2 .....	34
Windows NT 4.0 Enterprise Edition Recovery Procedures .....	34
Recovering a Failed Cluster Node when it is Unable to Start Microsoft Cluster Service .....	35
Recovering One Cluster Server Node from NOS Failure .....	36
Restoring Both Servers from the Original Images .....	39
Recovering a Cluster Server Node with a Failed ServeRAID Adapter .....	40
<b>Appendix A. Getting help, service, and product information</b> .....	43
<b>Appendix B. Product notices</b> .....	45
Notices .....	45
Edition Notice .....	45
Year 2000 readiness and instructions .....	46
Trademarks .....	46
Important notes .....	47
Power cords .....	47

**Index** ..... 49

# Safety Information

Before installing this product, read the Safety Information book.

مصح، يجب قراءة دات السلامة

Antes de instalar este produto, leia o Manual de Informações sobre Segurança.

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtete příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si preítajte Informa n ú brožúrku o bezpe nosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !



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## About this book

This book provides information and instructions for unpacking and setting up the IBM® Netfinity® High-Availability (HA) Cluster rack solution. It also provides information on installing and configuring the cluster solution.

This book is intended for experienced users who will be involved in setting up and administering clustering installations.

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## How this book is organized

Chapter 1, "Introduction," on page 1, provides an overview of the IBM Netfinity HA 4500R Cluster solution.

Chapter 2, "Installing the Netfinity HA 4500R Cluster hardware," on page 3, contains instructions for unpacking and installing the Netfinity HA 4500R Cluster components.

Chapter 3, "Configuring the Netfinity HA 4500R cluster," on page 13, provides information on configuring the cluster.

Chapter 4, "Troubleshooting and initial system settings," on page 33, provides information on the initial software configuration settings for Windows 2000. This chapter also provides troubleshooting information on how to recover from problems you might encounter while installing the IBM Netfinity HA 4500R Cluster solution.

Appendix A, "Getting help, service, and product information," on page 43, provides information on getting help, service, and other product information.

Appendix B, "Product notices," on page 45, contains trademarks and general-information notices.

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## Related publications

During the installation and set up of the IBM Netfinity HA 4500R Cluster, you might need to refer to one or more of the publications in the publication pack that arrived with the rack.

For additional information about these publications, call 1-800-879-2755 in the United States and Puerto Rico, or call 1-800-426-4968 in Canada. In all other countries, contact your IBM reseller or marketing representative.



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## Chapter 1. Introduction

The IBM Netfinity High Availability (HA) 4500R Cluster solution is a group of software and hardware components interconnected and configured together to provide users with uninterrupted applications and data access.

A *cluster* is a type of parallel or distributed system that consists of interconnected computers used as a single, unified computing resource. This group of computers is linked together in such a way that they share and manage a set of resources that can support a number of users at the same time.

This *high-availability clustering solution* is based on a two-node cluster, where both nodes, or servers, can access the same storage devices, but only one server at a time controls the storage devices shared by both servers. If one server fails, the second server automatically assumes control of the failed server resources, while still controlling its own resources. The failed server can then be repaired offline without the loss of time or work efficiency, because access to that server's data and applications is still available.

When the failed server is operational again, you can place it back into the cluster, the resources are reallocated between the two servers and the cluster will then resume normal operations.

The IBM Netfinity HA 4500R Cluster uses two Netfinity 4500R 3U servers with 667 MHz Pentium III micro-processors. Each server has up to 4 GB of SDRAM memory and is connected to a Netfinity EXP200 Storage Expansion Unit that holds up to 10 hot-swappable hard drives. Clustering software also comes pre-installed on each server.

The IBM Netfinity HA 4500R Cluster solution is installed using Microsoft® Windows 2000 Advanced Server or Windows NT 4.0 Enterprise Edition.

The Netfinity HA 4500R Cluster provides you with a prepackaged solution, eliminating the need for you to purchase and integrate multiple components. This cluster solution offers you one-stop shopping for system reliability, redundancy, and uninterrupted operations.

The Netfinity HA 4500R Cluster comes with a limited three-year on-site warranty. In the U.S. and Puerto Rico, call IBM at 1-800-772-2227, or in Canada, call 1-800-565-3344 if you need assistance. In all other countries, contact the IBM support organization that service your area, your IBM marketing representative, or your IBM reseller.

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### Netfinity HA 4500R cluster components

The following table lists the components included in the Netfinity HA 4500R cluster rack configuration:

Table 1. 4500R cluster components

Quantity	Component	Usage
<b>Server Nodes</b>		
2	Netfinity 4500R 667 MHz, 128MB RAM	Cluster nodes, onboard Ethernet for public network access
4	Netfinity 9.1 GB 7200RPM Ultra-3 SCSI hard disk drive - hot swap	Two per node for RAID 1

Table 1. 4500R cluster components

Quantity	Component	Usage
4	Netfinity ServeRAID-3L Ultra2 SCSI Adapter 2	Two per node: one for shared storage controller and one for RAID 1 (mirrored) internal server drives
2	Netfinity 10/100 Ethernet Adapter	Clustering Heartbeat - one per node
<b>Storage Subsystem</b>		
1	Netfinity EXP200 Hard Disk Drive Storage	One EXP200 for shared storage, maximum of 10 Ultra2 hard disk drives
5	Netfinity 9.1 GB 10K RPM Ultra2 SCSI hard disk drive - hot swap	RAID 5 shared storage in EXP200
1	Netfinity 2M Ultra2 SCSI cable	Server to EXP200 (EXP200 comes with one 2M cable)
1	Netfinity EXP200 350 Watt redundancy power supply	Required for redundancy (pre-installed)
<b>Rack Unit, Monitor, Console Server Switch</b>		
1	NetBAY 22 rack	22U rack unit
2	Low Voltage Power Distribution Unit (PDU)	Preinstalled
1	T54a Flat Panel Monitor	
1	Netfinity Rack Keyboard Tray	Preinstalled
1	Netfinity Flat Panel Monitor Rack Mount Kit II	
1	Space Saver Keyboard	
1	Netfinity Console Server Selector (4-port)	Preinstalled
2	Console Cable Set	One console cable set per node
<b>Cluster Interconnect</b>		
1	Ethernet Cluster Interconnect Cable	Ethernet Crossover cable for interconnection between Netfinity 10/100 Ethernet Adapters - Heartbeat
<b>Preloaded Software - Select an Option</b>		
2	Microsoft Windows NT Server 4.0 EE with MSCS	NOS and cluster middleware preloaded
2	Microsoft Windows 2000 Advanced Server	NOS and cluster middleware preloaded
<b>Options</b>		
2	Netfinity 667MHz, 256 KB upgrade with Pentium III Microprocessor	Symmetric multiprocessing (SMP) for Netfinity nodes
2	Netfinity 128MB SDRAM ECC RDIMM	Memory upgrade
5	Netfinity 9.1 GB 10K RPM Ultra2 SCSI hard disk drive - hot swap	RAID 5 shared storage in EXP200
1	Netfinity Advanced Systems Management PCI Adapter	One per cluster
1	Netfinity Advanced Systems Management Interconnect	One included with PCI adapter, one option required for second system
2	PCI V90 56 Data/FAX Modem	Required for communications
1	Tape drive	Tape backup
1	Uninterruptable power supply (UPS)	APC uninterruptable power supply

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## Chapter 2. Installing the Netfinity HA 4500R Cluster hardware

This chapter contains instructions for unpacking and installing the Netfinity HA 4500R Cluster hardware.

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### Unpacking the cluster components

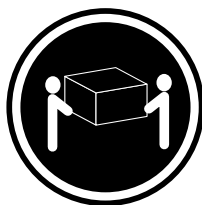
Before you unpack the cluster components, be sure to read the *IBM Netfinity Rack Planning and Installation Guide* for information on the following:

- Understanding the rack specifications and requirements
- Preparing a layout for the rack
- Preparing the physical site for the rack

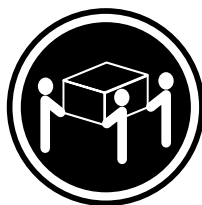
To unpack your Netfinity HA 4500R Cluster, do the following:

- Review the rack unpacking instructions that are attached to the outside of the rack packaging materials for details on how to unpack the rack

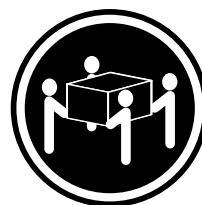
#### Statement 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

#### CAUTION:

Use safe practices when lifting.

- Carefully unpack the remaining components from the other packages and compare the components with the following inventory checklist

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### Inventory checklist

Take an inventory of items as you unpack them to ensure that you have all of the cluster components. The following is a list of items shipped for all Netfinity HA 4500R Cluster installations. If any items are missing or damaged, contact your place of purchase:

**Note:** Some cluster components, such as slide rails, come preinstalled in the rack cabinet.

- One Netfinity 9306 Model 200 NetBAY22 rack cabinet
- One Rack stabilizer bracket (located in the cardboard box in the rack)
- Two Netfinity 4500R servers (slide rails preinstalled in the rack)

- One Netfinity EXP200 expansion unit (rails preinstalled in the rack)
- One Netfinity console-server selector switch (preinstalled in the left side of the rack)
- Two Netfinity power distribution units (PDU) (preinstalled - one in each side of the rack)
- One Netfinity keyboard tray (preinstalled in the rack)
- One space-saver keyboard
- One T54a flat panel monitor
- One Netfinity Flat Panel Monitor Rack Mount Kit II (for installing the monitor in the keyboard tray)
- Two cable-management arms (for routing server cables)
- Two hinge pins (for attaching the cable-management arms to the rack)
- Six 120 V ac power cables (for connecting power to the monitor, selector switch, EXP200, and both servers)
- One Ethernet crossover cable (for connecting the Netfinity 10/100 Ethernet Adapters to each other)
- Two external LVD SCSI cables (for connecting the servers to the EXP200)
- Cable clamps (for cables connected to the servers)
- Cable-retainer brackets (one for each server for cable routing)
- M6 screw package (for securing components in the rack)
- Cable straps (for securing cables within the rack)
- User and Installation Guides for all cluster components
- *IBM Netfinity Safety Information* book
- This documentation

Your cluster might also include an APC uninterruptable power supply (UPS). If a UPS is part of your cluster installation, the mounting rails will be preinstalled in the rack for you.

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## Preinstallation procedures

**Before you begin**, do the following:

- Read "Handling static-sensitive devices".
- Read "Tool requirements".

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## Handling static-sensitive devices

Some of the cluster components are electrostatic discharge (ESD) sensitive. Take precautions to void damage from static electricity. For details on handling ESD-sensitive devices and components, refer to the following Web site and use a search term of ESD: <http://www.ibm.com>

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## Tool requirements

To install the Netfinity HA 4500R Cluster components, you will need the following tools:

- A medium flat-blade screwdriver
- A large flat-blade screwdriver
- A medium phillips screwdriver
- A 12-mm open-end wrench

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## Installing the 4500R cluster components

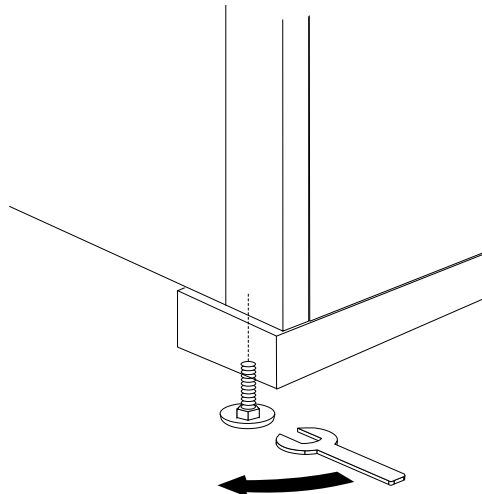
- Review the documentation that comes with your rack cabinet
- Maintain clearance around your devices for air circulation
- Ensure that the room air temperature is below 35°C (95°F)
- Install devices starting from the bottom of the rack
- Do not extend more than one device out of the rack at the same time
- Do not place any object weighing more than 50 kg (110 lbs.) on top of rack-mounted devices
- Remove the rack doors and side panels, if necessary, to provide easier access during installation
- Connect all power cords to properly wired and grounded electrical outlets
- Take caution to prevent overloading the power outlets when you install multiple devices in a rack

Use the following procedure to install the cluster components in your rack:

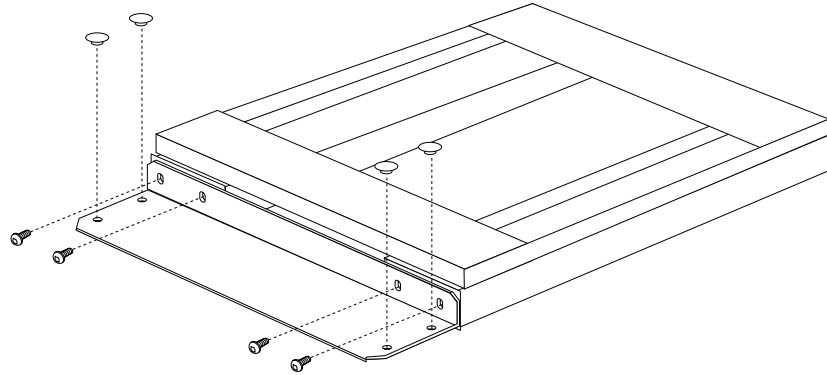
1. Before installing any devices in the rack, roll the rack to the location where you will connect your cluster to the local network.

**Attention:** You must connect the servers in your cluster to active ports on your public network before you turn on the servers and configure the software. Make sure that the location you choose for your rack will allow these network connections to be made.

2. Once you have located your rack, use a 12-mm open-end wrench to lower the four leveling pads on the bottom of the rack until they make firm contact with the floor.

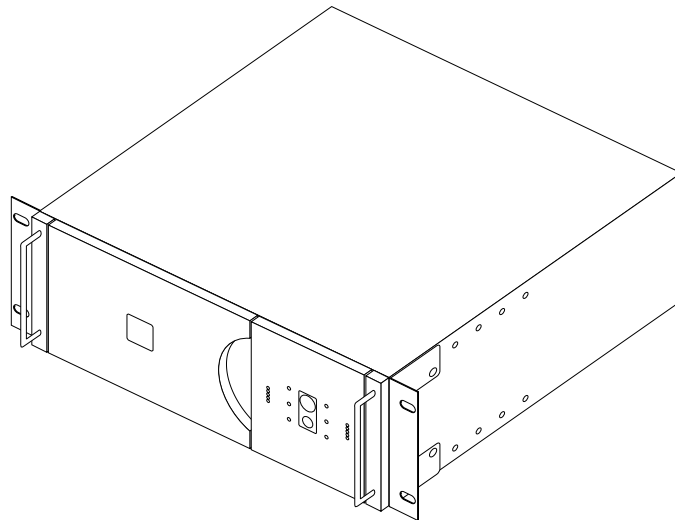


3. Place the rack stabilizer bracket so that the holes in the vertical flange align with the threaded holes on the bottom-front of the rack; then, secure the stabilizer bracket to the rack with the four screws that come in the box with the bracket.



**Note:** If necessary, bolt the bottom of the stabilizer bracket to the floor. Otherwise, use the bracket plugs to fill the holes in the stabilizer bracket.

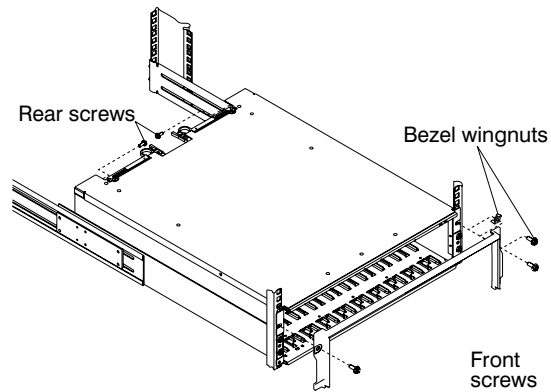
4. If a UPS came as part of your cluster, you must install it first in the bottom of the rack. Slide the UPS into the bottom of the rack and secure it to the rack with the provided M6 screws.



**Note:** The batteries inside of the UPS are disconnected before shipping. Refer to the documentation that comes with the UPS for instructions on how to reconnect the batteries before you turn on your UPS or any devices that are connected to it.

5. The EXP200 expansion unit installs in the bottom of your rack, or just above a UPS if you installed one in step 4. Before installing the EXP200, remove both rear screws from the preinstalled rails in the rack and save them.

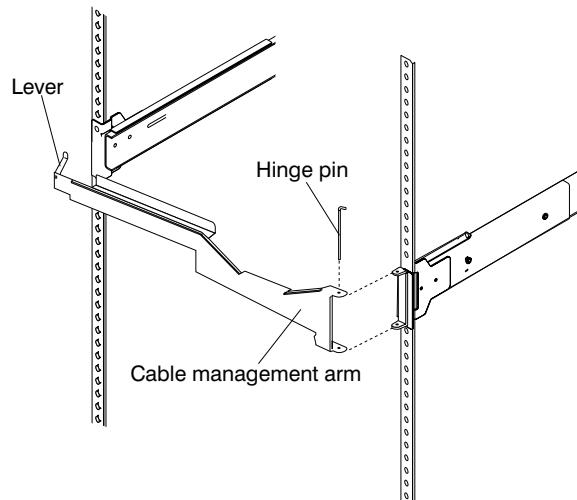




Remove the white screws and wingnuts from the bezel and set the bezel aside; then, slide the expansion unit fully into the rack. Align the bezel locator pins and secure the bezel to the rack with two M6 screws; then, secure the rear of the unit with the two screws that you removed in the beginning of this step.

**Notes:**

- a. The illustration shown here is of an EXP200 with its hard drives, power supplies, and fans removed. If you need to reduce the weight of the EXP200 for easier installation into the rack, refer to the EXP200 documentation that comes with your cluster for instructions on how to temporarily remove these items during installation.
  - b. Even if you do not remove items from the EXP200, verify that all hard drives are properly seated.
6. Install the cable-management arms for both servers before installing either server. Server 2 installs just above the EXP200 in your rack on the slide rails preinstalled in the rack, and Server 1 installs just above Server 2, also on preinstalled slide rails.

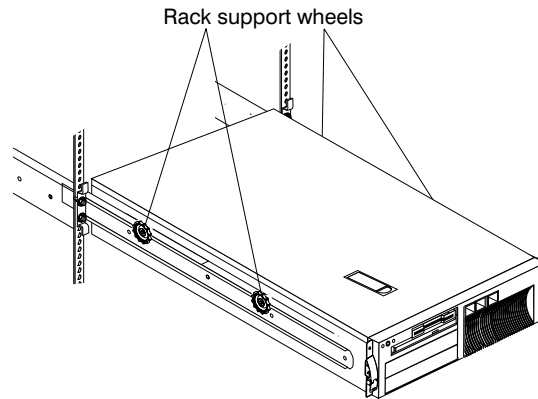


Use the hinge pins to attach each cable-management arm to the hinge bracket on the preinstalled slide rails for both servers.

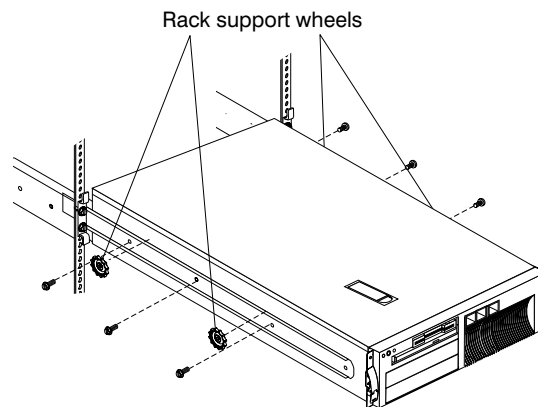
**Note:** If you need to access the rear of a server, after you install it, you must rotate the lever to the vertical position so that you can pull the arm away from the server. Otherwise, the lever must be in the horizontal position inside of the rack to prevent the cables from touching the rear rack door.

7. Extend the slide rails for Server 2 fully out of the rack; then, lift the server above the rails and rest the rack-support wheels on the slide rails.

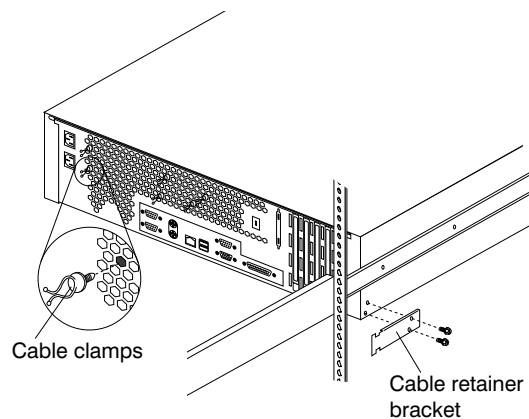
**Attention:** Be careful not to place your fingers around the wheels when you lower the server onto the rails.



8. Secure the server to the rails with three M4 screws per rail; then, remove the rack-support wheels and store them in a safe place for future use.



9. Use two M4 screws to install the cable-retainer bracket on the server; then, install the cable clamps to use later when routing cables.



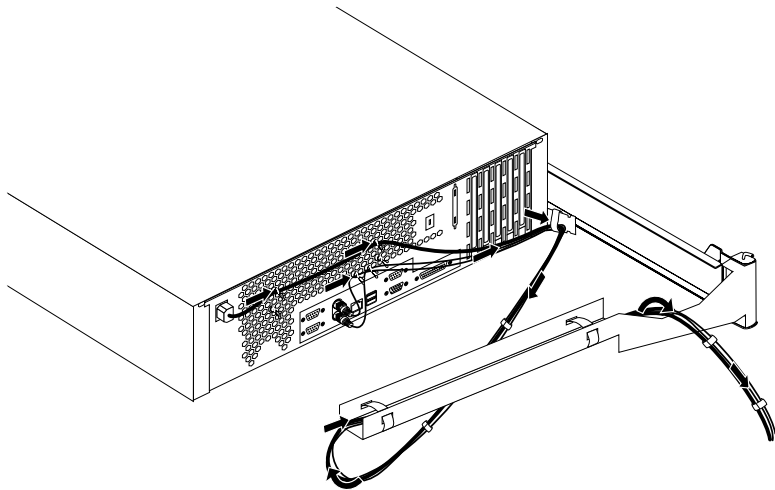
**Note:** Your cluster comes with enough cable clamps to use on both servers. Do not install all of the cable clamps on the same server; instead, divide the cable clamps evenly between both servers.

10. Press the latches on both rails inward so that you can slide the server into the rack; then, push the server until both release latches on the front of the server lock into place on the front of the rails.
11. Repeat step 7 through step 10 to install Server 1 just above Server 2 in the rack.
12. The T54a flat panel monitor installs in the preinstalled keyboard tray in your rack. Refer to the IBM Netfinity Flat Panel Monitor Rack Mount Kit II documentation for installation instructions for your monitor and space-saver keyboard; then, return here to cable your cluster components.

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## Cabling the 4500R cluster components

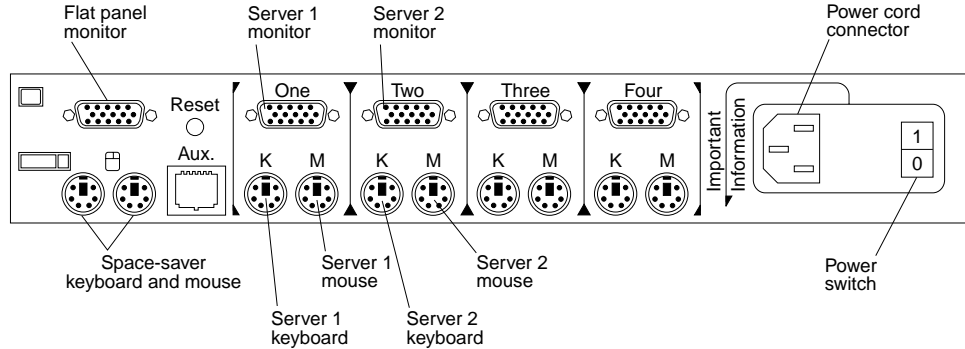
- Do not run cables in front of or behind other devices that will prevent service access to those devices
- Label all cables (all cables are pre-labeled except for the power cables) so that they are clearly distinguishable from each other
- When installing devices mounted on sliding rails, such as servers or the keyboard tray:
  - Run the cables neatly along equipment cable-management arms and tie the cables to the arms using the cable straps provided



- Leave enough slack so that the device can fully extend without putting a strain on the cables
- Secure the cables so that the device can retract without pinching or cutting the cables
- When installing devices mounted on non-sliding rails:
  - Run the cables neatly along the rack posts
  - Use the cable straps provided to secure the cables to the posts
- Make sure that the cables cannot be pinched or cut by the rack rear door or other devices
- Run external cables through the opening in the bottom of the rack

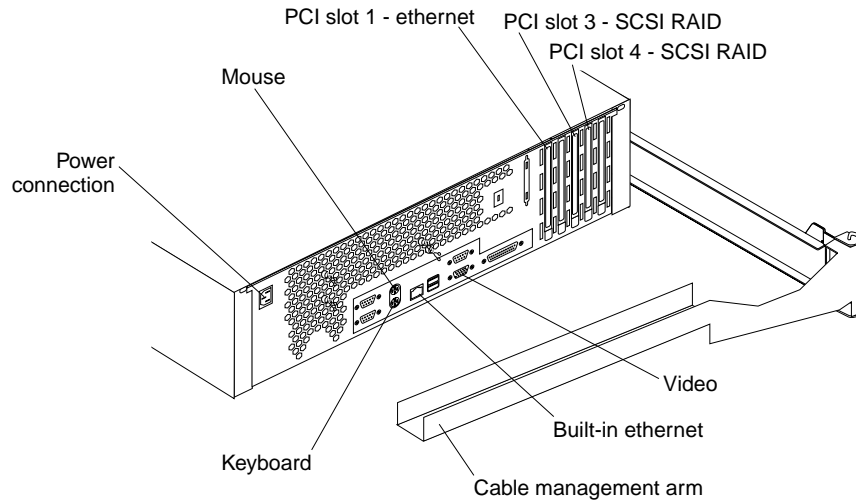
Make sure that the power switches on all devices are off before connecting any cables; then, use the following procedure to cable your 4500R cluster components:

1. Connect the flat panel monitor power cable to either PDU or to the UPS; then, connect the flat panel monitor and space-saver keyboard to the appropriate ports on the console-server selector switch as indicated below.



2. Connect the power cable for the console-server selector switch to either PDU or to the UPS.
3. Connect the monitor, keyboard, and mouse cable (labeled **1A**) from the Server 1 ports on the selector switch to the appropriate ports on Server 1; then, connect the monitor, keyboard, and mouse cable (labeled **2A**) from the Server 2 ports on the selector switch to the appropriate ports on Server 2.

**Note:** Make sure that you properly route all cables that you connect to a server along the server cable-management arm for that server.



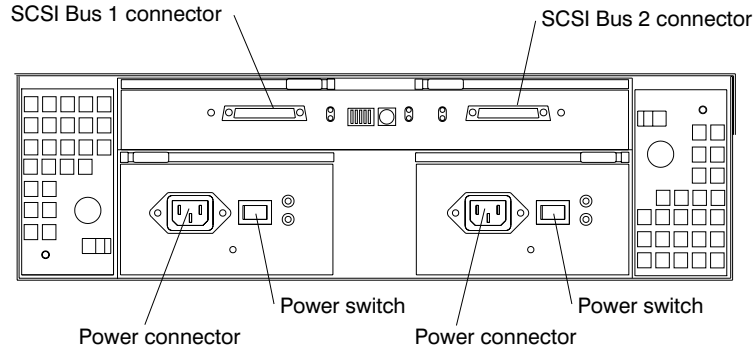
#### Attention - License Agreement

For Windows NT installations, the removal of the label covering the power connectors on each server constitutes acceptance of the Microsoft Windows NT Licensing Agreement. If you do not agree or accept the agreement, contact your IBM representative.

4. Connect a power cable to each server; then, connect the server power cables to a PDU or to the UPS.
 

**Note:** To provide redundant power protection against power failures for clusters without a UPS, connect one server to the PDU on the left side of your rack; then, connect the other server to the PDU on the right side of your rack.
5. Connect two power cables to the EXP200; then, connect both power cables to a PDU or to the UPS.

**Note:** To provide redundant power protection against power failures for clusters without a UPS, connect one power cable to each of the two PDUs installed in your rack.



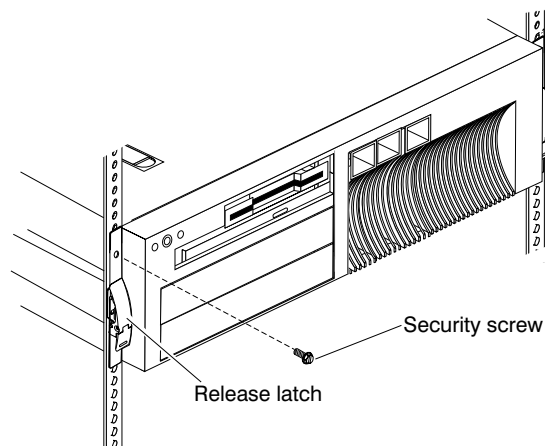
6. Connect SCSI bus 1 connector on the EXP200 to the Server 1 RAID adapter in PCI Slot 4 using the LVD SCSI cable labeled **3A**; then, connect SCSI bus 2 connector on the EXP200 to the Server 2 RAID adapter in PCI Slot 4 using the cable labeled **3B**.
7. Connect the Server 1 built-in Ethernet Controller to an active port on a hub that is part of your public network; then, connect the Server 2 built-in Ethernet Controller to another active port on a hub that is part of your public network.

**Note:** You do not have to connect both servers to the same hub, as long as they are connected to hubs on the same public network.

8. Connect the provided Ethernet crossover cable between the Server 1 Ethernet 10/100 Adapter in PCI Slot 1 and the Server 2 Ethernet Adapter in PCI Slot 1 to interconnect the cluster.

**Attention:** You must connect the servers in your cluster to active ports on your public network, and connect the servers to each other, before you turn on the servers and configure the software. Failure to do this will cause your software configuration to fail.

9. Once you have completed cabling your 4500R cluster, you can install the M6 security screws that hold the servers in your rack.



10. Plug both PDUs or the UPS into properly wired and grounded electrical outlets.

You have completed cabling your Netfinity 4500R Cluster and are ready to perform the software configuration. Continue with Chapter 3, "Configuring the Netfinity HA 4500R cluster," on page 13.



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## Chapter 3. Configuring the Netfinity HA 4500R cluster

The IBM Netfinity HA 4500R Cluster comes with the base operating system for Windows 2000 Advanced Server or Windows NT 4.0 Enterprise Edition already installed.

- If you are configuring this HA Cluster to use Windows 2000 Advanced Server see “Configuring the servers using Windows 2000 Advanced Server”
- If you are configuring this HA Cluster to use Windows NT 4.0 Enterprise Edition, see “Configuring the servers using Windows NT 4.0 Enterprise Edition” on page 18

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### Configuring the servers using Windows 2000 Advanced Server

**Note:** You will need the 25-character Product Key (Certificate of Authenticity) numbers for both Server 1 and Server 2 to configure the Netfinity HA 4500R Cluster servers. The Product Key numbers are located on top of the servers at the rear.

Before you begin the configuration process, you need to do the following:

- Keep in mind the following:
  - Ensure that the cables and power cords are connected properly.
  - Ensure that the servers are connected to a working public network.
  - Have the 25-character Product Key (Certificate of Authenticity (COA)) number available when you start the servers. You will need it later.
  - Be sure to configure Server 1 before you configure Server 2.
- Power on the cluster components in the following sequence:
  1. The PDU and/or UPS
  2. The EXP200
  3. The console server selector switch
  4. The flat panel monitor
  5. Server 1
  6. Server 2

The Windows 2000 Advanced Server clustering setup for Netfinity HA 4500R Cluster will consist of three phases:

- Phase 1 - personalizing the basic operating system
- Phase 2 - advance operating system configuration (for example, setting up the domain controllers)
- Phase 3 - cluster configuration

### Configuring server 1

To configure Server 1, do the following:

1. Ensure that Server 1 and Server 2 are powered on.

The Windows 2000 Setup program automatically starts the Windows 2000 operating system.
2. When the **Windows 2000 Server Setup** window displays, click **Next**.
3. When the **License Agreement** window displays, review the information. Then to continue, click **I Accept This Agreement**; then, click **Next**.

4. When the **Personalize Your Software** window displays, type your full name and company or organization in the **User Name** and **Organization** fields; then, click **Next**.
5. When **Your Product Key** window displays, type in the 25-character product key (Certificate of Authenticity) number in the **Product Key** field; then, click **Next**.  
The setup program takes control. Several screens later, the Completing the Windows 2000 Setup Wizard displays.
6. When the **Completing the Windows 2000 Setup Wizard** window displays, click **Finish**.  
The setup program has completed Phase 1 - personalizing the basic operating system.  
The system reboots the operating system and the setup program begins Phase 2 - advanced operating system configuration.  
At this stage in the process, you can choose to configure the server into the network in two ways. You can configure the server as a domain controller or you can configure the server as a member of another domain in the network.  
If you want to configure the server as a domain controller, continue with the following steps. If you want to configure the server as a member of an existing domain, see "Configuring the server as a member of an existing domain" on page 15. Once you are done, follow step 4., below, through step 25 on page 15 on configuring the server as a domain controller.

**To configure the server as a domain controller, do the following:**

1. From the desktop, double-click the **Create Domain** icon.  
The Configuration Active Directory wizard starts. At this stage, the setup program is configuring the server as a domain controller.
2. You might receive an error message if the server is not connected to a network correctly. If you get a message that says: "could not form the domain", connect the server to the network correctly and continue clicking **Next** until you are prompted to enter your administrative password. Type in the word *password* in lowercase in the **Password** field; then, click **Next**.
3. The **Insert Disk** window displays. Change the path from D:\i386 to C:\i386 then, click **OK**.  
The setup program configures the Active Directory. When complete, the system automatically shuts down and reboots. When the system comes up again, the setup program starts the cluster configuration phase.
4. When the **Welcome to Windows** window displays, press **Ctrl+Alt+Delete**. The system reboots.
5. When the **Log On to Windows** window displays, type the word *password* (in lowercase) in the **Password** field; then, click **OK**.
6. The **Windows 2000 Configuring Your Server** window displays. Close this window.
7. Run the setup.exe in the path c:\ibm to install Microsoft Clustering Services and IBM ServeRAID Clustering Support.
8. When the **IBM ServeRAID NT Cluster Solution** information window displays, click **OK**.
9. When the **Welcome** window for **IBM ServeRAID NT Cluster Solution** window displays, click **Next**.
10. When the **IBM ServeRAID Cluster Configuring Wizard** window displays, click **Next**.



11. When the **Cluster Service Configuring Wizard** window displays, click **Next**. The setup program is installing cluster services.
12. When the **Hardware Configuration** window displays, click **I Understand**; then, click **Next**.
13. When the **Create or Join Cluster** window displays, ensure that the first radio button is selected; then, click **Next**.
14. When the **Cluster Name** window displays, type in a name for the cluster in the **Cluster Name** field; then, click **Next**.
15. When the **Select an Account** window displays, type in a user name and password for the domain account in the **User Name** and **Password** fields; then, click **Next**.
16. When the **Configure Cluster Network** window displays, click **Next**.
17. When the **Network Connections** windows displays, ensure that for the IBM Netfinity 10/100 Ethernet Adapter, you select the **Internal cluster communications only (private network)** radio button; then, click **Next**.
18. When the next Network Connections window displays, ensure that for the IBM Netfinity Fault Tolerance PCI Adapter, you select the **all communications (mixed network)** radio button; then, click **Next**.
19. When the **Internal Cluster Communication** window displays, ensure that the network name for the IBM Netfinity 10/100 Ethernet Adapter is the first one in the network list; then, click **Next**.
20. When the **Cluster IP Address** window displays, type the IP Address for the management of the cluster in the **IP Address** field (use the cluster IP Address listed in Table 2 on page 33); then, click **Next**.
21. When the **Completing the Cluster Service Configuration Wizard** window displays, click **Finish**.
22. When the Cluster information window displays and indicates that the cluster service has started successfully, click **OK**.
23. The configuration that was shipped with the cluster must use the **Q:** drive as the quorum resource. When the **IBM ServeRAID Cluster Configuration Wizard** window displays, select the **Q:** drive and click **Next**.
24. When the window indicating that the configuring wizard has completed configuring the cluster displays, click **Finish**.
25. The **IBM ServeRAID NT Cluster Solution** window displays and indicates that the setup program has completed the installation of IBM ServeRAID Cluster Solution. Click **Finish**.

You have successfully completed cluster configuration of Server 1.

### Configuring the server as a member of an existing domain

Your servers were shipped pre-configured with a network configuration that might not be compatible with the network environment in which the servers will become a member of. You will need to modify the network connection settings to make the Server 1 accessible in an existing domain (refer to Table 2 on page 33 for the initial configuration settings). Although there are two network connections, you will only need to modify one of the network connections to make the Server 1 accessible in an existing domain.

**Note:** The procedures that follow apply to both Server 1 and Server 2.

**To configure the server as a member of an existing domain**, do the following:

1. From the desktop, right-click on **My Network Places** icon; then, click **Properties**.

2. Right-click on the network connection associated with the IBM Netfinity Fault Tolerance PCI Adapter; then, click **Properties**.
  3. When the **Local Area Connection Properties** window displays, select **Internet Protocol (TCP/IP)**; then, click **Properties**.
  4. Contact your network or system administrator to obtain the information needed to configure the internet protocol for this server.
  5. From the desktop, right-click on **My Computer** icon; then, click **Properties**.
  6. When the **System Properties** window displays, select the **Network identification** tab; then, click **Properties**.
  7. When the **Identification Changes** window displays, select the **Domain** radio button and type the name of the domain that you want the server to be a member of in the **Domain** text field; then, click **OK**.
  8. When the **Domain User name and Password** window displays, type the name and password of an account to join the domain in the **Name** and **Password** fields; then, click **OK**.
  9. When the **Network Identification** information window displays welcoming you to the domain that you have become a member of, click **OK**.
  10. When the **Network Identification** information window displays indicating that you must restart your computer for the changes to take effect, click **OK**.
  11. Click **OK** to save the changes and close the **System Properties** window.
  12. When the **System Setting Changes** information window displays indicating that you must restart the computer for the changes to take effect, click **Yes**.
- You have successfully configured the server as a member of an existing domain.

## Configuring server 2

To configure Server 2, do the following:

1. Ensure that Server 1 and Server 2 are powered on.
2. When the **Windows 2000 Server Setup** window displays, click **Next**.
3. When the **License Agreement** window displays review the information. Then to continue, click **I Accept This Agreement**; then, click **Next**.
4. When the **Personalize Your Software** window displays, type your full name and company or organization in the **User Name** and **Organization** fields; then, click **Next**.
5. When **Your Product Key** window displays, type in the 25-character product key (Certificate of Authenticity) number in the **Product Key** field; then, click **Next**.
6. When the **Completing the Windows 2000 Setup Wizard** window displays, click **Finish**.

The setup program has completed Phase 1 - personalizing the basic operating system.

The system reboots the operating system and the setup program begins Phase 2 - advanced operating system configuration.

At this stage in the process, you can choose to configure the server into the network in two ways. You can configure the server as a domain controller or you can configure the server as a member of another domain in the network.

If you want to configure the server as a domain controller, continue with the following steps. If you want to configure the server as a member of an existing domain, see "Configuring the server as a member of an existing domain" on page

15. Once you are done, follow steps d through q below on configuring the server as a domain controller.

**To configure the server as a domain controller, do the following:**

- a. From the desktop, double-click on the **Join Domain** icon.  
The Configuration Active Directory wizard starts. At this stage, the setup program is configuring the server as a domain controller.
- b. You might receive an error message if the server is not connected to a network correctly. If you get a message that says: "could not form the domain", connect the server to the network correctly and continue clicking **Next** until you are prompted to enter your administrative password. Type in the word *password* in lowercase in the **Password** field; then, click **Next**.
- c. The **Insert Disk** window displays. Change the path from D:\i386 to C:\i386 then, click **OK**.  
The setup program configures the Active Directory. When complete, the system automatically shuts down and reboots. When the system comes up again, the setup program starts the cluster configuration phase.
- d. When the **Welcome to Windows** window displays, press **Ctrl+Alt+Delete**. The system reboots.
- e. When the **Log On to Windows** window displays, type the word *password* (in lowercase) in the **Password** field; then, click **OK**.
- f. The **Windows 2000 Configuring Your Server** window displays. Close this window.
- g. Run the setup.exe in the path c:\ibm to install Microsoft Clustering Services and IBM ServeRAID Clustering Support.
- h. When the **IBM ServeRAID NT Cluster Solution** information window displays, click **OK**.
- i. When the **Welcome** window for **IBM ServeRAID NT Cluster Solution** window displays, click **Next**.
- j. When the **IBM ServeRAID Cluster Configuring Wizard** window displays, click **Next**.
- k. When the **Cluster Service Configuring Wizard** window displays, click **Next**. The setup program is installing cluster services.
- l. When the **Hardware Configuration** window displays, click **I Understand**; then, click **Next**.
- m. When the **Create or Join Cluster** window displays, select **The second or next node in the cluster** radio button; then, click **Next**.
- n. When the **Cluster Name** window displays, type the user name you want to use for the cluster and a password in the **Cluster Name** and **Password** fields and select the **Connect to cluster as** box; then, click **Next**.
- o. When the **Select an Account** window displays, type in a password for the domain account in the **Password** field (use the same password you used in the Select an Account window for Server 1); then, click **Next**.
- p. When the window indicating that the configuring wizard has completed configuring the cluster displays, click **Finish**.
- q. The **IBM ServeRAID NT Cluster Solution** window displays and indicates that the setup program has completed the installation of IBM ServeRAID Cluster Solution. Click **Finish**.

You have successfully completed cluster configuration of Server 2.

---

## Configuring the servers using Windows NT 4.0 Enterprise Edition

**Note:** You will need the 25-character Product Key (Certificate of Authenticity) numbers for both Server 1 and Server 2 to configuring the Netfinity HA 4500R Cluster servers. The Product Key numbers are located on the Certificate of Authenticity that is included with your Netfinity HA 4500R Cluster.

Before you begin the configuration process, you need to do the following:

- Keep in mind the following:
  - Ensure that the cables and power cords are connected properly.
  - Ensure that the servers are connected to a working public network.
  - Have the 25-character Product Key (Certificate of Authenticity (COA)) number available when you start the servers. You will need it later.
  - Be sure to configure Server 1 before you configure Server 2.
- Power on the cluster components in the following sequence:
  1. The PDU and/or UPS
  2. The EXP200
  3. The console server selector switch
  4. The flat panel monitor

**Note:** Do not power on either of the servers at this time.

The Windows NT 4.0 Enterprise Edition clustering setup for Netfinity HA 5100 Cluster will consist of five phases:

- Phase 1 - recording information necessary to complete the installation procedure
- Phase 2 - preparing the customer environment for the cluster
- Phase 3 - installing and configuring Windows NT 4.0 Enterprise Edition
- Phase 4 - assigning permanent drive letters
- Phase 5 - setting up Microsoft Cluster Server

### Recording Information Necessary for this Procedure

Before you begin the Windows NT 4.0 Enterprise Edition installation procedure, fill out the following table so that you will have all necessary addresses, user IDs, passwords, and so forth available during the installation process.

<b>For Computer Domain Controller (PDC)</b>	Domain Administrator User ID	
	Domain Administrator Password	

<b>For Server 1</b>	Computer Name (Host Name) for Server 1	
	Administrator Password for Server 1	
	TCP/IP Address for Public/Client Network	
	Subnet Mask for Public/Client Network	
	Default Gateway for Public/Client Network	
	DNS Server for Public/Client Network	
	WINS Server for Public/Client Network	
	TCP/IP Address for Private/Cluster Interconnect Network	
	Subnet Mask for Private/Cluster Interconnect Network	
<b>For Server 2</b>	Computer Name (Host Name) for Server 2	
	Administrator Password for Server 2	
	TCP/IP Address for Public/Client Network	
	Subnet Mask for Public/Client Network	
	Default Gateway for Public/Client Network	
	DNS Server for Public/Client Network	
	WINS Server for Public/Client Network	
	TCP/IP Address for Private/Cluster Interconnect Network	
	Subnet Mask for Private/Cluster Interconnect Network	
<b>For Cluster Virtual Server (Microsoft Cluster Service)</b>	Domain Name	
	Domain Cluster Service Account Name	
	Domain Cluster Service Account Password	
	Network Name for Primary Virtual Server (Cluster Name)	
	TCP/IP Address of Primary Virtual Server (Cluster TCP/IP Address)	
	Subnet Mask for Primary Virtual Server (Cluster TCP/IP Subnet Mask)	
<b>For ServerRAID Manager</b>	Password for default "admin" account	

## Preparing the Customer Environment for the Cluster

Add the two cluster servers to the Domain

1. Using a domain Administrator user ID and corresponding password, log onto a domain controller that manages the domain in which the HA cluster will be installed.
2. Start Server Manager (click **Start -> Program -> Administrative Tools -> Server Manager**). The Server Manager window (with the name of the domain included in the title bar) opens.
3. Select **Add to Domain** from the Computer menu. The Add Computer to Domain window opens.
4. Select the **Windows NT Workstation or Server** radio button.
5. Type in the computer name for Server 1 and then press **Enter** to add it to the domain.

6. Type in the computer name for Server 2 and then press **Enter** to add it to the domain.
7. Click **Close**.
8. Close the Server Manager window.

Add a Domain Administrator for the Cluster Server to use:

1. From the same domain controller system, start User Manager for Domains (**click Start -> Program -> Administrative Tools -> User Manager for Domains**).
2. Select **New User** from the User menu. The New User window (with the name of the domain included in the title bar) opens.
3. Enter the following information in the appropriate fields:
  - User Name** The Domain Cluster Service Account name that you have chosen
  - Full Name** "MSCS Cluster Service Account"
  - Description** "Account used by MSCS to access the domain"
  - Password** The Domain Cluster Service Account Password you have chosen
  - Password Confirmation**  
The Domain Cluster Service Account Password you have chosen

Then, uncheck the **User Must Change Password at Next Logon** check box, and check the **User Cannot Change Password** and **Password Never Expires** check boxes.
4. Click **Groups**. The Group Membership window opens.
5. Select **Domain Admins** from the **Not a Member Of** selection list.
6. Click **Add** to add this group to the **Member Of** selection list.
7. Select **Domain Admins** from the **Member Of** selection list and then click **Set (Primary Group)**.
8. Select **Domain Users** from the **Member of** selection list and then click **Remove**.
9. Click **OK** to accept these changes and close the **Group Membership** window.
10. From the New User window, click **Add** to create the user. The New User window closes when the new user is created. Then, click **Cancel** to close the Add User window.
11. Close the User Manager window.

## Installing and Configuring Windows NT 4.0 Enterprise Edition

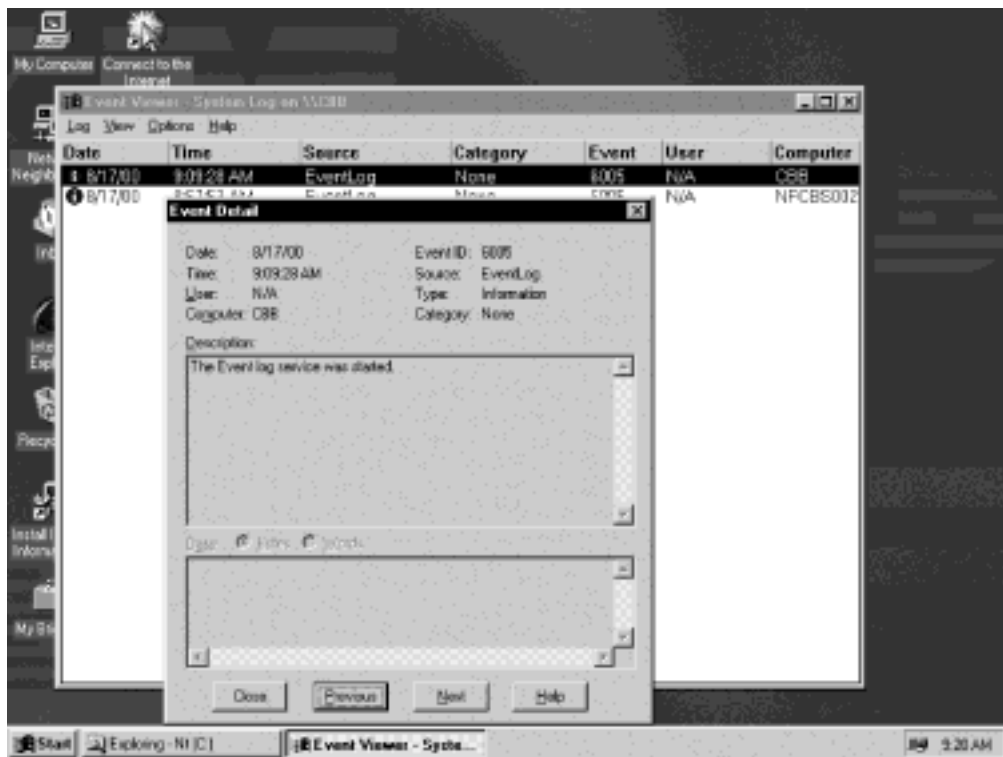
### Important

Power on the SCSI external storage enclosure and let it run for at least one minute before beginning this procedure.

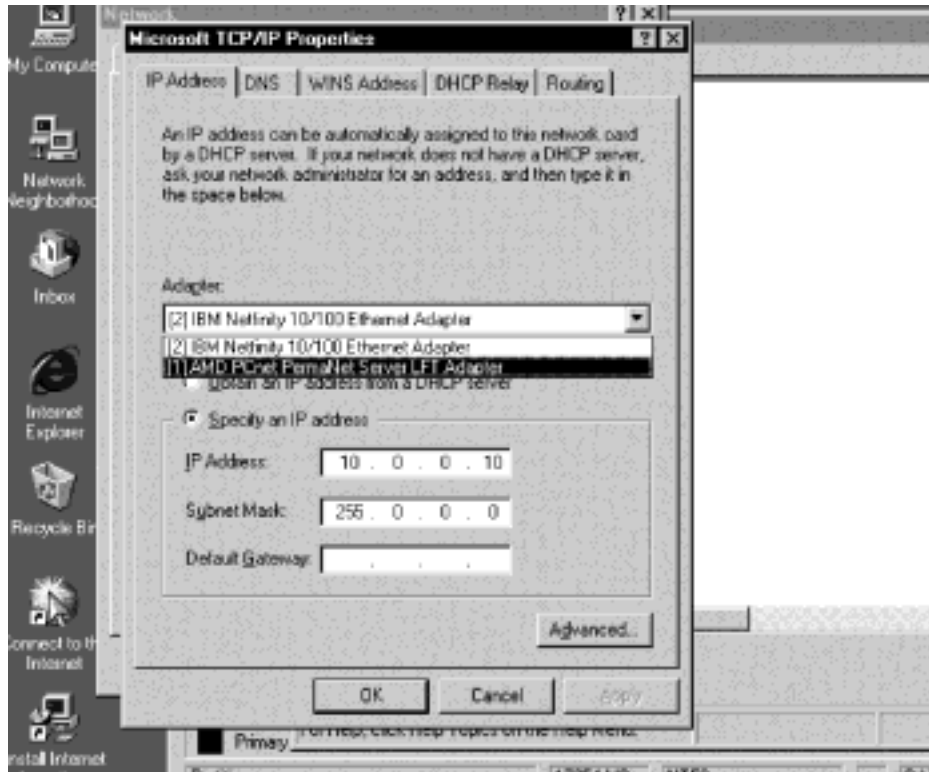
Installing and Configuring Windows NT on Server 1:

1. Power on Server 1.
  - Note:** Do not power on Server 2 at this time.
2. The Windows NT Setup Wizard window opens. Click **Next**.
3. The License Agreement window appears. Read the license agreement, select the **I accept this agreement** radio button and then click **Next**.
4. The Name and Organization window opens. Type in your name and organization information and then click **Next**.

5. The Registration window opens. Enter the product ID, found on the Certificate of Authenticity included in the bundle package, and then click **Next**.
6. The Computer Name window opens. Enter a computer name, or use the default computer name NFCBS001, and then click **Next**.
7. The Administrator Account window opens. Create the Administrator account password for Server 1. Type the same password in the **Password** and **Confirm Password** fields and then click **Next**.
8. Click **Finish** to complete the NT installation on Server 1. The server will restart automatically.
9. After the server restarts and the Begin Logon window opens, press **Ctrl+Alt+Delete** to log on to Server 1. Type the Administrator username and corresponding password (created in step 7.) in the **Username** and **Password** fields and then click **OK**.
10. The Welcome to Windows NT window opens. Click **Close**, and then use Event Viewer to ensure that Windows NT has started correctly. Click Start -> Programs -> Administrative Tools -> Event Viewer to open the Windows NT Event Viewer.



11. Use Event Viewer to check the System Event Log. Select **System** from the Log menu to display the system event log. If there are any Error events (identified by a red "stop sign" icon next to the event entry under the Date column), call IBM for support.
12. Select **Exit** from the Log menu to close the Event Viewer window.
13. From the Windows NT desktop, right-click on Network Neighborhood and then select **Properties** from the pop-up menu. The Network window opens.
14. From the Network window, click the **Protocols** tab. Make sure that the TCP/IP protocol entry in the Network Protocols selection list is highlighted, and then click **Properties**. The Microsoft TCP/IP Properties window opens.



15. Click on the **IP Address** tab. Then, using the information you entered in the Server 1 section of the network information table (see “Recording Information Necessary for this Procedure” on page 18), type the values for the IP Address, Subnet Mask and Gateway address (if applicable) for the Private/Heartbeat (Private) and the Public/Clients (Public) network adapters.

Before entering this data you must first select the appropriate network adapter by selecting it from the **Adapter** drop-box and then entering the TCP/IP information for that adapter. The network adapters that are used for the Private and the Public networks are:

- Netfinity 10/100 Ethernet adapter (Intel based) for the Private network
- Netfinity Fault Tolerant Ethernet Adapter (AMD based) for the Public network

The Netfinity Fault Tolerant Ethernet Adapter appears in the **Adapter** drop-box as (1) AMD PCnet PermaNet Server LFT adapter. The Netfinity 10/100 Ethernet adapter appears in the **Adapter** drop-box as (2) IBM Netfinity 10/100 Ethernet adapter.

**Note:** Make sure that the IBM Netfinity 10/100 Ethernet adapter is configured as part of the Private/Heartbeat network instead of the Public/Client network.

16. Click on the **DNS** tab. Enter in the **Host Name** field the computer name that you assigned to this server in step 6 on page 21. If your system is part of a DNS network, enter the full domain name (for example, mydomain.ibm.com) in the **Domain** field and then click **Add** in the DNS Service Search Order button group to open the TCP/IP DNS Server window.
17. Type in the TCP/IP address of the DNS Server and then click **Add** to close the TCP/IP DNS Server window and add the DNS Server to the DNS Service Search Order list. Up to three DNS Servers can be added to this list. DNS searches are carried out in order from the first DNS server to the last. You can select a DNS Server 1st then click **Up** or **Down** to change the order in which DNS Servers are searched.



18. Click on the **WINS Address** tab. Select the (1) AMD PCnet PermaNet Server LFT adapter from the **Adapter** drop-box and then type the WINS Server TCP/IP address in the **Primary WINS Server** field. Do not specify the WINS Server TCP/IP address for the Private network adapter. Click **OK** to save the updated information and to close the Microsoft TCP/IP Properties window.
 

**Note:** At this time a window opens asking whether you want to continue even though one of the network adapters has an empty WINS Server TCP/IP address. Click **Yes** to continue.
19. From the Network window, click on the **Bindings** tab. Select **all adapters** from the **Show Bindings for** drop-box. A list of the network protocols is displayed.
20. Click the "+" sign next to the TCP/IP Protocol entry to display a list of the network adapters. Right-click on (1) AMD PCnet PermaNet Server LFT adapter (the adapter that will be used for Public communication) and select **Move Up** to move it to the top of the list of the adapters under the TCP/IP Protocol entry.
21. Click the "+" sign next to the WINS Client (TCP/IP) entry to display a list of network adapters. Click on (2) IBM Netfinity 10/100 Ethernet adapter (the adapter that will be used for Private communication) and then click **Disable** to prevent the WINS Server from registering this network adapter. A "stop sign" icon appears beside the WINS Client (TCP/IP) entry. Click **OK** to save the network information and close the Network window. When the Network Settings Change window opens, click **No** to prevent the computer from restarting.
22. From the Windows NT desktop, right-click on My Computer and select **Properties** from the pop-up menu. The System Properties window opens.
23. From the System Properties window, click the **Performance** tab. Then, click **Change** under the Virtual Memory field. Change the Paging File Size value in the **Initial Size** and the **Maximum Size** fields to the size recommended by Windows NT under the Total Paging File Size for All Drives box. Click **Set** to set the value. Then click **OK** to close the Virtual Memory window.
24. Click **Close** to close the System Properties window. When asked if you want to restart the computer, click **Yes**.
25. After the server restarts and the Begin Logon window opens, press **Ctrl+Alt+Delete** to log on to Server 1. Type the Administrator username and corresponding password (created in step 7 on page 21) in the **Username** and **Password** fields and then click **OK**.
26. Close the Welcome to Windows NT window. Then right-click on Network Neighborhood icon in the desktop and select **Properties** from the pop-up menu.
27. Click the **Identification** tab and then click **Change**. Select the **Domain** radio button from the **Member of** group and type the name of the domain to which you want to add Server 1 in the **Domain** field. Then click **OK**. After the Server 1 joins the domain, a pop-up window appears with a message welcoming you to the domain. Click **OK** to close the pop-up window and then click **OK** to close the Identification Changes window. Finally, click **Close** on the Network window to save the network changes and close the window. When asked if you want to restart the computer, click **Yes**.
28. After the server restarts and the Begin Logon window opens, press **Ctrl+Alt+Delete** to log on to Server 1. Type the Domain Cluster Service Account Name and the Domain Cluster Service Account Password you created in the Before you Begin section (see "Recording Information Necessary for this Procedure" on page 18) in the **Username** and **Password** fields. Select from the **Domain** selection list the domain name that matches the domain name that was used in step 27.. Click **OK** to logon.
 

**Note:** If you do not have the Domain Cluster Service Account Name and Domain Cluster Service Account Password see "Recording Information Necessary

for this Procedure” on page 18 and “Preparing the Customer Environment for the Cluster” on page 19 or contact your network administrator.

29. Close the Welcome to Windows NT window. You are now ready to install and configure Windows NT on Server 2.

Installing and Configuring Windows NT on Server 2:

1. Power on Server 2.
2. Repeat step 2 on page 20 through step 28 on page 23.

**Note:** Be sure to use a new unique computer name or the Server 2 default computer name NFCBS002 in step 6 on page 21.

## Assigning Permanent Drive Letters to Shared Disks

To assign permanent drive letters from Server 1:

1. Start Disk Administrator (select Start -> Programs -> Administrative Tools (Common) -> Disk Administrator). If this is the first time you have used Disk Administrator a warning window appears stating that this is either the first time that Disk Administrator is run or at least one or more disks had been added to the computer since the last time Disk Administrator is run. Click **OK** to continue. You may also be prompted with Confirm windows if Disk Administrator does not find disk signatures on the shared disks. Click **Yes** in the confirm windows to continue.
2. When the Disk Administrator window appears, the shared disks are listed as Free Space with crosshatch boxes. Right-click on the crosshatch box next to **DISK 0** and then select **Create** from the pop-up menu.
3. The Create Primary Partition window opens. Click **OK** to accept the default size of the partition. A message box appears stating that the partition created may not be accessible from other operating systems and asks if you want to create the partition anyway. Click **Yes** to continue.

**Note:** After the partition is created, Windows NT may still show a crosshatched area beside the newly created partition. The size of this area varies but is usually less than 50M bytes. This is not free disk space. Do not create any disk partitions using this space. The system will crash if disk partitions are created using this space.

4. Right-click on the box next to **DISK 0** and select **Commit Changes Now** from the pop-up menu. A window appears asking whether you want to save the changes to the disk configuration. Click **Yes** to save the configuration and continue. A window appears to inform you that the disks were updated successfully. Click **OK**.
5. Right-click on the box next to **DISK 0** and select **Assign Drive Letter** from the pop-up menu. The Assign Drive Letter window opens.
6. Select the **Assign Drive Letter** radio button and then select the letter Q: from the drop-box beside the radio button. Click **OK** to set the drive letter for this disk. When the Confirm window appears, click **Yes**.
7. Right-click on the box next to **DISK 0** and then select **Format** from the pop-up menu.
8. From the Format window, select **NTFS** under File System. Type *Quorum* in the **Volume Label** field. Do not select any radio buttons from the Format Options group. Click **Start** to begin the formatting process on the disk. Click **OK** when the warning window is displayed to go ahead with the disk formatting process. Once the format has completed, click **OK** to clear the Format Complete information window. Then click **Close** to close the Format window.
9. Repeat step 4. through step 8. for the DISK 1 partition and for other shared disk partitions. When creating the partition for DISK 1, use drive letter R and use *Data* as the volume label. For additional shared disks, assign sequential drive letters starting with S and assign each volume a unique label.

10. Right-click on the box beside the CD-ROM entry select **Assign Drive Letter** from the pop-up menu. The Assign Drive L<sup>E</sup>tter window opens. Select the Assign Drive L<sup>E</sup>tter radio-button, and then select Z: from the Assign Drive Letter drop-box. Click **OK** to set the drive letter. When the Confirm window appears, click **Yes**.
11. When you have finished assigning permanent drive letters to shared disks, close Disk Administrator by selecting **Exit** from the Partition menu.

To assign permanent drive letters for Server 2:

1. On Server 2, open a Windows NT Command Prompt window. Change directories to the C:\IBM\Cluster\SUPPORT directory. Then type  

```
ipshahto synchoff
```

and press **Enter**. This command transfers control of the shared disks from Server 1 to Server 2.
2. Start Disk Administrator (select **Start -> Programs -> Administrative Tools -> Disk Administrator**). If this is the first time you have used Disk Administrator a warning window appears stating that this is either the first time that Disk Administrator is run or at least one or more disks had been added to the computer since the last time Disk Administrator was run. Click **OK** to continue.
3. When the Disk Administrator window opens, the formatted shared disks that you created on Server 1 are shown, but without their assigned permanent drive letters. Add the permanent drive letters that were defined for the shared disks on Server 1 by right clicking on the box next to each disk entry and selecting the **Assign Drive Letter** from the pop-up menu. Then, select the **Assign Drive Letter** radio button and select the drive letter from the drop-box beside the radio button.

**Notes:**

- a. You must use the same drive letter for each shared disk as it was assigned to in Server 1. If you do not perform this step or do not use the same drive letters as in the other cluster node you will not be able to bring the Microsoft Cluster Disk resources online in this cluster node.
  - b. Windows NT may show a small crosshatch area next to the created partition in each shared disk. The size of the area varies but it is usually less than 50M bytes. This is not free disk space. Do not create any disk partitions using this space. The system will crash if disk partitions are created using this space.
4. When you have finished assigning permanent drive letters to shared disks, close Disk Administrator by selecting **Exit** from the Partition menu.

Complete the shared disk configuration process:

1. On Server 1, open a Windows NT Command Prompt window. Change directories to the C:\IBM\Cluster\SUPPORT directory. Then type  

```
ipshahto synchoff
```

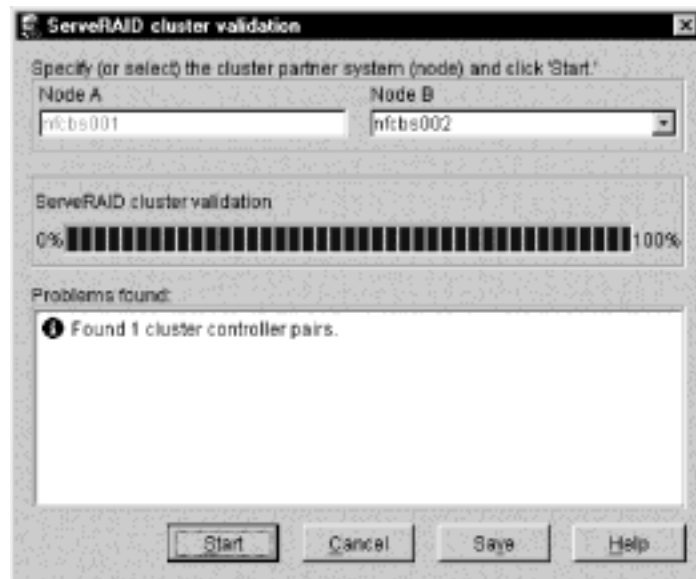
and press **Enter**. This command transfers control of the shared disks from Server 2 to Server 1.
2. On Server 1, start ServeRAID Manager (select **Start -> Programs -> ServeRAID Manager -> ServeRAID Manager**).  
When the ServeRAID Manager window opens, click the Server 1 (local system) name node on the Manage Systems tree in left window pane. Then, select **Actions -> Configure ServeRAID Agent -> Security**. If this is the first time you have configured the security agent, a New User window appears in addition to the ServeRAID Agent Security window and asks you to enter the password for the default security administrator "admin". Enter the same password in both the Password and Confirm Password fields and click **Add** to create the default security

administrator "admin". Select **Close** from the File menu to close the ServeRAID Agent Security window.

3. On Server 2, select **Start -> Programs -> ServeRAID Manager -> ServeRAID Manager** to start ServeRAID Manager.

When the ServeRAID Manager window opens, click the Server 2 Name node on the Manage Systems tree in left window pane. Then, select **Actions -> Configure ServeRAID Agent -> Security**. If this is the first time you have configured the security agent, a New User window appears in addition to the ServeRAID Agent Security window and asks you to enter the password for the default security administrator "admin". Enter the same password in both the Password and Confirm Password fields and click **Add** to create the default security administrator "admin". Select **Close** from the File menu to close the ServeRAID Agent Security window.

4. From Server 1's ServeRAID Manager window, click the Server 1 Name node on the "Manage Systems" tree in left window pane. Then, select **Actions -> Validate Cluster**. The ServeRAID Cluster Validation window opens. Type the name of Server 2 in the **Node B** field and click **Start** to validate the ServeRAID cluster settings. A window named Connecting to Remote System appears. Enter "admin" ID and the corresponding password you created in step 3. in the **User Name** and **Password** fields. Click **Connect** to close the Connecting to Remote System window. The progress bar in the ServeRAID Cluster Validation window will show the progress of the validation process. You should not see any errors in the **Problems Found** panel. If there are any errors, contact IBM support.



When the validation process is complete, click **Cancel** to close the ServeRAID Cluster Validation window. Then select **Exit** from the File menu to close the ServeRAID Manager window.

5. On Server 2, open a Windows NT Command Prompt window. Change directories to the C:\IBM\Cluster\SUPPORT directory. Then type

```
ipshahto synchoff
```

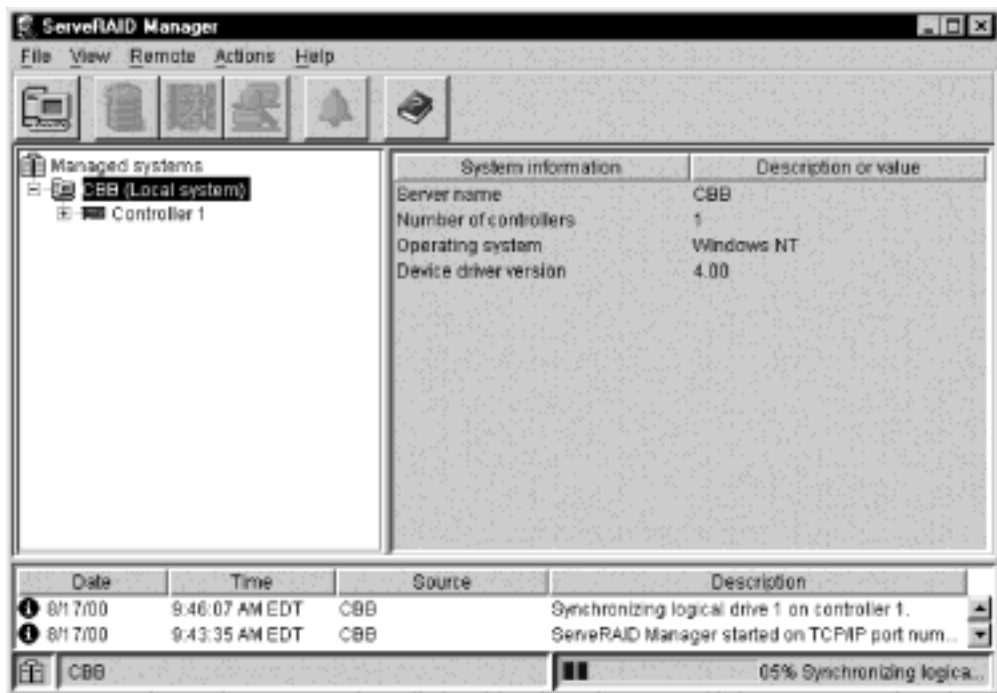
and press **Enter**. This command transfers control of the shared disks from Server 1 to Server 2. Then start the Disk Administrator program on Server 2 and verify that the drive letter for each of the shared disks is displayed correctly.

6. On Server 1, open a Windows NT Command Prompt window. Change directories to the C:\IBM\Cluster\SUPPORT directory. Then type
 

```
ipshahto synchoff
```

 and press **Enter**. This command transfers control of the shared disks from Server 2 to Server 1. Then start the Disk Administrator program on Server 1 and verify that the drive letter for each of the shared disks is displayed correctly.
7. Repeat steps 5 on page 26 and 6. three or four times to ensure that the drive letters stick to the defined share disks.
 

**Note:** If drive letters are missing, or if there are mismatches in drive letter assignment, first remove the drive letters from all shared disks. Then, reassign the drive letters for the shared disks by right-clicking on the box beside the the disk drive entry (for example, Drive 0 or Drive 1), selecting the **Assign Drive Letter** radio button, and then selecting the drive letter from the drop-box beside the **Assign Drive Letter** radio button. Be sure to use the same drive letters for each shared disk on both servers. Then repeat steps 5 on page 26 and 6. three or four times to ensure that the drive letters stick to the defined share disks. If the drive letters are still missing, or if there are still mismatches in drive letter assignment, call IBM for support.
8. Before going on to the MSCS cluster installation, you must synchronize the shared disks between the two servers at least once.



To start the synchronization process, open a Windows NT Command Prompt on the server that does not own the disks. Change directories to the C:\IBM\Cluster\SUPPORT directory. Then type

```
ipshahto synchoff
```

and press **Enter**. The Server will gain control of the shared disks and the disk synchronization process will be started on the shared disks. The duration of the synchronization process depends on the size of the shared disks. You can monitor the synchronization process by running the ServeRAID Manager program on the Server that owns the shared disks. The bottom window pane in the ServeRAID Manager window will show the synchronizing logical drive status.

**Note:** A "logical drive" is the same as a disk in Windows NT Disk Administrator.

9. Start Disk Administrator on Server 1 and verify that the drive letter for each of the shared disk drives is correctly displayed. If there are any mismatches, call IBM for support.

You are now ready to start the Microsoft Cluster Server software on Servers 1 and 2 to form a High Availability cluster.

## Microsoft Cluster Server Setup

1. Start the Microsoft Cluster Software (MSCS) installation on Server 1. Open a Windows NT Command Prompt window (or click **Start -> Run**) and type the following command:

```
C:\Microsoft\MSCS\Cluster\I386\setup /localquorum
```

and then press **Enter**.

**Note:** The parameter "localquorum" must be typed in lowercase.

2. The Microsoft Cluster Server Setup window opens. Click **Next**. Then click the **I Agree** radio button to indicate that you accept the Microsoft conditions that MSCS software is supported only if it is installed on a hardware configuration that was tested for compatibility with MSCS software. Then click **Next** to continue.
3. Select **Form a New Cluster** from the Select the Operation to Perform group and click **Next**.
4. Type in the **Enter the Name of the Cluster to Form or Join** field the name of the MSCS cluster to be formed and then click **Next**.

**Note:** The name of the MSCS cluster must be unique in the Public/Client network. If you choose a name that already exists in the network a warning will be displayed and you will need to specify another MSCS cluster name.

5. Click **Next** to accept the default directory for cluster software installation. The default directory (%systemroot%\cluster) is displayed in the **Setup will place files in this folder** field. To change the cluster software installation directory, click **Change** and then specify a different directory. Then, click **Next** to continue.

**Note:** Do not change this directory unless you have a strong technical understanding of the effects this can have on your MSCS installation.

6. Type in the **User Name** and **Password** fields the Domain Cluster Service Account Name and Domain Cluster Service Account Password (specified in "Recording Information Necessary for this Procedure" on page 18). Do not change the Domain selection, which should already show the name of the domain that this system is a member of. Click **Next** to continue.
7. Click **Next** to scan for all available adapters that are installed in the Server and to start the configuration of the role of each network adapter in the cluster.
8. In the Network Adapter window in which IBMFE2 appears in the Adapter Name field, type PRIVATE in the **Network Name** field. Then select the **Use only for internal cluster communications** radio button and click **Next** to continue.
9. In the Network Adapter window in which PCNTN4M1 appears in the Adapter Name field, type PUBLIC in the **Network Name** field. Then select the **Use for all communications** radio button and click **Next** to continue.

If additional network adapters are listed, you must either disable the adapter for cluster use or enable it only for client access.

- To disable the adapter for cluster use, uncheck the **Enable for Cluster Use** check box.
- To enable the adapter for use only for client access, type a unique name in the **Network Name** field and then select the **Use only for Client Access** radio button.

Click **Next** to continue.

10. When you have finished specifying the names and roles for all network adapters in your system a window opens that enables you to prioritize the networks that are available for Internal Cluster Communications. Select the **Private** entry and then click **Up** to move it to the top of the list and then click **Next**. If Private already appears at the top of the list, click **Next** to continue.
11. Next, type the TCP/IP address and the Subnet mask of the MSCS cluster in the **TCP/IP Address** and **Subnet Mask** fields. Do not change the values in the **Network** field (**Public** should already be selected). Click **Next**.
12. The MSCS setup program has completed collecting all necessary information and is now ready to install the cluster software. Click **Finish** to start copying files and to start Microsoft Cluster service once the file copying process is completed. If Microsoft Cluster Service has been installed successfully, a Microsoft Cluster Server Setup window opens stating that the cluster software has been successfully installed and advising you that you must restart the server for all changes to take effect. Click **OK** to restart the server.  
**Note:** If this window does not appear Microsoft Cluster Software has not been successfully installed. Please contact IBM for support for assistance.
13. Wait until Server 1 finishes restarting. Log into Server 1 and then open the Control Panel (click **Start -> Settings -> Control Panel**).
14. Double-click on **Services** to open the Services window. Find the Cluster Server entry in the **Services** list and ensure that the word Started is listed in the Status column. Click **Close** to close the Services window and then click **File -> Close** to close the Control Panel window.  
**Note:** You can also verify that the Cluster Service has started by issuing a PING command from a Windows NT Command Prompt with the name of the cluster used as the destination value (for example PING MYCLUSTER). If the Cluster Service has started, the PING command will display messages that the destination responded and how long it took to receive a reply. However, the Cluster Service will not respond to ping commands until several minutes after the service starts. If the cluster does not respond to the ping command wait 2 or 3 minutes and try again. When you have confirmed that the Cluster Server service has started on Server 1 you are ready start the cluster software installation process on Server 2 to join the MSCS cluster that was formed in Server 1.
15. Start the Microsoft Cluster Software (MSCS) installation on Server 2. Open a Windows NT Command Prompt window (or click **Start -> Run**) and type the following command:  

```
C:\Microsoft\MSCS\Cluster\I386\setup
```

and then press **Enter**.  
**Note:** Do not specify the parameter /localquorum. The localquorum parameter must be used only when installing MSCS to form an MSCS cluster on the first node or server of an MSCS cluster.
16. The Microsoft Cluster Server Setup window opens. Click **Next**. Then click the **I Agree** radio button to indicate that you accept the Microsoft conditions that MSCS software is supported only if it is installed on a hardware configuration that was tested for compatibility with MSCS software. Then click **Next** to continue.
17. Select **Join an Existing Cluster** from the Select the Operation to Perform box and click **Next**.
18. Type in the **Enter the name of the cluster to form or join** field the name of the cluster that you specified in step 4 on page 28. If you do not specify the same name an error window will be displayed and you will need to reenter the MSCS cluster name. Click **Next** to continue.

19. Click **Next** to accept the default directory for cluster software installation. The default directory (%systemroot%\cluster) is displayed in the **Setup will place files in this folder** field. To change the cluster software installation directory, click **Change** and then specify a different directory. Then, click **Next** to continue.
 

**Note:** If you changed the installation directory in step 5 on page 28 you must change the installation directory for Server 2 to the same installation directory. Do not change this directory unless you have a strong technical understanding of the effects this can have on your MSCS installation.
20. In the next window, type in the **Password** field the Domain Cluster Service Account Password that you specified in "Recording Information Necessary for this Procedure" on page 18. The **User Name** and **Domain** fields will be grayed-out. Click **Next**.
21. The MSCS setup program has completed collecting all necessary information and is now ready to install the cluster software. Click **Finish** to start copying files and to start Microsoft Cluster service once the file copying process is completed.
 

If Microsoft Cluster Service has been installed successfully, a Microsoft Cluster Server Setup window opens stating that the cluster software has been successfully installed and advising you that you must restart the server for all changes to take effect. Click **OK** to restart the server.

**Note:** If this window does not appear Microsoft Cluster Software has not been successfully installed. Please contact IBM for support for assistance.
22. Wait until Server 2 finishes restarting and the MSCS cluster service has started. Then, install the ServeRAID Windows NT Cluster Solution utility, first on Server 1 and then on Server 2. To install this utility:
  - a. Open a Windows NT Command Prompt on Server 1.
  - b. Change directories to make C:\IBM\Cluster the current directory.
  - c. Type setup at the prompt and then press **Enter** to start the installation program.
  - d. The setup program displays a reminder that "sticky" drive letters must be assigned before running this program. Click **OK** to continue.
  - e. The Welcome window opens. Click **Next** to install the software. When the software installation process is completed a window appears to advise you that the installation completed successfully. Click **OK** to continue to the next window, and then click **Finish** to complete the installation.
  - f. Repeat steps a through e on Server 2.
23. Use the Cluster Administrator program to ensure that the newly created MSCS cluster is started in both server nodes. Click **Start -> Programs -> Administrative Tools (Common) -> Cluster Administrator**. The Open Connection to Window window opens. Type in the **Cluster or Server Name** field the name of the newly formed MSCS cluster and then click **Open**. A window that shows the status of the MSCS cluster opens in the Cluster Administrator window. Make sure that there are no "stop signs" next to the Server 1 or Server 2 computer names in the tree menu in the left window pane.
24. Use Cluster Administrator to verify that the IPSHAH Disk Group x groups can be brought online in either nodes of the cluster by right-clicking on the group and then selecting **Move Group** from the pop-up menu. If an IPSHAH Disk group x group cannot be brought online in a node, it will either be shown as FAILED in the "moving to" node or will be shown as "online" in the "starting from" node as though the move command had never been issued. If this occurs, shutdown both servers and restart Server 1. Once Server 1 finishes restarting then start Server 2. If you are still unable to bring IPSHAH Disk Group x groups online in either server node call IBM support.
25. Right-click on the cluster name and choose **Properties** from the pop-up menu.



26. Click on the **Quorum** tab and change the quorum disk resource from Local Quorum to IPSHA Disk Q: by clicking on the **Quorum Resource** selection list. Click **OK** to save the changes. Next, move the local quorum and the IPSHA Disk Q: resources to the Cluster Group by right-clicking on the resource and then selecting **Change Group -> Cluster Group** from the pop-up menu. Finally, delete the Local Quorum and IPSHA Disk Group 1 groups by right-clicking on the group name and selecting **Delete** from the pop-up menu.
27. Customize the Failover/Failback properties for each shared disk group as needed. Then select **Exit** from the File menu to close the Cluster Administrator program.
28. Install Windows NT Service Pack 5 (NT4SP5-i386-Full-128Bit, located in directory C:\Microsoft\Service Pack 5) or Windows NT Service Pack 6a (NT4SP6a-i386-Full-128Bit, located in directory C:\Microsoft\Service Pack 6a) first on Server 1 and then on Server 2.
 

**Notes:**

  - a. Do not install Service Packs on both cluster server nodes at the same time.
  - b. Before installing service pack in a server node, use Cluster Administrator program to move all resources that are owned by the server node to the other cluster server node and to pause cluster service in the server node. To pause cluster service in a cluster node, right-click on the cluster node and then select **Pause Node** from the pop-up menu. After the service pack is installed and the node is restarted use Cluster Administrator to resume cluster service in the updated server node by right-clicking on the cluster node and selecting **Resume Node** from the pop-up menu.
29. After both servers have been updated and restarted, start Cluster Administrator and verify that all cluster groups and resources are in an ONLINE state. Next, make sure that all resource groups can be brought online in either cluster node by right-clicking on the resource group and selecting **Move Group** from the pop-up menu. Wait until the group is "online" in the other cluster node before moving the group back to the previous node. If all resource groups can be moved between the cluster nodes MSCS is ready for use. If not, follow the troubleshooting procedures outlined in the MSCS documentation.
30. Follow the instructions in the MSCS documentation to create additional cluster resources such as IP Addresses, Network Names, Generic Applications and so forth.

## Installing Netfinity Director Agent and UM Server Extensions

To install the Netfinity Director agent, perform the following steps on both servers in the HA Cluster:

1. Open a Windows NT Command Prompt window (or click **Start -> Run**) and type the following command:  
 C:\IBM\Applications\Netfinity Director 2\_12\setup  
 and then press **Enter**.
2. When the Information window opens, click **Next** to continue.
3. Select **English** and then click **Next**.
4. Click the **I Agree** radio button to indicate that you accept the license agreement and then click **Next** to continue.
5. Select **Client Install**.
6. Select all available options from the list and then click **Next**.
7. Click **Next** to accept the default installation destination directory.
8. Select **Server** as the platform type and then click **Next**.

9. When prompted for a user ID and password, type *Cluster* in the **Username** field and type *Bundle* in the **Password** field. Click **Next** to continue.
10. Click **Next** to accept the default data access port (411).
11. When prompted to select whether to install SNMP on this system, select **No**.
12. When prompted to select whether to add icons to the Start menu, select **Yes**.
13. When prompted to select whether to install Remote Control Support, select **Yes**.
14. When prompted to select whether to require user authorization for Remote Access, select **Yes**.
15. When prompted to select whether to replace newer files with older ones, select **No To All**.
16. When setup is complete, select **Yes** to restart your system and then select **Finish**. The system will then automatically restart.

To install UM Server Extensions for Netfinity Director perform the following steps on both servers in the HA Cluster:

1. Open a Windows NT Command Prompt window (or click **Start -> Run**) and type the following command:  

```
C:\IBM\Applications\Netfinity Director 2_12 Extensions\UMServer Extension  
2_12\Win\En\setup
```

and then press **Enter**.
2. When the title window opens, click **Next** to continue.
3. When the Welcome window opens, click **Next** to continue.
4. Click **Next** to confirm the default selection.
5. When prompted to select whether to stop the Netfinity Director Service, click **Yes**.
6. When prompted to select whether to read the Read Me file, click **No**.
7. Shutdown and restart the server.

---

## Chapter 4. Troubleshooting and initial system settings

This chapter provides information on the initial software configuration settings for Windows 2000. It also provides troubleshooting information on how to recover from problems you might encounter while installing the IBM Netfinity HA 4500R Cluster solution.

---

### Windows 2000 Advanced Server initial software configuration settings

In the event of an unsuccessful system recovery or if for some reason data is lost, the following information can assist you in reconfiguring the software. The following table shows the initial software configuration settings for Windows 2000.

Table 2. Initial software configuration settings

Drive partitioned and formatted as: C: NTFS 2000MB
License Mode: Per server for 25 CALs
Server 1:
Name = NFCBS001
Type = Primary Domain Controller
Heartbeat Ethernet Connection IP Address = 10.0.0.10      255.0.0.0
Public LAN Ethernet Connection IP Address = 192.168.0.1      255.255.255.0
Server 2:
Name = NFCBS002
Type = Backup Domain Controller
Heartbeat Ethernet Connection IP Address = 10.0.0.20      255.0.0.0
Public LAN Ethernet Connection IP Address = 192.168.0.2      255.255.255.0
Domain Name = NFCBD000
Administrator Password = password
Installation Directory = C:\WINNT
Networking Installed = TCP/IP
IIS Installed = No
Time Zone = Eastern Time (US and Canada)
Cluster IP Address = 192.168.0.3

---

### Windows 2000 Advanced Server Recovery Procedures

#### Restoring the servers original images

The Netfinity HA 4500R Cluster solution comes with two recovery CDs for each server. When you restore the servers, you will be restoring them back to the state they were in before you started the configuration process.

##### Restoring server 1

To restore Server 1 image to its factory-shipped configuration, do the following:

1. Insert the Media 1 CD labeled NFCBS001.PQI into the CD-ROM drive.
2. When the second **Easy Restore** window displays, click **Continue**.

3. When the **Warning** panel that displays, click **Yes** to continue restoring the image. Click **No** if you want to cancel.

The recovery program begins to restore the original image to the server.

4. When the **Drive Image** window displays and asks you to insert the Media 2 CD, insert the CD labeled NFCBS001.002 for Server 1; then, click **OK**.

Server 1 image has been successfully restored.

5. Press **Ctrl+Alt+Delete** to reboot the system.

**Note:** If you added other components to your cluster (for example, another EXP200 unit or additional hard drives), you must manually configure the added components into the cluster before you can access them.

## Restoring server 2

To restore Server 2 image to its factory-shipped configuration, do the following:

1. Insert the Media 1 CD labeled NFCBS002.PQI into the CD-ROM drive.
2. When the second **Easy Restore** window displays, click **Continue**.
3. When the **Warning** panel that displays, click **Yes** to continue restoring the image. Click **No** if you want to cancel.

The recovery program begins to restore the original image to the server.

4. When the **Drive Image** window displays and asks you to insert the Media 2 CD, insert the CD labeled NFCBS002.002 for Server 2; then, click **OK**.

Server 1 image has been successfully restored.

5. Press **Ctrl+Alt+Delete** to reboot the system.

**Note:** If you added other components to your cluster (for example, another EXP200 unit or additional hard drives), you must manually configure the added components into the cluster before you can access them.

## Configuration after restoring the image

**Note:** If you are only restoring one of the servers and you have changed the settings of the other server network environment since it was shipped (for example, see the settings in Table 2 on page 33), then for the server that you are restoring, you will need to change the Internet Protocol Properties so it will be compatible with the new network.

You must change the Internet Protocol Properties after Phase 1 of the configuration process, but prior to Phase 2 of the configuration process. Refer to steps 1 through 4 of “Configuring the server as a member of an existing domain” on page 15 for information on how to change the Internet Protocol Properties.

### Server 1

If you have restored both servers, the configuration process is the same as “Configuring server 1” on page 13. If you have restored Server 1 only, follow the steps used for “Configuring server 2” on page 16.

### Server 2

To configure Server 2 after restoring the original image to the server, follow the steps for “Configuring server 2” on page 16.

---

## Windows NT 4.0 Enterprise Edition Recovery Procedures

Use the following procedures to recover your Netfinity HA Cluster when a cluster node is unable to start the Microsoft Cluster Service, to recover one cluster node from NOS

failure, or to restore both nodes using the original disk images. These recovery procedures apply only to HA Cluster Bundles that are running Windows NT 4.0 Enterprise Edition.

## Recovering a Failed Cluster Node when it is Unable to Start Microsoft Cluster Service

1. Use Cluster Administrator to evict the failed cluster server node from the MSCS cluster. Right-click on the cluster node in the Cluster Administrator tree-view and select **Evict Node** from the pop-up menu.
2. Use Add/Remove Programs (located in the Windows NT Control Panel) to un-install Microsoft Cluster server software. Double-click on **Add/Remove Programs** in the Control Panel, select Microsoft Cluster Server from the **Programs** selection list, and then click **Add/Remove** to remove the cluster software. A warning message will appear; click **OK** to continue with the un-installation process. A second warning message will appear, stating that the IBM ServeRAID Logical Disk package should be remove before un- installation of Microsoft cluster software. Click **Yes** to continue with the un-installation. Do not restart the server when the un-installation process completes. When the window requesting whether you want to restart your system appears, click **Cancel**.
3. In the Add/Remove Program window, select IBM ServeRAID Windows NT Cluster Solution from the **Programs** selection list and click **Add/Remove** to remove it from the failed server node. Then shutdown and restart the failed server.
4. Check the other cluster server node to ensure that it is up and the Cluster Service has started successfully. Then, on the failed server, open a Windows NT Command Prompt (or click **Start -> Run**) and type the following command to start installing cluster server software:

```
C:\Microsoft\MSCS\Cluster\I386\setup
```

**Note:** Do not specify the parameter /localquorum.

5. The Microsoft Cluster Server Setup window opens. Click **Next**. Then click the **I Agree** radio button to indicate that you accept the Microsoft conditions that MSCS software is supported only if it is installed on a hardware configuration that was tested for compatibility with MSCS software. Then click **Next** to continue.
6. Select **Join an Existing Cluster** from the Select the Operation to Perform box and click **Next**.
7. Type in the **Enter the name of the cluster to form or join** field the name of the cluster that you want to join. If you do not specify the same name an error window will be displayed and you will need to reenter the MSCS cluster name. Click **Next** to continue.
8. Click **Next** to accept the default directory for cluster software installation. The default directory (%systemroot%\cluster) is displayed in the **Setup will place files in this folder** field. To change the cluster software installation directory, click **Change** and then specify a different directory. Then, click **Next** to continue.  
**Note:** If you previously changed the installation directory in step 5 on page 28 you must change the installation directory. Do not change this directory unless you have a strong technical understanding of the effects this can have on your MSCS installation.
9. In the next window, type in the **Password** field the Domain Cluster Service Account Password that you specified in "Recording Information Necessary for this Procedure" on page 18. The **User Name** and **Domain** fields will be grayed-out. Click **Next**.
10. The MSCS setup program has completed collecting all necessary information and is now ready to install the cluster software. Click **Finish** to start copying files and to start Microsoft Cluster service once the file copying process is completed.

If Microsoft Cluster Service has been installed successfully, a Microsoft Cluster Server Setup window opens stating that the cluster software has been successfully installed and advising you that you must restart the server for all changes to take effect. Click **OK** to restart the server.

**Note:** If this window does not appear Microsoft Cluster Software has not been successfully installed. Contact IBM for support.

11. Wait until the server finishes restarting and the MSCS cluster service has started. Then, install the ServeRAID Windows NT Cluster Solution utility on the server. To install this utility
  - a. Open a Windows NT Command Prompt.
  - b. Change directories to make C:\IBM\Cluster the current directory.
  - c. Type setup at the prompt and then press Enter to start the installation program.
  - d. The setup program displays a reminder that "sticky" drive letters must be assigned before running this program. Click **OK** to continue.
  - e. The Welcome window opens. Click **Next** to install the software. When the software installation process is completed a window appears to advise you that the installation completed successfully. Click **OK** to continue to the next window, and then click **Finish** to complete the installation.
12. Install Windows NT Service Pack 5 (NT4SP5-i386-Full-128Bit, located in directory C:\Microsoft\Service Pack 5) or Windows NT Service Pack 6a (NT4SP6a-i386-Full-128Bit, located in directory C:\Microsoft\Service Pack 6a) and then restart the server.

**Notes:**

- a. You must install the same Service Pack on both of the nodes in your cluster. Be sure to install the same Service Pack on the failed node as you have installed on the functional node of this cluster.
  - b. Before installing Service Pack in a server node, use Cluster Administrator program to pause cluster service in the failed server node. To pause cluster service in a cluster node, right-click on the cluster node and then select **Pause Node** from the pop-up menu.
13. After the server restarts, use Cluster Administrator to verify that the cluster service in the failed node has started correctly and to reconfigure the preferred owner for any groups which had the failed server as its preferred owner, if necessary.
  14. If you have installed any MSCS cluster aware applications, please follow the recovery instructions that were provided with the applications to restore the applications in the failed server.
  15. Start Cluster Administrator and verify that all cluster groups and resources are in an ONLINE state. Next, make sure that all resource groups can be brought online in either cluster node by right-clicking on the resource group and selecting **Move Group** from the pop-up menu. Wait until the group is "online" in the other cluster node before moving the group back to the previous node. If all resource groups can be moved between the cluster nodes MSCS is ready for use. If not, follow the troubleshooting procedures outlined in the MSCS documentation.

## Recovering One Cluster Server Node from NOS Failure

**Note:** The cluster service on the functioning cluster node must be shut down momentarily in step 7 on page 37 through step 9 on page 37. If this cluster is being used in a mission-critical capacity schedule the cluster node recovery procedure for off-peak hours to minimizing cluster downtime impact.

1. Use Cluster Administrator to evict the failed cluster server node from the MSCS cluster. Right-click on the cluster node in the Cluster Administrator tree-view and select **Evict Node** from the pop-up menu.
2. Place the appropriate recovery CD that corresponds to the failed cluster server node (NTCBS1W.IMD and NTCBS2W.IMD for cluster Server 1 and B, respectively) into the CD-ROM drive of the failed server and then restart the server.
3. After the server has restarted, the IBM Product Recovery Main Menu screen appears. Press **Enter** to confirm that you want to reformat your hard disk and restore all files in the failed server node.
4. On each of the following screens (Terms and Conditions, Attention Read This Before you Continue, and Your Hard Disk will be Formatted) type Y and then press **Enter** to confirm and continue with the restore process. Type N and press **Enter** on any of these screens to abort the software recovery process.
 

**Note:** If a window appears that states "The Program has detected on error 116 on the partition started at sector "x" on disk "y" (where "y"=2 or 3). The LBA and CHS values must be the equal. Would you like The Program to fix this error?" click **No** to continue. Do not click **Yes**.
5. When the restoration process has completed remove the CD from the CD-ROM drive and press **Ctrl+Alt+Delete** to restart the restored server.
6. Follow the steps in "Installing and Configuring Windows NT 4.0 Enterprise Edition" on page 20 that pertain to the server you have restored (Server 1 or Server 2). However, when you reach step 28 on page 23 you must check the **Create a computer account in the domain** check box and then type in the **User Name** and **Password** fields the Domain Cluster Service Account Name and the Domain Cluster Service Account Password before clicking **OK** to enable the server to join a network domain.
7. Use Cluster Administrator to stop the Cluster Service in the functional (non-failed) cluster server node.
8. Open a Windows NT Command Prompt on the restored cluster and change directories to the C:\IBM\Cluster\SUPPORT directory. Then type
 

```
ipshahto synchoff
```

 and press **Enter** to transfer control of the cluster shared disks from the surviving cluster server node.
9. Start Windows NT Disk Administrator (click **Start-> Administrative Tools-> Disk Administrator**) on the restored cluster server node. You will be prompted that the disk system configuration will be updated. Click **OK** to continue.
 

The cluster shared disks appear, but without drive letters assigned. Right click on the box to the right of each of the shared disk partitions and select **Assigning Drive Letter** from the pop-up menu. The Assigning Drive Letter window opens. Select the appropriate disk drive letter from the pull-down list and click **OK** to assign this drive letter to the disk partition.

**Note:** The drive letter for the shared disk partition must be the same in both cluster server nodes.
10. Use Cluster Administrator to start Cluster Service on the functional (non-failed) cluster server node. The functional cluster node will take control of the shared disks and shared disk synchronization will be started. Wait until all of the shared disks complete disk synchronizing between the two cluster server nodes before continuing.
11. On the restored cluster server node, open a Windows NT Command Prompt (or click Start -> Run) and type the following command to start installing cluster server software:
 

```
C:\Microsoft\MSCS\Cluster\I386\setup
```

**Note:** Do not specify the parameter /localquorum.

12. The Microsoft Cluster Server Setup window opens. Click **Next**. Then click the **I Agree** radio button to indicate that you accept the Microsoft conditions that MSCS software is supported only if it is installed on a hardware configuration that was tested for compatibility with MSCS software. Then click **Next** to continue.
13. Select **Join an Existing Cluster** from the Select the Operation to Perform box and click **Next**.
14. Type in the **Enter the name of the cluster to form or join** field the name of the cluster that you want to join. If you do not specify the same name an error window will be displayed and you will need to reenter the MSCS cluster name. Click **Next** to continue.
15. Click **Next** to accept the default directory for cluster software installation. The default directory (%systemroot%\cluster) is displayed in the **Setup will place files in this folder** field. To change the cluster software installation directory, click **Change** and then specify a different directory. Then, click **Next** to continue.

**Note:** If you changed the installation directory you must use the same installation directory. Do not change this directory unless you have a strong technical understanding of the effects this can have on your MSCS installation.
16. In the next window, type in the **Password** field the Domain Cluster Service Account Password that you specified in "Recording Information Necessary for this Procedure" on page 18. The **User Name** and **Domain** fields will be grayed-out. Click **Next**.
17. The MSCS setup program has completed collecting all necessary information and is now ready to install the cluster software. Click **Finish** to start copying files and to start Microsoft Cluster service once the file copying process is completed.

If Microsoft Cluster Service has been installed successfully, a Microsoft Cluster Server Setup window opens stating that the cluster software has been successfully installed and advising you that you must restart the server for all changes to take effect. Click **OK** to restart the server.

**Note:** If this window does not appear Microsoft Cluster Software has not been successfully installed. Please contact IBM for support for assistance.
18. Wait until the server finishes restarting and the MSCS cluster service has started. Then, install the ServerRAID Windows NT Cluster Solution utility on the server. To install this utility
  - a. Open a Windows NT Command Prompt.
  - b. Change directories to make C:\IBM\Cluster the current directory.
  - c. Type setup at the prompt and then press **Enter** to start the installation program.
  - d. The setup program displays a reminder that "sticky" drive letters must be assigned before running this program. Click **OK** to continue.
  - e. The Welcome window opens. Click **Next** to install the software. When the software installation process is completed a window appears to advise you that the installation completed successfully. Click **OK** to continue to the next window, and then click **Finish** to complete the installation.
19. Install Windows NT Service Pack 5 (NT4SP5-i386-Full-128Bit, located in directory C:\Microsoft\Service Pack 5) or Windows NT Service Pack 6a (NT4SP6a-i386-Full-128Bit, located in directory C:\Microsoft\Service Pack 6a) and then restart the server.

**Notes:**

- a. You must install the same Service Pack on both of the nodes in your cluster. Be sure to install the same Service Pack on the failed node as you have installed on the functional node of this cluster.



- b. Before installing Service Pack in a server node, use Cluster Administrator program to pause cluster service in the failed server node. To pause cluster service in a cluster node, right-click on the cluster node and then select **Pause Node** from the pop-up menu.
20. After the server restarts, use Cluster Administrator to verify that the cluster service in the failed node has started correctly and to reconfigure the preferred owner for any groups which had the failed server as its preferred owner, if necessary.
21. If you have installed any MSCS cluster aware applications, please follow the recovery instructions that were provided with the applications to restore the applications in the failed server.
22. Start Cluster Administrator and verify that all cluster groups and resources are in an ONLINE state. Next, make sure that all resource groups can be brought online in either cluster node by right-clicking on the resource group and selecting **Move Group** from the pop-up menu. Wait until the group is "online" in the other cluster node before moving the group back to the previous node. If all resource groups can be moved between the cluster nodes MSCS is ready for use. If not, follow the troubleshooting procedures outlined in the MSCS documentation.

## Restoring Both Servers from the Original Images

1. Place the appropriate recovery CD that corresponds to the failed cluster server node (NTCBS1W.IMD and NTCBS2W.IMD for cluster Server 1 and B, respectively) into the CD-ROM drive of each server and then restart the server.
2. After the server has restarted, the IBM Product Recovery Main Menu screen appears. Press **Enter** to confirm that you want to reformat your hard disk and restore all files in the failed server node.
3. On each of the following screens (Terms and Conditions, Attention Read This Before you Continue, and Your Hard Disk will be Formatted) type Y and then press **Enter** to confirm and continue with the restore process. Type N and press **Enter** on any of these screens to abort the software recovery process.

**Note:** If a window appears that states "The Program has detected an error 116 on the partition started at sector "x" on disk "y" (where "y"=2 or 3). The LBA and CHS values must be the equal. Would you like The Program to fix this error?" click **No** to continue. Do not click **Yes**.

4. When the restoration process has completed remove the CD from the CD-ROM drive and press **Ctrl+Alt+Delete** keys to restart the restored server.
5. After the images have been restored to both servers, follow the instructions in "Installing and Configuring Windows NT 4.0 Enterprise Edition" on page 20. Perform the steps first on Server 1 and then on Server 2 as documented.

**Note:** The cluster server node (1 or 2) that controlled the shared disks before the cluster stopped may display a Windows NT ERROR after performing 9 on page 21 of the "Installing and Configuring Windows NT 4.0 Enterprise Edition" on page 20 section. The error states that one of the services cannot be started and asks the user to open the Windows NT Event Viewer to find out which service cannot be started. This condition occurs because Windows NT rearranges the disk drive letters to account for the shared disks and assign the server operating system (OS) disk with a different drive letter than the letter C:.

To recover from this condition, use Disk Administrator to remove drive letters of all defined disks and CD-ROMs, except the OS disk. When you remove the drive letter from the disk with drive letter C: you may have to click either **Yes** or **OK** buttons in the warning screens that will be displayed to force the removal of the drive letter after the system is restarted.

Once you finish removing all of the drive letters, select **Commit Changes Now** from the File menu options to save the changes and to restart the server. After the server is restarted, use Disk Administrator to assign drive letter C: to the OS disk and the appropriate drive letters for the other shared disks. After you finish assigning all of the drive letters, select **Commit Changes Now** from the File menu to save the changes and to restart the server.

You can continue with step 10 on page 21 of the Installing and Configuring Windows NT 4.0 Enterprise Edition section after the server finish rebooting. In addition, in step 27 on page 23 of the Installing and Configuring Windows NT 4.0 Enterprise Edition section, you must select the **Create a computer account in the domain** option box and type in the **User ID** and **Password** fields the Domain Cluster Service Account Name and the Domain Cluster Service Account Password before clicking **OK** to let the server join the network domain.

6. After you have completed the steps in the Installing and Configuring Windows NT 4.0 Enterprise Edition section for both cluster server nodes, open a Windows NT Command Prompt on Server 1 and change directories to the C:\IBM\Cluster\SUP-PORT directory. Then type  

```
ipshahto synchoff
```

and press **Enter** to transfer control of the cluster shared disks from to Server 1.
7. Start Disk Administrator on Server 1 (click Start -> Programs -> Administrative Tools (Common) -> Disk Administrator). If this is the first time you have used Disk Administrator a warning window appears stating that this is either the first time that Disk Administrator is run or at least one or more disks had been added to the computer since the last time Disk Administrator is run. Click **OK** to continue. You may also be prompted to accept the disk signatures (SID IDs) that Windows NT will write into the shared disks that were created from ServeRAID Manager. Click **OK** to continue.
8. Perform step 6 on page 24 through step 8 on page 24 in the Assigning Permanent Drive Letters to Shared Disks section to remove and reassign the disk drive letters to the shared disks.
9. Repeat steps 6. through 8. for Server 2. Make sure that the same drive letter is assigned to a shared disk as it is in Server 1.
10. Run the ipshahto synchoff command on each server to transfer control of the shared disks and then use Disk Administrator after the shared disks are moved to a given node to verify that the drive letters assigned to the shared disks does not change as the shared disks are moved from one server node to another.  
**Note:** Be sure to close Disk Administrator after each verification procedure.
11. Perform all of the steps outlined in "Microsoft Cluster Server Setup" on page 28 to form the Microsoft cluster on these servers.
12. If you have installed any MSCS cluster aware applications, you must reinstall and reconfigure them according to the instructions that were shipped with the applications. Once you have completed the cluster- aware application installation and completed all of the non-cluster customizations on the newly restored servers, move the cluster groups between nodes one or two times to ensure that the failed servers have been restored correctly and are working properly.

## Recovering a Cluster Server Node with a Failed ServeRAID Adapter

1. Use Cluster Administrator to move any cluster groups and resources that are still online in the server that has the failed ServeRAID adapter and stop cluster service in that server.

**Note:** For the remainder of this section, "failed server" refers to the server that has the failed ServeRAID adapter.

2. Shutdown and power off the failed server.
3. Note and mark the SCSI cables that connect the ServeRAID adapter in the failed server to the external SCSI drive enclosures.

**Note:** If there is more than one SCSI connection to the ServeRAID adapter, note and carefully mark on the SCSI cable the number of the ServeRAID adapter port to which it is connected. If the SCSI cables are not reconnected to the same ports on the new ServeRAID adapter the data in the external SCSI enclosure will be corrupted and the MSCS cluster to fail.

4. Open the server bay. Note and record which PCI slot that has the ServeRAID adapter installed and then remove the failed ServeRAID adapter.
5. Install the new ServeRAID adapter in the same PCI slot that the failed ServeRAID adapter was removed from.

#### **Important**

Do not reconnect the SCSI cables back to the new ServeRAID adapter at this time. The new adapter must be at the same firmware and BIOS level as the adapter in the other server node.

6. Run the program in the c:\IBM\Firmware\ServeRaid\BIOS directory of the good cluster node to generate a startable ServeRAID firmware/BIOS update diskette(s). Follow the prompted instructions from the program.
7. Insert the startable diskette in the failed server diskette drive and power on the server. The server will start directly into the IBM ROM update program window. The main box in the window will display the ServeRAID adapter(s) in the server and its current firmware (FW) and BIOS version under the "old" column. It also displays the FW and BIOS level of the files on the diskette under the "new" column. If the adapter FW/BIOS is older than the ones in the diskette, you will be given a choice to either update the adapter FW/BIOS (microcode) or canceling out of the update program. Use the left and right arrow keys to select Update and then press **Enter** to start the update process.

**Note:** Do not power down the server during update. If the adapter FW/BIOS level is newer than the ones in the diskette, a "\*\*\*\* no updates required \*\*\*\*" message will be displayed on top of the main box and one is instructed to select the flashing **OK** button to restart the server. Do not press **Enter** to restart the server. Instead, press **Ctrl+F** to force the IBM ROM update program into update mode. Once the program is in update mode, press **Enter** key to start FW/BIOS updating process. Do not power down the server during update.

8. Once the update finishes, the status of the update will be displayed under the status column for each of the ServeRAID adapter in the system. Make sure that Successful is displayed in that column. Select **OK** and then press **Enter** to exit the IBM ROM update program. The IBM ROM update program will display a window with information about the fixes and changes in this FW/BIOS level. Press **Enter** to restart the server. Promptly remove the diskette from the diskette drive and insert the ServeRAID Manager CD that is shipped with the IBM Netfinity HA cluster into the CD-ROM drive.

**Note:** Do not insert the ServeRAID Manager CD that is included with the new adapter. You must use the ServeRAID Manager CD that is included with your Netfinity HA cluster.

9. The failed server automatically starts the ServeRAID Manager. Right-click on the "Controller 1 (not configured)" node (from the main tree on the top left window panel), and select "Restore to factory default settings" from the pop-up menu.

Click **Yes** when the Confirm window is displayed to let the ServeRAID Manager initialize the adapter configuration.

10. Right-click on the Controller 1 (not configured) node again and select Configure for Clustering from the pop-up menu. A "Configure controller 1 for clustering" window will be displayed. Enter the appropriate information in the Controller Name, Partner Name, and Initiator Identifier fields from the following table, depending on whether the failed server is Server 1 or Server 2, and then click **OK** to save the changes.

Server	Controller Name	Partner Name	Initiator Identifier
Server 1	NFCBS001	NFCBS002	7
Server 2	NFCBS002	NFCBS001	6

11. Right click on the Controller 1 node and then select Change stripe-unit size -> 16KB to change the stripe- unit to 16KB from the default setting. Click **Yes** when the Confirm window appears.
12. Select **Exit** from the File menu to stop the ServeRAID Manager program. Remove the CD from the CDRom drive and power off the server.
13. Connect the SCSI cables to the appropriate ports on the back of the ServeRAID adapter using the information collected in step 3 on page 41.
14. Power up the failed server. The server should restart and the cluster service should be started. If possible, open Cluster Administrator and move resources from the good server to the failed server. Verify that all of the cluster resources can be brought online correctly in the failed server.
15. (Optional) Perform step 2 on page 25 to create user "admin" as the default ServeRAID manager administrator.

## Appendix A. Getting help, service, and product information

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### **Engineering Change Management**

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- Machine Type and Model
- Serial numbers of your IBM hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

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Some helpful addresses are:

<b>Web page address</b>	<b>Description</b>
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<a href="http://www.ibm.com/pc/support">http://www.ibm.com/pc/support</a>	IBM Personal Computing Support
<a href="http://www.ibm.com/pc/us/accessories">http://www.ibm.com/pc/us/accessories</a>	Options by IBM (U.S.)
<a href="http://www.ibm.com/pc/us/netfinity">http://www.ibm.com/pc/us/netfinity</a>	IBM Netfinity Servers (U.S.)
<a href="http://www.ibm.com/pc/techconnect">http://www.ibm.com/pc/techconnect</a>	IBM TechConnect

You can select a country-specific Web site from these pages.

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13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
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# Index

## A

about this book vii  
adding  
    a server to a cluster as a domain controller 14  
    a server to an existing domain 15

## C

configuring  
    server 1 13  
    server 2 16  
    the Netfinity HA 4500R cluster 13  
    the server as a domain controller 14  
    the server as a member of an existing domain 15  
    using Windows 2000 Advanced Server 13

## E

edition notice 45

## G

getting help, service, and product information 43

## H

help  
    obtaining 43  
how this book is organized vii

## I

important notes 47  
installing  
    Netfinity HA 4500R cluster 3  
introduction 1

## N

Netfinity HA 4500R cluster  
    components 1  
    overview 1

## P

power cords 47  
product warranties and notices 45

## R

related publications vii  
restoring  
    the server's original image 33

## S

safety information  
    lifting server 3  
setting up  
    the 4500R cluster in the rack 5

## T

trademarks 46

## U

unpacking  
    the 4500R cluster 3







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