



IBM Netfinity

**Availability Extensions
for Microsoft Cluster Service
Supplemental Installation and User's Guide**



IBM Netfinity

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for Microsoft Cluster Service
Supplemental Installation and User's Guide**

Note

Before using this information and the product it supports, be sure to read the general information under Appendix B, "Product notices" on page 52.

Supplemental Edition (November 1999)

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About this book

IBM® Netfinity® Availability Extensions services works with the Microsoft® Cluster Server (MSCS) to provide a high-availability and scalability application framework to support three to eight IBM Netfinity 7000 M10 or IBM Netfinity 5500 M20 servers with a shared Fibre Channel External Storage.

The purpose of this book is to provide the most recent information about the IBM Netfinity Availability Extensions for MSCS Release 1.0, system software installation, the necessary hardware configurations, and general instructions on how to effectively use the program. The information in this supplement supersedes the information in the *IBM Netfinity Availability Extensions for MSCS Software Installation and User's Guide, First Edition*.

Who should read this book

This book is intended for the following audiences:

Network administrator— the individual responsible for configuring, managing, maintaining, and troubleshooting a network or LAN.

Database administrator— the individual responsible for configuring and maintaining the IBM DB2 Universal database and server software.

Customer project administrator— the individual who is the focal point for all IBM communication related to the cluster project.

How this book is organized

The following sections are included in this book:

- “Installing IBM Netfinity Availability Extensions for MSCS” on page 1, contains procedures for installing the IBM Netfinity Availability Extensions for MSCS software.
- “Administering clusters” on page 23 contains information on managing cluster entities.
- Appendix A, “Adding to, restoring, and uninstalling your cluster” on page 45 contains information on how to add a node to existing cluster, how to restore a cluster, how to set adapter defaults, and how to manually uninstall IBM Netfinity Availability Extensions for MSCS.
- Appendix B, “Product notices” on page 52 contains notices and trademarks.

Prerequisite and related information

The following resources provide information to help you in installing and configuring the IBM Netfinity Availability Extensions for MSCS software:

- *Administering Domino Clusters*. This guide describes how to set up and manage Lotus® Domino™ server clusters. It also describes how to monitor and troubleshoot server clusters.

- *Administering the Domino System, Volume 1.* This book describes how to configure servers, set up users, use administration tools, and set up directories, replication, and mail.
- *Administering the Domino System, Volume 2.* This book describes how to set up security, monitor and maintain servers and users, improve system performance, and troubleshoot system problems.
- *Administration Guide: Design and Implementation.* This book describes DB2 administration tasks and provides failover information to support MSCS.
- *IBM Cluster Systems Management User's Guide.* This book contains information on how to administer system clusters on an IBM Netfinity server.
- *IBM Netfinity SP Switch Installation and User's Guide.* This book describes how to install and set up an SP Switch for use in an IBM Netfinity cluster solution.
- *IBM Netfinity Networked SYMplicity Storage Manager Installation and User's Handbook, Second Edition.* This book contains installation and setup information for the SYMplicity Storage Manager software in a networked Microsoft Windows NT environment.
- *IBM Netfinity SYMplicity Storage Manager for Windows NT Installation and User's Handbook, Second Edition.* This book contains instructions for installing the SYMplicity Storage Manager software with the Windows NT operating system.
- *IBM Netfinity SYMplicity Storage Manager User's Handbook, Second Edition.* This book contains complete instructions for installing the SYMplicity Storage Manager software to perform various storage-management tasks.
- *Microsoft Clustering for Windows NT Server Administrator's Guide.* This book contains information on how to set up and administer clusters on a Microsoft Windows NT® server.
- *Microsoft Cluster Server Administrator's Guide.* This book contains information on how to administer MSCS clusters.
- *Microsoft Windows NT Installation and User's Guide.* This book contains instructions for installing and using Windows NT.
- *Setting Up a Domino Server.* This guide describes how to configure a Domino server. It includes information on the supported platforms and describes how to use configuration profiles.

Installing IBM Netfinity Availability Extensions for MSCS

The IBM Netfinity Availability Extensions for MSCS installation utility installs the following components onto your system:

- IBM Cluster Systems Management Version 1.5
- IBM Netfinity Availability Extensions services Release 1.0

You have the option of installing both of the listed components or just the IBM Cluster Systems Management (ICSM).

Important

After installing IBM Netfinity Availability Extensions for MSCS on your server, and before starting the service, use the procedures in place at your site to make a complete image backup of your present system configuration, including the operating system and MSCS. After you have configured the IBM Netfinity Availability Extensions for MSCS cluster be sure to back up your servers on a regular basis.

System specifications

IBM Netfinity Availability Extensions for MSCS operates in a client/server environment along with Microsoft Cluster Service. The following lists the minimum software and hardware requirements for an IBM Netfinity Availability Extensions for MSCS software installation.

Software requirements

- IBM Netfinity Fibre Channel Adapter device drivers
- IBM Netfinity Manager™ Version 5.20.4 or later
- Microsoft Cluster Service 1.0 (Service Pack 4)
- Microsoft Windows NT Server Enterprise Edition 4.0 (Service Pack 3 and 4, 128-bit security version)
- SYMplicity™ Storage Manager Version 6.22

IBM Netfinity Availability Extensions for MSCS supports Lotus Domino, version 5.0 and Windows NT File and Print services. These cluster-aware applications are not necessary to the successful installation or operation of this product release.

Hardware requirements

Hardware requirements can vary depending on the server used and on your configuration. The following tables lists the items required to complete a typical three to eight server node hardware configuration for the IBM Netfinity 7000 M10 and IBM Netfinity 5500 M20 servers.

This table lists the required items for a 3-, 5-, and 7-node hardware configuration.

Hardware Requirements	3 Node	5 Node	7 Node
IBM Netfinity Racks	2	3	3–4
IBM Netfinity 7000 M10 or IBM Netfinity 5500 M20 Servers	3	5	7
IBM Console Server-Selector Switch	1	1	1
IBM ServeRAID-3L Adapters (IBM Netfinity 7000 M10 only)	3	5	7
IBM 10/100 EtherJet PCI Adapters (for public network)	3	5	7
IBM Netfinity SP Host Adapters	3	5	7
IBM 10/100 EtherJet PCI Adapters (for client network using Netfinity 7000 M10)	3	5	7
IBM Console Cable Sets	3	5	7
IBM 8271-712 Ethernet LAN Switch (for interconnect only)	3	5	7
IBM Netfinity SP Switch cable (2.3m, 5m, and 10m)	3	5	7
IBM Netfinity SP Switch 3529 1RY	1	1	1
Hard disk drives for the server (2 per server)	6	10	14
IBM Netfinity Fibre Channel RAID Controller Unit including one IBM Netfinity Fibre Channel RAID Controller	1	1	1
IBM Netfinity Fibre Channel Failsafe RAID Controller for the IBM Netfinity Fibre Channel RAID Controller Unit	1	1	1
Rack mounts for the IBM Netfinity Fibre Channel RAID Controller Unit	1	1	1
IBM Netfinity EXP15 Storage Expansion Units	1–6	1–6	1–6
Hard disk drives for the IBM Netfinity EXP15 Storage Expansion Unit	1–10	1–10	1–10
Rack mounts for the IBM Netfinity EXP15 Storage Expansion Unit	1–6	1–6	1–6
IBM Netfinity Fibre Channel Switch (8–port)	2	2	4
*IBM Netfinity Fibre Channel PCI Adapters (2 per server)	6	10	14
Microprocessor Upgrades (3 per server)	9	15	21
1–4 GB Memory Option Kit (1 per server; refer to the documentation that comes with your server for memory configuration.)	3	5	7
APC Smart-UPS Model 3000	3	5	7
Standard Category-5 Ethernet cables with RJ45 connectors (for interconnect and client)	6	10	14
Shortwave Fibre Optic cables	8	12	18
Fibre Optic Gigabit Interface Converters (each IBM Netfinity Fibre Channel Hub comes with four GBICs, table lists total needed)	8	12	20
Display monitor, keyboard, and mouse (one of each)	1	1	1
Monitor compartment for the IBM Netfinity Enclosure	1	1	1
Fixed shelf for the IBM Netfinity Rack	1	1	1

Hardware Requirements	3 Node	5 Node	7 Node
Keyboard tray for the IBM Netfinity Enclosure	1	1	1

*Use the same type and number of network adapters for all nodes in the cluster.

This table lists the required items for a 4-, 6-, and 8-node hardware configuration.

Hardware Requirements	4 Node	6 Node	8 Node
IBM Netfinity Racks	2–3	3–4	4
IBM Netfinity 7000 M10 or IBM Netfinity 5500 M20 Servers	4	6	8
IBM Console Server-Selector Switch	1	1	1
IBM ServeRAID-3L Adapters (IBM Netfinity 7000 M10 only)	4	6	8
IBM 10/100 EtherJet PCI Adapters (for public network)	4	6	8
IBM Netfinity SP Host Adapters	4	6	8
IBM 10/100 EtherJet PCI Adapters (for client network using Netfinity 7000 M10)	1	1	1
IBM Console Cable Sets	4	6	8
IBM 8271-712 Ethernet LAN Switch (for interconnect only)	4	6	8
IBM Netfinity SP Switch cable (2.3m, 5m, and 10m)	4	6	8
IBM Netfinity SP Switch 3529 1RY	1	1	1
Hard disk drives for the server (2 per server)	8	12	16
IBM Netfinity Fibre Channel RAID Controller Unit including one IBM Netfinity Fibre Channel RAID Controller	1	1	1
IBM Netfinity Fibre Channel Failsafe RAID Controller for the IBM Netfinity Fibre Channel RAID Controller Unit	1	1	1
Rack mounts for the IBM Netfinity Fibre Channel RAID Controller Unit	1	1	1
IBM Netfinity EXP15 Storage Expansion Units	1–6	1–6	1–6
Hard disk drives for the IBM Netfinity EXP15 Storage Expansion Unit	1–10	1–10	1–10
Rack mounts for the IBM Netfinity EXP15 Storage Expansion Unit	1–6	1–6	1–6
IBM Netfinity Fibre Channel Switch (8–port switch for 4– and 6–node configurations, 16–port switch for 8–node configuration)	2	2	4
*IBM Netfinity Fibre Channel PCI Adapters (2 per server)	8	12	16
Microprocessor Upgrades (3 per server)	12	18	24
1–4 GB Memory Option Kit (1 per server; refer to the documentation that comes with your server for memory configuration.)	4	6	8
APC Smart-UPS Model 3000	4	6	8
Standard Category-5 Ethernet cables with RJ45 connectors (for interconnect and client)	8	12	16
Shortwave Fibre Optic cables	10	14	20
Fibre Optic Gigabit Interface Converters (each IBM Netfinity Fibre Channel Hub comes with four GBICs, table lists total needed)	10	14	22
Display monitor, keyboard, and mouse (one of each)	1	1	1

Hardware Requirements	4 Node	6 Node	8 Node
Monitor compartment for the IBM Netfinity Enclosure	1	1	1
Fixed shelf for the IBM Netfinity Rack	1	1	1
Keyboard tray for the IBM Netfinity Enclosure	1	1	1

*Use the same type and number of network adapters for all nodes in the cluster.

Installing prerequisite software

The IBM Netfinity Availability Extensions for MSCS software operation is dependent on specific software applications. Prior to installing IBM Netfinity Availability Extensions for MSCS, install and configure these products in the order in which they are presented in this section.

Note: IBM does not supply or bill for Microsoft Windows NT product licenses. You must acquire these licenses in advance of this installation.

Setting up Fibre Channel Adapter defaults

For proper operation of the fibre channel adapters in the IBM Netfinity Availability Extensions for MSCS environment, you must update the adapter's NVRAM.

1. Create a Fibre Channel Adapter bios diskette.

You can find a self-extracting diskette file (2100bios.exe) on the following web site:

<http://www.pc.ibm.com/support>

2. Insert the Fibre Channel Adapter bios diskette that you created into the disk drive, and then start the server.
3. At the command prompt run `q12xut i l /L /U`.
4. Remove the diskette, and then restart the server.
5. As the Qlogic adapters are loading, press **Alt-Q**.
6. Click **Adapter**.
7. Click **Advanced Configuration Settings**.
8. Verify that the menu option **Enable target reset** is set to **Yes**.
9. Repeat steps 6-8 for the other controller.
10. Exit the Alt-Q setup, and then restart your server.

Installing Microsoft Windows NT Server Enterprise Edition Service Pack 3

Install Microsoft Windows NT Server, Version 4.0 Enterprise Edition with Service Pack 3 on each server. Refer to the documentation that comes with this version for detailed installation instructions.

Note: The Microsoft Windows NT Server Enterprise Edition Service Pack 3 must be installed on your server before you can install Service Pack 4.

Installing IBM Netfinity Fibre Channel Adapter device drivers

Install the IBM Netfinity Fibre Channel Adapter device drivers in each server using the following instructions. If necessary, refer to the documentation that comes with the IBM Netfinity Fibre Channel Device Drivers for detailed installation instructions.

1. Insert the device driver diskette that accompanied the adapter into the disk drive on the server.
2. Click **Start** → **Settings** → **Control Panel**.
3. Double-click **SCSI Adapters**.
4. In the SCSI adapters window, click **Drivers**, and then click **Add** to add the Fibre Channel Device Drivers.
5. In the Install Driver window, click **Have Disk**.
6. In the Install From Disk window, verify the disk drive and then click **OK**.
7. In the Install Driver window, choose the model and then click **OK**.
8. When the device driver installation is complete, remove the diskette from the disk drive.
9. Click **Yes** to restart the computer.
10. Repeat this process for each server you plan to cluster.

Installing SYMplicity Storage Manager

Before installing SYMplicity Storage Manager on your server, make certain that the host adapters, host device drivers, and RAID controller unit have been installed. Use the following instructions to install SYMplicity Storage Manager.

1. Insert the SYMplicity Storage Manager CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel**.
3. Double-click **Add/Rem Programs**.
4. Click **Install** and then follow the instructions presented.
5. When `d:\native\symsm\setup.exe` displays, click **Finish**.
6. Continue to follow the setup instructions presented to complete the installation process.

Important

During installation, you will be prompted to define the directory where you want this software installed. If you are defining your own directory path, do not use special characters (such as #, \$, or +) for the directory name. The default path is `\Program Files\symsm` on your startup drive.

7. When the installation is completed, remove the CD from the CD-ROM drive and then restart the system.
8. Verify that the storage management software is installed and the Disk Array service is running:
 - a. Click **Start** → **Programs** to verify that SYMplicity Storage Manager appears in the list.
 - b. Click **Start** → **Settings** → **Control Panel** → **Services** to verify that the Disk Array Monitor is running.

9. Refer to the *IBM Netfinity SYMlicity Storage Manager for Windows NT Installation and User's Handbook, Second Edition*, to continue with the initial startup procedures to create and format logical units (LUNs).

Note: With Microsoft Windows NT Enterprise Edition, Service Pack 4, you can create only 8 LUNs.

Creating shared disk resources for use with IBM Netfinity Availability Extensions for MSCS

Using the Windows NT Disk Administrator utility, do the following to create shared disk resources:

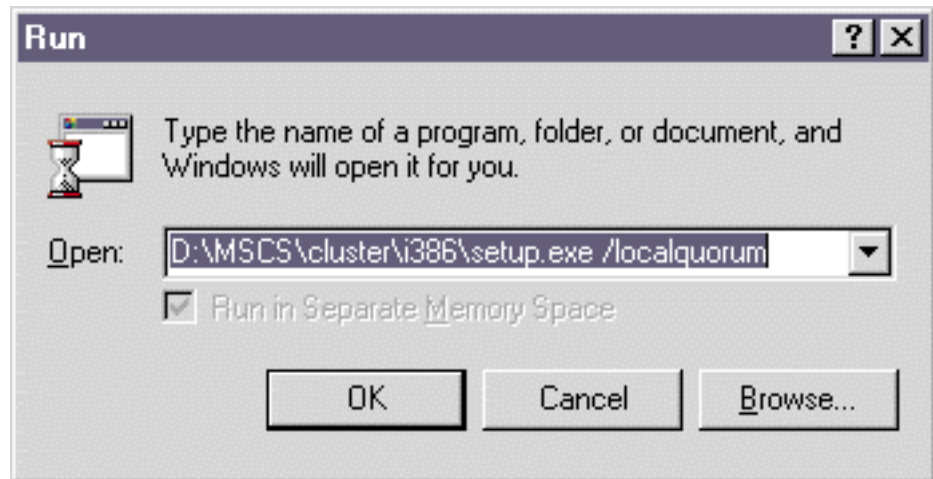
1. Use the Configuration menu to define the shared disk resource for SYMlicity Storage Manager. (For additional information refer to the *IBM Netfinity Networked SYMlicity Storage Manager Installation and User's Handbook, Second Edition*.)
2. Setup the Windows NT partitions (assign sticky drive letters, format disk).

Note: The IBM Netfinity Availability Extensions for MSCS quorum disk drive must be created with a 2 MB to 8 MB FAT partition and can not be used for any disk resources.

Installing Microsoft Cluster Service

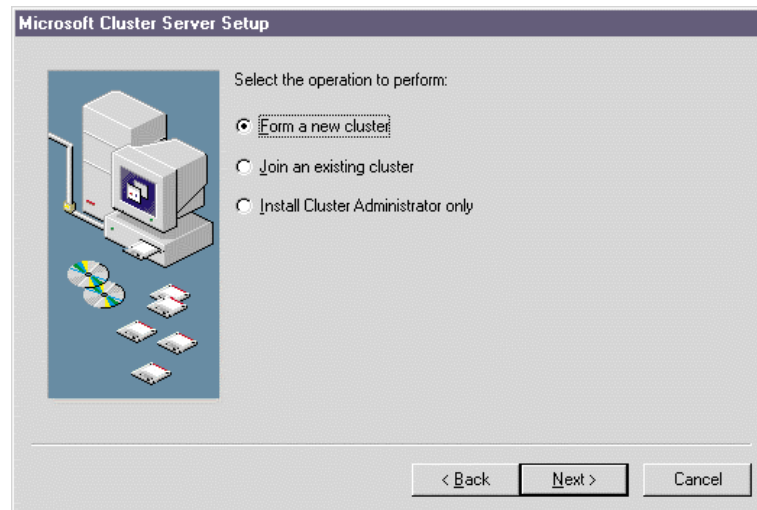
Install Microsoft Cluster Service with the /localquorum option on each server using the following instructions. If necessary, refer to the documentation that comes with the Microsoft Windows NT Server, Version 4.0 Enterprise Edition with Service Pack 4, for more detailed installation instructions.

1. Insert the Microsoft Windows NT Server Enterprise Edition, Version 4.0 disk 2 into the CD-ROM drive.
2. Click **Start** → **Run** → **Browse**.
3. Click **CD-ROM** drive.
4. Double-click **MSCS** → **Cluster** → **i386** → **SETUP.EXE**.
5. In the **Open** field, type /localquorum, adding it to the end of the command line.

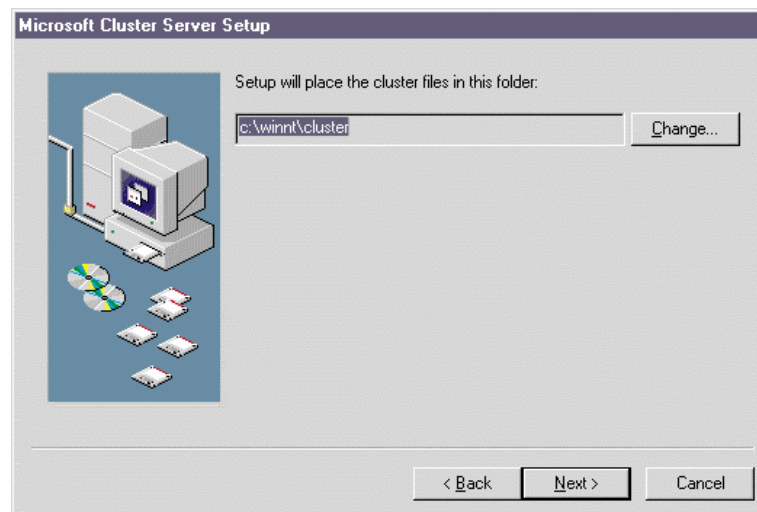


6. Click **OK**.

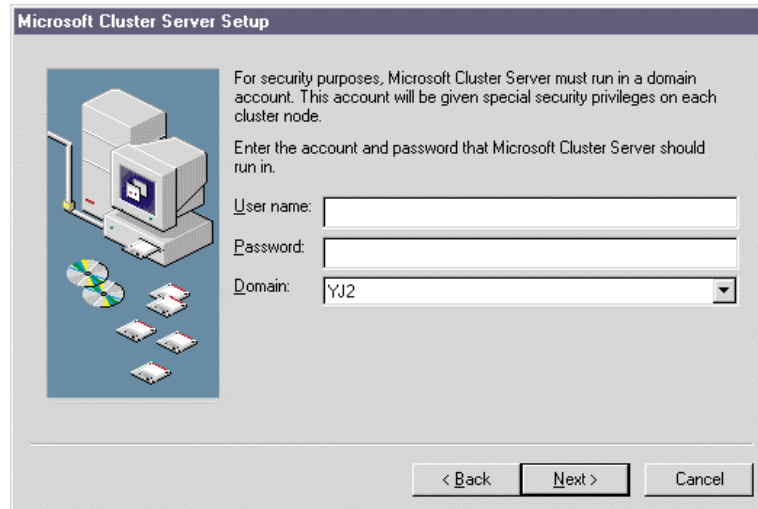
7. In the Microsoft Cluster Server installation program Welcome window, click **Next**.
8. Click **I Agree to consent to the conditions of the software license agreement**, and then click **Next**.



9. Click **Form a new cluster**, and then click **Next**.
10. In the **Computer Name** field, enter the unique name of the cluster to form, and then click **Next**.



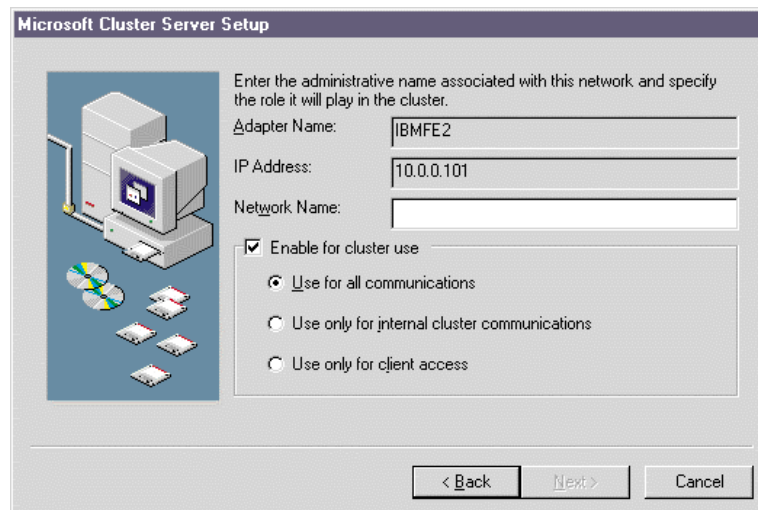
11. Click **Next** to accept the default location where the setup program will place the cluster.



12. Type the User name, Windows NT Password, and Domain in the appropriate fields and then click **Next**.

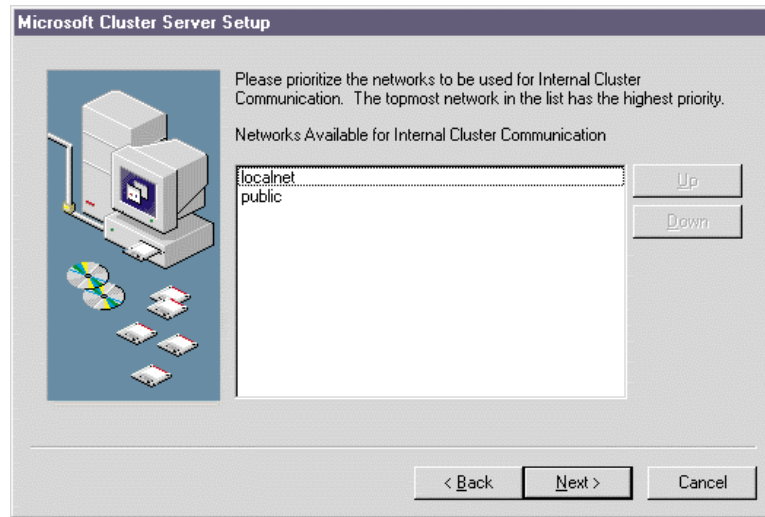
Note: You must create a domain administrator account for use with MSCS and log on with that account.

13. Click **Next** to prompt the setup program to scan and identify all network resources available on the server.

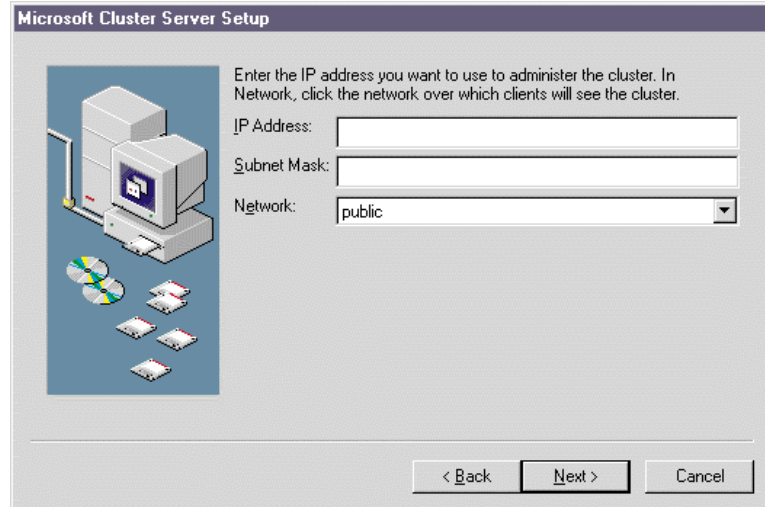


14. Specify the role for each network resource in the cluster, do the following:
 - a. Type the Local or Public network name in the **Network Name** field.
This is a unique name that must be used for the private interconnect on all nodes or the public network connection on all nodes.
 - b. Select the **Enable for cluster use** check box.
 - c. Do one of the following:
 - Click **Use for all communications**, if this is the public network.
 - Click **Use only for internal cluster communications**, if this is a local (Private) network between nodes in a cluster.
 - d. Click **Next**.

You must complete this information for each adapter.



15. Do the following to move the local (private) network to the top of the **Networks Available for Internal Cluster Communication** list. This ensures that the local network has the highest priority for internal cluster communication.
 - a. Select the local (private) network from the **Networks Available for Internal Cluster Communication** list, and then click **Up** to move it to the top of the list.
 - b. Click **Next**.



16. Do the following:
 - a. Type the IP Address you want to use to administer the cluster. (This address must be the same as the network adapter enabled for client access.)
 - b. Verify the Subnet Mask is correct for the IP address.
 - c. Click **Next**.
17. Click **Finish** to copy all necessary information to install the cluster.
18. In the message box, click **OK** to verify successful installation and to restart the system.

Note: You must repeat this MSCS installation for each server (node) you want in the IBM Netfinity Availability Extensions for MSCS cluster.

Installing IBM Netfinity Manager

Install IBM Netfinity Manager Version 5.20.4 or later on each server. Refer to the documentation that comes with this product for detailed installation instructions. This product must be installed on each server before the IBM Netfinity Availability Extensions for MSCS is installed.

Installing Microsoft Windows NT Server Enterprise Edition Service Pack 4

Install Microsoft Windows NT Server Enterprise Edition, Version 4.0, Service Pack 4 on each server. Refer to the documentation that comes with this version for detailed installation instructions.

Installing IBM Netfinity Availability Extensions for MSCS

You can install IBM Netfinity Availability Extensions for MSCS on one of the cluster nodes or on a remote workstation, if it is within the domain. Make certain that all prerequisite software is accessible on each node in the cluster prior to this installation.

Note: To perform this installation, you must have Administrator privileges and be a member of the Administrators group on the intended installation cluster node or remote workstation.

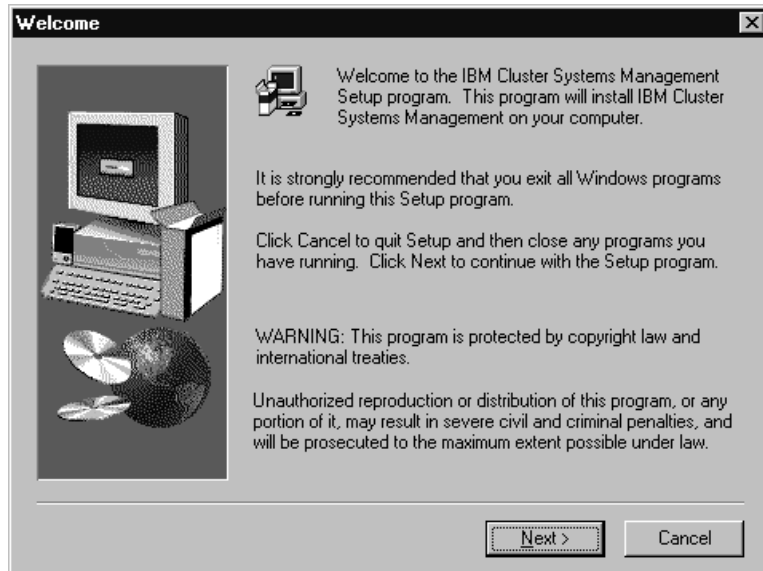
Installing IBM Netfinity Availability Extensions for MSCS on the nodes

Use the following instructions to install the IBM Netfinity Availability Extensions for MSCS on the nodes (servers) you want to cluster. Before beginning this installation, verify that all the nodes are turned on.

Note: IBM Netfinity Availability Extensions for MSCS does not support Primary Domain Controller (PDC) or Backup Domain Controller (BDC) as a node in the cluster.

1. Log on to your Windows NT server as the administrator.
2. Insert the Availability Extensions installation CD into the CD-ROM drive.
3. From the **Start** menu, select **Run**.
4. In the **Run** window, do one of the following:
 - In the **Open** field, type SETUP.
 - Click **Browse** to find the folder and file you want.
5. Click **OK**.

The IBM Cluster Systems Management Setup window opens.



6. Review the information in the Welcome window, and then click **Next**.
7. Read the software licensing agreement information, and then click **Yes**.



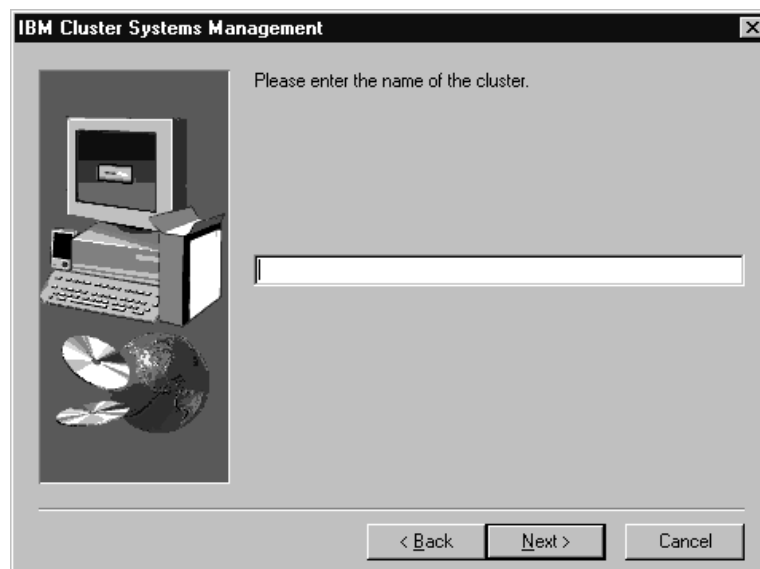
8. Type the password, and then click **Next**.



9. In the Select Components window, click **Next** to accept the default installation.

Important

Make sure you use the same drive letter and directory for each node you install.

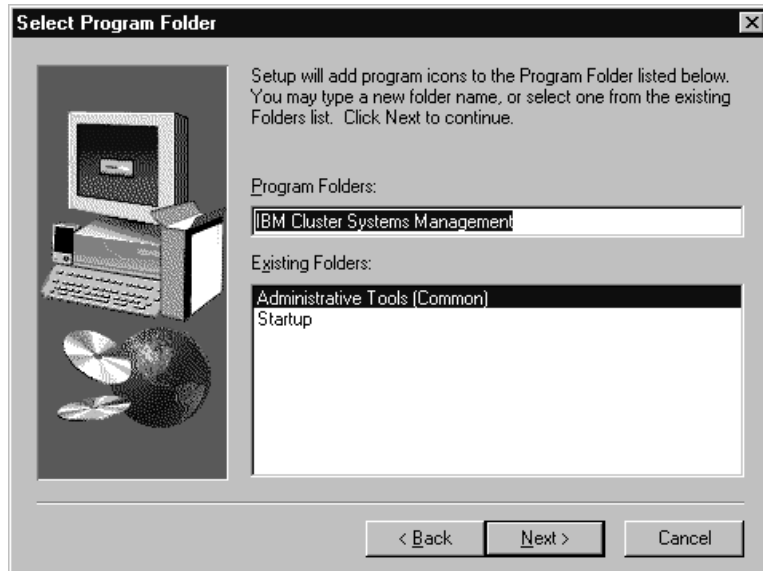


10. Type the alphanumeric (up to 16 characters) name for your IBM Netfinity Availability Extensions for MSCS cluster, and then click **Next**.

Important

This name must be used for all nodes participating in the IBM Netfinity Availability Extensions for MSCS cluster.

11. In the message window, click **Yes** to verify the cluster name.



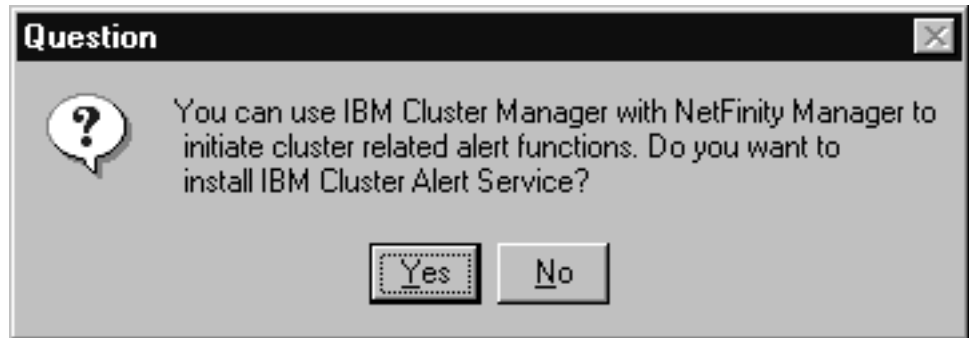
12. In the Select Program Folder window, do one of the following:

- Click **Next** to accept the default program folder location.
- Type the name of a new folder in the **Program Folders** field, and then click **Next**.
- Select a folder name from the **Existing Folders** list, and then click **Next**.



13. Verify the installation options, and then click **Next**.

The installation program copies files to the server and verifies the presence of the prerequisite software. If the software is not present, you are prompted to install the undetected programs.



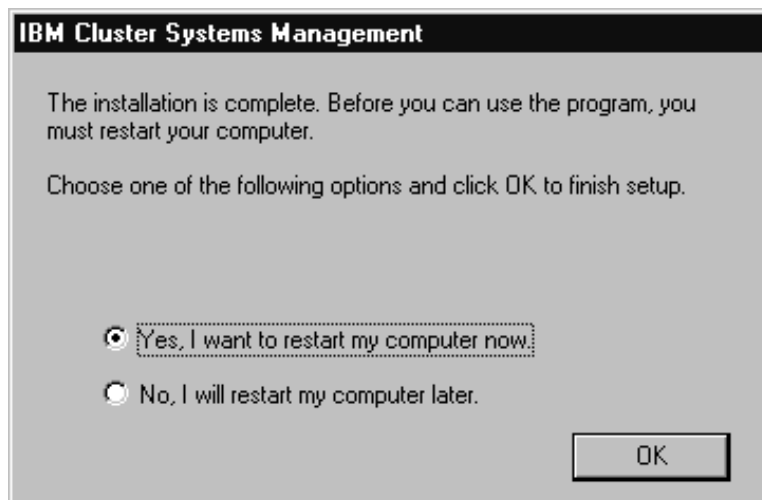
14. The setup program will prompt you to install the IBM Cluster Alert Service and Adobe Acrobat Reader programs. Do the following:
- Click **Yes** to install the specified software.
 - Click **No** if you do not want to install the specified software.

Important

IBM Netfinity Manager must be installed and running on your server for IBM Cluster Systems Management Alert to operate properly.

If you choose to install the Adobe Acrobat Reader, *do not* restart your computer until after you have completed the IBM Netfinity Availability Extensions for MSCS installation on every node. In the last Adobe window, click **No**.

15. The Setup program is designed to simultaneously configure all nodes in the cluster. This process is performed *only* when you are adding the last node to the cluster. In the Configure Cluster message window, do one of the following:
- Click **No** if you plan to add more nodes to the cluster, or if you are adding a new node to an existing cluster.
 - Click **Yes** if this is the last node you plan to add to the cluster.



16. Select the **Yes, I want to restart my computer now.** radio button to restart the server (node), and then click **OK**.

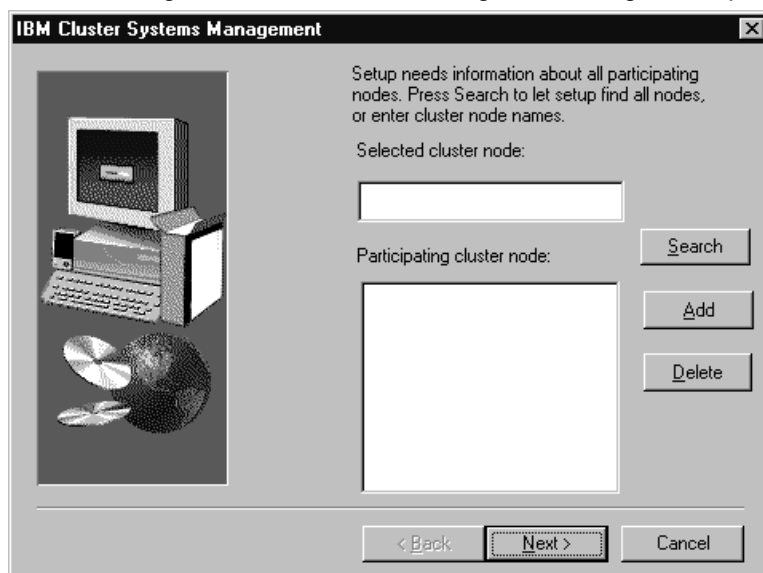
Note: If this is the last node you want to add to the cluster, verify that the prior installed nodes have restarted and are up and running, and then proceed to the next step.

The servers (nodes) must be restarted for the settings to take effect.

17. Do one of the following:

- If you plan to add more nodes to the cluster, repeat steps 1–16 to install each node you want in the cluster.
- If this is the last node, after you have restarted and logged on to your computer, the installation utility configures the nodes participating in the cluster.

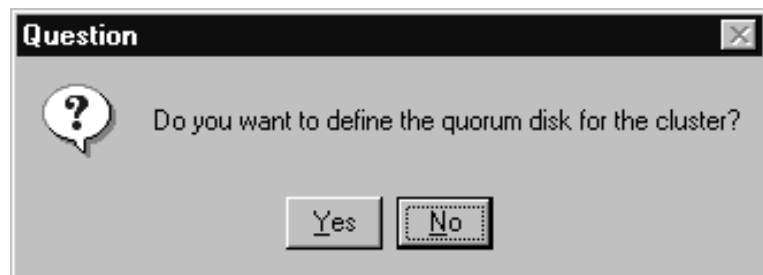
18. In the message window, click **OK** to begin the configuration process.



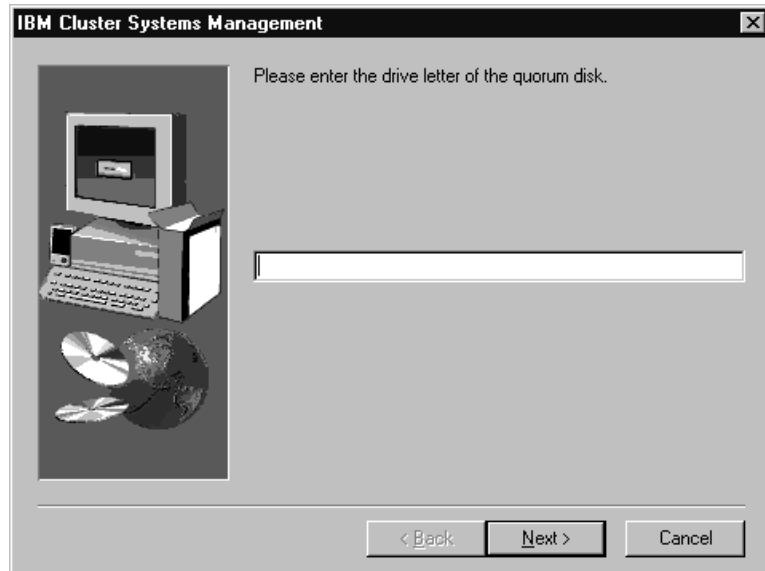
19. In the Setup Information window, click **Search** to identify all nodes in the cluster, and then click **Next**.

Note: To add nodes that do not appear in the list, type the cluster node name, and then click **Add**.

20. Click **Next** to confirm the cluster nodes located for configuration.

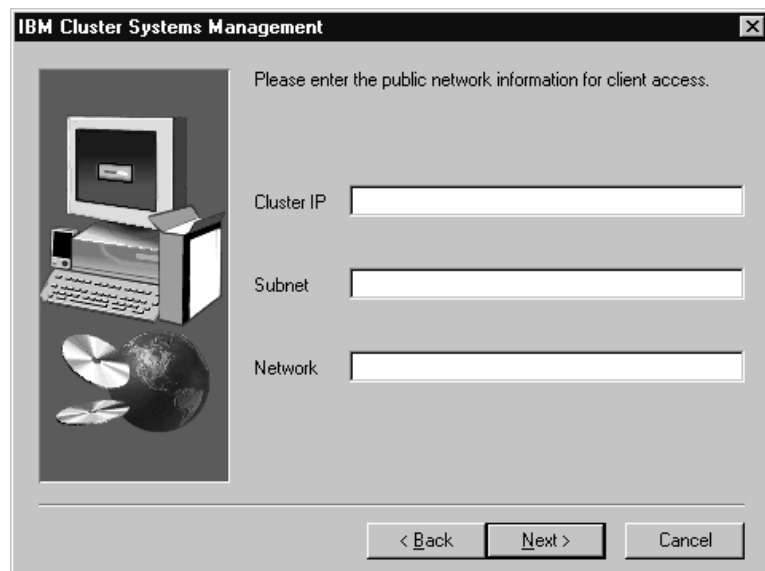


21. In the Question window, click **Yes** to define the quorum disk for the cluster.



22. Type the quorum disk drive letter (for example, k:), and then click **Next**.

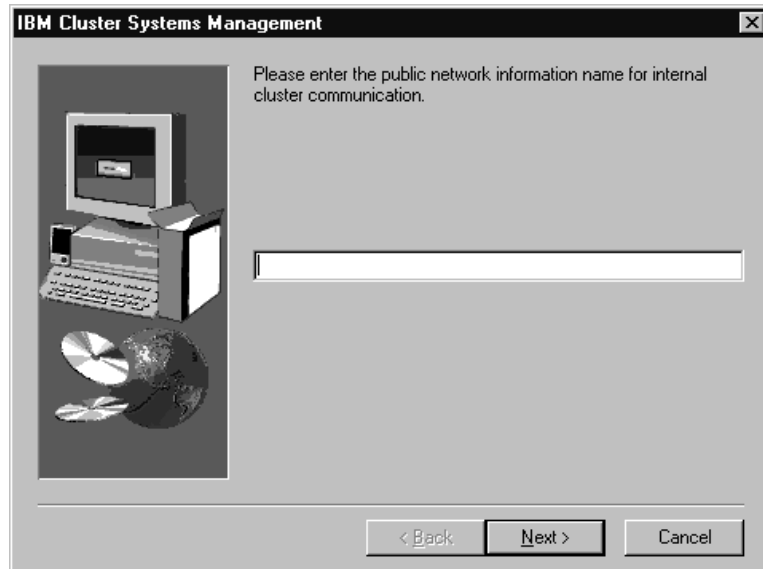
Note: Use the Disk Administrator utility to determine the available disk drive. The drive letter you specify must be an 2–8 MB file allocation table (FAT) partition on a shared disk.



23. Type the network information for the entire cluster, and then click **Next**.

Note: Make sure that you use a unique IP address that is enabled for client access and that the network name is the same public network name you defined in MSCS.

The installation utility will continue to configure the private (network) nodes.



24. Type the same private network name you defined for internal cluster communication in MSCS and then click **Next**.

The configuration program starts and stops MSCS on all nodes and updates all necessary files. This process might take a few minutes.

25. The setup program will prompt you to start the IBM Cluster Service, Alert Service, and Scheduler Service. Do one of the following:
 - Click **Yes** to start the specified service.
 - Click **No** if you do not want to start the specified service

26. Click **Finish**.

You can access the IBM Cluster Systems Management program from the Microsoft Windows NT Start menu.

Important

After IBM Netfinity Availability Extensions for MSCS has been successfully installed on all nodes in the cluster, do not reinstall Microsoft Windows NT Server Enterprise Edition service packs on the nodes. These service packs will overwrite files that are vital to operating IBM Netfinity Availability Extensions for MSCS.

Installing IBM Netfinity Availability Extensions for MSCS client on a remote workstation

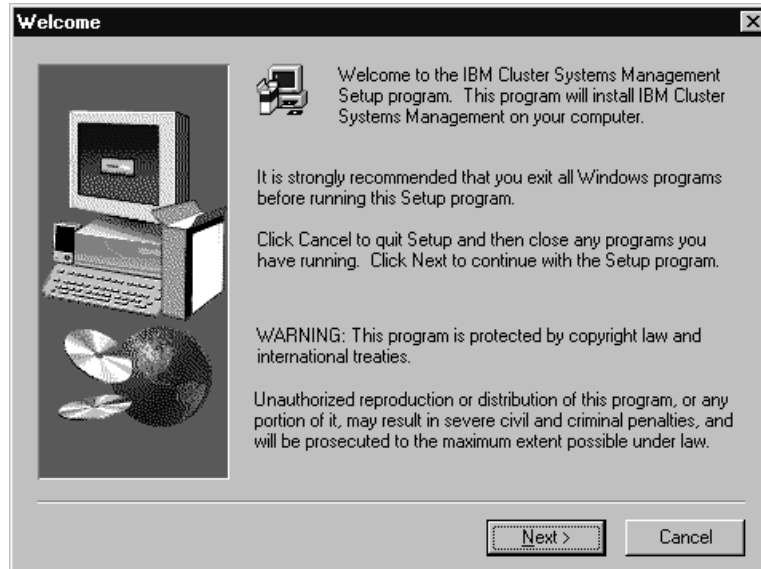
Use the following instructions to install ICSM, which is the IBM Netfinity Availability Extensions for MSCS graphical interface. You can use this client interface to administer clusters and to manage the Alert Manager functionality.

Note: The MSCS Cluster Administrator must be installed on the workstation prior to installing the IBM Netfinity Availability Extensions for MSCS client.

1. Log on to your Windows NT workstation.
2. Insert the Availability Extensions installation CD into the CD-ROM drive.
3. From the **Start** menu, select **Run**.

4. In the **Run** window, do one of the following:
 - In the **Open** field, type SETUP.
 - Click **Browse** to find the folder and file you want.
5. Click **OK**.

The IBM Cluster Systems Management Setup window opens.



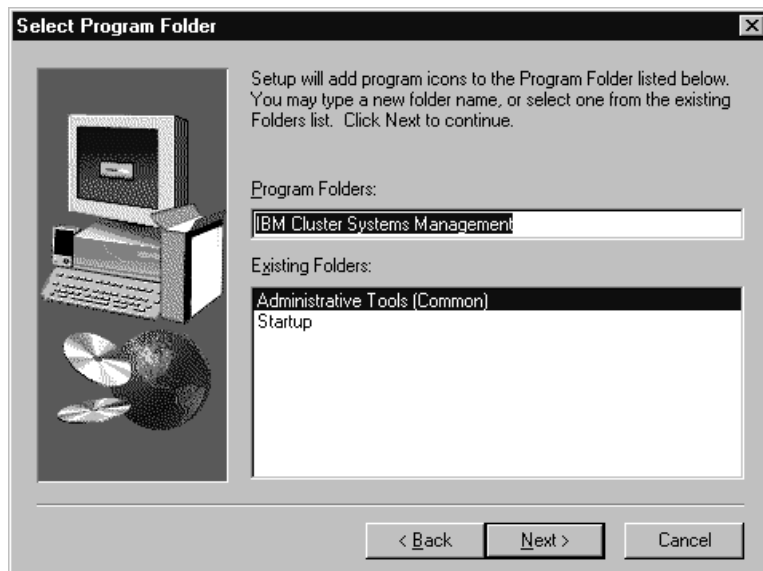
6. Review the information in the Welcome window, and then click **Next**.
7. Read the software licensing agreement information, and then click **Yes**.



8. Type the password, and then click **Next**.

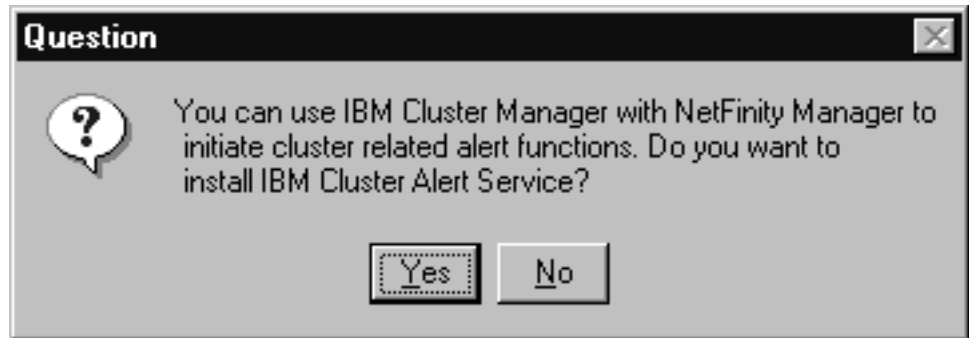


9. In the Select Components window, clear the **Cluster** check box, and then click **Next**.
10. In the message window, click **No**.



11. In the Select Program Folder window, do one of the following:
 - Click **Next** to accept the default program folder location.
 - Type the name of a new folder in the **Program Folders** field, and then click **Next**.
 - Select a folder name from the **Existing Folders** list, and then click **Next**.
12. Verify the installation options, and then click **Next**.

The installation program copies files to the server, and verifies the presence of the prerequisite software. If the software is not installed, you are prompted to install the undetected programs.



13. The setup program will prompt you to install the IBM Cluster Alert Service or Adobe Acrobat Reader programs. Do the following:
 - Click **Yes** to install the specified software.
 - Click **No** if you do not want to install the specified software.

Important

IBM Netfinity Manager must be installed and running for IBM Cluster Systems Management Alert to operate properly.

If you choose to install the Adobe Acrobat Reader, *do not* restart your computer until after you have completed the IBM Netfinity Availability Extensions for MSCS installation. In the last Adobe window, click **No**.

14. Select **Yes, I want to restart my computer now.**, and then click **Next**.
Your computer restarts.
15. When prompted, log on to your workstation.
The IBM Cluster Systems Management program icon appears on your Windows desktop.

Migrating to IBM Netfinity Availability Extensions for MSCS

Use the following instructions to upgrade your 2-node MSCS configuration to an IBM Netfinity Availability Extensions for MSCS 3- to 8-node configuration.

1. Use the Windows NT Add/Remove Programs utility to uninstall the cluster-aware applications that were designed to run exclusively with MSCS (for example, Lotus Domino) from your server.
 - a. Click **Start** → **Settings** → **Control Panel**.
 - b. Double-click **Add/Rem Programs**.
 - c. Select the **IBM DB2 Universal Database** program name from the Install/Uninstall list.
 - d. Click **Add/Remove**.
 - e. Click **Apply**.
2. Uninstall Microsoft Cluster Service from your system.
3. Verify that IBM Netfinity Manager is not running.

4. Install IBM Netfinity Availability Extensions for MSCS on each additional node you want to add to the cluster

Note: Refer to “Installing IBM Netfinity Availability Extensions for MSCS” on page 1 for detailed installation instructions.

5. Reinstall the cluster-aware applications on your new clusters.

Uninstalling IBM Netfinity Availability Extensions for MSCS

If you want to remove the IBM Netfinity Availability Extensions for MSCS software from your servers, use the Add/Remove Programs utility located in the Microsoft Windows NT Control Panel.

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Add/Rem Programs**.
3. Select the **IBM Cluster Systems Management** program name from the Install/Uninstall list.
4. Click **Add/Remove**.
5. Click **Apply**.

The utility removes all IBM Netfinity Availability Extensions for MSCS files and deletes all IBM Netfinity Availability Extensions for MSCS registry entries.

6. Select the **Microsoft Cluster Service** program name from the Install/Uninstall list.
7. Click **Add/Remove**.
8. Click **Apply**.

The utility removes all Microsoft Cluster Service files and deletes all Microsoft Cluster Service registry entries.

9. Click **OK** to exit the Add/Rem Programs utility.

For more information on removing programs using the Microsoft Add/Remove Programs utility, refer to the *Microsoft Windows NT User's Guide*.

Administering clusters

An IBM Netfinity Availability Extensions for MSCS cluster is a group of three to eight independent IBM Netfinity 7000 M10 and IBM Netfinity 5500 M20 servers that are addressed and used as a single system. A cluster owns all of the entities, such as resources, resource groups, nodes, networks, and network interfaces. The following describes the cluster entities.

Node

A node in the MSCS environment represents a IBM Netfinity 7000 M10 server or IBM Netfinity 5500 M20 server. Nodes can own resource groups.

Resource group

A resource group in the MSCS environment is a collection of resources grouped together in a single system. State, Move, and Initiate Failure are some resource group functions. When applied, these functions affect all resources in the group. (For example, if a node fails, another node in the cluster takes ownership of the group, providing client/server applications continuous access to the storage device.)

Resource

A resource offers a service to clients in a client/server application. IBM Netfinity Availability Extensions for MSCS uses the resource types (for example, physical disks, IP addresses, and network names) that exist in the MSCS environment to perform specific high-availability functions. For example, if a node fails, another node in the cluster takes ownership of the physical disk resources, providing client/server applications continuous access to the storage device.

Networks and network interfaces

In the MSCS environment, networks and network interfaces define an internal cluster communication between nodes and how clients access nodes in a cluster.

Using IBM Cluster Systems Management, you can configure your 3-node to 8-node cluster environment for high availability and scalability. You can create, delete, move, or change the properties of the entities in the cluster.

Managing clusters

A cluster name represents the top component in the IBM Netfinity Availability Extensions for MSCS tree structure and owns all of the entities, such as resources, resource groups, node, and networks and network interfaces. You can create, delete, or move cluster entities, as well as change the properties of cluster entities.

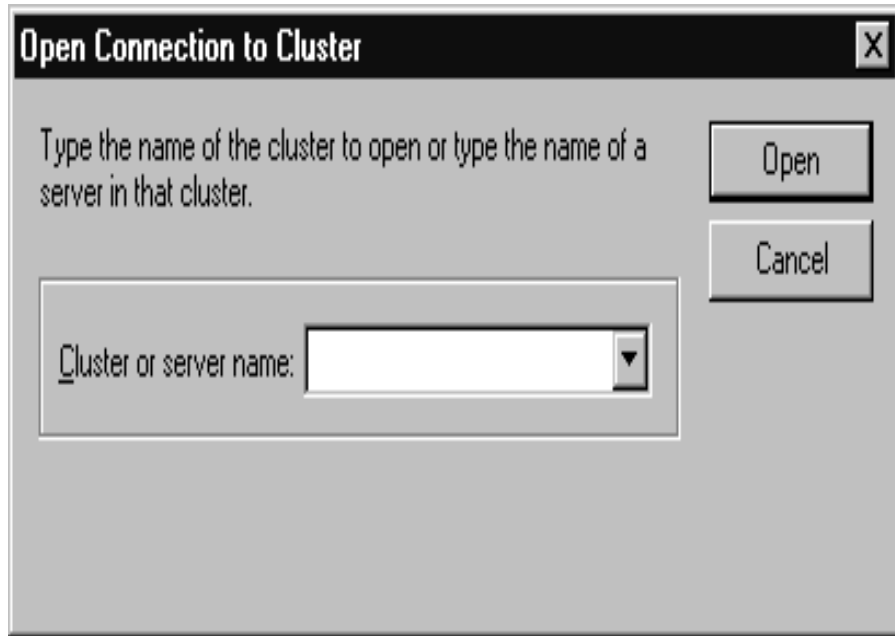
Opening a connection to a cluster

Before you can configure a cluster, you must first open a connection to a cluster.

Note: The first time you open a cluster, you are prompted to type the name of the cluster or server that you want to open. Thereafter, the name will display in and can be selected from the **Cluster or server name** list box.

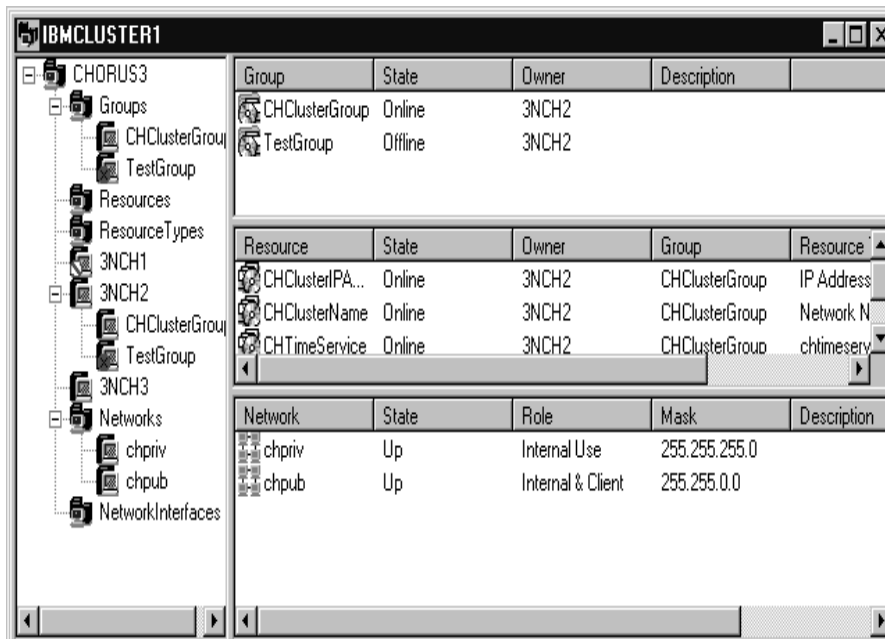
1. From the main window, do one of the following:

- Click **Open**.
 - Click **File** → **Open Connection**.
2. In the Open Connection to Cluster window, type the appropriate name in the **Cluster or server name** field.



3. Click **Open**.

The following window opens.



This window is divided into four panes. The left pane displays the IBM Netfinity Availability Extensions for MSCS cluster tree structure (the cluster name at the highest level, followed by the Groups, Resources, Resource Types, Nodes,

Networks, and Network Interfaces). The panes to the right display the Group, Resource and the Network views.

Renaming a cluster

You can change the name of a cluster.

1. Right-click the cluster name you want to change.
2. Click **Rename**.
3. Type in the new cluster name.
4. Press Enter.

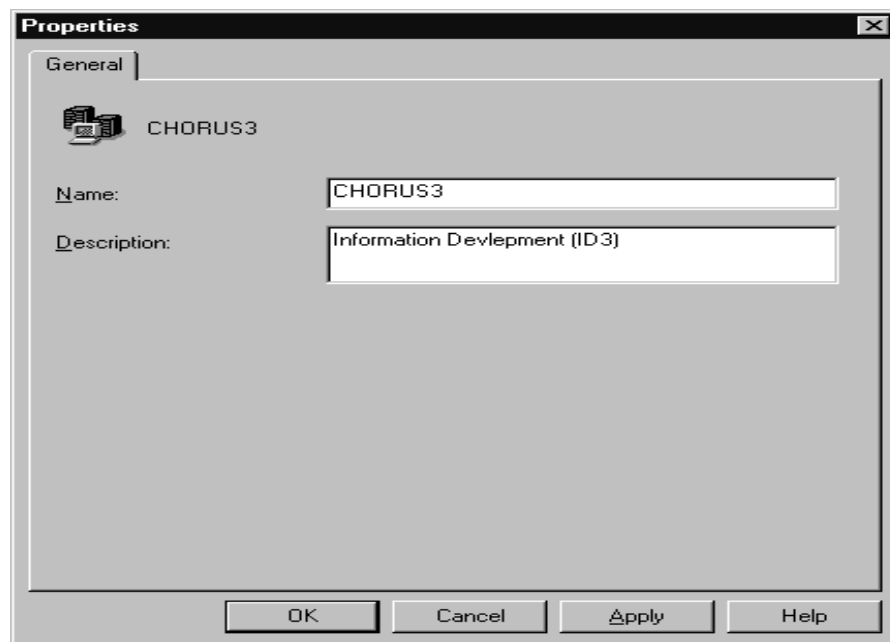
Note: When you rename a cluster, you must also rename the domain name system (DNS) entry.

Changing the description of a cluster

Use the following instructions to change the description of a cluster.

1. In the left pane, click the name of the cluster whose properties you want to change.
2. Click **File** → **Properties**.

The Properties window opens for the selected cluster.



3. Type a description of the cluster in the **Description** field.
4. Click **Apply**.
5. Click **OK**.

Managing nodes in a cluster

A node in the MSCS environment represents a IBM Netfinity 7000 M10 or IBM Netfinity 5500 M20 server. Nodes own resource groups, and resource groups can only be owned by one node at time. When a node starts, the cluster service starts automatically.

The following sections describe the various operations you can apply to a node in a cluster.

Starting cluster service in a node

1. From the ICSM window, right-click the node name in the left pane.
2. Click **Start Cluster Service**.
3. Click **Refresh**.

Stopping cluster service in a node

1. From the ICSM window, right-click the node name in the left pane.
2. Click **Stop Cluster Service**.
3. Click **Refresh**.

Pausing a node

1. From the ICSM window, right-click the node name in the left pane.
2. Click **Pause Node**.

Resuming a node

1. From the ICSM window, right-click the node name in the left pane.
2. Click **Resume Node**.
3. Click **Refresh**.

Entering node descriptions

You can add comments or a description of a node to its General properties information.

1. From the ICSM window, click the node name in the left pane.
2. Click **File** → **Properties**.



3. Type a description of the node in the appropriate field.
4. Click **Apply**.
5. Click **OK**.

Managing resource groups in a cluster

A resource group is a collection of resources. It is at the group level that you can move groups from one node to another node, and failover and failback between nodes. You can change the state (online or offline) of a collection of resources by changing the state of the group.

You can manage groups in a cluster by:

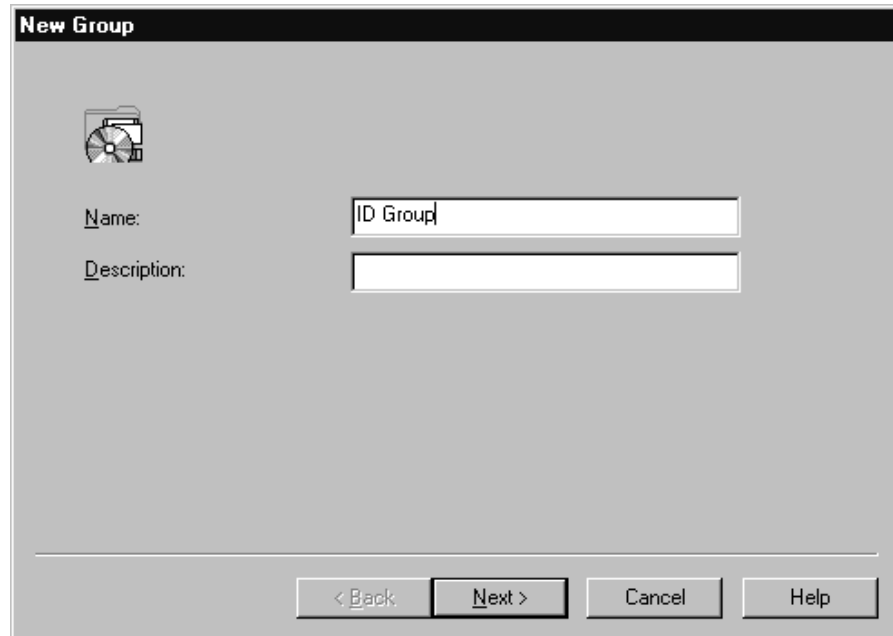
- Creating a new group
- Deleting a group
- Renaming a group
- Bringing a group online
- Taking a group offline
- Changing group description properties
- Changing group preferred owners
- Setting group failover policy
- Setting group failback policy
- Moving a group to another node

Creating a new group


After determining the resources you want together, you can create groups. Use the following instructions to create a group in a cluster.

1. From the ICSM window, click **File** → **New** → **Group**.

The New Group window opens.



New Group

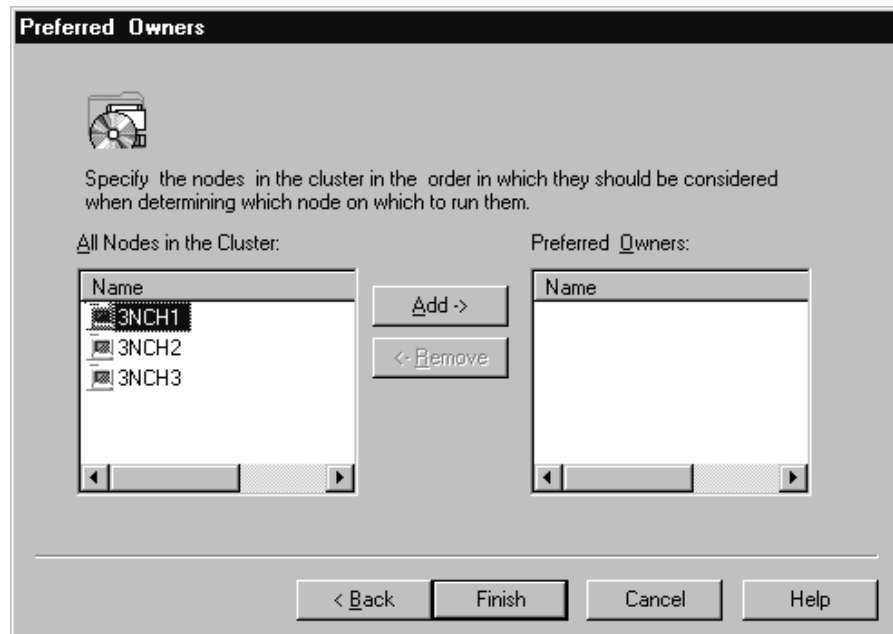


Name: ID Group


Description:

< Back Next > Cancel Help

2. Type the name and the description of the group in the appropriate fields.
3. Click **Next**.



Preferred Owners



Specify the nodes in the cluster in the order in which they should be considered when determining which node on which to run them.

All Nodes in the Cluster:

Name
3NCH1
3NCH2
3NCH3

Preferred Owners:

Name

Add -> <- Remove

< Back Finish Cancel Help

4. In the Preferred Owners window, do the following:
 - a. From the **All Nodes in the Cluster** list box, click the node name you want as Preferred Owner.

- b. Click **Add**.
- c. Repeat steps a and b for each node you want considered for use in the event of failure.

Note: To remove a node from the preferred owner list, click the node name and then click **Remove**.

5. From the ICSM window, click **Finish**.

Deleting a group

You can only delete a group that is offline and that does not contain resources. Use the following instructions to delete a cluster group.

1. From the ICSM main view, click a group name.
2. Click **File** → **Delete**.
3. Click **Yes** to confirm the deletion.

Renaming a group

You can assign a different name to each group in a cluster. Use the following instructions to rename a group in a cluster.

1. From the IBM Cluster Systems Management main view, right-click a group name.
2. Click **Rename**.
3. Enter the new name.

Note: If your group name includes a dash (–) or a hyphen (-), use an underscore (_) to denote these symbols.

4. Press Enter.

Bringing a group online

Use the following instructions to bring a group online in a cluster.

1. From the IBM Cluster Systems Management main view, right-click a group name.
2. Click **Bring Online**.

Taking a group offline

Use the following instructions to take a group offline in a cluster.

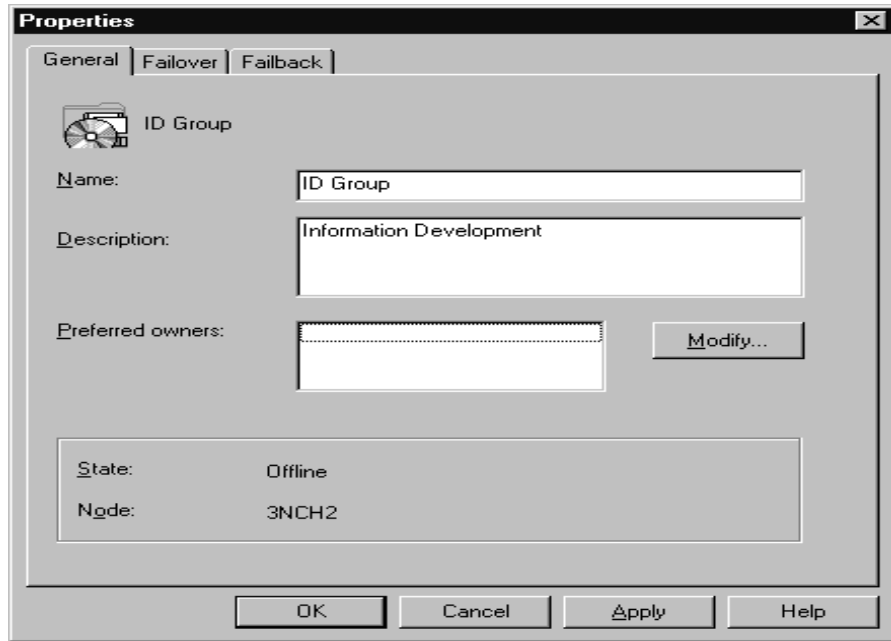
1. From the IBM Cluster Systems Management main view, right-click a group name.
2. Click **Take Offline**.

Changing group description properties

Use the following instructions to change the description of a cluster group.

1. From the IBM Cluster Systems Management main view, select the group name.
2. Click **File** → **Properties**.

The following window opens.

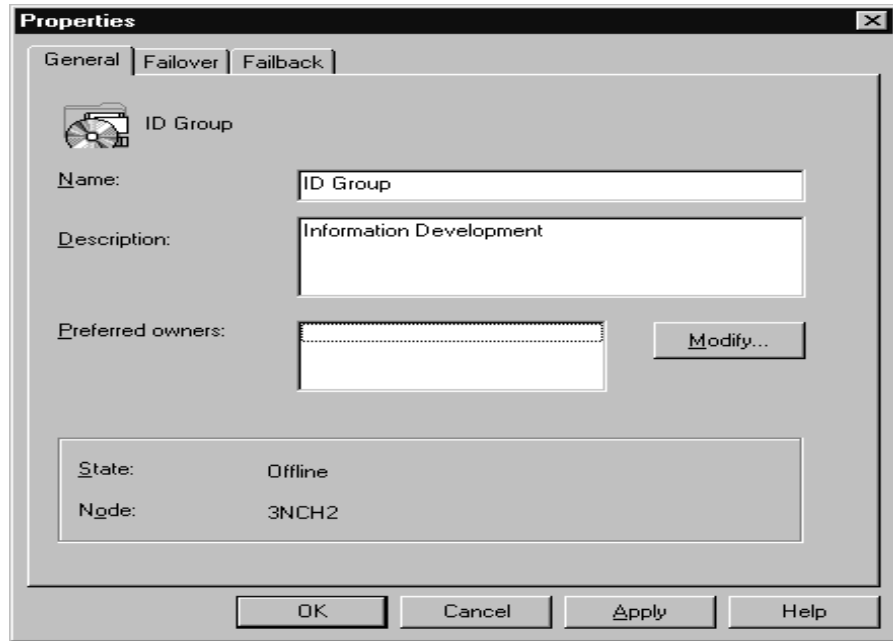


3. In the **Description** field, type a description of the group.
4. Do one of the following:
 - Click the **General** tab, if you want to change the Name, Description, or Preferred owners of the group.
 - Click the **Failover** tab, if you want to modify the group failover Threshold or Period information. (For more information, see “Setting group failover policy” on page 32.)
 - Click the **Failback** tab, if you want to prevent, allow, or schedule an immediate or predetermined time for failback. (For more information, see “Setting group failback policy” on page 33.)
5. Click **Apply**.
6. Click **OK**.

Changing group preferred owners

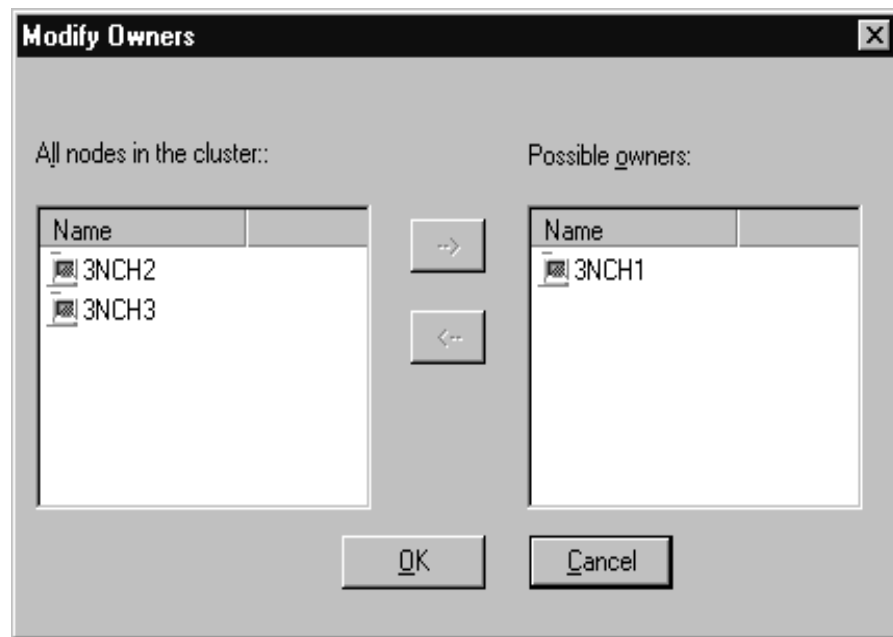
Use the following instructions to add, remove, or change group preferred owners.

1. From the ICSM window, click a group name.
2. Click **File** → **Properties**.



3. Click **Modify**.

The Modify Owners window opens.



4. In the Modify Owners window, do the following:

- a. From the **All nodes in the cluster** list box, click the node name you want as the preferred owner.
- b. Click the right arrow button to add the name to the **Preferred owners** box and to specify the preferred order in the event of failure.
- c. Repeat steps a and b for each node you want considered for use in the event of failure.

5. Click **OK**.

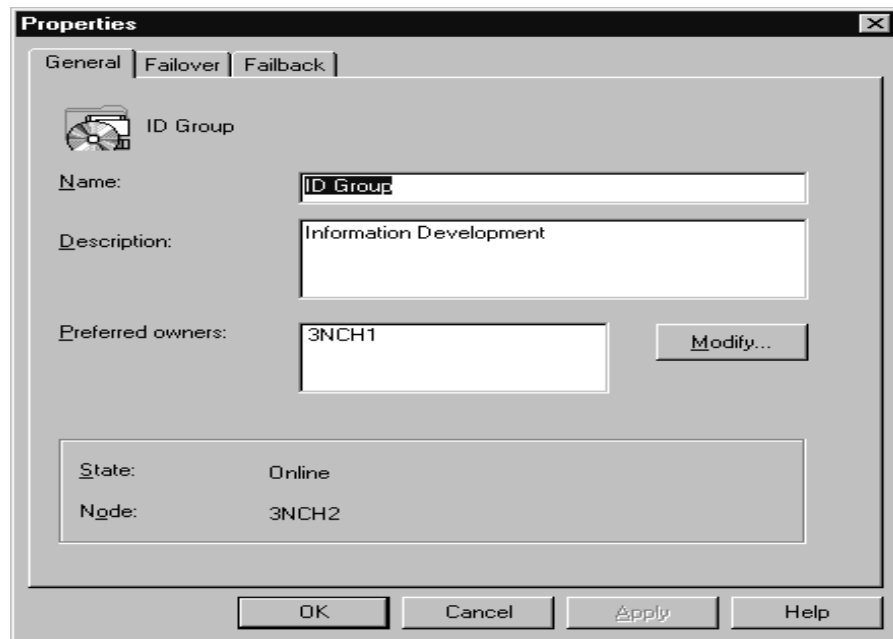
6. Click **Apply**.
7. Click **OK**.

Setting group failover policy

The failover policy for IBM Netfinity Availability Extensions for MSCS is to rotate to the next node listed in the Preferred owners list. Use the following instructions to set the failover policy for a group in a cluster.

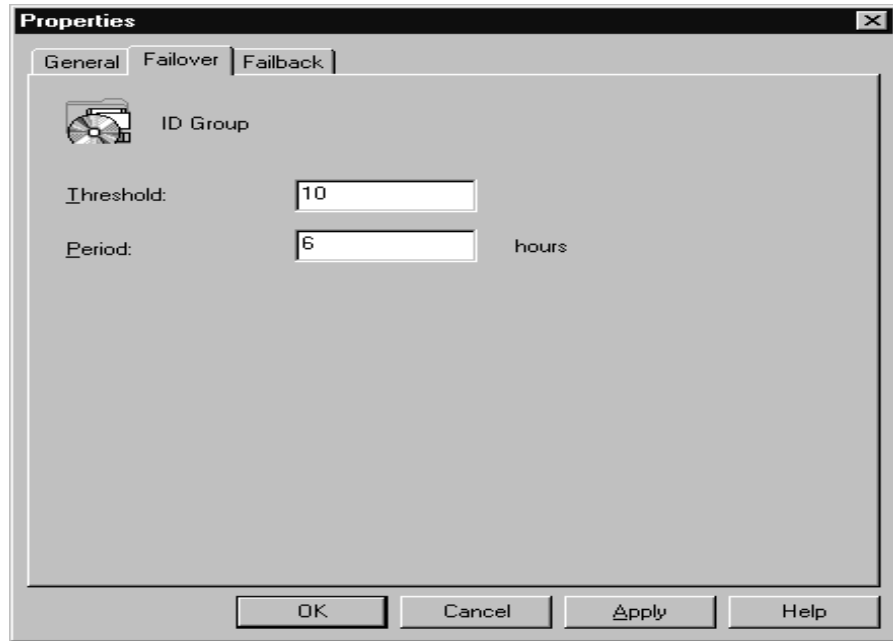
1. From the ICSM window, click a group name.
2. Click **File** → **Properties**.

The following window opens.



3. Click the **Failover** tab.

The following window opens.



4. Do the following:

- Set the **Threshold** field to the maximum number of times an attempt should be made to failover a group.
- Set the **Period** field, to specify the maximum number of hours before the group is taken offline after the threshold is exceeded.

For example, if a group failover Threshold is set to 10 and the Period is set to 6, the cluster software will take the group offline after the tenth attempt to failover the group within six hours.

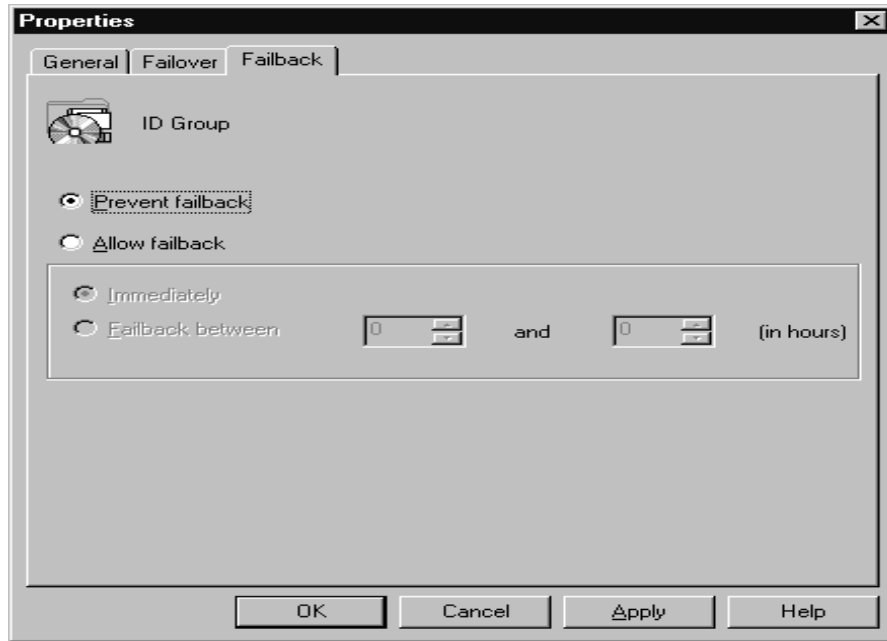
5. Click **Apply**.

6. Click **OK**.

Setting group failback policy

When a node comes back online, the group will failback to this node only if it is the first node in the Preferred owners list. To enable or disable the group failback policy, use the following instructions.

1. From the ICSM window, click the group name.
2. Click **File** → **Properties**.
3. In the Properties window, click the **Failback** tab.



4. Do one of the following:
 - To terminate the Failback, click **Prevent failback**.
 - To schedule a Failback, click **Allow failback** and set one of the following options.
 - a. **Immediately**
 - b. **Failback between**

Note: The **Failback between** option must be set between 0 and 23. If the beginning time is greater than the ending time, the failback will occur the following day.
5. Click **Apply**.
6. Click **OK**.

Moving a group to another node

Use the following instructions to move a group to a different node.

1. From the ICSM window, right-click the Group name.
2. Click **Move Group**.
3. Click the name of the node where the group is to move.

Note: You can also use the drag-and-drop method to accomplish this task.

Managing resources

You can manage resources by:

- Creating a new resource
- Deleting a resource
- Renaming a resource

- Bringing a resource online
- Taking a resource offline
- Initiating a resource failure
- Changing resource descriptions
- Modifying resource dependencies
- Specifying which nodes can own a resource
- Setting advanced resource parameters
- Setting resource parameters
- Moving a resource from one group to another group

Note: Changes made to IBM Netfinity Availability Extensions for MSCS cluster resources will not take affect until the resource is taken offline, and then brought back online.

Creating a new resource

Use the following instructions to create a cluster resource.

1. From the ICSM window, click **File** → **New** → **Resource**.

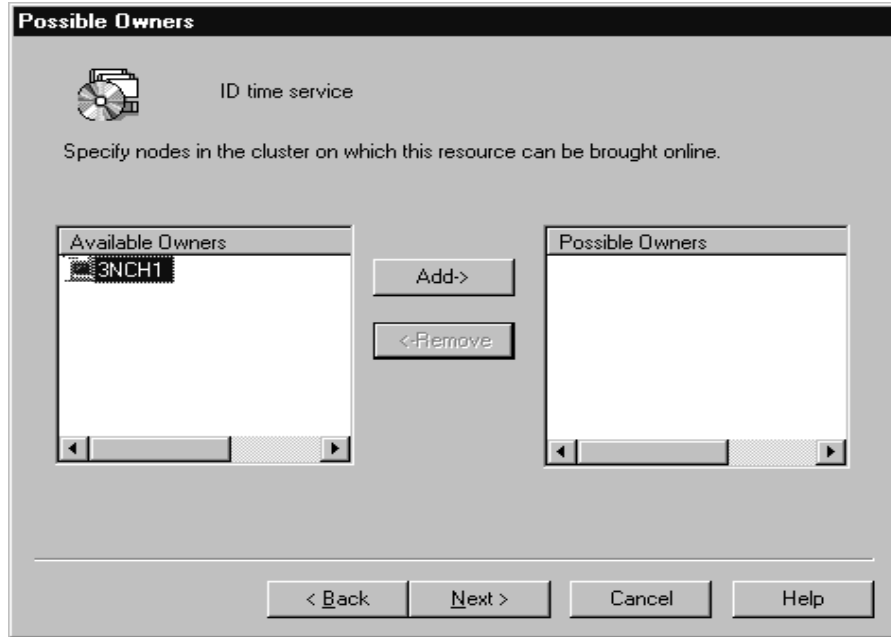
The New Resource window opens.

2. Do the following:
 - a. Type the name for the new resource.
 - b. Type a description of the resource.
 - c. Select the Resource type.
 - d. Select the Group.
 - e. Select **Run this resource in a separate Resource Monitor** check box.

Note: The **Run this resource in a separate Resource Monitor** option is used to debug or to resolve a conflict with other resources.

3. Click **Next**.

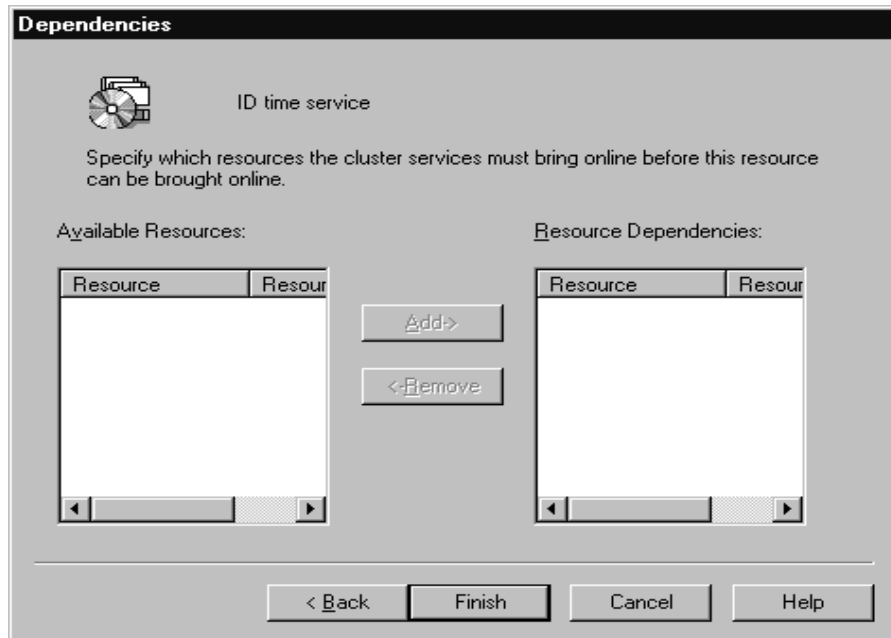
The Possible Owners window opens.



4. Click the node name, and then click **Add** to specify the possible owners.

5. Click **Next**.

The Dependencies window opens.



6. Click the name of the available resource you want to add as a resource dependency, and then click **Add**. (Repeat this step for each resource.)

Note: Depending on the selected resource, additional windows might open.

7. Click **Finish**.

Deleting a resource

Use the following instructions to delete or rename a resource.

1. From the ICSM window, right-click the resource name.
2. Click **Take Offline**.
3. Click **Delete**.
4. In the message box, click **OK** to confirm the deletion.

Renaming a resource

The following describes how to change the name of a resource.

1. From the ICSM window, right-click the resource name.
2. Click **Rename**.
3. Type the new name.
4. Press Enter.

Bringing a resource online or taking a resource offline

To bring a resource online or take a resource offline, do the following.

1. From the ICSM window, right-click the resource name.
2. Click **Bring Online** or **Take Offline**.

Initiating a resource failure

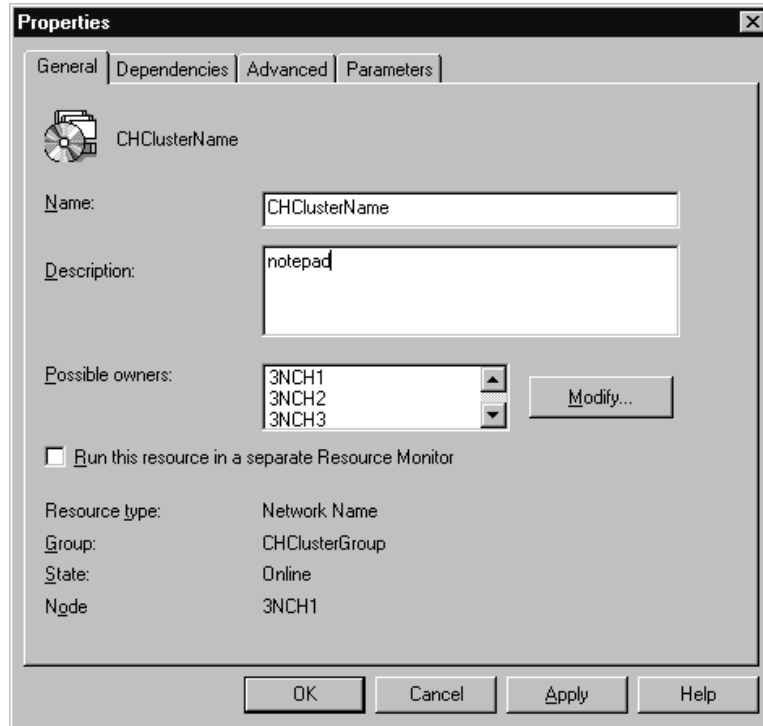
Initiating a resource failure is used for testing Failover and Failback functions. Use the following instructions to initiate a resource failure.

1. From the ICSM window, right-click the resource name.
2. Click **Initiate Failure**.

Changing resource descriptions

The General tab contains the same information for each resource type. Use the following instructions to view the resource name or to change the resource description.

1. From the ICSM window, click the resource name.
2. Click **File** → **Properties**. The Properties window opens.



3. Type the name (optional).
4. Type the description.
5. Click **Apply**.
6. Click **OK**.

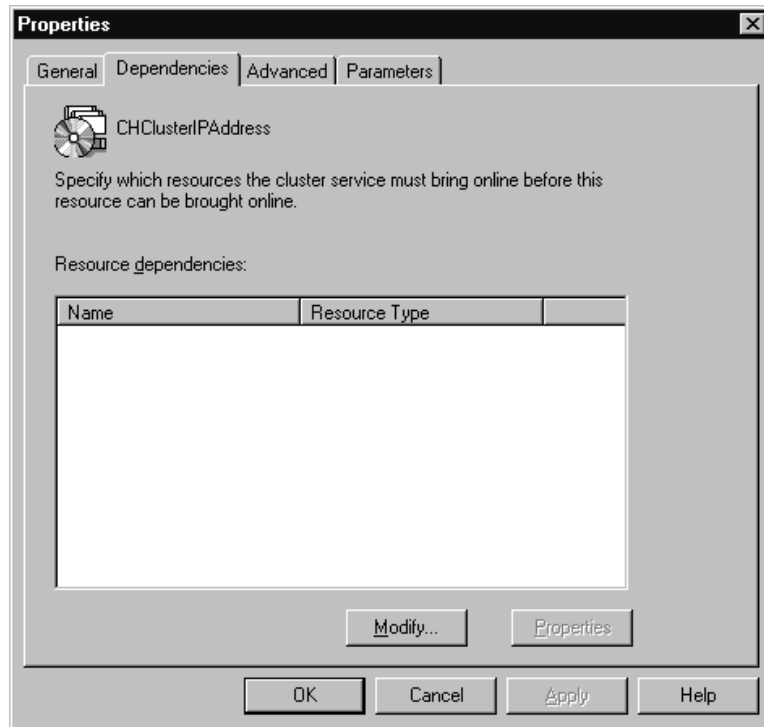
Modifying resource dependencies

IBM Netfinity Availability Extensions services uses a list of dependencies when bringing resources online or offline. The following table identifies resources and their dependencies.

Resources	Dependencies
File Share	Physical Disk (files location) TCP/IP Address Network Name
Generic Application	Default None. (This varies according to the specified service.)
Generic Service	Default None. (This varies according to the specified service.)
Network Name	TCP/IP Address
Physical Disk	None
Print Spooler	Physical Disk Network Name TCP/IP Address File Share
TCP/IP Address	None

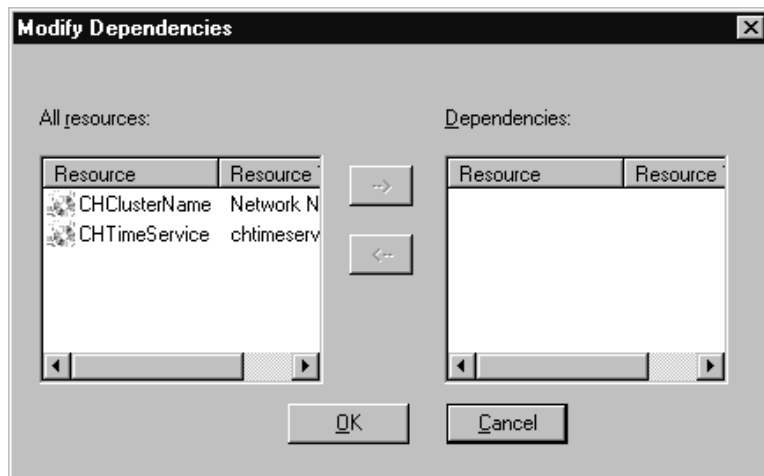
Refer to the table and use the following instructions to add or to remove resource dependencies in a cluster.

1. Click the resource name.
2. Click **File** → **Properties**.
3. In the Properties window, click the **Dependencies** tab.
4. Click **Modify**.



The Modify Dependencies window opens.

Use this window to select the resources that you want brought online before this resource. For example, a network name is dependent on an IP address, so the IP name must be brought online before the network name.



5. Click the name of the available resource you want to add as a resource dependency, and then click the right arrow button.
6. Click **OK**.

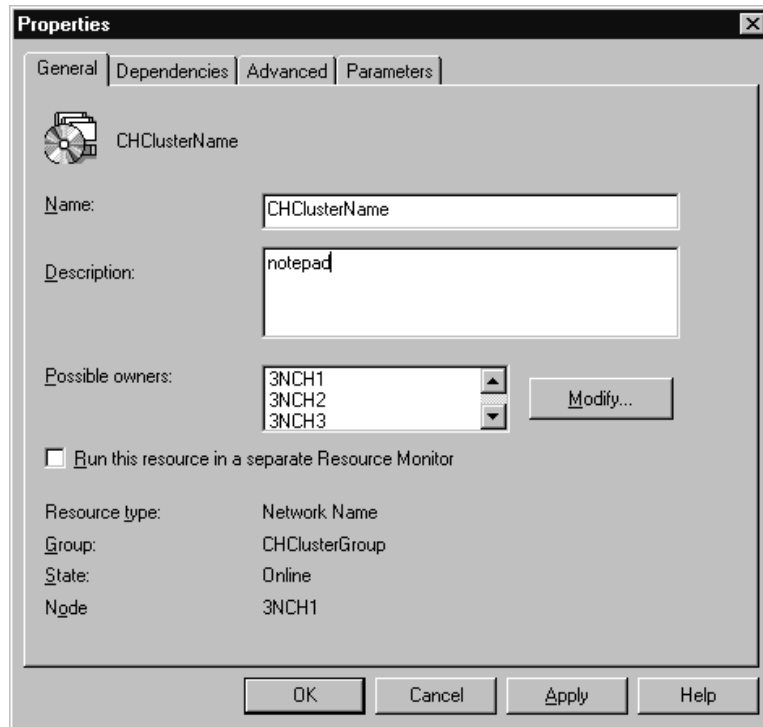
7. Click **Apply**.
8. Click **OK**.

Specifying which nodes can own a resource

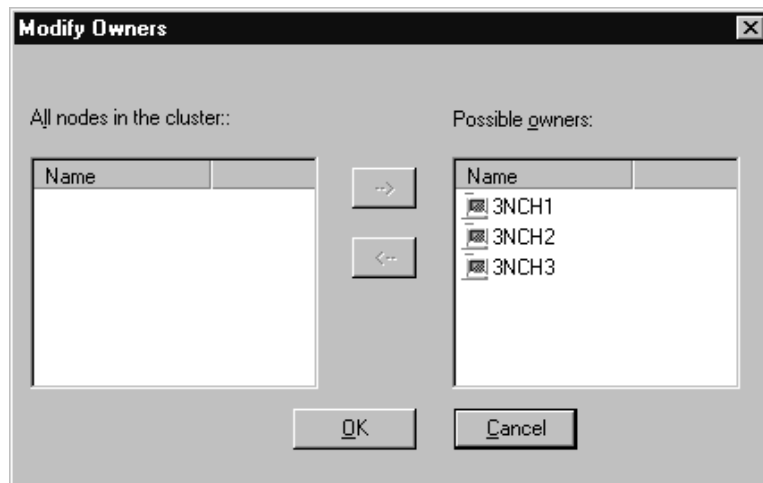
Use the following to specify which nodes can own resources.

1. Click the resource name.
2. Click **File** → **Properties**.

The following window opens.



3. Click **Modify**.



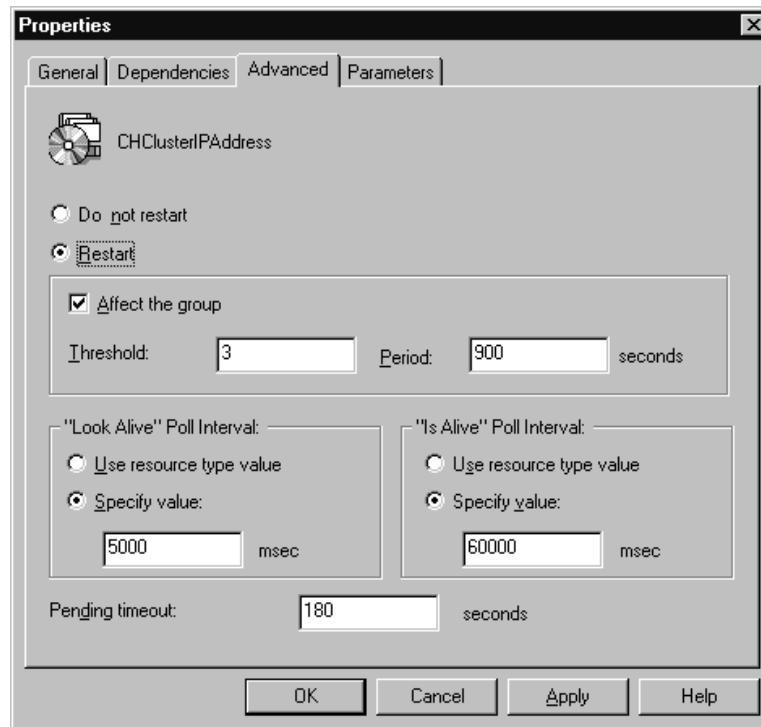
4. You must have at least one possible owner for a resource to be created. In the Modify Owners window, do one of the following:
 - Select a node name from the **All nodes in the cluster** list box, and then click the right arrow button to add it as a possible owner.

- Select a node name from the **Possible owners** list box, and then click the left arrow button to remove it from the list.
5. Click **OK**.
 6. Click **Apply**.
 7. Click **OK**.

Setting advanced resource parameters

You can specify whether the IBM Netfinity Availability Extensions services restarts the resource or allows it to fail, or how often it checks the resource state. The default is to not restart the cluster after failure.

1. Click the resource name.
2. Click **File** → **Properties**.
3. Click the **Advanced** tab.



4. Click **Restart**.
5. Select **Affect the group** check box. (If you want the group to move when the resource fails.)
6. Type the values you want in the **Threshold** and **Period** fields.
7. In the **"Look Alive" Poll Interval** box, click **Specify value** and then type how often you want to check the state of the resource activity.

Note: Click **Use resource type value** to use the default number for the resource type.
8. In the **"Is Alive" Poll Interval** box, click **Specify value**, and type how often you want to check the resource online state.
9. In the **Pending timeout**, specify the amount of time a resource in a pending state has to resolve its status before being put in offline or online status.

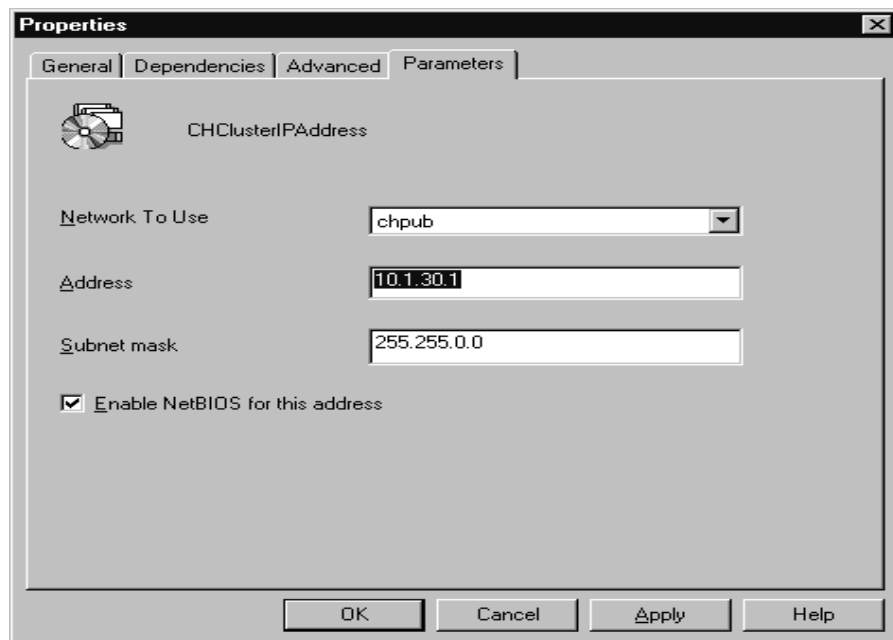
10. Click **Apply**.
11. Click **OK**.

Setting resource parameters

In the IBM Netfinity Availability Extensions services program, the Parameters tab in the Properties window is specific to the resource type. Use the following table as a guide and the instructions to change parameters.

Resource Type	Configurable Parameters
File Share	Control user access to the share by setting permissions and limiting the number of simultaneous users. Set the share name and the path to the shared files.
Generic Application	Set the specific image of the application. Set the command line that you want sent to the application. Set the directory location for the image.
Generic Service	Set the name of the service.
Network Name	Set the universal naming convention (UNC) name.
Physical Disk	None.
Print Spooler	Set the path to the print spooler folder.
IP Address	Set the IP address, subnet mask, and the network for the TCP/IP resource.

1. From the IBM Netfinity Availability Extensions services main view, click the resource name.
2. Click **File** → **Properties**.
3. Click the **Parameters** tab.
4. Make the necessary changes. (Refer to the table above or to your *MSCS Administrator's Guide* for more information.)



5. Click **Apply**.
6. Click **OK**.

Moving a Resource

Use the following instructions to move a resource to a different group.

1. Right-click the resource name.
2. Click **Change Group**.
3. From the drop down list box, select a group.
4. In the confirmation window, click **Yes**.

Note: All dependent resources are moved with the resource.

Changing the networks and network interfaces description

Use the following instructions to change the network description.

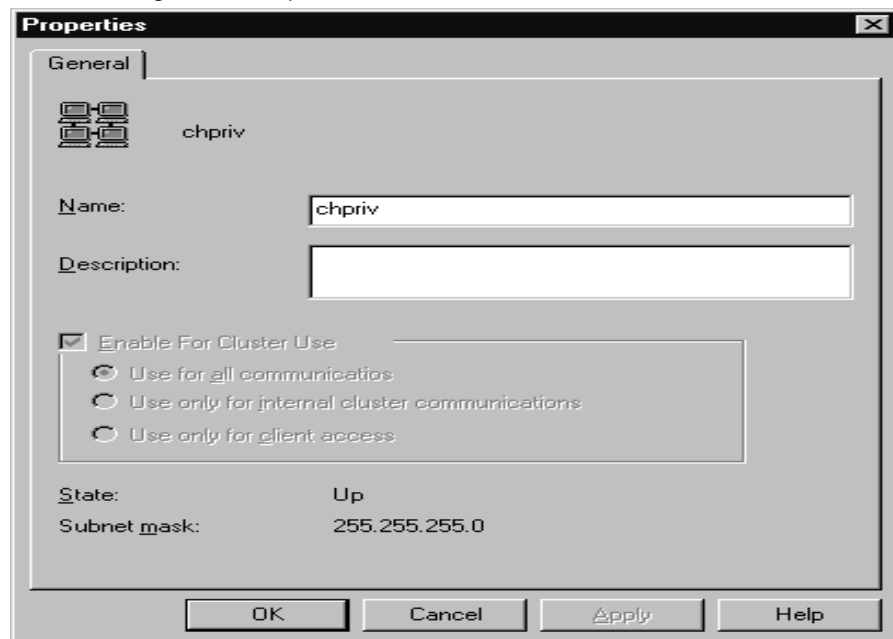
Notes:

Do not change the network name. Renaming the network might cause cluster performance problems.

The disabled options in this window are not supported by IBM Netfinity Availability Extensions for MSCS.

1. Click the network name.
2. Click **File** → **Properties**.

The following window opens.



3. Type the new description.
4. Click **OK**.
5. Click **Apply**.

6. Click **OK**.

Appendix A. Adding to, restoring, and uninstalling your cluster

This appendix describes how to add a node and shared storage to an existing cluster, how to set up supported software, how to set up adapter defaults, how to restore a cluster after a power failure, and how to manually uninstall IBM Netfinity Availability Extensions for MSCS from your servers.

Adding a node to an existing cluster

You must install the IBM Netfinity Availability Extensions for MSCS software on each node you want to add to the cluster. With IBM Netfinity Availability Extensions for MSCS, you can create a cluster of up to eight nodes.

1. Click **Control Panel** → **Services** → **IBM Cluster Systems Management** → **Stop** to stop IBM Netfinity Availability Extensions for MSCS. (This must be done from each existing node in the Cluster.)
2. Install IBM Netfinity Availability Extensions for MSCS on the node you want to add to the cluster. For detailed installation instructions, see “Installing IBM Netfinity Availability Extensions for MSCS” on page 11.

Reminder

Make certain you use the same directory locations and addresses for the new node that is used by the existing nodes in the cluster.

Also, do not reconfigure the cluster when prompted during installation. Click **No** in the Configure Cluster message window.

3. Do the following:
 - a. Log on to the primary node (the node used for the original cluster configuration).
 - b. Using the DOS command line or Windows NT Explorer, copy the following files located in the Configuration directory to the Config directory of the node you just added:
 - CSCLUSTER.CFG
 - CSCOMPUTER.CFG
 - CHCONFIG.TXT
4. Open the CSCOMPTER.CFG file in a text editor (for example, Notepad or DOS Editor), and do the following:
 - a. Scroll the page to locate the following line:

```
CS_COMPUTER{ ID=n
```

where *n* is the numeric value representing the total number of nodes participating in the cluster.
 - b. Edit the ID total to reflect the node you just added.
 - c. Save this information.
5. Open the CSCLUSTER.CFG file in a text editor, and do the following:

- a. Scroll the page to locate the following line:


```
CS_TOPOLOGY{ COMPUTER ID=n
```

where *n* is the numeric value representing the total number of nodes participating in the cluster.
- b. Type the IP address for the current server in the appropriate line.
- c. Save this information.
6. Open the CHCONFIG.TXT file in a text editor, and do the following:
 - a. Type the new node name, adding it at the bottom of the file.
 - b. Save this information.
7. From the DOS command line or Windows NT Explorer, copy the edited CHCONFIG.TXT and CSCLUSTER.CFG files to all nodes participating in the cluster.
8. From the new node, do the following:
 - a. Rename the CLUSAPI.DLL to MSCLUSAPI.DLL in the \\WINNT\SYSTEM32\ directory.
 - b. Copy the \\CLUSTER\BIN\IBMCLUSAPI.DLL to \\WINNT\SYSTEM32\CLUSAPI.DLL.
9. From the DOS command line of the primary node (Node 1), type CHCONFIG-INSTALL, and then press Enter.
10. From the DOS command line or Windows NT Explorer, do the following:
 - a. Start IBM Netfinity Availability Extensions for MSCS service on the primary node (Node 1).
 - b. After Node 1 has started, start IBM Netfinity Availability Extensions for MSCS on the remaining nodes in the cluster.

Adding shared storage to an existing cluster

IBM Netfinity Availability Extensions for Microsoft Cluster Services clusters can have up to seven LUNs. Use the following instructions to add shared storage to an existing cluster. However, do not use this procedure to increase DASD capacity in a previously defined LUN in an existing cluster.

1. Make backup images of all nodes in the cluster and of the existing shared storage drive data.
2. Stop IBM Netfinity Availability Extensions for MSCS on all the nodes in the cluster.
3. Shutdown and power off the following:
 - All nodes in the cluster.
 - Fibre Channel Controller.
 - All of the external SCSI drive enclosures.
4. Add the new devices (For detailed instructions, refer to the documentation accompanying the hardware).
5. Power on the following:

- All of the external SCSI drive enclosures.
 - Power on the Fibre Channel Controller.
 - Power on one cluster node.
6. Using the IBM SYMplicity Storage Manager Configuration utility, create and format LUNs with the newly added SCSI drives.

When the Configuration utility has finished formatting the LUNs, the LUNs should show as optimal in the Configuration Utility window, and the Access LEDs on the SCSI drives will not blink.
 7. Exit the Configuration utility and restart the node.
 8. When the node has restarted, verify that the new LUNs lists as available disks in the Windows NT Disk Administrator program. If it does not, restart the node once more.
 9. Use the Windows NT Disk Administrator program to define and assign drive letters, and to format Windows NT disk partition in the new LUNs.
 10. Restart the node.
 11. When the node has restarted, do the following:
 - Start IBM Netfinity Availability Extensions for MSCS on one node in the cluster.
 - Using the ICSM, define the Physical Disk resources. Do not try to bring the physical disk resources online.
 - Create physical disk resources for all of the newly defined disks.
 12. When you have finish creating the physical disk resources, do the following:
 - Restart the node.
 - Start IBM Netfinity Availability Extensions for MSCS and open ICSM.
 - Bring the physical disk resources you created online.
 13. Start the remaining nodes in the cluster.
 14. Verify that you can move the physical disk resources on to the nodes and that you can bring these resources online.

Setting up the IBM Netfinity SP Switch

The following sections describes how to set up the IBM Netfinity SP Switch in the MSCS and IBM Netfinity Availability Extensions for MSCS environment. For detailed information on how to install the IBM Netfinity SP Switch, refer to *IBM Netfinity SP Switch Installation and User's Guide*.

Setting up the IBM Netfinity SP Switch in MSCS

Before you complete your MSCS installation you must change the MSCS service startup type to Manual. These instructions assume that the IBM Netfinity SP Switch has been installed and configured on the servers with the switch fabric started.

1. From the Windows NT desktop, click **Start** → **Settings** → **Control Panel** → **Services**.

2. In the Services window, select the **Cluster Server** service from the list and then click **Startup**.
3. In the Service window, select **Manual** as the startup type.
4. Click **OK**.
5. Click **Close** to exit the Services window.
6. Click **OK** in MSCS window to end the installation and to restart the server.
7. When the server has restarted, open the IBM Netfinity SP Switch Manager to verify that the switch and Fabric has started before bringing MSCS online.

If the MSCS service is started before the switch fabric, the private network name for MSCS will be incorrect, which can adversely affect the IBM Netfinity Availability Extensions for MSCS installation.

Setting up the IBM Netfinity SP Switch in IBM Netfinity Availability Extensions for MSCS

Before you complete your IBM Netfinity Availability Extensions for MSCS server (node) installations you must change their service startup type to Manual. These instructions assume that the IBM Netfinity SP Switch has been installed and configured on the servers with the Fabric started, and that you have successfully installed MSCS onto your servers.

1. After you click **OK** to the 'No, I want restart my computer later IBM Netfinity Availability Extensions for MSCS installation' option, you must change the IBM Netfinity Availability Extensions for MSCS service startup type to Manual.
2. From the Windows NT desktop, click **Start** → **Settings** → **Control Panel** → **Services**.
3. In the Services window, select **IBM Netfinity Availability Extensions for MSCS** service from the list and the click **Startup**.
4. In the Service window, select **Manual** as the startup type.
5. Click **OK**.
6. Click **Close** to exit the Services window.
7. Restart the node.
8. When the server has restarted, open the IBM Netfinity SP Switch Manager to verify that the switch and Fabric has started on each node before continuing the IBM Netfinity Availability Extensions for MSCS installation on the last node.

Setting up supported software

The following sections describe how to set up Lotus Domino Version 5.0 and how to create Windows File and Print services for use with IBM Netfinity Availability Extensions for MSCS. These supported cluster-aware applications are optional and are not necessary for effective cluster administration.

Setting up Lotus Domino

Before setting up the Lotus Domino servers, read the "Configuring Partitioned Servers" chapter of the *Administering the Domino System, Volume 1* guide to refresh your knowledge of partition servers.

The following describes how to set up a Lotus Domino server as a cluster application in an MSCS and IBM Netfinity Availability Extensions for MSCS environment.

1. Install Lotus Domino, version 5.0 onto each node in the cluster.

Note: Refer to the *Administering Domino Clusters* guide's "Installing the Domino Server in an MSCS environment" chapter for detailed instructions. Repeat the instructions for installing a second node in an MSCS environment to install Lotus Domino on each additional node in the cluster.

2. After installing Lotus Domino on the nodes, add the following entry to the notes.ini file of each node in the cluster:

```
TCPIP_TcpIpAddress=0,xxx.xxx.xxx.xxx:1352
```

Where xxx.xxx.xxx.xxx is the IP address for the Domino server you are editing.

3. Enable Transaction Logging on each Domino server (node) in the cluster.

Note: Transaction logging must be activated on each node for Lotus Domino to be supported with IBM Netfinity Availability Extensions for MSCS environment. Refer to *Administering the Domino System, Volume 2*, "Transaction logging" for detailed instructions on how to set up the transaction logging and recovery service on each node.

Setting up Windows File and Print services

Use the following to instructions to set up File and Print services for use with IBM Netfinity Availability Extensions for MSCS. For more detailed instructions on creating new resource groups and resources, refer to "Creating a new group" on page 28 and "Creating a new resource" on page 35.

Creating a File share group

A highly available file share group consists of a disk resource, an IP address resource, a network name resource, and a file share resource.

Using the IBM Cluster Systems Management GUI, do the following:

1. Create a new group.
2. Create a Disk resource with a Physical Disk resource type, and then assign it to the new group.
3. Create an IP Address resource with a IP Address resource type, and then assign it to the new group.
4. Create a Network Name resource with a Network Name resource type, and then assign to new group. Make this resource dependent on the IP Address resource defined in step 3.

5. Create a File Share resource with the File Share resource type, and make it dependent on the Disk resource, the IP Address resource, and the Network name resource.

Creating a Print Spooler group

A print spooler group consists of a disk resource, an IP address resource, network name resource, and a print spool.

Using the IBM Cluster Systems Management GUI, do the following:

1. Create a new Group.
2. Create a disk resource with the Physical Disk resource type, and then assign it to the new group.
3. Create an IP Address resource with an IP Address resource type, and then assign it to the new group.
4. Create a Network Name resource, with a Network Name resource type, and then assign to new group. Make this resource dependant on the IP Address resource you defined in step 3.
5. Create a File Share resource with the File Share resource type, and make it dependent on the Disk resource, the IP Address resource, and the Network name resource.
6. Create a Print Spooler resource with a Print Spooler resource type. Make this resource dependant on the disk, IP address, network name, and file share resources.

Restoring IBM Netfinity Availability Extensions for MSCS following a power outage or lockup

Should you have to restore IBM Netfinity Availability Extensions for MSCS because of a power outage or system lockup, use the backup procedures you have in place for your site.

Important

In the event of a complete, catastrophic failure of the cluster, you must restore the entire cluster using the most recent full system backup you have of the entire cluster.

Restoring MSCS clusters

To revert to the Microsoft Cluster Server software, you must reinstall MSCS on your nodes. Refer to your *Microsoft Clustering for Windows NT Server Administrator's Guide* for installation instructions.

1. Uninstall IBM Netfinity Availability Extensions for MSCS from your servers. For more information, refer to "Uninstalling IBM Netfinity Availability Extensions for MSCS" on page 22.
2. Uninstall all cluster-aware applications (for example, IBM DB2 Universal Database) from your servers.
3. Reinstall Microsoft Cluster Server on your servers.

4. Reinstall the cluster-aware applications on your servers.

Manually removing IBM Netfinity Availability Extensions for MSCS from your servers

If the Microsoft Windows NT Add/Remove uninstallation utility did not remove all files used by IBM Netfinity Availability Extensions for MSCS, you must manually remove these files from your servers before you can restore your MSCS cluster. Use the following instructions to manually uninstall IBM Netfinity Availability Extensions for MSCS.

Note: This section assumes that the cluster administrator is familiar with DOS commands.

1. From the DOS prompt, remove IBMCS services from every node that participated in the cluster.
2. Stop the Scheduler service and set CHSchedulerService to Manual.
3. Type the following commands at the DOS prompt of one of the nodes to restore the original MSCS cluster hive.
 - a. type: `chconfig -uninstall all`, and then press Enter.
 - b. type: `chrg_start clussvc`, and then press Enter.
 - c. type: `chrg_stop clussvc`, and then press Enter.
4. From the DOS prompt on every node that participated in the cluster, do the following:
 - a. Remove all files from the `%SystemRoot%\cluster\mscs` directory.
 - b. Remove all files from the `%SystemRoot%\cluster\ibmcs` directory.
 - c. Delete the `%SystemRoot%\cluster\clusdb` file.
 - d. Delete the `%SystemRoot%\cluster\clusdb.log` file.
 - e. Copy the MSCS cluster hive that you saved using the `chrg_save` command to the `%SystemRoot%\cluster\clusdb` directory.
 - f. Set the `NodeId` Value to 1 in the Registry key
`KEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\ClusSvc\Parameters`
5. From the Microsoft Windows NT Control Panel, use the Add/Remove Programs utility to remove the ICSM program.
6. Remove all IBM Netfinity Availability Extensions services (RAS, Recovery, and Cluster) from the `%SystemRoot%\drivers\etc\Services` file.
7. Copy the `%systemRoot%\msclusapi.dll` to `clusapi.dll`.
8. Delete the `%systemRoot%\msclusapi.dll`.
9. Restart the workstation.
10. Start the MSCS server.
11. Stop the MSCS server.
12. Using REGEDT32, verify that the original MSCS hive has been restored.

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