

UM Server Extensions  
**User's Guide**





# UM Server Extensions User's Guide

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## 1

# Installing UM Server Extension Tools

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This section contains instructions for installing UM Server Extensions tools on your client, server, or console. The Extension tools work with Netfinity Director or IT Director to enhance your system-management capabilities.

## Before You Begin

The files that the Extensions Installer program installs are determined by the configuration of the resident Netfinity Director or IT Director program. Depending on whether you are using your system as a server, console, agent, or any combination of the three, Extensions Installer detects your current configuration and automatically installs the appropriate files.

Although the installation program automatically detects your configuration, you must install the UM Server Extension Tools on your console system, server system, and each of your client systems, separately.

Before you install UM Server Extensions, consider the following:

- Supported Systems by Component
- Hardware Requirements

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## Supported Systems by Component

**UM Server Extensions Server**, which installs all components (Server, Console, and Client), is supported on the following operating systems:

- Windows® 2000—Server or Advanced Server
- Windows NT® Server 4.0 (with Service Pack 4 or later)

The **UM Server Extensions Console** component supports the same operating systems as UM Server Extensions Server, including:

- Windows 2000 Professional
- Windows NT Workstation 4 (with Service Pack 4 or later)
- Windows 98®
- Windows 95® (with OEM Service Release 2 (OSR2) or later)
- NetWare 4.x or higher

### Notes:

- ServeRAID Manager console does not run in a NetWare 4.x environment. The Java console runs **only** in a NetWare 5.x environment. For more information on ServeRAID Manager, see “Chapter 6. ServeRAID Manager Program,” on page 157.
- The Netfinity SP Switch console is not supported on the Windows 95 or 98 platforms. For more information about the Netfinity SP Switch, see “Chapter 3. Using the Netfinity SP Switch task,” on page 35.

The **UM Server Extensions Client** component is supported on the following operating systems:

- Windows 2000—Server or Advanced Server
- Windows 2000 Professional
- Windows NT Server 4.0 (with Service Pack 4 or later)
- Windows NT Workstation 4.0 (with Service Pack 4 or later)
- OS/2 Warp 4.0
- OS/2 Warp 5.0
- NetWare 4.x or higher

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## Hardware Requirements

UM Server Extension tools require that you have Netfinity Director or IT Director installed and operational on your system. In addition, the following is required for the Server or Console systems:

- Intel® Pentium® class processor, 200 MHz or faster
- 64 MB of random access memory (RAM)
- 150 MB of virtual storage
- 75 MB of free disk space
- A network adapter that supports the TCP/IP protocol. The adapter must support also NetBIOS, IPX, or SNA, depending on which transport is needed to communicate with the managed systems.

The UM Server Extension Client requires at least:

- An IBM PC or server with an Intel Pentium processor
- 16 MB of RAM
- A network adapter that supports the TCP/IP protocol. The adapter must support also NetBIOS, IPX, or SNA, depending on which transport is needed to communicate with the managed systems.

The steps for each installation depend on the operating system to which you are installing. UM Server Extension Tools support console and server systems running a Windows® operating system only. For steps on installing on a Windows system, refer to “Installing UM Server Extension Tools on a Windows System”.

UM Server Extension Tools support client systems on Windows NT, OS/2®, and NetWare®. If you need to install on an OS/2 or NetWare agent, refer to steps under “Installing the UM Server Extension Tools on OS/2” on page 19, or “Installing the UM Server Extension Tools on a NetWare System” on page 22, respectively.

## Installing UM Server Extension Tools on a Windows System

This section details the attended installation of UM Server Extension tools in a Microsoft Windows operating system environment. Follow the

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supported operating system guidelines for installing the various UM Server extensions components.

## Step-by-Step Instructions for a Windows System

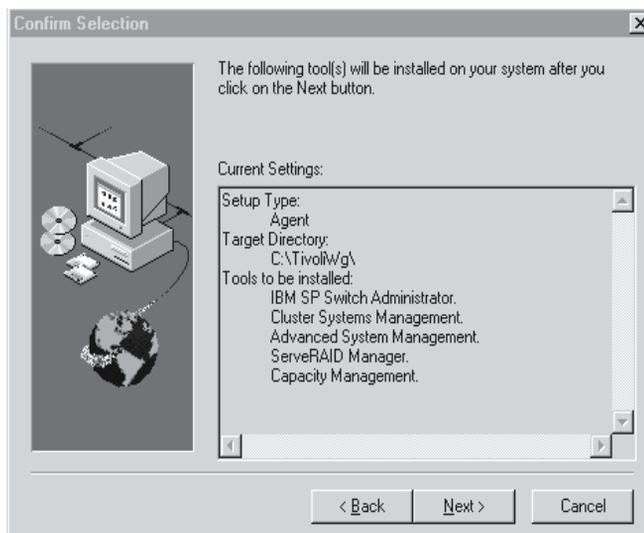
Take the following steps to install the UM Server Extension tools on a Windows system:

1. From the Windows **Start Menu**, click **Run**.
2. In the **Run** field, type:

*drive\_letter*:\directory\Win\setup.exe

where *drive\_letter* and *directory* are the drive and the temporary directory where the decompressed UM Server Extension tools files are located. The **Win** directory indicates the installation files for a Windows installation.

3. Click **OK**.  
The installation program displays two **Welcome** windows.
4. Click **Next** through both **Welcome** windows.  
The **Confirm Selection** window opens.



5. Click **Next**.

The **UM Server Extensions Installer** installs the following UM Server extension tools:

- IBM SP Switch Administrator
  - Cluster Systems Management
  - Advanced Systems Management
  - ServeRAID Manager
  - Capacity Management.
6. When the installation is complete, open **Netfinity Director** to view the extension tool icons.

## Installing the UM Server Extension Tools on OS/2

To install the UM Server Extension tools on an OS/2 platform, you must run **UM Server Extensions Installer** remotely from a Windows NT system. Windows 95 and Windows 98 systems do not work.

You must map the drive from the OS/2 system to the Windows NT system. The best method of mapping the drive is to use the **Net Use** command in a DOS window. The installation program displays

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windows that are intended to allow you to map the drive, but using the window method does not work in all remote install situations.

## Mapping the Drive for a Remote Installation

You can map a drive using a DOS window and enter the **Net Use** command as follows:

**Net Use***[driveletter|\*][\computername\sharename]*

Where *driveletter* / \* represents any available drive on the Windows NT system, and *computername\sharename* are the system name and sharename of the OS/2 system.

## Step-by-Step Instructions for an OS/2 System

Take the following steps to install the UM Server Extension tools on an OS/2 system.

1. From the Windows NT **Start Menu**, click **Run**.
2. In the **Run** field, type:

*drive\_letter:\directory\os2netw\setup.exe*

where *drive\_letter* and *directory* are the drive and the temporary directory where the decompressed UM Server Extension tools files are located. The **os2netw** directory indicates the installation files for an OS/2 or NetWare installation.

3. Click **OK**.  
The installation program displays two **Welcome** windows.
4. Click **Next** through both **Welcome** windows.  
The system displays the **Select Platform** window.
5. Select the radio button that corresponds to the platform you are using: **OS/2**.
6. Click **Next**.

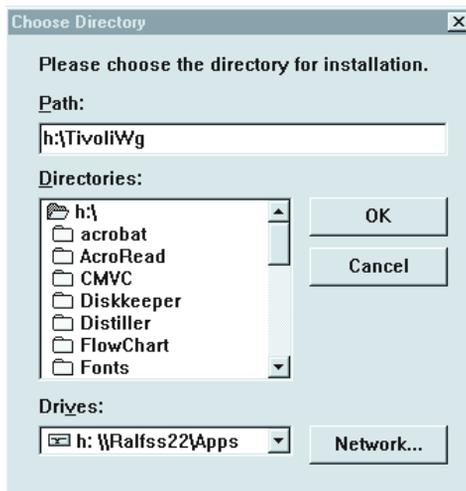
The installation program displays the **Choose Destination Location** screen, which reminds you that you must first map a drive for the OS/2 installation.



7. Click **Next** if you are using the default destination directory. Skip down to step 10 on page 22.

Click **Browse** if you want to change the destination directory.

The installation program displays the **Choose Directory** window.



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8. Click the arrow under the **Drives** field, and select the drive that you mapped for the OS/2 installation.

You can use the **Network** button to find an available drive to map; however, for this installation it is best to map the drive before you start the Extension Installer program.

Refer to “Mapping the Drive for a Remote Installation” on page 20.

9. From the **Directories** list, select the directory where Netfinity Director is installed. The default is `x:\TivoliWg\`

Where:

`x` is the mapped drive and **TivoliWg** is the default directory.

10. Click **OK**.

UM Server Extensions Installer installs the following extension tools:

- Capacity Manager
- Advanced Systems Management.

11. When the installation is complete, you must enter the following commands from the console of the OS/2 system to shut down and restart Netfinity Director on the OS/2 system:

- a. Type **twgipc shutdown** to shut down Netfinity Director.
- b. Type **twgipc** to restart Netfinity Director.

## Installing the UM Server Extension Tools on a NetWare System

To install the UM Server Extension tools on a NetWare system, you must run **UM Server Extensions Installer** remotely from a Windows NT system. Windows 95 or Windows 98 systems will not work.

With NetWare, you must map a drive between the NetWare system and the Windows NT system before you start the Extension Installer program.

The best method of mapping the drive is to use the **Net Use** command in a DOS window. The installation program displays windows that are

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intended to allow you to map the drive, but using the window method will not work for you in all remote install situations.

For instructions on using the **Net Use** command to map a drive, refer to “Mapping the Drive for a Remote Installation” on page 20.

## Step-by-Step Instructions for a NetWare System

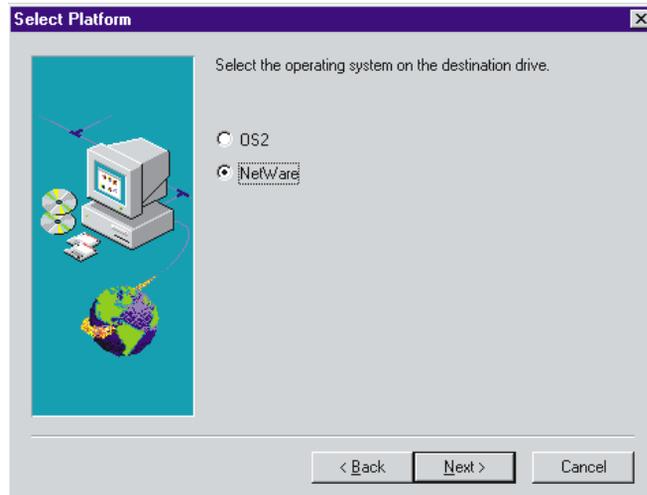
Take the following steps to install UM Services Extension tools on a NetWare system.

1. From the Windows **Start Menu**, click **Run**.
2. In the **Run** field, type:

*drive\_letter:\directory\os2netw\setup.exe*

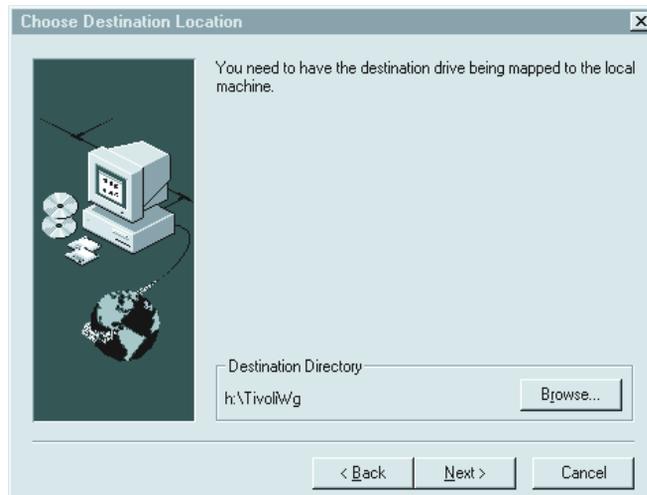
where *drive\_letter* and *directory* are the drive and the temporary directory where the decompressed UM Server Extension tools files are located. The **os2netw** directory indicates the installation files for an OS/2 or NetWare installation.

3. Click **OK**.  
The installation program displays two **Welcome** windows.
4. Click **Next** through both **Welcome** windows.  
The system displays the **Select Platform** window.
5. Select the radio button that corresponds to the platform you are using: **NetWare**.



6. Click **Next**.

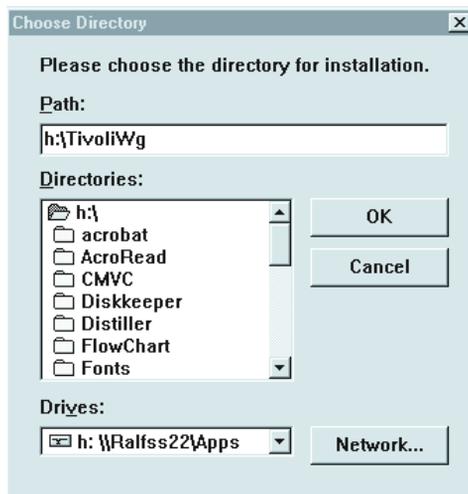
The installation program displays the **Choose Destination Location** window, which reminds you that you must first map a drive for the NetWare installation.



7. Click **Next** if you are using the default destination directory. Skip down to step 10 on page 25.

Click **Browse** if you want to change the default destination directory.

The installation program displays the **Choose Directory** window.



8. Click the arrow under the **Drives** field, and select the drive that you mapped for the NetWare installation.

You cannot use the **Network** button to find an available drive to map, because with a NetWare installation, you must map the drive before you start the Extension Installer program.

9. From the **Directories** list, select the directory where Netfinity Director is installed. The default is `x:\TivoliWg\`

Where:

`x` is the mapped drive and **TivoliWg** is the default directory.

10. Click **OK**.

UM Server Extensions Installer installs the following extension tools:

- Capacity Manager
- Advanced Systems Management.

11. When the UM Server Extension tools for NetWare are installed, you must enter the following commands at the NetWare system

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console to shut down and restart Netfinity Director on the NetWare system:

- a. Type **unload twgipc** to shut down Netfinity Director.
- b. Type **unloc SecMod01.sec**
- c. Type **load twgipc** to restart Netfinity Director.

## Uninstalling the UM Server Extension Tools

The procedure for uninstalling the extension tools depend on whether you installed the extension tools locally or remotely.

### Uninstalling the Extension Tools from a Local Windows NT System

To remove the UM Server Extension tools from the local Windows NT system, take the following steps:

1. Click **Start** → **Programs** → **UM Server Extensions** → **Uninstall IBM UM Server Extensions**.

The uninstall routine displays the message:

**Are you sure you want to remove the application and its components?**

2. Click **Yes**.

When the system is finished removing the files, it displays the message:

You need to reboot the machine to complete the uninstallation.

3. Click **OK**.

You must manually shut down and restart the system.

### Uninstalling the Extension Tools from a Remote System

Regardless of which operating system is running on the remote system: Windows NT, OS/2, or NetWareNetWare, the uninstallation procedure

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is the same. To remove the UM Server Extension tools from a remote system, take the following steps:

1. From a DOS window on the Windows NT system, map a drive for the remote target system. For steps on mapping the drive, refer to “Mapping the Drive for a Remote Installation” on page 20.
2. Change the directory to the target Netfinity Director directory.
3. Type **uninstex** *nddirectory*

where *nddirectory* is the target ND directory (including drive and full path).

**Note:** If you fail to enter the correct target directory, the system displays a message that the uninstall routine cannot find the appropriate log file.

The **Remove Programs from your Computer** window opens, confirming which files will be deleted.

4. Click **OK**.
5. The system displays the message: **You need to reboot your machine to complete the installation.**
6. Click **OK**.
7. You must manually shut down and restart the system.

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# 2

## Introducing UM Server Extension Tools

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You can use the UM Server Extension tools to further manage your IBM systems. These system management tools are provided free-of-charge with IBM Netfinity Director, and if you choose to upgrade to Tivoli IT Director, the Extension tools remain intact.

The following is a description of each UM Server Extension tool.

### IBM Netfinity SP Switch Administrator

The IBM Netfinity SP Switch is a scalable and parallel switch that provides high-performance communication between servers. The SP Switch Administrator monitors the operating status of various switch components, by providing proactive alert notification if a component fails.

### IBM Cluster Tools

IBM Cluster Systems Management (ICSM) and IBM Software Rejuvenation are the main program components of the IBM Netfinity Cluster Tools. These server programs are used to administer high-availability cluster environments and to increase reliability of cluster nodes.

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## Cluster Systems Management

The interface for IBM Netfinity Availability Extensions for Microsoft Cluster Service (MSCS). You can manage all cluster-related operations and manage cluster resources in an MSCS-based Availability Extensions cluster from one interface. With this tool you can provide cluster operations for a single cluster, or you can group components onto a node using the drag-and-drop method. System administrators can be alerted to any event in a cluster, reducing downtime by immediately sending an e-mail, sending an electronic page, or starting other programs.

## Software Rejuvenation

With this IBM Cluster tool, a system administrator can have precise control over the scheduling of a node restart for a specific cluster. The Software Rejuvenation interface resembles the IT Director Tasks Scheduling interface, and offers drag-and-drop capability. You can schedule node restarts by dragging a node icon onto the calendar and specifying schedule parameters.

## Advanced Systems Management

With Advanced Systems Management, you can monitor critical subsystems, restart logs, and troubleshoot Netfinity Servers, even when the targeted system is not turned on.

You can configure this tool to send alerts to changes in events such as POST, loader, and operating system timeouts. If any of these events occur, this tool automatically forwards a Netfinity alert in one of the following ways:

- To another Netfinity system through a modem
- To a numeric or alphanumeric pager
- To a Netfinity Manager system using a TCP/IP network connection, or to an SNMP Manager.

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## ServeRAID Manager

This is a management tool that reduces the time needed to configure, administer, and monitor ServeRAID controllers that are installed locally or remotely on Netfinity servers. The following are features of the ServeRAID Manager:

- Hot spares are reduced, reserving space on existing drives for rebuilds.
- Data scrubbing and auto synchronization of the parity drive can start automatically.
- Migration from previous RAID levels is possible to increase free space and logical drive space.

## Capacity Management

This is a resource management planning tool that tracks resource utilization, identifies potential network bottlenecks, and recommends ways to improve performance. It can generate a report, which allows for effective planning of future capacity, such as microprocessor, disk, or memory upgrades.

Capacity Manager's Report Generator tasks can be scheduled through the Director Scheduler.

The following are Capacity Manager tasks:

### **Using Capacity Manager**

This is documentation on Capacity Manager.

### **Monitor Activator**

This specifies which monitors are included in the report, such as CPU Utilization or Disk Drive Capacity.

### **Report Generator**

This specifies when and how often the report is generated. You can create new definitions, edit existing report definitions, and schedule reports through your Director Event Scheduler service.

### **Report Viewer**

This displays the data that the report collected.

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## Accessing the UM Server Extension Tools

Each task is launched from the Director console. Except for the IBM SP Switch Administrator, which is located on the icon menu bar, each Extension is accessed by dragging the appropriate icon from the Tasks panel of the Director console and dropped onto a system that supports that Extension in the Group Contents panel. Or, you right-click on a system that supports the Extension in the Group Contents panel and select the appropriate Extension from the system context menu.

Some tasks contain multiple features. The task that has a plus symbol (+) beside the corresponding icon denotes a collapsed selection tree. Click on the + to expand the multiple features of that task. The following sections describe each Extension service icon (or icons) and the placement of the icon within the Director console.

### IBM SP Switch Administrator

Icon	Location
	The IBM SP Switch Administrator icon is displayed in the icon menu of the Director console.

### IBM Cluster Tools

Icon	Location
	IBM Cluster Tools is merely an Extension service description and not a task. The supported tasks are located within this heading in the <b>Tasks</b> section of the Director console.
	Cluster Systems Management resides within the IBM Cluster Tools parent description in the <b>Tasks</b> section of the Director console.
	Software Rejuvenation resides within the IBM Cluster Tools parent description in the <b>Tasks</b> section of the Director console.

## Advanced System Management

Icon	Location
	Advanced Systems Management resides in the <b>Tasks</b> section of the Director console.

## ServeRAID Manager

Icon	Location
	ServeRAID Manager resides in the <b>Tasks</b> section of the Director console.

## Capacity Manager

Icon	Location
	Capacity Manager is an Extension service description and not a task. The supported tasks are located within this heading in the Tasks section of the Director console.
	*Using Capacity Manager is not system-enabled task but a set of on-line tutorials for using Capacity Manager. Click on this description to expand the tutorial choices. Click on one of the tutorial tasks to open the Capacity Manager on-line help.
	Monitor Activator resides within the Capacity Manager parent description in the <b>Tasks</b> section of the Director console.
	Report Generator resides within the Capacity Manager parent description but is an Extension service description and not a task. Click on this description to expand the type of report selections.
	Report Viewer resides within the Capacity Manager parent description in the <b>Tasks</b> section of the Director console.

---

## UM Server Extensions and the Event Builder in Director

Some of the UM Server Extensions programs add event filters to the Event Builder of Director. These filters were added for additional systems management capabilities. An event such as a battery failure in a ServeRAID controller is now channeled through the Event Action Plan in Director. The Event Action Plan creates a single monitoring interface for UM Server Extensions events.

Descriptions of event filters can be found in:

- “Creating Action Plans for Cluster Events in Netfinity Director” on page 105
- Advanced Systems Management events on page 132
- “ServeRAID Events in Director” on page 175

# 3

## Using the Netfinity SP Switch task

---

This section describes the configuration and management of the IBM Netfinity SP Switch Administrator task. The combination of the IBM Netfinity SP Switch, configured and clustered servers (nodes), and cabled hardware topology makes up an IBM Netfinity SP Switch fabric. The IBM Netfinity SP Switch fabric servers (nodes) consist of:

- One primary node:  
Manages the status of all servers (nodes) on the switch fabric. The primary node controls the online and offline status of all servers (nodes) on the switch fabric.
- One backup node:  
Provides functional failover support for the primary node.
- Secondary node:  
All other servers (nodes) attached to the IBM Netfinity SP Switch fabric.

Before you run the IBM Netfinity SP Switch Administrator task, you must install the original IBM Netfinity SP switch software on every node within the fabrics you want to create. Each node must have the following services and processes running:

- Device Driver:
  1. Click **Start** → **Settings** → **Control Panel**.

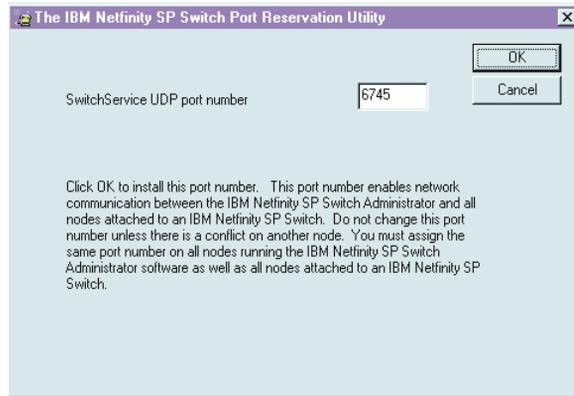
- 
2. Double-click **Devices**.
  3. Scroll through the list of device drivers and make sure that IBMTB3N and IBMTB3 are started. If these drivers are not started as Automatic, manually start them.
- Switch Services:
1. Click **Start** → **Settings** → **Control Panel**.
  2. Double-click **Services**.
  3. Scroll through the list of processes and make sure that IBM TB3 Switch Manager Service is started. If this service is not started as Automatic, manually start it.
- Switch Manager:
1. Using the right mouse button, click the Windows NT task bar.
  2. Select **Task Manager**.
  3. Click **Processes**. Scroll through the list of processes and make sure that SwitchMgr is started. There will be one switch manager service started for each IBM Netfinity SP Host adapter installed. If this process is not started, manually start it as a new task. If you have 2 IBM Netfinity SP Host adapters installed, and only one switch manager service is started, stop the switch manager service and manually restart both switch manager services as new tasks.

## Starting SP Switch Administrator

To start the SP Switch Administrator program, click on the **IBM SP Switch Administrator** icon from the icon menu bar of the Netfinity Director console. Please remember, this console is not supported on Windows 95 or 98 operating systems.

**Note:** If the Administrator does not find a switch fabric or available nodes with which to build a fabric, an error in the designated port assignment may have occurred. To verify an accurate connection to an SP switch:

- 
- Widen the discovery scope. From the SP switch menu bar, click **View**→**Options**. The Options window opens. Click on either **Add by Node name** or **Add by IP address**. In the appropriate field, add either the Node name or the IP address of a node that resides in the same subnet as the SP Switch you want to discover. Click **OK** and press **F5** on your keyboard to refresh the discovery process.
  - Configure the switch port mapper. If you configured the SP switch using another port number other than the default port, you have to change the port settings on the Administrator console as well. Take the following steps:
    1. From a DOS window type the following:  
`x:\nfd_directory\fsd\portmapper.exe`  
where:  
`x:\nfd_directory` is the drive and directory where Netfinity Director and the UM Server Extension tools are installed.  
`fsd` is the directory where the portmapper executable file is installed.  
`portmapper.exe` is the portmapper executable file.
    2. Press **Enter**.  
The system opens the **IBM Netfinity SP Switch Port Reservation Utility** window.



3. Enter the port number that you used when you previously installed the SP Switch Port Administrator. The same port numbers must be used in both places.
4. Click **OK**.

## The Interface

The IBM Netfinity SP Switch Administrator window is composed of three major components or internal windows:

- Fabric view - The fabric view window graphically displays all IBM Netfinity SP Switch fabrics, fabric components and unassigned nodes. This window is in the upper left corner of the IBM Netfinity SP Switch Administrator window. Component properties and actions are called from this view. Placing the cursor over a switch fabric, or one of the switch fabric components, will display the component status in a text pop-up window. Right-clicking a fabric icon or other component icon brings-up menu command options.
- Node view - The Node view window displays nodes within the selected IBM Netfinity SP Switch fabric. This window is in the upper right portion of the IBM Netfinity SP Switch Administrator window. The node information displayed shows:

- Node name and IBM Netfinity SP Host adapter occurrence
  - Node number
  - Type of node
  - IBM Netfinity SP Switch IP address
  - External network IP address (if an external network adapter is installed)
  - Node PCI slot number where the IBM Netfinity SP Host adapter is installed
  - Port number where the IBM Netfinity SP Host adapter is attached to the IBM Netfinity SP Switch
- Message window - The Message window contains the detailed communication output from the IBM Netfinity SP Switch fabrics. This window is in the bottom portion of the IBM Netfinity SP Switch Administrator window.

## Configuration: 8 Adapters / Single switch card

### Notes:

- The selected node is used as the primary node.
- Assign one node to the switch fabric. All other unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when it is started.
- The switch fabric name must be unique.

From the IBM Netfinity SP Switch Administrator window:

1. Using the right mouse button, click a node in the Unassigned nodes list to assign the node to the switch fabric.
2. Click Assign fabric name. The Assign fabric name window opens.
3. Type the name of the IBM Netfinity SP Switch fabric that you want to use. The node that you selected is assigned to this switch fabric.
4. Click **OK**. The IBM Netfinity SP Switch Administrator window displays the switch fabric.

- 
5. Using the right mouse button, click your fabric name under the Fabrics folder.
  6. Click **Configure**. The Configure Topology window opens.
  7. Select the eight-node configuration from the topology pull-down list.
  8. Type the switch board name that correctly represents your IBM Netfinity SP Switch and IBM Netfinity SP Host adapter wiring configuration. The name can be a total of 18 characters. The last two characters must be /A. The A corresponds to the side of the IBM Netfinity SP Switch where the switch card and interposers are installed. A1 through A8 is stamped above the interposers.
  9. Click **OK**. The Wiring Instructions window opens.

Use the cabling instructions in this window as a guide for the IBM Netfinity SP Host adapter connections from your nodes to the switch card connections (interposers) on your IBM Netfinity SP Switch.
  10. Loosen the two thumbscrews holding the two cable-retaining bars on the cable-management tray on the IBM Netfinity SP Switch (one thumbscrew on each cable-retaining bar) and remove the cable-retaining bars. You will replace the cable-retaining bars after you have cabled each node to the IBM Netfinity SP Switch.
  11. Using an IBM Netfinity SP Switch cable, attach one end of the cable to the IBM Netfinity SP Host adapter.
  12. Lay the other end of the IBM Netfinity SP Switch cable across the cable-retaining block and attach the 50-pin connector to an available interposer card on the rear of the IBM Netfinity SP Switch.
  13. Repeat steps 14 and 15 for each cable that you want to attach.
  14. Replace the cable-retaining bars.
  15. Click **OK**. You are returned to the IBM Netfinity SP Switch Administrator window. The switch fabric is configured and is ready to be brought online.
  16. Using the right mouse button, click your switch fabric name and click **On-line**. The Start Fabric window opens.

17. In the Fabric Name field, type the fabric name that you assigned in step 2.
18. In the Primary field, choose the node that you selected in step 1. If you want to assign another primary node, you must assign another node to your switch fabric.
19. Select the switch board from the Primary's Switch Board pull-down list.
20. Select the jack label from the Primary's Jack Label pull-down list.
21. Select a new backup node name from the Backup pull-down list (or keep the default name).
22. Click **OK**.

The IBM Netfinity SP Switch is now configured and started. The IBM Netfinity SP Switch Administrator window displays the nodes attached to the switch fabric

## Configuration: 12 Adapters / Dual switch cards

### Notes:

- The IBM Netfinity SP Switch Card Option is required to support this configuration.
- The selected node is used as the primary node.
- Assign one node to the switch fabric. All other unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when it is started.
- The switch fabric name must be unique.

From the IBM Netfinity SP Switch Administrator window:

1. Using the right mouse button, click a node in the Unassigned nodes list to assign the node to the switch fabric.
2. Click **Assign fabric name**. The Assign fabric name window opens.
3. Type the name of the IBM Netfinity SP Switch fabric that you want to use. The node that you selected is assigned to this switch fabric.

- 
4. Click **OK**. The IBM Netfinity SP Switch Administrator window displays the switch fabric.
  5. Using the right mouse button, click your fabric name under the Fabrics folder.
  6. Click **Configure**. The Configure Topology window opens.
  7. Select the 12-node configuration from the topology pull-down list.
  8. Type the switch board name that correctly represents your IBM Netfinity SP Switch and IBM Netfinity SP Host adapter wiring configuration. The name can be a total of 18 characters. The last two characters must be **/A** or **/B**. The **A** or **B** corresponds to the side of the IBM Netfinity SP Switch where the switch cards and interposers are installed. A1 through A8 and B1 through B8 is stamped above the interposers.
  9. Cable one end of the first 0.53 M cable to port **A7** and the other end of the cable to port **B2**. Cable one end of the second 0.53 M cable to port **A8** and the other end of the cable to port **B1** as specified in the wiring diagram window.
  10. Click **OK**. The Wiring Instructions window opens.

Use the cabling instructions in this window as a guide for the IBM Netfinity SP Host adapter connections from your nodes to the switch card connections (interposers) on your IBM Netfinity SP Switch.
  11. Loosen the two thumbscrews holding the two cable-retaining bars on the cable-management tray on the IBM Netfinity SP Switch (one thumbscrew on each cable-retaining bar) and remove the cable-retaining bars. You will replace the cable-retaining bars after you have cabled each node to the IBM Netfinity SP Switch.
  12. Using an IBM Netfinity SP Switch cable, attach one end of the cable to the IBM Netfinity SP Host adapter.
  13. Lay the other end of the IBM Netfinity SP Switch cable across the cable-retaining block and attach the 50-pin connector to an available interposer card on the rear of the IBM Netfinity SP Switch.
  14. Repeat steps 12 and 13 for each cable that you want to attach.

15. Replace the cable-retaining bars.
16. Click **OK**. You are returned to the IBM Netfinity SP Switch Administrator window. The switch fabric is configured and is ready to be brought online. Power-off and then power-on the IBM Netfinity SP Switch to reset the internal switch clock and synchronize the two switch cards.
17. Using the right mouse button, click your switch fabric name and click **On-line**. The Start Fabric window opens.
18. In the Fabric Name field, type the fabric name that you assigned in step 2.
19. In the Primary field, choose the node that you selected in step 1. If you want to assign another primary node, you must assign another node to your switch fabric.
20. Select the switch board from the Primary's Switch Board pull-down list.
21. Select the jack label from the Primary's Jack Label pull-down list.
22. Select a new backup node name from the Backup pull-down list (or keep the default name). The primary and backup nodes must not be the same.
23. Click **OK**.

The IBM Netfinity SP Switch is now configured and started. The IBM Netfinity SP Switch Administrator window displays the nodes attached to the switch fabric.

## Configuration: 14 Adapters / Dual switch cards

### Notes:

- The IBM Netfinity SP Switch Card Option is required to support this configuration.
- The selected node is used as the primary node.
- Assign one node to the switch fabric. All other unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when it is started.
- The switch fabric name must be unique.

---

From the IBM Netfinity SP Switch Administrator window:

1. Using the right mouse button, click a node in the Unassigned nodes list to assign the node to the switch fabric.
2. Click **Assign fabric name**. The Assign fabric name window opens.
3. Type the name of the IBM Netfinity SP Switch fabric that you want to use. The node that you selected is assigned to this switch fabric.
4. Click **OK**. The IBM Netfinity SP Switch Administrator window displays the switch fabric.
5. Using the right mouse button, click your fabric name under the Fabrics folder.
6. Click **Configure**. The Configure Topology window opens.
7. Select the 14-node configuration from the topology pull-down list.
8. Type the switch board name that correctly represents your IBM Netfinity SP Switch and IBM Netfinity SP Host adapter wiring configuration. The name can be a total of 18 characters. The last two characters must be /**A** or /**B**. The **A** or **B** corresponds to the side of the IBM Netfinity SP Switch where the switch cards and interposers are installed. A1 through A8 and B1 through B8 is stamped above the interposers.
9. Cable one end of the first 0.53 M cable to port **A8** and the other end of the cable to port **B1** as specified in the wiring diagram window.
10. Click **OK**. The Wiring Instructions window opens.

Use the cabling instructions in this window as a guide for the IBM Netfinity SP Host adapter connections from your nodes to the switch card connections (interposers) on your IBM Netfinity SP Switch.
11. Loosen the two thumbscrews holding the two cable-retaining bars on the cable-management tray on the IBM Netfinity SP Switch (one thumbscrew on each cable-retaining bar) and remove the cable-retaining bars. You will replace the cable-retaining bars after you have cabled each node to the IBM Netfinity SP Switch.

- 
12. Using an IBM Netfinity SP Switch cable, attach one end of the cable to the IBM Netfinity SP Host adapter.
  13. Lay the other end of the IBM Netfinity SP Switch cable across the cable-retaining block and attach the 50-pin connector to an available interposer card on the rear of the IBM Netfinity SP Switch.
  14. Repeat steps 12 and 13 for each cable that you want to attach.
  15. Replace the cable-retaining bars.
  16. Click **OK**. You are returned to the IBM Netfinity SP Switch Administrator window. The switch fabric is configured and is ready to be brought online. Power-off and then power-on the IBM Netfinity SP Switch to reset the internal switch clock and synchronize the two switch cards.
  17. Using the right mouse button, click your switch fabric name and click **On-line**. The Start Fabric window opens.
  18. In the Fabric Name field, type the fabric name that you assigned in step 2.
  19. In the Primary field, choose the node that you selected in step 1. If you want to assign another primary node, you must assign another node to your switch fabric.
  20. Select the switch board from the Primary's Switch Board pull-down list.
  21. Select the jack label from the Primary's Jack Label pull-down list.
  22. Select a new backup node name from the Backup pull-down list (or keep the default name). The primary and backup nodes must not be the same.
  23. Click **OK**.

The IBM Netfinity SP Switch is now configured and started. The IBM Netfinity SP Switch Administrator window displays the nodes attached to the switch fabric.

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## Managing the IBM Netfinity Switch fabric

**Note:** Do not run the IBM Netfinity SP Switch Administrator task from a secondary node if the secondary node does not have an external network adapter.

The following commands are available through the IBM Netfinity SP Switch Administrator task to manage your IBM Netfinity SP Switch. These switch fabric commands are run from the IBM Netfinity SP Switch Administrator menu bar, or by right-clicking your switch fabric or node in the IBM Netfinity SP Switch Administrator window.

### ■ Command

- **Off-line:** This command can be issued on a switch fabric or on an individual server (node). You can use the Off-line command to take a switch fabric offline. The servers (nodes) attached to this switch fabric cannot be accessed through the IBM Netfinity SP Switch while the switch fabric is offline.

Using the right mouse button, click a node to perform the same command on a node instead of a switch fabric:

- **Off-Line:** This command will bring a node offline and stop network IP traffic from flowing through this node

- **On-line:** This command can be issued on a switch fabric or on an individual server (node). The On-line command brings the switch fabric online and allows the servers (nodes) to send data across the network.

Using the right mouse button, click a node to perform the same command on a node instead of a switch fabric:

- **On-Line:** This command will bring a node online and allow network IP traffic to flow through this node

- **Configure:** This command can be issued on a switch fabric or on a switch card. This command cannot be issued on an individual server (node). The Configure command opens the Configure Topology window. You can configure the IBM Netfinity SP Switch fabric by following the hardware cabling shown in the window.

- **Properties:** This command can be issued only on a switch fabric and cannot be issued on an individual server (node). The Properties command opens the Fabric Properties Discovery window and lists all of the servers (nodes) attached to the switch fabric and the status of the nodes.
  - **Assign Fabric:** This command is issued from a server (node) in the Unassigned Node list. This command opens the Assign Fabric Name window. Servers (nodes) are assigned to this switch fabric and can be used after configuration. The assigned fabric name must be unique (unique to other switch fabrics) and cannot exceed 16 characters in length. All unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when the switch fabric is started.
  - **Exit:** This command closes the IBM Netfinity SP Switch Administrator window. Communication through the IBM Netfinity SP Switch is not interrupted.
- View
- **Toolbar:** You can use this command to toggle the toolbar on or off.

By clicking the icons (located below the menu bar), you can select a direct path or shortcut to the following commands:

    - View Large Icons
    - View Small Icons
    - View Node List
    - View Node Details
    - View Current Messages
    - View All Messages
  - **Status Bar:** This command shows or hides the switch fabric status bar located at the bottom of the IBM Netfinity SP Switch Administrator window. The status bar displays the definition of the Menu Bar commands when the mouse pointer highlights the command.
  - **Refresh:** This command activates a query on the switch fabric and updates the contents of the IBM Netfinity SP Switch

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Administrator windows with the latest status of the switch fabric.

- **Large Icons:** This command displays the servers (nodes) in the IBM Netfinity SP Switch Administrator window as large icons.
- **Small Icons:** This command displays the servers (nodes) in the IBMNetfinity SP Switch Administrator window as small icons.
- **List:** This command displays the server (node) names in the IBM Netfinity SP Switch Administrator window.
- **Details:** This command displays the server (node) names in the IBM Netfinity SP Switch Administrator window and displays the server (node):
  - Node number
  - Personality
  - External IP address
  - SP switch IP address
  - Node PCI slot number
  - Jack label
- **All Messages:** This command displays any messages generated from all of the switch fabrics with network connectivity to the node where the IBM Netfinity SP Switch Administrator is running.
- **Current Messages:** This command displays the messages generated from the selected switch fabric that is managed by the IBM Netfinity SP Switch Administrator.
- **Options:** This command opens the Options window so that you can add or remove network IP addresses or host names. These IP addresses or host names are resolved to a subnet mask and expand the search capability for the IBM Netfinity SP Switch Administrator in relation to other switch fabrics and unassigned nodes. The Default language selection on the Options window selects the language conforming to the code

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page loaded by the Windows NT operating system. The current supported languages are:

- English
- French
- German
- Italian
- Spanish
- Japanese

Click **OK** to save your selections or click **Cancel** to close this window and keep the default selections.

■ Help

- **Help Contents:** This displays a help index.
- **About:** The version/release of the IBM Netfinity SP Switch Administrator.

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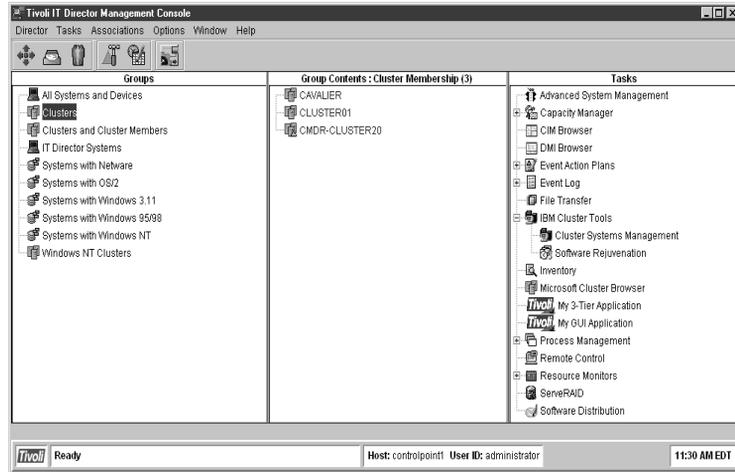
# 4

## IBM Netfinity Cluster Tools

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The IBM Netfinity Cluster Tools are installed during the UM Server Extensions installation and are seamlessly integrated into the Netfinity Director Console. IBM Cluster Systems Management (ICSM) and IBM Software Rejuvenation are the main program components of the IBM Netfinity Cluster Tools. These server programs are used to administer high-availability cluster environments, for example IBM Netfinity Availability for MSCS or MSCS clusters, and to increase reliability of cluster nodes.

You must be logged on to the IBM Netfinity Director Console as a user with general access, group access, and task access privileges before you can use IBM Netfinity Cluster Tools.



## Using IBM Cluster Systems Management

IBM Cluster Systems Management is a graphical user interface (GUI) client program that you can use to initiate cluster-related operations and manage cluster resources in a Microsoft Cluster Service (MSCS)-based cluster. The program displays all cluster components, including nodes, groups, resources, networks, and network interfaces. You can provide cluster operations for a single cluster, or you can group components onto a node.

ICSM includes a Cluster Configuration Expert Wizard, which you can use to create predefined resource groups for frequently used resources, such as File Share, Internet Information Service (IIS), and Print Spooler.

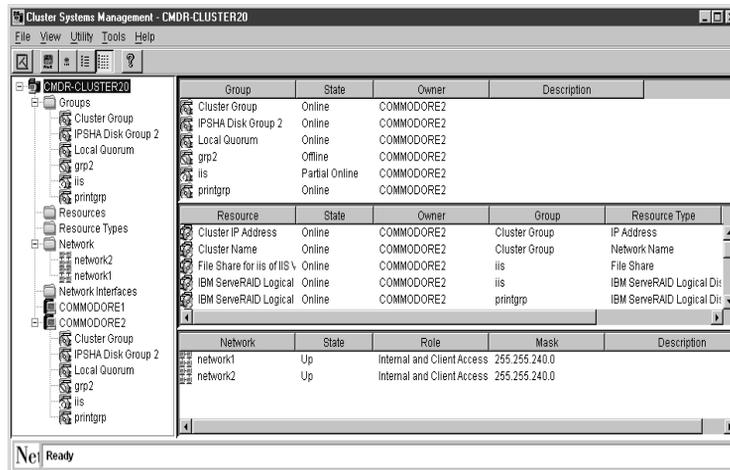
## Starting IBM Cluster Systems Management

To start the IBM Cluster Systems Management program from the Netfinity Director main window, you must do one of the following:

- Drag-and-drop the **IBM Cluster Systems Management** task icon onto a cluster (IBM Netfinity Availability Extensions for MSCS or MSCS cluster).
- Drag-and-drop a cluster onto the **IBM Cluster Systems Management** task icon.

- Right-click a cluster name in the Netfinity Director console, and then click **IBM Cluster Systems Management** from the menu.

The main IBM Cluster Systems Management window opens.



The IBM Cluster Systems Management window includes the following components:

- Title bar
- Menu bar
- Toolbar
- Status bar

The ICSM window is divided into four panes and is populated with the cluster data. The left pane displays the IBM Cluster Systems Management cluster tree structure (the cluster name at the highest level, followed by the Groups, Resources, Resource Types, Nodes, Networks, and Network Interfaces). The panes on the right display the Group, Resource, and Network views.

### Viewing the Title Bar

The title bar is located at the top of the window and displays the name of the program and the name of the cluster, IBM Cluster Systems Management - CMDR-CLUSTER20.

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## Viewing the Menu Bar

The menu bar is a set of menu names located directly below the title bar. The menu bar contains the following options.

### File Menu

The File menu provides commands that you can use to perform basic cluster tasks. The commands of this menu can vary, depending on the selected cluster entity.

Command	Use this command to:
New	Create a new cluster group or cluster resource.
Properties	Change the properties for a cluster entity.
Rename	Rename a cluster entity.
Bring Online	Bring a cluster group or cluster resource online.
Take Offline	Take a cluster group or cluster resource offline.
Initiate Failure	Initiate a resource failure.
Move Group	Move a cluster group or cluster resource to another location.
Change Group	Change the group for the selected resources.
View Resource Types	Inspect the various cluster resources types.
Pause Node	Pause the operations of the server (node) in a cluster.
Resume Node	Resume the operations of the server (node) in a cluster.
Start Cluster Service	Start the ICSM or MSCS service.
Stop Cluster Service	Stop the ICSM or MSCS service.
Delete	Permanently remove a resource or group from a cluster.
Exit	Close the ICSM program.

**Note:** These commands can also be accessed from a menu by right-clicking an entity.

## View Menu

You can use the View menu to change the appearance of items that are displayed in the IBM Cluster Systems Management main window.

This menu contains the following commands.

Command	Use this command to:
Toolbar	Show or hide the toolbar in the main window.
Large Icons	Display the cluster entity in the main window.
Small Icons	Display the cluster entities as small icon in the main window.
List	List the cluster entities in the main window.
Details	List and display details (for example, state owner and description) about the cluster entities in the main window.
Refresh	Refresh the main window.

## Utility Menu

The Utility menu provides commands that you can use to manage and administer the ICSM clusters.

This menu contains the following options.

Command	Use this command to:
Cluster Expert Wizard	Create File-share, IIS, and Print Spooler resource groups. (IIS is for MSCS clusters only.)

---

## Help Menu

The Help menu provides online information about IBM Cluster Systems Management.

### Viewing the Toolbar

The toolbar is a set of buttons that are located directly below the menu bar. These buttons serve as shortcuts for many frequently used commands. When you first view the IBM Cluster Systems Management window, some commands are disabled and are enabled only after you access certain menu commands.

The toolbar contains the following commands.

Icon	Command	Use this command to:
	Refresh	Refresh the main window.
	View Large Icons	Display the cluster entity.
	View Small Icons	Display the cluster entities as small icon in the main window.
	View List	List the cluster entities in the main window.
	View Details	List and display details (for example, state owner and description) about the cluster entities in the main window.
	About	Invoke online information about ICSM.

---

## Viewing the Status Bar

The status bar at the bottom of the window displays a message line that provides information about a selected menu command.

## Managing Clusters

A cluster name represents the top component in the IBM Cluster Systems Management tree structure and owns all of the entities, such as resources, resource groups, nodes, networks, and network interfaces. You can create, delete, or move cluster entities, as well as change the properties of cluster entities.

### Renaming a Cluster

To change the name of a cluster, do the following:

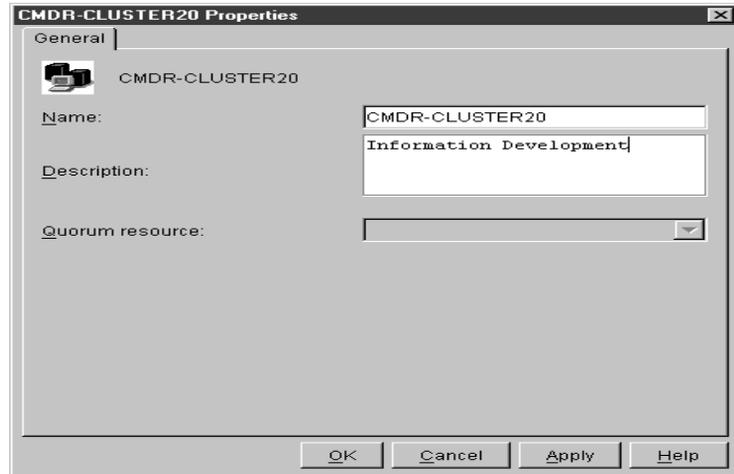
1. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the cluster name you want to change.
2. Click **Rename**.
3. Type the new name.
4. Press Enter.

### Changing the Description of a Cluster

To change the description of a cluster, do the following:

1. In the left pane of the IBM Cluster Systems Management main view, 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 an IBM Netfinity 7000 M10 or IBM Netfinity 5500 M20 server. Nodes own resource groups, and a resource group can be owned by only one node at a 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 a Node

To start a node, do the following:

1. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the name of the node you want to start.
2. Click **Start Cluster Service**.
3. Click **Refresh**.

---

## Stopping a Node

To stop a node, do the following:

1. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the name of the node you want to stop.
2. Click **Stop Cluster Service**.
3. Click **Refresh**.

## Pausing a Node

To pause a node, do the following:

1. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the name of the node you want to pause.
2. Click **Pause Node**.

## Resuming a Node

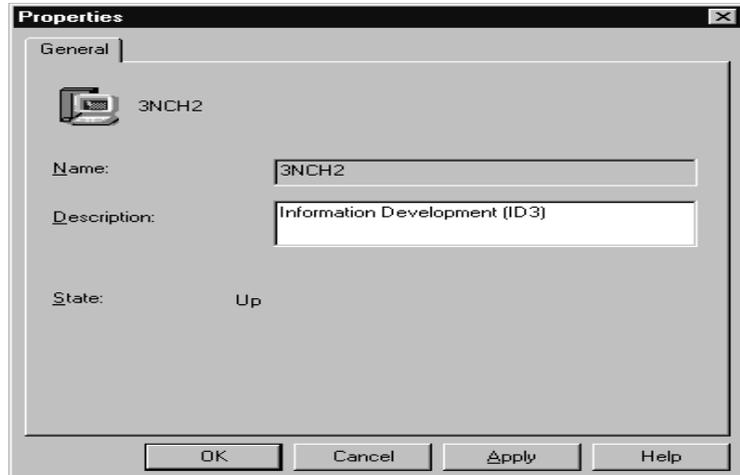
To resume a node, do the following:

1. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the name of the node you want to resume.
2. Click **Resume Node**.
3. Click **Refresh**.

## Entering Node Descriptions

To add comments or a description of a node to its General properties information, do the following:

1. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the name of the node whose description you want to change.
2. Click **Properties**.



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

## Managing Resource Groups in a Cluster

A resource group is a collection of resources. You can change the state of resources by changing the state of the resource group it is in.

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 fallback policy

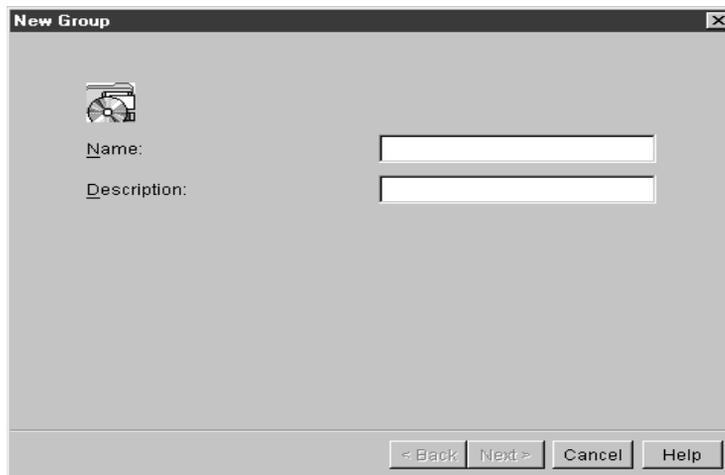
- Moving a group to another node

## Creating a New Group

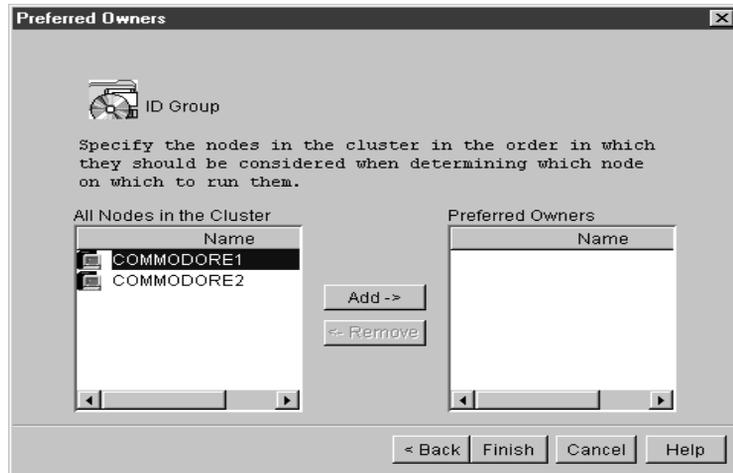
After defining the resources you want to group together, you can create groups. To create a group in a cluster, do the following:

1. Click **File** → **New** → **Group**.

The New Group window opens.



2. Type the name and the description of the group. Group names greater than 255 characters in length are not supported.
3. Click **Next**.



4. In the Preferred Owners window, do the following:
  - a. From the **All Nodes in the Cluster** menu, click the name of the node that you want to be the preferred owner.
  - b. Click **Add**.
  - c. Repeat steps a and b for each node that you want to be considered for use in the event of failure.

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

5. Click **Finish**.

## Deleting a Group

You can delete a group that is online only if it does not contain resources. To delete a cluster group, do the following:

1. From the IBM Cluster Systems Management 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. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the name of the node you want to change.
2. Click **Rename**.
3. Type the new name.
4. Press Enter.

## Bringing a Group Online

To bring a group online in a cluster, do the following:

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

## Taking a Group Offline

To take a group offline in a cluster, do the following:

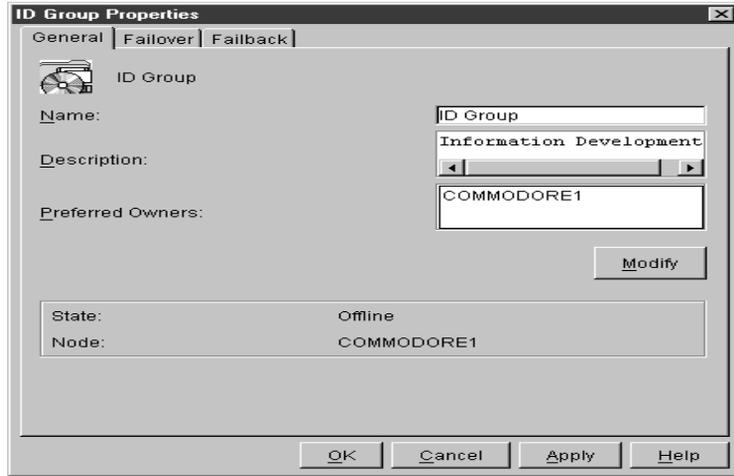
1. From the IBM Cluster Systems Management main view, right-click a group name.
2. Click **Take Offline**.

## Changing Group Description Properties

To change the description of a cluster group, do the following:

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

The following window opens.



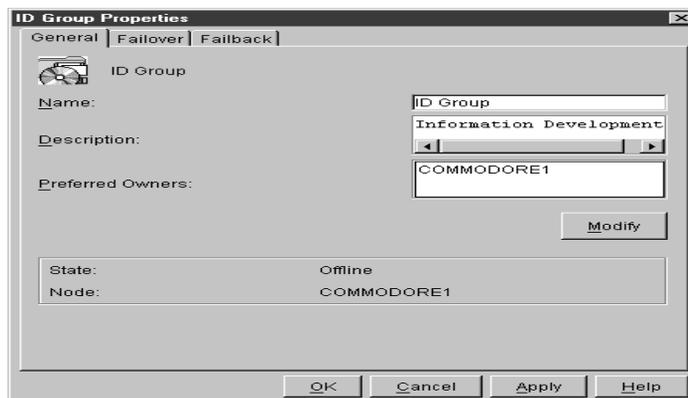
3. In the Description field, type a description of the group.
4. Do one of the following:
  - Click the **General** tab, if you want to change the name, description, or preferred owners of the group.
  - Click the **Failover** tab, if you want to change the group failover Threshold or Period information.
  - Click the **Failback** tab, if you want to prevent, allow, or schedule an immediate or predefined time for failback.
5. Click **Apply**.
6. Click **OK**.

## Changing Group Preferred Owners

To add, remove, or change group preferred owners, do the following:

1. Click a group.
2. Click **File** → **Properties**.
3. Click **Modify**.

The Modify Owners window opens.



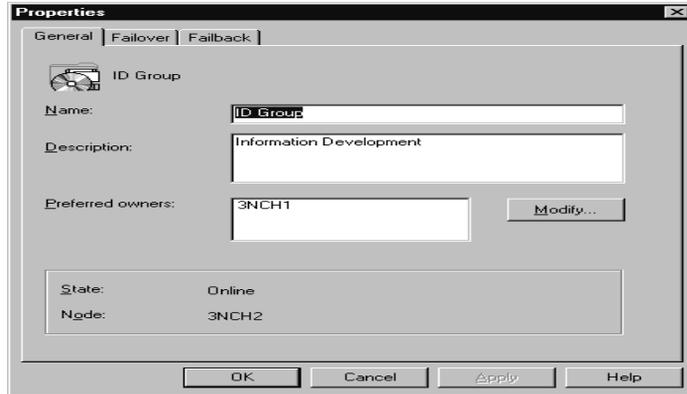
4. In the Modify Owners window, do the following:
  - a. From the **All Nodes in the Cluster** list box, click the name of the node you want to be the preferred owner.
  - b. Click the right arrow button to add the name to the **Preferred owners** box and to specify the preferred order in the event of failure.
  - c. Repeat steps a and b for each node that you want to be 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 Cluster Systems Management 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. 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 the group is to failover.
- Set the **Period** field to the maximum number of hours before the group is taken offline.

For example, if the group failover Threshold is 10 and the Period is 6, the cluster software will be taken offline after the tenth attempt that occurs within six hours.

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

## Setting Group Failback Policy

When a node comes back online, the group will failback to that 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. Click the group name.
2. Click **File** → **Properties**.
3. In the Properties window, click the **Failback** tab.
4. Do one of the following:
  - To initiate the Failback, click **Prevent Failback**.
  - To schedule a Failback, click **Allow Failback** and click either **Immediately** or **Failback Between**

**Note:** The **Failback Between** beginning and ending values must be 0-23. If the beginning value is greater than the ending value, the failback will occur the following day.

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

## Moving a Group to Another Node

To move a group to a different node, do the following:

1. In the upper-left pane of the IBM Cluster Systems Management main view, right-click the name of the group you want to move.
2. Click **Move Group**.
3. Click the name of the node to which the group is to be moved.

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

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## 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
- Changing resource parameters
- Moving a resource

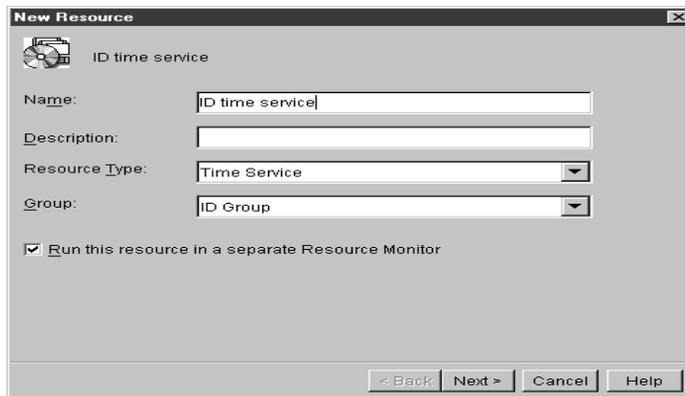
**Note:** Changes made to IBM Cluster Systems Management cluster resources will not take effect until the resource is taken offline and then brought back online.

### Creating a New Resource

To create a cluster resource, do the following:

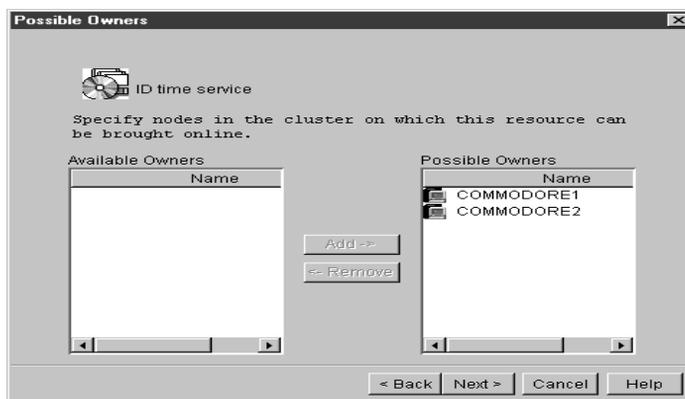
1. Click **File** → **New** → **Resource**.

The New Resource window opens.



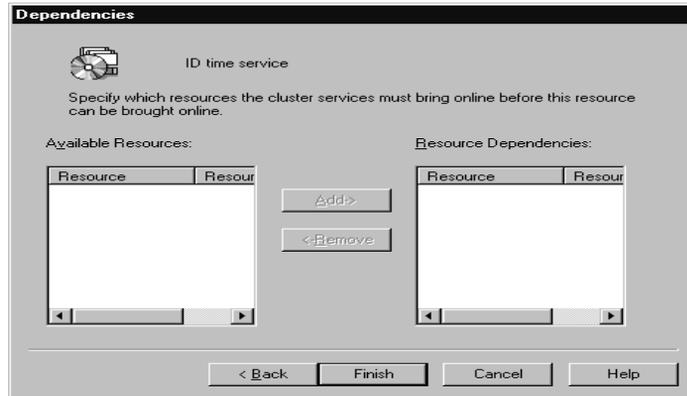
2. Do the following:
  - a. Type the name for the new resource.
  - b. Type a description of the resource.
  - c. Select the resource type.
  - d. Select the group.
  - e. Select the **Run this resource in a separate resource monitor** check box to debug or to resolve a conflict with other resources.
3. Click **Next**.

The Possible Owners window opens.



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

The Dependencies window opens.



- 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.
- Click **Finish**.

## Deleting a Resource

To delete or rename a resource, do the following:

- In the IBM Cluster Systems Management main view, right-click the name of the resource you want to change.
- Click **Delete**.
- In the message box, click **OK** to confirm the deletion.

## Renaming a Resource

To change the name of a resource, do the following:

1. In the IBM Cluster Systems Management main view, right-click the name of the resource you want to change.
2. Click **Rename**.
3. Type the new name. Resource names greater than 255 characters are not supported.
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. In the IBM Cluster Systems Management main view, right-click the name of the resource you want to change.
2. Click **Bring Online** or **Take Offline**.

## Initiating a Resource Failure

Initiate a resource failure to test Failover and Failback functions. To initiate a resource failure, do the following:

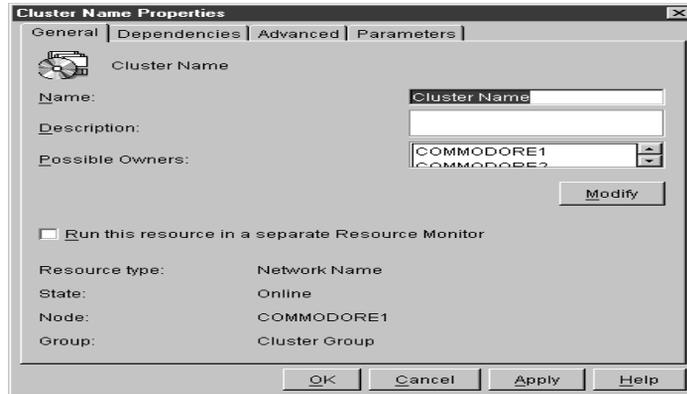
1. In the IBM Cluster Systems Management main view, right-click the resource name you want to change.
2. Click **Initiate Failure**.

## Changing Resource Descriptions

The General tab contains the same information for each resource type. To view the resource name or to change the resource description, do the following:

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

The Properties window opens.



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

## Modifying Resource Dependencies

IBM Cluster Systems Management uses a list of dependencies when bringing resources online or offline. The following table identifies resources and their dependencies.

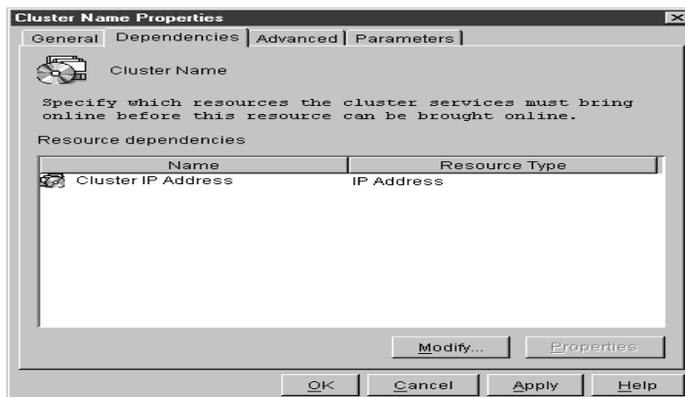
Resources	Dependencies
File Share	Physical Disk (files location)
Generic Service	None
IIS Virtual Root (MSCS only)	TCP/IP Address (required) Physical Disk or Fault Tolerant Disk Set
Network Name	TCP/IP Address (required)
Physical Disk	None

Resources	Dependencies
Print Spooler	Physical Disk (required) Network Name (required)
TCP/IP Address	None

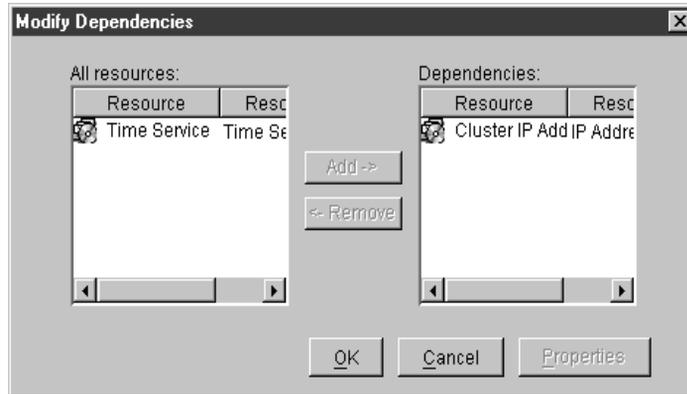
To add or to remove resource dependencies in a cluster, refer to the table and do the following:

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 the resource you selected in step 1. For example, a network name is dependent on an IP address, so the IP name must be brought online before the network name.



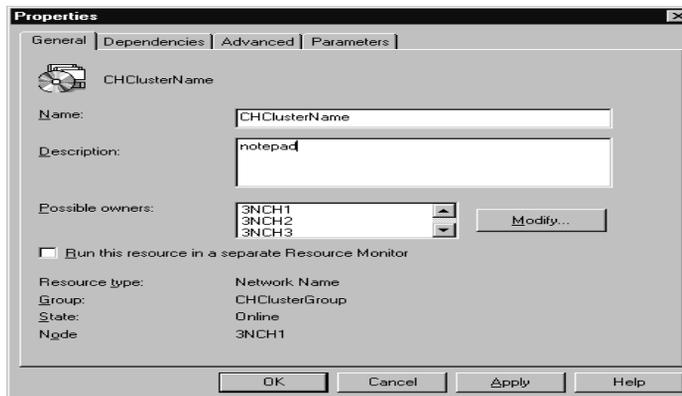
5. Click the name of the available resource you want to add as a resource dependency, and then click the right arrow button.
6. Click **OK**.
7. Click **Apply**.
8. Click **OK**.

### **Specifying which Nodes can Own a Resource**

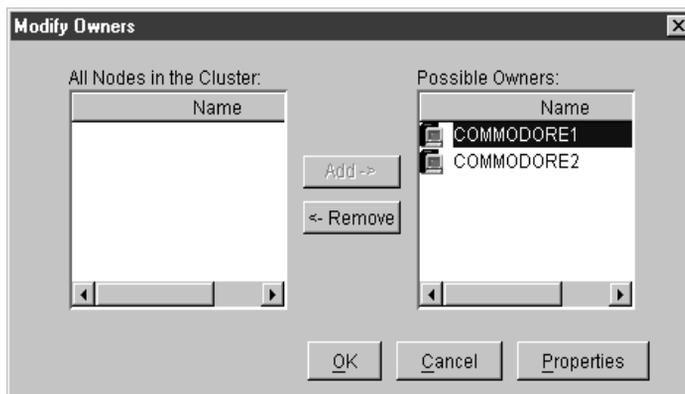
To specify which nodes can own resources, do the following:

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

The following window opens.



3. Click **Modify**.  
The following window opens.



**Note:** The resource must have at least one possible owner for failover.

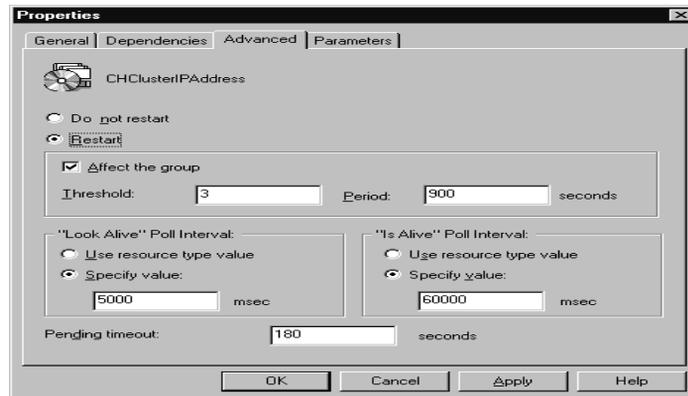
4. Do one of the following:
  - Select a node name from the **All Nodes in the Cluster** list box, and then click the right arrow button to add it as a possible owner.
  - Select a node name from the **Possible Owners** list box, and then click the left arrow button to remove it from the list.

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

## Setting Advanced Resource Parameters

You can specify whether the IBM Cluster Systems Management 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 the **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 a value to indicate 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 a value to indicate how often you want to check the resource online state.
9. In the **Pending timeout** field, type a value to indicate 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**.

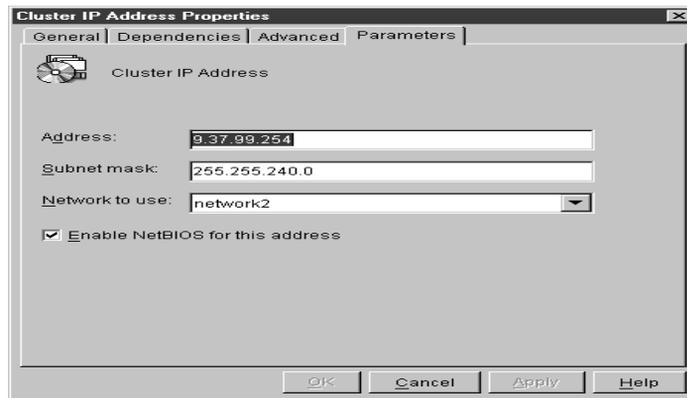
## Changing Resource Parameters

In the IBM Cluster Systems Management program, the Parameters tab in the Properties window is specific to the resource type. To change parameters, use the table as a guide, and do the following:

Resource Type	Configurable Parameters
File Share	<p>Set the specific image of the application.</p> <p>Set the command line that you want sent to the application.</p> <p>Set the directory location for the image.</p>
Generic Service	<p>Set the name of the service.</p>
IIS Virtual Root (MSCS only)	<p>Set the service that is to use the virtual root.</p> <p>Enter the path to the directory on shared disk.</p> <p>Set the alias for the virtual root.</p> <p>Set the user name and password used to access the share.</p> <p>Set the type of permissions (for example, Read, Execute).</p>
Network Name	<p>Set the universal naming convention (UNC) name.</p>
Physical Disk	<p>None.</p>

Resource Type	Configurable Parameters
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 Cluster Systems Management 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

To move a resource to a different group, do the following:

1. From the IBM Cluster Systems Management main view, right-click the resource name.
2. Click **Change group**.
3. From the menu, click a group.

4. Click **Yes**.

**Note:** All dependent resources are moved with the resource.

## Managing Networks and Network Interfaces

You can manage a network by:

- Changing the network and network interface description (MSCS clusters only)
- Enabling the network for use in a cluster
- Disabling the network for use in a cluster

### Changing a Network and Network Interface Description

To change the network description for MSCS clusters, do the following:

1. Click the network name.
2. Click **File** → **Properties**.
3. Type the new network name.
4. Type the new description.
5. Click **OK**.
6. Click **Apply**.
7. Click **OK**.
8. Click **Finish**.

### Enabling a Network for Use in a Cluster

To enable a network for use in a cluster, do the following:

1. Click the name of the network you want to enable.
2. Click **File** → **Properties**.

The following window opens.

3. Select **Enable for cluster use** check box.
4. Select one of the radio buttons to specify how you want to use the network in the cluster.
5. Click **Apply**.

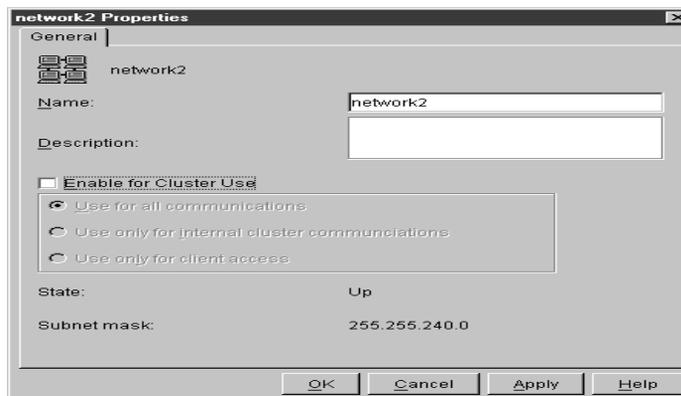
- 
6. Click **OK**.

## Disabling a Network for Use in a Cluster

Use the following instructions to enable a network for use in a cluster.

1. Click the network name you want to disable.
2. Click **File** → **Properties**.

The following window opens.



3. Clear the **Enable for cluster use** check box.
4. Select one of the radio buttons to specify how you want to use the network in the cluster.
5. Click **Apply**.
6. Click **OK**.

## Using the Cluster Expert Wizard

In the MSCS environment, you must define high-availability resource groups. MSCS must have information about which resources make up the resource groups and what their dependencies on each other are.

Every resource group must contain a virtual IP address for the clients to use when communicating with resource groups. MSCS makes virtual IP addresses and other resources highly available, to reduce the likelihood

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of failure. For example, if a server fails, another node will take ownership of the IP address and resources of that resource group.

For cluster groups to failover correctly, cluster resource groups must have the correct resources and dependencies.

The Cluster Expert Wizard is a tool you can use to support file-share and print-spooler resource groups. You can use it to create and define new resource groups in existing resource groups. This is especially useful when you have a limited number of physical disks that need to serve multiple purposes in your environment. For example, a single physical disk can be used to store data for multiple file shares.

During startup of the server, ICSM prompts you for a range of virtual IP addresses. A sequential range of IP addresses is created for use in the server.

**Note:** When you specify the IP address range, do not include an address that is currently assigned. For example, if the address 9.9.9.10 is already assigned, use a range of 9.9.9.11-9.9.9.100.

If an IP address is deleted, the Cluster Expert Wizard adds the address to the list of available IP addresses.

## File-share Resource Groups

File-share resource groups share the directory on one of the shared disks in the configuration. This file-share resource group is highly available, so that if one node fails, another node takes ownership of the failed node resources.

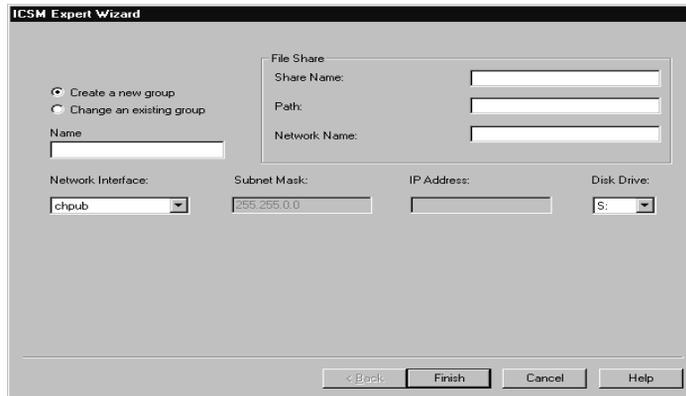
You can create a new file-share resource group or change an existing file-share resource group.

### Creating a New File-share Resource Group

Before creating a new file-share resource, make certain that a physical disk drive is available and that a directory has been created on the drive. To create a new file-share resource group, do the following:

1. Click **Utility** → **Cluster Expert Wizard** → **File Share**.

The Expert Wizard window opens.



2. Select **Create a new group**.
3. Type the group name in the **Name** field.
4. Type the share name, path, and network name for the file share.
5. Select the network interface from the menu.
6. Select the physical disk drive letter from the menu.
7. Click **Finish**.

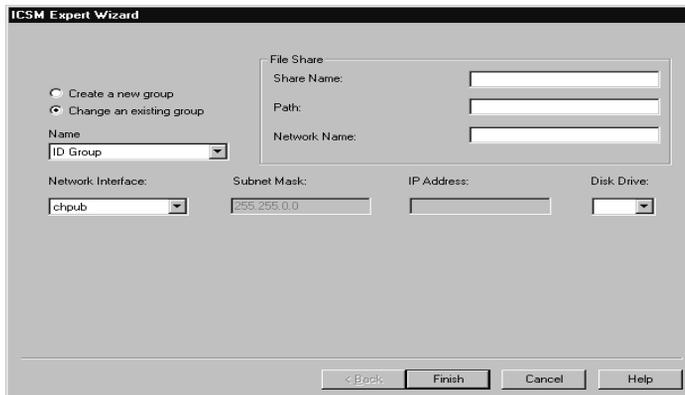
The group name displays in the main view.

## Changing a File-share Resource Group

To change a file-share resource group, do the following.

1. Click **Utility** → **Cluster Expert Wizard** → **File Share**.

A file-share resource group window opens.



2. Click **Change an existing group**.
3. Select the group Name from the menu.
4. Select the physical disk drive letter from the menu.
5. Click **Finish**.

## Internet Information Server Resource Group

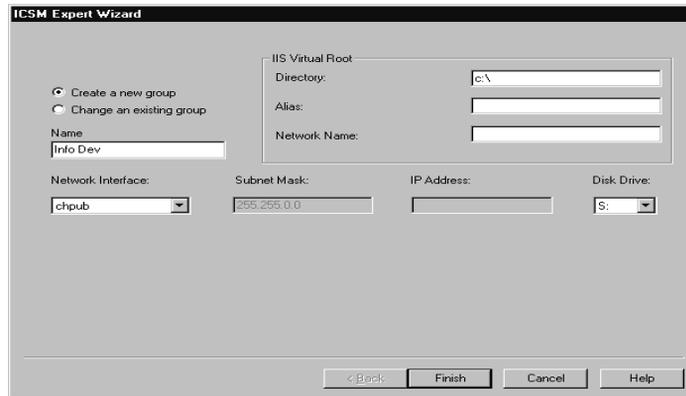
An Internet Information Server (IIS) resource group provides high-availability for the World Wide Web server, FTP, and Gopher components of the Microsoft Internet Information Server. IIS functionality is only available to MSCS clusters.

### Creating an IIS Resource Group

To create an Internet Information Server resource group in an MSCS cluster, do the following.

1. Click **Utility** → **Cluster Expert Wizard** → **IIS**.

The IIS resource group window opens.



2. Click **Create a new group**.
3. For the IIS virtual root, type the directory, alias, and network name.
4. Select the network interface for the IIS.
5. Select the physical disk drive letter from the menu.
6. Click **Finish**.

## Changing an IIS Resource Group

To change an Internet information server resource group in an MSCS cluster, do the following:

1. Click **Utility** → **Cluster Expert Wizard** → **IIS**.

The IIS resource group window opens.

The screenshot shows the 'ICSM Expert Wizard' dialog box. It has two radio buttons: 'Create a new group' (unselected) and 'Change an existing group' (selected). Below these is a 'Name' dropdown menu with 'ID Group' selected. To the right is an 'IIS Virtual Root' section with three text boxes for 'Directory:', 'Alias:', and 'Network Name:'. Below that are four fields: 'Network Interface:' with a dropdown showing 'chpub', 'Subnet Mask:' with '255.255.0.0', 'IP Address:', and 'Disk Drive:' with a dropdown. At the bottom are four buttons: '< Back', 'Finish', 'Cancel', and 'Help'.

2. Click **Change an existing group**.
3. Type the directory, alias, and network name for the IIS virtual root.
4. Select the network interface for the IIS.
5. Select the physical disk drive letter from the menu.
6. Click **Finish**.

## Print-spooler Resource Groups

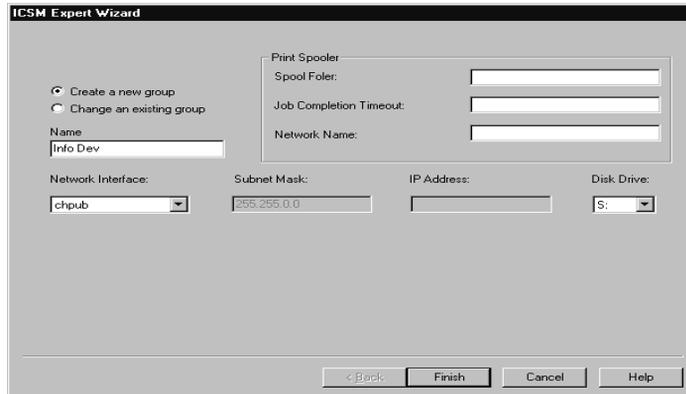
When a server functions as a print spooler, the server must specify where the print spooler stores its data. In a single-server environment where the server functions as the print spooler, the server must specify a spool directory for data storage.

### Creating a Print-spooler Resource Group

To create a print spooler resource group, do the following:

1. Click **Utility** → **Cluster Expert Wizard** → **Print Spooler**.

The Print Spooler resource group window opens.



2. Click **Create a new group**.
3. Type the spool folder, job completion, and network name information for the print spooler.
4. Select the network interface for the print spooler.
5. Select the physical disk drive letter from the menu.
6. Click **Finish**.

## Changing an Existing Print Spooler Resource Group

To change an existing print spooler resource group, do the following:

1. Click **Utility** → **Cluster Expert Wizard** → **Print Spooler**.

The Print Spooler resource group window opens.

ICSM Expert Wizard

Create a new group  
 Change an existing group

Name: \_\_\_\_\_  
ID Group: \_\_\_\_\_

Print Spooler:  
Spool Folder: \_\_\_\_\_  
Job Completion Timeout: \_\_\_\_\_  
Network Name: \_\_\_\_\_

Network Interface: \_\_\_\_\_ Subnet Mask: 255.255.0.0 IP Address: \_\_\_\_\_ Disk Drive: \_\_\_\_\_

< Back Finish Cancel Help

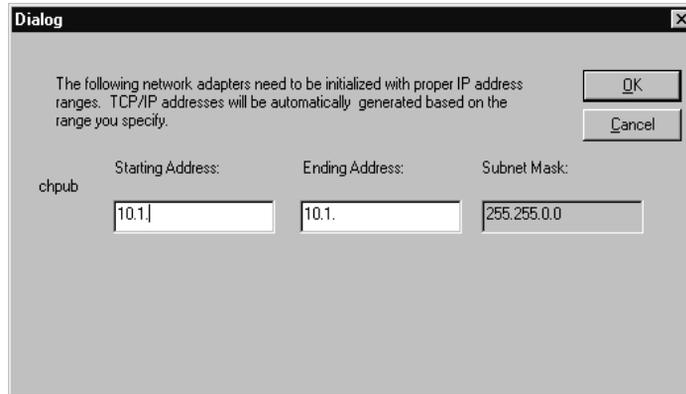
2. Click **Change an existing group**.
3. Type the spool folder, job completion timeout, and network name for the print spooler.
4. Select the network interface for the print spooler from the menu.
5. Select the physical disk drive from the menu.
6. Click **Finish**.

## Resetting IP Address Ranges

Network adapters require proper IP address ranges to be able to initialize. To reset the virtual IP address range for the Cluster Expert Wizard, do the following:

1. Click **Tools** → **Reset Expert Wizard IP Address Range**.

The following window opens.



2. Type the preferred IP address range in the **Starting Address** and the **Ending Address** fields.
3. Click **OK**.

## Closing IBM Cluster Systems Management

To close the IBM Cluster Systems Management program, from the IBM Cluster Systems Management main window click **File** → **Exit**.

## Using IBM Cluster Software Rejuvenation

The IBM Netfinity Cluster Software Rejuvenation program is used to increase the reliability of nodes in a cluster by scheduling periodic software restarts (rejuvenations) on each node. When a node is restarted, software resources on the node are refreshed or rejuvenated. You can restart a node in a selected cluster and you can also schedule restarts on multiple nodes on various dates.

## Starting the Software Rejuvenation Program

To start the Software Rejuvenation program from the Netfinity Director main window, you must do one of the following:

- Drag-and-drop the **Software Rejuvenation** task icon on to a cluster (IBM Netfinity Availability Extensions for MSCS or MSCS).

- Drag-and-drop a cluster onto the **Software Rejuvenation** task icon.
- Right-click a cluster name in the Netfinity Director console, then click **Software Rejuvenation** from the menu.

The Software Rejuvenation window opens.



The Software Rejuvenation window contains the following components:

- Title bar
- Rejuvenation Enabled radio buttons
- Node in Cluster list
- Calendar
- Command buttons
- Status bar

These components are described in more detail in the following sections.

## Title Bar

The title bar is located at the top of the window and displays the name of the program and the name of the selected cluster, for example, Software Rejuvenation - CMDR2-CLUSTER20.

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## Rejuvenation Enabled Radio Buttons

These buttons enable or disable cluster rejuvenation logic. By default, software rejuvenation is disabled (False). Though you can configure and save software rejuvenation settings for a cluster that is in the disabled state, you must enable (True) the software rejuvenation function for the cluster before the nodes can restart.

## Nodes in Cluster List

This list displays each node (icon and name recognized by the Netfinity Cluster Software Rejuvenation program) of the selected cluster that you can drag-and-drop onto the calendar. Nodes that are offline are available and cannot be scheduled for rejuvenation.

## Calendar

The calendar is used to schedule and edit node rejuvenations and provides a monthly view of the scheduled node rejuvenations.

The calendar opens to the current month and year, with the current date highlighted. The lower corners of the calendar display tabs. Clicking the minus sign (-) reverts the calendar to the previous month and clicking the plus sign (+) advances the calendar a month.

When a node is scheduled for rejuvenation, a node icon displays on every day for which the node is scheduled. If multiple nodes are scheduled for rejuvenation on the same day, the node icons are shown cascaded on the specified date.

## Command Buttons

Following are IBM Netfinity Cluster Software Rejuvenation program command:

**Options** Use this command to set the parameters for rejuvenation operations on a cluster level; for example, failover check, cluster error, and minimum reboot interval.

**Auto** This command is disabled and is not functional in this product release.

**Accept** Use this command to save your settings and to place the node scheduling into program memory. If the program is restarted, all

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scheduled rejuvenations that have been accepted will appear on the calendar.

**Note:** Nodes are not rejuvenated until the Rejuvenation Enabled switch has been set to True.

**Cancel** Use this command to discard your unsaved settings or to shut down the program.

**Close** Use this command to shut down the Netfinity Cluster Software Rejuvenation program.

**Help** Use this command to access online information to assist you in using the IBM Netfinity Cluster Software Rejuvenation program.

### Status Bar

The status bar, at the bottom of the window, displays a message line that provides information or status of a command.

## Managing Software Rejuvenations

You can use the IBM Netfinity Cluster Software Rejuvenation program to selectively restart nodes in a cluster. In restarting a node, you rejuvenate or refresh software resources. This program not only restarts a node in a selected cluster, but also allows you to schedule restarts, which includes scheduling multiple nodes on various dates.

The IBM Netfinity Cluster Software Rejuvenation program recognizes and can rejuvenate single MSCS clusters and single IBM Netfinity Availability Extensions for MSCS clusters only.

### Scheduling Nodes for Software Rejuvenation

Using the IBM Netfinity Cluster Software Rejuvenation program you can schedule nodes for rejuvenation in several modes. The following sections describe these ways.

**Note:** The Software Rejuvenation program uses the Netfinity Director console time to validate and duplicate rejuvenation schedules, and uses the server's system clock to execute schedules.

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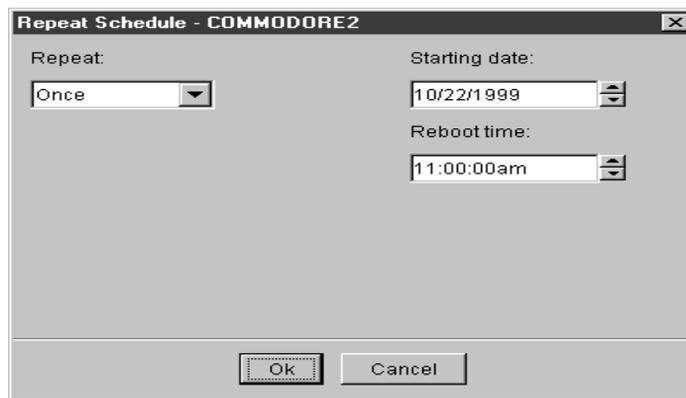
The Software rejuvenation must be enabled in order to schedule a rejuvenation.

## Scheduling a Rejuvenation for a Single Node

To schedule rejuvenation for a single node, do the following:

1. Select the node (icon) from the **Nodes in cluster** list in the Software Rejuvenation window.
2. Drag-and-drop the node onto the calendar date of the scheduled rejuvenation.

The Repeat Schedule window opens.



3. From the **Repeat** menu, select the preferred schedule type for the node.
4. In the **Starting Date** field, specify the date you want the rejuvenation to start.
5. Specify the time you want to start the rejuvenation in the **Reboot Time** field.  
**Note:** The number of days set in the **Min. Reboot Interval** field will override any repeat scheduling made through the calendar.
6. Click **OK**.
7. Click **True** to enable the rejuvenation process.
8. Click **Accept** to save your settings.

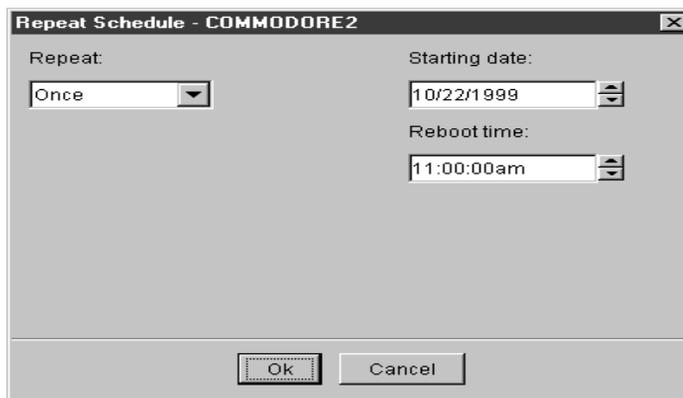
For more information on setting software rejuvenation parameters, see Setting cluster options.

### Scheduling a Single Rejuvenation

To rejuvenate a node as a single instance, do the following:

1. Select the node (icon) from the **Node in cluster** list in the Software Rejuvenation window.
2. Drag-and-drop the node onto the calendar date of the first scheduled rejuvenation.

The Repeat Schedule window opens.



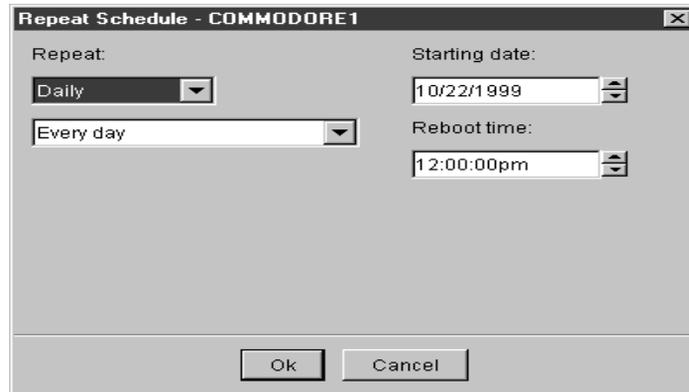
3. From the **Repeat** menu, select the schedule type for the node.
4. In the **Starting date** field, specify the date you want the rejuvenation to start.
5. In the **Reboot time** field, specify the time you want the rejuvenation to start. Time values are in 15-minute intervals.
6. Click **OK** to schedule the rejuvenation for this node.
7. Click **True** to enable the rejuvenation process.
8. Click **Accept** to save your settings.

### Scheduling a Daily Rejuvenation

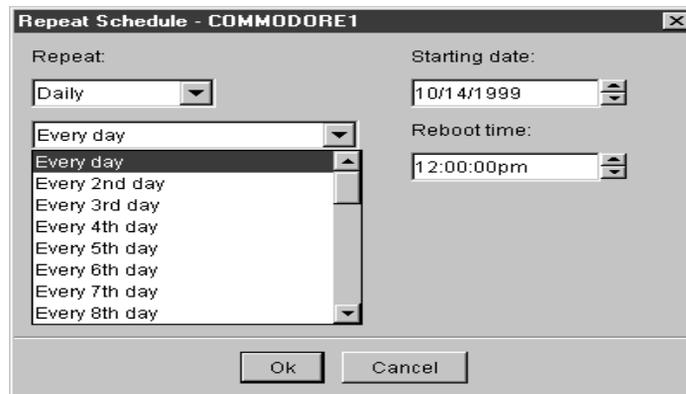
To rejuvenate a node daily, do the following:

- 
1. Select the node (icon) from the **Nodes in cluster** list in the Software Rejuvenation window.
  2. Drag-and drop the node on to the calendar date of the first scheduled rejuvenation.

The Repeat Schedule window opens.



3. From the **Repeat** menu, click **Daily**.



4. A new field appears in the window. From the new field, select the frequency during each week that you want the rejuvenation to occur for the node.

If you select **Every day**, the node is rejuvenated each day; while if you select **Every 2nd day**, the node is rejuvenated every other day, and so on.

5. Specify the **Reboot time** for the rejuvenation. Time is incremented in 15-minute intervals.
6. Click **OK** to schedule the rejuvenation for this node.

**Note:** The rejuvenation process will not take place unless the schedule has been accepted and the Rejuvenation Enabled switch has been set to True.

## Scheduling a Weekly Rejuvenation

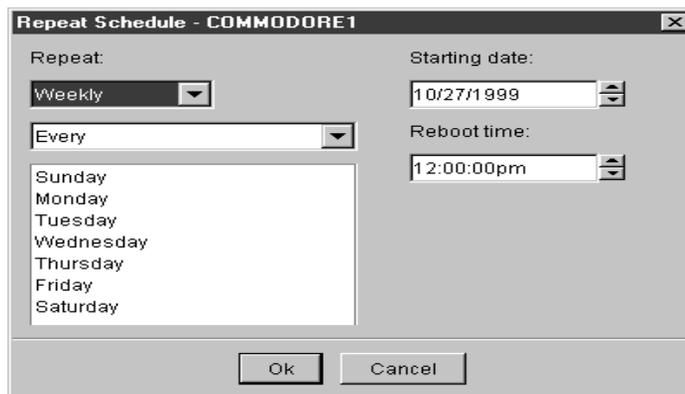
To rejuvenate a node as a weekly occurrence, do the following:

1. Select the node (icon) from the **Nodes in cluster** list in the Software Rejuvenation window.
2. Drag-and-drop the node on to the calendar date of the first scheduled rejuvenation.

The Repeat Schedule window opens.

3. From the **Repeat** menu, click **Weekly**.

New fields appear in the current window.



4. Select the number of days during the week that you want the node to be rejuvenated.

- 
5. From the menu, select the frequency that you want the rejuvenation to occur for this node.  

Selecting **Every** will rejuvenate the node each selected day of the week, while selecting **Every 2nd** will rejuvenate the node every other selected week of the month, and so on.
  6. From the menu, select the day of the week when you want the node to be rejuvenated.
  7. Specify the time you want to start the rejuvenation in the **Reboot time** field. Time is incremented in 15-minute intervals.
  8. Click **OK** to schedule the rejuvenation for the node.
  9. Click **True** to enable the rejuvenation process.
  10. Click **Accept** to save your settings.

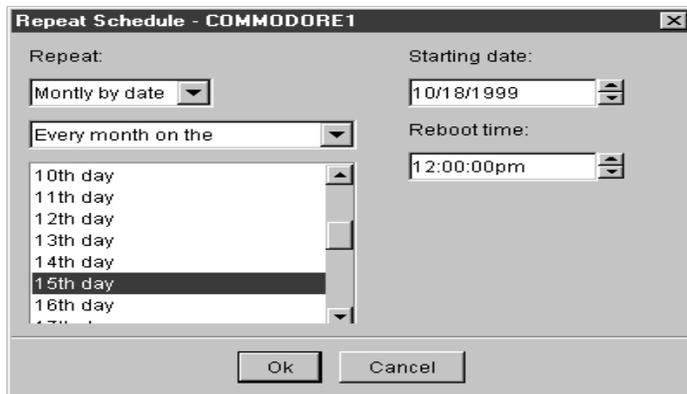
### **Scheduling a Monthly Rejuvenation by Date**

To rejuvenate a node as on a specific date each month, do the following:

1. Select the node (icon) from the **Nodes in Cluster** list in the Software Rejuvenation window.
2. Drag-and-drop the node on to the calendar date of the first scheduled rejuvenation.  

The Repeat Schedule window opens.
3. From the **Repeat** menu, click **Monthly by date**.  

New fields appear in the current window.



4. From the menu, select the frequency that you want the rejuvenation to repeat for the selected node.
5. From the menu, select the day of the month you want the node to be rejuvenated.
6. Specify the date you want to start the rejuvenation in the **Starting date** field.
7. Specify the time you want to start the rejuvenation in the **Reboot time** field. Time is incremented in 15-minute intervals.
8. Click **OK** to schedule the rejuvenation for the node.
9. Click **True** to enable the rejuvenation process.
10. Click **Accept** to save your settings.

**Note:** The rejuvenation process will not take place unless the schedule has been accepted and the Rejuvenation Enabled switch has been set to True.

### Scheduling a Monthly Rejuvenation by Day

To rejuvenate a node on specific days each month, do the following:

1. Select the node (icon) from the **Nodes in cluster** list in the Software Rejuvenation window.
2. Drag-and-drop the node on to the calendar date of the first scheduled rejuvenation.

- 
- The Repeat Schedule window opens.
3. From the **Repeat** menu, click **Monthly by day**.  
New fields appear in the current window.
  4. From the menu, select the frequency that you want the rejuvenation to occur for the selected node.
  5. Select the day of the month when you want the node to be rejuvenated.
  6. Specify the date when you want to start the rejuvenation in the **Starting date** field.
  7. Specify the time you want to start the rejuvenation in the **Reboot time** field. Time is incremented in 15-minute intervals.
  8. Click **OK** to schedule the rejuvenation for the node.
  9. Click **True** to enable the rejuvenation process.
  10. Click **Accept** to save your settings.

## Enabling Rejuvenation

The Rejuvenation Enabled switch states are True (enabled) and False (disabled). When you start the IBM Netfinity Cluster Software Rejuvenation program, the switch is in the False position. Using this switch, you can schedule rejuvenation of nodes at various times without the program actually starting the rejuvenation process. While the switch is in the False position, all schedule processes are recorded but not acted on at the designated time.

To enable rejuvenation, do the following:



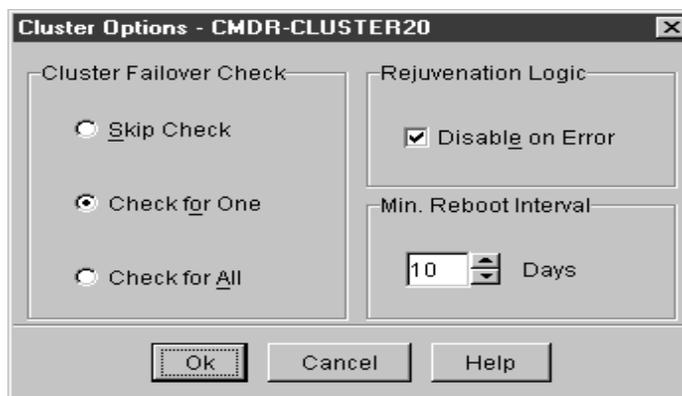
1. From the Software Rejuvenation window, select **True** to enable all processes.
2. Click **Accept**.

## Setting Cluster Options

Use the Cluster Options window to set parameters for rejuvenation operations on a cluster level. You can set parameters for a cluster failover check, cluster rejuvenation logic (errors), and a minimum restart interval.

1. From the Software Rejuvenation window, click **Options**.

The Cluster Options window opens.



- 
2. The Cluster Failover Check option defines the failover rules for a node in the selected cluster. Rejuvenation occurs if the selected value matches the state of the cluster. To set the Cluster Failover Check option, do the following:
    - Click **Skip check** if you do not want the rejuvenation program to check for other nodes in the cluster. Selecting this value allows a rejuvenation to always occur.
    - Click **Check for one** if you want the rejuvenation program to check for another node in the cluster. If the program cannot find another node in the selected cluster, the selected node will not be rejuvenated.
    - Click **Check for all** if you want the rejuvenation program to check the availability of all nodes in the cluster. If a single node in the cluster does not respond to the cluster, the selected node will not be rejuvenated.
  3. To set the rejuvenation logic for the cluster, do the following:
    - Select the **Disable on error** check box to enable error checking on the cluster.
    - Clear the **Disable on error** check box to terminate a restart.
  4. In the **Min. Reboot Interval** menu, set the number of days that must elapse a node in the selected cluster can be rejuvenated.

For example, if 3 days is selected, a node in the cluster will not be rejuvenated again in a period of less than 3 days after the previous rejuvenation. Selecting 0 days allows a node to be rejuvenated at any time without checking for the date of a previous rejuvenation.
  5. Click **OK**.
  6. Click **Accept**.

## Editing Scheduled Rejuvenations

Use the Netfinity Cluster Software Rejuvenation program to edit scheduled node rejuvenations at the cluster and node level.

## Editing a Scheduled Rejuvenation at the Node Level

To change the date, time, or frequency of scheduled node rejuvenations, do the following:

1. From the IBM Netfinity Director Console, drag-and-drop the Cluster (the owner of the nodes you want to reschedule) onto the **IBM Cluster Software Rejuvenation** task icon.

The Netfinity Cluster Software Rejuvenation window opens.

The calendar displays the current month and year, with the current date highlighted. A node icon is displayed on every day for which the node is scheduled for rejuvenation. If multiple nodes are scheduled for rejuvenation on the same day, the node icons are shown cascaded on the specified date.

2. In the Calendar, right-click the node you want to edit.



3. Click **Edit schedule** → **Schedule<node name>**.

**Note:** Click the plus sign (+) to advance the calendar a month, and click the minus sign (-) to revert the calendar to the previous month.

The Repeat Schedule window opens.

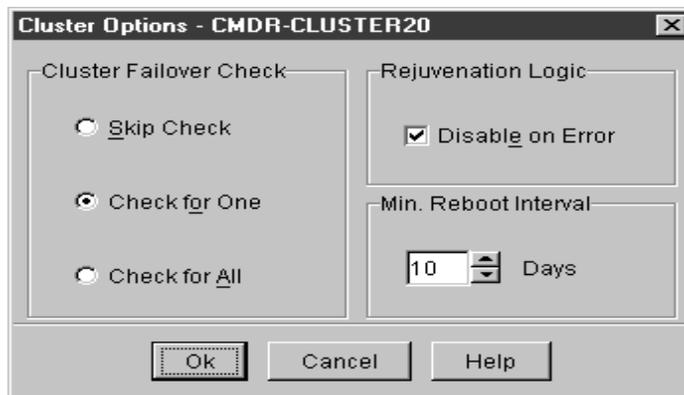


4. From the **Repeat** menu, edit the rejuvenation schedule settings (for example, repeat, starting date, and reboot time) for the node
5. Click **OK** to accept the schedule parameters.
6. In the Software Rejuvenation window, click **Accept**.

### **Editing a Rejuvenation at the Cluster Level**

To change the failover check, cluster rejuvenation logic (error), and minimum reboot interval for rejuvenation operations for a cluster, do the following:

1. From the Netfinity Director Console, drag-and-drop the cluster you want to edit onto the **IBM Cluster Software Rejuvenation** task icon.  
The Software Rejuvenation window opens. The calendar displays the current month and year, with the current date highlighted.
2. Click **Options**.  
The Cluster Options window opens.



3. Do one of the following to set the **Cluster Failover Check** option.  
The Cluster Failover Check option defines the failover rules for a node in the selected cluster. Rejuvenation occurs if the selected value matches the state of the cluster. To set the Cluster Failover option, do one of the following:
  - Click **Skip check** if you do not want the rejuvenation program to check for other nodes in the cluster. Selecting this value allows a rejuvenation to always occur.
  - Click **Check for one** if you want the rejuvenation program to check for another node in the cluster. If the program cannot find another node in the selected cluster, the selected node will not be rejuvenated.
  - Click **Check for all** if you want the rejuvenation program to check the availability for all nodes in the cluster. If a single node in the cluster does not respond to the cluster, the selected node will not be rejuvenated.
4. Do one of the following to set the rejuvenation logic for the cluster:
  - Select **Disable on error** check box to enable error checking on the cluster.
  - Clear **Disable on error** check box to stop a rejuvenation or if the program detects errors within the cluster.

- 
5. In the **Min. Reboot Interval** list box, set the number of days that a node in the selected cluster can be rejuvenated.

For example, if 3 days is selected, a node in this cluster will not be rejuvenated again in a period of less than 3 days after the previous rejuvenation. Selecting 0 days will allow a node to be rejuvenated at any time without checking for the date of a previous rejuvenation.

6. Click **OK**.
7. Click **Accept**.

## Removing a Node from the Rejuvenation Schedule

If a node is scheduled for rejuvenation on more than one date, removing the node from one date on the calendar removes it from all other dates and times on the calendar. To remove a node from the rejuvenation schedule, do the following:

1. From the Netfinity Director Console, drag-and-drop the cluster (the owner of the node you want to remove) onto the **IBM Cluster Software Rejuvenation** task icon.

The Software Rejuvenation window opens.

The calendar displays the current month and year, with the current date highlighted. A node icon is displayed on every day that it is scheduled for rejuvenation. If multiple nodes are scheduled for rejuvenation on the same day, the node icons are shown cascaded on the specified date.

2. In the Calendar, right-click the node you want to remove, and then click **Delete node**.
3. Click **Yes**.

If the node that you are removing from the calendar is scheduled to occur only once, you will not get this message window.

4. Click **Accept**.

## Using IBM Netfinity Cluster Software Rejuvenation Keyboard Commands

The following table describes the keyboard commands that you can use to perform basic tasks. These keyboard shortcuts are:

Keyboard command	Use this shortcut to:
TAB / SHIFT-TAB	Move a selected node forward or backwards through the calendar interface.
CTRL+C	Copy a node.
CTRL+V	Paste a copied node on a selected calendar date.
CTRL+E	Access the Repeat Schedule window and to edit the schedule.
CTRL+D	Delete a scheduled rejuvenation on a selected date.
CTRL+H	Select (highlight) a schedule.

## Closing the IBM Netfinity Cluster Software Rejuvenation Program

To close the IBM Netfinity Cluster Software Rejuvenation program, do the following:

1. From the Software Rejuvenation window, click **Close**.
2. In the Verify Application Close window, click **Yes**.

## Creating Action Plans for Cluster Events in Netfinity Director

The ICSM and Software Rejuvenation tools add new cluster event filters to the Netfinity Director console. Using the Events Action Plan Builder you can create filters for specific cluster events, and further qualify the events using the Extended Attributes option.

Do the following to create an event action:

- 
1. From the **Netfinity Director** console, click **Event Action Plan Builder**.
  2. Right-click in the **Event Filter** pane to display a menu.
  3. Click **New → Simple Event Filter**.
  4. In the **Simple Event Filter Builder** window, click the **Event Type** tab.
  5. Clear the **Any** checkbox.
  6. Click **Cluster** to expand the directory tree.
  7. Do one of the following:
    - Click **NT Cluster Server** and select an action to create an event filter for the listed ICSM cluster objects.
    - Click **Software Rejuvenation** and select an action to create an event filter for the listed objects.
  8. Click **Save**.
  9. In the **Event Filter** box, type in a descriptive name for the event, and then click **OK**.

The new filter lists in the **Event Filters** pane of the **Event Action Plan Builder** window.

## ICSM and Software Rejuvenation Event Types

The following table lists the ICSM cluster objects and the Software Rejuvenation events:

Cluster Object	Event Type
Group	Added, Deleted, Property Change, and State (Failed, Offline, Online, Partial Online, and Unknown)
Network	Added, Deleted, Property Change, and State (Down, Partitioned, Unavailable, Unknown, and Up)

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Cluster Object	Event Type
Network Interface	Added, Deleted, Property Change, and State (Failed, Unavailable, Unknown, Unreachable, and Up)
Node	Added, Deleted, Property Change, and State (Down, Joining, Paused, Unknown, and Up)
Property Change	
Quorum Change	
Resource	Added, Deleted, Property Change, and State (Failed, Inherited, Initializing, Offline, Offline Pending, Online, Online Pending, Pending, and Unknown)
Resource Type	Added and Deleted
Software Rejuvenation	Cancelled (Debug, Minimum Reboot Interval, Missed, Node State, No Peers, and Peer State), Failed, and Succeeded
State	Down, Unknown, and Up

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# 5

## Advanced System Management

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This chapter describes how to use the Advanced System Management service for Netfinity Director to change the configuration, modem, network, and automatic dialout settings of your Netfinity Advanced System Management PCI Adapter or Netfinity Advanced System Management Processor.

With the Advanced System Management service, you can configure system management events (such as POST, loader, and operating system time-outs or critical temperature, voltage, and tamper events). If any of these events occurs, the Advanced System Management service can be configured to automatically forward a Netfinity event in one of four ways:

- To a standard numeric pager
- To an alphanumeric pager
- To a Netfinity Director system using a TCP/IP network connection (available only when using Advanced System Management with a Netfinity Advanced System Management PCI Adapter)
- To an SNMP-based system management system in SNMP format (available only when using Advanced System Management with a Netfinity Advanced System Management PCI Adapter)

With this service, you can manage the Advanced System Management hardware installed in your own system or you can use Advanced System Management to connect with the Advanced System Management PCI

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Adapter or Processor installed in a remote server. You can connect with remote Advanced System Management hardware in one of two ways:

- If the remote system has a Netfinity Advanced System Management PCI Adapter installed and the adapter is connected to a Transmission Control Protocol/Internet Protocol (TCP/IP) network, you can open a TCP/IP link with the Netfinity Advanced System Management PCI Adapter from your Netfinity Manager system.
- If your Netfinity Advanced System Management PCI Adapter or Processor is connected to an Advanced System Management (ASM) Interconnect network, or if the remote Netfinity Advanced System Management PCI Adapter or Processor to which you have connected using TCP/IP connection is connected to an ASM Interconnect network, you can use this connection to access and manage the Advanced System Management PCI Adapter or Processor of any other system that is connected to the ASM Interconnect network.

In addition, with Advanced System Management, you can remotely monitor, record, and replay all text generated during power-on self-test (POST) on a remote system that includes a Advanced System Management Adapter or Processor. While monitoring a remote system during POST, you can enter commands from your keyboard that will then be relayed to the remote system.

## **Using the Advanced System Management PCI Adapter as a Network Gateway**

In systems that contain both an Advanced System Management Processor and an Advanced System Management PCI Adapter, the adapter acts as an Ethernet or Token Ring network gateway (or as a shared modem resource). In this configuration, the Advanced System Management Processor generates all events, time-outs, and other system management information. This data is relayed to the Advanced System Management PCI Adapter using the ASM Interconnect connection between the processor and the adapter. The adapter then forwards this information to other systems on the Ethernet or Token Ring network (or uses its modem to forward this data using a serial connection).

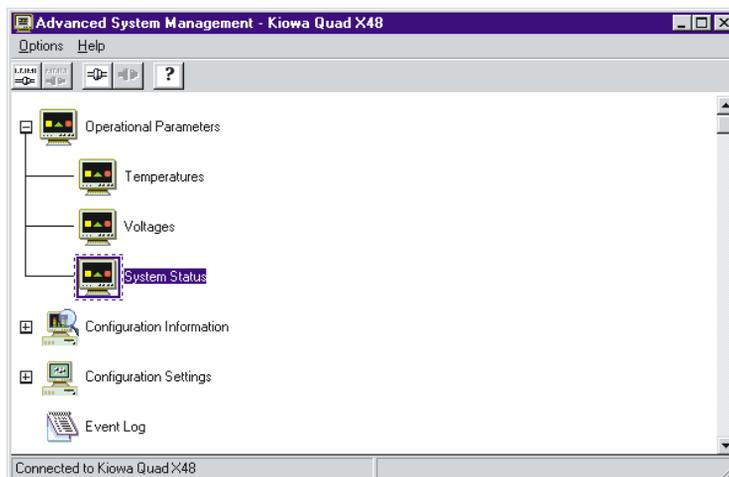
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When configuring systems that have both the Advanced System Management PCI Adapter and the Advanced System Management Processor, all system management settings (such as remote events settings and time-out settings) must be configured on the Advanced System Management Processor. However, before using TCP/IP to communicate with your Advanced System Management PCI Adapter, you must first establish an ASM Interconnect connection with the adapter and configure the network settings.

## Starting Advanced System Management

To start the Advanced System Management service, drag the **Advanced System Management** icon from the Tasks panel of the Netfinity Director console and drop it on a system that supports Advanced System Management in the Group Contents panel **or** right-click on a system that supports Advanced System Management in the Group Contents panel and select Advanced System Management from the system context menu. Then double-click any of the selections available in the **Advanced System Management** window to access the function or configuration information that you need.

**Note:** This starts Advanced System Management on this system and will enable you to configure and manage the Advanced System Management PCI Adapter or Advanced System Management Processor installed in your own system only. To access, configure, and manage an Advanced System Management PCI Adapter or Processor in a remote system, you must first use Advanced System Management to establish a connection with the remote system.



- Double-click **Operational Parameters** to expand the Operational Parameters tree and then double-click on a components to view the current values or status of many system components monitored by the Netfinity Advanced System Management PCI Adapter. For more information, see “Operational Parameters” on page 118.
- Double-click **Configuration Information** to expand the Configuration Information tree and then double-click on a components to view detailed information about the Netfinity Advanced System Management PCI Adapter or Processor, including random-access memory (RAM) microcode, read-only memory (ROM) microcode, and device-driver information. For more information, see “Configuration Information” on page 118.
- Double-click **Configuration Settings** to expand the Configuration Settings tree and then double-click on a components to configure the Netfinity Advanced System Management PCI Adapter or Processor. These features include general settings (such as system identification data, dial-in security settings, the time and date reported by the system management processor clock, time-out and delay values), modem settings, network settings (Netfinity Advanced System Management PCI Adapter only), SNMP settings (Netfinity Advanced System Management PCI Adapter

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only), and Remote Event Settings. For more information, see “Configuration Settings” on page 119.

- Double-click **Event Log** to view the contents of the Netfinity Advanced System Management PCI Adapter Event Log. Information about all remote access attempts and dialout events that have occurred is recorded in the Event Log. For more information, see “Event Log” on page 150.
- Double-click **System Power Control** to instruct the Netfinity Advanced System Management PCI Adapter to power off the system, restart the system, or power on the system. For more information, see “System Power Control” on page 152.
- Double-click **Remote POST Console** to remotely monitor, record, and replay all textual output generated during POST on a remote system that has a Netfinity Advanced System Management PCI Adapter. For more information, see “Remote POST Console” on page 153.
- To update the microcode on your Netfinity Advanced System Management PCI Adapter, from the **Options** pull-down menu, select **Update Microcode...** and then select **System Management Subsystem**. For more information, see “Updating Netfinity Advanced System Management PCI Adapter or Processor Microcode” on page 154.
- To update the System POST/BIOS microcode on a system that includes an Advanced System Management PCI Adapter or Processor, from the **Options** pull-down menu, select **Update Microcode...** and then select **System POST/BIOS**. For more information, see “Updating System POST/BIOS Microcode” on page 155.

## Remote Management Using a TCP/IP or ASM Interconnect Connection

If you want to use your system’s TCP/IP or ASM Interconnect network connection to access and manage the Advanced System Management adapter or processor on a remote system you can use Advanced System Management to:

- 
- Establish a TCP/IP or ASM Interconnect link with the Netfinity Advanced System Management PCI Adapter installed in the remote server
  - Establish an ASM Interconnect link with the Advanced System Management Processor installed in the remote server

You can also establish a TCP/IP connection with a remote Netfinity Advanced System Management PCI Adapter and then “pass through” that Netfinity Advanced System Management PCI Adapter and remotely access and manage any Advanced System Management adapter or processor that is connected to the remote Netfinity Advanced System Management PCI Adapter using an ASM Interconnect network.

**Notes:**

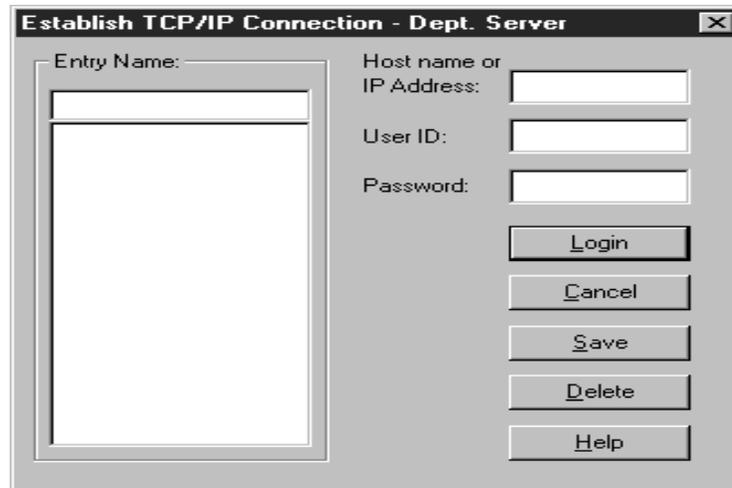
- TCP/IP linking over a network connection is available only when you are using Advanced System Management to directly access a Netfinity Advanced System Management PCI Adapter that is connected to your network.
- ASM Interconnect connections are available only when:
  - you are using Advanced System Management to directly access the Netfinity Advanced System Management PCI Adapter installed in your own system (Netfinity 7000 M10 only).
  - you are using Advanced System Management to access an Advanced System Management adapter or processor that is connected to the same ASM Interconnect network that your Advanced System Management adapter or processor is connected to OR
  - you have first established a TCP/IP link with a remote Netfinity Advanced System Management PCI Adapter that is connected to other Advanced System Management adapters or processors on an ASM Interconnect network.

## **Configuring and Establishing a TCP/IP Connection**

To configure and establish a TCP/IP connection with the Advanced System Management PCI Adapter in a remote server:

1. Start the Advanced System Management service.
2. Click on the **TCP/IP Connection** button in the **Advanced System Management** button bar **or** from the **Options** pull-down menu click **Change Connection** and then click **TCP/IP**.

The **Establish TCP/IP Connection** window opens.



3. Select a TCP/IP connection entry from the **Entry Name** selection list or create a new entry and then select the new entry. To create a new entry:
  - a. Type in the **Entry Name** field a name for the entry.
  - b. Type in the **Host Name or IP Address** field the TCP/IP address or hostname used by the remote Advanced System Management PCI Adapter.
  - c. Type in the **User ID** and **Password** fields a User ID and Password combination that will enable you to access the remote Advanced System Management PCI Adapter.

Type in a User ID and Password that will allow access to the remote Advanced System Management adapter or processor. This must match a User ID and Password combination that has been configured, using the Advanced System Management

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service, to allow access to the Advanced System Management adapter or processor.

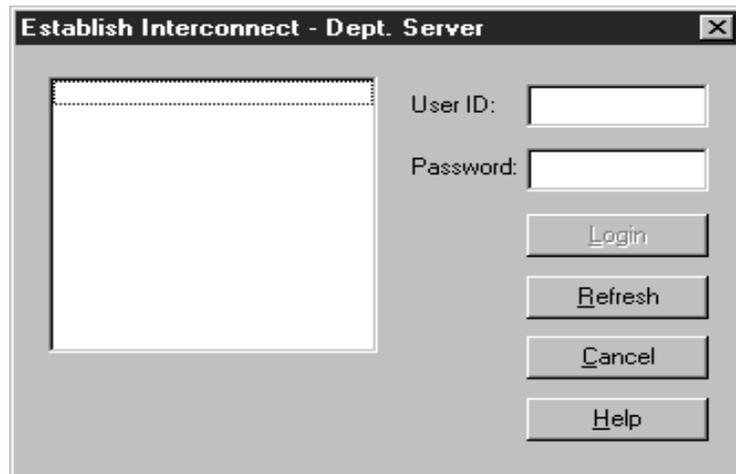
- d. Click on **Save** to add this entry to the **Entry Name** selection list.
4. Click on **Login** to establish the TCP/IP connection with the remote Advanced System Management PCI Adapter. Once the connection is established, use the Advanced System Management service to manage the remote Advanced System Management PCI Adapter.

## Establishing an ASM Interconnect Connection

Unlike the TCP/IP connection, ASM Interconnect connections require no additional configuration prior to attempting to connect with other Advanced System Management adapters or processors on the ASM Interconnect network. To establish an ASM Interconnect connection:

1. Start the Advanced System Management service.
2. Click on the **ASM Interconnect Connection** button in the **Advanced System Management** button bar **or** from the **Options** pull-down menu click **Change Connection** and then click **Interconnect**.

The **Establish Interconnect** window opens.



3. Select a system from the **Establish Interconnect** selection list.
4. Enter a User ID and Password for logging on to the remote Advanced System Management adapter or processor.  

Type in a User ID and Password that will allow access to the remote Advanced System Management adapter or processor. This must match a User ID and Password combination that has been configured, using the Advanced System Management service, to allow access to the Advanced System Management adapter or processor.
5. Click on **Login** to establish an ASM Interconnect connection with the selected system. Once the connection is established, use the Advanced System Management service to manage the Advanced System Management PCI Adapter or Processor in the remote system.

## Selecting an Event Source

Use the selections available from the **Select Event Sources** menu (located in the **Options** pull-down menu) to select the sources of Advanced System Management events that will be received and managed by the Advanced System Management service. There are two selections available, one for each method by which the Advanced System Management PCI Adapter or Processor can report events:

- **Driver (via driver)**  
Enables Director to receive Advanced System Management events generated by the Advanced System Management device drivers. The **Driver (via driver)** selection is always enabled.
- **TCP/IP (via server)**  
Select **TCP/IP (via server)** to enable Director to receive Advanced System Management events generated by the Advanced System Management PCI Adapter which are forwarded using the adapter network connection.  
**Note:** This selection is available only on systems that are using an Advanced System Management PCI Adapter.

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If you do not enable an event source, events generated by this source will not be received and handled as Director events generated by this source will not be received and handled as Director events.

## Operational Parameters

Click on the plus sign beside **Operational Parameters** or double-click on **Operational Parameters** to expand the Operational Parameters tree, showing the Operational Parameters components. Use the Operational Parameters components to view current status of system components, including:

### ■ Temperatures

Includes current temperatures and threshold levels for system components such as far-end adapter, center adapter, microprocessors, system board, and hard disk drive backplane.

#### Notes:

- Monitored system components vary by Advanced System Management adapter or processor.
- VRM voltages are monitored, but not displayed.

### ■ Voltages

Includes +5.9, +3.3, +12.0, and -12.0 Volt power supply voltages.

### ■ System Status

Includes system state (including O/S started, O/S running, POST started, POST stopped (error detected), and system turned off/state unknown), system power status (on or off), and power on hours (the total number of hours that the system has been turned on. This is a cumulative count of all running hours, not a count of hours since the last system restart).

## Configuration Information

Click on the plus sign beside **Configuration Information** or double-click on **Configuration Information** to expand the Configuration Information tree, showing the Configuration Information components. To view Configuration Information, double-click on a

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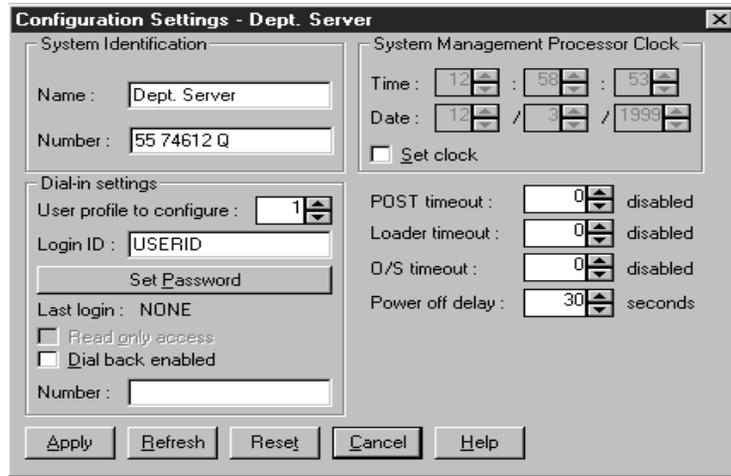
Configuration Information component. Configuration Information is available for three Advanced System Management subsystems.

- System Management Processor Information  
Provides information about the Advanced System Management PCI Adapter or Processor, including System Management Processor microcode build ID, revision number, file name, and date; device driver version number; and System Management Processor hardware revision number.
- System Vital Product Data  
Provides information about the system that contains the Advanced System Management PCI Adapter or Processor, including build ID, unique number, system board identifier, machine type/model, power controller microcode revision level, and front panel microcode revision level.
- System Card Vital Product Data  
Provides information (such as field replaceable unit [FRU] number, unique number, manufacturing ID, and slot number) about a variety of individual components installed in the remote system, including processor card, central processing units (CPU), memory cards, power supplies, power backplane, front panel, I/O backplane, I/O card, DASD backplane, and system management subsystem.

## Configuration Settings

Click on the plus sign beside **Configuration Settings** or double-click on **Configuration Settings** to expand the Configuration Settings tree, showing the Configuration Settings components. Use the Configuration Settings components to configure:

- General Settings
- Remote Event Settings
- Network Settings
- SNMP Settings



Double-click on one of the Configuration Settings components to view or change the configuration of the selected component. For more information, refer to the Configuration Settings component-specific sections that follow.

## General Settings

Double-click on **General Settings** to open the **Configuration Settings** window. The **Configuration Settings** window contains the following groups or fields:

- System Identification
- Dial-in settings
- System Management Processor Clock
- POST time-out
- Loader time-out
- O/S time-out
- Power off delay

## The System Identification Group

The **System Identification** group contains two fields to help you identify the system that contains the Netfinity Advanced System Management PCI Adapter or Processor.

Field	Description
Name	Use this field to provide a name for the system, the name of the system user, or the name of a contact. This information is included with forwarded Netfinity events and with messages that are sent to alphanumeric pagers to help you identify the system that generated the event
Number	Use this field to identify the system with a specific serial or identification number, to record the phone number used to dial into the system, or to provide the phone number of a contact. This information is included with forwarded Netfinity events and with messages that are sent to numeric pagers to help you identify the system that generated the event.

To change the information that is provided by these fields:

1. In the **Name** or **Number** field, type the system information you want to record.
2. Click **Apply** to save this information.

## The Dial-in Settings Group

Use the fields available in the Dial-In settings group to enable or disable dial-in support, and to enable users to dial in and access the Netfinity Advanced System Management PCI Adapter. The Dial-In settings group contains the following items.

Item	Description
User Profile to Configure	Use the spin buttons to select the user profile that you want to configure. This service supports up to 12 separate profiles.

Item	Description
Login ID	<p>Type in this field the login ID that will be used by the remote user. Up to 12 Login IDs can be configured. (This field is case sensitive.)</p> <p><b>Note:</b> A Login ID must be specified to remotely access the Netfinity Advanced System Management PCI Adapter.</p>
Set Password	<p>A password must be provided along with the Login ID to allow a remote user to access the Netfinity Advanced System Management PCI Adapter or Processor. After providing a Login ID, click <b>Set Password</b> to open the <b>Set Password</b> window. (The fields in the <b>Set Password</b> window are case sensitive.)</p> <p><b>Note:</b> This password must be 5-8 characters in length and must contain at least one non-alphanumeric character.</p>
Last Login	Shows the date and time of the last successful login by a remote user.
Read only access	If the <b>Read Only Access</b> check box is checked, the user whose profile is selected will not be able to alter any of the Netfinity Advanced System Management PCI Adapter or Processor settings when access is granted. The user will, however, be able to see all currently configured settings and values except passwords.

Item	Description
Dial Back Enable	If the <b>Dial Back Enabled</b> check box is checked, the Netfinity Advanced System Management PCI Adapter will automatically terminate the connection as soon as the user whose profile is selected logs in, and will then use the telephone number that is entered in the <b>Number</b> field to dial out and attempt to connect with a remote system.

To create a new login ID for a remote user:

1. In the **Login ID** field, type the ID that the remote user will use. This ID can be up to 8 characters.
2. Remote users must provide a password along with a login ID in order to access the Netfinity Advanced System Management PCI Adapter. Click **Set Password** to open the **Set Password** window.
3. From the **Set Password** window:
  - a. In the **Enter Password** field, type a password.
 

**Note:** This password must be 5-8 characters in length and must contain at least one non-alphanumeric character.
  - b. In the **Re-enter Password** field, type the same password that you typed in the **Enter Password** field.
  - c. Click **OK** to save this password and close the **Set Password** window.
4. Click **Apply** to save the new user ID.

To delete the currently selected login ID:

1. Use the spin buttons beside the **User ID to Configure** field to select a previously configured User profile.
2. Click the **Login ID** field.
3. Using the **Backspace** or **Delete** key, delete the currently displayed login ID.

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4. Click **Apply** to remove the user ID.

## The System Management Processor Clock Group

Use the selections available in the **System Management Processor Clock** group to set the time and date that is reported by your Netfinity Advanced System Management PCI Adapter or Processor.

**Note:** The System Management Processor clock is separate from and independent of the system clock. Changes made to this setting will have no effect on the system clock.

To change the time or date:

1. Verify that there is a check in the **Set Clock** check box. You must check this check box to enable the Advanced System Management service to change the currently stored time and date values.
2. Use the spin buttons beside each field to set the time or date.
  - The **Time** fields represent, when viewed from left to right, hours, minutes, and seconds.
  - The **Date** fields represent, when viewed from left to right, month, date, and year.
3. Click **Apply** to save the new time and date.

## POST Time-out

The **POST Time-out** field shows the number of seconds that the Netfinity Advanced System Management PCI Adapter or Processor will wait for the system power-on self-test (POST) to complete before generating a POST Time-out event. If POST takes longer than the configured amount of time to complete and the **POST Time-out** check box (found in the **Enabled Events** group of the **Remote Event Settings** window) is checked, the Netfinity Advanced System Management PCI Adapter or Processor will automatically restart the system one time and will attempt to forward an event to all enabled Remote Event Entries. Once the system restarts, **POST Time-out** is automatically disabled until the system is properly shutdown and restarted.

**Note:** If a POST time-out occurs and you have not checked this check box, the system will restart, but no event will be forwarded.

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To set the POST time-out value, use the spin buttons beside the **POST Time-out** field to set the number of seconds that the Netfinity Advanced System Management PCI Adapter or Processor will wait for POST to complete. Then, click **Apply** to save this value. The maximum POST time-out value you can set is 7650 seconds. Set this value to 0 to disable POST time-out detection.

## Loader Time-out

The **Loader Time-out** field shows the number of seconds that the Netfinity Advanced System Management PCI Adapter or Processor will wait for the system loading process to complete before generating a Loader Time-out event. The Loader Time-out measures the amount of time that passes between the completion of POST and the end of operating system (O/S) startup. If this takes longer than the configured amount of time to complete and the **Loader Time-out** check box (found in the **Enabled Events** group of the **Remote Event Settings** window) is checked, the Netfinity Advanced System Management PCI Adapter will automatically restart the system one time and will attempt to forward an event to all enabled Remote Event Entries. Once the system is restarted, **Loader Time-out** is automatically disabled until the system is properly shutdown and restarted.

**Note:** If you do not check this check box and a Loader time-out is detected, the system will restart but no event will be forwarded.

To set the Loader time-out value, use the spin buttons beside the **Loader Time-out** field to set the number of seconds that the Netfinity Advanced System Management PCI Adapter or Processor will wait between POST completion and O/S startup before generating a time-out event. Then, click **Apply** to save this value. The maximum Loader time-out value you can set is 7650 seconds. Set this value to 0 to disable Loader time-out detection.

## O/S Time-out

A periodic signal is sent from the Netfinity Advanced System Management PCI Adapter or Processor to the O/S to confirm that the O/S is running properly. The O/S Time-out event occurs when the O/S does not respond to the signal within 6 seconds. The **O/S Time-out** field shows the number of seconds that the Netfinity Advanced System

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Management PCI Adapter or Processor will wait between O/S time-out checks. If the O/S fails to respond within 6 seconds, the Netfinity Advanced System Management PCI Adapter or Processor will attempt to restart the system, and if the **O/S Time-out** check box (found in the **Enabled Events** group of the **Remote Event Settings** window) is checked, the Netfinity Advanced System Management PCI Adapter will automatically restart the system one time and will attempt to forward an event to all enabled Remote Event Entries.

**Note:** If you do not check this check box and a O/S time-out is detected, the system will restart but no event will be forwarded.

To set the O/S time-out value, use the spin buttons beside the **O/S Time-out** field to set the number of seconds that the Netfinity Advanced System Management PCI Adapter will wait between O/S time-out checks. Then, click **Apply** to save this value. The maximum O/S time-out value you can set is 255 seconds. Set this value to 0 to disable O/S time-out detection.

## Power Off Delay

The **Power Off Delay** field shows the number of seconds that the Netfinity Advanced System Management PCI Adapter or Processor will wait for the operating system shutdown process to complete before turning off the system.

When the Netfinity Advanced System Management PCI Adapter or Processor initiates a shutdown procedure and the **Power Off** check box (found in the **Enabled Events** group of the **Remote Event Settings** window) is checked, the Netfinity Advanced System Management PCI Adapter will automatically attempt to forward an event to all enabled Remote Event Entries. This event is forwarded after the system is turned off and the **Power Off Delay** time has passed.

To set the power off delay value, use the spin buttons beside the **Power Off Delay** field to set the number of seconds that the Netfinity Advanced System Management PCI Adapter or Processor will wait for the system's operating system shutdown to complete before turning off the system. Then, click **Apply** to save this value. The maximum Power off delay value you can set is 9999 seconds. Set this value to 0 to disable the Power Off Delay.

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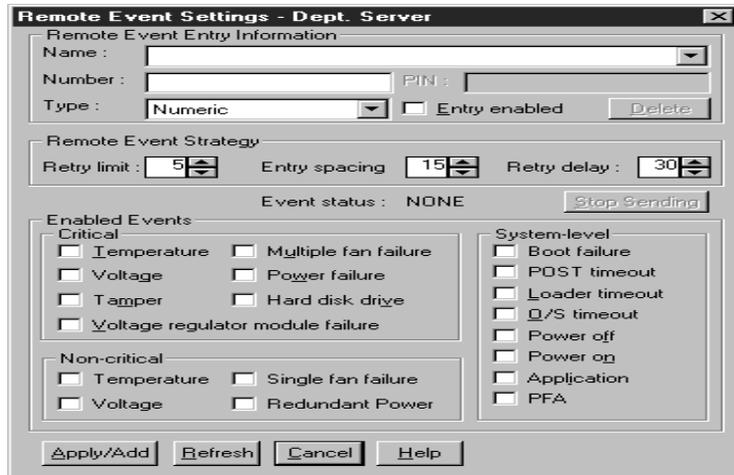
## Other Configuration Settings Functions

The **Configurations Settings** window also includes these three buttons:

Button	Description
Refresh	Click <b>Refresh</b> to update all data that is shown on the <b>Configuration Settings</b> window, including date, time, and last login.
Reset	Click <b>Reset</b> to set all Advanced System Management settings back to their default values, including configuration settings, dialout settings, and advanced dialout settings. <b>Note:</b> All previously configured Advanced System Management settings will be permanently lost.
Cancel	Click <b>Cancel</b> to close this window without saving any changes.

## Remote Event Settings

Double-click on **Remote Event Settings** to open the **Remote Event Settings** window. Use the **Remote Event Settings** window to configure the Advanced System Management Adapter or Processor event forwarding functions. If you configure a Remote Event Entry, the Advanced System Management Adapter or Processor will attempt to forward an event to a remote Netfinity system through a network connection, a numeric pager, an alphanumeric pager, or an SNMP community when any of the events selected from the **Enabled Events** group occur. This event will contain information about the nature of the event that occurred, the time and date at which the event occurred, and the name of the system that generated the event.



Before Advanced System Management can forward events to SNMP communities, you must configure the Advanced System Management SNMP settings. To configure SNMP settings, double-click the **SNMP Settings** component of the Configuration Settings tree. This will open the **SNMP Settings** window.

You can configure the Advanced System Management PCI Adapter or Processor to forward events to multiple pagers or Netfinity Director systems in response to individual critical and non-critical dialout events. Therefore, the **Event Status** text will read **SENDING** as soon as the first event forwarding operation begins, change to **NONE** when the event forwarding operation is completed, change to **SENDING** again when the second event forwarding operation begins, change to **NONE** when the second event forwarding operation is completed, and so on. If you click **Stop Sending**, the Netfinity Advanced System Management PCI Adapter or Processor abandons the currently active event forwarding operation, and moves to the next one.

Your Netfinity Advanced System Management PCI Adapter or Processor can be configured with up to twelve separate Remote Event Entries.

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## Remote Event Entry Information Group

To edit or create a Remote Event Entry:

1. In the **Name** field, type the name of the person or system to which the event will be forwarded. The information in the **Name** field is strictly for your use in identifying the Remote Event Entry. If you are editing a previously configured Remote Event Entry, select the entry that you want to edit from the **Name** selection list.
2. In the **Number** field, type a telephone number (if you are forwarding the event to a pager) or an IP address (if you are forwarding the event to a system using the network adapter; this feature is supported only with a Netfinity Advanced System Management PCI Adapter) that will be used to forward an event.  
**Note:** Depending on your paging service, you might need to increase the amount of time that this event action waits after dialing the telephone number before it transmits the numeric data. To increase the amount of time that will pass before the numeric data is transmitted, add one or more commas (,) to the end of the telephone number. Each comma will cause the modem to wait two seconds before transmitting the numeric data.
3. In the **PIN** field, type the personal identification number required by your alphanumeric pager provider. This field will be active only if you select Alpha-numeric in the **Type** field.
4. From the **Type** selection list, select the type of connection the Netfinity Advanced System Management PCI Adapter or Processor will attempt to make in order to forward the event notification. You can select Numeric (for standard pagers), Alpha-numeric (for alphanumeric pagers), or Netfinity IP (for using a TCP/IP link to connect to a remote Netfinity system; available only on systems with a Netfinity Advanced System Management PCI Adapter),
5. Check the **Entry Enabled** check box to activate this Remote Event Entry. If the **Entry Enabled** check box is not checked, no events will be forwarded to this entry.

- 
6. Select dialout events from the **Enabled Events** group. If any of the checked events occur, the Netfinity Advanced System Management PCI Adapter or Processor will use the telephone number or IP address specified in the **Number** field to forward an event describing the event using the method selected in the **Type** field.
  7. Click **Apply/Add** to save these settings.

To remove a previously configured Remote Event Entry, select the name of the entry from the **Name** selection list and then select **Delete**.

### Remote Event Strategy Group

Use the selections available in the Remove Event Strategy group to specify the number of times Advanced System Management will attempt to forward an event if an attempt fails, the amount of time that Advanced System Management will allow between event generation attempts, and the amount of time Advanced System Management will wait between successive event forwarding operations. The Remote Event Strategy group contains the following items.

Item	Description
Retry limit	Use the spin buttons to select the number of additional times that Advanced System Management will attempt to forward an event. The Dialout retry limit applies only to attempts to forward the event information to an alphanumeric pager. If you are forwarding the event information to a numeric pager, only one attempt will be made to forward this information. The maximum value for this field is 8.

Item	Description
Entry spacing	If you have configured more than one Remote Event Entry to forward events, the Netfinity Advanced System Management PCI Adapter will attempt to contact each of these entries sequentially. Use the spin buttons to specify the number of seconds for the Netfinity Advanced System Management PCI Adapter or Processor to wait between dialout attempts for separate Remote Event Entries. The minimum value for this field is 15 seconds, and the maximum value is 120 seconds.
Retry delay	Use the spin buttons to specify the <b>Delay</b> number of seconds that Advanced System Management will wait before retrying a dialout attempt. The minimum value for this field is 30 seconds, and the maximum value is 240 seconds.

## Enabled Events Group

Use the selections available in the **Enabled Events** group to specify which events will result in all currently configured Entries being contacted by the Advanced System Management PCI Adapter or Processor. Any selected items will, if detected, result in an event describing the event being forwarded, using the method selected in the **Type** field, to the recipient specified by the **Name** field in the **Remote Event Entry** window.

If the event is being forwarded to a pager, Advanced System Management will include information about the event that triggered the event. If the event is forwarded to a numeric (or standard), pager, the page will include a code number that corresponds to the triggering event. If the event is forwarded to an alphanumeric pager, the page will include both a code number and a text string that describe the triggering event. For more information on the numeric codes and text strings that are transmitted to pagers, refer to the following tables.

All numeric codes and text strings are included in forwarded Netfinity Manager events, regardless of whether they are forwarded using a serial or TCP/IP link. All information is also included in forwarded SNMP events.

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The Enabled Events group is divided into the Critical, Non-critical, and System groups. The Critical Enabled Events group contains the following items.

<b>Item</b>	<b>Description (if checked)</b>	<b>Numeric Code</b>	<b>Text String</b>
Temperature	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event and then automatically initiate a system shutdown if any monitored temperatures exceed their threshold values.	00	SYSTEM SHUTDOWN DUE TO TEMPERATURE
Voltage	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if the voltages of any monitored power sources fall outside their specified operational ranges.	01	SYSTEM SHUTDOWN DUE TO VOLTAGE
Tamper	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if the voltages of any monitored power sources fall outside their specified operational ranges.	02	SYSTEM TAMPER EVENT

Item	Description (if checked)	Numeric Code	Text String
Voltage regulator module failure	Advanced System Management PCI Adapter or Processor will forward an event and then automatically initiate a system shutdown if the voltage regulator module (VRM) fails.	06	VRM FAILURE
Multiple fan failure	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if two (or more) of the systems cooling fans fail and will automatically initiate a system shutdown.	03	MULTIPLE SYSTEM FAN FAILURES
Power failure	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if the systems power supply fails.	04	POWER SUPPLY FAILURE
Hard disk drive	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if one or more of the hard disk drives in the system fail.	05	DASD FAULT

The Non-critical Enabled Events group contains the following items.

Item	Description	Numeric Code	Text String
Temperature	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if any monitored temperature exceeds its threshold value. However, unlike the Critical Temperature event, this Event will not initiate a system shutdown automatically.	12	NON-CRITICAL TEMPERATURE THRESHOLD EXCEEDED
Voltage	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if any monitored voltage exceeds its threshold value.	13	VOLTAGE
Single fan failure	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if one of the systems cooling fans fails.	11	SINGLE FAN FAILURE

Item	Description	Numeric Code	Text String
Redundant Power	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if the redundant power system fails.	10	POWER REDUNDANCY HAS BEEN COMPROMISED. PLEASE CHECK THE SYSTEM MANAGEMENT PROCESSOR ERROR LOG FOR MORE INFORMATION.

The **System Enabled Events** group contains the following items.

Item	Description (if checked)	Numeric Code	Text String
Boot Failure	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if the system fails to start.	25	REQUIRES POST INTERACTION. POST DETECTED ERROR WHICH PREVENTS THE SYSTEM FROM BOOTING.
POST time-out	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if the time-out value (specified in the <b>Configuration Settings</b> window) is exceeded.	20	POST/BIOS WATCHDOG EXPIRED. SYSTEM RESTARTED.

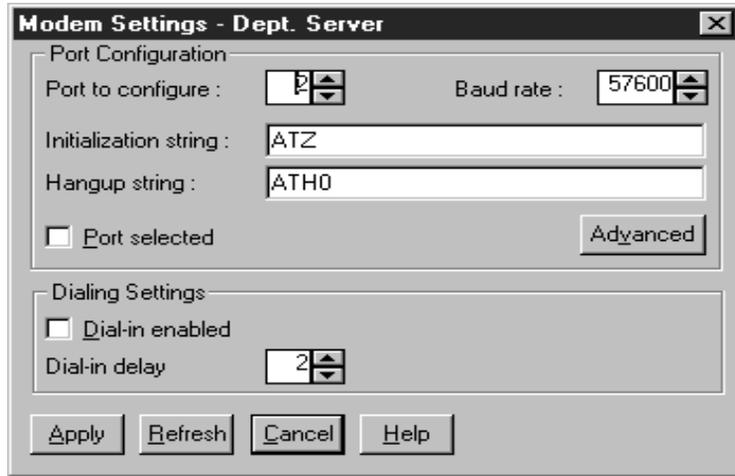
Item	Description (if checked)	Numeric Code	Text String
O/S time-out	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if the <b>O/S System</b> time-out value (specified in the <b>Configuration Settings</b> window) is exceeded.	21	OPERATING SYSTEM WATCHDOG EXPIRED. SYSTEM RESTARTED.
Loader time-out	Advanced System Management PCI Adapter or Processor will forward an Event if the Loader time-out value (specified in the <b>Configuration Settings</b> window) is exceeded.	26	LOADER WATCHDOG EXPIRED. SYSTEM RESTARTED.
Power off	The Netfinity Advanced System Management PCI Adapter or Processor will forward OFF an Event if the system is powered off.	23	SYSTEM COMPLEX POWERED OFF
Power on	The Netfinity Advanced System Management PCI Adapter or Processor will forward an Event if the system is turned on.	24	SYSTEM COMPLEX POWERED ON

Item	Description (if checked)	Numeric Code	Text String
Application	The Netfinity Advanced System Management PCI Adapter or Processor will forward an event if it receives a Netfinity event.	22	APPLICATION LOGGED EVENT
PFA	Advanced System Management PCI Adapter will forward an event if it receives a Predictive Failure Analysis (PFA(R)) Event from the system.	27	PFA

## Modem Settings

Double-click on **Modem Settings** to open the **Modem Settings** window. Use the **Modem Settings** window to specify modem and dialing settings. The **Modem Settings** window contains the following groups or fields:

- Port Configuration
- Dialing Settings



## The Port Configuration Group

Use the Port Configuration group to specify and configure the modem or port that will be used to forward an event when an Advanced System Management Event occurs. The Port Configuration group contains the following items.

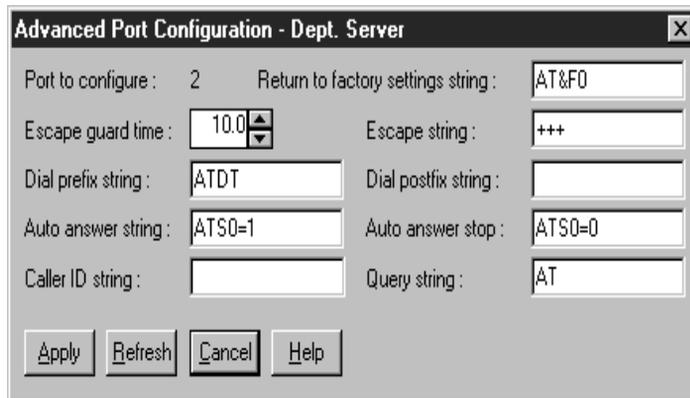
Item	Description
Port to configure	Use the spin buttons to select the port that your modem is configured to use. This spin button will show only values that are available for use by your Netfinity Advanced System Management PCI Adapter or Processor. The port that you select to use affects the availability of the modem for use by either the Netfinity Advanced System Management PCI Adapter or Processor or the operating system. The ports that are available to the system or to the Advanced System Management service vary depending on your hardware configuration.
Baud Rate	Use the spin buttons to specify the baud rate for the serial port.

Item	Description
Initialization string	Type the initialization string that will be used for the specified modem. A default string is provided (ATE0). Do not change this string unless your dialout functions are not working properly.
Hang-up string	Type the initialization string that will be used to instruct the modem to disconnect. A default string is provided (ATH0). Do not change this string unless your dialout functions are not working properly.
Port selected	This check box indicates whether the port number currently displayed in the <b>Port to Configure</b> field is the port that is currently designated for use by the Netfinity Advanced System Management PCI Adapter or Processor. Check this check box if you want to configure the Netfinity Advanced System Management PCI Adapter or Processor to use the currently displayed port number.
Advanced button	Click this button to open the <b>Advanced Port Configuration</b> window.

The **Advanced Port Configuration** window contains the following items.

Item	Description
Return to factory settings string	Type the initialization string that returns the modem to its factory settings when the modem is initialized. The default is AT&F0.
Escape guard time	Type in this field the length of time TIME <sup>3</sup> before and after the escape string is issued to the modem. This value is measured in 10 millisecond intervals. The default value is 1 second.
Escape string	Type the initialization string that returns the modem to command mode when it is currently talking to another modem (connected). The default is +++.

Item	Description
Dial prefix string	Type the initialization string that STRING <sup>3</sup> is used before the number to be dialed. The default is ATDT.
Dial postfix string	Type the initialization string that STRING <sup>3</sup> is used after the number is dialed to tell the modem to stop dialing. The default is the Carriage Return character or ^M.
Auto-answer string	Type the initialization string that STRING <sup>3</sup> is used to tell modem to answer the phone when it rings. The default is to answer after two rings or ATSO=2.
Auto-answer stop	Type the initialization string that STOP <sup>3</sup> is used to tell the modem to stop answering the phone automatically when it rings. The default is ATSO=0.
Caller ID String	Type the initialization string that will be used to get Caller ID information from the modem.
Query string	Type the initialization string that is used to find out if the modem is attached. The default is AT.



The port that you select to use affects the availability of the modem for use by either the Netfinity Advanced System Management PCI Adapter or Processor or the operating system. The ports that are available to the system or to the Advanced System Management service vary depending on your hardware configuration.

- If the system has an Advanced System Management Processor only, use this table to determine what ports are available.

Physical Ports (as labeled)	A	B	C
Ports Available to Advanced System Management	Port 1 Shared	N/A	Port 2 Dedicated
Ports Available to Operating System	COM 1 Shared	COM 2	N/A

- If the system has an Advanced System Management PCI Adapter only, use this table to determine what ports are available.

Physical Ports (as labeled)	A	B	MODEM	COM_AUX
Ports Available to Advanced System Management	N/A	N/A	Port 1 Shared	Port 2 Dedicated
Ports Available to Operating System	COM 1	COM 2	COM 3 Shared	N/A

- If the system has an Advanced System Management PCI Adapter and an Advanced System Management Processor, use this table to determine what ports are available.

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Physical Ports (as labeled)	A	B	C	MODEM	COM_AU X
Ports Available to Advanced System Management	Port 1 Shared	N/S	Port 2 Dedicated	N/A	N/A
Ports Available to Operating System	COM 1 Shared	COM 2	N/A	N/A	N/A

**Notes:**

- Shared ports are recognized by the operating system when the system is running. Shared ports are recognized by the Advanced System Management PCI Adapter or Processor when the system is starting up or turned off. The shared port will also be recognized by the system, but not by the Advanced System Management PCI Adapter or Processor, when started with DOS.
- In a system with the Advanced System Management PCI Adapter only, the device driver must be running for the operating system to recognize COM3.

**The Dialing Settings Group**

Use Dialing Settings to specify settings related to the modem, and to configure the modem that is used to forward an event when a Advanced System Management Event occurs. The Dialing Settings group contains the following items.

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Item	Description
Dial-in enabled	Check this check box to enable remote users to dial into and access the Netfinity Advanced System Management PCI Adapter. If this box is unchecked, remote users will be unable to remotely access the Netfinity Advanced System Management PCI Adapter. Click <b>Apply</b> after checking or unchecking this check box to save the new setting.

Item	Description
Own port on startup	<p>Check this check box to reserve a serial port for exclusive use by the Netfinity Advanced System Management PCI Adapter or Processor. Checking this box will reserve one of the adapter's integrated communications ports. Click <b>Apply</b> after checking or unchecking this check box to save the new setting.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Check this box if you are configuring your system for dial-in access. If this check box is not checked, you will be unable to dial into this system unless the adapter has reclaimed the port for a dialout. If you want to configure the Netfinity Advanced System Management PCI Adapter or Processor to always be dial-in enabled, regardless of whether the system is on, you must check this check box. When this check box is checked, you cannot configure the specified port for use by your system.</li> <li>• Port C is dedicated for use by the Netfinity Advanced System Management PCI Adapter only. Port A is used by the operating system, and is available to the Netfinity Advanced System Management PCI Adapter only when one of the following conditions exists: <ul style="list-style-type: none"> <li>■ The server is off</li> <li>■ The Netfinity Advanced System Management PCI Adapter needs a port to perform a Critical Enabled Event Event (in this case, the Netfinity Advanced System Management PCI Adapter seizes control of the port from the operating system, dials out, and then turns off the server to avoid damage to your hardware).</li> </ul> </li> </ul>

Item	Description
Dial-in delay (minutes)	The <b>Dial-In Delay (Minutes)</b> field shows the number of minutes that must pass after an incorrect User ID or Password has been used in six successive dial-in attempts before valid dial-in access will be permitted. After the sixth successive login failure, dial-in access is disabled for the number of minutes that you specify, the Netfinity Advanced System Management PCI Adapter or Processor adds an entry in the Event Log noting that dial-in access was suspended due to six successive login failures, and the Netfinity Advanced System Management PCI Adapter or Processor attempts to forward an event if the <b>Tamper Enabled Events</b> check box has been checked. The minimum value for this field is 4 minutes, and the maximum value is 240 minutes.

### Initialization String Guidelines

If you need to provide a new initialization string, refer to the user's guide that came with your modem. Your initialization string must contain commands that configure your modem as follows:

- Command echoing OFF
- Online character echoing OFF
- Result codes ENABLED
- Verbal result codes ENABLED
- All codes and Connect messages with BUSY and DT detection
- Protocol identifiers added - LAPM/MNP/NONE V42bis/MNP5
- Normal CD operations
- DTR ON-OFF hang-up, disable AA and return to command mode
- CTS hardware flow control
- RTS control of receive data to computer
- Queued and nondestructive break, no escape state

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**Note:** The abbreviations in these commands have the following meanings:

**AA** Auto Answer

**CD** Carrier Detect

**CTS** Clear to Send

**DT** Data Transfer

**DTR** Data Terminal Ready

**RTS** Ready to Send

## Network Settings

Double-click on **Network Settings** to open the **Network Settings** window. Use the **Network Settings** window to specify network settings on the Netfinity Advanced System Management PCI Adapter.

**Note:** This window is only available when you are using the Advanced System Management service to manage a system that has a Netfinity Advanced System Management PCI Adapter or if you have used Advanced System Management to establish a TCP/IP, serial, or ASM Interconnect connection with a remote Netfinity Advanced System Management PCI Adapter.

The **Network Settings** window contains the following items.

Item	Description
Network interface spinbox	Use the spin buttons to select a network interface to configure. When you have selected the network interface you want to use, check the <b>Interface Enabled</b> check box.
Host name	Type the TCP/IP host name that will be used by the Netfinity Advanced System Management PCI Adapter.
IP address	Type the IP address that will be used by the Netfinity Advanced System Management PCI Adapter.

Item	Description
Subnet mask	Type the subnet mask that will be used by the Netfinity Advanced System Management PCI Adapter.
Gateway	Type the TCP/IP address of the gateway that will be used by the Netfinity Advanced System Management PCI Adapter.
Line type	Use the spin buttons to select the line type that will be used by the Netfinity Advanced System Management PCI Adapter. Available selections are Ethernet, PPP, and Token Ring. Check the <b>Disable Routing</b> check box if needed
Data rate	Use the spin buttons to select the data rate that will be used by the Netfinity Advanced System Management PCI Adapter. Available selections are AUTO, 4M, 16M, 10M, and 100M.
Duplex	Use the spin buttons to select the duplex method that will be used by the Netfinity Advanced System Management PCI Adapter. Available selections are AUTO, FULL and HALF.
MTU size	Use the spin buttons to specify the maximum transmission unit (MTU) value that will be used by the Netfinity Advanced System Management PCI Adapter.
MAC address	Type the media access control (MAC) address of the network adapter being used by the Netfinity Advanced System Management PCI Adapter.

**Attention:** If you have installed the Netfinity Advanced System Management Token Ring Connection, you must not enable or use the Ethernet port that is included on your Advanced System Management PCI Adapter. Enabling the Ethernet port while the IBM Turbo 16/4 Token Ring PCMCIA card is installed on your adapter will cause your system to become unstable. To enable, configure, or use the Ethernet

port, you must first remove the IBM Turbo 16/4 Token Ring PCMCIA card from your Advanced System Management PCI Adapter

## SNMP Settings

Double-click on **SNMP Settings** to open the **SNMP Settings** window. Use the **SNMP Settings** window to specify SNMP settings for the Netfinity Advanced System Management PCI Adapter. These settings must be configured correctly for the Netfinity Advanced System Management PCI Adapter to forward events to SNMP managers on the network.

**Note:** This window is only available when you are using the Advanced System Management service to manage a system that has a Netfinity Advanced System Management PCI Adapter or if you have used Advanced System Management to establish a TCP/IP, serial, or ASM Interconnect connection with a Netfinity Advanced System Management PCI Adapter. If you are connected to a system that does not have a Netfinity Advanced System Management PCI Adapter, this window will not be available.

The screenshot shows the 'SNMP Settings' dialog box. It features a title bar with the text 'SNMP Settings'. The main area contains the following elements:

- Two checkboxes:  'SNMP agent enabled' and  'Traps disable'.
- Two text input fields: 'System contact:' and 'System location:'.
- A section titled 'SNMP Communities' containing:
  - A 'Community:' dropdown menu with '1' selected.
  - A 'Community name:' text input field containing 'public'.
  - A 'Community IP address 1:' text input field containing '130.57.3.20'.
  - A 'Community IP address 2:' text input field containing '0.0.0.0'.
  - A 'Community IP address 3:' text input field containing '0.0.0.0'.
- Four buttons at the bottom: 'Apply', 'Refresh', 'Cancel', and 'Help'.

The **SNMP Settings** window contains the following items.

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Item	Description
SNMP Agent Enabled	Check this checkbox to enable Netfinity Advanced System Management PCI Adapter to forward events to SNMP managers on your network.
Traps Disable	Check this checkbox to prevent SNMP traps from being sent.
System Contact	Type in this field the name of the SNMP System Contact.
System Location	Type in this field information regarding your system's location.
Community	Use this spin button to select and define up to three SNMP communities. <b>Note:</b> SNMP events will be sent only to the currently selected SNMP communities.
Community Name	Type in this field the name of the selected SNMP community.
Community IP Address 1, 2, 3	Type in these fields the IP addresses for the selected SNMP communities.

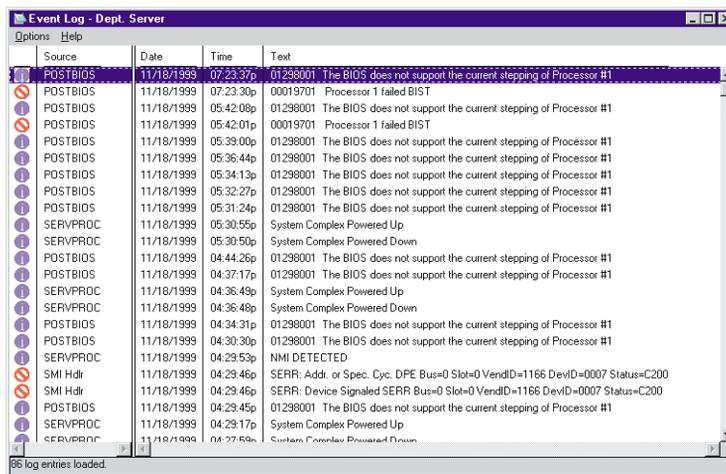
After making any changes to these settings, click **Apply** to save the changes. Then, close this window and click **Restart** in the **Network Settings** window. Changes to Network Settings on a Netfinity Advanced System Management PCI Adapter will not take effect until the adapter has been restarted.

## Event Log

Click **Event Log** to open the **Event Log** window. This window contains all entries that are currently stored in the Advanced System Management PCI Adapter or Processor event log. Information about all remote access attempts and dialout events that have occurred is recorded in the Advanced System Management adapter or processor event log.

**Notes:**

- If you are using the Advanced System Management service with a Netfinity Advanced System Management PCI Adapter installed in a Netfinity server, the event log might contain entries that begin with the text “I2C Message.” These messages are normal and are intended for use by services in the event of system problems.
- If you are using the Advanced System Management service with a Netfinity 8500 M10, 7000 M10, 7000 M20, 5600, 5500, 5500 M10, 5500 M20, or 5000 server, the event log will also include any POST error messages.



The following functions are available from the Options pull-down menu in the **Event Log** window:

**Load** Refreshes the contents of the **Event Log** window.

**Print to file**

Saves the contents of the **Event Log** window to a text file.

**Print to printer**

Sends the contents of the **Event Log** window to a printer attached to your system.

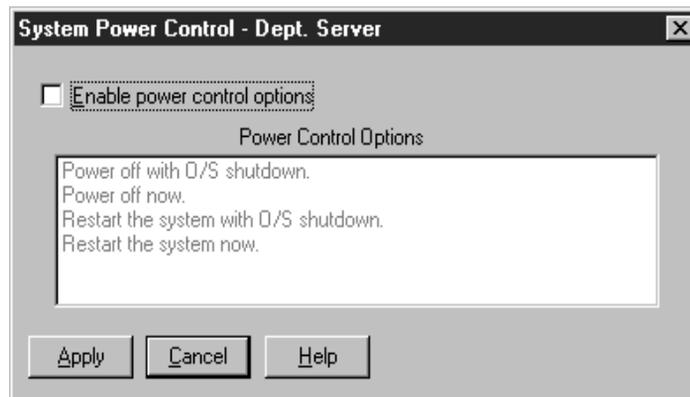
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**Clear log** Erases all entries that are currently stored in the Event Log (including any entries that are not currently visible in the **Event Log** window).

**Note:** Once you use **Clear Log** to erase the entries in the Event Log, they are permanently erased and cannot be retrieved.

## System Power Control

Double-click on **System Power Control** to open the **System Power Control** window. Use the **System Power Control** window to instruct the Netfinity Advanced System Management PCI Adapter or Processor to turn off the system, restart the system, or turn on the server. To initiate any of the power control options, you must first check the **Enable Power Control Options** check box. If this check box is unchecked, the Power Control Options field will not be available.



The following System Power Control functions are available at all times.

Function	Description
Power off with O/S shutdown	Performs an O/S shutdown before removing power from the system.
Power off now	Immediately removes power from the system.

Function	Description
Restart the system with O/S shutdown	Performs an O/S shutdown, removes power from the system, and then restores power to the system.
Restart the system now	Immediately removes power from the system, and then restores power to the system.

If you are directly connected to the Netfinity Advanced System Management PCI Adapter through a TCP/IP link, the **Power On Now** selection will also be available. This function turns on the server and allows the microprocessor to perform POST, loading, and O/S startup procedures.

To initiate a Power Control Option:

1. Check the **Enable Power Control Options** check box.

NOTE: To initiate any of the power control options, you must first check the **Enable Power Control Options** check box. If this check box is unchecked, the **Power Control Options** field will not be available.

2. From the **Power Control Options** field, select the Power Control Option you want to activate.
3. Click **Apply**.

## Remote POST Console

You can use the Advanced System Management Remote POST Console function to remotely monitor, record, and replay all textual output generated during POST. To monitor and record the POST data on a remote system:

1. Connect to the remote Netfinity Advanced System Management PCI Adapter or Processor.
2. Open the **Remote POST** window.
3. Restart the remote system (using the Advanced System Managements System Power Control functions).

All POST data will be displayed in and recorded by the Remote POST Console as the remote system completes POST. While you are monitoring POST on a remote system, all local keystrokes are relayed

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automatically to the remote system, enabling you to interact with the POST process on the remote system.

To review data after POST completes, disconnect from the remote system and use the Replay functions.

Use the selections available in the Replay menu to replay the text output that was captured during the last Remote POST operation. All text that was displayed by the remote system during POST will be displayed as it appeared on the remote system.

- To begin playing the recorded POST data, or to resume playing the recorded POST data after stopping playback, click **Replay Last POST**.
- To halt playback of the recorded POST data, click **Stop**.
- To resume viewing the recorded POST data from the beginning, click **Restart**.
- Click **Fast**, **Medium**, or **Slow** to specify the speed at which the recorded POST data is displayed in the **Remote POST** window.

**Note:** Remote POST data can be replayed only when you are not connected to a remote system's Netfinity Advanced System Management PCI Adapter or Processor.

## Updating Netfinity Advanced System Management PCI Adapter or Processor Microcode

**Attention:** If you update the Netfinity Advanced System Management PCI Adapter microcode, the default user name (USERID) and password (PASSWORD) are reset. If you had previously changed them, you will need to change them again.

To update the Netfinity Advanced System Management PCI Adapter or Processor microcode:

1. From the Options menu, click **Update Microcode...** and then click **System Management Subsystem**.  
An Insert Diskette window opens.
2. Insert the SystemManagement microcode update diskette into the diskette drive.

3. Click **OK** to continue.
4. Warning notices will appear, asking that you verify that you want to continue. Click **OK** to continue or **Cancel** to stop the microcode update process.

When you have verified that you want to proceed with updating the Netfinity Advanced System Management PCI Adapter or Processor microcode, the Advanced System Management service will apply the microcode update to the Netfinity Advanced System Management PCI Adapter or Processor.

During this process, some of the monitoring functions of the Netfinity Advanced System Management PCI Adapter or Processor (such as the environmental monitors) will be disabled. After you have updated the microcode all system monitoring will resume.

## Updating System POST/BIOS Microcode

To use Advanced System Management and your Advanced System engagement PCI Adapter or Processor to update the system POST/BIOS Microcode:

1. From the Options menu, click **Update Microcode...** and then click **System POST/BIOS**.  
An Insert Diskette window opens.
2. Follow the onscreen directions and insert the System POST/BIOS update diskette into the diskette drive.
3. Click **OK** to continue.
4. Warning notices will appear, asking that you verify that you want to continue. Click **OK** to continue or **Cancel** to stop the microcode update process.

When you have verified that you want to proceed with updating the system POST/BIOS microcode update the Advanced System Management service will apply the microcode update to the system that contains the Advanced System Management PCI Adapter or Processor to which you are connected.

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# 6

## ServeRAID Manager Program

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This chapter provides the information needed to start and use the ServeRAID Manager program. You can use the ServeRAID Manager program to easily configure and monitor your ServeRAID controllers.

The information in this chapter is a high level explanation of the ServeRAID Manager program and its capabilities. For instructions on specific processes using the ServeRAID Manager program, refer to the ServeRAID Manager online help.

**Note:** The ServeRAID Manager program works with systems using Microsoft Windows NT, Windows 95, Windows 98.

### Using the ServeRAID Manager Program Interface

The graphical interface in the ServeRAID Manager program makes it easy for you to create, delete, change, view and monitor your ServeRAID configuration.

Before you begin, review the following illustration to become familiar with the layout of the ServeRAID Manager program windows.

#### Viewing the Menu Bar

The menu bar is a set of menu names located directly below the title bar. It provides commands from drop-down menus. The menu bar options include; File, View, Remote, Actions, and Help.

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## Viewing the Toolbar

The toolbar is a set of buttons that are located directly below the menu bar. These buttons serve as shortcuts for many frequently used commands. When you first view the ServeRAID Manager window, some commands are disabled and are enabled only after you access certain menu commands.

The toolbar includes the following commands.

Icon	Command
	Create arrays
	Configure for clustering
	Scan for new or removed ready drives
	Silence repeating alarm
	Help

## Viewing the Expandable Tree

The ServeRAID Manager interface provides an expandable tree view of your ServeRAID subsystem.

You will perform most of your ServeRAID configuration and maintenance tasks by first selecting the ServeRAID controller, array, logical drive, hot-spare drive, or physical drive objects from this Main Tree.

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## Viewing the Main Panel

The ServeRAID Manager interface provides specific device information or configuration instructions. When the ServeRAID Manager program is in the Information mode and you select an object from the Main Tree, detailed information about the object appears in this panel. When the ServeRAID Manager program is in the Configuration mode, the instructions needed to configure your ServeRAID subsystem appear in this panel.

## Viewing the Event Viewer

The ServeRAID Manager interface provides advisory and progressive-status information and messages during the ServeRAID configuration process and while monitoring systems with ServeRAID controllers. Each message appears with a host name from where the event originated, a time stamp, a date stamp, and an icon that classifies the severity of the event. The event icons are:

- Information: An "i" inside a blue circle
- Warning: A "!" inside a yellow triangle
- Fatal: An "x" inside a red circle

Warning messages identify potential data-loss situations, and Fatal messages inform you when a failure has occurred. All Fatal messages will launch an audible alarm.

## Viewing the Status Bar

Provides three types of information in a resizable panel. The panels contain the following information:

- The left panel displays the managed system status, which is either **No problems detected on any system** or **Problems detected on one or more systems**.
- The center panel displays the current tree path.
- The right panel displays a progress meter with the label of the currently selected system and the process that is taking place at the current time.

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## Using the ServeRAID Manager Program

To start the ServeRAID Manager, drag the task to the system. ServeRAID Manager starts in Information mode.

### Using the Configuration Mode

You can use the Configuration mode to create up to eight independent disk arrays for each ServeRAID controller. The Configuration mode provides two configuration paths: Express configuration and Custom configuration.

### Learning about Express Configuration

Express configuration provides a quick and easy path for you to automatically configure your ServeRAID controller. This choice creates the most efficient ServeRAID configuration based on the number and capacity of the Ready drives available in your system. If four or more Ready drives of the same capacity are available, this choice also will define a *hot-spare* drive for the ServeRAID controller. A hot-spare drive is a physical drive that is defined for automatic use when a similar drive fails.

The Express configuration choice groups all Ready drives of the same capacity into one or more disk arrays and defines one logical drive for each array. This choice defines the size of the logical drive, based on the amount of free space available, and it assigns the highest RAID level possible, based on the number of physical drives available.

For example, if your server contains one 1024 MB Ready drive, two 2150 MB Ready drives, and four 4300 MB Ready drives, Express Configuration will create three arrays and one hot-spare drive such as the following:

**Array A:** The total capacity of this array is 1024 MB (1 x 1024 MB) and it contains one 1024 MB RAID level-0 logical drive.

**Array B:** The total capacity of this array is 4300 MB (2 x 2150 MB) and it contains one 2150 MB RAID level-1 logical drive.

**Array C:** The total capacity of this array is 12900 MB (3 x 4300 MB) and it contains one 8600 MB RAID level-5 logical drive.

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**Hot Spare:** Express Configuration defines one of the four 4300 MB drives as a hot-spare drive.

**Notes:**

- When there are four or more Ready drives of the same capacity, Express configuration defines one drive as a hot spare and the remaining drives into one array (as in Array C).
- A hot-spare drive must be of equal or greater capacity than the drive that it is intended to replace. In this configuration, the 4300 MB drive can replace any failed drives in Array B or Array C. The drive in Array A cannot be replaced because it is RAID level-0.

## Using Express Configuration

To use the Express configuration path:

**Note:** If the Express configuration mode/Custom configuration mode radio buttons do not appear on the right screen, click on the tool bar.

1. Click the ServeRAID controller that you want to configure in the Main Tree.
2. If it is not already selected, click the **Express configuration** radio button.
3. Click **Next**.
4. Review the information that appears on the **Configuration summary** screen.

**Notes:**

- Some operating systems have size limitations for logical drives. Before you save the configuration, you might want to verify that the size of the logical drive is appropriate for your operating system. See your operating-system documentation for more detailed information.
- To change the configuration, click **Modify arrays** or **Modify logical drives**.

- 
5. Click **Apply** to accept and save the configuration. The configuration is saved in the ServeRAID controller and in the physical drives.

## Learning about Custom Configuration

The Custom configuration path allows you to manually configure your ServeRAID subsystem. Using this path, you can select the drives that you want to include in each array, define the number and size of the logical drives for each array, and select the drives that you want to use as hot spares.

The Custom configuration path allows you to manually configure your ServeRAID subsystem. Using this path, you can select the drives that you want to include in each array, define the number and size of the logical drives for each array, and select the drives that you want to use as hot spares.

Before you select the Custom configuration path, consider the following:

- Each ServeRAID controller supports a maximum of eight arrays.
- Each ServeRAID controller supports a maximum of eight logical drives.

When you create an array, you group physical drives into one storage area. You can define this storage area as a *single* logical drive, or you can subdivide it into several logical drives. Each logical drive appears to the operating system as a single physical drive.

If you have only one array, you can define it as a single logical drive, or you can divide it into several logical drives. Typically, the first logical drive defined on the first ServeRAID controller found by the basic input/output system (BIOS) during startup will be your startup (boot) drive.

If you have two or more arrays, each array can be one logical drive, or you can divide each array into multiple logical drives, as long as the total number of logical drives for all of the arrays does not exceed eight.

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**Note:** Independent of the RAID logical drives, most operating systems allow you to partition the logical drives further.

- The optimal way to create arrays is to use physical drives that have the same capacity.

Physical drive capacities influence the way you create arrays. Drives in an array can be of different capacities (1 GB, or 2 GB, for example), but RAID controllers treat them as if they all have the capacity of the *smallest* disk drive.

For example, if you group three 1 GB drives and one 2 GB drive into an array, the total capacity of the array is 1 GB times 4, or 4 GB, not the 5 GB physically available. Similarly, if you group three 2 GB drives and one 1 GB drive into an array, the total capacity of that array is 4 GB, not the 7 GB physically available.

- A hot-spare drive is a disk drive that is defined for automatic use in the event of a drive failure. The hot-spare drive must be of equal or greater capacity than the drive that it is intended to replace. If a physical drive fails and it is part of a RAID level-1, RAID level-1E, RAID level-5, or RAID level-5E logical drive, the ServeRAID controller automatically starts to rebuild the data on the hot-spare drive.
- If you are using the ServeRAID-3L:
  - Eight physical drives are supported in an array if the stripe-unit size is set to 32 KB or 64 KB.
  - Sixteen physical drives are supported in an array if the stripe-unit size is set to 8 KB or 16 KB.

If you are using the ServeRAID-3H or ServeRAID-3HB, sixteen physical drives are supported in an array if the stripe-unit size is set to 32 KB or 64 KB.

## Using Custom Configuration

To use the Custom configuration path:

- Note:** If the Express configuration mode/Custom configuration mode radio buttons do not appear on the right screen, click on the tool bar.

- 
1. Click the ServeRAID controller that you want to configure in the Main Tree.
  2. Click the **Custom configuration** radio button.
  3. Click **Next**. The screen similar to the following opens:
  4. Do one of the following:
    - Using the right mouse button, click on the drive or SCSI channel icons in the Main Tree to select the drives that you want to add to your arrays, delete from your arrays, or define as hot-spare drives; then, select a choice from the pop-up list.
    - Drag the drive or SCSI channel icon from the Main Tree and drop it on the Array or Hot-spare drive icon in the Main Panel on the right. If you change your mind, you can drag the icons back to the Main Tree to remove them from the configuration.
  5. After you select the physical drives for your arrays and define your hot-spare drives, click **Next**.

If you change your mind, you can:

- Remove a specific drive from a newly defined array or delete an entire newly defined array. To do this, click **Back**, use the right mouse button to click on the specific drive or Array icon in the Main Panel on the right, and then select **Remove from new array** or **Delete new array**.
  - Remove a specific drive from a newly defined array or delete an entire newly defined array. To do this, click **Back**, use the right mouse button to click on the specific drive or Array icon in the Main Panel on the right, and then select **Remove from new array** or **Delete new array**.
6. Select a RAID level for the logical drive from the RAID pull-down menu in the Main Panel.
  7. If you do not want to use the maximum size for the logical drive, move the sliding bar in the Main Panel from right to left to allot data and parity space for the logical drive, or type in the size in the data field.

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**Notes:**

- You can define from one to eight logical drives.
  - Some operating systems have size limitations for logical drives. Before you save the configuration, you might want to verify that the size of the logical drive is appropriate for your operating system. See your operating-system documentation for more detailed information.
  - Typically, the first logical drive defined on the first ServeRAID controller found by system BIOS during startup will be your startup (boot) drive.
8. If free space is available and you want to define another logical drive, click the **Add logical drive** tab in the Main Panel.
  9. Repeat steps 6, 7, and 8 for each logical drive that you want to define in this array; then, continue with step 10.
  10. If you are defining multiple arrays, click on the next New array tree node; then, repeat steps 6, 7, 8 and 9. When you are finished, go to step 11.
  11. Click **Next**.
  12. Review the information that appears on the **Configuration summary** screen.  
**Note:** To change the configuration, click **Modify arrays** or **Modify logical drives**.
  13. Click **Apply** to accept and save the configuration. The configuration is saved in the ServeRAID controller and on the physical drives.
  14. If you have multiple controllers, repeat steps 1 to 13 for each controller.

## Using the Information Mode to View Device and Configuration Information

You can use the Information mode to view the configuration information of ServeRAID controllers, arrays, logical drives, hot-spare drives, and physical drives that make up your ServeRAID subsystem.

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You also can use this mode to change some of the ServeRAID controller settings. Click an item in the Main Tree and select the **Actions** menu to display available actions on that item.

To view the current settings for the device and configuration information:

1. Click the plus (+) box next to the object in the Main Tree to expand that portion of the tree.
2. Click the icon for the server, ServeRAID controller, array, logical drive, hot-spare drive, or physical drive to view its current settings.

Detailed information about the selected device will appear in the Main Panel on the right.

## Modifying the ServeRAID Controller Configuration

You can use the ServeRAID Manager program to configure and modify ServeRAID controllers. This section provides information about the following ServeRAID actions:

- Change RAID levels
- Increase free space
- Increase logical drive space

## Modifying a Configuration

You can modify a configuration to change RAID levels, increase free space, or increase logical drive space. When you use these actions, you dynamically change the current logical drive structure.

To modify a configuration, you must have at least two logical drives available: one free logical drive and one source logical drive that is in the okay state. During the procedure, the ServeRAID controller changes the state of the free logical drive to system; then, temporarily uses the system drive to perform the migration. When the migration procedure completes, the ServeRAID controller changes the state of the system drive back to free.

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## Considerations while Modifying a Logical Drive

- The Main Tree displays only physical drives that are at least the size of the smallest physical drive in the selected array. When adding to an existing array, you cannot add physical drives that are smaller than the smallest drive currently in the array.
- When adding to an existing array, if you add physical drives that are larger than the physical drives currently in the array, you will not be able to use all the space on the new physical drives.
- Existing physical drives in the selected array are labeled **Online**. Newly added physical drives are labeled **New online**. You cannot remove online drives from an existing array.
- If you want to remove a new online drive from the array, drag it back to the Main Tree.

## Changing RAID Levels

You can change the RAID levels of currently defined logical drives. To use the Change RAID level, all of the logical drives within the array must be the same RAID level.

The ServeRAID controllers support changing RAID levels as follows:

- Change two or more drives from RAID level-0 to RAID level-5 by adding one physical drive.
- Change two drives from RAID level-1 to RAID level-5 by adding one physical drive.
- Change from RAID level-5 to RAID level-0 by removing one physical drive.
- Change from RAID level-5E to RAID level-5.

To change the RAID level of an existing array:

1. Click an array from the Main Tree (that is, the left tree).
2. Select **Logical drive migration** from the Actions menu.
3. Select from the available Change RAID levels on the menu.

If you select one of the following, another tree appears on the right. Go to step 4 on page 168.

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■ **Change RAID level from RAID 0 to RAID 5**

■ **Change RAID level from RAID 1 to RAID 5**

**Note:** If the array already contains the maximum number of physical drives (based on the firmware level and the stripe-unit size), the two previous Change RAID levels actions are not available.

If you select one of the following, go to step 6 on page 168.

■ **Change RAID level from RAID 5 to RAID 0**

■ **Change RAID level from RAID 5E to RAID 5**

4. Add to the selected array by dragging one ready drive from the Main Tree to the array in the right tree.

5. After you add the physical drives to your arrays, click **Next** to review your new logical drive configuration.

**Note:** If you change your mind and want to modify your configuration, you can click **Back** to return to this array tree window.

6. Review the configuration in the right panel. It describes how the configuration will affect the logical drives and free space when you click **Apply**.

**Note:** You can expand the tree for another view of the configuration.

7. Click **Apply** to approve the new configuration. The ServeRAID Manager program automatically changes the RAID levels of the logical drives in the array.

If you do not want to approve the logical drive configuration, click **Cancel** and return to the system management information window.

**Note:** Change RAID levels is a lengthy process. You cannot perform any other actions on the affected controller until the migration is complete. The ServeRAID Manager program displays a progress indicator in the status bar. You can use the logical drive during the change RAID levels process. You can also remove the system power. When you restore the power, the change RAID levels process restarts where it left off.

- 
8. Click **Yes** when the confirm pop-up window opens.

## Increasing Free Space

Using this feature you can add one, two, or three physical drives to an existing array so you can create another logical drive in the array.

When you create an array, logical drives are striped across all physical drives in that array. To create more free space in an existing array, define additional physical drives to add to the array. Then, the ServeRAID Manager program migrates the logical drives such that the data is spread across the existing and new physical drive

To increase free space:

1. Click an array from the Main Tree (that is, the left tree).
2. Select **Logical drive migration** from the Actions menu.
3. Select **Increase free space** from the menu.
4. Add to the selected array by dragging ready drives from the Main Tree to the array in the right tree.

**Note:** You can add up to three physical drives.

5. After you add the physical drives to your arrays, click **Next** to review your new logical drive configuration.
6. Review the configuration in the right panel. It describes how the configuration will affect the logical drives and free space when you click **Apply**. If you want to modify the configuration, click **Back** to return to the array tree window.

**Note:** You can expand the tree for another view of the configuration.

7. Click **Apply** to approve the new configuration. The ServeRAID Manager program automatically increases the free space.

If you do not want to approve the logical drive configuration, click **Cancel** and return to the system management information window.

8. Click **Yes** when the confirm pop-up window opens.

**Note:** Increasing free space is a lengthy process. You cannot perform any other actions on the affected controller until

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the process is complete. The ServeRAID Manager displays a progress indicator in the status bar. You can use the logical drive during the increase free space process. You can also remove the system power. When you restore the power, the increase free space process restarts where it left off.

9. When the increase free space process completes, you can create new logical drives in this array.

## Increasing Logical Drive Space

Using this feature you can add one, two, or three physical drives to an existing array so you can expand the size of the logical drives in the array. When increasing logical drive space, the ServeRAID Manager program migrates the logical drives such that the logical drives gain additional space, much like adding paper to a notebook.

When you create an array, logical drives are striped across all of the physical drives in that array. To increase the size of the logical drives in an existing array, define additional physical drives to add to the array. Then, the ServeRAID Manager program migrates the logical drives such that the data is spread across the existing and new physical drives.

To increase logical drive space:

1. Click an array from the Main Tree (that is, the left tree).
2. Select **Logical drive migration** from the Actions menu.
3. Select **Increase logical drive space** from the menu.
4. Add to the selected array by dragging ready drives from the Main Tree to the array in the right tree.

**Note:** You can add up to three physical drives.

5. After you add the physical drives to your arrays, click **Next** to review your new logical drive configuration.
6. Review the configuration in the right panel. It describes how the configuration will affect the logical drives and free space when you click **Apply**. If you want to modify the configuration, click **Back** to return to the array tree window.

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**Note:** You can expand the tree for another view of the configuration.

7. Click **Apply** to approve the new configuration. The ServeRAID Manager program automatically increases the logical drive space. If you do not want to approve the logical drive configuration, click **Cancel** and return to the system management information window.
8. Click **Yes** when the confirm pop-up window opens

**Note:** Increasing logical drive space is a lengthy process. You cannot perform any other actions on the affected controller until the process is complete. The ServeRAID Manager displays a progress indicator in the status bar. You can use the logical drive during the increase logical drive space process. You can also remove the system power. When you restore the power, the increase logical drive space process restarts where it left off.

## Setting User Preferences

Select **User preferences** from the File menu. A window opens that you can use to specify the following settings:

- Initialization settings
- Alarm settings

### Initialization Settings

Initializing a logical drive erases the first 1024 sectors on the drive and prevents access to any data previously stored on the drive. The default setting is checked. When this mode is enabled, the ServeRAID Manager program automatically initializes each new logical drive and prevents access to the manual initialization function.

1. Click the **Initialization settings** tab.
2. Click the check box to enable or disable automatic initialization of logical drives.
3. Click **OK**.

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**Note:** If you uncheck (that is, disable) automatic initialization, the Manager will not initialize each logical drive (by writing zeros to the first 1024 sectors of the logical drive) when it is created. You must still initialize all newly defined logical drives before storing data.

## Alarm Settings

All Warning and Error events cause an audible alarm to sound every five minutes, notifying you of the event. You can adjust the alarm interval in the Alarm settings window.

1. Click the **Alarm settings** tab.
2. Click the check box to enable or disable the repeating alarm.  
**Note:** If you disable the alarm, you will not hear an audible alarm when you receive problem events.
3. If you have enabled the alarm, you can adjust the time interval (in seconds) you want between each alarm. The default is 300 seconds (that is, 5 minutes).
4. If you have enabled the alarm, you can adjust the length of time (in beeps) you want the alarm to continue. The default is 3 beeps.
5. Click **OK**.
6. Restart the Manager for these settings to take effect.

## Silencing the Repeating Alarm

Silence the repeating alarm turns off the alarm for the current failure without disabling the feature.

- To silence the alarm, click on the tool bar.

## Understanding Drive States

This section provides descriptions of the physical and logical drive states.

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## Physical Drive State Descriptions

The following table provides descriptions of the valid physical drive states.

DRIVE STATE	MEANING
Defunct	A physical drive in the Online, Hot-Spare, or Rebuild state has become defunct. It does not respond to commands, which means that the ServeRAID controller cannot communicate properly with the drive.
Hot Spare	A Hot-Spare drive is a physical drive that is defined for automatic use when a similar drive fails.
Online	The drive is Online. It is functioning properly and is part of an array.
Rebuilding	The drive is being rebuilt.
Ready	The ServeRAID controller recognizes a Ready drive as being available for definition.
Standby Hot Spare	A Standby Hot Spare is a Hot-Spare drive that the Spare ServeRAID controller has spun down. If an Online drive becomes Defunct and no suitable Hot-Spare drive is available, a Standby Hot-Spare drive of the appropriate size automatically spins up, and enters the Rebuild state.

## Logical Drive State Descriptions

The following table provides descriptions of the valid logical drive states.

DRIVE STATE	MEANING
Blocked	<p>During a rebuild operation, the ServeRAID controller sets the state of any RAID level-0 logical drives associated with a failed array to the Blocked state; then, it reconstructs the data that was stored in RAID level-1, RAID level-1E, Raid level-5 and RAID level-5E logical drives.</p> <p>After the Rebuild operation completes, you can unblock the RAID level-0 logical drives, and access them once again. However, the logical drive might contain damaged data. You must either re-create, reinstall, or restore the data from the most recent backup disk or tape to the RAID level-0 logical drive.</p>
Critical Migrating	A logical drive in the critical state that is undergoing a logical drive migration (LDM).
Critical System	The ServeRAID controller uses this reserved state during a logical drive migration (LDM) when the logical drive is in the critical state.
Critical	A RAID level-1, RAID level-1E, RAID level-5, or RAID level-5E logical drive that contains a defunct physical drive is in the critical state. A critical logical drive is accessible, despite a physical drive failure.
Migrating	The logical drive is undergoing a logical drive migration; that is, a change in RAID levels, a change in logical drive size, an increase in free space, or a RAID level-5E compression or decompression.

DRIVE STATE	MEANING
Offline	<p>The logical drive is offline and not accessible. This state occurs when one of the following is true.</p> <ul style="list-style-type: none"> <li>■ One or more physical drives in a RAID level-0 logical drive is defunct.</li> <li>■ Two or more physical drives in a RAID level-1, RAID level-1E, or level-5 logical drive are defunct.</li> <li>■ Three or more drives in a RAID level-5E logical drive are defunct.</li> </ul>
Okay	The logical drive is okay. It is in a good, functional state.
System	The ServeRAID controller uses this reserved state during logical drive migration (LDM).

## ServeRAID Events in Director

The ServeRAID Manager tool adds the following events to the event builder log:

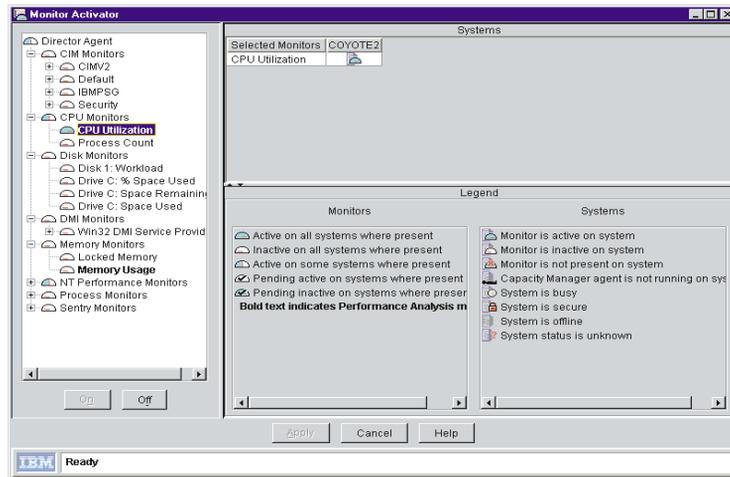
- Battery-Backup events: Failed and Need Replacement.
- Configuration Change events: Adapter, Array, Array (BIOS Mode, Failover), Import, Logical Drive, Merge Migration, Read Ahead Cache, Rebuild Rate, Removed, Replaced, Reset To, Scan, SCSI, Set To (Strip Size, Successful), Unattended Mode, Write Back, Write Cache, Write Through.
- Enclosure
- Logical Drive
- Physical Drive
- State events: Added, Failed, Failover, Not Found, Replaced, Working.

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# 7

## Capacity Management

Capacity Management is an easy-to-use resource-management and planning tool for network managers and administrators, allowing remote performance monitoring of every server on the network. IBM Capacity Management identifies potential bottlenecks in a network, allowing for effective planning of future capacity needs, such as microprocessor, disk, or memory upgrades, thus preventing network slow downs and downtime. With Capacity Management you can intelligently plan for future hardware upgrades and how best to spend your resource dollars.



Capacity Management includes extensive on-line help, including an on-line tour. The on-line tour is an interactive help that guides you

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through Capacity Management's functions, making it especially simple to learn and understand this service. To begin an on-line tour, select **Report Viewer tour** from the **Using Capacity Manager** task on the Director console.

**Note:** The Capacity Management interface is available for use only on systems running Windows NT. However, data can be collected from any remote systems running Client Services for Netfinity Manager for OS/2, Windows 95, Windows NT, or NetWare.

## Components of Capacity Manager

Capacity Manager contains several features within the Netfinity Director Extension tools package.

- The console is now separated from the server. Before when you managed your systems, you had to be on a server that had Capacity Manager installed, but now all Capacity Manager functionality can be accessed remotely.
- The new **Monitor Activator** task provides a single console where you can manage your systems. Actions within the task include:
  - All NT PerfMon monitors are now available.
  - With Monitor Activator's new informative icons you can learn whether a monitor is active, inactive, or not present on a given system, whether Capacity Manager is running, or if a system is busy, secure, offline, or of an unknown status.
  - Capacity Manager will activate by default the Performance Analysis monitors that are present on your systems, but you can activate additional monitors and deactivate them at any later time without having to edit an .ini file or restart your systems.
- The **Report Generation** task now gives you improved performance with its new option of either generating a report directly to the viewer for immediate viewing or generating to a file for later viewing.
  - Reports that are generated to the viewer are created very quickly because they are not saved to the disk while they are generating. You view these reports before deciding to save

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them, thus keeping your disk from being cluttered with every generated report.

- Generation performance is faster because of the improved error detection. For example, when generating a report to the viewer, you will first see a status window that tabulates the status of each system during the generation. Without waiting for the timeout to elapse, Capacity Manager will use its improved diagnostics to report why any system does not respond, so you can more quickly remedy the problem.
- The **Report Definition** user-interface panels were redesigned to provide improved usability and functionality. Some facets of the interface include:
  - The **Report Parameters** pane allows you to select a report duration, a global sampling frequency, and the days and times for collecting data.
  - The **Method of Generating a Report** pane gives you the choice between generating a report to the viewer or to a file. To help you more easily keep track of report files and know which can be merged, you can now include in the file name the date and time of report generation in addition to the report definition name.
  - The **Monitor Selection** pane gives you the option of either including all activated monitors on your report or using the Monitor Selection panel where you can individually activate or deactivate monitors and select their sampling frequencies.
  - The **Timeout** parameter at the very bottom of the **Report Definition** panel allows to set how long each system has to respond for inclusion in a report.
- The **Report Viewer** also has new options and performance improvements:
  - Forecasting has been enhanced with the addition of a wavelet transform technique that transforms the observed monitor data prior to the linear regression computations. The result is a more accurate 95% prediction interval for the forecasting graphs.

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- You have a choice between saving a report or a .gif file as either a remote file on the Netfinity Director server or as a local file on your workstation. Both remote files and local files can be managed by way of the console, but you can access remote files from other workstations, and you can manage local files with the command-line tools, **CMView** and **CMReport**.
  - A new sort option in Table view allows you to sort by clicking on a column header. For example, you can click the column header, **CPU Utilization**, to see your systems sorted by their CPU-utilization values. The sort order is dependent on which sort-order button is depressed on the toolbar.

## Capturing Data

Once you have a list of discovered systems, you can use the **Monitor Activator** task to learn the status of the monitors on your selected systems, and select which you want active or inactive. Capacity Manager will collect data on all the monitors that are both activated and present on your selected systems. The Performance Analysis monitors that are present on your system are activated by default when you install Capacity Manager.

When you initiate the Monitor Activator task, Capacity Manager opens a **Monitor Activator** window that lists your selected systems and all the monitors for those systems. In the left pane you can select which monitors to activate or deactivate on your selected systems. By selecting one or more monitors in the left pane, you create in the upper right pane a table of each selected monitor's status on each system listed. In the lower right pane you can see the legend for all the icons used in the Monitor Activator task.

### Notes:

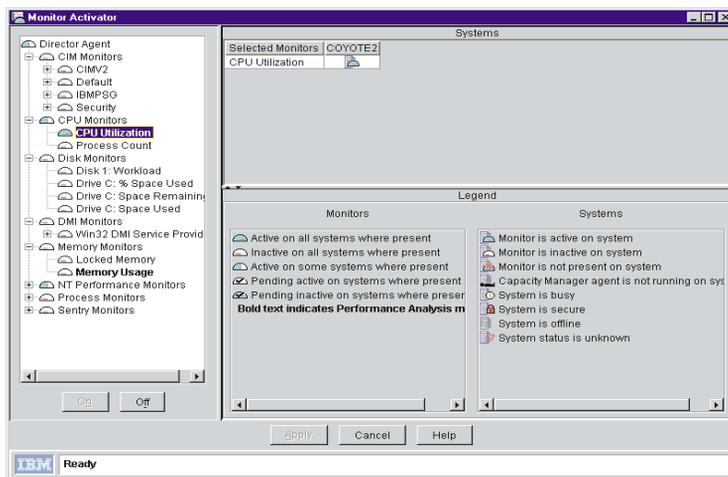
- Not all monitors are present on all systems. For example, Drive E: is only present on systems that have it installed.
- If you add or remove disk drives or LAN adapters, be sure to rerun the **Monitor Activator** task. Not rerunning the Monitor Activator task after changes in the drives and LAN adapters could compromise the accuracy of the Performance Analysis function.

## Starting the Monitor Activator

To start the Monitor Activator, either drag the **Monitor Activator** task onto a system or group of systems, or select one or more individual systems and drag the Monitor Activator task onto one of the selected systems. The Monitor Activator task will include all the systems you selected.

## Using the Monitor Activator

The Monitor Activator has two main functions, to reveal the status of monitors on your selected systems, and to allow you to change the status of these monitors. These two functions are driven by actions you take in the left pane, the **Monitor** pane, and either reflected in the **Monitor** pane or in the upper right pane, the **Systems** pane.



When you first see the **Monitor** pane, it is a collapsed tree structure. To see the individual monitors, you must expand the different nodes of the tree until you get to the particular monitors of interest, which are located at the end of each branch. For example, the CPU Utilization monitor is at the end of the CPU Monitors branch node or group.

There is an icon to indicate the status of each monitor and each group. The meaning of the icon depends on whether it is beside a group or a monitor.

The group icons:	
	All monitors in the group are active.
	Some monitors in the group are active.
	No monitors in the group are active.

The monitor icons:	
	This monitor is active on your selected systems where it is present.
	This monitor is inactive on your selected systems where it is present.
	This monitor is active on some of the systems where it is present. You will see this status if at least one system has this monitor in an inactive state.

## Activating or deactivating monitors

To change the status of a monitor, select it by clicking on its name and clicking either the on button to activate it or the off button to deactivate it. To select multiple monitors at a time, control-click additional monitors.

As a safety feature, Capacity Manager will not allow you to select a group of monitors by clicking on the group name: each monitor must be selected individually. Once you have completed your changes, click the **Apply** button at the bottom of the window to apply the changes and close the window.

**Note:** While you can go through and deactivate all your monitors on this panel and apply this change, the next time you open the monitor activator panel you will see that a monitor still remains activated. You cannot delete all the monitors from the slot file.

If you decide to change the status of a monitor, the monitor's icon will change to indicate its pending state:	
	Your selected monitor will be activated on systems where it is present.
	Your selected monitor will be deactivated on systems where it is present.

## Monitoring for Performance Analysis

The Report Viewer's Performance Analysis function probes for bottlenecks in server hardware performance, diagnoses the problem, and suggests ways to improve performance. In order to create this report on your selected systems' performance, the Performance Analysis (PA) function must have specific monitors activated in the Monitor Activator. These PA monitors are shown in bold text in the monitor pane.

## Creating a Status Table in the System Pane

To see the status of one or more monitors on each of your selected systems, build the status table in the Systems pane by selecting monitors of interest in the Monitor pane. This table lists all your selected monitors down the left side and all your selected systems horizontally across the top.

The system pane icons are:	
	The monitor is present and active on this system.

	The monitor is present but not active on this system.
	The monitor not present on this system.
	The agent is not running on this system. Either the Capacity Manager agent is not installed on this system or there is an error.
	This system is busy; the Capacity Manager agent is processing another request. Please try again later.
	The system is secured.
	The system is offline.
	The system status is unknown because the Capacity Manager agent is not responding.

## Viewing Data

Capacity Manager allows you generate a file either to the Report Viewer for immediate viewing or to a file for later viewing. Before a report can be viewed it must be defined.

## Creating a Report Definition

To create a report definition, double-click **New Report Definition** in the list of report definitions.

Once you are inside the report definition window, you can choose the time period for collecting data, the amount of data to collect, and the days and times for collecting data. You can also determine what monitor data will appear in the report. While you are in the report definition, you can also decide whether to generate the report to the viewer or to a file.

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If you elect to generate the report to a file, the file will be saved on the Netfinity Director server for later viewing. If you elect to generate the report to the viewer, this generated file will be kept in memory only for the time you are viewing the report.

Notice that the standard report definitions, for example Weekly and Hourly, are by default set to file and to viewer respectively. You can change these settings either by right-clicking the report definition name and selecting the alternate option, or you can double-click the report definition name and change the option on the Report Definition window.

If you are creating a new report definition with **New Report Definition** listed under Report Generation, select either to **Viewer** or to **File** on the Report Definition window. When you save your new report definition, it will be labeled with your selected option.

### Generating the Report to a File

When you initiate the generation step, you will see a dialog box, which will ask if you want to either create a scheduled job for this task or execute it immediately.

If you click **Schedule**, you will see another dialog box, which will ask you for a job name, and the time and date for generating the report.

If you click **Execute Now**, you will see a status box for the generation of your report. Any report that you create with the to-file option is saved automatically in the /reports subdirectory of the Netfinity Director install directory.

You can create a report as more than one file type: .cmr, .txt, or .html. Both .cmr and .txt files can be loaded into the Capacity Manager Report Viewer. The .cmr file loads faster than does the .txt file, but the .txt file can be loaded into most spreadsheet applications. The .html file format cannot be loaded into the Report Viewer, but it can be loaded into a browser where you can then print it. Also, some spreadsheet applications will accept an .html file.

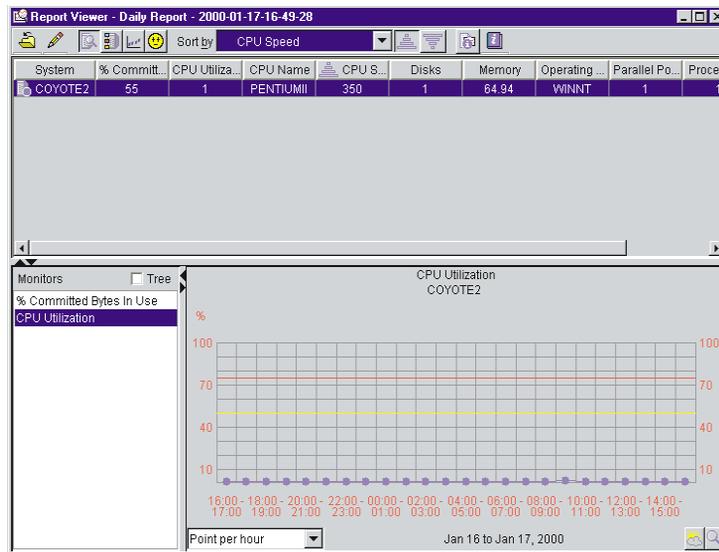
### Generating the Report to the Viewer

When you initiate the generate step, Capacity Manager will immediately open a Status window where you can see the status of your selected systems as Capacity Manager tries to include them in a report. A status

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bar at the top indicates the progress of the task. When Capacity Manager either successfully accesses all your selected systems or reaches the timeout limit, it will open Report Viewer to display the generated report.

You can also click **Finish Now** to immediately terminate the generate step and open the Report Viewer to display the system data that was collected at that point.



**Note:** When you go to close or exit the generated report in the Report Viewer, Capacity Manager will not ask you if you want to save it. If you do not save the file prior to closing it, the file will be lost. You can save your report as either a .cmr file or a .txt file, or you can export it to HTML format. You also have the choice of saving the report as a remote file on the Netfinity Director server, or as a local file on your workstation.

## Analyzing Data

Capacity Manager probes for bottlenecks in server hardware performance, diagnoses the problem, and suggests ways to improve performance through the Performance Analysis function. The function indicates a bottleneck when one or more monitors exceed their

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thresholds settings for a significant amount of the report period. Performance Analysis will also look at performance trends and predict when a bottleneck may occur in the future or what latent bottlenecks will be revealed when current bottlenecks are resolved.

## Performance Analysis Monitor Requirements

The algorithm uses the following monitors:

- Memory usage
- % Disk time
- CPU utilization
- % Processor time
- Packets/sec
- % Network utilization

By default Capacity Manager will activate all the required Performance Analysis (PA) monitors that are present on your systems, but only Windows NT has all the required monitors, therefore Performance Analysis is not available on other operating systems. The packets/sec and % processor time monitors are not required, but omitting them could cause Performance Analysis to miss some system problems.

To help you identify the PA monitors, their names are in bold on the Monitor Activator task window, the Monitor Selection window for the Report Definition task, and on the Monitor tab for the Settings notebook in the Report Viewer. Each of the PA monitors has a critical threshold and a warning threshold; both thresholds are important to the generation of a Performance Analysis report. Any change to the threshold values for any of the PA monitors could adversely affect the performance of Performance Analysis. Whenever you work with your monitor selections, remember to have all the PA monitors set to the same sampling frequency and active at the same time.

### Notes:

- Not all systems have the packets/sec monitor, but if this monitor is present on your system, it will be activated with your other NT Performance monitors. There are other packets/sec monitors

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located under the Redirector, but these will not give the appropriate data for the Performance Analysis report.

- There is a % processor-time monitor for each processor device on your system, but the monitor for CPU utilization monitors all processor-time devices on your system. When a system has only one processor time device, data values from the single % processor-time monitor will be very similar to the CPU-utilization monitor data values. Any differences in these data values are attributable to the sampling times of the two monitors not being precisely in phase.

## Performance Analysis Report Terminology

- A **device** is a system component such as memory, a CPU, or a LAN adapter.
- A device is **constrained**, or over-used, when one or more of the monitors is in the critical threshold for enough of the time.
- A **bottleneck** occurs on a system when one or more devices are constrained.
- A bottleneck that is currently happening is sometimes called a **realized bottleneck** (or just a bottleneck).
- A bottleneck that may occur after you fix the realized bottleneck is called a **latent bottleneck**.

## Bottlenecks

Bottlenecks occur on a system when one or more devices become constrained. The device's monitor will detect the constraint, and Performance Analysis will indicate a bottleneck.

There are four types of single bottlenecks detected by Performance Analysis: CPU, disk, memory, and LAN adapter. Each of the PA monitors detects one of these four bottleneck types:

- The CPU utilization and % processor time monitors detect a CPU bottleneck.
- The % disk time monitor detects a disk bottleneck.
- The memory usage monitor detects a memory bottleneck.

- The packets/sec and the % network utilization monitors detect a LAN adapter bottleneck.

These are not the only types of bottlenecks that can occur: there can be bottleneck combinations. For example, a disk bottleneck occurs if either the Disk 1 or Disk 2 device is constrained, and a memory bottleneck occurs if a memory usage device is constrained. But if Disk 1 becomes constrained along with Memory Usage, then the memory bottleneck becomes a disk + memory bottleneck, and the recommendation for addressing a bottleneck with two devices may not be the same as addressing two bottlenecks individually.

In the example of a disk + memory bottleneck, the algorithm recognizes that insufficient memory can lead to disk thrashing, so the recommendation is to add memory and leave the disk drive unchanged. Devices often interact in this way, so each combination of device types (memory, disk, CPU, LAN) constitutes a separate bottleneck with its own recommendation.

Often when you have one bottleneck, others are not evident while the system is slowed by the first bottleneck. The bottleneck that is currently happening is a realized bottleneck, but one that is not evident while the system is slowed is a latent bottleneck. Performance Analysis will report a device as a latent bottleneck if it exceeds the warning threshold setting at least 50% of the time that another device is constrained. It is also possible for a given device to contribute to a latent bottleneck for part of the time and to a realized bottleneck for part of the time.

The Performance Analysis algorithm scans for bottlenecks on each system. If no bottlenecks are found for a given system, then Performance Analysis will use a forecasting algorithm to look simultaneously at all the system monitors to predict what bottlenecks may occur and report the first bottleneck that it foresees. The forecast period is the same length as the report period. For example, a report period of one month can have a forecast of one month into the future.

## Recommendations and Details

The Performance Analysis report consists of two main sections: **Recommendations** and **Details**. The Details section shows everything that was found while the Recommendations only shows the subset of

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Details that the user needs to act on. The Details section includes links that allow you to see a graph of the performance of the monitor in question.

The report lists first the systems with the most severe bottlenecks. A bottleneck that is reported in the Details will appear in the Recommendations if it meets one of the following criteria:

- It occurred on the last day of the report.
- It occurred more than 25% of the time, plus it occurred more than any other bottleneck for that particular system.
- It appears that it will occur in the future; this prediction is based on Performance Analysis having enough data for the system to make a reliable forecast.

## Performance Analysis

The Performance Analysis button appears as one of four icons, each of which represents a different meaning.	
	Your Performance Analysis report is ready and has no bottleneck recommendations, but the Details section of the report may discuss some bottlenecks or latent bottlenecks.
	Your Performance Analysis report is still being prepared
	Your Performance Analysis report could not be prepared; you could be missing one or more critical monitors.
	Your Performance Analysis report is ready, and you have system bottlenecks.

To see a Performance Analysis report of the system data, click **Performance Analysis** on the toolbar.

To examine the report more closely, go to the top of the report, in the Recommendations section and click on the system **Go to details** link to see a detailed report of that particular system bottlenecks.

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## Saving and Printing a Performance Analysis

To save a report summary as a local .html file, click **File**→**Export Report to local HTML**. In the **Save as local HTML...** window, select a preferred directory, input a new file name and click **Save**.

A report saved as an .html file will contain the following sections:

- A **Table of Contents** that contains links to the other sections: a Report Table, the Report Information, and the Performance Analysis Recommendations and Details.
- A **Report Table** that presents the same monitor and system data that is available in the Report Viewer in Table view.
- The **Report Information**, which includes the file name, the analysis start and end dates, days of the week and hours of coverage, the name of the report definition, plus a list of any systems that were requested but not included in the report.
- The **Performance Analysis Recommendations**, which include recommendations for remedying the most serious bottlenecks.
- The **Performance Analysis Details**, which include information on the frequency and duration of both active and latent bottlenecks, plus remedies for the bottlenecks. A latent bottleneck is a bottleneck that will become active once a current bottleneck is fixed.

To print a Performance Analysis report, save it first as either a local HTML file or as a remote (on your server) HTML file, then print it from your Web browser. A printed version of the report omits the links to the graphs but includes the monitor and system parameter information from **Table** view.

## Forecasting Data

The Forecast function allows you to see Capacity Manager's prediction of the future performance of your selected systems.

Capacity Manager uses forecasting in two of its components:

- In a Performance Analysis report. If there are no realized bottlenecks, Capacity Manager uses forecasting to predict, with a

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level of confidence, if and when it foresees a monitor performance bottleneck.

- In your systems' monitor performance graph. On a graph of a selected monitor's performance for one or more systems, you can click the forecast button to see a forecast of the monitor's performance on your selected systems. The graph depicts both the observed data and the forecast.

## About the Calculations

To create a forecast, Capacity Manager applies a wavelet transform to the monitor data prior to performing a least squares linear regression. With this transformed data, it computes a forecast line with a 95% prediction interval. The forecast duration is equal to the duration of the observed data. For the forecast to be valid, Capacity Manager needs a minimum of 24 days of previously collected data where the system monitors have been running at least 50% of the time.

## Viewing a Performance Forecast for a Selected System

To see the performance forecast for your selected systems, click the **Forecast** button in the lower right corner of the screen. Capacity Manager's forecast is for whatever monitor you currently have selected. To see a forecast for another monitor, click its name in the monitor box.

### Notes:

- You cannot use **Zoom** and **Forecast** at the same time; they are mutually exclusive such that one is turned off when the other is turned on.
- The forecast data is more meaningful for systems that are individually graphed rather than shown in a trend graph. To change from a trend graph to a graph of individual systems, either set your trend graph threshold to a higher number or select fewer systems to graph at one time. For more information, see the help page on Changing the number of systems graphed as individual systems.

---

## About the Forecast Display

The Forecast graph has a number of elements that are unique.

- The **forecast line** is a dashed line with an arrow at the end. This line describes possible future data values that are consistent with the prediction that an actual future data value will fall with equal probability above or below the forecast line. The forecast interval is a multiple of your data collection period. The default prediction period is set to the same length as the data collection period. For example, if you have a month of collected data, the forecast will be for a month into the future.
- The **prediction interval** is represented by the dotted lines located above and below the forecast line. The prediction interval represents the range of data values that are located above and below the forecast line and are consistent with the prediction that an actual future data value will fall within the interval with a probability of 95 percent. The width of the interval depends upon the variability of the observed monitor data: the greater the variability, the wider the prediction interval. The prediction interval is only displayed when you request a forecast of a single system. Graphs of multiple-system forecasts do not show prediction intervals.
- The **vertical bar** at the beginning of the forecast data depicts the range.
- The **gap** between the actual collected data and the beginning of the predicted data serves as a separator between these two data sets.

The following illustration is an example of a forecast plot.

If you are puzzled by a wide prediction interval for a forecast, click the **Point per** box to call up a finer resolution of your data. Your data points may have a broad variance that is hidden by the averaging that occurs when data is displayed at a coarser resolution.

## About Warning Messages on the Forecast Graph

Capacity Manager will display one of two warnings if your forecast is not valid. Do not use an invalid forecast to make decisions about your systems.

- 
- **Data collection period is too short for a valid forecast.** To generate a valid forecast, you need at least 24 days of data.
  - **System 'X' does not have enough data for forecasting.** or **Multiple systems do not have enough data for forecasting.** The selected monitor must have been on at least 50% of the time during the data collection period.

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