IBM TotalStorage™ Network Attached Storage 200
Models 200 and 225

Release Notes
Version 1.7
7/15/02

IBM

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Contents

Release notes

This document contains the release notes for the Network Attached Storage 200 (Models 200 and 225) Version 1.7. Unless otherwise noted, Models 200, and 225 of the product are collectively referred to as the NAS 200.

Refer to www.ibm.com/storage/support/nas for possible updates to these release notes and for copies of the base documents.

Fixes and enhancements for Version 1.7

Your NAS 200 comes with a preloaded set of software (described in detail in the *User's Reference*). As the preloaded software is updated with newer software components (containing problem fixes, functional enhancements, or both), the changes are applied in product manufacturing before the product is shipped to you. For this reason, the exact release of preloaded software on your NAS 200 may vary, depending on when you received your NAS 200.

To identify the exact release of preloaded software, from the NAS 200 desktop (using Terminal Services or direct-attached keyboard and monitor), click **IBM NAS Admin**, then on the left pane select **Software Version**. The first line of text that appears on the right pane provides the software release (version and build number).

The original level of NAS 200 software is Version 1.00, Build 49. The following sections describe fixes and enhancements to newer levels of software, in reverse chronological order. If you have an older version of NAS 200 software and require fixes or enhancements that are provided in newer versions, go to www.storage.ibm.com/support/nas for information on obtaining those fixes and enhancements. They may be provided as CDs which you must contact IBM technical support to obtain and install, in technical tips informing you of software configuration changes (applied by IBM to later versions of NAS 200 software preloads) that you must apply, or occasionally in software packages which you must download and install.

The following "Fixes and enhancements" sections contain information on fixes and enhancements that are included in this current release of the product. The Release Notes information begins after these sections with "Functional notes" on page 5.

The FixPack CD that accompanies the Version 1.6 to Version 1.7 upgrade includes the following list of drivers:
- ServeRAID 4.84
- Intel ProSet II Version 5.1.71.0
- Alacritech SLICuser Package 5.15.0
- Drivers and firmware upgrades:
  - ServeRAID Driver Version 4.84
  - Intel Ethernet Gigabit Version 3.63.363.00
  - IBM Ethernet 10/100 Version 5.41.27
  - Alacritech Quad-Port Ethernet Adapter Version 5.15.0
  - Adaptec 2944UW SCSI HVD Version 5.0.2182.1

Updated IBM ServeRAID Storage Manager

IBM ServeRAID™ Storage Manager has been updated to Version 4.84.

Fixes and enhancements for Version 1.6

Persistent Storage Manager / Veritas Open File Option interoperability fix

When using Veritas backup software (NetBackup and BackupExec) on the NAS 200 to perform open file backup (using the Veritas Open File Option), problems occured due to interoperability issues between the Veritas Open File Option and PSM. Those problems have been corrected in PSM Version 2.2 Build 2216.3, which is included in Version 1.6, or later.

Dynamic disks may lose data on shutdown

There was a problem where, when the NAS 200 was shut down, dynamic disks could lose data because of a bug in the Windows dynamic disk device driver where the driver failed to ensure that all outstanding write requests (cached in the ServeRAID controller) were processed before the shutdown completed. This problem has been fixed in Version 1.6, or later.

Fixes and enhancements for Version 1.50

Microsoft Server Appliance Kit Version 2.01

Version 1.50 of the NAS 200 software includes Microsoft Server Appliance Kit (SAK) Version 2.01 (upgraded from Version 1.7). The SAK supports the Windows 2000 for Network Attached Storage (NAS) Web-based user interface for administering the NAS 200. SAK 2.01 contains an improved look and feel over its predecessor, including better organization of the task groups, and some problem fixes.

Persistent Storage Manager Version 2.2

Version 1.50 of the NAS 200 software includes Persistent Storage Manager (PSM) Version 2.2 (upgraded from Version 1.0). In addition to having more reliability than PSM 1.0, PSM 2.2 adds capability for restoring entire volumes from persistent images, has an improved user interface (using SAK 2.01 described earlier), and provides a disaster recovery solution for the system volume (as a better alternative to using the Recovery CD). For more information on PSM 2.2, see "Updated information on Persistent Storage Manager" on page 12.

Services for UNIX Version 2.2

Version 1.50 of the NAS 200 software includes the official release of Services for UNIX Version 2.2 (upgraded from Version 2.0). Services for UNIX 2.2 contains fixes for a number of problems, particularly in User Name Mapping support. For more information on Services for UNIX, see "Microsoft Services for UNIX and NFS Support in the NAS 200" on page 12.

Tivoli Storage Manager Client Version 4.20

Version 1.50 of the NAS 200 software includes Tivoli Storage Manager (TSM) Client Version 4.20 (upgraded from Version 3.7).

IBM Universal Manageability Services / IBM Director Support Program Version 2.22

Version 1.50 of the NAS 200 software includes Version 2.22 of Universal Manageability Services (upgraded from Version 2.12), which contains the IBM Director Support Program that enables management of the NAS 200 from an IBM (or Tivoli IT) Director console.

Telnet Server support

Version 1.50 of the NAS 200 software includes Telnet server capability. The Telnet server provides limited administrative capability for the NAS 200. This can be useful in cases where you need to remotely administer the NAS 200, but do not have access to a Windows-based workstation (from which you could remotely administer the appliance using a supported Web browser or Terminal Services Client).

You can access the NAS 200 from any Telnet client by specifying the IP address or host name of the NAS 200, then logging in using an ID and password (defined on the NAS 200) with administrative authority. After you have logged in, you will be presented with a command-line interface similar to that of a DOS command prompt in Windows (in fact, it will start at the C:\ prompt). From this interface, you can issue DOS-like commands (such as dir and cd), and some UNIX-like commands (such as grep and vi). You can launch some applications, but only character-mode applications are supported.

By default, the Telnet server is disabled. To enable the Telnet server, from the Windows 2000 for NAS user interface, go to the Network task group, then click **Telnet**. On the Telnet Administration Configuration page that appears, select the **Enable Telnet access to this appliance** check box. Later, if you want to disable Telnet access, you can clear this check box. If you do not require Telnet access to the NAS 200, then it is recommended that you leave the Telnet server disabled.

SNMP support

Support for the Simple Network Management Protocol (SNMP) is enabled. To manage the NAS 200 from your SNMP-capable management application, you need to install the Management Information Base (MIB) files for various components of the NAS 200 on the management application workstation, so that the application can recognize those SNMP elements (values, alerts, and so on) supported by the components. Go to www.ibm.com/storage/nas for information on MIB files that are supported by the NAS 200.

Fixes and enhancements for Version 1.00, Build 54

Windows Powered Service Pack 2

Version 1.00, Build 54 of the NAS 200 software contains Service Pack 2 for Microsoft Windows Powered, the operating system on which the NAS 200 is based. Earlier versions of the NAS 200 software contained Service Pack 1. Service Pack 2 fixes the following known NAS 200 problem:

- When using Terminal Services to administer the NAS 200, you cannot shut down the NAS 200 using the Shut Down Windows dialog box (accessed by selecting **Shut Down...** from the Start menu on the NAS 200 [Windows Powered-based] desktop displayed through Terminal Services).

"Code Red" worm exposure

Your NAS 200 runs the Microsoft Internet Information Services (IIS) Server to provide Web-based management. Because of this, the NAS 200 is vulnerable to attack by the "Code Red" worm. Version 1.00, Build 54 of the NAS 200 software contains a fix for IIS Server that eliminates this exposure.

Fixes and enhancements for Version 1.00, Build 50

Director Support Program problem

If you are using the IBM Director (or Tivoli IT Director) Management Console on your network to manage the NAS 200 appliance, the appliance name might not appear in the list of systems and devices. (The appliance name should appear in the list as IBM5194-*xxxxxx*, where *xxxxxx* is the serial number of the appliance, located in the lower right corner of the bezel on the front of the appliance.) A fix for this problem is included in Version 1.00, Build 50 of the NAS 200 software, as a patch to the IBM Director Support Program that is part of the software.

If your NAS 200 is running Version 1.00, Build 50, and you later use the Recovery CD (provided with that level of software) to restore the preloaded software image on your NAS 200, the NAS 200 reverts to Version 1.00, Build 49, which does not include the fix for this problem. You need to download and install a patch for the IBM Director Support Program.

Go to www.ibm.com/storage/support/nas, and then go to the Downloads section under 5194 TotalStorage NAS 200 (Model 200 or Model 225) to find the patch package titled IBM Director Support Program patch. Download and install the patch on your appliance as instructed by the documentation accompanying the package.

ServeRAID Configuration Reset Diskette update available from Web (for Version 1.0 Supplementary CD users only)

Note: This section applies only to Model 200.

Your NAS 200 Model 200 might have come preloaded with the ServeRAID-4LX adapter, instead of the ServeRAID-4L adapter as documented in the *User's Reference*. If you have Version 1.0 of the Supplementary CD and you need to reset the RAID configuration of the adapter back to the factory default configuration, it is recommended that you not use the ServeRAID Configuration Reset Diskette image provided on the Supplementary CD to create the reset diskette; instead, you should download the diskette image from the Web and use that image to create the diskette. The diskette image provided on the Web supports reset of the ServeRAID-4LX adapter RAID configuration as well as the ServeRAID-4L adapter RAID configuration.

Go to www..ibm.com/storage/support/nas, and then go to the Downloads section under 5194 TotalStorage NAS 200 Model 200 to find the package titled ServeRAID Configuration Reset Diskette update. Download the diskette image, create the reset diskette, and apply the diskette as instructed by the documentation accompanying the package.

If you have Version 1.6 of the Supplementary CD, you can use the diskette image provided on the CD, even if you have the ServeRAID-4LX adapter.

Functional notes

Error 508 after using the Recovery CD Set

When an image is built on a non-mirrored system and is recovered on a RAID mirrored system, Error 508 might occur. This error also occurs when an image is restored to any hard drive configuration that is different from the configuration where the image was created (for example, moving from 36.4-GB to 73.4-GB drives or a different ServeRAID controller). Error 508 occurs after the recovery process and before Windows Powered starts. The text of the error message is as follows:

```
As specified, the operation does not change the partition
```

The error message appears when the requested partition size is aligned with a cylinder boundary that is the same cylinder boundary as the existing partition size.

Note: This message is informational only and does not require action.

Error when trying to disable port A on Alacritech 10/100 Quad-Port Ethernet adapter

If you attempt to disable port A on the Alacritech 10/100 Quad-Port Ethernet adapter by right-clicking **My Network Places** on the desktop, then right-clicking **Alacritech Port A**, the following message appears:

```
It is not possible to disconnect at this time.  This connection may be using
one or more protocols that do not support Plug-and-Play, or it may have been
initiated by another user or the system account.
```

Click **OK**. There will be no indication that the port has been disabled. You must reboot the appliance before the port will be disabled.

Alacritech adapter not prompting to reboot after deleting adapter team

Although you are not prompted to reboot the appliance after you delete an adapter team on the Alacritech 10/100 Quad-Port Ethernet adapter, you must reboot the appliance at this time.

You will see an indication that a reboot is needed by performing the following steps:
1. Right-click **My Network Places** and select **Properties**.
2. Right-click **Port A of Alacritech Adapter** and select **Properties**.
3. Click **Configure** and the Properties page appears. A message indicating a reboot is necessary is under Device Status.
4. Click **OK**. A message that a reboot is now needed appears.

Windows 2000 for NAS GUI tabs not working correctly

If you connect remotely to the NAS appliance through port 8099 using the fully qualified IP address, you might see the following message if you click on a link that launches Terminal Services:

```
Cannot access this program in the current browser zone.
```

There are two ways to resolve this problem:
- In the browser address field, use the hostname of the NAS appliance you are connecting to (for example, http://IBM5194-23A1055:8099).

- From Internet Explorer, select **Tools** → **Internet Options** → **Security** → **Trusted Sites** → **Sites**. Clear the "Require server verification (https:) for all sites in this zone" check box and add the fully qualified IP address of the NAS appliance.

Model reference

The *IBM TotalStorage Network Attached Storage 200 Storage Unit Model EXP Installation and User's Guide* references IBM TotalStorage Network Attached Storage 200 Models 201 and 226. These references can also be applied to the IBM TotalStorage Network Attached Storage 200 Models 200 and 225, respectively.

Drive configuration support

The ServeRAID Configuration Reset diskette will return the system to the factory defaults and leave the drives any NAS EXP units unconfigured (see Table 1 on page 7 for the factory default configuration). Any data on these drives will be lost. If you have changed your configuration from the factory default, including any of the following, follow the procedure for ServeRAID array restoration and data restoration (see "Backup and restoration of ServeRAID storage configuration" on page 7):
- Added NAS EXP units
- Reconfigured the drives in the engine from the factory default configuration

Table 1. RAID Array A factory default configuration

Number of disks in base engine	Logical Drive 1 Seen as C: (System) in Windows Powered OS	Logical Drive 2 Seen as D: (Maintenance) in Windows Powered OS	Logical Drive 3 Seen as E: (User Data) in Windows Powered OS	Hot spare available
	|——————— RAID Array A ———————|		
3	6199 MB RAID 1E across disks 1-2-3	12288 MB RAID 1E across disks 1-2-3	Remaining free space RAID 5 across disks 1-2-3	No
4	6199 MB RAID 1E across disks 1-2-3	12288 MB RAID 1E across disks 1-2-3	Remaining free space RAID 5 across disks 1-2-3	Yes: disk 4
5	6199 MB RAID 1E across disks 1-2-3-4	12288 MB RAID 1E across disks 1-2-3-4	Remaining free space RAID 5 across disks 1-2-3-4	Yes: disk 5
6	6199 MB RAID 1E across disks 1-2-3-4-5	12288 MB RAID 1E across disks 1-2-3-4-5	Remaining free space RAID 5 across disks 1-2-3-4-5	Yes: disk 6
Notes: 1. Disk size will affect size of remaining free space only in E: user data drive. 2. All disks (3 ,4, 5, or 6 disks in base engine) must be the same size.				

Backup and restoration of ServeRAID storage configuration

You should save any changes that alter the factory settings of the ServeRAID storage configuration on a diskette for archival purposes. In the event of disaster, your custom configuration can be restored; for example, if you have added a NAS EXP expansion unit or reconfigured the drives in your NAS 200, you will be able to recover to that configuration instead of the factory default. Refer to the *ServeRAID-4 Ultra160 SCSI Controller User's Reference* for a detailed description of the ServeRAID configuration backup and restoration process.

Backing up ServeRAID configuration: Backing up the ServeRAID configuration can be accomplished in two ways: (1) from a command window in the Microsoft® Windows operating system, (2) or from a bootable DOS diskette. The method that you use depends on the current state of the appliance. If the storage configuration was changed using ServeRAID Manager, it might be more convenient to back up your configuration from the command window instead of rebooting the appliance. However, in the event of disaster, it might be impossible to start the operating system first and you need to use a bootable DOS diskette.

Backing up from the command window:

1. After you finish reconfiguring your storage, close ServeRAID Manager and start a command window. Click **Start → Programs → Accessories → Command Prompt**. Change to the C:\DRIVERS\SCSI\SERVERAID_484\WINSRV\CMDLINE folder by entering:

   ```
   cd \DRIVERS\SCSI\SERVERAID_484\WINSRV\CMDLINE
   ```

.

2. Configuration backup is performed using the IPSSEND command. To save your present ServeRAID configuration, type:

   ```
   ipssend backup 1 filename noprompt
   ```

   where *filename* is the path and file name where you want the configuration to be saved (it is recommended that you save the file to a diskette). The **noprompt** parameter is an optional parameter that overrides the user prompt.

Backing up from a bootable DOS diskette:

1. Create a bootable DOS diskette with the IPSSEND command available. You can do this in two ways:
   - Create the diskette from the ServeRAID Support CD. In the \diskette folder of the support CD is a file called dos.img. Use an image extraction tool (available on the support CD in the \diskette\tools folder) to create the bootable diskette.
   - Create the diskette using the ServeRAID Configuration Reset diskette. The ServeRAID Configuration Reset diskette image is available as a self-extracting utility on the Version 1.7 Upgrade CD. Refer to the *User's Reference* for instructions for creating the disk.

2. Boot the diskette you created in Step 1. If you are using the diskette created using the ServeRAID Support CD, the IPSSEND command is run without parameters from the autoexec.bat file each time the disk is booted. If you are using the ServeRAID Configuration Reset diskette, you are given a choice to either continue with the configuration reset process or exit. You must choose to exit the process. This will place your cursor at a DOS prompt, and the IPSSEND command is now available.

3. To save your present ServeRAID configuration, type:

   ```
   ipssend backup 1 filename noprompt
   ```

   where *filename* is the path and file name where you want the configuration to be written (it is recommended that you save the file to a diskette). The **noprompt** parameter is an optional parameter that overrides the user prompt.

Restoring the RAID configuration: If you saved your custom configuration using the **backup** option with the IPSSEND command (see "Backing up ServeRAID configuration" on page 7), you can use the restore function to load the configuration. This operation overwrites the existing configuration information and BIOS settings stored for the ServeRAID controller.

1. Boot the diskette you created in Step 1.of "Backing up from a bootable DOS diskette." If you are using the diskette created using the ServeRAID Support CD, the IPSSEND command is run without parameters from the autoexec.bat file each time the disk is booted. If you are using the ServeRAID Configuration Reset diskette, you are given a choice to either continue with the configuration reset process or exit. You must choose to exit the process. This will place your cursor at a DOS prompt, and the IPSSEND command is now available.

2. To restore your saved configuration, type:

   ```
   ipssend restore 1 filename noprompt
   ```

   where *filename* is the path and file name where the configuration was saved. The **noprompt** parameter is an optional parameter that overrides the user prompt.

3. When the IPSSEND command completes, continue the recovery procedure described in the "Using the Recovery Enablement Diskette and Recovery CD Set" section in the *User's Reference*.

If you did not save your configuration using the IPSSEND command, use the standard ServeRAID Configuration Reset diskette procedure. Note that this procedure will reset your system to the factory default configuration (see Table 1 on page 7 for the factory default configuration).

Powering on the NAS 200 and the 5194-EXP Storage Units

This procedure replaces the section titled "Powering on the appliance" in the *IBM TotalStorage Network Attached Storage 200 Hardware Installation Guide*, and the sections titled "Powering on the NAS EXP after an emergency" and "Powering on the NAS EXP" in the *IBM TotalStorage Network Attached Storage 200 Storage Unit Model EXP Installation and User's Guide*. This procedure applies to all releases of the IBM TotalStorage Network Attached Storage 200 Models 201, 226, and EXP.

To power on the NAS 200 and the NAS EXP:

1. Verify that:
   - There is no visible damage, in the event of an emergency powering off. If there is damage, have the unit serviced.
   - All cables are correctly attached.
   - All power cords are plugged into the back of the NAS 200 engine (3 cords) and optional 5194-EXP Storage Units (2 cords).
   - All hard disk drives are locked securely in place.
   - All switches on the optional 5194-EXP Storage Units are set correctly: the internal option switches 1 through 4, external option switches 1 through 5, and the unit ID switch. For more information on these switch settings, refer to the section titled "Setting the interface options and ID settings" in the *IBM TotalStorage Network Attached Storage 200 Storage Unit Model EXP Installation and User's Guide*.

2. Wait at least 20 seconds after connecting the power cords.

3. Power on the appropriate device:
   - If you are restarting the engine when all optional NAS EXPs are already recognized by the ServeRAID controller (for example, after a power failure), power on the devices in this order:
     a. NAS EXPs
        1) Switch on both power supplies in the back of the NAS EXP.

           The NAS EXP might take a few seconds to power on. During this time, you might see the fault (amber) and the power (green) LEDs on the NAS EXP turn on and off intermittently.
        2) When the power-on sequence is complete, verify that only the power (green) LEDs on the front and back are on. If one or more fault (amber) LEDs remain on, refer to the "Troubleshooting" section of the *IBM TotalStorage Network Attached Storage 200 Storage Unit Model EXP Installation and User's Guide*.

           Attention: If you have data stored on the drives, label the drives before you remove them. Then, when you replace the drives, install each of the drives back into the same drive bay from which you removed it. Failure to do so will result in a loss of data.
     b. Engine

1) Press the power button on the front of the engine to power on the appliance.

   Attention: The first time that you start the appliance, a series of configuration and system preparation programs that finish configuring the *Network Operating System* (NOS) run automatically. These programs must complete before you use any included applications to connect to or configure your appliance. Wait at least 5 minutes before connecting to or configuring the appliance after the initial system start.

2) Verify that the Power-on LED is *on* and the Information LED and System Error LED are both *off*.

   Note: Depending on the system status, other LEDs might be on.

1	Information LED
2	System error LED
3	Power-on LED
4	POST complete (OK) LED
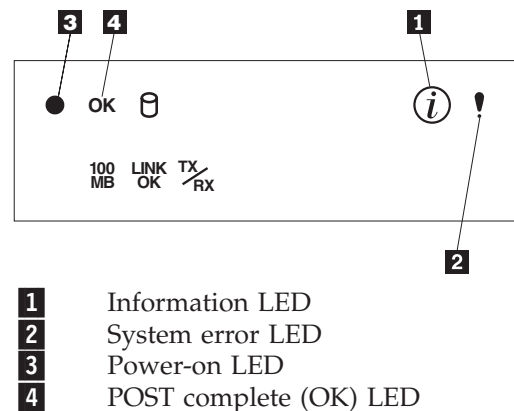
If a problem is detected during the diagnostics, refer to the *IBM TotalStorage Network Attached Storage 200 User's Reference*.

- If you are not using a NAS EXP, power on the engine using the procedure in step 3b on page 9.
- If you are adding one or more new NAS EXPs, then power on the devices in the following order:
  a. Already recognized NAS EXPs. These are any NAS EXPs that are already recognized by the ServeRAID controller (see step 3a on page 9 for instructions explaining how to start the NAS EXPs).
  b. Engine (see step 3b on page 9 for instructions explaining how to start the engine).
  c. New NAS EXPs. These are all NAS EXPs that are new to the configuration and not recognized by the ServeRAID controller (see step 3a on page 9 for instructions explaining how to start the NAS EXPs).

MES support for ServeRAID-4Mx

If you install an optional IBM ServeRAID-4Mx Ultra160 SCSI controller, it is recommended that you create a backup copy of your RAID configuration file by following the procedure found in "Backing up ServeRAID configuration" on page 7. In the event that disaster recovery is required, the recovery process will recreate your configuration based on the assumption that the standard ServeRAID-4Lx controller is installed. By following the procedure for using the backed-up file as explained in "Restoring the RAID configuration" on page 8, you can quickly restore your previous configuration.

Ethernet adapter teaming

The Ethernet adapters (GB Ethernet SX and 10/100 Ethernet) that you install in the PCI slots of the NAS 200 support adapter teaming. With adapter teaming, two or more PCI Ethernet adapters can be physically connected to the same IP subnetwork and then logically combined into an adapter team. Such a team can support one of the following functional modes:

Fault tolerance

In fault tolerance mode, only one adapter in the team is fully active on the Ethernet network (for example, sending and receiving data) at any point in time, while the other adapters are in standby mode (receiving data only). If that adapter detects a link failure or fails completely, another adapter in the team automatically and rapidly takes over as the active adapter, and all Ethernet traffic being handled by the failing adapter is seamlessly switched to the new active adapter, with no interruption to network sessions (for example, file transfers) in progress at the time of the failover.

Load balancing

In load balancing mode, all adapters in the team are active, increasing the total transmission throughput over the common IP subnetwork. If any adapter in the team fails (link failure or complete failure), the other adapters in the team continue to share the network transmission load, although total throughput is decreased. Load balancing is supported only for adapter teams consisting of only one type of adapter; different types of adapters cannot be combined in a load balancing team.

You configure adapter teaming with Intel PROSet II, which is preloaded on the NAS 200, as follows:

1. On the NAS 200, physically connect the adapters that you want to team to the same IP subnetwork.
2. Access the NAS 200 desktop by directly attaching a keyboard, mouse, and monitor, or over the network by starting Terminal Services on another workstation. (For instructions on how to invoke Terminal Services, see the "Terminal Services and the IBM NAS Administration Console" section in the *User's Reference*).
3. From the NAS 200 desktop, go to the Start menu, then select **Settings**, then select **Control Panel**.
4. Double-click the Intel PROSet II icon in the Control Panel to start Intel PROSet II.
5. You will see a list of all adapters for each slot and type supported under Network Components.
6. Under Network Components, you will see a list of resident and nonresident adapters for each slot and type supported under Network Components. Drivers are preset for all supported adapter configurations, but will be loaded only for resident adapters.
7. Identify which adapters you are going to team. To do this, click the adapter under Network Components, and select one of the adapters that will be part of the teaming.
8. Right-click the adapter, then select **Add to Team**, then select **Create New Team...**.
9. Select the type of team that you want to create.
10. Select the adapters for the team you are creating by selecting the check box for the appropriate adapters in the list, and then select **Next**.
11. Verify that these settings are correct, and then select **Finish**.

The procedure creates a device named Intel Advanced Network Services Virtual Adapter. It also binds all network protocols that were bound to the physical adapters that were added to the team to this virtual adapter, and unbinds those protocols from the physical adapters. If you delete the team, the settings will return to the state prior to creating the team.

For complete help on adapter teaming, from Intel PROSet II click **Network Components**, and then select **Help** from the Help menu.

Microsoft Services for UNIX and NFS Support in the NAS 200

Support for the Network File System (NFS) is provided in the NAS 200 by a preloaded and preconfigured software component, Microsoft Services for UNIX. The levels of NFS supported by Services for UNIX, and in turn the NAS 200, are NFS Versions 2 and 3. Any client workstation that is using an NFS software stack supporting NFS Version 2 or NFS Version 3, regardless of the client workstation's operating system, should be able to connect to the NAS 200 and access its storage as defined by the NAS 200 administrator.

You administer NFS file shares and other attributes with standard Windows administration tools, including those provided as part of the IBM NAS desktop, and the Microsoft Windows 2000 for NAS user interface. Additional configuration of the User Name Mapping component of Services for UNIX, which maps the UNIX user name space to the Windows user name space, is required to support NFS security. Consult the online documentation for Services for UNIX for more information on configuring User Name Mapping. To view the online documentation for Services for UNIX on the NAS 200:

1. From the NAS 200 desktop, click the **IBM NAS Administration Console** icon.
2. On the left pane of the IBM NAS Administration Console, expand File Systems.
3. Expand Services for UNIX.
4. Select any of the items that appear under **Services for UNIX**.
5. Click anywhere on the right pane of the IBM NAS Administration Console, and then press the **F1** key to open the online documentation for Services for UNIX in a separate window.

Updated information on Persistent Storage Manager

The information in the "Persistent Images" section in the *User's Reference* applies to Version 1.00 of the NAS 200 software (containing Persistent Storage Manager [PSM] Version 1.0). For Version 1.6, or later (containing PSM Version 2.2), the information in this section replaces that information.

Persistent Images
A persistent image is a copy that you make of one or more file system volumes at a specific time. The Persistent Images function allows the recovery of a file or volume to the state it was in at the time that you created the persistent image. Persistent images are maintained in a way that minimizes the storage required to keep a second (or third or fourth, and so on) copy of the volume. This is done by using a copy-on-write technique that uses, for each volume, an area of pre-allocated storage (the PSM cache file) that keeps only those data blocks which have been written since the time you made a persistent image of the volume.

Persistent Storage Manager (PSM) enables you to create and preserve images of the NAS 200 drives. You can take a persistent image immediately or schedule persistent images as one-time events or regularly repeated events. You can access

the PSM tasks in the Disks/Persistent Storage Manager task group within the Windows 2000 for Network Attached Storage user interface, in one of two ways:

- By going to the IBM NAS Admin console on the appliance desktop (using Terminal Services or directly-attached keyboard, monitor, and mouse) and selecting Persistent Storage Manager (this automatically launches the Windows 2000 for Network Attached Storage user interface and brings up the Disks/Persistent Storage Manager page containing the PSM tasks)
- By starting the Windows 2000 for Network Attached Storage user interface directly

When you create a persistent image, it appears as a directory on the original drive. Access rights and permissions from the original drive are inherited by the persistent image. Persistent images are used in the same way as conventional drives. However, unlike conventional drives, persistent images are records of the content of the original drive at the time that you created the persistent image. Persistent images are retained following shutdown and reboot.

There are six PSM tasks in the Disks/Persistent Storage Manager group:
- Global Settings
- Volume Settings
- Persistent Images
- Schedules
- Restore Persistent Images
- Disaster Recovery

Each of these tasks is described in the following sections. More detailed descriptions and instructions for each of the control panels and topics are contained in the online help.

Global settings: On this panel you can configure the following attributes of the persistent image system:

Attribute:	Default value:
Maximum number of persistent images	250
Inactive period	5 seconds
Inactive period wait timeout	15 minutes

Volume Settings: This panel displays statistics for each volume, such as total volume capacity, free space, and cache file size and usage. You can also select any volume and configure volume-specific PSM attributes for that volume, such as:

Attribute:	Default value:
Cache-full warning threshold	80 percent full
Cache-full persistent image deletion threshold	90 percent full
Cache size	15 percent (of the total volume capacity)

Note: You cannot change the cache size for a volume while there are persistent images on that volume (the ″Cache size combo box will be disabled). You must delete all persistent images on the volume before changing the cache size for that volume.

Persistent Images: This panel lists all of the persistent images that exist on all volumes. On this panel you can:

- Create a new persistent image immediately (without scheduling it using the Schedules panel). When you create the persistent image, you can specify properties for the persistent image, including:

Volume(s)	The persistent image can contain a single volume or multiple volumes. To select multiple volumes, hold down the **Ctrl** key while clicking on the volumes that you want to select. For multi-volume persistent images, a virtual directory containing data for a volume will appear under the persistent image directory in the top level of each volume in the persistent image (the name of the persistent image directory is configured in the Global Settings panel).
Name	You can name the persistent image. This will be the name of the virtual directory containing the persistent image, underneath the persistent image directory in the top level of the volume (the name of the persistent image directory is configured in the Global Settings panel).
Read-only or read-write	A persistent image is read-only by default, so no modifications can be made to it. However, you can set the persistent image to read-write, which permits you to modify it. When a persistent image is written, the modifications made are also persistent (they survive a reboot of the system). Changing a persistent image from read-write to read-only resets the persistent image to its state at the time you took the persistent image, as does selecting **Undo Writes** for a read-write persistent image from the Persistent Images panel.
Retention value	A persistent image can be given a relative retention value or weight. This is important when PSM needs to delete some persistent images for a volume because the cache file for the volume for which the persistent image was taken capacity has reached a certain threshold, as described later in this section. If the volume cache file completely fills, then all persistent images for that volume are deleted regardless of the retention values. By default, a new persistent image is assigned a "Normal" retention value (there are other higher and lower values which can be selected).

- Delete an existing persistent image.
- Modify properties of an existing persistent image, including read-only or read-write, and retention value.

Schedules: Use this panel to schedule persistent images to be taken at specific times (this is independent of the scheduled backup function using NAS Backup Assistant described earlier). Each PSM schedule entry defines a set of persistent images to be taken starting at a specified time and at a specified interval, with each image having the set of properties defined in the entry. This allows you to customize scheduled persistent images on a per-volume basis.

For instance, you could set a persistent image for one volume to occur every hour, and for another volume to occur only once a day. The set of properties that you can define are the same properties described in the Persistent Images panel description above; when you define these properties, all persistent images created according to this schedule entry will be given those properties. After a scheduled persistent image is created, certain properties of that persistent image can be modified using the Persistent Images panel, independently of other persistent images created according to the schedule.

After a schedule entry is created, it appears in the list of scheduled persistent images. Subsequently you can modify the properties of an existing entry, such as start time, repetition rate, the volume(s), and so on. For a schedule, you can name the persistent images based on a pattern that you configure; format specifiers (defined on the New Persistent Image Schedule panel under the Persistent image name(s) entry field) enable you to customize variable portions of the name.

Restore Persistent Images: On this panel, you can select an existing persistent image and quickly restore the volume contained in the image back to the state it was in at the time when the selected persistent image was taken. This is useful if you need to recover an entire volume, as opposed to just a few files. This volume restore function is available for the data volumes but not the system volume.

Disaster Recovery: PSM provides a disaster recovery solution for the system drive. This extends the volume restore function of PSM to provide disaster recovery in the event that the system drive is corrupted to the point where the file system is corrupt, or the operating system is unbootable. Note that while disaster recovery is also supported using the Recovery CD-ROM and backup and restore capability, that is a two-step process. In contrast, the method supported by PSM allows you to restore the system drive from a single image, without having to go through the entire recovery procedure and then additionally having to restore a system drive backup.

Use the Disaster Recovery panel to schedule and create backup images of the system drive, and to create a bootable diskette which will allow you to restore the system drive from a backup image (located on the maintenance partition, or network drive). The remainder of this section provides additional information on how to perform backup and recovery operations for the NAS 200.

Note: Restoration of a PSM backup image over the network is not supported for the Gigabit Ethernet Adapter. If you have only Gigabit Ethernet adapters installed, it is recommended that you perform PSM backup of each NAS 200 to its maintenance partition (D: drive), which would allow you to recover if the system volume is corrupt or unbootable, or both. If the hard disk drive fails completely, use the Recovery CD as described in "Using the Version 1.6 Recovery Enablement Diskette and Recovery CD Set" on page 25 to restore the NAS 200 to its original (factory) configuration.

Backing up the system drive: On the Disaster Recovery panel you will find status information for backup operations, both scheduled and immediate, as well as buttons for starting and stopping a backup operation, for configuring backup, and for creating a recovery diskette.

Click **Modify Settings** to open the Disaster Recovery Settings page. Modify the settings that you want for backup. Note that you must not include spaces in the *Backup name* field. When you have modified the settings, click **OK** to save the changes.

On the Disaster Recovery page, click **Start Backup** to begin the backup. The backup process first creates a persistent image of the system drive (C:), named *System Backup*. Then it creates the backup images from that persistent image, and then deletes that persistent image when the backup operation is complete.

Creating a recovery disk: You will now create a bootable recovery diskette which, when used to boot up the NAS 200, will use the backup location settings that you configured on the Disaster Recovery Settings page to locate the backup image and restore it to the system drive of the NAS 200.

1. Insert a blank, formatted diskette in the diskette drive of the NAS 200.
2. On the Disaster Recovery page, click **Create Disk**.
3. Click **OK** on the Create Recovery Disk page to create the diskette. The diskette drive LED will turn off when the creation is complete. The diskette creation should take no more than two minutes.
4. One of the files that is copied onto the diskette is a utility to make it DOS bootable, called fixboot.exe. From a command prompt, either using the desktop of the NAS 200 itself (with the diskette still in the diskette drive of the NAS 200), or on another system with the diskette in its diskette drive, type **a:\fixboot.exe** and answer the prompts.

   Note: After you have run fixboot.exe for the diskette, the diskette remains bootable unless you format it again (without specifying an option to make it bootable), so if you later erase files on the diskette you do not need to run fixboot.exe again.
5. Remove the diskette from the diskette drive (of the NAS 200 itself, or other system if you used that system to run the fixboot utility). You should label the diskette appropriately and keep it in a safe place.

You may create additional copies of the diskette using the above procedure for each new copy. Note that if you change the backup location or logon settings using the Disaster Recovery Settings page, you will need to rebuild the recovery diskette or diskettes for that NAS 200 to reflect the new backup location or logon settings for that NAS 200.

Static IP addressing: If you do not have a DHCP server on your network, and you must access a backup image that is only accessible using the network (for example, no backup image is located on the maintenance partition [D: drive] of the NAS 200 to be recovered), then you must configure the recovery diskette so that it will use a static IP address and subnet mask when accessing the network.

On the recovery diskette, edit the file a:\net_sets.bat. Near the top of this file are two lines that begin with *rem* (comment lines) that, when you uncomment them, set the IPAddress and SubnetMask environment variables. Change these lines as follows:

1. Uncomment both lines by removing *rem* from the beginning of both lines.

2. For each line, what follows the equals sign (=) is an IP address expressed as a set of four space-separated numbers (an IP address without the dots [.]). Change the SubnetMask value to match the subnet mask that your network uses. Change the IPAddress value to match the IP address that you want to assign to the NAS 200, during the recovery operation. Do not insert dots between the numbers (octets) in either value.

As an example, here is how the lines would look for a NAS 200 using IP address 192.168.1.200, and subnet mask 255.255.255.0:

```
set SubnetMask=255 255 255 0
set IPAddress=192 168 1 200
```

If you later want to reconfigure the recovery diskette to use DHCP to obtain an IP address instead of static IP addressing, you must reinsert *rem* in front of the SubnetMask and IPAddress lines to disable static IP addressing, as follows (based on the previous example):

```
REM set SubnetMask=255 255 255 0
REM set IPAddress=192 168 1 200
```

If you have multiple 10/100 Ethernet adapters: If your NAS 200 has more than one 10/100 Ethernet adapter, then you must configure the recovery diskette to select the 10/100 Ethernet adapter to be used for disaster recovery over the network (the network over which the network drives containing backup images can be accessed). On the recovery diskette, edit the file a:\net_sets.bat, and add the following line:

set SLOT=*slotvalue*

where *slotvalue* is one of the following, depending on the PCI slot (on the back of the NAS 200) in which the desired 10/100 Ethernet adapter is installed:
- 0x0009 for PCI slot 1
- 0x000a for PCI slot 2
- 0x0026 for PCI slot 4
- 0x0027 for PCI slot 5

Restoring the system drive: If you need to restore the system drive from a backup image created using the PSM Disaster Recovery panel as described above, you must use a recovery diskette created using the Disaster Recovery panel. If you did not create a recovery diskette, then you must use the Recovery CD as described in "Using the Version 1.6 Recovery Enablement Diskette and Recovery CD Set" on page 25 to restore the system drive to its original (factory) configuration.

To restore the system drive:
1. Set the write-protect tab of the recovery diskette to the write-protect position. This is a protection feature to prevent accidental initiation of the recovery process (by booting the NAS 200 with the recovery diskette in the diskette drive).
2. Insert the recovery diskette in the diskette drive of the NAS 200, and restart the NAS 200.
3. The recovery process begins. The recovery diskette software will locate the first backup image that it can find, based on the backup locations specified on the Disaster Recovery Settings panel in Microsoft Windows 2000 for NAS when the diskette was created. After it has located a backup image it will begin restoring the system drive from the image. During the restore operation the hard disk

drive LEDs (on the front right of each hard disk drive) will flash green or stay nearly solid green; this indicates write activity to the system volume.

> **Note:** If the hard disk drive LEDs stay off for at least 10 minutes since you restarted the NAS 200, then there is a problem with the recovery procedure and it will not be able to restore the system volume from a backup image. Should this occur, you will need to use the Recovery CD as described in "Using the Version 1.6 Recovery Enablement Diskette and Recovery CD Set" on page 25.

4. When the restore operation completes, the hard disk drive LEDs will turn off, and a short song will play periodically (every 15 seconds). Remove the diskette, set the write-enable tab back to the write-enabled position, and reinsert the diskette. The log file results.htm will be written to the diskette; this log file can be viewed with any Web browser to examine the results of the restore operation.

5. After the log file is written, another song will play (continuously). Remove the diskette and restart the NAS 200. If the restore was successful, the NAS 200 will come back up in the state it was in at the time that you created the backup image used for the recovery operation.

> **Note:** The persistent image that was created on the system drive (named System Backup) by the backup process is restored by the restore process as it is preserved in the backup image. It is recommended that you now delete that persistent image as it is no longer needed. On the Persistent Images panel, select the persistent image named **System Backup** on drive C: from the list of persistent images, then click **Delete**, then click **OK** on the Delete Persistent Image panel that appears.

If the restore was unsuccessful, then you must use the Recovery CD as described in "Using the Version 1.6 Recovery Enablement Diskette and Recovery CD Set" on page 25.

Granting user access to persistent image files: You can give end-users access to files in the persistent images. For example, this would be helpful to a user who has accidentally corrupted a file and needs to get an uncorrupted copy of that file.

To enable end-user access to persistent image files, go into Terminal Services. When you are in Terminal Services, click the **My Computer** icon. Next, click the volume on which you want to enable persistent image access. Then, go into the persistent images directory and right-click the mouse on the persistent image mount point that you want, select **Sharing**, then specify sharing settings. If you want to enable the same access to all persistent images on the volume, you can right-click the persistent images directory (from the top level of the volume), select **Sharing**, and then specify sharing as desired.

> **Note:** The share settings are maintained in a persistent image. Therefore, granting access to all end-users only permits those users to access files and directories within the persistent image that they would have been able to access originally on the actual drive.

PSM notes:

1. As mentioned, you can take and keep a maximum of 250 persistent images. These can be taken on local drives, or drives on the external storage that are logically local.

Note that on various panels, such as the New Persistent Image Schedule panel, you will see a field, *Keep the last:* (number of persistent images). The total number of persistent images that you enter in these fields will not override the maximum number of persistent images that you set in the Global Settings panel. For example, if your maximum number of persistent images is 10, and you enter in numbers in other fields that add up to greater than 10, only 10 persistent images will be taken.

2. You cannot take a persistent image of the maintenance drive (D:). Hence, you will not see it as a choice in either the New Persistent Image Schedule panel or the Create Persistent Image panel.

3. PSM stores the cache file for each drive on the drive itself. The first persistent image created on a particular drive will take a significant amount of time because the PSM cache file must be created (pre-allocated) for that drive.

   The time required for creation depends on the configured size of the cache file (15 percent of the total drive size by default). Creation takes roughly three to four minutes per gigabyte. For example, a 10 GB cache file would take 30 to 40 minutes to create. You should create a persistent image for a drive before scheduling any persistent images for that drive, to build the cache file. You may then delete the persistent image that you just created if you do not need to keep it.

   After the creation of the first persistent image on a volume, future persistent images on that volume will complete faster.

4. As mentioned, the default size of the cache file per drive is 15 percent of the total drive capacity. In most cases, that should be sufficient.

   However, it is possible that it will not be enough to maintain the number of persistent images that you want to keep concurrently on the drive, given the amount of file-write activity to the drive. PSM will automatically take action to prevent the cache file from overflowing, because if that occurred, PSM would be forced to automatically delete all persistent images on the drive (when it cannot keep track of changes made to the drive, it cannot maintain a valid persistent image).

   PSM takes the following actions as the cache file usage approaches a full condition:

   - When the cache file usage exceeds the warning threshold (configured in the PSM Volumes panel for the drive; the default value is 80 percent), PSM generates a warning message to the system event log (viewable using the Windows 2000 Event Viewer in the IBM NAS Admin console), and to the alert log in the Microsoft Windows 2000 for Network Attached Storage user interface. The name of the source for the message will be *psman5*. Additionally, while the cache file usage is above the warning threshold, PSM prohibits any attempt to create a new persistent image, and logs an error message (to the system log and alert log). The text of the error message that is logged in the system event log (from *psman5*) is "A persistent image could not be created due to error 0xe000102b".

   - When the cache file usage exceeds the automatic deletion threshold (also configured in the PSM Volumes panel for the drive; the default value is 90 percent), PSM automatically selects a persistent image on the volume and deletes it to reduce the cache file usage. It selects the persistent image with the lowest retention value (as described above in the Persistent Images panel section). If more than one persistent image has the same (lowest) retention value, then the oldest image will be selected for deletion. If this deletion does not reduce the cache file usage below the automatic deletion threshold, then it will continue to select and delete persistent images until the cache file usage is reduced below the automatic deletion threshold. For

each deletion, PSM generates an error message to the system event log and to the Windows 2000 for Network Attached Storage alert log indicating that a persistent image was deleted.

You should periodically check the system event log or Windows 2000 for Network Attached Storage alert log to ensure that the cache file usage is not consistently high, forcing existing persistent images to be deleted and preventing new persistent images from being created. If you find that this is the case, you can increase the size of the cache file using the PSM Volumes page, but you will need to delete all persistent images currently on that volume because dynamic cache file resizing is not supported in this release.

5. Volume restore of the system volume (C: drive) is not supported. If you attempt to restore a persistent image containing the system volume, the restore operation will not take place.

6. Volume restore of a data volume may require a reboot of the node. You will be notified by the Restore Persistent Images panel if a reboot is required after a restore operation is initiated.

7. When you restart the NAS 200, Persistent Storage Manager (PSM) takes two actions:
   a. Loading
   b. Mapping

   During loading, PSM loads existing persistent images from the cache files on each of the volumes. The loading time depends on the amount of cache data there is to read. Cached data is used by PSM to maintain the persistent images, and the more cache data there is, the longer it takes to load the persistent images, and thus the longer it may take your NAS 200 to become fully operational after a restart.

   During mapping, PSM makes the loaded persistent images accessible using the file system by mounting them as virtual volumes underneath the persistent images directory on the volume for which the persistent image was created. The mapping time varies with the number of persistent images, as well as the size of the volume.

   As an example, suppose that on your NAS 200, you defined a 1 TB volume with 50 percent of the volume allocated to the cache (500 GB cache), and that you had 20 persistent images on the volume, using 100 GB (20 percent) of the cache (based on the write activity to the volume since the first persistent image was created). You would observe an increase in the NAS 200 startup time of roughly 3 minutes, 20 seconds over what it would be without any persistent images on the volume. Then, when the NAS 200 has become fully operational, all 20 persistent images would become accessible within another 13 minutes.

8. PSM imposes a limit of 1 terabyte (TB) of cached data, across all volumes on the NAS 200. For this reason, you should ensure that the total configured size of all cache files on the NAS 200 is not greater than 1 TB.

   You can do this by accessing Persistent Storage Manager, then going to the Volume Settings page, and making sure that the total of all values in the Cache Size column is 1 TB or less. (You can access Persistent Storage Manager by selecting the **Persistent Storage Manager** link on the IBM NAS Admin console on the NAS 200 desktop, or by starting the Windows 2000 for Network Attached Storage user interface and then selecting **Disks**, then **Persistent Storage Manager**.)

If the total configured size of all cache files is greater than 1 TB, then you should reduce the size of the cache on one or more of the volumes by selecting the volume from the list, then clicking **Configure**, then selecting a smaller value from the **Cache size** drop-down list and clicking **OK**.

Note: You cannot change the size of the cache on a volume that has persistent images. You must delete all persistent images on the volume before changing the cache size. You should try to reduce the cache size on a volume that has no persistent images, if possible, before deleting any persistent images.

If there is more than 1 TB of cache configured on the NAS 200, the following can occur:

- When you restart the NAS 200, PSM will prevent a volume from being mounted on the file system (prevent it from being accessible) if that volume's PSM cache would increase the total size of all cache files (on all volumes mounted to that point) above 1 TB, and an error message will be written to the system event log. The event source is psman5, and the text of the error message is:

  `There is insufficient memory available.`

- If you increase the size of any cache such that the total cache size of all volumes on the NAS 200 becomes greater than 1 TB, and if you do not restart the NAS 200 after you change the cache size, then no persistent images can be created on the volume for which the cache size increase was made. An attempt to create a persistent image on that volume will cause an error message to be written to the system event log. The event source is psman5, and the text of the error message is:

  `There is insufficient memory available.`

9. If you delete the last persistent image on a volume, and then immediately attempt to create a new persistent image on that volume, the creation of the new persistent image might fail, and an error message will be written to the system event log.

   The event source is psman5, and the text of the error message is:

   `A persistent image could not be created due to error 0xc0000043.`

   This message is generated because when PSM is reinitializing the PSM cache file on a particular volume (after you delete the last persistent image on that volume), a new persistent image cannot be created. If this error occurs, wait for a few minutes, and then try to create the persistent image again.

10. If you use the Windows Powered Disk Defragmenter to attempt to defragment a volume containing persistent images, the volume will not be defragmented. If you select the volume and click **Defragment**, the Disk Defragmenter runs on the volume and then indicates that the volume was successfully defragmented. However, the Analysis display appears the same as it did before you clicked **Defragment**, which indicates that defragmentation did not take place. You can defragment volumes without persistent images.

Attention: The recovery process invalidates persistent images and leaves them in an inconsistent state. So, if you plan to use the Recovery CD, it is recommended that you first delete all persistent images to ensure a clean reload of the system software. For more information on using the Recovery CD, see "Using the Version 1.6 Recovery Enablement Diskette and Recovery CD Set" on page 25.

Administration notes

Using a keyboard, monitor, and mouse for initial setup

It is highly recommended that you directly attach a keyboard, monitor, and mouse to the NAS 200 when:

- Initially setting up and configuring the device
- Changing or adding to RAID arrays (for example, adding a new array with ServeRAID Manager, adding a new RAID controller, or adding a storage expansion unit)
- Troubleshooting the device

OpenHCD USB controller warning

Any warning (Yellow Explanation) indication in Device Manager, under Universal Serial Bus Controller, Standard OpenHCD HSB Host Controller, should be ignored. The warning is an indication that the device cannot find enough free resources and does *not* affect product function or performance.

Attention: The USB controller is *not* supported in this appliance.

Summary of configuration and administration tools for the NAS 200

There are several ways to setup and administer the NAS 200. Table 2 on page 23 suggests which tool you can use for specific functions, but does not list all options or combinations. The administrator training-level or administrator preferences may determine an alternate approach from that suggested in the table.

Table 2. Summary of configuration and administration tools for the NAS 200

Administration Tool	Main functions
Windows Domain Controller (not NAS appliance)	Users and user groups may be defined and authenticated by a Windows Domain Controller, although this is not required.
IBM Advanced Appliance Configuration Utility	Access a headless NAS 200, particularly for the initial setup of the network connectivity. (Alternatively, you can attach a keyboard, mouse, and display to the NAS 200.) • Set time and date • Configure initial network connectivity parameters • Access to Windows 2000 for NAS GUI, Terminal Services (NAS Desktop), and Universal Manageability Services
Windows 2000 for NAS GUI	Provides ease-of-use administration, but not all the capability of Terminal Services and IBM NAS Administration • Configure networking connectivity • Create and format logical drives • Join domains • Setup access permissions and disk quotas for CIFS, NFS, HTTP, FTP, and NetWare shares • Use Persistent Storage Manager

IBM NAS desktop and IBM NAS Admin program, using a Terminal Services session or a directly connected keyboard and display	Provides in-depth administration of all aspects of NAS 200. Provides all of the Windows 2000 for NAS GUI functions above, plus:
	• Use NAS Backup Assistant, or NTBackup and Restore wizard
	• Learn detailed inventory information about hardware, OS, and so on, using Universal Manageability Services.
	• RAID configuration using ServeRAID Manager
	  – Create RAID arrays and LUNs
	  – Add additional RAID or storage enclosure after initial purchase
	• Diagnose system problems
	  – Check 10/100 or GB Ethernet using PROSet II
	  – Check RAID subsystem using ServeRAID Manager

Disaster Recovery	Restores a previously saved PSM image of the system partition to a failed machine. This will restore all configuration information on the machine. You create the recovery boot diskette from the PSM tools in the Windows 2000 for NAS GUI.
Recovery CD	Reinstalls the software to the original state as shipped on the machine; however, does not restore configuration information (so configuration changes you applied to the original shipped configuration are lost). You must first boot with the Recovery Enablement Diskette, and then reboot with the Recovery CD. To create the Recovery Enablement Diskette, run \DiskImages\Recovdsk.bat on the Supplemental CD-ROM.
Planar ASM Adapter configuration program	Configures the onboard planar Advanced Systems Management Adapter. To create this diskette, run C:\IBM\ASMP\UPDATES\32P0083.EXE on the NAS 200 operating system volume.
ASM PCI Adapter configuration program	Configures the optional Advanced Systems Management PCI Adapter. To create this diskette, run C:\IBM\ASMP\UPDATES\24P1874.EXE on the NAS 200 operating system volume.

Determining who is using the network-attached-storage

Occasionally, the administrator may want to know who is using the network-attached storage. The administrator can determine this information as follows:

1. Start a Windows Terminal Services session from the administrator's console to the NAS 200.

2. Click on the **IBM NAS Admin** icon on the desktop.
3. In the left plane, click on **File Systems**, then **Shared Folders**, then **Sessions**.
4. The users currently using the storage are displayed. If necessary, you can close those sessions with a right-click. Before you close a session, you can notify the user that you are going to close the session by clicking on **Start**, **Programs**, **Accessories**, **Command Prompt**, and then issuing the **net send** *hostname messagetext* command.

AntiVirus protection

You can perform AntiVirus scanning of the NAS 200 storage from clients having the appropriate access permissions. Also, you can install Norton AntiVirus Version 7.5 or later on the NAS 200 engine using normal Windows 2000 software installation procedures.

Depending on configuration options, AntiVirus scanning may use substantial CPU or disk resources. Therefore, you should carefully select scanning options and scan schedule.

Norton AntiVirus is not included with the NAS 200; you must purchase it separately.

Memory notes

The following sections contain information on adding memory.

Adding more engine memory to increase performance

You can enhance the performance of the NAS 200 in an NFS environment by adding more RAM to its processor. To do this:

1. From your IBM representative, purchase any of the 5194 memory field-upgrade feature codes applicable to your model:

   Reviewers Note:

   Are these correct for Version 1?

   Model 200 (feature code and title):
3411	256 MB to 512 MB Memory Upgrade
3412	256 MB to 1 GB Memory Upgrade
3413	256 MB to 2 GB Memory Upgrade
3421	512 MB to 1 GB Memory Upgrade
3422	512 MB to 2 GB Memory Upgrade
3431	1 GB to 2 GB Memory Upgrade

   Model 225 (feature code and title):
3531	1 GB to 2 GB Memory Upgrade

2. Follow the instructions in the "Replacing memory modules," section in the *Installation Guide*.
3. Before rebooting, attach a keyboard and display directly to the back connectors of the product. During the first IPL, you will have to read and answer questions about the additional memory you have installed.

Using the recovery CD-ROM if you have added more processor memory

If you have installed more processor memory, and later use the Recovery CD-ROM (see "Updated information on using the Recovery and Supplementary CDs" on page 25), you will have to attach a keyboard and display and answer questions about the additional memory that you have installed.

Additional storage notes

This section contains information on adding and configuring additional storage.

Configuration of Unit ID switch on the 5194-EXU or 5194-EXP

The Unit ID switch comes with a factory default of ID 0. Because each 5194-EXU or EXP is on a separate SCSI channel connected to the SCSI RAID card, you can leave this Unit ID configuration as ID 0 for any attached 5194-EXU or EXP units.

Updated information on using the Recovery and Supplementary CDs

The information in the *User's Reference* applies to Version 1.00 of the NAS 200 software. For Version 1.6, or later, the information in this section replaces that information. Note that the Recovery CD for Version 1.6, or later, is now a set of 2 CDs, referred to collectively as the Recovery CD Set, consisting of Recovery CD 1 and Recovery CD 2.

Attention: Changing the preloaded software configuration of this product, including applying or installing unauthorized service packs or updates to preinstalled software, or installing additional software products that are not included in either the preloaded image or on the Supplementary CD, may not be supported and could cause unpredictable results. For updated compatibility information, see www.ibm.com/storage/support/nas.

To correct problems with a preloaded software component, back up your user and system data. Then use the Recovery CD Set to restore the preloaded software image.

This chapter describes the applications included on the Supplementary and Recovery CDs, and how and when you should use them.

As an alternative to using the Recovery CD Set, you can use the restore portion of the disaster recovery solution provided by Persistent Storage Manager (PSM) to recover the appliance, if you have met the requirements (including creating a PSM backup image and PSM recovery diskette). The restore function enables you to restore the appliance to the state it was in at the time of the PSM backup, in one step, without having to revert back to the original (factory) configuration which would require you to subsequently reconfigure clustering and other components. See "Restoring the system drive" on page 17 to determine whether you have met the requirements. If so, you can use the PSM recovery method. If you have not met the requirements for using the PSM recovery method, or if the PSM recovery fails, then you must use the Recovery CD Set as described in this chapter.

Using the Version 1.6 Recovery Enablement Diskette and Recovery CD Set

This section contains changes to the recovery process described in the *User's Reference*. This section is not a complete replacement for that information. Review the original information before using the information in this section.

The Recovery CD Set (two CDs, labeled as Recovery CD 1 and Recovery CD 2) contains the preload image for your NAS 200 and is used to recover the preloaded image on your appliance. You must start the appliance using the Recovery Enablement Diskette before you can use Recovery CD 1.

CAUTION:
The NAS 200 does not have a monitor, keyboard, or mouse attached to it under normal operating conditions. Because of this, you cannot interact with the preload-image restore process using a monitor. Starting Recovery CD 1 will, without visually prompting the user, automatically destroy all data on the system drive. Use the Recovery Enablement Diskette and Recovery CD Set only when it is absolutely necessary to restore the preloaded system image.

To recover the preloaded image on an appliance, perform the following steps. Note that the recovery process invalidates persistent images and leaves them in a state that is inconsistent with their pre-recovery state. So, if you plan to use the Recovery CD Set, it is recommended that you first delete all persistent images to ensure a clean reload of the system software.

1. Attach a keyboard and display to the appliance.
2. Insert the Recovery Enablement Diskette into the diskette drive and place Recovery CD 1 into the CD-ROM drive of the appliance.

> **Important**
>
> The Recovery Enablement Diskette restores the NAS 200 from the CD-ROM drive. You will not be able to restore the preload image from the Recovery CD Set without first restarting the appliance using the Recovery Enablement Diskette.

3. Restart the appliance.
4. If you installed additional processor memory on the appliance, the BIOS configuration program will appear. Click **Continue** on the first panel, click **Continue** again, click **Exit Setup**, and finally, click **Yes, save and exit Setup**.
5. When the diskette loads, you will be prompted with a message that asks if you want to proceed. Enter *Y* to proceed. If you enter *N*, you will be returned to a command prompt.
6. The recovery process will begin automatically. Follow the instructions provided by the image restoration software, and the original manufacturing preload will be restored. During the restoration of the preload, you will be prompted to insert the other recovery CDs into the CD-ROM drive. After the preload image is restored, the appliance restarts automatically.
7. If you installed additional processor memory, the BIOS configuration program will now appear a second time. Click **Continue** on the first panel, click **Continue** again, click **Exit Setup**, and finally, click **Yes, save and exit Setup**. You may now detach the keyboard and display from the appliance and allow the recovery process to complete automatically.

> **Important**
>
> After the appliance restarts, a series of configuration and system preparation programs that finish configuring the appliance run automatically. These programs must finish running before you use any included applications (such as the IBM Advanced Appliance Configuration Utility or the Terminal Services Client) to connect to or configure your NAS 200. Do not connect to or configure the appliance for at least 15 minutes after system restart. This notice applies only to the first time the NAS 200 is started after using the Recovery CD Set.
>
> Logical Disk 0 will be configured to have a 6-GB NTFS boot partition. Any other previously configured logical disk drives, as well as the remainder of Logical Disk 0 (which, on the original hard disk drive of the appliance, contains the Maintenance partition, but for a replacement hard disk drive would not contain any other partitions), will be left unchanged.

8. Reinstall all software updates you had loaded on the appliance when you first installed it. Or, if the Recovery CD Set that you used in this procedure is a newer version than the one you received with the NAS 200, reinstall only those software updates that are newer than those on the Recovery CD Set.

Using the Supplementary CD

The Supplementary CD contains documentation and copies of key software applications that are preinstalled on your NAS 200. Table 3 includes the names of the directories found on the Supplementary CD and a description of the contents of the directory.

Table 3. Supplementary CD directories

Directory name	Contents
IBM Advanced Appliance Configuration	IBM Advanced Appliance Configuration console and agent installation files. The IBM Advanced Appliance Configuration agent is preinstalled as a Windows Powered service on the NAS 200. To install the Advanced Appliance Configuration console (on another network-attached workstation running Windows 98, Windows NT, or Windows 2000), run lpv2setup.exe (if you have Supplementary CD Version 1.6) or setup.bat (if you have Supplementary CD Version 1.0) from the x:\IBM Advanced Appliance Configuration directory, where x is the drive letter assigned to your workstation's CD-ROM drive. **Note:** When the installation completes, it will leave behind a temporary directory named iaacu on the workstation, under the directory specified by the TEMP environment variable (usually c:\temp; you can determine the value of the TEMP variable by typing `set temp` from a DOS command prompt). You should remove this directory (using Windows Explorer) after the installation has completed.

Table 3. Supplementary CD directories (continued)

Directory name	Contents
DiskImages	Diskette images for the Recovery Enablement Diskette and the ServeRAID Configuration Reset diskette. To create the Recovery Enablement Diskette, run RecovDsk.bat and insert an HD 1.44 floppy diskette into drive A: when prompted. Note that in conjunction with NAS 200 software Version 1.6, the NAS 200 Model 200 Tower Model now supports three, four, five, or six internal hard disk drives. There are different versions of the ServeRAID Configuration Reset diskette for each of the four hard disk drive configurations. Read the file readme.txt in the root directory and readme!.txt in this directory for more information about the diskette images and how to create diskettes from the images. **Attention:** Starting the NAS 200 with the ServeRAID Configuration Reset diskette will remove all RAID configuration changes from your ServeRAID adapter, including any changes that you applied to the configuration for any additional storage (internal hard disk drives or external storage units) that you added to the NAS 200 since you received it, and restore the RAID configuration to its factory default configuration. All data stored in your ServeRAID arrays will be lost. Use this diskette only if you want to reset the NAS 200 to factory default settings. After using the diskette, you must use the Recovery CD (described earlier in this chapter) to restore the preloaded software image on the system drive.
I386	Windows Powered installation files. If you add device drivers, OS features, and so on, you may be prompted to insert your Windows Powered CD-ROM. If so, insert the Supplementary CD, and specify path x:\i386, where x is the drive letter assigned to your CD-ROM drive.
W2KSP2	Windows Powered Service Pack 2, which is preloaded on your NAS 200 (if you are at Version 1.00, Build 54 or later). If you add any device drivers, OS features, and so on, you should reapply Service Pack 2. Run the executable w2ksp2.exe, and follow the instructions provided.
Services for UNIX	SFU 2.2 installation files, zipped into a self-extracting executable, sfu22.exe. If you add features that are not preloaded, you will be prompted for these installation files. You will need to extract the installation files onto the hard disk drive of your NAS 200. It is recommended that you use the maintenance drive (D: drive) as the destination, but you can use the system drive (C: drive). On whatever drive you choose, make sure that you have at least 250 MB of free space available, create a temporary directory on the drive, and then issue the following command from the Services for UNIX directory on the Supplementary CD: sfu22 *path*, where *path* is the drive letter and path of the temporary directory you created. Then when you are prompted by the Services for UNIX installation to provide the path of the installation files, specify the same path you specified in extracting the files from the CD.
Terminal Services Client	The stand-alone Win32 Terminal Services Client application. The NAS 200 appliance supports Web-based terminal services, so this is an optional installation. To install the Terminal Services Client, run setup.exe from the Disk1 subdirectory.
readme.txt	This is a text file that describes the contents of the Supplementary CD.

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