Understanding NFS and Print Assistant

NFS (Network File System) gives you access to files or printers on a remote host that runs an NFS server.   The operating system hosting the NFS server is normally transparent to you when you use an NFS client.

You can access an NFS server on your local network or on remote networks.   The only requirement is that you have an account on the NFS server, and network connectivity to the server.   Ask your network administrator for your NFS account names and passwords if you do not know them.   Once you know which NFS servers you need to use, use the NFS and Print Assistant to add these servers to your NFS configuration.   You must add the NFS servers and printers to the list of available servers in the NFS and Print Assistant before you can connect to those servers.

The NFS server administrator decides which directories are accessible over NFS.   These directories are called **mount points**, which are directory names to which you are granted access on a remote system.   After you have added the NFS server to your list of servers in NFS and Print Assistant, you can use the Windows 95 Network Neighborhood to browse the server (you can find the server under the NFS Servers and Printers workgroup entry) and permanently mount the drives you want to use frequently.   Mounting a drive or directory means that you assign the drive or directory to a drive letter that your workstation is not currently using (for example, W:\). Mounted drives show up in My Computer and Windows Explorer

When you browse a server through Network Neighborhood, or a mounted drive through My Computer or Windows Explorer, accessing NFS files is the same as accessing files on your local drives. You can copy, move, view, and delete files just as you would under Windows.   You can also access NFS-mounted drives from a <u>DOS command prompt.</u>

Once a print request you submit is sent to a remote print server, you can not delete the job from within Windows.   Contact your network administrator to manage print jobs that are at the the print server.

You can connect to NFS servers, and use TCP/IP, at the same time that you use other networking software such as Microsoft Networking (NetBIOS) or Novell NetWare.   If you are using other types of networking, one network might get in the way when you try to connect to a server using another type of network.   In this case, you might need to <u>force</u> the interfering network to pass your request to the other network.

{button ,AL(`NFS1')}   <u>Things you can do with NFS and Print Assistant</u>

Bypassing Incorrect Network Provider Access

In Windows 95, the Microsoft Client Manager determines which networking client is given a networking request. If you have more than one client installed (for example, the Cisco TCP/IP Stack 100 NFS Client and Printing, the Client for Microsoft Networks, and the Client for Netware Networks are common clients), the Client Manager might pass your network logon or access request to the wrong client.   If this client cannot make the connection, your connection request fails and you cannot access the drive.   The request is not passed on to the other networking clients.

For example, if the Accounting server offers an NFS mount point \\Accounting\nfs and a Novell IPX mount point \\Accounting\novell, when you attempt to connect to \\Accounting\novell you might get the NFS logon dialog instead of the Novell logon dialog.   The reverse can also happen, where you get the Novell logon dialog when you attempt to connect to \\Accounting\nfs.

If NFS incorrectly attempts to handle a logon request to a non-NFS mount point, press the Ctrl key and click Cancel to dismiss the NFS logon dialog.   You may have to repeat this.   NFS then attempts to pass the logon request to the next provider.

If another networking client incorrectly attempts to handle a logon request to an NFS mount point, start NFS and Print Assistant, double-click the affected server, and change the name of the server to use its fully-qualified name, such as Accounting.yoyodyne.com.

{button ,AL(`NFS1')}   Things you can do with NFS and Print Assistant

For More Information

Recommended Reading

- For an excellent conceptual overview of TCP/IP networking concepts, we recommend the following books:

    Comer, Douglas E., *Internetworking with TCP/IP*, Volume I, 2nd ed., Prentice Hall

    Black, Uyless D., *TCP/IP and Related Protocols*, McGraw-Hill
- For information on NFS, we recommend:

    Stern, Hal, *Managing NFS and NIS*, O'Reilly and Associates, Inc.
- Recommended books.

Relevant RFC

For more information on NFS, consult RFC 1094.
Learn how to get RFCs.

{button ,AL(`NFS1')}   Things you can do with NFS and Print Assistant

NFS and Print Assistant

The NFS and Print Assistant activity window lets you add, modify, or delete information about an NFS server, and to set server options.   In addition, you can use this dialog to add a printer server for printing files on a networked printer.   The NFS and Print Assistant is the configuration utility for the Cisco TCP/IP Stack 100 NFS Client and Printing network client, which is installed in the Network Properties control panel when you install the NFS component of Cisco TCP/IP Suite.

After you specify the server and close NFS and Print Assistant, use the NFS Servers and Printers workgroup in Network Neighborhood's Entire Network entry to view and browse mount points.   You can assign a drive letter to the mount point.

Use   Windows Explorer or My Computer to access the files.

If you are starting a connection to a print server, use NFS and Print Assistant to add print servers.   Then use Network Neighborhood to locate the printer names and double-click the printer icon to start the Windows Add Printer wizard.

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Lists the servers and printers that you intend to access.

Opens the Add Server dialog box, which lets you enter the name of a new server and specify whether you intend to connect to a file system or a printer handled by the server.   Note: A printer that is connected directly to the network and has its own IP address is a server in its own right.

Lets you delete an NFS server from the server list.

Opens the Modify Server dialog box, which lets you change the settings for an NFS server.

Opens the Global Options dialog box, which lets you specify a default user name, enable network warnings, and set default file permissions.   Note: You must reboot for the global options to take effect.

Lets you exit the current dialog box.

Lets you view information about this screen.

Provides information about using NFS and Print Assistant.

Add/Modify Server Dialog Box

The Add/Modify Server dialog box lets you specify the services the NFS server provides for access to file systems and printers.   You can also specify Stream port and LPR print queue names, which you must specify if you are using Stream or LPR printing.

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Enter the full domain name of the NFS server.   Your network administrator provides server names.   By entering the full domain name of a server, you minimize potential conflicts with other network services such as NetWare.

Lets you access mount points on the remote host using Network Neighborhood or from the Save menus in your programs.

Mount points are directory names to which you are granted access on a remote system.

Lets you access print queues (also known as mount points) served directly by the NFS server on the remote host. NFS print servers identify their print queues for you and let you view the available printers from within Network Neighborhood.

Mount points are directory names to which you are granted access on a remote system.

A print queue is disk storage on a print server where print requests are queued so that the print server can submit them in an orderly fashion to prevent simultaneous print requests from interleaving.

Lets you submit print requests on Stream protocol printers.   Your network administrator can tell you which printers support the Stream protocol.

Lets you submit print requests to printers supporting the LPR/LPD protocol.   Your network administrator can tell you which printers support the LPR protocol.   To use the LPR printer, you must specify the name of the LPR/LPD print queue.   Click Add in the LPR Queue Name group to enter the queue name.

A print queue is disk storage on a print server where print requests are queued so that the print server can submit them in an orderly fashion to prevent simultaneous print requests from interleaving.

Lets you add, modify, or delete Stream print queues.   Stream queues are actually port numbers.

A Stream print queue is disk storage on your workstation where print requests are queued so that the print server can send them to the printer in an orderly fashion to prevent simultaneous print requests from interleaving.

Lists the current Stream print queues.

Lists the current LPR print queues.

Opens the Add Stream Queue dialog box, which lets you add a Stream print queue.   Stream queues are actually port numbers.   Your network administrator can supply the information you need to complete the dialog box.

Lets you modify Stream print queue information.

Lets you delete a Stream print queue.

Lets you add, modify, or delete an LPR print queue.

Opens the Add LPR Queue dialog box which lets you add an LPR print queue.   Your network administrator can supply the information you need to complete the dialog box.

Opens the Modify LPR Queue dialog box which lets you change the parameters of an LPR print queue.

Lets you delete an LPR print queue entry.

Exits the current dialog box and saves your changes.

Exits the current dialog box without making changes.

Add Stream Queue Dialog Box

The Add Stream Queue dialog box lets you to set up a Stream printer queue.   The Stream protocol means that the NFS client sends print requests directly to a printer.   When using the Stream protocol, the NFS client opens a TCP/IP connection to the specified printer port and sends the document to the printer making sure that each line ends with a carriage return and line feed.   You can also use the Stream protocol to send print requests to a terminal server that connects one or more printers to its different ports.

If you are having trouble printing to a Stream printer, disconnect the queue and clear the Enable Telnet Negotiation check box.

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The print device and the path of the print server.

The port number on the Stream printer.   The default port is 9100 for Hewlett-Packard (HP) printers; however, you must create a queue for NFS to accept this port.   Printer port numbers vary by printer vendor.   The printer documentation or your network administrator can provide port information.

Determines whether Telnet negotiation is used with the printer.   Some printers require Telnet negotiation when sending data to the printer.   Telnet negotiation means that, in addition to the data being printed, other control codes required during a Telnet session are sent simultaneously so that the printer can talk to your workstation as though you were conducting a Telnet session.   Your network administrator or the printer manufacturer can inform you if the printer requires Telnet negotiation.   If you are having trouble printing to a Stream printer, disconnect the queue and clear the Enable Telnet Negotiation check box.

Add LPR Queue Dialog Box

The Add LPR Queue dialog box lets you specify information required for printing on an LPR printer, such as your user name, the print queue name, print banner information, and optional print filter information.

The LPR/LPD protocol is based on the BSD (Berkeley Software Distribution) UNIX printing protocol.   The NFS and Print Assistant uses the LPR/LPD protocols to submit print requests to LPR/LPD printer servers.   When using an LPR/LPD printer server, you must know the names of the print queues on the printer server.

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Enter your user name on the LPR server.   Your network administrator gives you access to the LPR printer.

Enter the name of the print queue you want your print request to go to.   Your network administrator can supply queue names.

Enter your full name for use on the print banner page that identifies your printout.

Choose an optional filter type in use at the printer site for file translation.   Filters are identified by a single letter in the smaller Filter type field.   On all but the User Defined filter, the letter type is a reserved character and is grayed.   If your network administrator has defined special print filters, choose a user-defined class from the drop-down list and enter the letter associated with the print filter.   Your network administrator provides the user defined filter letters.

A filter is a type of program that changes one type of data to another.   Filters are used for printers to add protocols or special characters depending on the needs of the printer. For example, some printers expect to receive special control characters before receiving a PostScript file.   A filter, in this case, would add control characters to any print jobs destined for the printer.

Global Options Dialog Box

The Global Options dialog box lets you set a default user name, start NFS connections when Windows starts, and view warnings if the network connection fails.

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Enter your NFS server user name.   When you start a connection, this name appears in the User Name field of the NFS Network Client Connection dialog box, but you can enter another name to override the default value.

Determines whether to view warning messages when the network is not running or when the system has become too low on memory to perform NFS operations.   Check this box to receive all warning messages.   Clear this box to disable warning messages.

Indicates the file access privileges for the file.   Owner privileges are those assigned to you, Group privileges are those assigned to your Group, and World privileges are those you assign to permit anyone else outside your Group to read, change, or delete your files.

Lets you use the file protection attributes of the directory containing the files you create or access during an NFS session.

Lets you specify the specific file protection values for all files you create or access during an NFS session.

Owner privileges are those assigned to you, Group privileges are those assigned to your Group, and World privileges are those you assign to permit anyone else outside your Group to read, change, or delete your files.

Lists the server location of your file or directory.

Indicates that you are examining properties for more than one file or directory.

Indicates the file type.   Depending on the NFS server, other operating systems such as UNIX, can show file types other than File or Directory.

Indicates your user ID (UID) number on the remote system.   Each user on an NFS server has a unique identification number.

Indicates your Group ID (GID) number on the remote system.

NFS Network Client Connect Dialog Box

The NFS Network Client Connect dialog box lets you start an NFS connection.   If you are trying to make a non-NFS connection, press the Ctrl key and click Cancel.

The items in this dialog box are:

Path
   Specifies the location of the mount point file or folder on the NFS server.

Drive Mapping
   Specifies the current drive you assigned to the connection (if any).

User Name
   Specifies your user name.   If a name is not present, enter your user name on the NFS server.

Password
   Enter your password on the NFS server.

Authentication Server
   If the NFS server relies on PC-NFS authentication from another host, enter the name of that host.

Save Password
   Check to indicate that NFS save your password between Windows sessions.

Enable Fast Read
   Check to enable fast read.

Options...
   Click to open the Connection Options dialog box, which lets you set additional performance options.

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Connection Options Dialog Box

The Connection Options dialog box lets you set performance options for the connection.   The items in this dialog box are:

- Persist After Network Failure
- Wide Area Network
- Convert Text files to Stream-LF
- Enable Data Caching
- Enable Network Locking
- Enable Fast Write
- Read Only Filesystem
- Maximum Packet Size
- NFS Server Port

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{button ,AL(`NFS1')}   Things you can do with NFS and Print Assistant

Determines whether, if the NFS server goes down, the NFS client should either attempt to reconnect or close the connection. Clear this check box to indicate that if the NFS server goes down, NFS times out within 30 seconds.

If you check this, NFS tries to reconnect every second, indefinitely, until a response is received from the server. If the Wide Area Network check box is checked, NFS retries every 30 seconds.   This can improve NFS performance on slow networks such as WANs or serial connections (over a modem).

Indicates whether your workstation is part of a wide area network (WAN). Check this box to compensate for delays when connecting across long distance phone lines or by satellite. Clear this box to indicate your site is local and does not require compensation for network delays.

Determines whether the text files you view or copy are converted to Stream-LF format so you can view them correctly.   To view UNIX or OpenVMS text files correctly, check the Convert Text Files to Stream-LF check box.   If you do not view or copy text files that reside on UNIX or OpenVMS systems, clear this box.   Binary files are not converted.

Determines whether NFS client should increase NFS performance for programming applications accessing NFS mounted files.   Check this check box to increase NFS performance when building applications between mounted file systems.   Clear this check box if your system runs out of resources or memory.

Determines whether to prevent access by other users to files that you have open. Check this box if you are using files in a shared environment and want to ensure that others cannot access a file while you are using it (the files are only locked if the server allows users to lock files). Clear this box if you are the only one accessing the files on the file systems to which you are connected.

Determines whether the NFS server increases NFS performance when saving data to disk. This feature works by the NFS client not waiting for verification from the NFS server that a write is successful. Data is written, but the NFS client does not wait to be sure. If a problem occurs on the NFS server, the next read or write request detects the problem and data is resent, or should the NFS server fail, queued until the server is back online.

Check this check box to increase performance. Because not all NFS servers support fast writes, if you enable fast writes, you might have difficulties when reading or writing files on the NFS server. Also, if the NFS server overloads, use of this feature can cause slower write performance. Clear this check box if performance decreases.

Increases NFS performance by reading data before it is requested and storing it in cache memory.   For example, if you are viewing the first page of a file, the NFS client anticipates that you want to view additional pages of the same file, requests those from the NFS server, and caches the data.   The file displays much faster than if the pages were requested one at a time.   Random I/O files are not affected by this feature.

Do not enable fast read if:

- The NFS server access is slow due to system overload
- The network adapter on your workstation cannot handle the speed at which data is being accessed by the NFS server (this can cause your workstation to hang)
- An intermediate router is overloaded

Determines whether you have read-only access for this NFS connection.   Check this check box to disable write or delete access to files.   Write access is disabled regardless of file access privileges permitting write access. Clear this check box to be able to write or delete files during an NFS session.

The number of characters (bytes) to store in a packet before it is sent to the NFS server.   We recommend a packet size of 8192 bytes.   If performance degrades over NFS, use 1024 bytes.   Contact your network administrator for more information.

The port number on the NFS server.   The default port is 2049 as specified in RFC 1094.   If the NFS server you are connecting to uses a different port, enter that number in the NFS Server Port field. Your network administrator can provide port information for the NFS server.

Displays the product name for the NFS client.

To use NFS to connect to a remote host:

Step 1: Add a server if required.

1 Start the NFS and Print Assistant.   You can also <u>create NFS connections with the NET USE command</u> from an MS-DOS prompt.
2 If you need to specify an NFS server, click Add..., which opens the Add Server dialog box.
3 In the Add Server dialog box, enter the server name.   By default, NFS checks the NFS Drive Mount Points and NFS Printer Mount Points check boxes.   If the NFS Drive Mount Points check box does not contain a check, click it.
4 If you are <u>accessing a remote printer</u>, set the printing check boxes as needed.
5 If you want to <u>set global options</u>, click Options....
6 Click OK to add the server name.   Then click OK to exit NFS and Print Assistant.

Step 2: Find and browse the mount point.

1 Start the   Network Neighborhood.   Double-click Entire Network when it appears.   A window appears listing all network servers.

2 Double-click the NFS Servers and Printers workgroup: NFS Servers and Printers - a window appears listing NFS server names.

3   Double-click the server name to which you want access.   A window appears listing all available mount points.

4   Double-click the mount point folder, which opens the NFS Network Client Connect dialog box. If you want to browse the mount point and files, erase the user name and leave the password field blank, and click OK.

5 NFS displays a reminder that the user name and password fields are empty.   You can ignore this message for browsing.   Click Yes to continue.   If the NFS server supports browsing, you can view directories and even the file contents.   Browsing is possible even on NFS servers that do not have PC-NFS authentication.   In some cases, you may be able to browse a system to which you cannot start a connection.

If the NFS server does not accept browsing, a message appears informing you that your login credentials are not accepted.   Browsing is also known as anonymous login.   Your network administrator can tell you if the NFS server accepts anonymous logins.

Step 3: Assign a drive letter to the mount point and start the connection.

1 Locate the window containing the mount point folders.
2 Select a mount point and right-click it.
3 Choose the Map Network Drive command from the menu.   The Windows Map Network Drive dialog box appears.
4 Enter a drive letter or choose the drive Windows displays.   If you want this drive mapping available the next time you start Windows, check the Reconnect at logon check box.   Click OK to continue.   The NFS Network Client Connect dialog box appears.   <u>When you start the connection, another network provider may attempt to handle the connection instead of NFS.</u>
5 Enter your user name on the remote host if different than the User Name value.   Then enter your remote host password.   If the remote host is authenticating connections on an alternate server, enter its domain name or IP address in the Authentication Server field.   If you want NFS to store your password between sessions, check the Save Password check box.   If required, check the <u>Enable Fast Read</u> check box.   If you want to <u>set additional performance options</u>, click Options.... Click OK to start the connection.
6 If the remote host accepts your connection credentials, the connection starts.

Step 4: Access the files.

1 Start Windows Explorer.
2 Locate your NFS drive letter in the list.   Use Windows Explorer to view, or copy files between your two systems.   In addition, you can access the drive from within your Windows programs to open and save files.   You can also view file properties from within Windows Explorer.

Step 5: If desired, remove the connection.

1 Start Windows Explorer.
2 Select your NFS-mounted drive and right-click it.
3 Choose the Disconnect command from the menu.

{button ,AL(`NFS2')}   <u>Related Topics</u>

To set global options:

1 From the NFS and Print Assistant, click Options....   The Global Options dialog box appears.

2 Set the global options as required:

n Enter Default User Name

n Check or clear Enable Network Warnings

n Set the File Protection Mask settings: Use Parent Directory Protection Mask, Use Specified File Protection Mask.

n Check or clear Owner, Group, and World permissions

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{button ,AL(`NFS2')}   Related Topics

To start a connection from the command line:

Before you can connect from a command line:

n   Create a host table entry for each host you want to connect to.   Use the Configuration Utility to create your host table.   You need to create a host table even if DNS is present on your system.   (The host table - DNS search order in the Configuration Utility has no effect because NET USE assumes that a host table is present.)

n   The NFS server cannot be running a case-sensitive operating system such as UNIX.   Windows 95 automatically changes all NET USE commands to uppercase before sending them to NFS.

To start a connection:

1   Start an MS-DOS prompt so that you can enter the NET USE command.

2   Enter the NET USE command in this format: **net use *drive:* *host;user;password\\folder* -** where ***drive*** is an available drive letter, ***host*** is the full domain name of the NFS server, ***user*** is your user name on the NFS server, ***password*** is your password on the NFS server, and ***folder*** is the mount point folder on the NFS server.

3   You can also append an option after the password (separate multiple options with semicolons):

n   MTU:***nn*** - enter the maximum transmission unit size in bytes

n   PORT:***nnn*** - enter the port number on the NFS server

n   HARD - perform a hard mount (persistent connection)

n   SOFT - perform a soft mount (mount only good for the current Windows session) (default)

n   WIDEAREA - compensate for delays when connecting across long-distance telephones or by satellite

n   LOCAL - local area network connection (default)

n   READONLY - prevent file or directory deletions

n   NOLOCK - disable lock manager

n   LOCK - use lock manager if present

n   NOCACHE - disable caching

Tip:

n   You can only use the NET USE command if you have installed Microsoft or Novell networking.

{button ,AL(`NFS2')}   Related Topics

To set connection performance options:

1 Find a <u>mount point</u> and assign a drive letter to it.

2 Set options as required:

n Check or clear <u>Persist After Network Failure</u>

n Check or clear <u>Wide Area Network</u>

n Check or clear <u>Convert Text files to Stream-LF</u>

n Check or clear <u>Enable Data Caching</u>

n Check or clear <u>Enable Network Locking</u>

n Check or clear <u>Enable Fast Write</u>

n Check or clear <u>Read Only Filesystem</u>

n Enter an alternate <u>Maximum Packet Size</u>

n Enter an alternate <u>NFS Server Port</u>

{button ,AL(`NFS2')}   <u>Related Topics</u>

To print files on an NFS-served printer:

Step 1: Add a print server:

1 Start NFS and Print Assistant.
2 If you need to specify a print server, click Add..., which opens the Add Server dialog box.
3 Enter the server name.
4 If the printer is handled by the NFS server itself, check the NFS Printer Mount Points box.
5 If the printer uses the Stream protocol, click Add... in the Stream Queues control group to specify the port by which your programs access the printer.
6 If the printer uses the LPR protocol, click Add... in the LPR Queues control group to specify information that the printer requires to handle your print request.

   If you enter your server by IP address instead of server name, Windows 95 converts the LPR queue name to uppercase.   This might cause connection problems to some LPR printer queues.   If you have problems, change the server entry to use the server name rather than the IP address.   If the server does not have a host name, add an entry to your host table (using the Cisco TCP/IP Suite Configuration Utility) for the server, giving it a unique host name, and use that host name for the server name.
7 Click OK to exit the current dialog box.

Step 2: Locate the printer mount point and start the printer connection:

1 Start the   Network Neighborhood.   Double-click Entire Network when it appears.   A window appears listing all network servers.
2 Double-click the NFS Servers and Printers workgroup: NFS Servers and Printers - a window appears listing NFS server names.
3   Double-click the print server name.   A window appears listing all available mount points.
4   Double-click the printer you want to access.   Windows starts the Add Printer wizard to configure the print software for the printer you specify.   If you are configuring a printer to which you have not previously configured Windows access, Windows will request that you insert your Windows 95 installation media in the appropriate drive.
5 If you are accessing a printer directly handled by an NFS server, NFS and Print Assistant opens the NFS Network Client Print Connect dialog box, which lets you enter your user name and password for the remote host connection.   You can also specify that NFS save your password between sessions by checking the Save Password check box.

{button ,AL(`NFS2')}   Related Topics