# *Solstice NFS Client User's Guide*

*for Microsoft Windows 95 and Windows NT*

THE NETWORK IS THE COMPUTER™

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# Preface

This *Solstice NFS Client User's Guide* explains how to install, use, and manage Solstice™ NFS™ Client™ software on your network.

## Who Should Use This Book

This guide contains instructions for users of Solstice NFS Client installed on a Windows 95 or Windows NT system, or anyone helping users to manage this software on a network.

## How This Book Is Organized

This manual is organized as follows:

**Chapter 1, "Installing Solstice NFS Client,"** describes the how to install the software components that make up the Solstice NFS Client product.

**Chapter 2, "Setting Up Serial Connections,"** describes how to set up a serial connection to a PPP server from a computer running Solstice NFS Client software.

**Chapter 3, "NFS File Services,"** explains how access files and devices across the network using NFS file services.

**Chapter 4, "NFS Server,"** describes how set up, use, and manage NFS Server software on your computer. NFS Server enables you to share files and directories with other computers on the network.

**Chapter 5, "Printing,"** describes how to set up and manage printing and how to share a printer from your computer.

**Chapter 6, "PC-CacheFS,"** describes the PC-CacheFS™ program on your Windows 95 system. It explains how to use it to speed up the performance of your CD-ROM and network drives.

**Appendix A, "Frequently Asked Questions,"** Lists some typical questions users would ask about the product components and provides answers.

**Appendix B, "Setting Up PCNFSD,"** describes how to set up the PCNFSD software on a Solaris server.

## Related Books

*Solstice Network Client Installation and Licensing Guide*—Refer to this book for complete information on installing, setting up, and licensing Solstice NFS Client software.

Consult your Solaris documentation, or books such as *Managing NFS and NIS* (O'Reilly & Associates, 1991), for specific information about NFS performance.

For updates to the release notes, workarounds, frequently asked questions, and similar technical information, please check the News and Updates link on the Solstice Network Client page at the `www.sun.com` Web site (`www.sun.com/solstice/net_client.html`).

## Ordering Sun Documents

The SunDocs℠ program provides more than 250 manuals from Sun Microsystems, Inc. If you live in the United States, Canada, Europe, or Japan, you can purchase documentation sets or individual manuals using this program.

For a list of documents and how to order them, see the catalog section of the SunExpress™ Internet site at `www.sun.com/sunexpress`.

## What Typographic Changes Mean

The following table describes the typographic changes used in this book.

*Table P-1* Typographic Conventions

| Typeface or Symbol | Meaning | Example |
|---|---|---|
| `AaBbCc123` | The names of commands, files, and directories; on-screen computer output | Edit your `.login` file.<br>Use `ls -a` to list all files.<br>`machine_name% You have mail.` |
| **`AaBbCc123`** | What you type, contrasted with on-screen computer output | `machine_name%` **`su`**<br>`Password:` |
| *AaBbCc123* | Command-line placeholder: replace with a real name or value | To delete a file, type `rm` *filename*. |
| *AaBbCc123* | Book titles, new words or terms, or words to be emphasized | Read Chapter 6 in *User's Guide*.<br>These are called *class* options.<br>You *must* be root to do this. |

## Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

*Table P-2* Shell Prompts

| Shell | Prompt |
|---|---|
| C shell prompt | `machine_name%` |
| C shell superuser prompt | `machine_name#` |
| Bourne shell and Korn shell prompt | `$` |
| Bourne shell and Korn shell superuser prompt | `#` |

# Installing Solstice NFS Client 1

This chapter describes how to install and configure the Solstice NFS Client software on Windows 95 and Windows NT systems, how to create a silent installation, how to create custom installation scripts for batch installations, and how to uninstall the product.

The installation instructions assume you are installing Solstice NFS Client from a Web site. If you are installing over a network connection or from a CD-ROM, follow the instructions in *Solstice Network Client QuickStart* or *Solstice Network Client Installation and Licensing Guide*.

You can read the background information, or consult the references below to go directly to the specific topic.



## System Requirements

Be sure your computer meets these requirements before installing Solstice NFS Client.

- IBM-compatible computer with 80486 or Pentium CPU
- 16 Mbytes RAM

- VGA/MVGA (640x480) or higher resolution graphics capability
- 2 Mbytes free disk space (or less depending on components installed)
- Microsoft Windows 95 or Windows NT
- Microsoft TCP/IP network protocol stack

## Questions Asked During Installation

During installation, you are asked to provide the following information:

- Your name and your company name
- Serial number
- Installation directory
- Setup type
- PC-CacheFS preferences (Windows 95 only)
- License Server (with Custom Setup)
- NIS/NIS+ name server

### Serial Number

Enter a valid serial number from your license certificate or click the Evaluation button. An evaluation license allows you to use the software for a period of 30 days. This license must be replaced by a permanent license before the expiration date if you want to continue using the software.

### Installation Directory

The default is to install the Solstice NFS Client software into the directory `C:\Program Files\Solstice`. If this directory does not exist, you can choose to create it during installation. You can also choose to install NFS Client into an alternate directory.

### Setup Type

Choose the setup type to determine which components are installed on your computer.

- Typical – Installs the full Solstice NFS Client product: NFS and Printing support, NFS Server, Printer Server and PC-CacheFS. PC-CacheFS and Printer Server can be installed only on a Windows 95 system.

- Compact – Installs a portion of Solstice NFS Client: NFS and Printing support and PC-CacheFS (Windows 95).
- Custom – Allows you to choose which components and subcomponents to install. Select the component and click Change to see the list of subcomponents for that component.

## *PC-CacheFS Preferences*

PC-CacheFS is available for installation only on a Windows 95 system.

PC-CacheFS uses a location on your hard drive to cache or store data. When you open a file on a network drive, the file is written to the cache. This may improve network performance, especially over a serial connection. If you select Typical setup during installation, PC-CacheFS uses default settings. If you select Custom setup, you can customize the following settings:

- Cache on Drive – Designate a drive that PC-CacheFS will use to hold the cached information. Be sure you have enough space on this drive to accommodate the cache.
- Size – You can limit the size of the cache buffer. The default limit for the size of the cache is determined from the amount of available disk space.
- Drives to Cache – By default, PC-CacheFS caches files that you access from any network drives currently mapped and all new drives as they are added. You can choose to:
  - Select which currently mapped network drives to cache
  - Cache files read from the CD-ROM
  - Cache all currently mapped network drives
  - Cache all new drives when they are mapped

## *License Server*

If you choose Custom as the setup type, you are asked to designate a license server. Click Next if you are not using a license server.

The license server manages concurrent licenses. Fill in the host name or IP address of the license server and the port number that this server will use to receive license requests. See the *Solstice Network Client Installation and Licensing Guide* for more information on how to choose a license server and install licenses.

The port number identifies the port used by this server to monitor license requests. To get the port number of your license server, log in to the license server and type

```
more /etc/opt/licenses/licenses_combined |grep SERVER
```

The port number is the last number in this line. In the following example, the port number is 1726.

```
SERVER bigserver 7220b150 1726
```

## Name Service

Solstice NFS Client uses a name service to locate other machines on the network. You can configure NIS or NIS+ during installation. Some applications also use either DNS or a local HOSTS file to resolve names and IP addresses.

If your site uses either NIS or NIS+ as a name service, you can configure the service during installation. Enter the domain name and the IP address of the NIS or NIS+ name server. The domain name is case-sensitive; be sure to enter it correctly. The client cannot broadcast for a NIS or NIS+ server.

After installation, you can use the Solstice NIS/NIS+ Services Configuration page to add or change your name service and set up a search order. Access the NIS/NIS+ page from the Services tab in the Network dialog box.

### *NIS*

NIS is Sun's network information service. It is a name service that provides access to a set of network databases that contain information such as server names, IP addresses, and host IDs (Ethernet addresses).

### *NIS+*

NIS+ is a successor to NIS. It is a hierarchical name service that provides read/write access to a set of distributed network databases. NIS+ provides scalability, which makes it suitable for very large networks. It also provides authentication services, which provide security and improved updating capability.

*Windows Default*

The Microsoft network uses the domain name service (DNS) or a local file named HOSTS as a name service. If you enable DNS, it will be used as the default name service. If DNS is not enabled, the HOSTS file becomes the default.

On Windows 95, a sample HOSTS file is in the C:\WINDOWS directory, called HOSTS.SAM.

On Windows NT, a sample HOSTS file has the path name C:\WINNT\SYSTEM32\DRIVERS\ETC\HOSTS. If you edit this file using a text editor, save it without a .TXT or .DOC extension.

## *Installing Solstice NFS Client*

Solstice NFS Client relies on the Microsoft TCP/IP network protocol stack to provide the network connection. The Microsoft TCP/IP stack must be set up before you can install the Solstice software. When you start the Solstice NFS Client installation, the installation detects your current network configuration. If the required TCP/IP network is not configured, the installation stops and an online Help program guides you to set up and configure the Microsoft TCP/IP stack.

### ▼ To Install Solstice NFS Client

1. **Start the installation by double clicking on the self-extracting executable file** `sunwlite.exe`**.**
   The installation program expands the program files and starts the setup program.

2. **Click Next to step through the installation screens, answering the questions.**

3. **Restart your computer.**
   When you finish installing the software, restart your system to include the new configuration information. Restarting Windows is not enough.

# Creating a Silent Installation

A silent installation uses a setup file to provide installation and configuration information, eliminating the need for a user to enter information during the installation process.

Running the installation program in administration mode creates a setup file containing information recorded during the installation. The setup file must end with a `.SIS` extension.

A silent installation proceeds as specified by the `.SIS` file and can be completed without user interaction. (The user will see any screen that contains a field with no value assigned to it in the `.SIS` file.)

## ▼ To Create a Silent Installation

To create a silent installation, run the installation program in administration mode, on the installation platform. Because you must supply an argument to the `setup` command, you must start this program from the Run prompt.

1. **Click Start, click Run, and then start Setup in administration mode. Type the full path name of the setup command: <*pathname*>`\setup /a`.**
   The installation program starts in administration mode.

2. **Enter the name of the silent install file.**
   Enter the full path name of the file you are creating. The file name must end in `.SIS.` If you do not enter a full path name, the default is to place the file in the current directory.

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**Note –** If the setup file is named `setup.sis` and it resides in the same directory as the `setup.exe`, then this file is called automatically whenever you enter the `setup` command.

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3. **Progress through the installation screens, entering information as requested.**
   Fill in all fields that contain information common to the type of installation you are designing. If any fields are left blank on a screen, the screen that contains the blank field will appear to the user during installation.

---

**Caution –** The `.SIS` file contains coded text. Do not edit this file.

---

### ▼ To Run a Silent Installation

Because you supply the path name of the `.SIS` file as an argument to the `setup` command, you must execute the `setup` command from the Run prompt.

♦ **Click Start, click Run, and then type the full path name of the installation** `setup` **command followed by the full path name of the** `.SIS` **file. For example, if you are installing from a CD-ROM in drive E, type:**
`E:pcpro3\setup C:\install\`*setupfile*`.sis`

The installation proceeds according to the contents of the `.SIS` file.

## *Automating Installation*

If you are supporting users with various system configurations, you may want to automate installations. You could, for example, copy the installation software to a network area that is available to the computers at your site, create a separate setup file for each type of installation, and place the `.SIS` files in the installation directory. You can then write a separate batch file (or installation script) for each type of installation.

### ▼ To Create an Installation Script

You can create a batch file that will run the installation program and call the setup file for installation and configuration settings.

1. **Create a network installation area on your computer.**
   Create an area that can be accessed by other computers at your site.

2. **Copy the installation software to the network installation directory on your computer.**

3. **Run Setup in administration mode, creating one or more silent installation files. (See "To Create a Silent Installation" on page 6.)**

4. **Create a batch file that starts a silent installation from your network directory. For example, for a Windows 95 installation:**

   a. **Create a directory called** `C:\INSTALL` **on the computer** `admin`**.**

   b. **Run** `setup /a` **from this directory, creating a Windows 95 silent installation file called** `C:\INSTALL\SUNW95.SIS`**.**

c. **Create a file called** `SUNW95.bat` **containing the command:**
`\\admin\install\pcpro3\setup.exe sunw95.sis`

Users can run the batch file from a mounted directory, using the Microsoft Run command.

## *Uninstalling Solstice NFS Client*

You can use the Add/Remove capability in Windows 95 or Windows NT to uninstall the Solstice NFS Client components from your system.

Uninstalling is a four-step procedure.

### ▼ To Uninstall Solstice NFS Client

1. **Remove NFS Printer and Drive Connections.**

   a. **Click the Start button, click Settings, and then click Printers.**
   The Printers dialog box opens.

   b. **Select the NFS printer icons, click File, and then click Delete.**

   c. **Double-click the My Computer icon.**

   d. **Select any NFS-mounted drives, click File, and then click Disconnect.**

2. **Shut down and restart your computer.**

3. **Uninstall Solstice NFS Client.**

   a. **Click the Start button, click Settings, and then click Control Panel.**

   b. **Double-click Add/Remove Programs.**

   c. **From the Install/Uninstall tab, select Solstice, and then click Add/Remove.**
   A confirmation box opens.

d. **Click Yes to confirm removal of the Solstice NFS Client software.**
The uninstall program removes all files and folders that are not being shared by another program. If a shared file is empty, the uninstall program notifies you and gives you the option to keep or remove it.

If you are certain that the shared file is not used by another application, then you may remove it. If there is any doubt, the safest course is to retain it.

e. **Click OK in the Add/Remove Programs Properties dialog box.**

4. **Delete the Installation Directory.**
The last step is to delete the directory in which Solstice NFS Client was installed. After the uninstall program has finished, you can remove the folders the Solstice NFS Client installation created.

# Setting Up Serial Connections 2

You can set up network connections on a Windows 95 or Windows NT computer running the Solstice Network Client software by configuring the Microsoft TCP/IP protocol. Configuring a serial connection from a client to a point-to-point (PPP) server requires changing the default authentication method from broadcast to using a specific authentication server. This chapter describes how to set up a serial connection to a PPP server from a client running Windows NT or Windows 95.

Refer to your Microsoft Windows documentation for information on setting up a LAN connection and for switching between LAN and serial connections.

You can read background and procedural information throughout this chapter, or you can use the following references to go directly to a specific topic.


- Gathering Information – page 12
- Installing Dial-Up Networking on Windows 95 – page 12
- Setting Up a Serial Connection to a PPP Server on Windows 95 – page 13
- Adding and Removing an NFS Server – page 16
- Setting Up a Serial Connection to a PPP Server on Windows NT – page 18
- Troubleshooting – page 24

## Gathering Information

For a serial connection, your Internet service provider determines the information you need. Your provider may not require all the following information:

Your login user name ____________________________________________
Telephone number of the service provider ____________________________
PC COM port number______________________________________________
Name service (DNS) ______________________________________________
IP address for your PC ___________________________________________
Name and IP address of name server ________________________________
Modem speed and parity setting ____________________________________

## Installing Dial-Up Networking on Windows 95

This section explains how to install dial-up networking on a Windows 95 computer running Solstice Network Client software with the NFS Client component installed. If you have not yet installed and set up the Solstice Network Client software, refer to the *Solstice Network Client Installation and Licensing Guide* for instructions.

### ▼ To Install Dial-Up Networking

1. **Double-click My Computer on the Windows 95 desktop.**
   If you do not see a Dial-Up Networking folder in the My Computer program group, then either dial-up networking software or a modem is not installed in the computer. If dial-up networking software is not installed, follow these steps to install it.

2. **Make sure you have the Windows 95 CD-ROM. You will be asked to insert it in the CD-ROM drive during this procedure.**

3. **Click the Windows 95 Start button, point to Settings, and then click Control Panel.**

4. **Double-click Add/Remove Programs.**
   The Add/Remove Programs Properties dialog box opens.

5. **Click the Windows Setup tab.**

6. **Select Communications.**

7. **Click Details.**
   The Communications page lists communications software components.

8. **Select Dial-Up Networking and click OK.**

9. **Click OK to close the Windows Setup dialog box.**

---

**Note –** If you are asked to insert the Windows 95 CD-ROM, insert the CD-ROM in the CD-ROM drive and then click OK.

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10. **Click Yes when asked to restart the computer.**

## *Setting Up a Serial Connection to a PPP Server on Windows 95*

Setting up a serial connection to a PPP server on a Windows 95 computer includes four steps.

### ▼ To Create a Dial-Up Connection

1. **Double-click the My Computer icon, and then double-click Dial-Up Networking.**
   If you do not see a Dial-Up Networking folder in My Computer, then either dial-up networking software or a modem is not installed in the computer. If dial-up networking software is not installed, see "To Install Dial-Up Networking" on page 12.

2. **Double-click Make New Connection.**
   The Make New Connection Wizard starts.

3. **(Optional) Click Configure to customize the modem properties.**
   Click one or more of the tabs and make any desired changes. For example, select the Options tab and choose to open a terminal window before or after dialing the number. You can use this window to enter modem AT commands or dynamic passwords.

4. **Type a name for the dial-up connection.**

5. **Type the telephone number of the service provider, and then click Next.**

6. **Click Finish.**
   The name of the new connection is listed in the Dial-Up Networking dialog box.

## ▼ To Set Up TCP/IP Properties

1. **Select the New Connection icon, and click the right mouse button, and then select Properties.**
2. **Click Server Type.**
3. **In Type Of Dial-Up Server, select PPP: Windows 95, Windows NT 3.5, Internet.**
4. **Under Advanced Options, select Log On To Network.**
   Windows 95 prompts you to log in just after the connection is made.
5. **Under Allowed Network Protocols, select TCP/IP.**
6. **Click TCP/IP Settings.**
7. **Type the IP address for the domain name service (DNS) server to use for this serial connection.**
   To use the same DNS server for all PPP connections, specify the DNS server in the TCP/IP property page in the Network dialog box.
8. **Click OK to close the TCP/IP Settings dialog box.**
9. **Click OK to close the Server Types dialog box, and then click OK again.**

## ▼ To Configure the Authentication Server

1. **Select Network Neighborhood and click the right mouse button.**
   The Network dialog box opens.
2. **Select the Microsoft TCP/IP protocol and click Properties.**
   Make sure the TCP/IP protocol is selected next to the Dial-Up Adapter.
3. **Select Solstice NFS Client and click Properties.**

4. **Click the Security tab (Figure 2-1).**

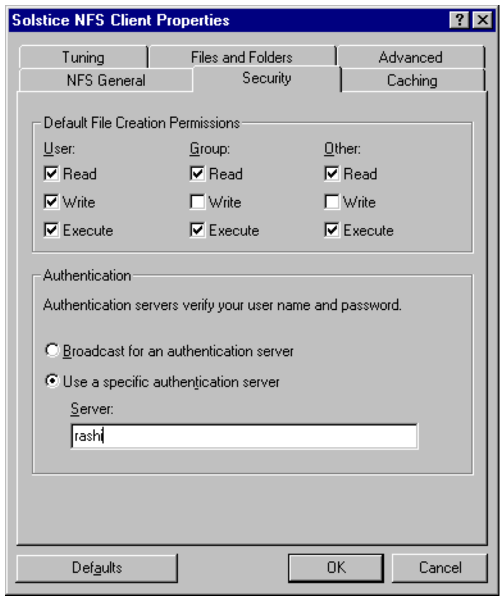


*Figure 2-1* Changing the Default Authentication Server

5. **Type the name or IP address of your authentication server.**
   When you connect to a PPP server, only the client and the PPP server are considered hosts on the local subnet. You must specify the IP address of the authentication server if it is outside the local subnet.

## ▼ To Log In and Connect to a PPP Server

1. **Start Windows 95.**
   If you selected Solstice Network Client as the primary network client, the Solstice Network Client login dialog box opens. If you selected Microsoft Windows as the primary network login, the Windows 95 login dialog box opens.

2. **Click Cancel in the login dialog box.**
   You cannot successfully log in to the network and be authenticated until you establish a connection to the Solaris server. The Windows 95 desktop opens.

3. **Select the Serial Connection icon and type your network user name and password.**

4. **Click Connect.**

5. **Log in to the PPP server.**
   You might need to type a string such as `ppp` to start the PPP server.
   The message, `Verifying Username and Password`, means that the PCNFSD server is authenticating your user name and password. The message, `Logging on to Network` is displayed, and then either the Solstice Network Client or Windows 95 network login dialog box opens.

6. **In the login dialog box, type your user name and password.**
   If the login is successful, the message, "`Connected at` *baud rate* `is shown`." You can now run TCP/IP applications.

## *Adding and Removing an NFS Server*

In a PPP configuration, the local subnet includes only your Windows computer and the PPP server. You cannot browse files on an NFS server that is outside the local subnet. To access files on an NFS server in a PPP configuration, you must add the NFS server.

### ▼ To Add an NFS Server

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays a list of NFS Servers and NFS Automount Maps.

2. **Select NFS Servers and click the right mouse button.**

3. **Click Add/Remove NFS Servers.**
   The NFS Servers dialog box opens (Figure 2-2).

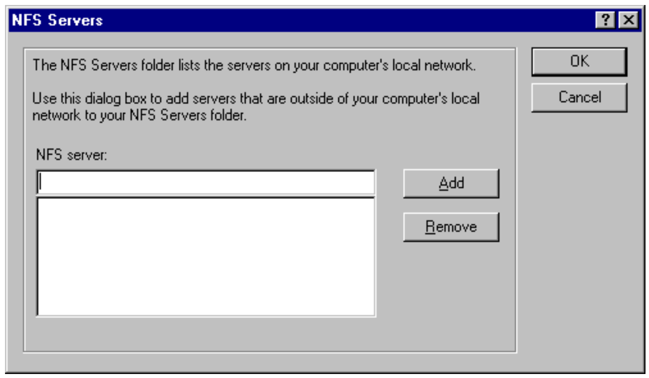


*Figure 2-2* NFS Servers Dialog Box

4. **Type the name of an NFS server and then click Add.**

5. **Click OK to close the NFS Servers dialog box.**

## ▼ To Remove an NFS Server

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays a list of NFS Servers and NFS Automount Maps.

2. **Select NFS Servers and click the right mouse button.**

3. **Click Add/Remove NFS Servers.**
   The NFS Servers dialog box opens (Figure 2-2).

4. **Select an NFS server to remove and then click Remove.**

5. **Click OK to close the NFS Servers dialog box.**

## Setting Up a Serial Connection to a PPP Server on Windows NT

If your computer has a network adapter card installed *and* you plan to use the computer to make both serial and LAN connections, create a separate Windows NT hardware profile for each configuration. Refer to Windows NT on-line Help for instructions on setting up hardware profiles.

Setting up a serial connection to a PPP server on a Windows NT computer includes five steps.

### ▼ To Add Remote Access Service

1. **Right-click Network Neighborhood icon, then click Properties.**
   The Network properties dialog box opens.
2. **Click the Services tab, click Add, select Remote Access Service, and then click OK.**
   The Remote Access Setup program opens the Add RAS Device dialog box.
3. **Follow the instructions on the screens to install your modem.**
   When you have installed your modem, it is listed in the Remote Access Setup dialog box.
4. **Click Continue.**
   Remote Access Service is added to the list of services.
5. **Click Close to close the Network dialog box.**
6. **Click Yes when asked if you want to restart your computer.**

### ▼ To Create a Dial-Up Connection

1. **Double-click the My Computer icon, and then double-click Dial-Up Networking.**
2. **Click New.**
   The New Phonebook Entry Wizard starts. Fill in the information asked for on each screen with information provided by your Internet Service Provider.
3. **Type a name for the connection and then click Next.**
   Answer questions about how you dial the Internet and then click Next.

4. **Type the telephone number of the service provider, and then click Next.**
5. **Click Finish.**
6. **(Optional) Click More and choose from the menu to customize modem properties and dialing preferences.**
7. **Click Close.**

## ▼ To Configure an Authentication Server

1. **Right-click Network Neighborhood and then click Properties.**
   The Network dialog box opens.
2. **Click the Services tab, select Solstice NFS Client, and then click Properties.**
   The Solstice NFS Client Configuration page opens.
3. **Click the Security tab.**
4. **In the Authentication field, select Use A Specific Authentication Server, type the IP address of your authentication server, and then click OK.**
   When you connect to a PPP server, only the client and the PPP server are considered hosts on the local subnet. You must specify the IP address of the authentication server if it is outside the local subnet.
5. **Click Close to close the Network dialog box.**
6. **Click Yes when asked if you want to restart your computer.**

## ▼ To Grant Dialin Permission to a User

A Windows NT user must have dialin permission to log in to a network over a serial connection.

1. **From the Start menu, select Programs, select Administrative Tools, and then click User Manager.**
2. **Double-click the user's name to open the User Properties dialog box.**
3. **Click Dialin.**
4. **Select Grant Dialin Permission To User, choose a Call Back option, and then click OK.**
5. **Click OK to close the User Properties dialog box.**

## ▼ To Log In and Connect to a PPP Server

1. **Press Ctrl+Alt+Delete to log in to Windows NT.**
2. **Type your Windows NT user name and password, and then click OK.**
   You will see a message stating that the Solstice NFS Client was not started because a local network was not detected. You cannot successfully log in to the network and be authenticated until you establish a connection to the Solaris server.
3. **Click OK.**
   The Windows NT desktop opens.
4. **Double-click the Network Neighborhood icon, double-click Entire Network, and then double-click Solstice_NFS_Client.**
   The Solstice NFS Client dialog box (Figure 2-3) opens.

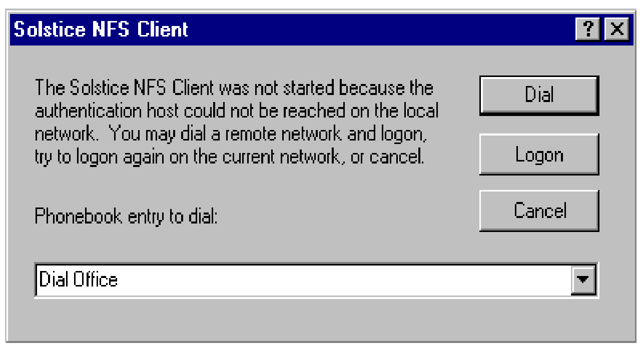


*Figure 2-3* Solstice NFS Client Dialog Box

5. **Select a number to dial from the phonebook entries listed and click Dial to dial a network connection.**

6. **Log in to the PPP server.**
   You might need to type a string such as `ppp` to start the PPP server. The message, `Registering Your Computer on the Network`, means your computer has successfully connected to the PPP server. The message, `Authenticated`, means the PPP server has verified your user name and password.

   The Solstice NFS Client Login dialog box (Figure 2-4) opens.

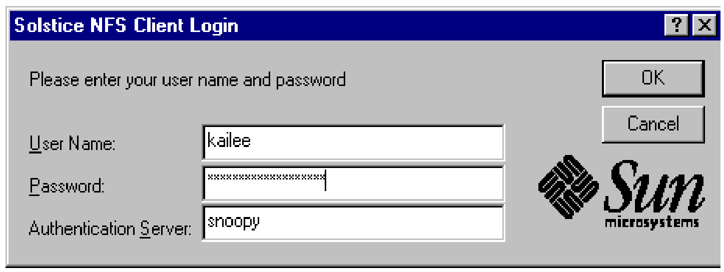


*Figure 2-4* Solstice NFS Client Login Dialog Box

7. **Type your Solstice user name and password, type the name of an authentication server, and then click OK.**
   You are now logged in to the network and can use NFS to connect to network files.

## ▼ To Log In to the Solstice Network

If you have set up an automatic dial-in connection, your computer might start dialing the remote server before you click Dial on the Solstice NFS Client dialog box. You are connected to the remote PPP server, but not yet logged in to the network. Logging in to the Network Provider allows you to access NFS files and printers.

1. **Double-click the Network Neighborhood icon, double-click Entire Network, and then double-click Solstice_NFS_Client.**
   The Solstice NFS Client dialog box (Figure 2-5) opens.

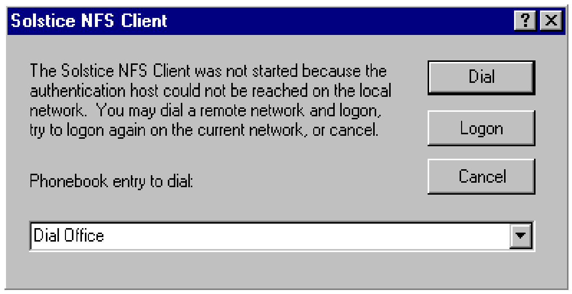


*Figure 2-5* Solstice NFS Client Dialog Box

2. **Select a number to dial from the phonebook entries listed and click Dial to dial a network connection.**
   Your computer dials the number you selected.

3. **Log in to the PPP server.**
   You might need to type a string such as ppp to start the PPP server. The message, Registering Your Computer on the Network, means your computer has successfully connected to the PPP server. The message, Authenticated, means the PPP server has verified your user name and password.

   The Solstice NFS Client Login dialog box (Figure 2-6) opens.

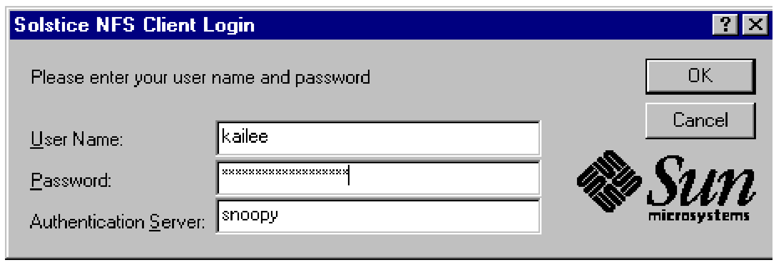


*Figure 2-6* Solstice NFS Client Login Dialog Box

4. **Type your Solstice user name and password, type the name of an authentication server, and then click OK.**
   You are now logged in to the network and can use NFS to connect to network files.

# Troubleshooting

Table 2-1 lists solutions to common problems connecting to the network from a Windows 95 computer running the Solstice Network Client software using a serial connection.

*Table 2-1* Troubleshooting Serial Connection Problems on Windows 95

| **Problem** | **Possible Cause** | **Solution** |
|---|---|---|
| PC hangs on starting Windows 95 before any login dialog box appears. Pressing Ctrl+Alt+Del shows nothing running. | DNS server address is configured incorrectly on the TCP/IP property page (e.g., `123.345.6.7` instead of `123.345.6.15`). | Boot in safe mode and fix the DNS server address. Click Start, point to Settings, click Control Panel, and then double-click Network. Double-click TCP/IP. After you correct the problem, restart your computer. |
| Logging in fails after a few minutes with the message `Unable to contact authentication server.` | When you make a serial connection, you must first connect to the Solstice network so that a PCNFSD server can authenticate your username and password. Then you can log in to the network provider. | Click OK to close the message. Click Cancel in the Solstice or Windows 95 network login dialog box. When the Windows 95 desktop appears, double-click the icon for the dial-up connection you configured. When the network login dialog box again appears, type your user name and password for the Solstice network. You will see the message `Logging on to network` when the login succeeds. |
| You can use TCP/IP applications, such as Netscape, but browsing or mapping NFS servers fails with the message `You are not logged in to the network`. | You have a TCP/IP connection to the server, but were not authenticated by a PCNFSD server and are, therefore, not logged in to the network. | Select the icon for the dial-up connection you are making. Select Properties, click Server Type, and then make sure Log On To Network is selected.<br>Select Start, select Shutdown, and then click Close All Programs and Log On As A Different User. Then follow the procedure in “To Log In and Connect to a PPP Server” on page 15. |

Table 2-2 lists possible solutions to problems logging in to a Windows 95 or Windows NT computer running the Solstice Network Client software using a serial connection.

*Table 2-2* Troubleshooting Login Problems Using a Serial Connection on Windows 95

| Possible Causes | Solutions |
|---|---|
| You entered the authentication server incorrectly or the authentication server is not working. | Use the Windows `ping` command to reach the machine running the authentication server. Ask a network administrator for the correct IP address of the authentication server to use.<br><br>Retype the correct authentication server address in the login dialog box and click OK. |
| One or more TCP/IP settings are incorrect. | On Windows 95, follow the steps in the "Checklist for TCP/IP Settings on Windows 95" on page 150. On Windows NT, follow the steps in the "Checklist for TCP/IP Settings on Windows NT" on page 151. |
| You have not yet configured a serial connection. | Click Cancel on the Solstice NFS Client login dialog box to log in without networking enabled. Follow the instructions in "To Create a Dial-Up Connection" on page 13. |
| You are trying to connect to a PPP server, and Solstice NFS Client is set up with an asterisk (*) for the authentication server. When you connect to a PPP server, the local network consists of only the client and the PPP server. Solstice NFS Client cannot broadcast beyond the local subnet. | Select NFS Client, click Properties, and then click the Security tab. Type the IP address for an authentication server on the network. |
| The name server cannot find an IP address for the remote computer. | Verify that you typed the name for the remote computer correctly.<br>Ping the remote computer's IP address. |
| The remote computer, the network, or part of the network is down. | Check your modem or network cables.<br>Ping your computer to verify it can connect to itself (which verifies that your local interface is running).<br>Ping your name server (by name or by IP address) and your local gateway. |

Table 2-3 lists solutions to common problems connecting to the network from a Windows NT computer running the Solstice Network Client software using a serial connection.

*Table 2-3* Troubleshooting Serial Connection Problems on Windows NT

| Problem | Possible Cause | Solution |
|---|---|---|
| You log in to NT and see the message `The Solstice NFS Client was not started because a local network was not detected and the authentication server could not be reached.` | You cannot successfully log in to the network and be authenticated until you establish a connection to the Solaris server. | Click OK to complete the NT login. Follow the procedure "To Log In and Connect to a PPP Server" on page 15. |
| You see the message `Unable to browse the network. The network is not present or is not started.` | You cannot browse NFS servers until you connect to a PPP server and log in to the Solstice network. | Follow the procedure "To Log In and Connect to a PPP Server" on page 15. |
| After you log in to NT, network drives fail to automatically reconnect and are marked with a red `x` in My Computer. | You are not logged in to the network. | Make sure you are logged in to the network. Follow the procedure "To Log In and Connect to a PPP Server" on page 15. Double-click the drive to re-establish the connection. |

# NFS File Services 3

This chapter describes how to use and manage Solstice NFS Client file services on Microsoft Windows 95 and Windows NT 4.0.

You can read background and procedural information or use the following references to go directly to the specific topic.


- Accessing NFS File Systems – page 27
- Customizing Solstice NFS Client – page 47
- Troubleshooting – page 57


## Accessing NFS File Systems

You can access files on NFS servers using Network Neighborhood or Windows Explorer similar to the way you access Microsoft or Netware file services. You access an NFS file system in the following ways.

- Using NFS Servers – You can find an icon for NFS Servers on the Entire Network screen from Network Neighborhood. When you access it, you see a list of all the NFS servers on your local subnet. If the NFS server you need is part of your local subnet, you can browse its file system and map its folders to network drives. If the NFS server exists outside your subnet, you can easily add the server to the subnet. If you know the name of the folder you want to access, you can also map it to a network drive using the Tools menu of Windows Explorer or Windows NT Explorer.

- Using NFS Automount Maps – These maps provide a means of accessing file systems, independent of their actual network location. You do not need to browse for servers or know the name of the server and its directories. Instead, you browse for the automount map that points to the file system. You can access the server's folders the same way you would those of an NFS server, browsing files or mapping drives.

## *Accessing NFS Servers*

On a Windows 95 or Windows NT system, you can access NFS servers using Network Neighborhood. You can browse for NFS servers on your local subnet, or add NFS servers from outside your local subnet. You can also map a drive letter to an NFS server.

The multiple provider router (MPR) component of Microsoft Windows uses the universal naming convention (UNC) for specifying network resource names, and Solstice NFS Client uses two NFS conventions. Because of this use of multiple conventions, Solstice NFS Client's file-name mapping feature differs in detail from the file-name mapping used by Windows 95 and NT.

Windows 95 and Windows NT use this naming convention:

- Universal Naming Convention (UNC), which uses the syntax `\\`*server*`\`*share*

The Solstice NFS Client conventions include:

- NFS, which uses the syntax *server*`:/`*dir1*`/`*dir2*`/`*dir3*`...`
- Automount, which uses the syntax `/`*automap*`/`*autokey*`/`*dir1*`/`*dir2*`/`*dir3*`...`

Solstice NFS Client must convert the NFS and automount formats to UNC format to enable processing by Windows 95 and Windows NT.

You can use UNC everywhere (that is, from the Map Network Drive dialog box, a Windows application, or a DOS box). NFS and automount formats can be used only when mapping a drive from a Map Network Drive dialog box.

On Windows NT, NFS format can also be used when mapping a drive from DOS with the `net use` command. See "Mapping Network Drives" on page 31 for more information.

## How UNC and NFS Names Differ

UNC resource names use the format *server**share*. The *server* is the computer on which the shared component is located. The *share* is the network resource name, usually an exported file system or a printer, that is being shared.

NFS file-name conventions use the format *server*:/*directory1*/*directory2*. An important function of the Solstice NFS Network Provider is to translate the NFS network resource names into the UNC format that is recognized by Windows 95 and Windows NT. This translation creates a UNC alias for an NFS resource name.

UNC aliases are created when you map a drive or browse a file system.

### How a UNC Alias is Created

A UNC alias is actually a combination of two aliases: a server alias and a share alias. The server alias is usually identical to the NFS server name minus the domain name. The exception occurs when you access two servers with the same name in different domains. For example, if the server `sarge.bread.com` is on your subnet and you add the server `sarge.roses.com`, the first `sarge` would be assigned the alias `sarge`, and the second might be assigned `sarge~1`. Network Provider stores both the NFS server name and its corresponding UNC server alias.

Network Provider creates a share alias to match the name of the last subdirectory in a network path that you browsed or to which you mapped a drive.

#### *Aliases Created When You Browse*

If you browse servers in Network Neighborhood, the Solstice NFS Client Network Provider creates server aliases for all active NFS servers on your subnet. Network Provider first broadcasts to the NFS network servers on the local subnet, and any servers you have added. For each network server that responds, Network Provider translates the NFS name into a UNC name, creating a server alias. After server aliases are created, the list of responding servers is displayed in Network Neighborhood.

When you browse a particular server, Network Provider creates share aliases for the server’s exported file systems. At this point, you can connect to those exports using either the UNC or NFS format. When you browse a subdirectory within an export, a share alias is created only if you map a drive to the subdirectory. The share alias corresponds to the name of the last subdirectory in the path.

#### *Aliases for Automount Maps*

When you browse NFS automount maps or map a drive to an automount point, Network Provider creates a server alias for the automap and share aliases for the autokeys and subdirectories. For example, if you browsed the automount map for `/home/joeuser`, a server alias for `/home` and a share alias for `/joeuser` would be created. You could then use UNC format to access the directory.

Once Solstice NFS Client has created a UNC alias, you can connect to the network resource using either a UNC or NFS resource name format. When you enter the NFS name for a network resource, the Network Provider checks the entry for that name and uses the UNC name to connect the network resource on Windows 95 or NT. If no alias is found, Network Provider generates one automatically from the NFS name.

### *Aliasing Multilevel Directories on Windows 95*

On a Windows 95 system, the multiple provider router (MPR) recognizes only UNC format (*server**mount_point*), and will not allow the mapping of path names consisting of more than two components. If you try to map more than two components, for example, *server**mount_point**directory*, to a drive letter, you will get an error.

If you want to map a drive to a subdirectory beneath the exported mount point, you must use NFS format. Windows does not recognize NFS formatted network resource names, but the MPR passes those names along to other network providers running on the computer. The NFS syntax, *server*:/*mount_point*/*directory*/*subdirectory*, lets you connect to a server using a multiple-level directory path. Windows MPR knows multiple-level NFS path names are not valid UNC names and just passes them on to the Solstice NFS Client Network Provider.

Solstice NFS Client handles the two-component limitation on path names by creating an alias for the full UNIX path of a network resource in the correct format. For example, the NFS resource name:

*server*:/*mount_point*/*directory*/*subdirectory1*/*subdirectory2* is aliased as:

*server**subdirectory2*.

In summary, alias creation is the key to successful network resource connection. Aliases are created in one of two ways:

- Browsing NFS resources with Network Neighborhood
- Using the NFS resource name convention when making connections

## *Aliasing Multilevel Directories on Windows NT*

In contrast to Windows 95, Windows NT allows you to use multiple-level UNC path names when mapping a drive. Solstice Network Provider creates a UNC alias when you map a drive using either the NFS or UNC path formats. You do not need to browse a file system in order to create an alias.

If you map a drive to the file system `/usr/doctools/dp` on the server `bluebird`, using either the NFS path `bluebird:/usr/doctools/dp` or the UNC path `\\bluebird\usr\doctools\dp`, the resulting server alias would be `\\bluebird` and the share alias would be `\dp`.

You could then use the UNC format name in a Windows application or from DOS, using either the alias `\\bluebird\dp` or the full path `\\bluebird\usr\doctools\dp`.

If you look at your network drive connections through Windows NT's My Computer, or use the `net use` command in DOS, you see the full paths rather than the aliases of your network drives.

## *Mapping Network Drives*

You can map an NFS network drive from:

- Network Neighborhood
- Windows Explorer
- Other parts of the Windows 95 or Windows NT user interface, such as My Computer (using a toolbar icon)
- Microsoft's `net use` command from a DOS prompt

Any time Windows 95 and Windows NT give you access to drives, you can map them. Some applications may also provide drive mapping capability from the Open and Save As dialog boxes.

The following procedures describe several ways to map a network drive.

## ▼ To Map a Network Drive from Network Neighborhood on Windows 95

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays a list of workgroups, including workgroups labeled NFS Automount Maps and NFS Servers.

2. **Double-click NFS Servers.**
   Network Neighborhood displays a list of all active NFS servers on your local subnet.

3. **Double-click any NFS server.**
   Network Neighborhood displays a list of shared directories on that server.

4. **Select the folder to map to a network drive. Right click on the directory, select Map Network Drive (Figure 3-1), and then click OK.**

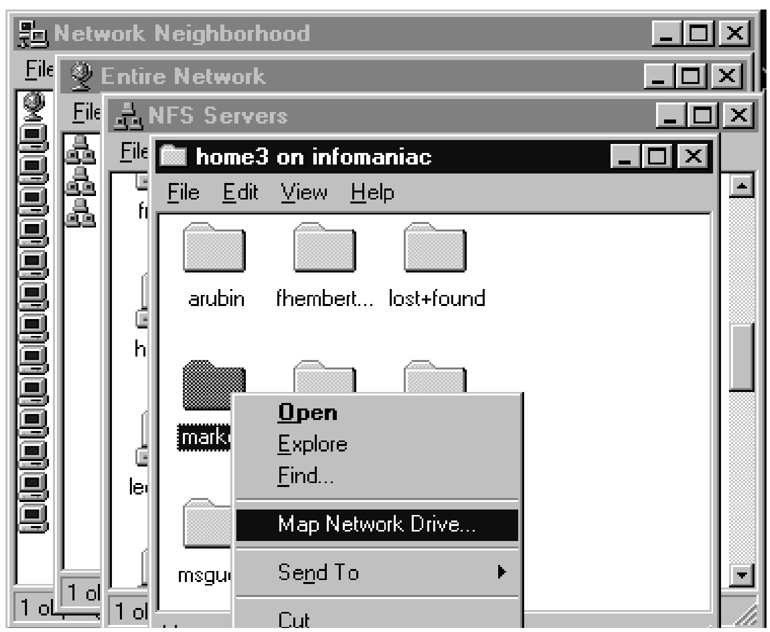


*Figure 3-1* Mapping a Network Drive on Windows 95

### ▼ To Map a Network Drive from Network Neighborhood on Windows NT

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays two icons labeled Microsoft Windows Network and Solstice_NFS_Client.

2. **Double-click the Solstice_NFS_Client icon.**
   Network Neighborhood displays workgroups labeled NFS Automount Maps and NFS Servers.

3. **Double-click the NFS Servers workgroup.**
   Network Neighborhood displays a list of all active NFS servers on your local subnet.

4. **Double-click any NFS server.**
   Network Neighborhood displays a list of exported folders on that server.

5. **Select the folder to map to a network drive. Right-click on the folder, then select Map Network Drive (Figure 3-2).**

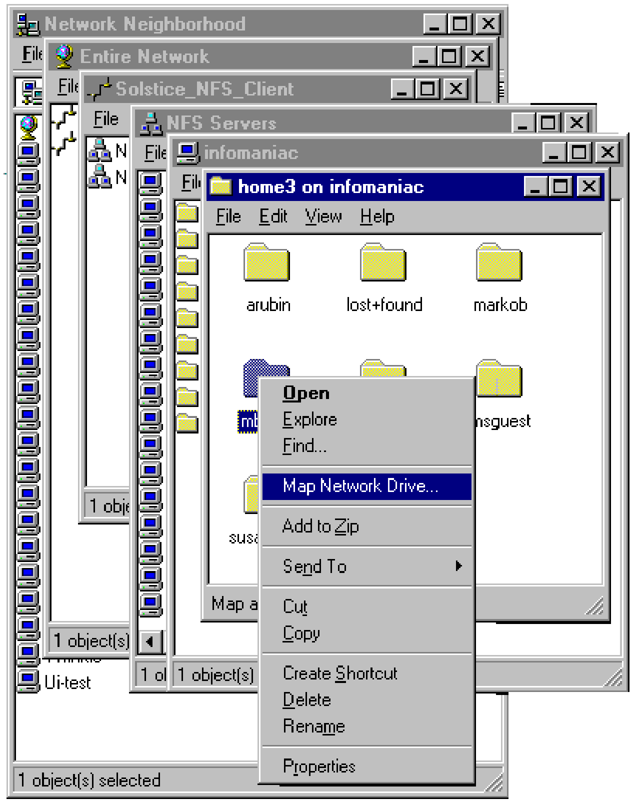


*Figure 3-2* Mapping a Network Drive on Windows NT

## ▼ To Map a Network Drive from Windows Explorer

1. **Click the Start button, point to Programs, and then click Windows Explorer or Windows NT Explorer.**

2. **From the Tools menu, click Map Network Drive.**
   The Map Network Drive dialog box opens.

3. **In the Path text entry box, type the NFS name of the network resource to which you want to connect.**
   Be sure to use the correct case (upper, lower, or mixed) for the server and directory names as they appear in the UNIX file system.

   If you enter the NFS name `spooky:/fun/house`, for example, Network Provider creates a UNC alias for the NFS resource and stores it. The next time you connect to this network resource, you can specify either its NFS file name (`spooky:/fun/house`) or its UNC alias (`\\~spooky\house`).

   You can also use automount syntax here, using the format */automap/autokey/dir1/dir2*

   For example, if your home directory is an automount point, you could enter a path similar to `/home/joeuser`. See "Browsing NFS Automount Maps" on page 41 for more information about automounting.

---

**Note –** Solstice NFS Client does not support the Connect As feature of drive mapping on Windows NT. To connect a drive, you must use your login name.

---

## ▼ To Map a Network Drive Using a UNC Name on Windows 95

On Windows 95, you can specify the UNC alias for a network resource only if it already exists. If you have connected to this resource before, the Solstice network has created and stored an alias for it. If you are not sure whether the alias exists, use Explorer or My Computer to browse the network.

1. **Click the Start button, point to Programs, and then click Windows Explorer.**

2. **From the Tools menu, click Map Network Drive.**
   The Map Network Drive dialog box opens.

3. **In the Path text entry box, type the tilde (~) character followed by the UNC alias. For example:**
   `\\~spooky\house`

### ▼ To Map a Network Drive Using a UNC Name on Windows NT

On Windows NT, you can specify the full path to a network resource in UNC format. If you have not connected to this resource before, the Solstice network creates and stores an alias for it as it makes the connection. You do not need to browse the network before using a UNC name.

1. **Click the Start button, point to Programs, and then click Windows NT Explorer.**
2. **From the Tools menu, click Map Network Drive.**
   The Map Network Drive dialog box opens.
3. **In the Path text entry box, type the UNC path. For example:**
   `\\spooky\fun\house`

## *Browsing NFS Servers*

The Solstice NFS Client software uses the implicit drive mapping capability of Windows 95 and Windows NT to mount servers transparently when you browse for NFS servers. This implicit mapping process lets you look at and access files on NFS servers without mapping a network drive first.

## ▼ To Browse for NFS Servers on Windows 95

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays a list of Microsoft network workgroups, including workgroups labeled NFS Servers and NFS Automount Maps (Figure 3-3).

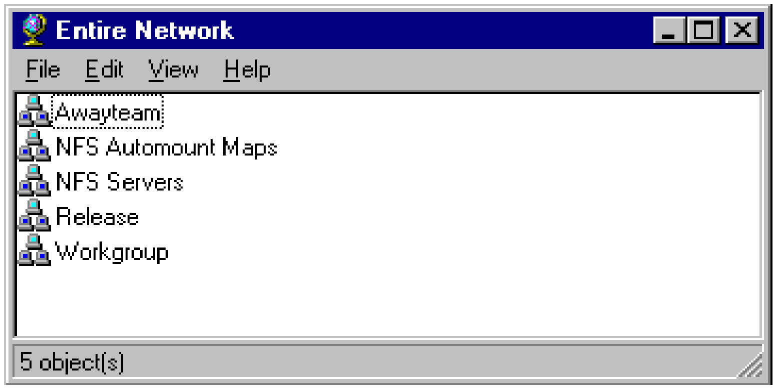


*Figure 3-3* Browsing NFS Servers in Network Neighborhood

2. **Double-click on the NFS Servers workgroup.**
   Network Neighborhood displays a list of all active NFS servers on the local subnet to which your machine is attached (Figure 3-4).

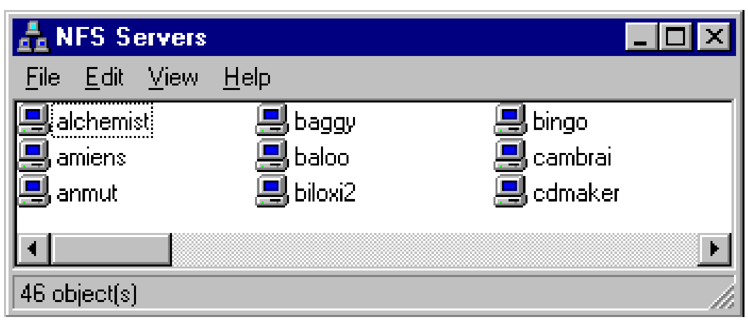


*Figure 3-4* NFS Servers Listed in Network Neighborhood

3. **Double-click any NFS server.**
   Network Neighborhood displays a list of exported folders on that server.

**Note –** You will see the UNC alias names for the network resources you browse. To see the NFS names, click details from the View menu. The UNC names are listed under Name, and the corresponding NFS names are listed under Comment.

4. **Access these folders as you would folders on your local computer.**

## ▼ To Browse for NFS Servers on Windows NT

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays workgroups labeled Microsoft Windows Network and Solstice_NFS_Client (Figure 3-5).

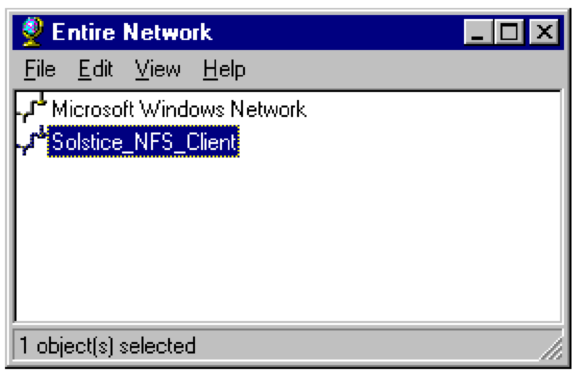


*Figure 3-5* Selecting Solstice_NFS_Client Workgroup

2. **Double-click Solstice_NFS_Client.**
   Network Neighborhood displays workgroups labeled NFS Servers and NFS Automount Maps.

3. **Double-click the NFS Servers workgroup.**
   Network Neighborhood displays a list of all active NFS servers on your local subnet (Figure 3-6).

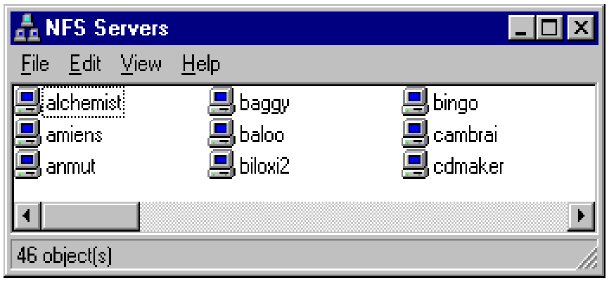


*Figure 3-6* NFS Servers in Network Neighborhood on Windows NT

## ▼ To Add an NFS Server Outside the Local Subnet on Windows 95

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays a list of Microsoft network workgroups, including workgroups labeled NFS Servers and NFS Automount Maps.

2. **Right-click NFS Servers and then select Add/Remove NFS Servers.**
   The Add/Remove NFS Servers dialog box opens (Figure 3-7).

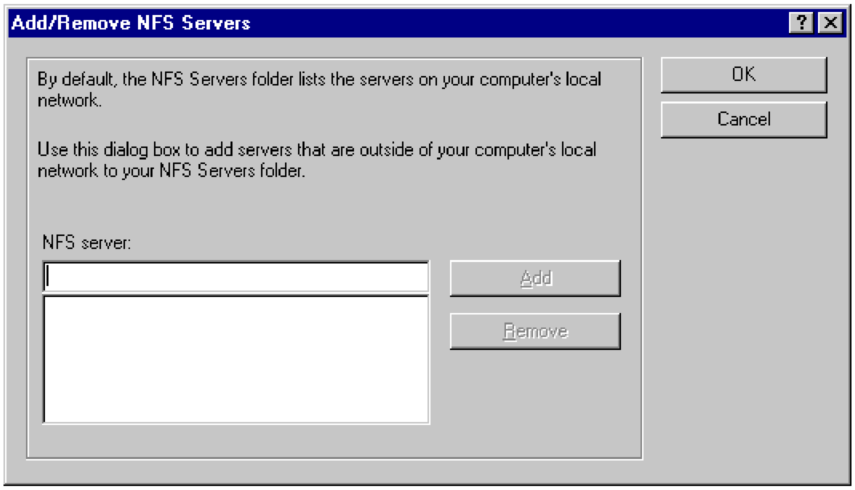


*Figure 3-7* Add/Remove NFS Servers Dialog Box

3. **Type the name of an NFS server that is not on the local network and then click Add.**
   Repeat this step for each server you want to add.

4. **Click OK to close the Add/Remove NFS Servers dialog box.**

## ▼ To Add an NFS Server Outside the Local Subnet on Windows NT

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays workgroups labeled Microsoft Windows Network and Solstice_NFS_Client.

2. **Double-click Solstice_NFS_Client.**
   Network Neighborhood displays workgroups labeled NFS Servers and NFS Automount Maps.

3. **Right-click NFS Servers and then select Add/Remove NFS Servers.**
   The Add/Remove NFS Servers dialog box opens (Figure 3-7).

4. **Type the name of an NFS server that is not on the local network and then click Add.**

5. **Click OK to close the Add/Remove NFS Servers dialog box.**

## ▼ To Remove an NFS Server Outside the Local Subnet on Windows 95

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays a list of Microsoft network workgroups, including workgroups labeled NFS Servers and NFS Automount Maps.

2. **Right-click NFS Servers and then select Add/Remove NFS Servers.**
   The Add/Remove NFS Servers dialog box opens (Figure 3-7).

3. **Select an NFS server to remove and then click Remove.**

4. **Click OK to close the Add/Remove NFS Servers dialog box.**

## ▼ To Remove an NFS Server Outside the Local Subnet on Windows NT

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays workgroups labeled Microsoft Windows Network and Solstice_NFS_Client.

2. **Double-click Solstice_NFS_Client.**
   Network Neighborhood displays workgroups labeled NFS Servers and NFS Automount Maps.

3. **Right-click NFS Servers and then select Add/Remove NFS Servers.**
   The Add/Remove NFS Servers dialog box opens (Figure 3-7).

4. **Select an NFS server to remove and then click Remove.**

5. **Click OK to close the Add/Remove NFS Servers dialog box.**

## *Browsing NFS Automount Maps*

In addition to browsing NFS servers, Solstice NFS Client lets you browse NFS automount maps. The maps can be either NIS/NIS+ automount maps, or local automount maps. These maps contain information about other computers on your network.

The Solstice NFS Client automount maps use the same format as the NIS/NIS+ automount maps in Solaris. The Solstice Network Client installation program installs two required automount maps in the `C:\Program Files\Solstice\Etc` directory, `auto_home` and `auto_master`. These files must reside in this directory whether you use a local name service or NIS/NIS+. Figure 3-8 and Figure 3-9 show slightly modified versions of these two files. For more information on the format of these files, see the UNIX man page for automount (enter `man automount` on a Solaris workstation command line), and consult the Solaris system administration documentation.

You can view NIS/NIS+ maps on a Solaris machine by entering:

```
ypcat -k auto.home
```

or

```
niscat auto_home
```

If your network does not use NIS or NIS+, your computer will use the locally installed automount maps. These files must reside in your `C:\Program Files\Solstice\Etc` directory. The `auto_home` file requires an entry for each user. Use a 32-bit editor (like WordPad) to edit the automount maps to prevent Windows from converting the file names to 8.3 DOS names.

The auto_master file is only read at startup so you must reboot after editing it. However, the auto_home file is read as “needed” so it does not require a reboot after editing.

```
# Master map for automounter
#
# use +auto_master for NIS+
# use +auto.master for NIS
+auto_master
/net            -hosts          -nosuid
/home           auto_home
/xfn            -xfn
#
# next line is a sample: use auto_sac for all entries
# for directory /sac
#
/sac auto_sac -intr,nosuid
```

*Figure 3-8* A Master Automount Map

**Note –** The Solstice NFS Client Automounter is an NFS automounter. It enables administrators to define mount points without regard to their actual location on a network. Automount maps provide the links between file system names and their actual locations. For example, a file system name of /dat/pcapps could map to a network location of appserver:/export/pcapps. This location could change with a simple update to the automount maps.

```
#
# The auto_home map
#
# use +auto_home for NIS+
# use +auto.home for NIS

+auto_home
#
# sample lines in auto_home
#
edwards tandoori:/os_eng/edwards
jenifer topfuel:/top3/jenifer
```

*Figure 3-9* A Home Automount Map

## Configuring NIS or NIS+

To browse NIS or NIS+ maps, you must configure either NIS or NIS+ as your Solstice naming service. Configure the naming service by entering the domain and IP address of your NIS or NIS+ server, following the directions in "To Configure NIS or NIS+" on page 44.

To see the host name of your NIS server, use the following command on a Solaris system:

```
ypwhich
```

To see the IP address of your NIS server, use the following command:

`ypcat hosts | grep` *hostname*

To see the domain name and IP address of your NIS+ server, use the following command:

```
niscat -o org_dir
```

## ▼ To Configure NIS or NIS+

1. **In Control Panel, double-click the Network icon.**
   - **For Windows 95, click the Configuration tab.**
   - **For Windows NT, click the Services tab.**
2. **Double-click Solstice NIS/NIS+ Naming Services, or select Solstice NIS/NIS+ Naming Services and click Properties.**
   The Solstice NIS/NIS+ Naming Services Properties dialog opens.
3. **Click Enable NIS or Enable NIS+ to enable the appropriate name service for your network.**
4. **Enter the name service domain.**
   The name service domain is the complete name of your domain, usually ending in `.COM`, `.EDU`, `.NET`, `.ORG` and so on. To find out the domain name, enter the command below on a Solaris system on your subnet.

   ```
   /bin/domainname
   ```
5. **Specify a name server search order.**
   Select a name service and click Up or Down until the service you want is at the top of the list. The NIS or NIS+ service does not need to be at the top of the list for you to browse automount maps.

## ▼ To Browse NFS Automount Maps on Windows 95

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays a list of Microsoft network workgroups, including workgroups labeled NFS Servers and NFS Automount Maps.
2. **Double-click the NFS Automount Maps workgroup.**
   Network Neighborhood displays a list of the local NFS automount maps on your machine, or a list of NIS/NIS+ automount maps (Figure 3-10).

---

**Note –** If your network uses NIS/NIS+ but you do not see NIS/NIS+ automount maps, you may need to configure NIS or NIS+, as explained in “Configuring NIS or NIS+” on page 43.

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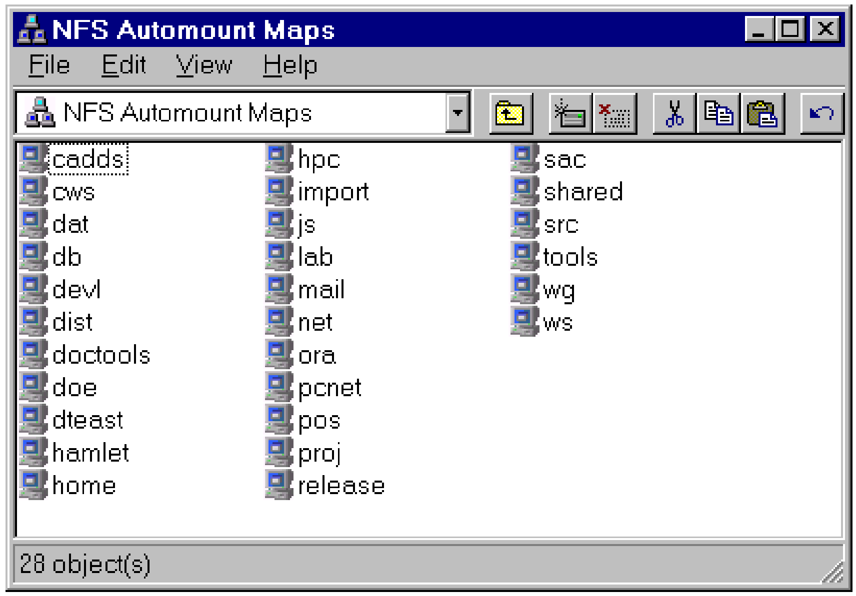


*Figure 3-10* NFS Automount Maps Listed in Network Neighborhood

3. **Double-click any NFS automount map.**
   Network Neighborhood displays a list of all NFS mount points defined in the automount maps.

4. **Access these automount points as you would folders on your local computer.**
   Note that you can open an automount point and map a network drive to a folder within it by right-clicking the folder, selecting Map Network Drive, and clicking OK in the Map Network Drive dialog box.

## ▼ To Browse NFS Automount Maps on Windows NT

1. **Open Network Neighborhood and double-click Entire Network.**
   Network Neighborhood displays workgroups labeled Microsoft Windows Network and Solstice_NFS_Client.

2. **Double-click Solstice_NFS_Client.**
   Network Neighborhood displays workgroups labeled NFS Servers and NFS Automount Maps.

3. **Double-click the NFS Automount Maps workgroup.**
   Network Neighborhood displays a list of the local NFS automount maps on your machine, or a list of NIS/NIS+ automount maps (Figure 3-10).
4. **Double-click any NFS automount map.**
   Network Neighborhood displays a list of all NFS mount points defined in the automount maps.
5. **Access these automount points as you would folders on your local computer.**

## *User Profiles and Connected Drives*

Windows 95 and Windows NT differ in the way persistent drive mappings are treated when different users log in to a system.

Due to the default behavior of Windows 95, a network drive specified to be reconnected on login is mapped whenever a user logs in to Windows 95 on that computer. You can, however, set up Windows 95 so that drive mappings are associated with specific users. See the *Solstice Network Client Administration Guide* for information about user profiles.

In Windows NT 4.0, each user account has a unique user profile by default. As a result, drive mappings are associated with specific users. However, if you want all users to be reconnected to the same network drives when they log in, you can take advantage of the mandatory user profile ability of Windows NT Server 4.0 to give users identical environments. See the Windows NT documentation for more information about mandatory user profiles.

### ▼ To Set Up Custom User Profiles on Windows

1. **Click the Start button, point to Settings, click Control Panel, and then double-click Passwords.**
   The Passwords Properties dialog box opens.
2. **Click the User Profiles tab.**
3. **Click the option button labeled "Users can customize their preferences and desktop settings."**
   The previously grayed-out User Profile Settings become active.

4. **Click the options to turn settings on and off.**
   Use What's This help to determine what settings you need.

# Customizing Solstice NFS Client

Solstice NFS Client provides a Properties dialog box for adjusting the global default values for the connection (mount) options that it uses when it connects to an NFS file system or creates files on an NFS server. See "To Change Default Settings for Solstice NFS Client Properties" on page 53 for the steps to open the Solstice NFS Client dialog box.

All NFS Client mount option settings have default values, which you can change using the Solstice NFS Client Properties dialog box. The settings in this dialog box are used initially for all connections and will be suitable in most situations. When you change any of the settings here, the values are applied to all connections (including persistent connections), except those values that have been changed for specific connections. You can change many mount option settings for specific connections and mapped drives, which is explained in "Changing Mount Options for Specific Connections" on page 54.

For more information about NFS options, consult your Solaris documentation, or books such as *Managing NFS and NIS* (O'Reilly & Associates, 1991).

## Setting General Preferences

Use the NFS General tab to select mount options, the file name mapping character, and the data transfer size.

### Mount Options

You can choose to connect drives with read-only permissions, and set file-locking so that others will not be able to access a file that you have opened.

### File Name Mapping

Select which character NFS Client uses as a replacement character when it maps long file names to the DOS 8.3 file name convention.

### Data Transfer

Select the read/write size of NFS transfers.

- Read size (in bytes) is the number of bytes per data block read from a file during a data transfer across the network. A larger size increases NFS performance if the network hardware can handle the larger size. Default is 32768 bytes for TCP and 8 kilobytes for UDP.
- Write size (in bytes) is the number of bytes per data block written to a file or sent to a printer during a data transfer across the network. A larger size increases NFS performance if the network hardware can handle the larger size. Default is 32768 bytes for TCP and 8 kilobytes for UDP.

## *Setting Security Preferences*

Use the Security tab to set file permissions and to specify whether to broadcast for an authentication server.

### *Default File Creation Permissions*

Use this option to set the default UNIX permissions for each file created across the network through NFS. This performs a function similar to that of the UNIX `umask` command.

### *Authentication*

Specify whether Solstice NFS Client will broadcast for an authentication server.

- Broadcast For An Authentication Server tells Solstice NFS Client to broadcast across the subnet to find a server running the `rpc.pcnfsd` daemon when the user logs in to verify the user's login name and password. Locating an authentication server in this way may take a little longer, but eliminates problems accessing a specific server that is down.
- Use A Specific Authentication Server tells NFS Client to contact a specific server (by name or IP address) to verify the user's login and password. This method is faster, but only if the server is up and running. If it is not, Solstice NFS Client prompts you to specify a different server.

You should select Use A Specific Authentication Server if you are using a serial connection.

## *Setting Caching Preferences*

Use the Caching tab to set preferences for caching:

### Attribute Cache

You can enable caching of file attributes (such as file size and modification time) which do not change often. Caching these attributes improves NFS performance. Use the drop-down lists to adjust the rates at which the attributes are updated. A smaller interval assures earlier detection that a file or folder has been modified by someone else. A larger interval improves performance by decreasing the frequency of NFS reads.

### Data Cache

You can enable caching of previously read files in memory. Data caching can improve NFS Client file access time if your computer has free memory available. Read-write cache size (in Kbytes) determines how much memory the cache can use. The default setting, Automatic, allows NFS Client to select a value based on the free memory available.

### File Name Cache

Specify how many mappings of long file names to DOS 8.3 file names can be stored in the file name cache. This cache is necessary for applications that do not support long file names.

## Setting Tuning Preferences

Use the Tuning tab to adjust performance settings:

### NFS Retransmissions

This setting determines the number of times NFS Client tries to reach an NFS server.

### Asynchronous Transmissions

This setting turns on an NFS v3 performance enhancement. This enhancement detects when NFS is reading a file sequentially rather than randomly as in a database file, and prompts NFS to retrieve into the data cache several data blocks ahead of the data you are currently reading. If you notice poor performance when using a database or other random-access file, turn off asynchronous readaheads.

### Automounter

You can specify the number of seconds an automounted file system remains connected after all files on it have been closed.

## Setting Files and Folders Preferences

Use the Files and Folders tab to set preferences for case handling and how folders are created.

### Archive Attribute

Showing NFS files with archive attribute checked specifies that you want to see when a file has the DOS archive attribute set, although it has no meaning in NFS.

### Preferred Case

You can determine which case NFS should use when creating new files and doing file lookups. The preferred case is used only if the next option (Create File Names In Preferred Case) is selected.

### Case Handling

The default selections for the two Case Handling options are intended to replicate the case-handling behavior of Windows 95 and Windows NT. These settings work fine if you do not create files or directories whose names are the same except for case. For example, you should not create one directory named `STATUS` and another named `Status` within the same parent directory.

- Create File Names In Preferred Case makes NFS create new files using the case specified in the previous field, Preferred Case. This option also causes NFS to use the Preferred case for file lookups.

  For example, if you select Uppercase as the preferred case and then select Create File Names In Preferred Case, all file names you enter will be converted to uppercase. File lookups will look for the uppercase version of the file name searched for. However, this is usually not noticeable if the next option, Use Case Sensitive File Name Lookup, is not selected. It will only be noticeable if you create duplicate file names that differ in case.

If you do not select Create File Names In Preferred Case, NFS preserves the case (lower, upper, or mixed) that you use when you enter the file name and does not consider case when doing file lookups. This is the default (not selected).

- Use Case Sensitive File Name Lookup specifies that NFS should look up file names using the preferred case. This option is available only when you first select Create File Names In Preferred Case.

  For example, if you select Uppercase as the preferred case, then select Create File Names In Preferred Case, and then select Use Case Sensitive File Name Lookup, all file names will be created in uppercase, and a file lookup will look for the uppercase version of the file name searched for. If this feature is selected and you use Explorer to enter the directory `status`, NFS looks for the directory `STATUS`. You will see an error such as `D:\Status is not accessible. The folder was moved or removed.` The folder is still there, but NFS cannot find it because it is looking for a different name.

  By default, the Use Case Sensitive File Name Lookup option is not selected, so file lookups do not consider case.

### *Folder Creation Semantics*

Determine how NFS handles the group identification (GID) assigned to files it creates. UNIX System V normally assigns to a file the GID of the process that creates it. However, if the parent folder was set up to pass its GID to all files created within it, System V assigns the GID of the parent folder to the new file. Berkeley Software Distribution (BSD) UNIX always assigns the GID of the creating process to a new file.

## *Setting Advanced Preferences*

Use the Advanced tab to select the transport mechanism, the NFS version, and determine how to specify the NFS port.

### *Transport*

Select which transport to use. Automatic tries TCP first and then UDP. Using the UDP transport speeds up network traffic by reducing packet overhead on LANs and high-speed reliable networks. TCP works better when high reliability of packet transmission is a requirement, as on WANs where transmission speed is slower and more errors are encountered. TCP is able to recover one bad packet without requiring the whole frame to be resent. TCP waits for acknowledgment that a packet arrived, and if it does not receive one, it retransmits the packet.

### *NFS Version*

You can speed up connections to the network by specifying what version of NFS to use. If the servers to which you most often connect support only one version, configure that version as a default. Automatic tries v3 first and then v2.

If a server is running Solaris 2.5 or later, its default NFS version is v3, but it can use v2 if the client needs to use v2. If a server is running Solaris 2.4 or earlier, it can only run NFS v2.

For any UNIX server, including one running a brand of UNIX other than Solaris, you can find out which NFS version it supports using the `rpcinfo` command, as follows:

`rpcinfo -p` *hostname* | `grep 10003`

(NFS is RPC program #100003.)

Running this command on a Solaris 2.5 system would return the following, which means that v2 and v3 are supported over UDP and TCP.

```
100003     3    udp    2049   nfs
100003     2    tcp    2049   nfs
100003     3    tcp    2049   nfs
100003     2    udp    2049   nfs
```

Running this command on a Solaris 2.4 system would return the following, which means that only v2 is supported over UDP.

```
100003     2    udp    2049   nfs
```

Compare the output for a non-Solaris system to determine which NFS version it supports.

### *NFS Port*

Determine how to specify a port.

- Use Portmapper tells NFS to use the Portmapper program to determine which port to use. Using Portmapper is less efficient than using a specific port, but frees you from having to know the NFS server's listening port number.
- Use A Specific Port tells NFS to use the port you specify instead of using Portmapper. Using a specific port speeds up NFS operations. The NFS specification suggests port number 2049 as the standard NFS server port. Your network may choose to use another port number.

## ▼ To Change Default Settings for Solstice NFS Client Properties

1. **In the Control Panel, double-click the Network icon.**
2. **Open the Solstice NFS Client Properties dialog box.**
   - In Windows 95, click the Configuration tab, then double-click Solstice NFS Client.

- In Windows NT, click the Services tab, then double-click Solstice NFS Client.

The Solstice NFS Client Properties dialog box opens (Figure 3-11).

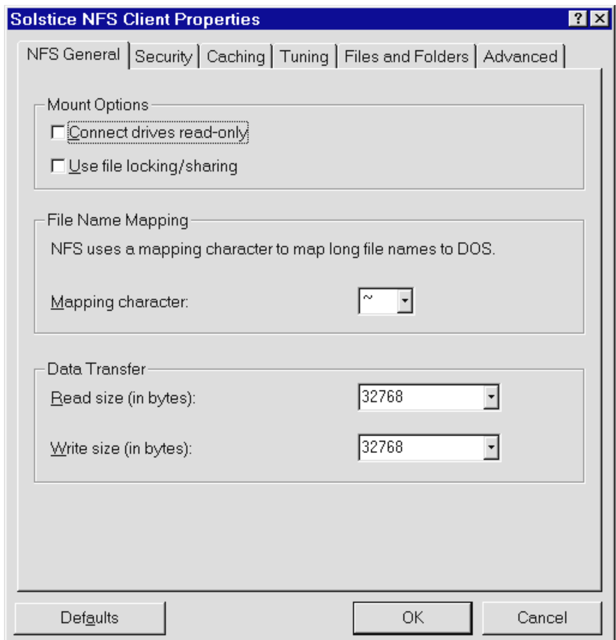


*Figure 3-11* Solstice NFS Client Properties Dialog Box

Use the property pages to change the default settings for NFS Client properties.

Use What's This? help to jog your memory about various NFS options.

3. **Click OK when finished.**

## *Changing Mount Options for Specific Connections*

The Solstice NFS Client Properties are global mount options, meaning they are the initial settings used for all network connections made, either implicitly by browsing in Network Neighborhood, or explicitly by mapping a drive. The global properties are applied to persistent connections as well.

The Solstice NFS Client software also lets users change mount options for connections to a server and for implicit mounts and mapped drives. This capability allows users to access servers or exported file systems using options that are different from the default options.

NFS Client allows two kinds of per-connection options:

- Server-level options, which affect all connections to that server
- Connection-point options, which affect only that connection

Not all the NFS properties are available at all levels. For example, the Data Cache and File Name Cache options are available as global properties, but are not available as properties of server-level connections.

### *Changing Mount Options for Connections to a Server*

Users can set mount options for all connections made from the Windows computer to a particular server. Once this is done, each connection (implicit, or explicit drive map) will use the same mount options set for the server. Change mount options by first browsing NFS servers, and then selecting a specific server or file system. Once selected, display a server's or file system's properties to see its current connection options. Use these property sheets to modify these options.

### *When Changes to Connection Options Take Effect*

Changes to connection options will take effect the next time a network resource is *connected*, not *mapped*. There is a reason for this distinction. When you browse into an exported file system on a network through Network Neighborhood, that resource gets temporarily connected. If you then change a connection option and map that same resource to a local drive letter, the new option will not be used because the resource is already connected.

Resources that are connected through Network Neighborhood, but not mapped, will be disconnected:

- After the 5-minute time-out has been reached
- When the user logs out

Once the resource has been disconnected, browsing or mapping that resource will use the new connection options.

The surest way, however, to make sure you connect to a server or other resource with the changed connection options is to restart Windows 95.

### Order Used in Applying Mount Options to a Connection

Mount options are applied to a connection in the order of global, server, mount point. This means that when NFS makes a connection and decides which mount options to use, it looks at the global NFS Client Properties first, the server properties second, and the mount point properties last. To illustrate this, consider one particular mount option, the Mapping Character feature. Suppose you set this feature as follows for the global NFS Client properties, for server `woody`, and the connection to `/files` on `woody`.

| Which Properties dialog box? | Mapping character | Connection that would use this setting |
|---|---|---|
| Solstice NFS Client Properties | ~ | buzz:/files2 |
| woody Properties | @ | woody:/opt |
| files on woody Properties | # | woody:/files |

If Mapping Character were the only property set at the server level and mount point level, each connection would use the Solstice NFS Client Properties for the values of all other mount options besides Mapping Character.

# Troubleshooting

Table 3-1 lists problems that might occur using network file services on a computer running Solstice NFS Client.

*Table 3-1* Solutions to NFS File Access Problems

| Problem | Possible Cause | Solution |
|---|---|---|
| Cannot log in to Solstice NFS Client Login dialog box. | One or more TCP/IP settings are incorrect. | Click Cancel on the Solstice NFS Client Login dialog box to log in without networking enabled.<br><br>Click Start, point to Settings, click Control Panel, and then double-click Network.<br><br>In Windows 95, double-click TCP/IP. Refer to "Checklist for TCP/IP Settings on Windows 95."<br><br>In Windows NT, click the Protocols tab, then double-click TCP/IP Protocol. Refer to "Checklist for TCP/IP Settings on Windows NT." |
| On Windows 95, you tried to enter a UNC file name in the Map Network Drive dialog box and received the error message, "`The following error occurred while trying to connect drive to server. Resource not found.`" | The UNC name for the network resource you tried to access does not exist. | Use NFS format in the Map Network Drive dialog box, or browse the network resources listed in Network Neighborhood. As you select each network resource, the Network Provider creates a UNC name for it. |

*Table 3-1* Solutions to NFS File Access Problems *(Continued)*

| Problem | Possible Cause | Solution |
|---|---|---|
| You tried to map a drive on Windows NT using the Connect As feature and received the error message: `The credentials supplied conflict with an existing set of credentials.` | You tried to connect as a different user. | The Connect As feature is not supported by Solstice NFS Client, so you should leave this field blank. |
| You logged in to Solstice NFS Client, but when you browse NFS Servers, no servers are listed. | No NFS servers are running on the same subnet as Solstice NFS Client. | Open Network Neighborhood and double-click Entire Network. In Windows NT, double-click Solstice_NFS_Client. In both environments, select NFS Servers and click the right mouse button. Click Add/Remove NFS Servers.Type the name of an NFS Server outside the local subnet, and then click Add. Click OK to close the dialog box. |
| Attempting to copy a directory on which you only have read permission from one NFS server to another using Explorer, Windows 95, or Windows NT fails with the message, `Cannot create or replace` *directory_name*`. Access is denied.` | The directory was copied read-only and then none of the contents could be copied into it. | Open a DOS prompt window and use the `xcopy` command to copy the directory. |

## Checklist for TCP/IP Settings on Windows 95

If you cannot log in to Solstice NFS Client, follow these steps to troubleshoot the problem:

1. **Right-click on the Network Neighborhood icon and click Properties to open the Network dialog box.**

2. **Click the Configuration tab and double-click TCP/IP.**

3. **If your site uses DNS:**

   a. **Click the DNS Configuration tab and make sure Enable DNS is selected.**

   b. **Make sure the DNS domain name is correct.**

   c. **Make sure the number listed in DNS Server Search Order is the correct address of your DNS server.**

4. **If your site uses DHCP to automatically generate IP addresses for clients, click the IP Address tab and make sure Obtain An IP Address Automatically is selected.**

5. **If your site does not use DHCP:**

   a. **Click the IP Address tab and make sure Specify An IP Address is selected and the number typed in the IP Address box is correct.**

   b. **Click the Gateway tab and make sure the number listed in Installed Gateways is the correct address of a gateway on your local subnet.**

6. **Check the authentication server:**

   a. **In the Network dialog box, double-click the Solstice NFS Client.**

   b. **Click the Security tab and check the authentication server.**
   If Broadcast For An Authentication Server is selected, make sure there is a server running the `pcnfsd` daemon on the same local subnet as the computer running Solstice NFS Client. Do this by entering the following command from a Solaris system on the subnet:

   ```
   rpcinfo -b 150001 2
   ```

   c. **If no server on the subnet is running the `pcnfsd` daemon, select Use A Specific Authentication Server and type the IP address of an authentication server outside the local subnet.**

## Checklist for TCP/IP Settings on Windows NT

If you cannot log in to Solstice NFS Client, follow these steps to troubleshoot the problem:

1. **Right-click on the Network Neighborhood icon and click Properties to open the Network dialog box.**
2. **Click the Protocols tab and double-click TCP/IP Protocol.**
3. **In the IP address tab, check the following:**
   a. **If you use DHCP for dynamic configuration, verify that the Obtain An IP Address From A DHCP Server option is selected.**
   b. **If you don't use DHCP, verify that the Specify An IP Address option is selected. Make sure correct values are entered for the IP Address of your computer, the subnet mask used in your subnetwork, and the IP address of the default gateway server.**
4. **If your site uses DNS, click the DNS tab and check that:**
   a. **The name of your system appearing in the Host Name field is correct.**
   b. **The name listed in the Domain field is correct.**
   c. **The IP addresses of DNS servers are correct in the DNS Service Search Order.**
5. **Click OK to close TCP/IP Properties.**
6. **Click Services, and double-click Solstice NIS/NIS+ Naming Service.**
   a. **If you have selected NIS or NIS+, the name service you selected should be enabled. Be sure you have entered an IP address and domain name for the NIS or NIS+ name server. If there is an asterisk (*) in the IP address field, you must replace it with a real address.**
   b. **The name service domain name is case-sensitive. Be sure you have entered the name correctly.**
7. **Verify the authentication server:**
   a. **In the Services tab of the Network dialog box, double-click Solstice NFS Client.**

**b. Click the Security tab and verify the authentication server.**
If Broadcast For An Authentication Server is selected, make sure there is a server running the `pcnfsd` daemon on the same local subnet as Solstice NFS Client. Do this by entering the following command from a Solaris system on the subnet:

```
rpcinfo -b 150001 2
```

**c. If no server on the subnet is running the `pcnfsd` daemon, select Use A Specific Authentication Server and type the IP address of an authentication server outside the local subnet.**

# NFS Server 4

This chapter describes how to set up and manage NFS Server on Windows 95 or Windows NT.

You can read background and procedural information throughout this chapter, or you can use the following references to go directly to a specific topic.



## About NFS Server on Windows 95 and Windows NT

The NFS Server is a daemon that runs on a Microsoft Windows computer. It enables the Windows user to share directories, files, and devices with other Windows and UNIX users connected to the network. The NFS Server is a Winsock application.

The computer running the NFS Server daemon shares computer resources with other users on the network by "exporting" a folder or a device, such as a CD-ROM drive. Once the resource is exported, a coworker can mount that folder or device and access it from another Windows computer or from a UNIX workstation.

## Enabling NFS File Services

The installation program automatically adds the NFS File and Printer Sharing as a network service for Windows 95 systems and NFS File Sharing for Windows NT systems. The following instructions are provided in the event that this component is removed and you need to add it again.

Print services are described in Chapter 5, “Printing.”

### ▼ To Enable File and Printer Sharing on Windows 95

1. **Click the Start button, point to Settings, click Control Panel, and then double-click Network.**
   The Network dialog box opens.

2. **Click Add.**
   The Select Network Component Type dialog box opens.

3. **Select Service and then click Add.**
   The Select Network Service dialog box (Figure 4-1) opens.

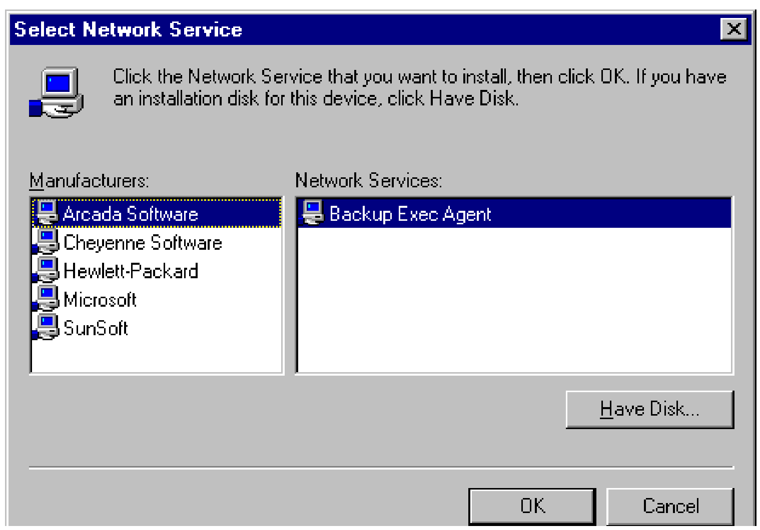


*Figure 4-1* Select Network Service Dialog Box

4. **In the Manufacturers list, select SunSoft, and in the Network Services list, select Solstice File and Printer Sharing (Figure 4-2).**

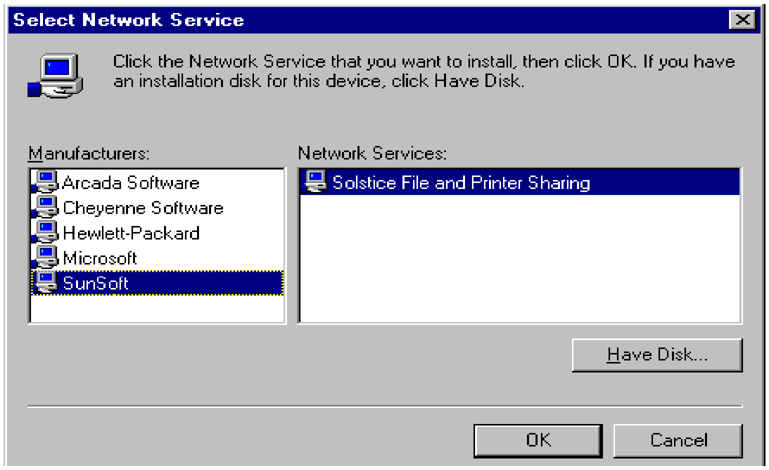


*Figure 4-2* Selecting Solstice File and Printer Sharing

5. **Click OK.**
   You return to the Network dialog box. The Solstice network services you installed appear in the list of installed network components.

6. **In the list of installed network components, select Solstice File and Printer Sharing and click Properties.**

7. **On the NFS Server tab, do the following:**

   a. **Verify that Enable Solstice NFS Server is selected. If not, select the option to ensure that NFS Server is started when Windows is started.**

   b. **(Optional) Keep the Log NFS Server Activity option selected (recommended) to get access to the log of NFS Server events.**

8. **Click OK.**
   You return to the Network dialog box.

9. **Click OK again.**
   Windows 95 will inform you that you must restart Windows for your changes to take effect.

10. **Click Yes when offered to restart Windows.**

### ▼ To Enable File Sharing on Windows NT

1. **From the taskbar, click the Start button, point to Settings, click the Control Panel, and then double-click Network.**
2. **Click the Services tab and click Add.**
3. **Select Solstice File Sharing and click OK.**
4. **On the NFS Server tab, do the following:**
   a. **Verify that Enable Solstice NFS Server is selected.**
   If not, click the option to select it.
   b. **(Optional) Keep the Log NFS Server Activity option selected so that you have continuing access to the log of NFS Server activity and problems.**
5. **Click OK.**
   You may be prompted to insert the Windows NT CD-ROM.
6. **Click OK again.**
7. **Click Yes when asked if you want to restart your computer.**

## *Running NFS Server*

When NFS Server is running, the NFS Server icon (Figure 4-3) appears in the status area.


*Figure 4-3* NFS Server Icon

Right-click on the icon to open the NFS Server menu from which you can:

- Display a list of shared directories and devices
- Suspend the NFS Server temporarily
- Enable or disable NFS Server logging
- Access the NFS Server Help
- Exit NFS Server

### ▼ To Start NFS Server

♦ **From the taskbar, click the Start button, point to Programs, point to Solstice Utilities, and then click NFS Server.**

NFS Server starts and its icon appears in the status area.

### ▼ To Suspend NFS Server

1. **Right-click the NFS Server icon in the status area.**
2. **Click Suspend.**

Users temporarily lose access to the shared folders and devices.

### ▼ To Resume NFS Server After Suspend

1. **Right-click the NFS Server icon in the status area.**
2. **Click Resume.**

Users regain access to the shared folders and devices.

## *Granting Access to Shared Resources*

You can grant access to a file or directory by selecting it in Windows Explorer and designating it as an NFS shared folder or device. You can restrict access to the folder or device by system, rather than by user, and by specifying read and write access rights.

---

**Warning –** On Windows NT with an NTFS file system, NFS Server exports the security attributes of the user on the local system to any remote user with full access to the local system. If NFS Server is started by a user with Administrator privileges, those privileges are granted to the remote user.
Be careful to restrict access rights to read-only for important files or folders or restrict access to well-known, trusted hosts.

---

## ▼ To Grant Access to Shared Resources

1. **Start Explorer.**
2. **In the Explorer folders pane, select the folder that contains the files you want to share, or select a device such as your CD-ROM drive.**
3. **Right-click and then click Properties in the pop-up menu.**
4. **On the NFS Sharing tab, select Shared As.**
5. **(Optional) Replace the name of the folder or the device with another name.**
6. **(Optional) Specify the access type.**
   - Click Full if you want to grant read, write, execute, and delete rights.
   - Click Read Only to limit the access to reading.
7. **(Optional) Specify which access restrictions apply.**
   - Click Unrestricted if you want to allow all network hosts to access the shared folder or device with the type of access specified in step 6.
   - Click Restricted and then click the Access List button to limit access to specific hosts.
8. **Complete the Access List dialog box as follows:**
   - From the list, select the host whose users may access the shared folder or device, or enter its name, for example, `bigsister`.
   - Click Add. The host name appears in the Clients Granted Access field.
9. **Repeat the previous step for additional systems.**
10. **When you are finished, click OK to return to the Properties sheet.**
11. **Click OK.**

    Users on the selected systems gain immediate access to the shared resources.

## ▼ To Revoke Access to Shared Resources

1. **Start Explorer.**
2. **In the Explorer folders pane, select the folder (or the device) for which you want to revoke access.**

3. **Right-click and then click Properties in the pop-up menu.**
4. **On the NFS Sharing tab, do one of the following:**
   - Select Not Shared to revoke access to all users of all hosts specified in the Access List.
   - Click the Access List button to open the Access List dialog box.
5. **Select the host whose users should no longer have access to the folder or device, and then click Delete.**
6. **When you are finished, click OK to return to the Properties sheet.**
7. **Click OK.**
   The Properties sheet closes.

The selected folder or device is no longer shared and network users loose immediate access.

## *Guidelines for Enabling NFS Server Logging*

With NFS Server logging enabled, any interaction between the NFS clients and server is written in the NFS log file `c:\logging.txt`. You should enable NFS Server logging when:

- A client fails to mount a PC folder or device from a server, and gets no response from that server.
- A client can mount a folder or device from a server, but cannot do anything with the folder or device while getting no error message.
- The error message does not clearly indicate whether the problem exists on the server, on the client, or on both systems.

To start NFS Server logging, you must enable both NFS Server logging and Network Event logging.

### ▼ To Enable NFS Server Logging on Windows NT

1. **Start NFS logging.**
   a. **Right-click on the NFS Server icon in the status area.**
      The NFS Server menu appears.
   b. **If NFS Logging is not checked, select the option.**

2. **Enable Event logging.**

   a. **Right-click the Network Neighborhood icon and then click Properties.**

   b. **Click Services, select Solstice File Sharing, and then click Properties.**

   c. **On the NFS Server tab, select Log NFS server activity.**

   d. **On the Logging tab, select Enable Network Event Log.**

   e. **Select Save Log Messages To File and enter the name of a log file.**

   f. **Click OK to close the Solstice File Sharing Properties dialog box.**

   g. **Click OK to close the Network dialog box.**
   You do not need to restart your computer.

3. **Start the Network Event Log.**

   a. **Click the Start button, click Run, and then type:** `sunwsyslogd`**.**
   The Network Event Log window opens.

   b. **On the Display menu, click Configure.**
   The Network Event Log dialog box opens.

   c. **Select Log Messages To File and enter the name of a log file.**

   d. **Set the desired options, such as how frequently network events are to be written, the severity levels of the messages you want to record, and so on.**
   Click Help for detailed information on each option.

   e. **Click Save.**

   f. **Minimize the window.**

All logging events pertaining to NFS Server activities are written in the log file which you can open with Notepad.

## ▼ To Enable NFS Server Logging on Windows 95

1. **Start NFS logging.**

   a. **Right-click on the NFS Server icon in the status area.**
   The NFS Server menu appears.

   b. **If NFS Logging is not checked, select the option.**

2. **Enable Event logging.**

a. **Right-click the Network Neighborhood icon, and then click Properties.**

b. **Select Solstice File and Print Sharing and then click Properties.**

c. **On the NFS Server tab, select Log NFS server activity.**

d. **On the Logging tab, select Enable Network Event Log.**

e. **Select Save Log Messages To File and enter the name of a log file.**

f. **Click OK to close the Solstice File Sharing dialog box.**

g. **Click OK to close the Network dialog box.**
You do not need to restart your computer.

3. **Start the Network Event Log.**

a. **Click the Start button, select Programs, select Solstice Utilities, and then click Network Event Log, or enter** `sunwsyslogd` **at the Run prompt.**
The Network Event Log window opens.

b. **On the Display menu, click Configure.**
The Network Event Log dialog box opens.

c. **Select Log Messages To File and enter the name of a log file.**

d. **Set the desired options, such as how frequently network events are to be written, the severity levels of the messages you want to record, and so on.**
Click Help for detailed information on each option.

e. **Click Save.**

f. **Minimize the window.**

## ▼ To Disable NFS Server Logging

1. **Right-click the NFS Server icon in the status area.**
The NFS Server menu opens.

2. **Click NFS Logging.**
The check box is no longer checked and NFS logging is no longer enabled.

# Printing 5

This chapter describes how to set up print servers and mount network printers on Microsoft Windows computers running the Solstice Network Client software.

You can read background and procedural information throughout this chapter, or you can use the following references to go directly to a specific topic.



## Setting Up Printing

Setting up the print environment for Solstice Network Client is accomplished in two stages:

- First, print servers must be configured correctly so they can process print requests from print clients.
- Then, print clients must mount printers and specify which print protocol to use.

The next section, "Road Map for Printer Setup" provides high level guidelines to the tasks that must be done on the print servers and print clients before you can print successfully.

## Road Map for Printer Setup

The four tables in this section constitute a road map of the requirements for setting up print servers and print clients in a Solstice Network Client environment.

***Print Servers***

- Table 5-1 on page 75 covers setting up print servers to provide PCNFSD print services.
- Table 5-2 on page 75 covers setting up print servers to provide LPD print services.

***Print Clients***

- Table 5-3 on page 76 covers setting up print clients to send PCNFSD print jobs.
- Table 5-4 on page 77 covers setting up print clients to send LPD print jobs.

### Setup Requirements for Print Servers

Print servers provide either PCNFSD or LPD print services, or both, to print clients.

Table 5-1 identifies the tasks necessary to configure and set up print servers to handle PCNFSD-based print jobs from print clients.

*Table 5-1* Print Server Setup Requirements for PCNFSD Printing

| **UNIX Server** | **Windows 95 Server** | **Windows NT Server** |
|---|---|---|
| Install and configure the `rpc.pcnfsd` daemon.<br><br>Then, export the print spool directory with no access restrictions.<br><br>See *Installation and Licensing Guide* -> *Setting Up Server Programs* -> *The PCNFSD Daemon* for detailed instructions. | No PCNFSD print services are provided. | No PCNFSD print services are provided. |

Table 5-2 identifies the tasks necessary to configure and set up print servers to handle LPD-based print jobs from print clients.

*Table 5-2* Print Server Setup Requirements for LPD Printing

| **UNIX Server** | **Windows 95 Server** | **Windows NT Server** |
|---|---|---|
| Install and configure the LPD daemon.<br><br>Refer to the man page or documentation set for the operating system for detailed instructions. | Install and configure the Solstice NFS Client LPD Print Server Utility, and enable it to accept incoming print jobs.<br><br>See "Setting Up an LPD Shared Network Printer" on page 86 for details. | Add the Microsoft TCP/IP Print service to the Services environment in the Control panel.<br><br>Then, using the Add Printer Wizard, select the sharing option to set up the printer as a shared network printer.<br><br>Refer to the Microsoft documentation for Windows NT systems for details. |

## Setup Requirements for Print Clients

Table 5-3 highlights the tasks necessary to send PCNFSD-based print jobs to network printers.

*Table 5-3* Print Client Setup Requirements for PCNFSD Print Jobs

| UNIX Client | Windows 95 Client | Windows NT Client |
|---|---|---|
| No PCNFSD print jobs can be sent from a UNIX workstation to Windows computers running Solstice Network Client. | Add Solstice NFS Client service to the print client's network environment.<br><br>Then, using the Add Printer Wizard, mount the network printer and specify the PCNFSD print protocol using the following syntax: `pcnfs://`*servername/ queuename*.<br><br>See "To Mount a Network Printer on Windows 95" on page 80 for details. | Add the Solstice NFS File service to the print client's network environment.<br><br>Using the Add Printer Wizard, add a local PCNFSD printer port and use it to mount a PCNFSD network printer.<br><br>See "To Mount Network Printers Using a PCNFSD Network Port on Windows NT" on page 82 for step-by-step instructions. |

Table 5-4 highlights the tasks necessary to send LPD-based print jobs to network printers.

*Table 5-4* Print Client Setup Requirements for LPD Print Jobs

| UNIX Client | Windows 95 Client | Windows NT Client |
|---|---|---|
| Use Admin Tool, or an equivalent printer administration tool, to add the network printer from a Windows 95 or Windows NT print server.<br><br>See "To Mount a Shared PC Printer from a UNIX Workstation" on page 84 for the details. | Add the Solstice File and Print Sharing service to the print client's network environment.<br><br>Using the Add Printer Wizard, mount the network printer and specify the LPR print protocol using the following syntax: `lpr://`*servername*`/`*queuename*.<br><br>See "To Mount a Network Printer on Windows 95" on page 80 for details. | Add the Microsoft TCP/IP printing service to the print client's network environment.<br><br>Using the Add Printer Wizard, add a local LPR printer port and use it to mount an LPR network printer.<br><br>See "To Mount Network Printers Using an LPR Port on Windows NT" on page 83 for step-by-step instructions. |

# *Browsing for Network Printers*

You can browse for printers only on servers running the `pcnfsd` daemon. You cannot browse for LPR printers.

## *Browsing for Printers on Windows 95*

You can start browsing from the Add Printer Wizard or from Network Neighborhood. In either case, the Solstice printer name takes a different form than when you enter a printer name manually.

When browsing, the name takes the form:`\~`*hostalias*`\`*queuename*`.` Here, *hostalias* is an internal name and may not be an actual server name.

Browsing makes printer resources on servers running the `pcnfsd` daemon visible to users. But users cannot connect to these printers unless the print spool directory on the server is exported. As an administrator, you can decide to make a PCNFSD printer available to users by exporting the print spool directory on the print server. For detailed instructions on installing the `pcnfsd` daemon and exporting the print spool directory, see the *Solstice Network Client Installation and Licensing Guide*.

## ▼ To Browse for PCNFSD Printers on Windows 95

1. **From Network Neighborhood, click the Entire Network icon.**
2. **Double-click NFS Servers.**
   The list of NFS servers appears.
3. **Open each server icon to see which printers it offers.**

---

**Note –** When you find a printer you want to mount, look for a `usr`, `var`, `spool`, or `pcnfs` folder in the list of resources. If you do not see one of these folders, you cannot connect to the printer either because the print spool directory is not exported or has been changed to some other location on the server.

---

4. **Double-click the printer or drag the printer icon to the Printer control window.**

5. **When you are asked "Do you want Windows to set up the printer and continue this operation?", click Yes.**
   The Add Printer Wizard starts.


*Figure 5-1* Browsing for Printers

6. **Complete the remaining questions as required.**

## ▼ To Browse for Network Printers on Windows NT

1. **Double-click Network Neighborhood.**

2. **Double-click Entire Network, double-click Solstice_NFS_Client, and then double-click NFS Servers.**

3. **Double-click a server name to reveal its resources.**
   You will recognize PCNFSD printers by the `pcnfs` or `var` folder listed under the printer icon. LPR printers do not display such folders.

4. **Start the Add Printer Wizard manually.**
   See "To Mount Network Printers Using a PCNFSD Network Port on Windows NT" on page 82 and "To Mount Network Printers Using an LPR Port on Windows NT" on page 83 for step-by-step instructions.

## Mounting Network Printers on Print Clients

On Windows 95, Solstice NFS Client supports both the PCNFSD and LPR print protocols. Mount network printers using the Add Printer Wizard and specifying the print protocol in the printer's path name.

On Windows NT, Solstice NFS Client provides support for the PCNFSD print protocol; Microsoft Windows NT provides support for the LPR print protocol. In both cases, you need to add a local printer port for mounting the network printer using the Add Printer Wizard.

### Specifying Which Print Protocols to Use on Windows 95

You can add a printer to the Solstice network environment using the Windows 95 Add Printer Wizard. When you start the process from the wizard, you can set up the printer to use either print protocol. Add the print protocol name to the beginning of the queue name in the Add Printer dialog box as in the following example:

`lpr://`*servername*/*queuename*

Here, `lpr` is the print protocol, *servername* is the server name, and *queuename* is the printer name. For the PCNFSD protocol, use this syntax:

`pcnfs://`*servername*/*queuename*

### Specifying Which Print Protocols to Use on Windows NT

You can add a printer to the Solstice network environment using the Windows NT Add Printer Wizard. You must add one or more local PCNFSD and LPR printer ports for mounting the network printers. Add these local printer ports using the Add Printer Wizard.

The steps for adding these local printer ports are included in the instructions for mounting printers on Windows NT later in this chapter. See "To Mount Network Printers Using a PCNFSD Network Port on Windows NT" on page 82.

### ▼ To Mount a Network Printer on Windows 95

**1. Click the Start button, point to Settings, and then click Printers.**

2. **Double-click Add Printer to start the Windows 95 Add Printer Wizard.**
3. **When prompted, select To Add A Network Printer.**
4. **In the path name of the network printer, add the print protocol to the beginning of the printer name, using the following syntax:**
   - LPR print protocol: `lpr://`*servername*`/`*queuename*. For example, to add a network printer with a queue name `dopey_laser` connected to a print server named `dopey`, enter this path name: `lpr://dopey/dopey_laser`.
   - PCNFSD print protocol: `pcnfs://`*servername*`/`*queuename*. For example, to add a network printer with a queue name `dopey_laser` connected to a print server named `dopey`, enter this path name: `pcnfs://dopey/dopey_laser`.

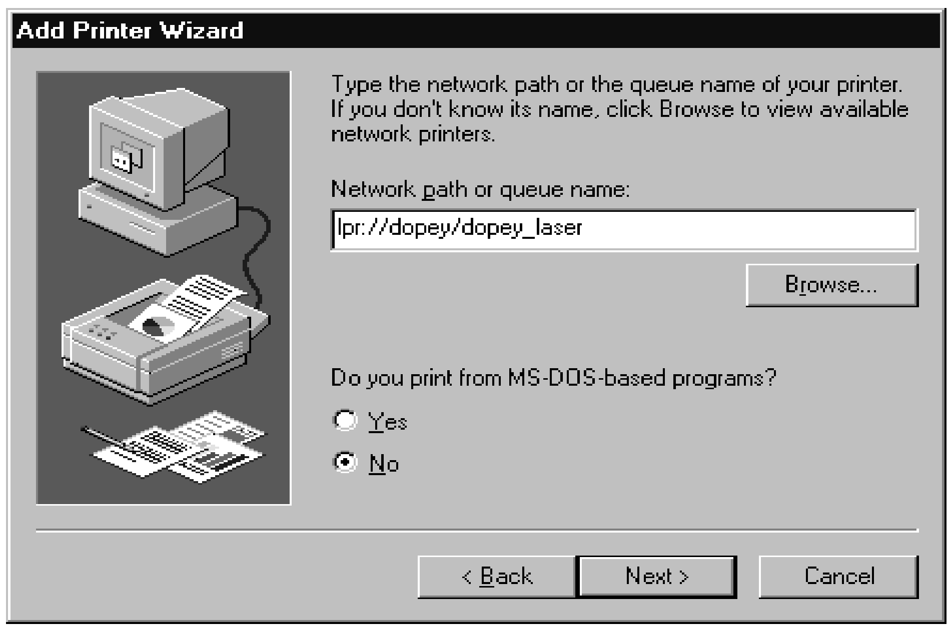


*Figure 5-2* Add Printer Wizard Dialog Box

5. **Complete the remaining Wizard questions as required.**

## ▼ To Mount Network Printers Using a PCNFSD Network Port on Windows NT

Before you begin this procedure, you must know the names of the server and the printer queue. If you need to find a PCNFSD printer, see "To Browse for Network Printers on Windows NT" on page 79.

1. **Click the Start button, point to Settings, and then click Printers.**
2. **Double-click the Add Printer icon.**
3. **Select My Computer (do not select Network Printer Server) and then click Next.**

The default settings in Window NT allows only Administrators to access My Computer. To enable the users in the "User" group to mount network printers, you must change the policies to allow them to load and unload device drivers.

4. **Click Add Port.**
5. **Select SunSoft PCNFSD Network Port and then click New Port.**
6. **Enter the printer queue name using one of the following syntaxes.**
   For example, to add a printer that has as queue name `hornbeam` and is attached to a server called `melody`, you can specify the port as follows:
   - `melody:hornbeam`
   - `pcnfsd:\\melody\hornbeam`
   - `pcnfs:\\melody\hornbeam`
   - `pcnfsd://melody/hornbeam`
   - `pcnfs://melody/hornbeam`
   - `\\melody\hornbeam`
   - `//melody/hornbeam`
   - `123.456.78.90:hornbeam` (where `123.456.78.90` is the IP address of the server `melody`)
7. **Click OK and then click Close.**
8. **Click the highlighted PCNFSD network port you just specified to select it and then click Next.**
   The check box of the PCNFSD port should display a check mark.
9. **Select the printer manufacturer from the Manufacturers list and the printer model from the Printers list, and then click Next.**

10. **(Optional) Replace the default printer name with a name more meaningful to you, and then click Next.**
11. **Click Not Shared and then click Next.**
12. **(Recommended) Select to print a test page and then click Finish.**

## ▼ To Mount Network Printers Using an LPR Port on Windows NT

This procedure describes how to establish a network printer using a Microsoft LPR port. The procedure assumes you know the server and the printer queue names. Also, you must have added the Microsoft TCP/IP Printing service to your network environment, using the Services tab in the Network dialog box.

1. **Click the Start button, point to Settings, and then click Printers.**
2. **Double-click the Add Printer icon.**
3. **Select My Computer (do not select Network Printer Server) and then click Next.**
4. **Click Add Port.**
5. **Select LPR Port and then click New Port.**
6. **Type the server name and printer queue name.**
   For example, to add a printer that has the queue name `eliz3` and is attached to a server called `midas`, you would type `midas` in the Server Name field, and `eliz3` in the Printer Queue Name field.
7. **Click OK and then click Close.**
8. **Click the highlighted LPR port to select it, and then click Next.**
   A check mark must appear in the check box of the LPR port.
9. **Select the printer manufacturer from the Manufacturers list and the printer model from the Printers list and then click Next.**
10. **(Optional) Replace the default printer name with a name more meaningful to you, and then click Next.**
11. **(Recommended) Select to print a test page and then click Finish.**

### ▼ To Delete Printer Ports on Windows NT

1. **Click the Start button, point to Settings, and then click Printers.**
2. **On the File menu, click Server Properties.**
3. **Select the PCNFSD or LPR port to be deleted and then click Delete Port.**
4. **Click OK in the warning message box.**
5. **Click OK again.**

## *Mounting Shared PC Printers in UNIX*

Individual UNIX users with superuser privileges can mount PC printers that are shared on Windows 95 computers running LPD Print Server, or are shared using the sharing capabilities of the Add Printer Wizard on Windows NT.

### ▼ To Mount a Shared PC Printer from a UNIX Workstation

1. **From a command window, enter the command `su` to become superuser.**
2. **At the superuser system prompt, enter `admintool&`.**
   The Administration Manager starts.
3. **Click Host Manager, and then click the appropriate name service to verify that the Windows computer is listed in the hosts list.**
4. **Close the Host Manager dialog when finished.**
5. **Click Printer Manager to open the Printer Manager dialog.**
6. **Click Edit, click Add Printer, and then click Add Access To Remote Printer.**
7. **Complete the Add Access To Remote Printer dialog as follows:**
   a. **In Printer Name, enter the queue name of the shared PC printer, for example, `dopey1_laser`.**
   b. **In Printer Server, enter the name of the Windows computer to which the printer is connected, for example, `dopey1`.**
   c. **In Comment, add some text that identifies the printer to the users, for example, `Laser in Jackie's office`.**

d. **For Printer OS Server, click BSD.**

e. **(Optional) Set the printer as the system default printer.**

f. **Click Add and close the Access to Remote Printer dialog.**

8. **Quit the Administration tool, press Ctrl-D to exit superuser.**

# *Viewing Print Jobs*

## ▼ To View Print Jobs on Windows 95 and Windows NT

1. **Click the Start button, point to Settings, and then click Printers.**
   The Printers window opens.

2. **Double-click the shared printer's queue name.**
   A window opens that shows details such as the document name, the status, the owner, the progress, and the start time.

## ▼ To View Print Jobs on UNIX

Use the print commands of your UNIX operating system to view the available printers, the status of print requests, and to cancel print requests.

For example, assuming the queue name of a shared PC printer is `dopey1_laser`, you would enter the commands in Solaris 2.*x* shown in Table 5-5.

*Table 5-5* Solaris 2.*x* Commands for Print Jobs

| To do the following... | Enter this command in Solaris 2.x... |
|---|---|
| Display status information about print jobs on the PC printer | `lpstat dopey1_laser` *filename* |
| Print to the shared PC printer when it is not the default printer | `lp -d dopey1_laser` *filename* |
| View print jobs sent to the shared PC printer | `lpstat -p dopey1_laser` |
| Cancel print jobs sent to the shared PC printer | `cancel` *job-ID* |

## Providing LPD Print Services on Windows 95

The Solstice NFS Client includes a UNIX-like LPD Print Server that runs on Windows 95. Using this software, you can share a printer connected to your PC with other users on the network. When your PC is running the LPD print daemon, a coworker can send a job to your local printer from a UNIX system or from a computer running Microsoft Windows.

When active, the LPD Print Server runs minimized, and its icon appears in the taskbar status area. Start LPD Print Server by double-clicking its icon, or enable the LPD server to start up automatically each time Windows starts.

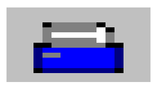

*Figure 5-3* LPD Print Server Icon

LPD Print Server relies on the Windows Print Manager to spool print requests and display information. The print server processes print requests on a first-come first-served basis. When the print request has been processed, LPD Print Server directs the processed requests to the LPD spool directory.

Windows Print Manager starts automatically when you start LPD Print Server. When you exit Print Manager, LPD Print Server stops running.

In most situations, you would set up LPD Print Server to start automatically when Windows starts. You can also start LPD Print Server manually.

**Note –** The LPD Print Server only supports the LPR print protocol.

### Setting Up an LPD Shared Network Printer

The LPD Server lets you share a PC printer with any PC or UNIX user with network access to that PC. To set up an LPD Shared Network Printer:

- Set up the LPD Server on the PC with the shared printer
- Start up the LPD Print Server so it can accept print requests from network users.

You can access LPD settings for the LPD Print Server control menu. Click the LPD icon to open this menu.

## ▼ To Set Up the LPD Server

**Note –** The Solstice File and Printer Sharing service should be added automatically as part of your installation. However, if it does not appear in the Network Properties page of the Control Panel, you must add it manually. See "To Enable File and Printer Sharing on Windows 95" on page 64.

1. **From the taskbar, click the Start button, point to Settings, click Control Panel, and then double-click Network.**
   The Network Properties dialog box opens.
2. **Select Solstice File And Printer Sharing and click Properties.**
3. **Click the Printer Sharing tab.**
4. **Select Enable Solstice LPD Server.**
   This starts the LPD Print Server daemon on the PC. The option is enabled by default.
5. **If you want to log the print activities in a log file:**
   a. **Select Log LPD Server Activity.**
   b. **(Optional) Select a different font and point size for the LPD Print Server messages that are written in the log file.**
      The fonts listed are those installed on the PC.
6. **Select the PC printer from the list in the Add Printer dialog box and click OK. Remain in the Properties dialog box.**
7. **In Queue Name, enter a printer queue name. For example:** `dopey_laser`**.**
   The printer's queue name must follow the naming rules and conventions of UNIX printer queues. The first character cannot be a number, and the length of the queue name cannot exceed fourteen characters.
8. **Accept Detect Automatically (default) as the file type checking option.**
9. **Decide how the printer driver should interpret carriage returns and line feeds when formatting binary files to be printed.**
   Choosing Assume Binary as the file type affects how the printer driver interprets carriage returns and line feeds. See "Interpreting Carriage Returns and Line Feeds" on page 93 for more information about your choices.

10. **(Optional) Replace the default spool directory** `c:\tmp` **with a directory of your choice. For example:** `pc_spool`**.**
    The directory will be created if it does not exist.

11. **Click OK.**
    The LPD Print Server daemon starts and the LPD Print Server icon appears in the taskbar status area.

## ▼ To Enable Print Requests From Network Users

Before users can print documents on the shared PC printer, you must enable LPD Print Server to accept incoming print requests.

If you see the LPD Print Server icon in the taskbar status area, and when you move your mouse pointer over it, the message `LPD: Accept Files` appears, the setup is complete.

If you see the LPD Print Server icon with the red stop sign in the taskbar status area, then continue as follows:

♦ **Click the right mouse button on the LPD icon in the status area.**
The LPD Print Server menu opens. The appearance of the LPD Print Server icon in the status area changes.

### *Starting LPD Print Server*

When the Enable Solstice LPD Server option is checked (the default), the LPD Print Server daemon starts automatically. You can also start it manually. The daemon runs in the background until you disable it.

## ▼ To Start LPD Print Server Automatically

1. **Click the Start button, point to Settings, click Control Panel, and then double-click Network.**
   The Network Properties dialog box opens.

2. **Select Solstice File And Printer Sharing and click Properties.**

3. **Select Enable Solstice LPD Server and click OK.**
   The LPD Print Server icon appears in the taskbar status area.

   If you do not see the LPD Print Server icon with the red stop sign in the taskbar status area, continue, with the steps in "To Enable Print Requests From Network Users" on page 88.

## ▼ To Start LPD Print Server Manually

1. **Click the Start button, point to Programs, and then point to Solstice Utilities.**

2. **Click the LPD Print Server icon.**
   LPD Print Server starts minimized and its icon appears in the status area of the taskbar.

   Print Manager starts running if it was not already running.

### *Stopping LPD Print Server*

If you want to stop sharing a PC printer, you need to disable LPD Print Server daemon. Use following procedure on the PC with the shared printer.

## ▼ To Stop (or Disable) LPD Print Server

1. **Click the Start button, point to Settings, click Control Panel, and then double-click Network.**
   The Network Properties dialog box opens.

2. **Select Solstice File And Printer Sharing and click Properties.**

3. **Click the File and Printer Sharing tab.**
   Remove the checkmark from the Enable Solstice LPD Server option. Disabling this option stops the LPD Print Server daemon.

4. **Click OK.**
   Both LPD Print Server and Print Manager stop running. Print requests that were already processed and placed in the LPD Print Server spool directory print when you restart LPD Print Server.

### Adding a Shared Printer to a Users' Work Environment

Users who want to access the shared LPD printer need to add the printer to their work environment. These users must have network access to the PC with the shared printer.

## ▼ To Add a Shared Printer to a PC Environment

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**Note –** You do not need to perform the following procedure on the PC with the shared printer.

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1. **Click the Start button, point to Settings, and then click Printers.**
2. **Double-click Add Printer to start the Microsoft Add Printer Wizard.**
3. **When prompted, select To add a Network Printer.**
4. **Add the path name for the printer using the following syntax:**
   `lpr://`*hostname*`/`*queuename* or `lpr:\\~`*hostalias*`\`*queuename*

   For example, to add a shared PC printer with a queue name `dopey_laser` connected to a PC with a hostname `dopey`, enter this path name: `lpr://dopey/dopey_laser`.
5. **If you want to print from MS-DOS based applications, click Yes.**
6. **(Optional) Set the shared PC printer as the default printer.**

## ▼ To Add a Shared Printer to a UNIX Environment

Individual UNIX users with superuser privileges can add a shared PC printer by following these steps:

1. **From a command window, enter the command** `su` **to become superuser.**
2. **At the superuser system prompt, enter** `admintool&`**.**
   The Administration Manager starts.
3. **Click Host Manager, and then click the appropriate name service to verify that the PC is listed in the hosts list.**
4. **Close the Host Manager dialog when finished.**

5. **Click Printer Manager to open the Printer Manager dialog.**
6. **Click Edit, click Add Printer, and then click Add Access to Remote Printer.**
7. **Complete the Add Access To Remote Printer dialog as follows:**
   a. **In Printer Name, enter the queue name of the shared PC printer, for example,** `dopey1_laser`**.**
   b. **In Printer Server, enter the name of the PC to which the printer is connected, for example,** `dopey1`**.**
   c. **In Comment, add some text that identifies the printer to the users, for example,** `Laser in Jackie's office.`
   d. **As Printer OS Server, click BSD.**
   e. **(Optional) Set the printer as the system default printer.**
   f. **Click Add and close the Access to Remote Printer dialog.**
8. **Quit the Administration tool and press Ctrl-D to exit superuser.**

# *Managing LPD Printing*

You can view your print jobs, cancel print jobs, log messages, and set printing options for your LPD printer.

## ▼ To View Print Jobs in a PC Windows Environment

1. **Click the Start button, point to Settings, and then click Printers.**
   The Printers window opens.
2. **Double-click the shared PC printer's queue name.**
   A window opens that shows details such as the document name, the status, the owner, the progress, and the start time.

## ▼ To View Print Jobs in a UNIX Environment

Use the default UNIX `lpstat` commands to view the available printers, the status of print requests, and to cancel print requests. For example, assuming the queue name of the shared PC printer is `dopey1_laser`,

- To print to a shared printer when it is not the default, enter:
  `lp -d dopey1_laser`,
- To view print requests sent to the shared PC printer, enter:
  `lpstat -p dopey1_laser`
- To cancel a print request sent to the shared PC printer, enter:
  `cancel` *job-ID*
  The *job-ID* is the first field in the response from the `lpstat -p` command.

### *Working with the LPD Print Server Log File*

Messages related to printing documents under the control of the Solstice LPD Print Server are written in the LPD Print Server log file. The default path and file name of the LPD Print Server log file is `c:\spool\logfile.txt`.

While there is no physical limit to the size of the LPD Print Server log file other than the available disk space, it is a good idea to purge the log file regularly.

## ▼ To View and Print the LPD Print Server Log File

1. **Click the right mouse button on the LPD Print Server icon in the taskbar status area to open the LPD Print Server menu.**
2. **Click View Log File.**
   Solstice opens the file `logfile.txt` in Notepad.
3. **(Optional) On the File menu, click Print.**
4. **Close Notepad when you are finished.**

## ▼ To Purge the LPD Print Server Log File

1. **Click the right mouse button on the LPD Print Server icon in the taskbar status area to open the LPD Print Server menu.**
2. **Click Purge Log File.**
   A message appears asking if you really want to purge the contents of the log file.
3. **Click Yes to purge the contents of the log file, or click No to retain the log file contents.**

## Turning Off a PC With a Shared Printer

When you turn off your PC, the LPD Print Server stops. When you turn the PC on again, the LPD Print Server automatically prints any files that are in the spool directory.

Users who sent documents to the shared PC printer may have to wait until you turn on the PC to get their printed documents. Alternatively, users can print their documents on another available printer, and cancel their print requests on the shared PC printer.

As a convenience to all users who access the shared printer, consider keeping the PC turned on at all times.

## Turning Off a Shared PC Printer

When users send files to a shared PC printer which is not available (but is turned on) LPD Print Server processes the files for printing and places them in the spool directory. When the shared PC printer becomes available again, it prints the files in the spool directory.

When you turn off a shared PC printer, processed files are stored in the LPD Print Server spool directory. These files print when you turn on the PC printer again.

Unprocessed files are lost when you turn off the shared PC printer. Users have to resend those files to the shared PC printer.

## Interpreting Carriage Returns and Line Feeds

The options Assume Binary and Map Newline to CR+LF For Binary Files in the Solstice File And Printer Sharing Properties dialog box work together.

If you select both options, the printer driver interprets the carriage returns and line feeds as shown in Table 5-6.

*Table 5-6* Carriage Returns and Line Feeds with LPD Print Server

| If the binary file contains... | The printer does the following... |
|---|---|
| Carriage returns followed by line feeds. | Starts a new line and adds a blank line.<br>`XXXXXXX.`<br><br>`XXXXXXXXXXX` |
| Carriage returns only | Starts a new line and starts printing from the left margin.<br>`XXXXXXX.`<br>`XXXXXXXXXXX` |
| Linefeeds only | Adds a blank line and continues printing.<br>`XXXXXX.`<br>`       XXXXXX` |

## Troubleshooting LPD Print Server

Refer to the Troubleshooting section in the LPD Print Server online Help for solutions to problems with LPD Print Server problems.

A computer running Solstice NFS Client on Windows 95 can act as a print server by using the LPD Print Server Utility.

## Troubleshooting Printing Problems

Table 5-7 discusses frequent printing problems on Windows NT and Windows 95 and their solutions. Also refer to the online Help for additional troubleshooting information on printing.

*Table 5-7* Solutions to Frequent Printing Problems on Windows 95 and Windows NT

| **Problem** | **Possible Cause** | **Solution** |
|---|---|---|
| When attempting to mount network printers on Windows NT, My Computer is greyed out. | Default settings on Windows NT. | By default, only users with Administrator privileges can load and unload device drivers. Either change the policies to give the access right to users in the “User” group, or log in as a user with administrator privileges. |
| You can browse a PCNFSD printer, but cannot connect to it. You might see the error message, “Problem printing Printer Test Page on host *unixhost* in queue *lp*. Unable to write to the remote filesystem \\~*unixhost**pc.domain*.” | The print spool directory is not exported. | Export the print spool directory on the server. For example, on a SunOS 5.*x*, enter `share -F nfs /var/spool echo share -F nfs /var/spool >> /etc/dfs/dfstab`. See the *Solstice Network Client Installation and Licensing Guide* for details. |

*Table 5-7* Solutions to Frequent Printing Problems on Windows 95 and Windows NT

| Problem | Possible Cause | Solution |
|---|---|---|
| When you try to print on a PCNFSD printer, you see an error message about a problem writing to the remote file system. | The print spool directory is mounted with read-only permissions. | Select Network Neighborhood. Click the right mouse button, and click Properties.<br>On Windows 95, double-click Solstice NFS Client.<br>On Windows NT, select the Services tab and double-click Solstice NFS Client.<br><br>In both environments, on the NFS General page, under Mount Options, clear Connect Drives Read-Only.<br><br>Make sure that on the UNIX system, the spool directory is shared read-write. On a Solaris system, enter the `share` command. You should see output similar to the following:<br>`/var/spool/pcnfs rw ""` |

# PC-CacheFS 6

This chapter describes the PC-CacheFS program and explains how to use it to speed up the performance of your CD-ROM and network drives.

You can read background and procedural information throughout this chapter, or use the following references to go directly to a specific topic.


- What Is PC-CacheFS? – page 97
- What You Need to Know About Cache Security – page 98
- Starting Up PC-CacheFS on Windows 95 – page 98
- Managing the Cache – page 99
- Customizing PC-CacheFS – page 101
- Using Cache Statistics – page 104


## What Is PC-CacheFS?

PC-CacheFS is a software application that reduces network traffic and improves system performance by copying the files you work with most frequently across the network to your local hard drive. The network files are written to a designated location called a cache. Cached data can be accessed more quickly because you access it from your local hard drive instead of across the network.

## What You Need to Know About Cache Security

During setup, PC-CacheFS creates a directory called `CFS.SYS`, which is located in the root directory of the selected cache drive. As you access information from the network and CD-ROM drives, PC-CacheFS retains this information in the `CFS.SYS` directory.

Users who are either permitted to use your personal computer, or who are granted network access, can look in the `CFS.SYS` directory and access any files and directories that you have cached there. These files may contain information to which they should not have access. For this reason, you should be cautious about the kinds of information you cache. Be sure that you have cached only work-related, non-confidential information that can be viewed, without consequences, by users who share your computer or network.

To remove data from the cache directory, flush the cache. See “To Flush the Cache” on page 100.

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**Caution –** Do not to remove the `CFS.SYS` directory or modify any of the information it contains, as doing so may cause the removal or malfunction of the cache.

---

## Starting Up PC-CacheFS on Windows 95

PC-CacheFS works transparently and automatically. Even when the PC-CacheFS Monitor is not running or displayed, PC-CacheFS continues to cache your network and CD-ROM drives. You can view the PC-CacheFS Monitor when you want to view cache statistics or change cache settings.

### ▼ To Start Up PC-CacheFS Monitor

1. **Click the Start button, point to Programs, point to Solstice Utilities, and then click PC-CacheFS.**
   By default, the PC-CacheFS Monitor displays in its collapsed state.

2. **Click the View Statistics button to expand the monitor.**
   The expanded CacheFS Monitor screen appears (Figure 6-1).

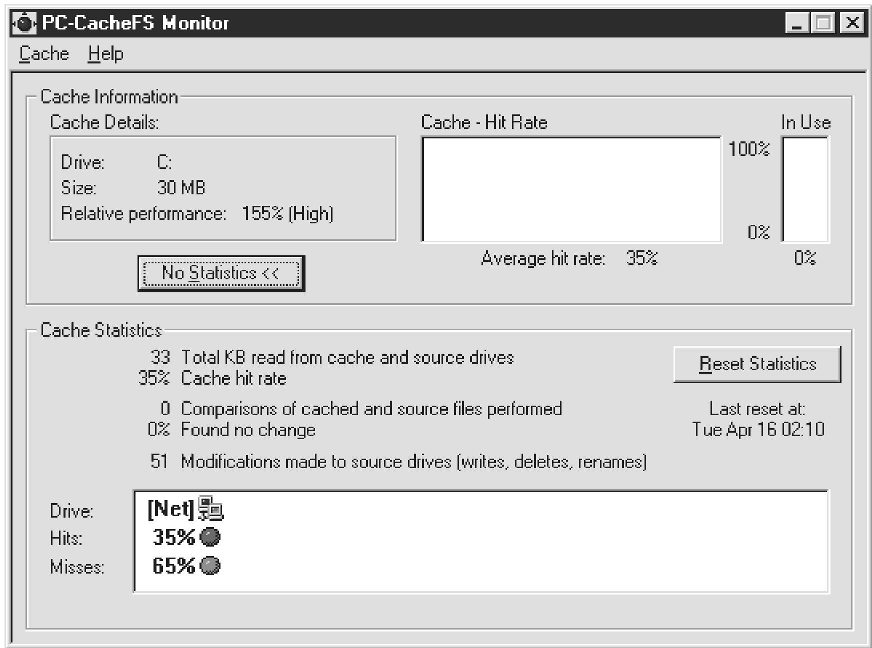


*Figure 6-1* PC-CacheFS Monitor – Expanded

## *Managing the Cache*

When starting up PC-CacheFS for the first time after installation, you can set up and customize the cache. If you ever delete the cache, for example, to free disk space, you can restore it by setting it up again.

### ▼ To Set Up the Cache

1. **In the PC-CacheFS Monitor, click Cache, and then click Configuration.**
   The PC-CacheFS Configuration dialog box opens.

2. **In the PC-CacheFS Configuration dialog box, click Let Me Specify My Own Cache Settings.**

3. **Change the following settings as needed.**
   - **Cache On Drive –** Selects the location for the cache. The default is to locate the cache on Drive C.
   - **Size of Current Disk Cache –** Represents the size of the cache in megabytes. The recommended size is calculated as a percentage of the available space on the disk.
   - **Drives to Cache –** Connects CD-ROMS and new network drive letters to the cache. You can elect to cache all network drives as you connect to them, or select and deselect drives that are already connected.
4. **Click OK.**

## *Flushing the Cache*

If you need to use more disk space than is currently available on your computer, you can either change the size of your cache or flush the cache.

Making your cache smaller is a preferable solution if you are not using all the cache space. Determine the amount of cache space currently in use by looking at the In Use graph on the PC-CacheFS Monitor.

Flushing the cache is a preferable solution if you temporarily need to make space available on your computer. Flushing the cache causes the information contained in the cache to be temporarily removed from your hard disk until you access the information again.

### ▼ To Flush the Cache

1. **In the PC-CacheFS Monitor, click the Cache menu.**
2. **Click Flush Cache.**
3. **Click Yes.**

The cache is emptied.

### Deleting and Restoring the Cache

Deleting the cache causes the cache and the information contained in it to be completely removed from your computer. This is a more permanent operation than flushing the cache, as you have to set up the cache when you want to use it again. Delete the cache if you need to free the disk space and no longer wish to cache data.

## ▼ To Delete the Cache

1. **In the PC-CacheFS Monitor, click the Cache menu, and then click Configuration.**
   The PC-CacheFS Configuration dialog box opens.
2. **In the PC-CacheFS Configuration dialog box, click Delete Cache.**
3. **In the confirmation box, click Yes.**
4. **Click OK.**

The cache is deleted.

## ▼ To Restore the Cache

1. **In the PC-CacheFS Monitor, click Cache, and then click Configuration.**
   The PC-CacheFS Configuration dialog box opens.
2. **Select Let Me Specify My Own Cache Settings**
3. **Select a drive letter in the Cache On Drive field.**
4. **Click Change.**

The cache is restored.

# Customizing PC-CacheFS

You can customize PC-CacheFS to make your cache perform according to your needs by changing advanced settings. You can change settings for each drive, or configure settings that apply to all drives available to be cached. Use PC-CacheFS advanced settings to configure the following properties:

- *Directory Caching* – Caches the attributes of a directory.

- *Directory Time-out* – Determines how long PC-CacheFS will retain a cached copy of directory information.
- *File Time-out* – Determines how often PC-CacheFS compares the modification time of the file on the source drive with the cached copy.
- *Read Size* – The number of bytes of information used during a read function.
- *Write Size* – The number of bytes of information used during a write function.

## Directory Caching

PC-CacheFS will cache information about a directory. By having this information moved into the cache, you save the time it takes to search for directory information on your server.

## Directory Time-out

Directory time-out values determine how long PC-CacheFS will retain a copy of the directory information. The minimum and maximum time-out values establish a range. (The default range is between a 30-second directory time-out minimum and a 120-second maximum.) PC-CacheFS selects a value within the range based on the amount of time that has passed since the directory was last modified. Recently modified directories are read again more quickly than less-recently modified directories.

If a file is copied to the source drive from a computer other than yours, you will not see the changes until the time-out expires and PC-CacheFS updates the cache. Setting low time-out values increases directory consistency at the expense of network traffic. Use higher time-out values for directories that are modified only from your computer, or if you are accessing information using a slow network connection, such as a PPP dial-up connection.

## File Time-out

File time-out determines how often PC-CacheFS compares the modification time of the file on the source drive with the cached copy. The minimum and maximum time-out values establish a range. (The default range is between a 3-second minimum and a 60-second maximum.) PC-CacheFS selects a value within the range based on the amount of time that has passed since the file was modified. Recently modified files are checked for consistency more frequently than less-recently modified files.

Setting low time-out values increases file consistency at the expense of network traffic. Use higher time-out values for files that change infrequently or if you are accessing information using a slow network connection, such as a PPP dial-up connection.

If the file on the source drive changes infrequently, you can increase the file time-out to allow more time to pass between consistency checks. For example, you can increase the default file time-out maximum from 60 seconds to 75 seconds, and increase the minimum from 3 seconds to 5 seconds. An amount of time greater than 5 seconds but not more than 75 seconds will pass before PC-CacheFS makes a consistency check of the cache and the source drive. The additional time between consistency checks results in less network traffic and improved network performance.

If the file on the source drive changes frequently, you can ensure greater consistency between the file on the source drive and the copy in your cache by decreasing the default file time-out maximum from 60 seconds to 45 seconds and minimum from 3 seconds to 2 seconds. An amount of time greater than 2 seconds but not more than 45 seconds will pass before PC-CacheFS makes a file comparison between the source drive and your cache. Because comparisons and updates of cache and server information are more frequent, greater load is added to your network and you may notice more of a delay in retrieving information. In most situations, you do not need to decrease the file time-out minimum below the 3-second default.

## *Read or Write Size*

The read size is the number of bytes of information used during a read function. A read function is any task that retrieves information from a file, such as opening a file for editing. In the PC-CacheFS Monitor, the effects of the read function are displayed in the field Total Kbytes Read From Cache And Source Drives.

The write size is the number of bytes of information used during a write function. A write function is any task that causes information in your cache to be changed, such as saving a file, deleting a file, or renaming a file. The effects of the write function are displayed in the field Modifications Made To Source Drives (Writes, Deletes, Renames).

PC-CacheFS breaks down large read and write requests into smaller blocks of the specified read or write size to help your computer perform other tasks in a timely manner. You can select a read or write size from 512 to 8192 bytes.

The default value of 8192 bytes is suitable for most LAN connections. Selecting a smaller read or write size may provide improved response times when accessing information using a slow network connection, such as a PPP dial-up connection.

### ▼ To Change Advanced Settings

1. **In the PC-CacheFS Monitor, click Cache, and then click Configuration.**
   The PC-CacheFS Configuration dialog box opens.
2. **Click Let Me Specify My Own Cache Settings.**
3. **Click the Advanced button.**
4. **In the PC-CacheFS Advanced Configuration dialog box,**
   a. **To configure a single drive, click Configure Drives Independently, then click the tab showing the drive letter of the drive for which you want to change settings.**
   b. **To configure options for all drives, click Use One Setting For All Drives.**
5. **Change the required settings and then click OK.**

## *Using Cache Statistics*

The PC-CacheFS Monitor displays statistics that allow you to monitor performance. Click the View Statistics button to expand the Monitor. The Monitor displays the Cache-Hit Rate, the Capacity, and the Relative Performance.

## Cache-Hit Rate

PC-CacheFS retrieves file or directory information from a CD-ROM or network drive and moves the information into the cache, stored on your local hard drive. To ensure that the files in the cache are updated with changes to the files on the network drive, PC-CacheFS makes consistency checks between the cache and the remote location, and updates the cache.

A hit occurs when the information in the source network drive is current with the information in the cache. A miss occurs when the information on the source network is more recent than the information in the cache.

The average of the number of hits to the total number of hits and misses is referred to as the cache-hit rate, and is displayed in the Cache-Hit Rate graph.

## Factors Affecting the Cache-Hit Rate

The cache-hit rate is affected by the type of access, the size of the cache, and the frequency of the consistency checks.

### Type of Access

The way you access your files affects the cache-hit rate. If you access many files and you have a large cache, you will have a larger cache-hit rate because older information still remains in the cache during consistency checks. However, if you have a small cache, there is less room for information to remain. As the cache fills, older information is automatically removed from the cache. You will experience more misses and a lower cache-hit rate.

### Cache Size

The cache size implies cache capacity. The larger the cache, the better the chances are that least-recently-accessed information remains in the cache and has not been automatically removed. The smaller the cache, the more likely that least-recently-accessed information will be removed from the cache.

### Frequency of Consistency Checks

The file and directory time-out values affect the frequency with which PC-CacheFS performs consistency checks. When information on the network drive changes, PC-CacheFS updates the cache. These instances are misses and result in a lower cache-hit rate.

## Capacity

The In Use graph monitors the capacity of the cache. The In Use statistic fluctuates as you access new files from a network drive or a CD-ROM and the information is added to your cache. When your cache is full, capacity reaches 100% on the In Use graph. As the cache becomes updated with new information from the source network or CD-ROM drive, the least-recently-accessed information is automatically removed from the cache to make space available for the new information.

## Relative Performance

Your most precise indicator of cache effectiveness is the relative performance value displayed in the PC-CacheFS Monitor. After you restart your computer, relative performance displays at 100%, which indicates that system performance is the same as without PC-CacheFS. As you retrieve information from a remote location or from a CD-ROM, relative performance increases or decreases to indicate the overall gain or loss of performance for your particular mix of applications. A low relative performance may indicate that while your network is fast, your local disk, where your cache is located, may be slow.

A relative performance under 100% can occur when PC-CacheFS automatically updates information in the cache, slowing the speed of your system below your regular system speed. A continued relative performance below 100% indicates you are not using the information on the current drive enough times to necessitate caching that particular network or CD-ROM drive. Select a different drive to cache, one on which you use information more frequently.

Since PC-CacheFS has the benefit of reducing network traffic and server load, a slightly lower relative performance may indicate increased productivity across multiple clients at your site. A high relative performance indicates that your cache is performing well in relation to the network, thereby enhancing your personal productivity. Other indicators of cache effectiveness include an average cache-hit rate greater than 50%, and green lights in the Hits field more often than yellow lights in the Misses field.

## *Resetting Cache Statistics*

Over time, PC-CacheFS accumulates statistics about your cache, such as the cache-hit rate and total kilobytes (KB) read. If you want the fields in the PC-CacheFS Monitor to display the statistics for a particular drive, you can reset the statistics. By resetting the statistics, you can determine the changes of statistics for a particular drive over time. You can also find out how one particular drive contributes to cache performance overall.

You can reset the statistics by expanding the Monitor and clicking Reset Statistics.

# Frequently Asked Questions A

## NFS Client

**Can I use other network clients at the same time as Solstice NFS Client?**

Yes. For example, if you are using both Solstice NFS Client and Client for Microsoft Network, when you go into Network Neighborhood you will see both your local network and also icons for NFS Servers and Automount Maps.

**Do I need to be authenticated by a `pcnfsd` server?**

Yes. If you want to access NFS file servers, you must have user and group IDs as credentials. The only way to get them is from an authentication server. An exception to this rule is accessing files on a computer running the NFS Server which grants or rejects access based on machine name rather than user/group IDs.

If you just want to use NFS Sever, LPR Server, or PC-CacheFS, then you do not need to be authenticated.

**How do I specify the Authentication server to use?**

From the Properties screen of the Solstice Network Client, you select the Security tab and select either to broadcast on your local subnet for a server or enter the IP address of a server if there is not one on your local subnet or you are making a serial connection.

**Does the Solstice NFS Client have to be the Primary Network Logon?**

The answer depends on how your computer is set up. Windows 95 uses the Primary Network Logon to determine two things:

- Which network client will present its logon screen first. If you have both Microsoft Client networking and Solstice NFS Client networking installed and you are using the same username/password for both clients, you can use either network as the Primary Network Logon and you will only have to login once to reach both networks. If you use different username/passwords for each network, it also doesn't matter which is the primary logon since you will have to enter your username and password for each client's logon screen.
- Only one Network Provider governs where user and system policies are downloaded from. So if you want to be sure that your Windows client downloads any Solstice related policy files, you must set the Solstice NFS Client to be the Primary Network Logon. If you don't care, then it doesn't matter.

**How do I access NFS files?**

The Solstice NFS Client mounts servers transparently when you browse for NFS servers. This implicit mapping process lets you look at and access files on NFS servers without having first to map a network drive. You can also explicitly map a network drive, using the Tools menu of Windows Explorer for instance.

**What is the difference between mapping a network drive and accessing an NFS server through Network Neighborhood?**

The convenience of browsing Network Neighborhood does come with a small price—when you close Network Neighborhood or one of the windows that is viewing an NFS file system, the files on that file system are no longer accessible until you browse that file system again. In addition, the files on an implicitly mapped file system cannot be accessed from an MS-DOS box, or by an application that uses only mapped drives to access files. When you explicitly map network drives you have access to them all the time.

**What is an Automount map?**

The Solstice NFS Client automounter provides administrators with the capability to define mount points without regard to their actual location on a network. Automount maps provide the links between file system names and their actual locations. For example, a file system name of `/pcapps` could map to a network location of `appserver:/export/pcapps`. This location could change with a simple update to the automount map.

**Can I access NFS files on UNIX servers other than Solaris?**

Solstice NFS Client is an NFS V2 and V3 implementation. It should interoperate with NFS servers that support those standards.

## *NFS Server*

**What is NFS Server?**

The NFS Server is a daemon that runs on your Windows computer and lets you share files and directories with other Windows computers and UNIX workstations connected to your network. The NFS Server is a Winsock application and it supports NFS version 2 functionality. The NFS Server will not turn your computer into a full-fledged file server. Rather, NFS Server provides a simple mechanism for the casual sharing of PC-based files among a limited number of users.

**Using NFS, what can I share with coworkers?**

With NFS Server, you can share files and folders located on your computer or devices, such as a CD-ROM drive.

**How do I share files, folders and devices?**

To share files, folders and devices you configure the NFS Server program and then start it. From then on, any coworker who has network access to your computer and who has the right to access your shared devices, can mount a drive pointing to the shared device.

**Who can access my shared devices?**

When configuring the NFS Server, you specify which remote computer may access your shared devices. These remote computers are either Windows computers running Solstice Network Client, or UNIX workstations. Remote computers that have access to shared devices are referred to as NFS Server clients.

**Can I restrict access to my shared devices?**

NFS Server lets you restrict access based on a list of names of remote NFS Server clients rather than on the basis of individual users. For example, restricting access to a remote computer called `galaxy` means that no user working on `galaxy` has access to your shared devices. You cannot specify that certain users on `galaxy` can access your shared devices while others cannot.

**What other type of restrictions can I specify?**

In addition to specifying which NFS Server client can access your shared devices, you can restrict access based on the following:

- Type of access: Read Only or Read/Write
- By prompting NFS Server clients to enter a password.

**Where does NFS Server store access rights data?**

NFS Server maintains the list of shared devices in the Windows 95 or Windows NT Registry. The only way to modify this information is though the NFS Sharing property sheet that you access through the Windows Explorer program.

**Must the NFS Server program be running to enable coworkers to access shared devices?**

Yes, without NFS Server running on your computer, coworkers will not be able to see your shared devices. As a courtesy to your coworkers, we suggest you add NFS Server in the Start Programs menu so that it is started automatically when you start Windows.

**Where can I find out about problems with NFS Server?**

You can enable the logging of NFS Server and Port Map activities via the Logging command in the NFS Server and Port Map menus. Once you have enabled logging, you must make sure that the Network Event Log program is running. Start Network Event Log by clicking its icon in the Solstice program group, or by entering `sunwsyslogd` at the Run prompt. Also refer to the Troubleshooting section in the NFS Server online help.

## LPD Printing

**Can I share my PC printer with my coworkers and what must I do?**

To make your printer available to coworkers, you must define a printer queue for the printer on your computer, start LPD Print Server, and enable your computer to receive print requests.

**Who can access my printer?**

When you share your printer using LPD Print Server, your printer becomes a network printer. Coworkers within your networked environment who use software that can interpret the LPD protocol, can print documents on your PC printer. This includes coworkers using a Windows computer or a UNIX workstation.

**What happens to my coworkers' print requests when I turn off my printer or my computer?**

Print requests that were processed and placed in the LPD Print Server spool directory are saved before your turn off either your computer or your printer. Those print requests will be printed when you restart your computer, the LPD Print Server, and your PC printer.

**How can I find out which print requests belong to me and which belong to coworkers?**

To find out which print requests belongs to you or your coworkers, display the Printers window from the Settings menu, and double-click the printer's queue name. A window appears listing such details as document name, status and owner.

**Where are printer problems logged?**

All operations related to print requests sent to your LPD printer are written in a log file. You can open, print, or purge the log file. The default path and file name of the log file is `C:\spool\logfile.txt`. The Troubleshooting section of the Solstice LPD Print Server utility provides solutions pertaining to LPD Print Server setup and error messages.

**What must I do to access a coworker's printer?**

To print documents on a coworker's printer, you add that printer to your list of available printers using the Microsoft Add Printer Wizard. If you will use that printer frequently, you may want to specify it as your default printer.

## *PC-CacheFS*

**What Is PC-CacheFS?**

PC-CacheFS is a software application that reduces network traffic and improves system performance by copying the files you work with most frequently on the server to your local hard drive. This technique is referred to as caching. The location on your hard drive is referred to as a cache. Caching helps you to use your files more quickly because you access them from your local hard drive instead of across the network.

**Does PC-CacheFS only work with NFS file systems?**

Solstice PC-CacheFS operates with any file system that is compliant with Microsoft's Windows Installable File System (IFS), allowing you to use the same product throughout your heterogenous network environment.

**Can I install and use just the PC-CacheFS part of the Solstice NFS Client product?**

Yes, during installation, select Custom as the setup type, then click Change to list the subcomponents. From the list of subcomponents, make sure that only PC-CacheFS is checked.

**How can I tell if PC-CacheFS is working?**

The PC-CacheFS Monitor shows cache statistics. A high Relative Performance indicates that your cache is performing well in relation to the network, thereby enhancing your personal productivity. Other indicators of cache effectiveness include:

- Average cache-hit rate greater than 50%
- Green lights in the Hits field more often than yellow lights in the Misses field

# Setting Up PCNFSD

B

This chapter provides background information and instructions for installing the authentication server daemon on a UNIX server.

You can read background and procedural information throughout this appendix, or use these references to go directly to a specific topic.



## UNIX Server Requirements

You can install the `pcnfsd` server software on one of the following:

- Sun-3™, Sun-4™, or SPARCstation™ servers running SunOS operating system version 5.0
- Sun-3, Sun-4, or SPARCstation servers running SunOS operating system version 4.x for `rpc.pcnfs` daemon installation only.
- Intel-based PCs running SunOS 5.1 or later

- Other NFS servers such as a Digital Equipment Corporation system running the Ultrix operating system. (Contact your local Solstice NFS Client distributor or service provider for more information.)

## *PCNFSD Daemon Overview*

The PCNFSD daemon, `rpc.pcnfsd`, provides user authentication services that allow the Solstice Network Client to access files on any NFS server in the network. The daemon also provides access to PCNFSD-based printing. Using these services requires you to install `rpc.pcnfsd` on at least one server in your network.

The PCNFSD daemon runs continuously on a UNIX server to service requests for user authentication and for printing to network printers. The `rpc.pcnfsd` daemon is based on Sun's remote procedure call (RPC) services. Programs running on the PC make remote procedure calls to the `rpc.pcnfsd` program running on a UNIX server.

Although not part of the PCNFSD services, Solstice Network Client provides support for user views and client management using the PCNFSD server.

## *Services Provided by* `rpc.pcnfsd`

The `rpc.pcnfsd` daemon provides the following services:

- *Authentication* – PC users can identify themselves to the network and be granted appropriate privileges for file access and program execution.
- *Access to printer spooling services* – PC users can send printing requests to printers attached to servers on the network.

### *Authentication and System Security*

A Solstice Network Client user can log in to the Solstice network in much the same way as the user can log in to a UNIX system. The Login program takes the user name and password, encrypts them, and calls the authentication procedure in `rpc.pcnfsd` on the authentication server. If this procedure succeeds, it returns a user ID and a group ID to be used when constructing the credentials for the user. These credentials are used for subsequent NFS file access. If the user name and password are not found, then authentication fails and the user is denied access.

The authentication server may also return secondary group membership, umask, and home directory information (such as server name and home directory path name).

Solstice NFS Client users who do not log in to the network have no access to the network. If necessary, users can log in with the user name, nobody (UID –2, GID –2). When users perform tasks under the user name nobody, all files they create on NFS-mounted file systems are owned by nobody, and can be accessed by everyone.

### Shared Printer Support

The rpc.pcnfsd daemon provides users with the following printing services:

- Connecting to a network printer and starting a print job
- Browsing for network printers
- Viewing network print queues
- Canceling or removing print jobs in network print queues

### Support for User Views and Site Policies

For Windows 95 and Windows NT users, a system administrator can create a directory on the PCNFSD server that contains user profiles and system policy files. Storing user profiles on the PCNFSD server allows users to have an identity separate from the machine on which they are working. Users can carry their preferences with them whenever they log in to any PC in the network.

The system administrator can use centrally located policy files to manage clients by customizing the desktops, configuring network settings, and restricting access to applications and options.

Support for user views and site policies requires the administrator to create a directory on the PCNFSD server called /opt/MSPolicy. For more information about managing Windows 95 and NT clients see the *Solstice Network Client Administration and Maintenance Guide*.

## Determining if rpc.pcnfsd Is Already Installed

Many operating systems from various vendors include rpc.pcnfsd. To see if rpc.pcnfsd is installed on a server, use one of the following methods:

- Use the `ps` command to list all processes by name, and check if `rpc.pcnfsd` is among them.
- Use the `ls` command to see if `rpc.pcnfsd` is present in any of the following directories: `/opt/SUNWpcnfs/sbin` (SunOS 5.*x* software only), `/etc`, `/usr/etc`, `/usr/lib`, `/bin`, or `/usr/bin`.

### ▼ To See if `rpc.pcnfsd` Is Installed

♦ **On the server with SunOS 4.*x*, enter** `ls /usr/etc/rpc.pcnfsd`**.**
See if the output shows that the `rpc.pcnfsd` daemon is already installed. You may also list other directories such as `/etc/usr/bin`, `/bin`, and `/usr/lib`, in case it is not in the expected directory.

♦ **On a server with SunOS 5.*x*, enter**
`ls /opt/SUNWpcnfs/sbin/rpc.pcnfsd`.
See if the output shows that the `rpc.pcnfsd` daemon is already installed.

### ▼ To See if `rpc.pcnfsd` Is Running

♦ **On a server with SunOS 4.*x* or SunOS 5.*x*, enter**
`rpcinfo | grep rpc.pcnfsd`**.**
See if the output shows that the daemon is already running.

## *Deciding Where to Install* `rpc.pcnfsd`

You can install and run `rpc.pcnfsd` on a single server, on several servers, or on all servers on the network.

If you run `rpc.pcnfsd` on a single server, this machine will be used for all PCNFSD authentication and printing. In this case, make sure this server is always available and is accessible to all PCs. When the PC user configures Solstice Network Client software, the user can identify this server by name, and the software will always try to use this server for authentication.

This method has disadvantages, however, particularly in a large network. For example, if there is only one PCNFSD server and it fails, users will not be able to log in or print from their PCs to a network printer. Also, a PC may not be able to access the PCNFSD server if a router in the network fails.

It is better to run `rpc.pcnfsd` on several servers on the network. Users can enter the server's name or IP address when they set up Solstice Network Client software, or they can broadcast for a PCNFSD server on the local subnetwork by entering an asterisk (*) rather than a server name or IP address.

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**Note –** You do not need to reinstall the `SUNWpcnfd` package if your server is already running the PCNFSD daemon.

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## *Installing* `rpc.pcnfsd`

The Solstice Network Client CD-ROM contains software to install the `rpc.pcnfsd` version 2 daemon on a Sun server running SunOS 4.*x* or SunOS 5.*x*. For non-SunOS platforms, the CD-ROM contains the source files that allow you to build and install binaries on other UNIX servers.

### ▼ To Install `rpc.pcnfsd` on a SunOS 5.*x* Server

1. **Move to the product installation page, to the section marked Server Components, and click SPARC or x86 to download the correct version of the server software to your machine.**
   The compressed tar file is copied to your system (`pkgs.sparc.tar.Z` or `pkgs.i386.tar.Z`, depending on your operating system).

2. **Uncompress the file. For example, on a SPARC system, type**
   `uncompress pkgs.sparc.tar.Z`

3. **Extract the files. For example, for a SPARC system, type**
   `tar xvf pkgs.sparc.tar`

   This creates four packages: `SUNWipop`, `SUNWlit`, `SUNWlicsw`, and `SUNWpcnfsd`. You can then run the `pkgadd` utility in this directory to install the software on your system.

4. **Become superuser.**

5. **Enter the following command:**
   `` pkgadd -d `pwd` ``

**Note –** If you change to the directory where you installed the packages, you can type: `pkgadd -d`.

When you press Return, the `pkgadd` program displays information for the SPARC architecture and similar information for Intel, as in the following example.

```
The following packages are available:
  1  SUNWipop      Solstice Internet Mail POP3 server
                   (sparc) 1.0

  2  SUNWlicsw     FlexLM License System
                   (sparc) 4.1

  3  SUNWlit       STE License Installation Tool
                   (sparc) 4.0

  4  SUNWpcnfd     PC-NFSpro Daemons
                   (sparc) 1.1

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]:
```

6. **Enter the number 4 to select the PCNFSD daemon package.**
   During the installation, you are prompted for permission to execute with superuser privileges. Answer yes to each request.

   When the package has been installed, the original `pkgadd` screen is displayed.

   The `pkgadd` program stops related server daemons already running, starts the server components, and copies a script to the `init.d` directory to start these components each time you reboot the machine.

7. **Set the man page path or add the man pages to your man page directory.**
   Find out where the man pages are located.

   Enter `env` and look at `MANPATH`. For example:

   ```
   # env | grep MANPATH
   MANPATH=/usr/share/man:/usr/man
   ```

8. **Copy the man page for** `pcnfsd.1m` **into section 1M. For example:**

```
# cp /opt/SUNWpcnfs/man/pcnfsd.1m /usr/share/man/man1m
```

9. **If necessary, create a** `pcnfsd` **configuration file,** `/etc/pcnfsd.conf`**.**
This file is used to contain configuration information for PCNFSD printing. (See "Configuring the PCNFSD Daemon" on page 124.) Refer to the man page `pcnfsd`(1m) for information about this file.

10. **Once** `rpc.pcnfsd` **starts, you must export the print spool directory created by** `rpc.pcnfsd`**.**
For example:

```
# share -F nfs /var/spool
# echo share -F nfs /var/spool >> /etc/dfs/dfstab
```

11. **If you are supporting user and group polices for your Solstice clients, create a directory for policy files called** `/opt/MSPolicy`**.**

## ▼ To Install `rpc.pcnfd` on a SunOS 4.*x* Server

1. **Move to the product installation page, to the section marked Server Components, and click SPARC or x86 to download the correct version of the server software to your machine.**
The compressed tar file is copied to your system (pkgs.sparc.tar.Z or pkgs.i386.tar.Z, depending on your operating system).

2. **Uncompress the file. For example, on a SPARC system, type**
`uncompress pkgs.sparc.tar.Z`

3. **Extract the files. For example, for a SPARC system, type**
`tar xvf pkgs.sparc.tar`

   This creates four packages: `SUNWipop`, `SUNWlit`, `SUNWlicsw`, and `SUNWpcnfsd`. You can then run the `pkgadd` utility in this directory to install then software on your system.

4. **Become superuser.**

5. **Make a working directory in the** `/var` **directory.**
For example, enter `mkdir /var/tmp/sunw`

6. **Enter the shell command to install the** `rpc.pcnfsd` **daemon.**
   Enter `./addpcnfsd.sh` to install `rpc.pcnfsd.`

   As you enter these commands, you are asked whether you want to start the daemon each time the machine is rebooted, and where you want to install the executable files. (The default directory is `/usr/etc`.)

7. **If necessary, create a** `rpc.pcnfsd` **configuration file** `/etc/pcnfsd.conf`.
   (See "Configuring the PCNFSD Daemon" on page 124.) Refer to the man page `pcnfsd`(8) for information about this file.

8. **Enter the** `/usr/etc/exportfs /usr/spool/pcnfs` **command to export the print-spool directory.**
   The directory `/usr/spool/pcnfs` is created by `rpc.pcnfsd` and must be exported. You should also add an entry to the `/etc/exports` file, so the directory is exported whenever the server reboots. For example:

```
# /usr/etc/exportfs /usr/spool
# echo /usr/spool >> /etc/exports
```

## *Upgrading the PCNFSD Daemon*

There are two versions of the PCNFSD protocol:

- Version 1 of PCNFSD – This version was developed prior to PC-NFS version 4.0. The `rpc.pcnfsd` version 1 daemon provides user authentication and basic printing services. This version can run only with SunOS 4.*x* software.
- Version 2 of PCNFSD – The latest version of the PCNFSD protocol, version 2 was developed for the 4.0 release of the PC-NFS™ product. It provides expanded user authentication and enhanced printing services. The current release of the `rpc.pcnfsd` daemon supports both version 1 and version 2 of the PCNFSD protocol. Version 2 runs on both SunOS 4.*x* and 5.*x* software.

The current release of the `rpc.pcnfsd` daemon supports both version 1 and version 2 of the PCNFSD protocol. Source code and binary programs of this daemon are included on the CD-ROM for installation on a SunOS 4.*x* or 5.*x* system. Daemons are in compressed UNIX `tar` files for installation on SunOS 4.*x* systems.

In addition, the `SUNWpcnfd` package on the Solstice Network Client CD-ROM incorporates patches that were added to the PCNFSD software to fix security problems.

Since version 2 of the daemon can support existing PC-NFS software users (with one compatibility issue, see Note following), you should replace existing version 1 `rpc.pcnfsd` server daemons with version 2. If you do not, users may find that certain features of Solstice Network Client will not work. To upgrade `rpc.pcnfsd` on SunOS 4.*x* servers, follow the procedure "To Upgrade rpc.pcnfsd on a SunOS 4.x Server" on page 124.

---

**Note –** The `rpc.pcnfsd` version 2 daemon recognizes only those printer names listed by the UNIX `lpstat -t` command. Run this command on the print server to determine the printer names that the `rpc.pcnfsd` daemon will recognize. This is different from the `rpc.pcnfsd` version 1, which allows you to use any names associated with a particular printer.

---

## ▼ To Determine if Version 2 Is Running

♦ **On a system running SunOS 4.*x* or 5.*x*, enter:**

`rpcinfo -u` *servername* `150001 2`

If the new version of `rpc.pcnfsd` is running, you will see the following message:

```
proc 150001 vers 2 ready and waiting
```

If the server is running the old version of `rpc.pcnfsd` or if `rpc.pcnfsd` is not running, you will see the following message:

```
proc 150001 version 2 is not available
```

## ▼ To Determine if Version 1 Is Running

♦ **On a system running SunOS 4.*x*, enter:**
`rpcinfo -u` *servername* `150001 1`
If the server is running the old version of `pcnfsd`, you will see the following message:

```
proc 150001 vers 1 ready and waiting
```

In this case, upgrade to version 2.

If neither version is running, try starting the daemon by entering `/usr/etc/rpc.pcnfsd` and then check the version.

If that fails, you need to install `rpc.pcnfsd`.

Source code and binary versions of `rpc.pcnfsd` are distributed on your Solstice Network Client CD-ROM in compressed UNIX `tar` files. Before installing the daemon, check your server to see if `rpc.pcnfsd` is already present. If not, install it using the appropriate installation procedure.

With `pcnfsd` version 1, you were able to install `rpc.pcnfsd` so that it was started by the `inetd` superdaemon. The new `rpc.pcnfsd` daemon must execute a possibly lengthy configuration sequence each time its starts. To avoid delays—and possible time-outs—you should arrange for the daemon to be invoked from `/etc/rc.local` (SunOS 4.*x*) or by means of a script in the `init.d` directory (SunOS 5.*x*). Do not use `inetd`.

### ▼ To Upgrade `rpc.pcnfsd` on a SunOS 4.*x* Server

1. **If the `rpc.pcnfsd` daemon is running, stop (kill) it.**
   a. **Become root.**
   b. **Determine the `rpc.pcnfsd` process ID number.**
      For example:
      `# ps -ax | grep rpc.pcnfsd`
   c. **Enter** `kill -9` *processid number*.
2. **Rename the `rpc.pcnfsd` version 1 daemon.**
   For example, you might rename `/usr/etc/rpc.pcnfsd` to `/usr/etc/rpc.pcnfsd.v1`.
3. **Install `rpc.pcnfsd` version 2 according to the instructions in** **"To Install rpc.pcnfd on a SunOS 4.x Server" on page 121.**
4. **When you are satisfied that the new `rpc.pcnfsd` version is working correctly, delete the old version.**

## *Configuring the PCNFSD Daemon*

To configure PCNFSD, you must edit the `pcnfsd` configuration file `/etc/pcnfsd.conf`. Modify this file if you want to perform any of these tasks:

- Rename the print spool directory

- Define “virtual” printers
- Disable the `wtmp` compile-time option
- Specify a UID range for authentication and printer security

For details about configuring `/etc/pcnfsd.conf`, refer to the `pcnfsd.1m` or `pcnfsd.8c` man page included on the Solstice distribution media.

For instructions on how to set up and configure print services, see the *Solstice Network Client Administration and Maintenance Guide*.

## Non-SunOS Platforms Installation

SunSoft supplies C source code for `rpc.pcnfsd` that you can run on most UNIX servers, including SunOS 4.*x* servers. If your server is not one of these, you may need to adapt the source code to your system, and then compile and install the modified version.

Adapting `rpc.pcnfsd` to environments other than SunOS requires some understanding of what the program does and how it interacts with other software on the server. You may want to contact your system vendor to see if that company has a version of `rpc.pcnfsd` available for its system. See the section on porting `rpc.pcnfsd` in the *Solstice Network Client Installation and Licensing Guide.*

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