Solaris™ PC NetLink 1.2 Administration Guide

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Solaris ™ PC NetLink 1.2 Administration Guide

CHAPTER **1**

Introduction to Solaris PC NetLink Administration

The Solaris™ PC NetLink product[1] that you have installed within your network will be at once new and familiar to you, the administrator. This guide will introduce you to the product and to your new role as PC NetLink program administrator.

About Your New Server

PC NetLink software is a set of Solaris operating environment services that enable powerful, highly scalable, highly reliable Sun™ computers to perform vital local area network (LAN) tasks within a Microsoft Windows, Windows NT, or mixed-client environment.

As a server within a LAN, a Sun computer with PC NetLink software installed provides file, print, authentication, member server, and primary and backup domain controller (PDC and BDC) services that enable the efficient sharing of computing resources among desktop computer users. Incorporating Microsoft technology, PC NetLink software works like a native Windows NT server in network “neighborhoods” that include systems running Windows NT Server, Windows NT Workstation, Windows 98, Windows 95, and Windows for Workgroups (Windows 3.11). (Note that, in this guide, references to Windows 95 generally apply as well to Windows 98.)

PC NetLink software implements many of the services that are offered by Windows NT Server 4.0. Among these services are:

- Windows NT PDC, BDC, and member server functionality
- Windows Internet Name Service (WINS)
- Microsoft Remote Procedure Calls (RPCs)
- Windows NT Directory Services (NTDS)

[1] PC NetLink software incorporates AT&T’s Advanced Server for UNIX Systems.

- Windows NT Registry
- Microsoft NTFS-compatible file Access Control Lists (ACLs)
- Event Logging

In addition, PC NetLink software offers user account synchronization between NTDS and related Solaris services.

The additional benefits of Sun computers running the Solaris operating environment include true preemptive multitasking and symmetric multiprocessing. The time-sharing, multiuser model employed by the Solaris operating environment ensures file system integrity and continued server availability—even if a user's application crashes.

About Your New Administration Role

Although it incorporates networking technology from Microsoft, the foundation of PC NetLink software is the Solaris operating environment. A computer running PC NetLink software is not an emulation of a Windows NT server, but rather a distributor of true Windows NT file and print services implemented on the Solaris operating environment.

Once you have set up your PC NetLink computer on the network, users of Microsoft Windows 95-based client computers won't notice that their network services are being provided by a Solaris, rather than Windows NT, server. Their Microsoft Windows clients' views of the Windows NT network servers will merely include one or more new servers that seem the same as the others.

In your role as an administrator of your Windows NT network, you won't notice any differences, either. You will continue to use the same Windows NT tools to perform the same Windows NT network administration tasks that you ordinarily perform. But the presence of the PC NetLink server in your Windows NT network does mean that you have one additional role that is not the same as Windows NT administration: PC NetLink administration.

The difference between administration of the computer running PC NetLink software on your network and the Windows NT network services *provided by* PC NetLink software is both critical and occasionally subtle.

For example, you can set up a native Windows NT server as a Windows Internet Name Service (WINS) database server that resolves client computers' host names to their IP addresses. As a Windows NT administrator, you have probably set up and administered services on one or more WINS servers. Likewise, you can set up the PC NetLink computer as a WINS server and administer its Windows NT network role in the same way that you administer the native Windows NT server.

But note the subtle difference between Windows NT and PC NetLink administrative duties:

- *Windows NT network administration* – Creating Printer shares
- PC NetLink *administration* – Setting up a Solaris printer that can be shared

To complete the Windows NT printer administrative task, you would use the same Windows NT administration tool that you have always used and you would follow instructions in the tool's online help or in your Windows NT network administration documentation. To complete the PC NetLink printer administration task, you would use the PC NetLink Server Manager or command-line utility documented in the PC NetLink online help or in this guide.

Similar to the WINS server example, you will find new administrative duties that are closely related to, but importantly different from, many of your ordinary Windows NT administration tasks. This guide covers all of them. Additionally, Appendix B, "Common Windows NT Administration Tasks" on page 219, provides instructions for accomplishing several Windows NT administration tasks.

Windows NT Administration Tools Overview for Experienced Solaris System Administrators

You may be an experienced administrator of a Windows NT network; in that event, you are already familiar with Microsoft NT administration tools and you can skip this section and proceed to the section, "The PC NetLink Server Manager or Command Line: Your Choice" on page 7.

For administrators of a Solaris network, however, this section is a summary of the Windows NT administration tools that you use to carry out your Windows NT network responsibilities. Becoming familiar with the functions of these tools will help you discern the difference between a Windows NT network administration task and a PC NetLink administration task.

Nearly all Windows NT network administration tasks are carried out by way of several graphical user interface (GUI) tools. A PC NetLink server can operate and be administered regardless of whether Windows NT is running on the network. However, client-based network administrative tools running on Windows NT Workstation and Microsoft Windows 95-based client computers enable remote administration of the Windows NT services provided by a PC NetLink server.

To perform Windows NT network administration tasks on a PC NetLink server from a Microsoft Windows 95-based client computer, you install Windows NT Server Tools. Remote administration is supported for all network functions. Windows NT Server Tools are available in the PC NetLink installation package.

All of the GUI-based tools for Windows NT network administration feature online help.

The most important and most commonly used Windows NT administration tools, and the common administrative tasks associated with them, are described in the following sections. (Depending on which tools package you use and which Windows NT version you are running, you may not have access to one or more of the tools listed in the following sections.)

User Manager for Domains

Windows NT network client computer users gain access to network resources with a single logon and password, from any computer in their own “domain” or other “trusted” domain. No matter which computer they use, their own user environment will be established for them by the Windows NT server at logon. (Similar—though not equivalent—information in the world of the Solaris system administrator is stored in the `/etc/passwd`, `/etc/groups`, `.profile`, and `.cshrc` files.) This environment and various other user attributes are maintained by way of the Windows NT *User Manager for Domains* tool.

You use User Manager for Domains for many common tasks, including:

- Managing passwords, including resetting forgotten passwords
- Setting up logon hours
- Setting account expiration dates
- Managing user accounts, including creating, deleting, altering, naming, and disabling
- Creating and modifying a path to the user’s profile
- Creating logon scripts for users and specifying their home directories
- Managing groups, including creating, deleting, and changing them and their membership
- Managing security policy, including number of failed logons permitted, users’ and groups’ rights, and audit policy
- Managing trust relationships among Windows NT domains

Server Manager

Windows NT network resources—file services and print services, for example—are allocated from the servers to the client computers as *shares*. These shares are given names, and accounted for by way of these names. You manage shares and other server-based resources by way of the *Server Manager* tool.

You use Server Manager for many common tasks, including:

- Setting and managing share permissions for users, viewing a computer’s shares, adding new shares, and stopping sharing directories

- Checking who is connected to which server, for how long, and which resources they have open
- Configuring the Windows NT Directory Replicator service
- Specifying path names for logon scripts (script file names are specified by way of User Manager for Domains)
- Sending and managing administrative alerts
- Managing domains and domain controllers
- Managing services

Event Viewer

An *event* is any significant occurrence in the system or in an application. Some critical events are noted in on-screen messages.

An event that does not require immediate attention is noted in an *event log*. Event logging starts automatically. With an event log and the Windows NT tool called *Event Viewer*, you can troubleshoot various hardware and software problems, and monitor Windows NT security events. You also can archive logs in various file formats.

You use Event Viewer for many common Windows NT administrative tasks. Among Event Viewer's features, it:

- Reports all errors and exceptions
- Displays event logs for security, systems, and applications
- Displays event descriptions and details
- Sorts events by timeframe
- Filters events, displaying only those with characteristics you specify
- Searches for events
- Provides Windows NT error codes

System Policy Editor

On computers running Windows NT Workstation or Windows NT Server, the contents of the user profile are taken from the user portion of the Windows NT Registry. Another part of the Registry, the local computer portion, contains configuration settings that you can manage along with user profiles.

Using the *System Policy Editor*, you can create a *system policy* to control user work environments and actions and to enforce system configuration for all computers running Windows NT Workstation and Windows NT Server.

With system policies, you can control some aspects of user work environments without enforcing the restrictions of a mandatory user profile. You can restrict what users can do from the desktop, such as which options in Control Panel they can use, and customize parts of the desktop or configure network settings.

User Profile Editor

On computers running Windows NT Workstation or Windows NT Server, *user profiles* automatically create and maintain the desktop settings for each user's work environment on the local computer. (Although you can save user profiles in shared network directories on PC NetLink servers, user profiles have no effect on those particular computers—only on the clients served by them.)

You can create and modify user profiles using the *User Profile Editor* tool.

In Windows NT and Windows 95, a user profile is created for each user when the user logs on to a computer for the first time. User profiles provide the following advantages to users:

- When users log on to their workstations, they receive the desktop settings as they existed when they logged off.
- Several users can use the same computer, with each receiving a customized desktop when they log on.
- User profiles stored on a server enable the profiles to follow users to any computer running the Windows NT or PC NetLink software on the network. These are called *roaming* user profiles (see Appendix B, "Common Windows NT Administration Tasks" on page 219).

As an administrative tool, user profiles provide the following options:

- You can create customized user profiles and assign them to users to provide consistent work environments that are appropriate to their tasks.
- You can specify common group settings for all users.
- You can assign mandatory user profiles to prevent users from changing any desktop settings.

Other Windows NT tools available to many administrators include *WINS Manager*, *Registry Editor* (Regedit32), *Disk Administrator*, *Performance Monitor*, and a *Backup* utility. (Note, by the way, that beginning with the 1.2 version of Solaris PC NetLink software, Solaris backup and restore utilities that are fully "aware" of Windows NT ACLs are supported.) Detailed information about these and the previously described Windows NT tools, as well as instructions for using them, are included in the tools' online help and your Windows NT network documentation.

The PC NetLink Server Manager or Command Line: Your Choice

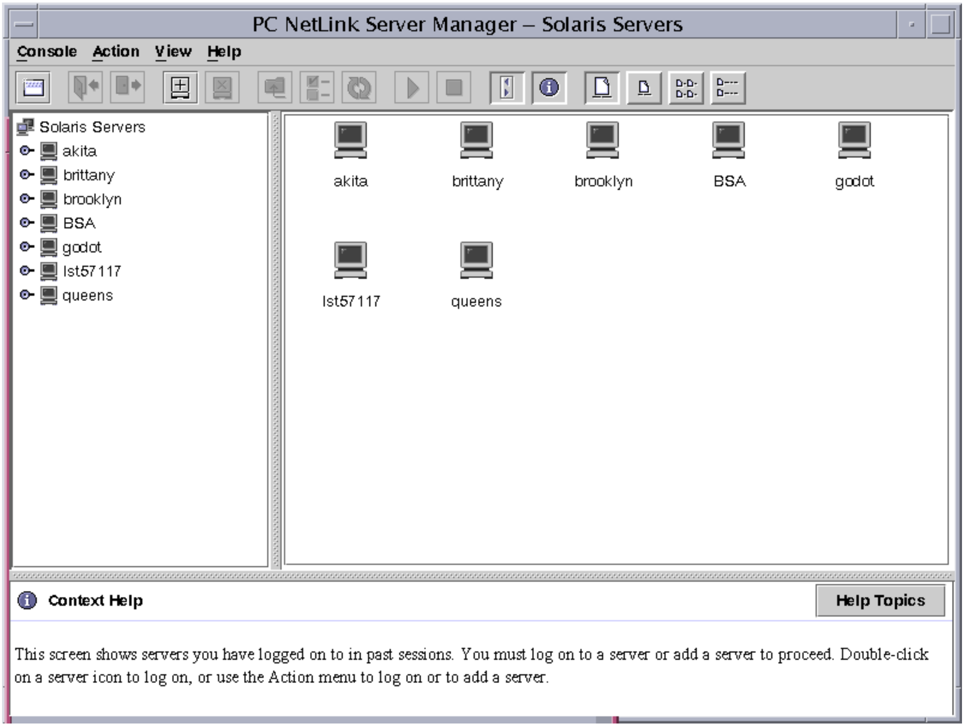
Aside from the administrative tasks that you routinely perform to keep your Windows NT or mixed-client network healthy—and for which you use the previously described Windows NT administration tools—you also need to perform some administrative tasks directly on your Solaris system-based computer running PC NetLink software.

Suiting your background and preferences, PC NetLink administration provides a clear choice of methods: by way of a graphical user interface or the Solaris command line. This guide provides instructions on how to accomplish any administrative task on a PC NetLink server by either method.

Note – Make sure that only one administrator at a time is making changes to any particular server. Neither the command-line interface nor the PC NetLink Server Manager tool will preclude two or more administrators from simultaneously making changes—though the PC NetLink Server Manager tool will warn you if someone else with administrator privileges is logged on to a particular server.

PC NetLink Server Manager

Fitting comfortably within a Windows NT and Microsoft Windows environment, in which most routine and complex tasks are accomplished by way of graphical tools, is the PC NetLink administration tool, PC NetLink Server Manager, shown in the next figure.



This screen shows servers you have logged on to in past sessions. You must log on to a server or add a server to proceed. Double-click on a server icon to log on, or use the Action menu to log on or to add a server.

You can manage all major aspects of PC NetLink administration, which is distinct from Windows NT network administration, by way of PC NetLink Server Manager—a distributed client-server application based on the Java™ programming language from Sun Microsystems. You install the server portion of PC NetLink Server Manager on the PC NetLink server, and the client portion on a Solaris (shown), Windows NT 4.0, or Windows 95 client. (If you are going to run PC NetLink Server Manager on a Solaris machine, do so *locally*. Running the tool on a Solaris machine *remotely* may degrade interactive performance and result in less than optimal display.)

Note – You cannot use the 1.2 version of PC NetLink Server Manager to administer servers that are running previous versions of PC NetLink software. If you intend to keep a previous version of PC NetLink software on any machine, then you must also keep the matching version of PC NetLink Server Manager—called “SunLink Server Manager” in older versions—on the network to administer it. Note also that you cannot use previous versions of the tool for PC NetLink 1.2 administrative tasks.

Among the most common and most important administrative tasks and concerns for which PC NetLink Server Manager is useful:

- *Logon and logoff* – To administer a PC NetLink computer from a remote client, you must have special user permissions (known as *root* in the Solaris and UNIX world). PC NetLink Server Manager enables you to do this.
- *Server startup and shutdown* – PC NetLink software includes a set of Solaris server processes that enables the computer to act as a Windows NT network server. PC NetLink Server Manager alerts you when you are attempting a task that requires shutdown of the PC NetLink program, informs you about whether the server is running, and enables you to start and stop the program without having to invoke any special Solaris commands.
- *Domain configuration* – PC NetLink Server Manager covers most PC NetLink domain configuration tasks, including naming the server and the domain, and specifying it as a PDC, BDC, or member server. You can also use the Windows NT Server Manager for PC NetLink configuration tasks.
- *Policy configuration* – PC NetLink Server Manager enables you to change various server policy parameters that are special to the PC NetLink server, and provides context to help you understand the ramifications of policy changes that you put into effect.
- *Event management* – PC NetLink Server Manager’s Events view, much like the Windows NT Event Viewer tool, enables you to check a variety of events related to PC NetLink operations.
- *Database management* – PC NetLink Server Manager enables you to manage and maintain the integrity of various Windows NT-related databases that are stored on your PC NetLink server—backing up and restoring them, for example. (Altering the content of these databases is a Windows NT administrative function, and not a PC NetLink administrative function.) Among the databases that you can manage with PC NetLink Server Manager are the Access Control List (ACL), the Registry, the Security Accounts Manager (SAM), and the Windows Internet Name Service (WINS).
- *NetBIOS* – Using PC NetLink Server Manager, you can set NetBIOS policies, including configuring the service as a WINS proxy.
- *Printing* – PC NetLink Server Manager includes a wizard that enables you to set up a Solaris printer, the first step toward setting up print services on a PC NetLink network.

- *Performance monitoring* – PC NetLink Server Manager includes a detailed graphical display of statistics related to the performance of the Solaris server that is running PC NetLink software.
- *Performance tuning* – PC NetLink Server Manager includes a tool that helps you manipulate various system settings and defaults to tune memory and speed for optimum performance.
- *Diagnostics* – A new Diagnostics wizard automatically performs system tests to help you determine the cause of any problems you may encounter, and provides detailed information on how to resolve or work around the problem.
- *Online Help* – Detailed instructions for all tasks covered by PC NetLink Server Manager are available online.

Command-Line Interface for All Tasks

If you are an experienced administrator of Solaris systems or any other UNIX system, you already know the power of the command line. From the Solaris system prompt you can type in any number of commands to perform every administrative duty.

All of the traditional Solaris commands, and some new ones (including the Windows NT `net` commands), are available to you. For a rundown of the commands that are most relevant to PC NetLink administration, see Chapter 2, “PC NetLink Administration at the Command Line” on page 11. That chapter also provides general explanations of the use of Solaris commands to administrators whose Solaris experience is limited.

CHAPTER **2**

PC NetLink Administration at the Command Line

This chapter describes how you can use PC NetLink commands, the `net` commands, and `lanman.ini` file editing to administer your PC NetLink server at the Solaris system console. It contains the following information:

- PC NetLink *commands* – This section describes the Solaris system commands that you can use to administer your PC NetLink server at its command prompt. (PC NetLink commands are installed in the `/opt/lanman/bin` and `/opt/lanman/sbin` directories.)
- `net` *command* – This section lists the `net` commands that are available to administer your PC NetLink server at its command prompt.
- `lanman.ini` *file* – This section is a table of values in the `lanman.ini` file that you can change by editing the file. Note that editing the vital `lanman.ini` file is a task for experienced administrators only.

Not covered in this chapter is information about the PC NetLink *Registry*, which plays a vital role in PC NetLink administration. The Registry is covered in Appendix A, "PC NetLink Registry" on page 187.

Note – For the purposes of this Solaris system-centric chapter, the Microsoft Windows and Windows NT term "log on" is replaced with the Solaris term, "log in."

Instructions are included in this chapter for accomplishing the following tasks.

- "How to Administer a Local PC NetLink Server" on page 16
- "How to Administer a Remote PC NetLink Server" on page 17
- "How to Use PC NetLink Commands on a Windows Client" on page 18
- "How to Change a `lanman.ini` File Parameter" on page 27

Show Commands

The PC NetLink graphical user interface tool for administration, PC NetLink Server Manager, includes a feature that is especially useful for administrators who use the command line. The *Show Commands* feature outputs and offers brief explanations about the commands it invokes in the background while carrying out its tasks. You can use the Show Commands feature as “training wheels” to become accustomed to PC NetLink commands, and you can easily copy the commands and paste them into a PC NetLink command line.

▼ How to Use the PC NetLink Server Manager Show Commands Feature

1. **Start PC NetLink Server Manager by entering the following command on a PC NetLink command line:**

   ```
   /opt/lanman/sbin/slsmgr &
   ```

2. **If you have** *not* **already added a PC NetLink server to PC NetLink Server Manager, continue with Step 3; if you** *have* **added a server, skip the next step and continue with Step 4.**

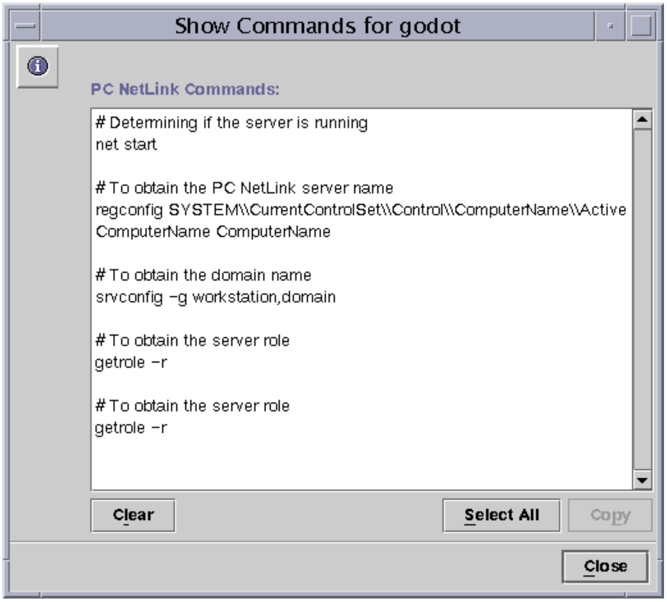
3. **Using the instructions in the section, “How to Add a Server to PC NetLink Server Manager” on page 35, add a PC NetLink server to the interface.**

   After adding a server, skip the next step and continue to Step 5.

4. **Using the instructions in the section, “How to Log On Using PC NetLink Server Manager” on page 36, log on to the server.**

5. **With the server name highlighted, choose Show Commands from the View menu.**

   A screen similar to the following appears.



```
# Determining if the server is running
net start

# To obtain the PC NetLink server name
regconfig SYSTEM\\CurrentControlSet\\Control\\ComputerName\\Active
ComputerName ComputerName

# To obtain the domain name
srvconfig -g workstation,domain

# To obtain the server role
getrole -r

# To obtain the server role
getrole -r
```

Among the commands in the example above are those invoked by PC NetLink Server Manager to complete the foregoing task.

About PC NetLink Commands

You can use Solaris system commands at the PC NetLink command prompt to perform several administrative tasks.

Note – The commands listed in this chapter have not been translated into languages other than English.

TABLE 2-1 lists the Solaris system commands that you can use. For complete descriptions, syntax, and examples of the commands, consult the PC NetLink man pages. Make sure that your `MANPATH` variable is set as follows:

```
$MANPATH:/opt/lanman/man:/opt/SUNWlznb/man
```

With this variable set, you can find complete descriptions of each command by typing the following at the PC NetLink command prompt:

```
man name-of-command
```

TABLE 2-1 Solaris Commands for PC NetLink Administration

PC NetLink Command	Description
`acladm`	Creates, checks, prunes, and removes the Access Control List (ACL) database.
`blobadm`	Displays statistical information, checks, and configures well-known or specified binary large object (BLOB) files.
`chacl`	Changes access control entry associated with the specified object(s).
`delshmem`	Deletes PC NetLink shared memory.
`elfread`	Displays event logs on the local PC NetLink server at the Solaris system console.
`euctosjis`	Converts the coding of characters from Extended UNIX Code (EUC) to Shift-JIS (S-JIS) encoding.
`fixdb`	Sets the PDC name without harming the database.
`fixmemsrv`	Fixes member server group problems, adding the primary domain global groups into the local member server's local group. Run this command on the member server as root. With `-x` option, cleans up what was done by the add operation.
`getrole`	Displays the name of the local system's domain, its role within the domain, and the PDC of the domain.
`joindomain`	Moves a PC NetLink server from one domain to another.
`lmat`	Schedules commands or programs to run on a server at a specified time or date. (Note that the Solaris system `at` command also exists.)
`lmshare`	Manipulates a PC NetLink share file without server intervention.
`lmshell`	Provides the "look and feel" of an MS-DOS shell at the PC NetLink command prompt. Allows users to log in and link to other servers on the network, and to run a subset of DOS commands.
`lmstat`	Displays statistical information retrieved from the PC NetLink server's shared memory.

TABLE 2-1 Solaris Commands for PC NetLink Administration

`lsacl`	Displays acces control information associated with the specified object(s)/enumeration. The output of lsacl consists of two sections: the comments section and the ACL entries section.
`mapuname`	Maps and unmaps PC NetLink user names to and from Solaris system user names.
`netevent`	Sends administrative or user alerts.
`passwd2sam`	Adds or deletes Solaris user accounts stored in a Solaris name service (FILES, NIS, NIS+) into or from the PC NetLink Security Accounts Manager (SAM) database.
`promote`	Promotes a BDC to a PDC, and (with the -d flag) demotes a PDC to a BDC.
`regcheck`	Manipulates the PC NetLink Registry to enumerate Registry keys, dump the contents of the Registry, or to check and repair Registry files.
`regconfig`	Queries or sets PC NetLink Registry key information.
`regload`	Creates a Registry file if one does not exist. Also reinitializes the Registry to system defaults.
`rmacl`	Deletes one or more entries from the Access Control List.
`sam2passwd`	Creates a passwd file containing PC NetLink user accounts to add into a Solaris name service (FILES, NIS, NIS+).
`samcheck`	Checks or fixes the SAM database, or dumps the change log, built-in, account, or local security authority (LSA) databases.
`setdomainname`	Changes the domain name of the local PC NetLink server.
`setservername`	Changes the name of the local PC NetLink server.
`sjistoeuc`	Converts the coding of characters from Shift-JIS (S-JIS) to Extended UNIX Code (EUC) encoding.
`srvconfig`	Displays or modifies PC NetLink configuration information stored in the `lanman.ini` file.
`winsadm`	Configures the Windows Internet Name Service (WINS).

About the `net` Command

You can perform many PC NetLink administrative tasks by using the `net` command with any of its various options at the PC NetLink command prompt. Complete descriptions of the `net` command options are in TABLE 2-3 on page 23.

The following sections summarize the `net` command and its options that are available from the PC NetLink prompt, and describe syntax and usage conventions.

Administering Local and Remote Servers

When you administer a server while you are working at the server command prompt, that server is called the *local* server. If you are administering a server from the command prompt of another server, the server being administered is called the *remote* server.

Some of your network client computer users may be designated as *account operators*, *print operators*, or *server operators*. These users have limited administrative or operator privileges that enable them to perform specific tasks. These privileges are sufficient to use the `net` command to administer a local server at the PC NetLink command prompt.

However, to use the `net` command to administer a *remote* PC NetLink server, you must be logged in to the PC NetLink server as an administrator with full administrative privileges. If you have different operators responsible for parts of your network and you do not want to assign them full administrative privileges, then they must work *only* at the PC NetLink command prompt of the server being administered.

▼ How to Administer a Local PC NetLink Server

To administer a local PC NetLink server using the `net` command:

1. **Log in to the Solaris system that is running the PC NetLink software.**

2. **At the Solaris system prompt, log in to the network as Windows NT administrator or as a user with Windows NT administrative privileges by typing the following command:**

   `net logon` *username password*

3. **Enter the appropriate `net` command.**

   See a complete listing of `net` command options in the section, "PC NetLink `net` Command Options" on page 23.

Note – Remember to log off when you are finished administering the PC NetLink server by entering the `net logoff` command.

▼ How to Administer a Remote PC NetLink Server

To perform server administrative tasks using the `net` command remotely, use the `net admin` command and the appropriate `net` command for the task. (Note that Step 2 of the following procedure describes two ways of entering the `net admin` command.)

To enter a `net` command remotely:

1. **Log in to the network as Administrator or as a user with administrative privileges. (Operator privileges are not sufficient to perform this procedure.)**

2. **Enter the `net admin` command using one of the following methods:**

   - Enter a separate `net admin` command for each `net` command you want to execute. For example, to display statistics for a server named `account`, type the following:

```
net admin \\account /command net statistics server
```

This method is useful for batch files.

   - Enter a `net admin` command followed by multiple `net` commands. For example, to execute multiple `net` commands on a server named `payroll`, type the following:

```
net admin \\payroll /command
```

This creates an *administrative command shell* from which you subsequently can issue `net` commands. The prompt changes to include the name of the server you are remotely administering; for example, \\`payroll`.

Any `net` command that you type at this prompt is executed on the server that you specify. For example, at the prompt, type:

```
[\\payroll] net share
```

```
[\\payroll] net print
```

where `\\payroll` is the prompt, and `net share` and `net print` are the commands.

3. **To exit the command shell and return to the system prompt, type `exit` or press CTRL+Z.**

Note – You can use `net` commands that take a domain or computer name as an option for administering remote servers. This type of administration can be performed directly at the Solaris system command prompt without using the `net admin` command. For example, to display local groups on a remote domain named `market_dom`, you would type: `net localgroup /domain:market_dom`

▼ How to Use PC NetLink Commands on a Windows Client

1. **From the Start menu, choose Run.**

2. **Enter the following:**

   `telnet` *pc-netlink-servername*

   where *pc-netlink-servername* is the actual host name of the PC NetLink system. For example, if you want to run PC NetLink commands from a Windows client PC and you have a PC NetLink PDC named “godot,” you would enter:

   ```
   telnet godot
   ```

   When the telnet connection is made, you can run any PC NetLink command from the client PC.

Paging Through Screens

Some displays provide more than one screen full of information. For example, the following command provides several screens of information on the `net share` command:

```
net help share /options
```

To display information one screen at a time, use the `more` command; for example:

```
net help share /options | more
```

After you have examined one screen of information and are ready to proceed, press the Spacebar to display the next screen of text.

Using Passwords With Commands

Some commands require a password as an option. You can provide a password as a command option by typing the password on the same line as the command itself. For example, to log on to the network with the user name `jim` and the password `kahuna`, you would type:

```
net logon jim kahuna
```

If you don't supply either the user name, the password, or both when you log on, the PC NetLink server will prompt you for the information.

For example, assume that you wanted to use the same resource described above, and typed only the user name:

```
net logon jim
```

The PC NetLink software then displays the following message:

```
Type your password:
```

When you enter a password at this prompt, the password does not appear on the screen as you type. This allows you to keep your password confidential, providing added security.

If you forget to type a password with a command that requires one, the PC NetLink software prompts you for it. Depending on the command that you type, the PC NetLink software also may prompt you for other pertinent information, such as your user name.

Using Command Confirmation

Some `net` commands require confirmation. The `/yes` and `/no` options help expedite `net` commands. When PC NetLink software reads one of these options, it does not pause to display the corresponding prompt. Instead, it accepts the `/yes` or `/no` option as your response to the prompt.

You can use `net` commands with `/yes` (`/y`) and `/no` (`/n`) options to create batch files and shell scripts that are not interrupted by PC NetLink prompts.

For example, if you use the `net logoff` command to log off the local area network with connections to remote shared resources intact, PC NetLink software displays a prompt similar to the following:

```
You have the following remote connections:

LPT1

Continuing will cancel the connections.
```

```
Do you want to continue this operation? (Y/N)  [Y]:
```

You can use the `/yes` and `/no` options with any `net` command to anticipate and respond to a prompt. For example, you are not prompted for confirmation when you type the following:

```
net logoff /yes
```

Using Abbreviations

The command reference pages in this chapter always use the full command names, command options, and service names. However, PC NetLink software recognizes abbreviations.

You can abbreviate any command option by typing enough letters to distinguish it from other command options. For example, the following is the syntax for the `net accounts` command:

`net accounts [/forcelogoff:`{*minutes*`|no` }`] [/minpwlen:`*length*`]`
`[/maxpwage:`{*days*`|unlimited`}`][/minpwage:`*days*`] [/uniquepw:`*number*`]`

You can abbreviate the options, as illustrated in the following example:

```
net accounts /f:10 /minpwl:6 /ma:unlimited /minpwa:7 /u:3
```

You cannot abbreviate option values (for example, the `unlimited` option value for `/maxpwage`).

Using Special Characters With Commands

Some of the names or passwords that you need to enter may contain one or more special characters; for example, an ampersand (&). When you are at the Solaris system command prompt typing a name with a special character in a PC NetLink command, you must use an escape character (the backslash [\ ]) before each special character. If you are at a client computer, you can surround the string containing the special characters in double quotation marks.

For example, to log in with the user name `marksp` and the password `mrkt&dev` from the system command prompt, you would type the following:

```
net logon marksp mrkt\&dev
```

Some commonly used Solaris system special characters include the following: asterisk (`*`); semicolon (`;`); pipe (`|`); square brackets (`[ ]`); parentheses [`( )`]; question mark (?); ampersand (&); caret (^); backslash (\); greater-than and less-than signs (< >); blank ( ) and the “at” sign (@).

There are other Solaris special characters that you may encounter. For more information on special characters, consult your Solaris system documentation.

Typing Path Names With Solaris `net` Commands

The Solaris operating system uses a forward slash to separate names in a path. This is different from client computers, which use backslashes. Note, however, that the great majority of commands *will work* with either forward or backward slashes.

When typing path names at a Solaris system command prompt, you can use any of the following methods:

- *Single forward slashes* – Separate each element of the path with single forward slashes, like this:

```
net share tmpshare=c:/tmp /us:10 /r:"Share for temporary use"
```

- *Double backslashes* – Separate each element of the path with double backslashes, like this:

```
net share tmpshare=c:\\tmp /us:10 /r:"Share for temporary use"
```

- *Single quotation marks* – Separate each element of the path with single backslashes and surround the whole path in single quotation marks, like this:

```
net share 'tmpshare=c:\tmp' r:"Share for temporary use"
```

When including spaces in values, you may want to enclose the value in double quotation marks. For example, to change the comment for the `domain guests` group, you would type the following command:

```
net group "domain guests" /comment: "All domain guests"
```

Typing Path Names at Client Computers

Client computer operating systems, such as Windows 95 and Windows NT, use backslashes to separate names in paths. For example:

```
net use f: \\product\data
```

Understanding Command Syntax

Directions in man pages for using PC NetLink commands will be easier to understand and use if you keep the following concepts in mind:

- When an option is enclosed in braces ({}), the option is a required item in the syntax statement. For example, {yes|no} indicates that you must specify yes or no when using the command.
- When an option is enclosed in brackets ([ ]), it is an optional item in the syntax statement. For example, [*password*] indicates that a password may be used with the command, if desired.
- When a vertical bar (|) separates items within braces or brackets, only one of the options must be used. For example, {/hold | /release | /delete} indicates that only one of the three options must be used.
- When an ellipsis (...) appears in a syntax statement, it indicates that you can repeat the previous item(s). For example, /route: *devicename* [, ...] indicates that you can specify more than one device, putting a comma between the device names.
- Be sure to type slashes (/), backslashes (\), commas (,), double quotation marks (" "), equal signs (=), colons (:), semicolons (;), and asterisks (*) as they are shown.
- Replace the pound sign (#) with a number.
- When you finish typing a command, press Enter (or Return). If you are typing a long command string, do not press Enter when your cursor gets to the edge of your screen; the cursor will “wrap around” and continue on the next line of your screen. Press Enter only after you finish typing the entire command string.

Getting Help on net Commands

Online help is available for all of the net commands that you can enter at the server command prompt. It provides command parameters, syntax, details about a command, and examples of the command in use.

To obtain information about a net command option, type one of the following commands at the PC NetLink system prompt.

TABLE 2-2 Help on net Commands

Command	Description
net help	Names of available net commands.
net help *command*	Description, syntax, and options for net commands.

TABLE 2-2 Help on `net` Commands

`net` *command* `/help`	Description, syntax, and options for `net` commands.
`net` *command* `/?`	Syntax only for `net` commands.
`net help` *command* `/options`	Detailed description of the options of the command you selected.

PC NetLink `net` Command Options

The following table includes descriptions of the PC NetLink `net` command options that are available at the PC NetLink command prompt.

TABLE 2-3 PC NetLink `net` Command Options

Command	Descriptions
`net access`	Displays or modifies resource permissions on servers. Use this command only for displaying and modifying permissions on pipes and printer queues. Use `net perms` for managing permissions on all other types of resources.
`net accounts`	Displays the role of servers in a domain and displays or modifies password and login user requirements.
`net admin`	Runs a PC NetLink command or starts a command processor on a remote server. Usage note: In a situation in which a trust relationship does not exist between two domains, the logon (and user) authentication is done by the *remote* server for all the operations you perform on the remote server. For thisreason, you must specify the remote server's administrator password when you use the `net admin` command to connect to it. However, once you have established a trust between the two domains, then the *`trusted`* domain is responsible for the logon and user authentication on behalf of the trusting domain. Thus, to set up a connection from the console of a trusted domain server to a trusting domain server, the logon password you use should be of the *local* domain administrator rather than that of the remote domain administrator. (You can ignore the password field if you have logged on to the local domain.)
`net auditing`	Displays and modifies the auditing settings of a resource.
`net browser`	Displays the list of domains that are visible from a local server or the list of computers that are active in a domain.
`net computer`	Displays or modifies the list of computer accounts in a domain. You can also enter this command as: `net computers`

TABLE 2-3 PC NetLink `net` Command Options

Command	Descriptions
`net config`	Displays the controllable services that are running.
`net config server`	Displays or changes settings for the server service while it is running.
`net continue`	Reactivates suspended services when typed at a server, and reactivates shared printers that have been disabled by `net pause` when typed at a client computer.
`net device`	Displays or modifies resource permissions on servers. Use this command only for displaying and modifying permissions on pipes and printer queues. Use `net perms` for managing permissions on all other types of resources.
`net file`	Displays the names of all open shared files and the number of file locks, if any, on each file. You can also use this command to close shared files. When used without options, this command lists all of the open files at a server. You can also type this command as `net files`.
`net group`	Adds, displays, or modifies global groups. You can also enter this command as: `net groups`.
`net help`	Provides lists of network commands and topics for which you can get help, or provides help for a specific *command* or *topic*.
`net helpmsg`	Provides help for a network error message.
`net localgroup`	Adds, displays, or modifies local groups in domains. You can also type this command as `net localgroups`.
`net logoff`	Logs off a user name from the network.
`net logon`	Logs in a user name to the server and sets the user name and password for the user's client. If you do not specify a user name with this command, the default user name will be your Solaris system login name.
`net password`	Changes the password for a user account on a server or in a domain.
`net pause`	Suspends services or disables printers at a server. (Note: After you have followed the instructions in Chapter 4 of this guide to set up your Solaris printer, establish it as a PC NetLink shared printer, and make it available to your Microsoft Windows clients, do *not* use the `net pause` command as a method to pause the print queue. That command is interpreted by PC NetLink software as a command to disable the printer rather than merely to pause the queue. Instead, to pause the queue by way of the command line, use the `net print /hold` command.)

TABLE 2-3 PC NetLink `net` Command Options

Command	Descriptions
`net perms`	Displays or modifies resource permissions and ownership information on servers. The resources on which this command currently operates are shares, directories, and files.
`net print`	Displays or controls print jobs and printer queues; also sets or modifies options for a printer queue. (See the note in the `net pause` section.)
`net send`	Sends a message to connected client computers.
`net session`	Lists or disconnects sessions between a server and clients. When used without options, this command displays information about all of the sessions with the local server. You can also type this command as `net sessions`.
`net share`	Creates, deletes, modifies, or displays shared resources. Use this command to make a resource available to clients. When used without options, this command displays information about all of the resources being shared on the server.
`net sid`	Performs translations between account names and their corresponding security identifiers (SIDs).
`net start`	Starts a service or, if used without options, displays a list of services that are running. The services that you can start are Alerter, Computer Browser, Directory Replicator, EventLog, Net Logon, Netrun, Server, Time Source, and WINS.
`net statistics`	Displays or clears the statistics log.
`net status`	Displays a server's computer name, configuration settings, and a list of shared resources.
`net stop`	Stops a network service.
`net time`	Synchronizes the client's clock with that of a server or domain, or displays the time for a server or domain.
`net trust`	Establishes and breaks trust relationships between domains, and lists trust information for a specified domain.
`net user`	Adds, modifies, or deletes user accounts or displays user account information.
`net version`	Displays version of network software currently running on the computer at which the command is issued.
`net view`	Displays list of servers or displays resources being shared by a server.

About lanman.ini File Entries

This section lists and describes the lanman.ini file parameters that you can modify to change PC NetLink system configuration and performance. (Other configuration values are stored in the PC NetLink Registry, as well; see Appendix A, "PC NetLink Registry" on page 187.) The configuration values within the lanman.ini file are vital to the proper operation of the PC NetLink program, and editing this file is a task that should be performed *only by experienced administrators*.

When PC NetLink software is first installed, the lanman.ini file (/etc/opt/lanman/lanman.ini) contains some default parameter values. Other parameters and the titles of the sections in which they reside are added whenever you change the PC NetLink configuration. Only parameters that have been changed to values other than their default values are added to the lanman.ini file. If a parameter does not appear in the file (or is commented out with a semicolon), it is set to its default value.

Before attempting to change any of the parameters available in the lanman.ini file, it is useful to understand the relationship between the lanman.ini file entries and server defaults.

Every server parameter has a default setting. To display and edit default settings, a utility program called srvconfig is provided in the /opt/lanman/sbin directory.

You can edit the lanman.ini file to set parameters to values other than the defaults. The value assigned to any parameter in the lanman.ini file always supersedes the default value for that parameter. Note that no changes will actually take effect until you have stopped and then restarted the server.

When you want to set the value of a parameter to something other than the default by directly editing the lanman.ini file, locate (or add) the appropriate section title in the file, and then add the desired *parameter*=*value* entry.

File Syntax

Within each section of the lanman.ini file, parameters are listed as follows:

- The name of each parameter is at the beginning of a line, followed by an equal sign and the value assigned to it: *parameter*=*value*.
- Comments start with a semicolon (;). If a semicolon precedes a parameter on the line, that parameter is ignored.

- When a list of values is assigned to a parameter, the values are separated by commas: *parameter=value,value,value*, ... (There are some exceptions to this rule, which are noted in the description of the appropriate parameters.)
- When a value consists of a path, the path may be absolute, starting with a forward slash (`/`). If a path does not start with `/`, it is assumed to be relative to the `lanman` directory.
- If a numeric value begins with 0 (the numeral), it is octal; if it begins with an “X,” it is hexadecimal; if it begins with a numeral from 1 to 9, it is decimal.
- When a parameter has no assigned value (nothing to the right of the equal sign), the value is 0 for a parameter that requires a number and null for a parameter that requires a character string.
- A null value is not valid for all parameters.

▼ How to Change a `lanman.ini` File Parameter

1. **Use the `srvconfig` command to display default settings for the server parameters:**

```
/opt/lanman/sbin/srvconfig -p | more
```

2. **Edit the `lanman.ini` file using vi or a similar text editor.**

   The file is in the `/etc/opt/lanman` directory. You may have to add a section heading to the file; for example [`lmxserver`]. You then need to add a *parameter*=*value* pair to the appropriate section of the `lanman.ini` file. (See the section, “About `lanman.ini` File Entries” on page 26.)

3. **Stop and restart the server for the new values to take effect.**

For more information about the `srvconfig` command, type `man srvconfig` at the PC NetLink command prompt.

File Parameters

The following tables describe the configurable parameters in the `lanman.ini` file. The parameters are grouped according to the section of the `lanman.ini` file in which they reside.

The lanman.ini file contains additional parameters that are not included in the following tables. These parameters are for debugging purposes and you should not modify them.

TABLE 2-4 [Lmxserver] Section Parameters

Parameter	Description, Values, and Default Setting
anncmailslot	The name of the mail slot used for periodic server announcements. Values: A path up to a maximum of 256 characters. Default: \\*\MAILSLOT\LANMAN Note that backslashes must be doubled on input or else the entire input line must be enclosed in single quotation marks. (Type *text*\\text or '*text**text*' to enter text with a single backslash.)
appsources	The names of the modules that can write to the application log. Default: The server initializes the value of this parameter at startup.
country	The country code for server-generated messages. Default is 001. Other values: Asia—099; Australia—061; Belgium—032; Canada—002; Denmark—045; Finland—358; France—033; Germany—049; Italy—039; Japan—081; Latin America—003; Netherlands—031; Norway—047; Portugal—351; Spain—034; Sweden—046; Switzerland—041; United Kingdon—044; United States—001
dll_dir	The path to the directory containing message text files used by PC NetLink Solaris system commands. Default: /opt/lanman/shares/asu/system32
lang	Defines the character set that PC NetLink software uses for processing client requests. Default: en_US
listenextension	The extension that the Solaris system Listener program, by default, applies to the name of the server computer. This parameter is ignored if the listenname parameter in the [server] section is used. Values: 0-13 characters and a null value are acceptable. Default: .SERVE
listennamechk	If set to yes, it forces any name specified with the listenname parameter to be different than the Solaris machine name or the Solaris machine name with a .serve extension in order to avoid name conflicts with the Solaris Listener. Default: Vendor specific
lmaddonpath	The directory for dynamic libraries bound into the server program and called at various times during server execution, as described in the /usr/include/lmx/lmaddon.h header file. The server looks for these dynamic libraries on startup. Values: A path up to a maximum of 256 characters. Default: /opt/lanman/lib/addon/lmaddon

TABLE 2-4 [Lmxserver] Section Parameters

Parameter	Description, Values, and Default Setting
lmgetmsg_path	Search order for message text files used by PC NetLink. Default: netmsg.dll, kernel32.dll, locallspl.dll, asumsg.dll
lptmpdir	The location of the spooling directory for temporary files used by the Solaris system's LP (printer) subsystem. Default: /var/spool/lp/tmp/*uname* where *uname* is the server's Solaris system name. (This is not changeable by users.)
mapaclblob	Configures whether to use memory-mapped file operations when accessing the PC NetLink Access Control List database. Values: yes, no. Default: yes
mapchangelogblob	Configures whether to use memory-mapped file operations when accessing the PC NetLink Change Log database. Values: yes, no. Default: no
maplsablob	Configures whether to use memory-mapped file operations when accessing the PC NetLink Local Security Authority database. Values: yes, no. Default: no
mapregistryblob	Configures whether to use memory-mapped file operations when accessing the PC NetLink Registry database. Values: yes, no. Default: no
mapsamblob	Configures whether to use memory-mapped file operations when accessing the PC NetLink Security Accounts Manager database. Values: yes, no. Default: no
maxfilesize	The maximum file size, in kilobytes, that the Solaris system redirector will allow a "local Solaris user" to create on a local system. Values: 100 - unlimited. Default: 2097152
msgforward	Specifies if PC NetLink software implements message forwarding between clients. Implementation of message forwarding is not recommended. Values: yes (implement forwarding) or no (do not implement forwarding). Default: no
nativelm	An additional field in the session setup request/response. Default: PC NetLink
nativeos	An additional field in the session setup request/response. Default: UNIX *x.x* Generic (where *x.x* is the release number)

TABLE 2-4 [Lmxserver] Section Parameters

Parameter	Description, Values, and Default Setting
netaddonpath	The directory in which the PC NetLink program looks for dynamic libraries on startup. Dynamic libraries found in the directory are bound into the PC NetLink program and used to access the various network interfaces on the server computer. Sample source for a network interface file is located in the default directory. Values: A path up to a maximum of 256 characters. Default:/opt/lanman/lib/addon/networks
nethelpfile	The location of the help file used by the net help command (relative to /var/opt/lanman/msgfiles). Default: /opt/lanman/msgfiles/net.hlp
netmsgwait	The interval, in seconds, that the server waits for a response when it sends a message that requires one. Values: 0 - unlimited. Default: 300
network	The network device names and NetBIOS name-passing type for the network(s) the server should use. Values: Sets of four items separated by commas, each set of four separated from the next by a space. The following four items are in each set: 1. The device name for virtual circuit access. 2. The device name for datagram network access. 3. A digit identifying the NetBIOS interface convention used by the two devices above. Currently there is only one convention compiled into the server: 0 = OSI NetBIOS convention. 4. The name of the transport provider, as returned by the nlsprovider system call. (For networks not configured to accept incoming connections through the Solaris system Listener program, this can be any arbitrary string.)
prebinduxredir	Controls the name that the Solaris system net command binds when it uses the Solaris system redirector (uxredir). If this parameter is set to yes, the server pre-binds a NetBIOS name that will be used by all Solaris system net commands. Because this name is pre-bound, the net command does not need to bind its own name, and this quickens the Solaris system's net access to the server. If this parameter is set to no, then each net command will use its own unique name with somewhat slower performance resulting. Values: yes, no. Default: yes
secsources	The names of the modules that can write to the Security log. Default: The server initializes the value of this parameter at startup.

TABLE 2-4 [Lmxserver] Section Parameters

Parameter	Description, Values, and Default Setting
srvstathelpfile	The location of the help file used by the Activity Monitor. Default: /opt/lanman/msgfiles/srvstat.hlp
stacksize	The size of the stack, in bytes, for each task internal to the server. Values: 12000 - unlimited. Default: 20000
syssources	The names of the modules that can write to the System log. Default: The server initializes the value of this parameter at startup.

TABLE 2-5 [Fsi] Section Parameters

Parameter	Description, Values, and Default Setting
fsaddonpath	The location of dynamic link libraries (DLLs) that support file systems on the server. Values: A path up to a maximum of 256 characters. Default: /opt/lanman/lib/addon/fsaddon
fslibname	The subdirectory of the directory identified by fslibpath where new file systems are located. Values: A path up to a maximum of 256 characters. Default: lmfsiops.so
fslibpath	The location of new file systems on the server. Values: A path up to a maximum of 256 characters. Default: /usr/lib/fs
fsmap	File system type identifiers that map unknown file systems to known file system types. Values: a comma-separated list of mappings. Default: unknown:s5,nfs:nfs,sfs:vxfs,cdfs:vxfs
fsnosupport	Maps unknown file system to specified file system. Default: s5
remotemounts	The names of file system types that indicate remotely mounted file systems. Default: nfs

TABLE 2-6 [Workstation] Section Parameters

Parameter	Description, Values, and Default Setting
domain	The name of the domain that includes the server. Values: Any name of up to 15 characters, including letters, numbers, and the following characters: ! # $ % & ( ) - . ^ _ { } ~ ; @ ‘ Default: <*servername*>_dom

TABLE 2-7 `[Server]` Section Parameters

Parameter	Description, Values, and Default Setting
`listenname`	If set, this is the server’s name on the network. If not set, the PC NetLink system may receive client connections from the Solaris Listener on the Solaris machine name with a `.serve` extension (such as `liberty.serve`). This is implementation dependent. The Solaris system machine name can be determined by using the `uname -n` command. To change the value of the `listenname` parameter, use the `setservername` command. For more information about this command, type `man setservername` at the PC NetLink command prompt. Values: Any name of 1-15 characters, including letters, numbers, and the following characters: ! # $ % & ( ) - . ^ _ { } ~ ; @ ‘ Default: null
`maxclients`	Identifies the maximum number of simultaneous client sessions that the server must support. Default: 2000.
`srvservices`	The list of keywords for the services that start automatically when the server is started. Because services are started in the order they appear in the `srvservices` entry, you must ensure that `netlogon` appears before any services that require it. Default: `alerter`, `netlogon`, `browser`

CHAPTER **3**

Configuring and Managing PC NetLink Software

This chapter provides general background information about, and instructions for, configuring and managing your PC NetLink software. Note that the instructions in this chapter pertain only to your PC NetLink program, not to Windows NT network configuration or management.

You can accomplish most tasks in this chapter in two ways: by using the PC NetLink Server Manager tool, or by typing commands at the PC NetLink system command prompt.

Major topics covered in this chapter include:

- Logon and logoff
- Startup and shutdown
- Domain configuration and management
- Policy management
- Event monitoring

Instructions are included in this chapter for accomplishing the following tasks:

- "How to Start PC NetLink Server Manager" on page 35
- "How to Add a Server to PC NetLink Server Manager" on page 35
- "How to Log On Using PC NetLink Server Manager" on page 36
- "How to Log On From the Command Line" on page 38
- "How to Log Off Using PC NetLink Server Manager" on page 39
- "How to Log Off From the Command Line" on page 39
- "How to Start the PC NetLink Server" on page 40
- "How to Stop the PC NetLink Server" on page 41
- "How to Start the PC NetLink Server From the Command Line" on page 42
- "How to Stop the PC NetLink Server From the Command Line" on page 42
- "How to Start Individual Services" on page 42
- "How to Stop Individual Services" on page 43
- "How to Configure Startup for Individual Services" on page 45
- "How to Rename a Server" on page 49

- "How to Move a Server to Another Domain" on page 53
- "How to Promote a Server Within Its Domain" on page 59
- "How to Change Computer Browsing Policy" on page 74
- "How to Set Up File Name Mapping" on page 75
- "How to Edit NetBIOS Policy" on page 77
- "How to Configure WINS" on page 79
- "How to Start the WINS Service at the Command Line" on page 81
- "How to Secure PC NetLink Server Manager Transactions" on page 82
- "How to Tune PC NetLink for Optimum Performance" on page 83
- "How to Set PC NetLink Server Performance Alarms" on page 84
- "How to Investigate Performance Alarms" on page 89
- "How to Set Solaris File System Integration Policies" on page 90
- "How to Use UPS Power Failure Notification" on page 92
- "How to Edit User Account Mapping Policies" on page 93
- "How to Monitor Events" on page 99
- "How to Monitor Events From the Command Prompt" on page 100
- "How to View PC NetLink Information" on page 100
- "How to View Solaris Information" on page 102

About Logon and Logoff

To perform PC NetLink Solaris administrative tasks or Windows NT administrative tasks—whether from the PC NetLink console, the PC NetLink Server Manager tool, or from a remote client—you must be authorized by the server. Network resources are protected at several levels by different processes.

Depending on what type of privileges that the administrative task you want to accomplish requires, you need to log on by identifying yourself with both a special user name and a password that accompanies it. Purely PC NetLink administrative tasks, such as changing the name of a PC NetLink system, require that you log on with the Solaris "superuser" name, root. Windows NT administrative tasks, such as creating file and printer shares, also require special Windows NT administrator privileges and passwords.

Windows NT and Solaris Root Logon Privileges

To administer Windows NT data, some of your network users may be designated as *account operators*, *print operators*, or *server operators*. These users have limited Windows NT administrative or operator privileges that enable them to perform specific tasks. These privileges are sufficient to use the `net` command to administer a *local* server at the PC NetLink command prompt, as well.

However, *remote* Windows NT administrative access to a PC NetLink server is protected by additional logon security, which requires you to be a member of a specially privileged group, *Administrators*. Once you have identified yourself to the server, it checks your user name and password against the server directory database.

You can use PC NetLink Server Manager or the Solaris command line to log on to, or log off from, your PC NetLink system. To perform any administrative task, you must log on as root first, and then, in some cases, also provide your Windows NT administrator name and password. Note that using the PC NetLink command line requires you first to log on as root to the Solaris system that hosts the PC NetLink server software, and then, using your Windows NT administrator user name and password, to log on to the network with the `net` command.

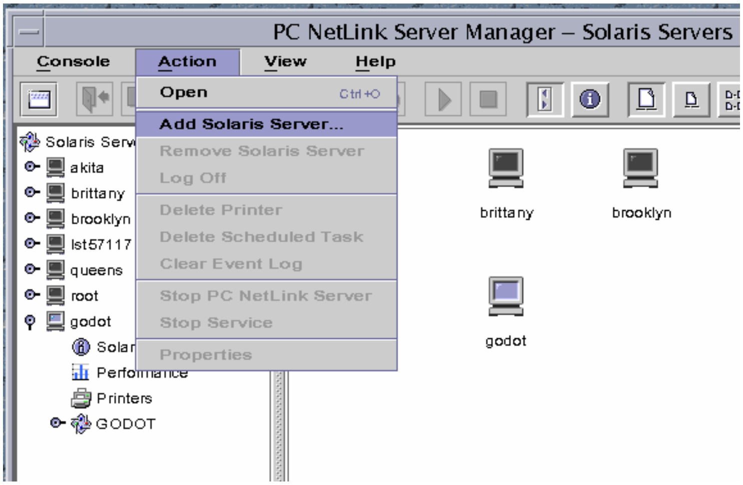
▼ How to Start PC NetLink Server Manager

- **Do one of the following, depending on the computer you are using:**
  - Using a Microsoft Windows system, double-click the PC NetLink Server Manager icon. (If you have chosen not to have icons placed on the start menu or your desktop, select the PC NetLink Server Manager folder from the Programs menu, and then double-click the icon.)
  - Using a Solaris system, enter the following at the command prompt: `/opt/lanman/sbin/slsmgr`

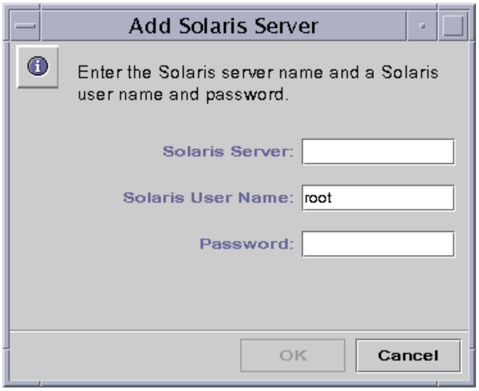
▼ How to Add a Server to PC NetLink Server Manager

1. **From the Action menu, choose Add Solaris Server.**

   (If this is the first time you started PC NetLink Server Manager, the Add Solaris Server dialog box will appear automatically, making this step unnecessary.)



The following screen appears.



Enter the Solaris server name and a Solaris user name and password.

Solaris Server:

Solaris User Name: root

Password:

2. **Type in the Solaris name of the PC NetLink system that you want to add to PC NetLink Server Manager.**

3. **Enter the root password for the system (the root user name is already entered by default), then click OK.**

   You are logged on to the specified server, which is added to the list of PC NetLink systems.

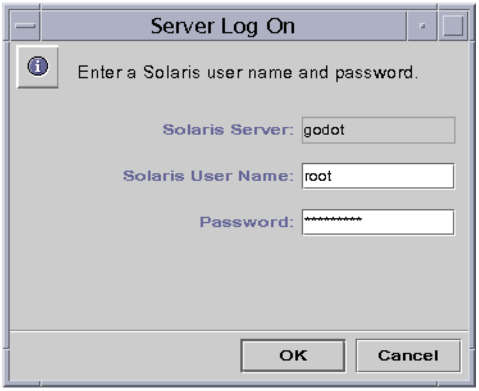
▼ How to Log On Using PC NetLink Server Manager

1. **Do one of the following:**

- In the Solaris Servers list in the Navigation pane (left side) of PC NetLink Server Manager, click the name of any PC NetLink system; or
- Double-click a system name in the Results pane (right side) of PC NetLink Server Manager; or
- Highlight a system name in the Results pane (right side) of PC NetLink Server Manager, and choose Log On from the Action menu; or
- With the mouse pointer over the icon of a PC NetLink system in the Results pane, right-click and choose Log On.

Note – The step above assumes that this is not the first time that you have run PC NetLink Server Manager. If this is the first time, then the system prompts you to add a server—a procedure that also logs you on to the system. See "How to Add a Server to PC NetLink Server Manager" on page 35.

The Server Log On dialog box appears.



Server Log On

Enter a Solaris user name and password.

Solaris Server: godot

Solaris User Name: root

Password: **********

Note – The Server Log On dialog box will also appear whenever you attempt to perform an administrative task on a PC NetLink system to which you are not logged on. To make any changes, you must log on as root.

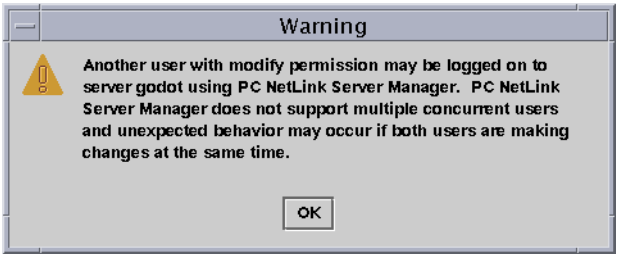
---

2. **In the text field provided, type the root password.**

   Although you can log on with a non-root user name, PC NetLink administrative functions require root privileges. A root account in a Solaris system is equivalent to an Administrators group account in a Windows NT system, with full administrative privileges. Therefore, if you log on with a user name other than root (the default), you will not be able to make any administrative changes to the system.

3. **Click OK.**

   Note that the PC NetLink program permits only one administrative user at a time to make changes. Should another user with administrative privileges be logged on when you log on, the following message is displayed.



Warning

Another user with modify permission may be logged on to server godot using PC NetLink Server Manager. PC NetLink Server Manager does not support multiple concurrent users and unexpected behavior may occur if both users are making changes at the same time.

▼ How to Log On From the Command Line

1. **At the Solaris prompt of the system that hosts the PC NetLink program, enter the following command:**

```
system% su
Password:
system#
```

2. **At the new system prompt, log on to the network as Administrator or as a user with administrative privileges by entering the following command:**

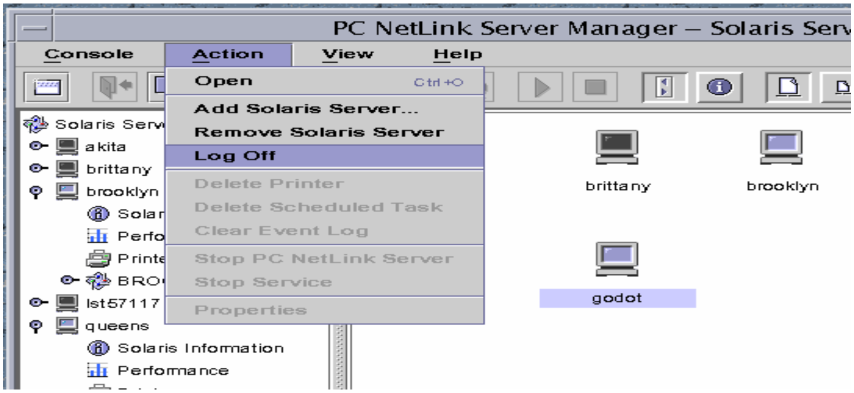
```
system# net logon username password
```

   Substitute a privileged user name for *username*, and substitute the privileged user's correct password for *password*.

Note – To perform administrative tasks on any *remote* PC NetLink system, you must be logged on as a member of the Administrators group. Operator privileges are not sufficient for remote administration.

▼ How to Log Off Using PC NetLink Server Manager

- **With the PC NetLink system name highlighted, choose Log Off from the scrolldown list in the Action menu.**



▼ How to Log Off From the Command Line

- **Enter the following command:**

```
system# net logoff
```

(If you are root, type **exit** to return to your usual user name.)

About Starting and Stopping Services

The PC NetLink program provides the following Windows NT services:

- Alerter
- Computer Browser
- Directory Replicator
- Event Log
- Net Logon
- Netrun
- Timesource
- Windows Internet Name Service (WINS)

To perform a number of administrative tasks, you must first shut down some or all of these services, and then restart the services after performing the tasks.

In a native Windows NT environment, you use the Services command in Server Manager to start and stop each of the services available on the computer, determine whether a service starts automatically, and control some service startup parameters.

You can use the Windows NT Server Manager's Services Startup dialog box to configure when and how a service is started, and optionally, to specify the user account that the service will use to log on. By default, most services log on using a special system account. (Of the services provided with PC NetLink software, only the Directory Replicator service logs on using a specific user account.)

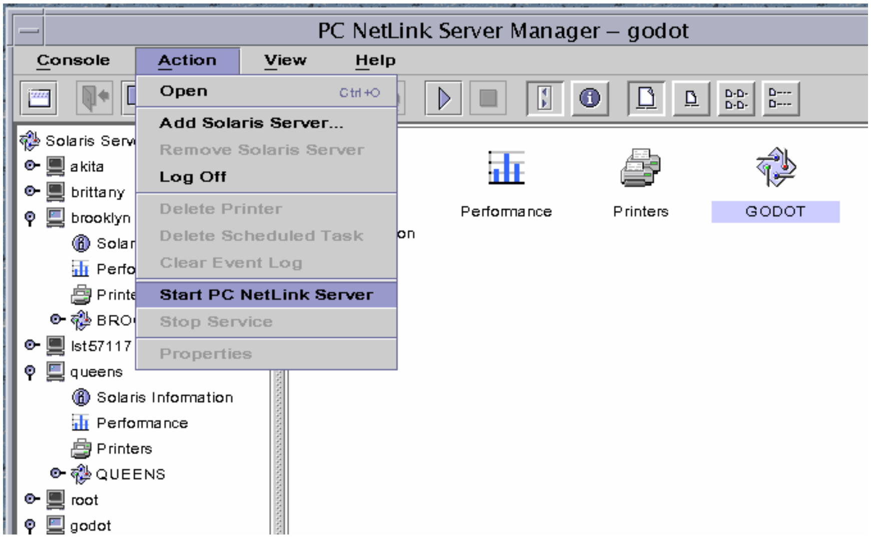
To start and stop your PC NetLink program, as well as individual services that are specifically supplied by it, you use either PC NetLink Server Manager, the PC NetLink command line, or your Windows NT Server Manager.

▼ How to Start the PC NetLink Server

1. **Using PC NetLink Server Manager, log on to the system whose PC NetLink program you want to start.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **With the name of the PC NetLink server highlighted, choose Start PC NetLink Server.**



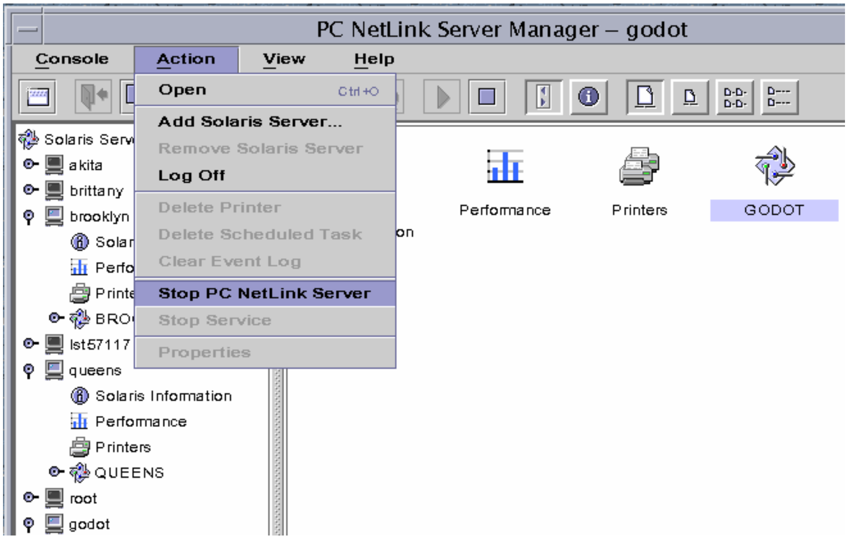
Note – PC NetLink Server Manager wizards for various administrative tasks offer you the option of having the wizard itself shut down and start up PC NetLink processes. If you choose this option when using these wizards, you don't need to start up or shut down the processes manually.

▼ How to Stop the PC NetLink Server

1. **Using PC NetLink Server Manager, log on to the system whose PC NetLink program you want to stop.**

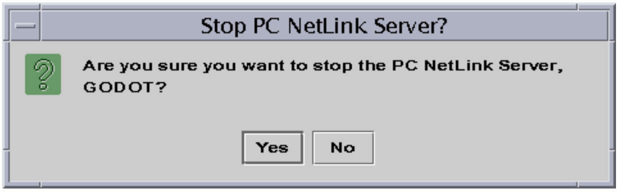
   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **With the name of the PC NetLink server highlighted, choose Stop PC NetLink Server.**



Note – PC NetLink Server Manager wizards for various administrative tasks offer you the option of having the wizard itself shut down and start up PC NetLink processes. If you choose this option when using these wizards, you don't need to start up or shut down the processes manually.

3. **Choose Yes to confirm that you want to stop the PC NetLink server, or No to cancel the operation.**



Stop PC NetLink Server?

Are you sure you want to stop the PC NetLink Server, GODOT?

▼ How to Start the PC NetLink Server From the Command Line

1. **Log on to a PC NetLink server.**

   For instructions, see "How to Log On From the Command Line" on page 38. To make any changes, you must be logged on as root.

2. **At the system prompt, type the following:**

```
system# /opt/lanman/bin/net start server
```

▼ How to Stop the PC NetLink Server From the Command Line

1. **Log on to a PC NetLink server.**

   For instructions, see "How to Log On From the Command Line" on page 38. To make any changes, you must be logged on as root.

2. **At the system prompt, type the following:**

```
system# /opt/lanman/bin/net stop server
```

▼ How to Start Individual Services

1. **Using PC NetLink Server Manager, log on to the appropriate PC NetLink server.**

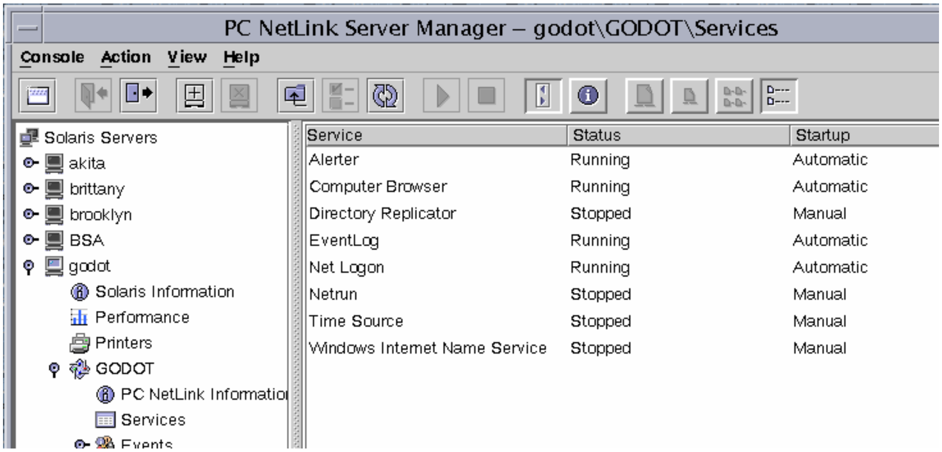
   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click the icon that represents the PC NetLink server.**

   The Results pane changes, displaying a list of six administrative categories.

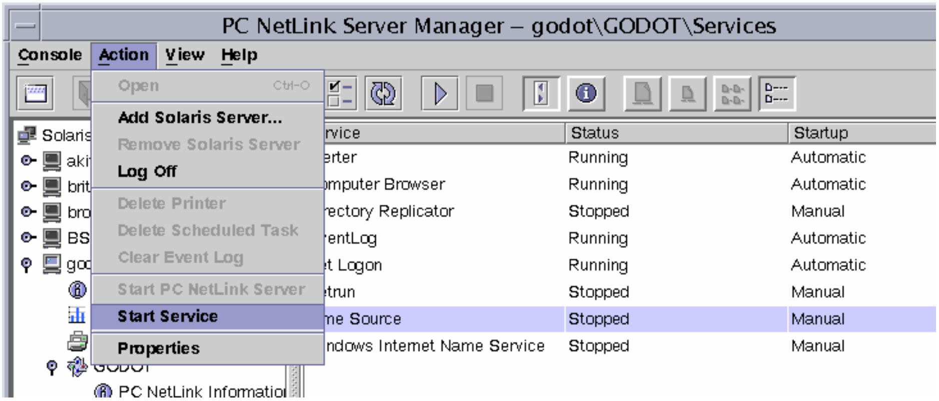
3. **Double-click the Services icon.**

   The Results pane changes, displaying a list of individual PC NetLink services, their status, and their startup method—either manual or automatic.



Service	Status	Startup
Alerter	Running	Automatic
Computer Browser	Running	Automatic
Directory Replicator	Stopped	Manual
EventLog	Running	Automatic
Net Logon	Running	Automatic
Netrun	Stopped	Manual
Time Source	Stopped	Manual
Windows Internet Name Service	Stopped	Manual

4. **Highlight the service that you want to start, then choose Start Service from the Action menu.**



rvice	Status	Startup
erter	Running	Automatic
mputer Browser	Running	Automatic
ectory Replicator	Stopped	Manual
entLog	Running	Automatic
t Logon	Running	Automatic
trun	Stopped	Manual
me Source	Stopped	Manual
ndows Internet Name Service	Stopped	Manual

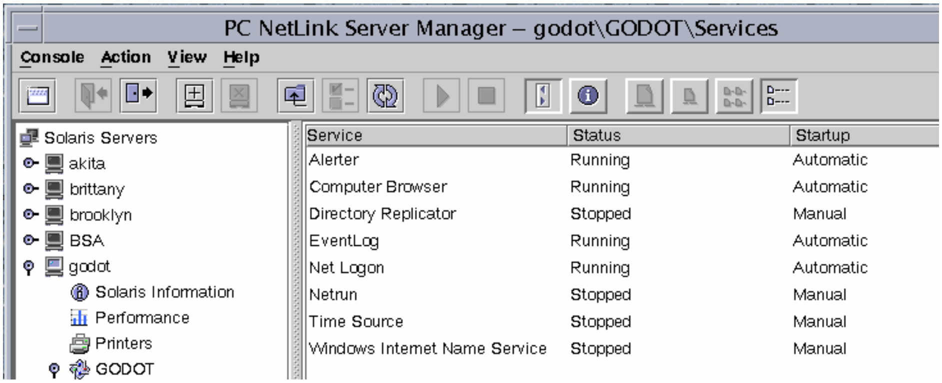
▼ How to Stop Individual Services

1. **Using PC NetLink Server Manager, log on to the appropriate PC NetLink system.**

   For instructions, see “How to Log On Using PC NetLink Server Manager” on page 36. To make any changes, you must be logged on as root.

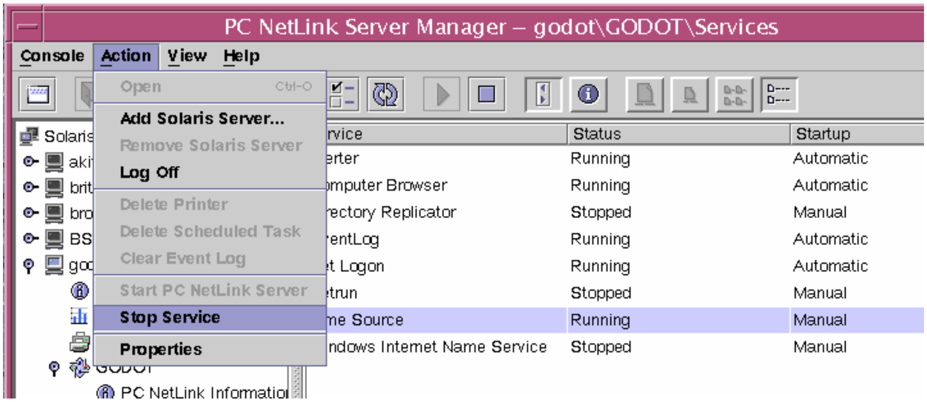
2. **In the Results pane, double-click Services.**

   The Results pane changes, displaying a list of services, their status, and their startup method—either manual or automatic.



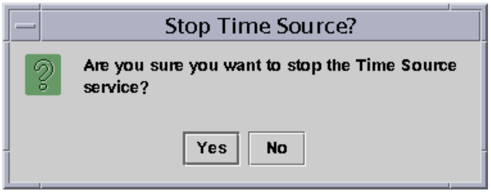
Service	Status	Startup
Alerter	Running	Automatic
Computer Browser	Running	Automatic
Directory Replicator	Stopped	Manual
EventLog	Running	Automatic
Net Logon	Running	Automatic
Netrun	Stopped	Manual
Time Source	Stopped	Manual
Windows Internet Name Service	Stopped	Manual

3. **Highlight the service that you want to stop, then choose Stop Service from the Action menu.**



rvice	Status	Startup
erter	Running	Automatic
mputer Browser	Running	Automatic
ectory Replicator	Stopped	Manual
entLog	Running	Automatic
t Logon	Running	Automatic
trun	Stopped	Manual
ne Source	Running	Manual
ndows Internet Name Service	Stopped	Manual

4. **Choose Yes to confirm that you want to stop the service, or No to cancel the operation.**



Are you sure you want to stop the Time Source service?

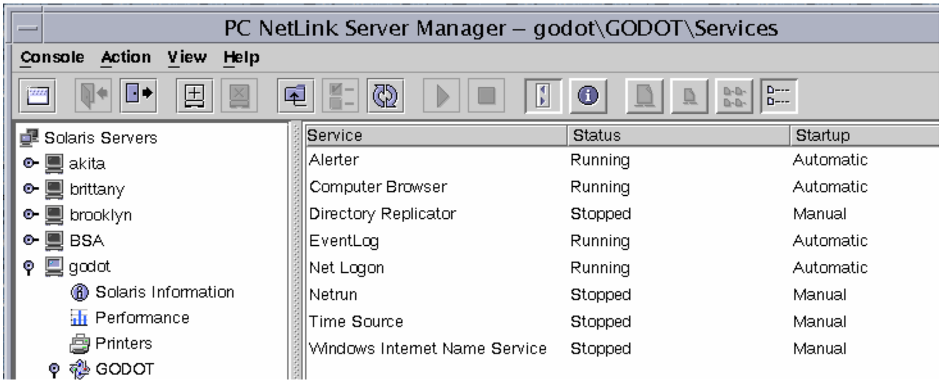
▼ How to Configure Startup for Individual Services

1. **Using PC NetLink Server Manager, log on to the appropriate PC NetLink system.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click Services.**

   The Results pane changes, displaying a list of services, their status, and their startup method—either manual or automatic.

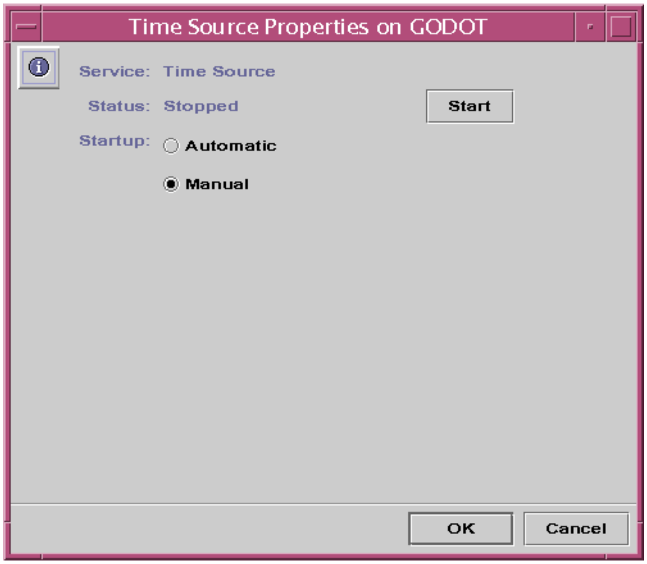


PC NetLink Server Manager – godot\GODOT\Services

Service	Status	Startup
Alerter	Running	Automatic
Computer Browser	Running	Automatic
Directory Replicator	Stopped	Manual
EventLog	Running	Automatic
Net Logon	Running	Automatic
Netrun	Stopped	Manual
Time Source	Stopped	Manual
Windows Internet Name Service	Stopped	Manual

3. **Double-click the name of the service whose startup method you want to change.**

   A screen similar to the following appears.



Time Source Properties on GODOT

Service: Time Source

Status: Stopped

Startup: ○ Automatic

● Manual

4. **Click either the Manual or the Automatic button, then click OK.**

   Automatic startup means that the service will start when you start PC NetLink.

About Domain Configuration and Management

A *domain* is a logical grouping of network servers and other computers that share common security and user account information. Within domains, you create one user account for each user. Users then log on to a domain, not to individual servers within the domain.

A domain is the administrative unit of PC NetLink directory services. The term, domain, does not refer to a single location or specific type of network configuration. Computers in a single domain can share physical proximity on a small local area network (LAN) or can be located in different corners of the world, communicating over any number of physical connections, including dial-up lines, ISDN, fiber, Ethernet, Token-Ring, frame relay, satellite, and leased lines.

Every PC NetLink system in a Windows NT network must be given one of the following roles in the domain:

- *Primary domain controller (PDC)* – A PDC distributes user account information to backup domain controllers and validates network logon requests. There can be only one primary domain controller per domain.
- *Backup domain controller (BDC)* – A BDC receives user account information from the primary domain controller and validates network logon requests. Using either the PC NetLink Server Manager or the Windows NT Server Manager tool, you can promote a BDC to primary if the primary domain controller is not accessible. Note, however, that the primary domain controller must be the first server that is installed in a domain, and it must be up and running before you install a backup domain controller.
- *Member server* – Also known as a *standalone server*, a member server is a computer that is running PC NetLink (or Windows NT) server software, but has no domain controller role whatsoever. Because a member server has no controller role within its domain, you can move it at will to any other domain or workgroup. Member servers do not participate in user logon validation; therefore, they offer more computing resources than PDCs or BDCs for acting as file and print servers, for example. If you know that you will need to move a particular server to a different domain in the future, you should install it as a member server.

If you used *Express* installation, the program installed your PC NetLink system as a *primary* domain controller in a new domain. If you used *Custom* installation, you chose the system's role. As administrator, you can change the role, the name, and the domain of the server.

Note – On first startup of the PC NetLink server, the default name of the Administrator account is the English word, "Administrator." If you are using a localized version of the PC NetLink program, you must still type the English word when you log on for the first time. "Administrator" is not translated. After you have logged on, you can then change the words as you desire.

In addition to setting up the PC NetLink system as a PDC, the Express installation defaults specify that:

- The server name is the host name of the Solaris system.
- The server domain name is *hostname*`_dom`.

You can change any of the defaults by using the instructions in the next few sections.

Note – Keep in mind that the instructions in this book are for PC NetLink systems *only*. For native Windows NT servers, you use the utilities provided in Windows NT Server Tools, Windows NT Administrative Tools, or Windows NT Server to promote and demote domain controllers; synchronize backup domain controllers with the PDC; add, remove, and rename domain controllers; and manage domain security, including account policy, audit policy, and trust relationships. Because these Windows NT tools are also effective with the PC NetLink program, it is advisable to use them for most domain configuration tasks.

Adding, Removing, Renaming, and Moving Computers Within a Domain

If you used the Express installation program, you created a new domain within your Windows NT network, which was automatically designated as a PDC. You can add other computers to the domain.

Before a computer running PC NetLink, Windows NT Server, or Windows NT Workstation software can be a domain member and participate in domain security, you must add it to the domain. When you add a computer to a domain, the PC NetLink program creates a computer account for it. If the added computer is a BDC, it requests a copy of the domain directory database from the PDC. A member server does not store copies of the database.

Adding a Domain Workstation or Server Computer

To add a computer to a domain, you must be logged on to a user account that has the appropriate user privileges. With the appropriate privileges, you can add workstations and servers to domains after installation.

To add a PC NetLink server to a domain, you can use either PC NetLink Server Manager or the `joindomain` command. You must be logged on as root; and, to reconfigure a PC NetLink server to be a BDC in an existing domain without reloading the server software, you must furnish the Windows NT password for the target domain's Administrators or Account Operators group. The PDC must be running in the domain that is being joined.

Removing a Computer From a Domain

You can remove workstations, BDCs, and member servers from a domain—but you cannot remove the PDC until you promote a BDC.

When you remove a computer running Windows NT Workstation or Windows NT Server as a member server from a domain served by a PC NetLink domain controller, use Windows NT Server Manager to delete the computer's account from the directory database so that the computer cannot participate in domain security.

After a computer account has been removed from the domain, a user of the computer must move it to a new workgroup or domain using the Network option in the Windows NT Server Manager tool.

Caution – To remove a *native* Windows NT BDC from a domain, you must delete the computer account and reinstall Windows NT Server or Windows NT Workstation on that computer, indicating the new domain. Do not continue to use a BDC that has been removed from a domain until you have reinstalled the operating environment software. For a PC NetLink BDC, however, you do *not* need to reinstall the software.

Changing the Name of a Domain or Server

You can locally change the domain name for every computer in a domain, move computers from one domain into another, or change the name of the server itself. To do so, you use either PC NetLink Server Manager (see the following procedure) or the `setdomainname` or `setservername` command at the PC NetLink command-line prompt. (For information about the commands, type `man setdomainname` or `man setservername` at the PC NetLink command prompt.)

Moving a Computer to a Different Domain

To change the domain to which a PC NetLink computer belongs, you use either PC NetLink Server Manager or the `joindomain` command locally at the system prompt. (For information about the `joindomain` command, type `man joindomain` at the PC NetLink command prompt.)

After you have moved a workstation or member server from one domain served by a PC NetLink domain controller to another by way of either the `joindomain` command or PC NetLink Server Manager, you should delete its computer account from the PDC in its former domain.

Note that while a *native* Windows NT BDC cannot change domains unless Windows NT Server is reinstalled, PC NetLink BDCs can change domains without requiring the software to be reinstalled.

▼ How to Rename a Server

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose server name you want to change.**

   For instructions, see “How to Log On Using PC NetLink Server Manager” on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click the icon that represents the PC NetLink server.**

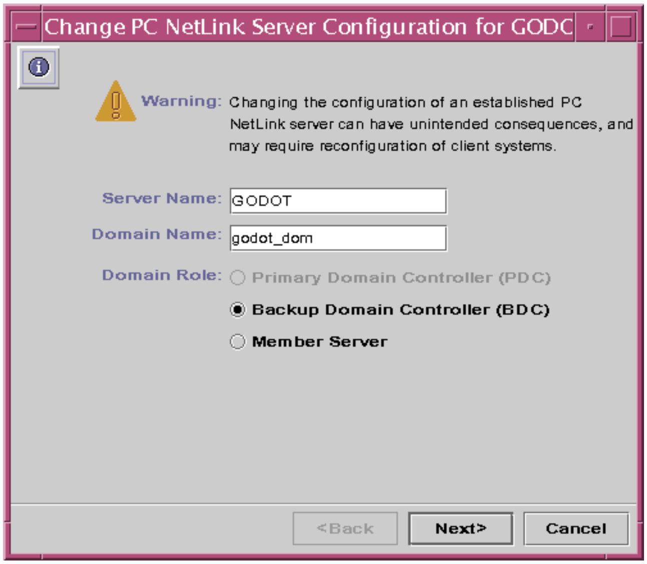
   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click PC NetLink Information.**

   The PC NetLink Server Information window appears, listing the PC NetLink system’s server name, the domain name, the system’s role within the domain, and the version of PC NetLink software that it is running. If the system is either a BDC or a member server, the name of the domain’s PDC is also listed. The State of the server can either be Running or Stopped. In the example in Step 4, the server’s name is GODOT and its role is BDC in the godot_dom domain. The domain’s PDC is the server named BSA.

4. **Click Change.**

   A screen similar to the following appears.



Change PC NetLink Server Configuration for GODC

Warning: Changing the configuration of an established PC NetLink server can have unintended consequences, and may require reconfiguration of client systems.

Server Name: GODOT

Domain Name: godot_dom

Domain Role: ○ Primary Domain Controller (PDC)

● Backup Domain Controller (BDC)

○ Member Server

   Note that this same task wizard appears when you use the alternative method of changing server configuration; that is, by double-clicking Tasks and then double-clicking Change PC NetLink Server Configuration.

5. **In the Server Name text field, type the new server name, then click Next.**

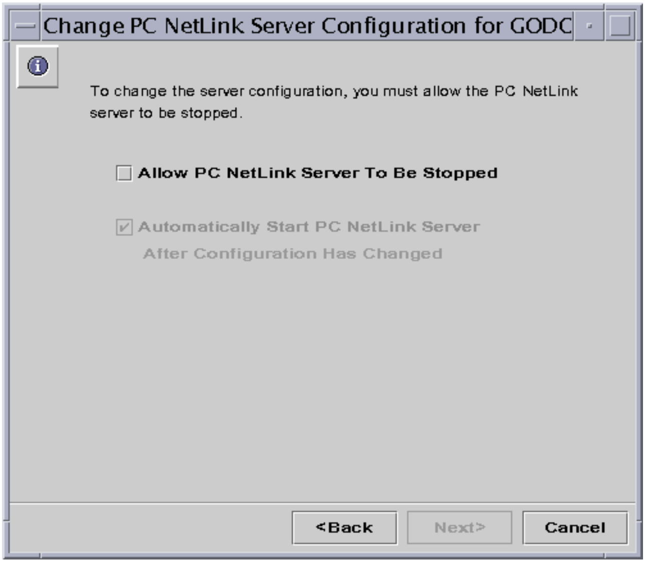
   Note that merely changing the name of a PDC does not permit you also to change its role within its current domain.

6. **Depending on the role of the server whose name you are changing, do one of the following:**

   - *If you are changing the name of a PDC* – Skip to Step 8.
   - *If you are changing the server name of a BDC or member server* – You must furnish information about the domain’s PDC to add the new computer account to the directory database. Proceed to Step 7.

7. **Type the password for the domain PDC's Administrator account, and then click Next.**

   The resulting screen informs you that the PC NetLink program must be stopped and then restarted for the changes to become effective.



Change PC NetLink Server Configuration for GODC

To change the server configuration, you must allow the PC NetLink server to be stopped.

☐ Allow PC NetLink Server To Be Stopped

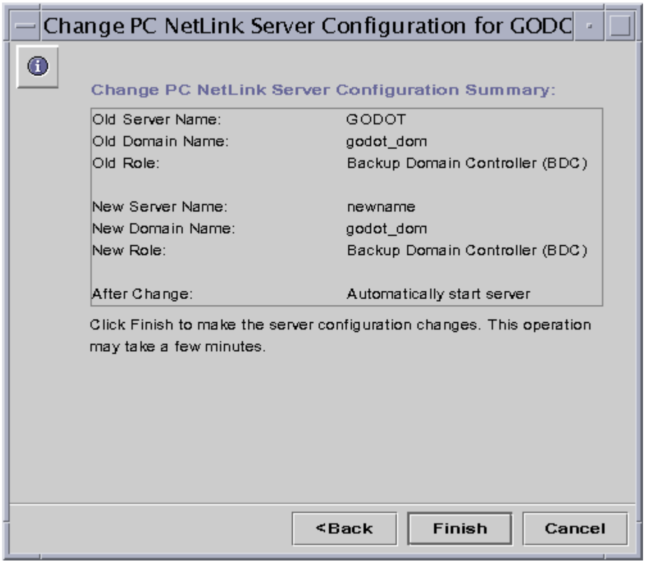
☑ Automatically Start PC NetLink Server After Configuration Has Changed

8. **Select Allow PC NetLink Server To Be Stopped.**

   You must select this to proceed. After you have selected this, you have the option of permitting the system to restart the server automatically after the completion of the configuration change. If you choose to uncheck this option, which is selected by default, you must restart the server manually to complete the configuration change.

9. **Click Next to proceed with the name change, Back to make changes, or Cancel to abandon the procedure and leave the server name and domain name unchanged.**

   If you continue the procedure by clicking Next, the resulting screen summarizes the choices you have made.



Change PC NetLink Server Configuration for GODC

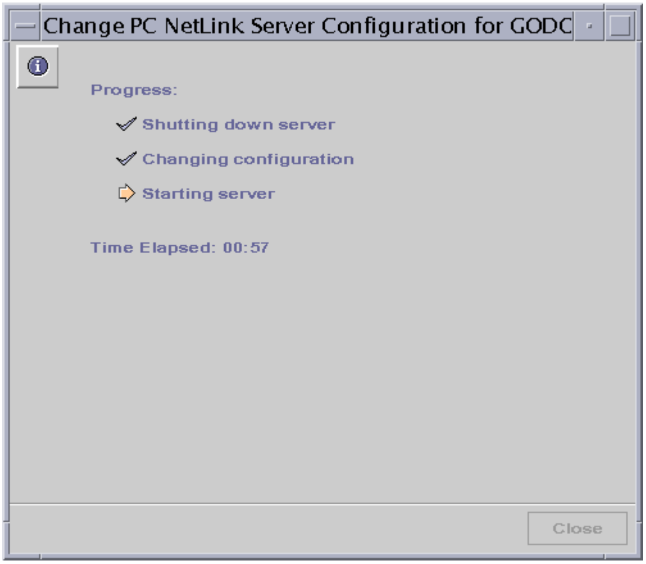
Change PC NetLink Server Configuration Summary:

Old Server Name:	GODOT
Old Domain Name:	godot_dom
Old Role:	Backup Domain Controller (BDC)
New Server Name:	newname
New Domain Name:	godot_dom
New Role:	Backup Domain Controller (BDC)
After Change:	Automatically start server

Click Finish to make the server configuration changes. This operation may take a few minutes.

10. **Click Finish to proceed with the name change, Back to make changes, or Cancel to abandon the procedure and leave the server name and domain name unchanged.**

    The resulting screen informs you of the progress of the configuration change, marking pending activity with an arrow and completed activity with a checkmark.



Change PC NetLink Server Configuration for GODC

Progress:

✓ Shutting down server

✓ Changing configuration

⇨ Starting server

Time Elapsed: 00:57

11. **(Optional) If you did *not* choose to have the PC NetLink server restarted automatically, restart it by following the instructions in "How to Start the PC NetLink Server" on page 40 or "How to Start the PC NetLink Server From the Command Line" on page 42.**

    Any changes you have made will not become effective until you restart the server.

▼ How to Move a Server to Another Domain

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose domain you want to change.**

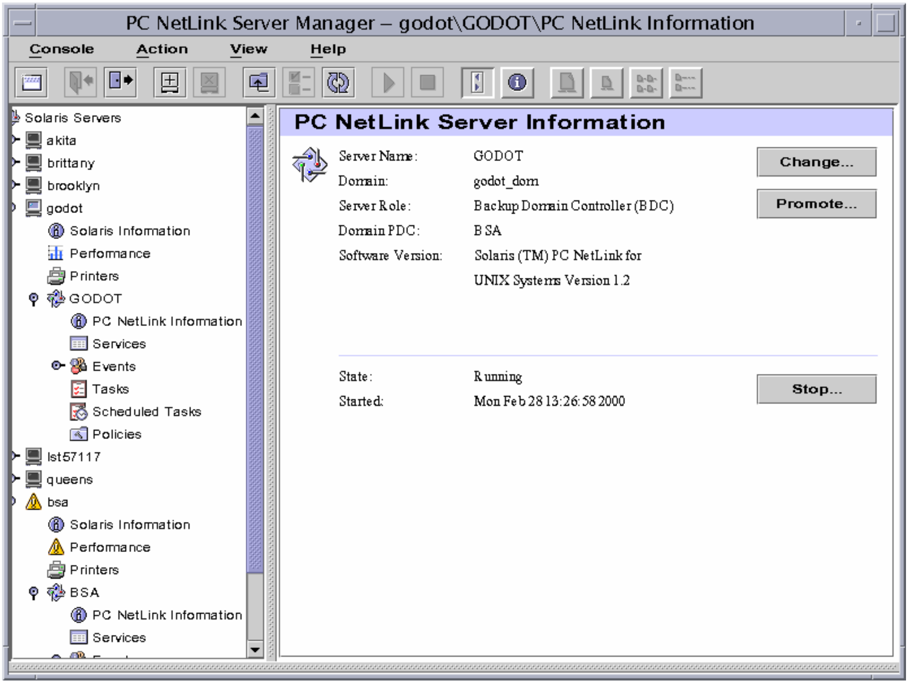
   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click PC NetLink Information.**

   The PC NetLink Server Information window appears, listing the PC NetLink system's server name, the domain name, the system's role within the domain, and the version of PC NetLink software that it is running. If the system is either a BDC or a member server, the name of the domain's PDC is also listed. The State of the server can either be Running or Stopped.



PC NetLink Server Information

Server Name: GODOT

Domain: godot_dom

Server Role: Backup Domain Controller (BDC)

Domain PDC: BSA

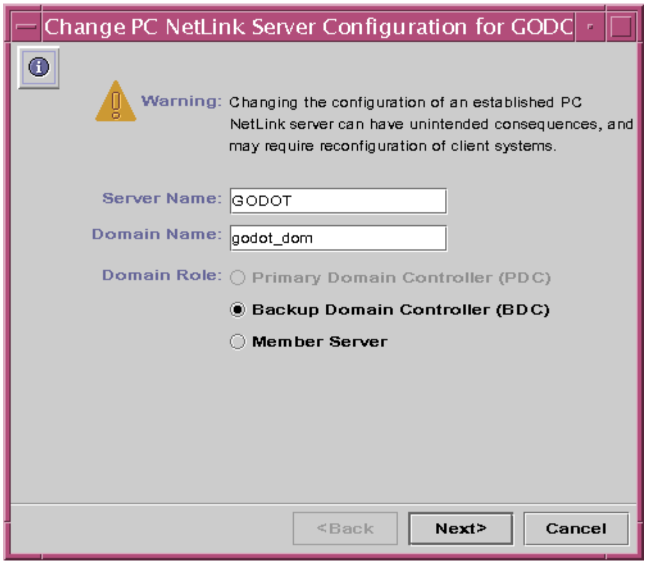
Software Version: Solaris (TM) PC NetLink for UNIX Systems Version 1.2

State: Running

Started: Mon Feb 28 13:26:58 2000

4. **Click Change.**

   A screen similar to the following appears.



Change PC NetLink Server Configuration for GODC

Warning: Changing the configuration of an established PC NetLink server can have unintended consequences, and may require reconfiguration of client systems.

Server Name: GODOT

Domain Name: godot_dom

Domain Role:
○ Primary Domain Controller (PDC)
● Backup Domain Controller (BDC)
○ Member Server

5. **In the Domain Name text field of the dialog box, change the server’s domain name according to the following guidelines:**

   - By changing the domain name of the server, you are effectively reassigning it to the domain whose name you enter.
   - By changing domains, you may also designate a new role for the server within its new domain.
   - A domain name can be up to 15 characters long and can contain any combination of characters—*other than the following exceptions*. You *cannot* use any blank space or the following 15 characters:
     ] [/ \ * : + ; < > , ? ’ = @
   - To complete a change to the name of a domain served by a PC NetLink domain controller, you must use this procedure on *every* PC NetLink server within the domain, then use the Network option in the Windows NT Control Panel to change the domain name on every Windows NT Workstation and Windows NT Server computer within the domain. For Windows 95 clients, you change the name of the Windows NT domain in the Network Properties of Microsoft Network Client. You must then reestablish existing trust relationships.

6. **Click the appropriate Domain Role button to designate the role of the server in its new domain, according to the following guidelines:**

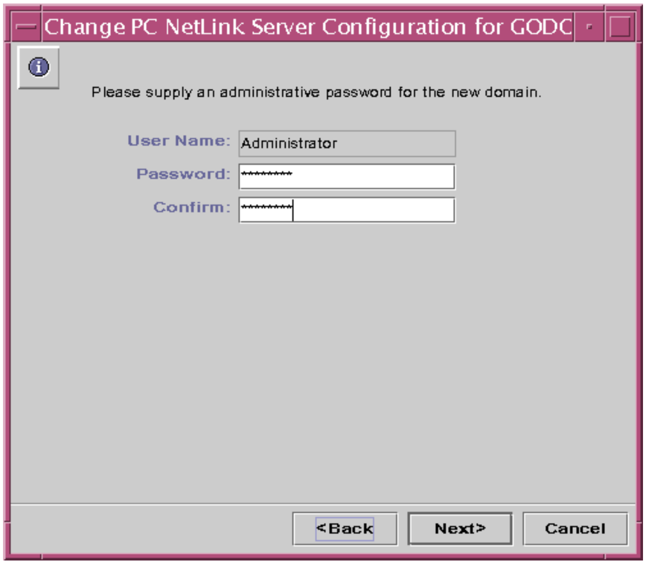
   When you change the server’s domain, you have three options: PDC, BDC, or Member Server.

- If you make the server the PDC in its new domain, you will be prompted to create a *new* password for its Administrator account.
- If you move an existing domain's PDC into a different domain, you must also promote the BDC in the existing domain to become that domain's PDC. See "How to Promote a Server Within Its Domain" on page 59.
- If you make the server either a BDC or a member server in the domain to which you are moving it, you will be prompted to specify the domain's PDC and furnish the password for that PDC's Administrator account.
- If you make the server a member server in its new domain, you will be prompted to furnish a *new* password to be used for the local administrative account on the member server.

7. Click Next.

8. Depending on the role you selected for the server in its new domain, do one of the following:

- *If PDC*, furnish the *new* password for the server's new role in both password text fields. Note that you cannot assign more than one PDC to a single domain. If you are moving an existing domain's PDC to another domain, remember to promote the existing domain's BDC to become the domain's PDC. See "How to Promote a Server Within Its Domain" on page 59.



Change PC NetLink Server Configuration for GODC

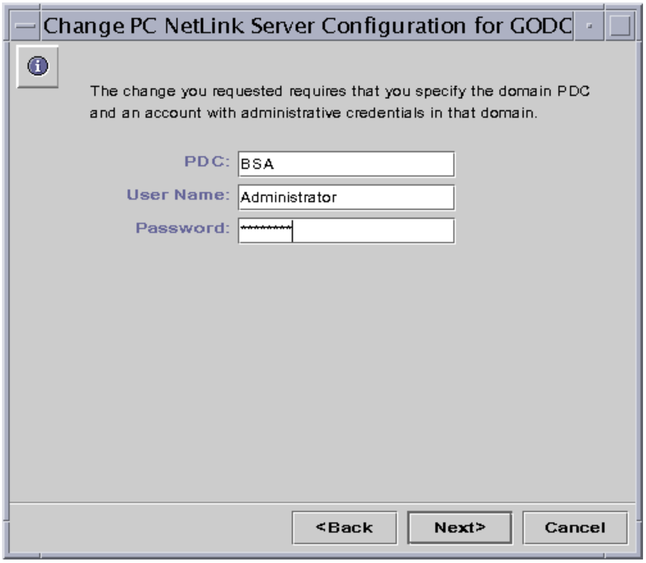
Please supply an administrative password for the new domain.

User Name: Administrator

Password: **********

Confirm: **********

- *If BDC or Member Server*, enter the Administrator account user name and password for the PDC that exists in the domain to which you are moving the server.



Change PC NetLink Server Configuration for GODC

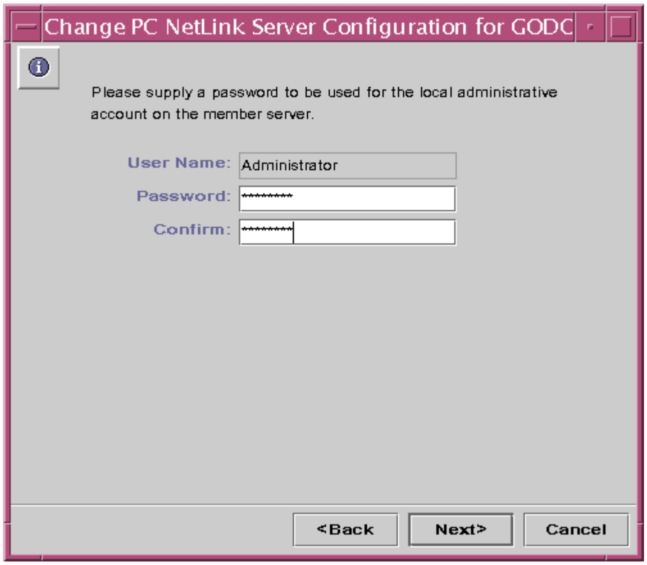
The change you requested requires that you specify the domain PDC and an account with administrative credentials in that domain.

PDC: BSA

User Name: Administrator

Password: *********

- *If Member Server*, furnish a *new* password to be used for the local administrative account on the member server.



Change PC NetLink Server Configuration for GODC

Please supply a password to be used for the local administrative account on the member server.

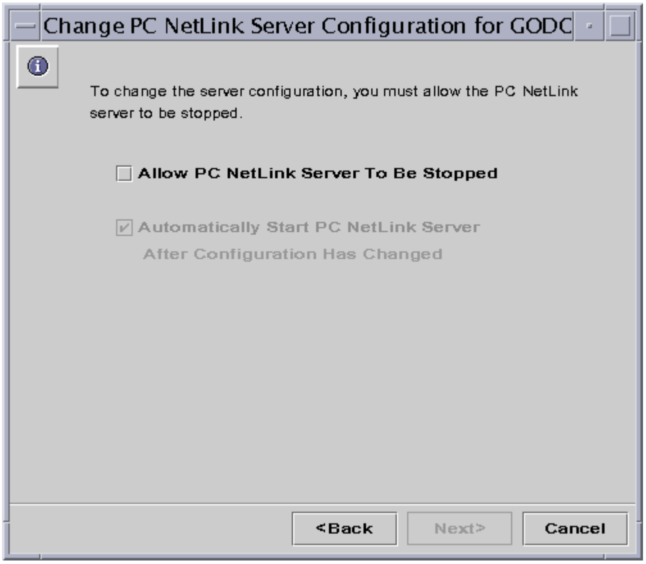
User Name: Administrator

Password: *********

Confirm: *********

9. **Click Next.**

The resulting screen informs you that the PC NetLink program must be stopped and then restarted for the changes to become effective.



Change PC NetLink Server Configuration for GODC

To change the server configuration, you must allow the PC NetLink server to be stopped.

□ Allow PC NetLink Server To Be Stopped

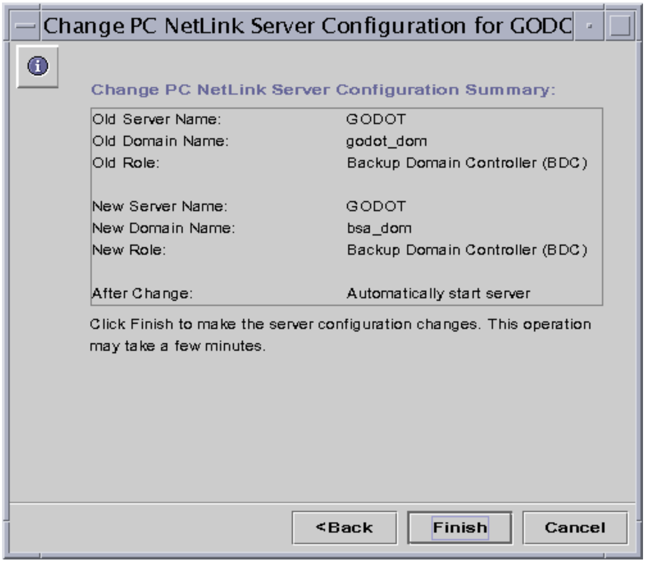
☑ Automatically Start PC NetLink Server After Configuration Has Changed

10. **Select Allow PC NetLink Server To Be Stopped.**

You must select this to proceed. After you have selected this, you have the option of permitting the system to restart the server automatically after the completion of the configuration change. If you choose to uncheck this option, which is selected by default, you must restart the server manually to complete the configuration change.

11. **Click Next to proceed with the configuration change, Back to make changes, or Cancel to abandon the procedure and leave the server configuration unchanged.**

    If you continue the procedure by clicking Next, the resulting screen summarizes the choices you have made.



Change PC NetLink Server Configuration for GODC

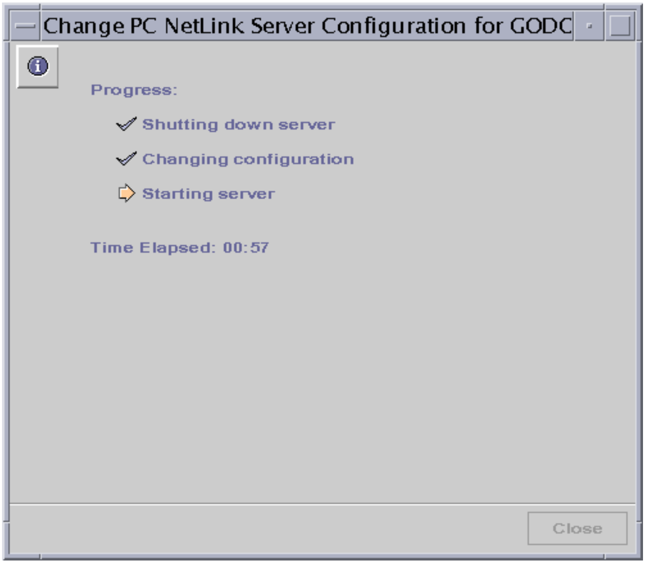
Change PC NetLink Server Configuration Summary:

Old Server Name:	GODOT
Old Domain Name:	godot_dom
Old Role:	Backup Domain Controller (BDC)
New Server Name:	GODOT
New Domain Name:	bsa_dom
New Role:	Backup Domain Controller (BDC)
After Change:	Automatically start server

Click Finish to make the server configuration changes. This operation may take a few minutes.

12. **Click Finish to proceed with the name change, Back to make changes, or Cancel to abandon the procedure and leave the configuration unchanged.**

    The resulting screen informs you of the progress of the configuration change, marking pending activity with an arrow and completed activity with a checkmark.



Change PC NetLink Server Configuration for GODC

Progress:

✓ Shutting down server

✓ Changing configuration

⇨ Starting server

Time Elapsed: 00:57

13. **(Optional) If you did *not* choose to have the PC NetLink server restarted automatically, restart it by following the instructions in "How to Start the PC NetLink Server" on page 40 or "How to Start the PC NetLink Server From the Command Line" on page 42.**

    Any changes you have made will not become effective until you restart the server.

▼ How to Promote a Server Within Its Domain

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose domain name or server name you want to change.**

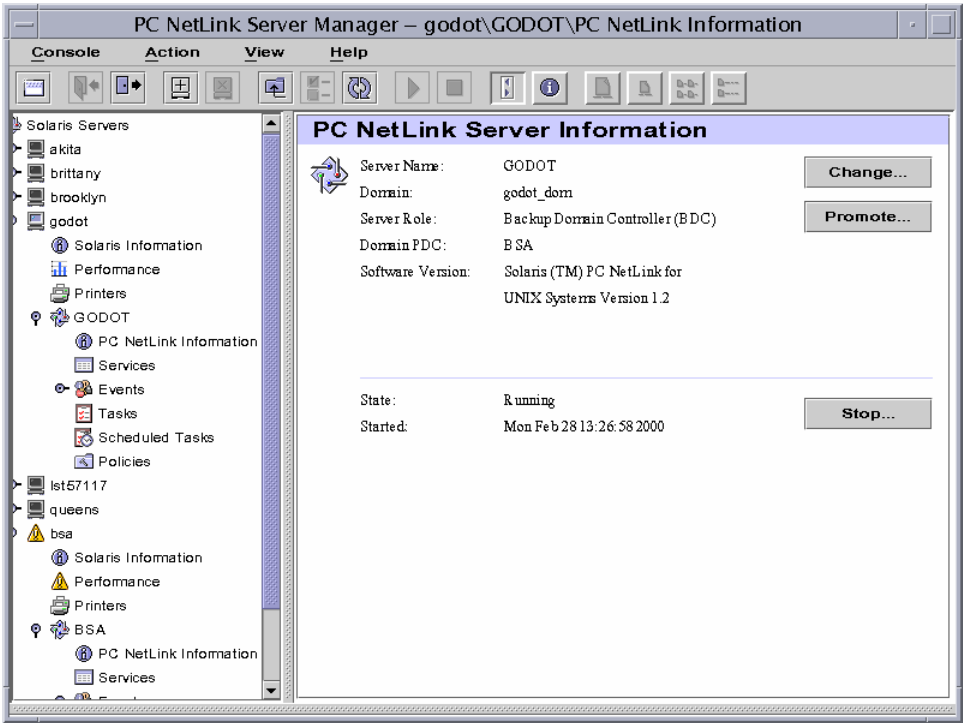
   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click PC NetLink Information.**

   The PC NetLink Server Information window appears, listing the PC NetLink system's server name, the domain name, the system's role within the domain, and the version of PC NetLink software that it is running. If the system is either a BDC or a member server, the name of the domain's PDC is also listed. The State of the server can either be Running or Stopped. In the example below, the server's name is GODOT and its role is BDC in the godot_dom domain. The domain's PDC is the server named BSA.

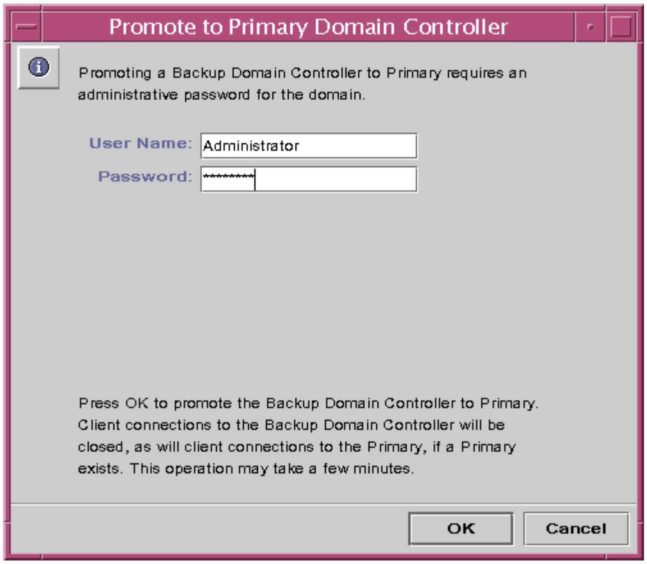


Server Name: GODOT
Domain: godot_dom
Server Role: Backup Domain Controller (BDC)
Domain PDC: BSA
Software Version: Solaris (TM) PC NetLink for UNIX Systems Version 1.2

State: Running
Started: Mon Feb 28 13:26:58 2000

4. **Click Promote.**

   The following screen appears, prompting for the password for the Administrator account on the *current* PDC.



Promoting a Backup Domain Controller to Primary requires an administrative password for the domain.

User Name: Administrator

Password: *********

Press OK to promote the Backup Domain Controller to Primary. Client connections to the Backup Domain Controller will be closed, as will client connections to the Primary, if a Primary exists. This operation may take a few minutes.

5. **Click OK to continue the promotion or Cancel to halt it.**

   If you click OK, all client connections to the BDC and the current domain's PDC will be closed while the configuration change, which takes several minutes, is being made.

About Managing Policies

You can define the following eight sets of PC NetLink policies:

- Computer browsing
- File name mapping
- NetBIOS
- PC NetLink Server Manager security
- Performance tuning
- Solaris file system integration
- UPS power failure notification
- User account mapping

The instructions in this guide for managing these policies relate to, and affect, only your PC NetLink program—not the Windows NT network itself. You continue to administer Windows NT network policies in the manner and with the tools to which you are accustomed. Windows NT policies that are not covered in this guide include:

- User password (account)
- Audit
- Trust relationships

Computer Browsing

Computer browsing is the process of checking domains, workgroups, and computers to look for shared directories and printers. Networks, domains, workgroups, computers, and shared directories are organized in a tree structure. You choose a network name to display available domains and workgroups, a domain or workgroup name to display available computers, or a computer name to display its shared directories.

A *master browser* maintains the tree-structure list and updates the *backup browsers*. Users of network client computers are viewing this list when they look at their Network Neighborhood.

Computer browsing policy in the PC NetLink program involves setting the frequency that the master browser updates its list, the frequency that a backup browser copies the list from the master browser, and the level of browsing event detail that you want to be included in the system log.

File Name Mapping

On Solaris system files and directories, you can have names of up to 255 characters, far greater than the MS-DOS operating system 8.3 standard. And, while Windows NT Workstation and Windows NT Server users will see the long Solaris file name in a PC NetLink directory, users of client computers running Windows for Workgroups—which uses the MS-DOS 8.3 name convention—would not. To ensure access to all Solaris files by all users, the PC NetLink program provides *name mapping*: each file or directory with a name that does not conform to the MS-DOS 8.3 standard automatically is given a second name that does conform.

Many Microsoft Windows 3.1 and Windows for Workgroups users connecting to the file or directory over the network see the name in the 8.3 format; Windows NT Workstation and Windows NT Server users see the long name. (Note, however, that the PC NetLink program does not generate short names for *share* names that do not conform to MS-DOS naming standards, but only for files and directories with long names. When naming a share, use the 8.3 standard to avoid potential file name conflicts.)

PC NetLink file name mapping also allows applications that do not support long file names to access files with such names. These applications refer to files that have long names by their shorter names.

Note – If an application that does not support long file names opens a file with a long name and then saves the file, the long name is lost and only the short name remains.

PC NetLink file name mapping is composed of the following three elements:

- Mixed-case support
- Mapping Solaris system file names to the 8.3 convention
- Mapping Solaris system file names containing characters that are unacceptable in Windows NT to names that are acceptable to Windows NT

The challenge of mapping between name spaces is resolved on Solaris systems by concatenating a truncated file name with a pseudo-unique suffix, which is generated dynamically from the i-node number of the Solaris system file.

File Name Mapping Rules

For mapping Solaris system file names to 8.3-type file names, the following default rules apply:

- Spaces are removed from the name.
- Periods are removed, except for the last one followed by at least one character.
- Invalid characters are replaced by underscores (_).
- The name, not including suffix, is truncated; a tilde (~) separator and a combination of numbers (0 - 9) and letters (A - Z) are appended.
- The suffix (the characters following the tilde separator) is truncated to three characters.

For example, the file name *longfilename.txt* and i-node number of 11455, would have a mapped name of *long~8u7.txt*.

For mapping from Solaris system file names to Windows NT-style file names, the following default rules apply:

- Invalid characters are replaced by underscores (_).
- A mapping separator (a tilde by default) and a combination of numbers (0 - 9) and letters (A - Z) are appended to the name, not including the extension.

- The extension is preserved.

For example, the file name *k<l<m.expression* and i-node number of 8461 would have a mapped name of *k_l_m~6j1.expression*.

Considerations for Using Mixed-Case Support

A decision on whether your server should continue to support mixed-case file names—which is the default in the PC NetLink program—should be considered carefully. Mixed-case support allows clients to have access to file names on Solaris systems that contain uppercase characters, but turning off this feature could improve server performance.

It is inadvisable to switch frequently between mixed-case support on the same server. While mixed-case support is enabled, clients can create files with mixed-case names. These files will become unavailable to them as soon as mixed-case support is disabled. If mixed-case support is changed from enabled to not enabled, every existing file name should be made lowercase.

Do not create file names that are, but for case, identical in the same directory. Although the Solaris system is case-sensitive, PC NetLink mixed-case support causes the server to preserve case but behave in a case-insensitive way, just like Windows NT. Microsoft product users are not aware of the possibility of having case-insensitive similar file names in a directory, because Windows NT does not allow such files. As a result, users may become confused if they access incorrect files or are denied access to files they need.

NetBIOS

NetBIOS, which stands for Network Basic Input/Output System, is a session-layer interface used by applications to communicate. Its logical naming system permits computers' network interfaces to establish connections, and ensures reliable data transfer between computers once the connections exist.

Lana Numbers

LAN Adapter (Lana) numbers are part of the logical naming system established by NetBIOS. PC NetLink software assigns Lana numbers automatically to each network interface, choosing a number that is unique within the particular computer.

One NetBIOS Lana can be configured for each available network interface card. You should plan ahead to choose the particular network interfaces that you want to be assigned NetBIOS Lanas.

WINS Servers

A Windows Internet Name Service (WINS) server is a machine that maintains a database of available network resources and the computers that own them. A computer seeking such a resource “asks” the WINS server to look up the address of the machine that owns the resource.

A network can have no WINS servers, or it can have any number of them. See a fuller discussion of WINS in Chapter 5, “Implementing WINS and Maintaining Databases” on page 119.

WINS and NetBIOS Nodes

By default, PC NetLink software brings up each network interface in Broadcast node (b-node). In this mode, a computer seeking a network service or resource broadcasts a general request to the network, seeking a response from the machine that owns the resource or service. Each computer receiving such a request responds with its address.

This mode has the advantage of not requiring WINS servers, but it generates a lot of network traffic. Broadcast node does not work across subnets.

WINS servers use the NetBIOS Hybrid node (h-node). In this mode, a computer seeking a network service or resource sends that request directly to a specified WINS server, which in turn looks up the address of the machine that owns the resource.

WINS Proxy

WINS proxies are useful in networks comprising several subnets, where some of the computers on those subnets are running in Broadcast node. A WINS proxy fields local requests for services located on a different subnet, caching network addresses and communicating with the WINS server when necessary.

You can also configure the NetBIOS service to use WINS servers to resolve NetBIOS names by entering the IP address of the primary and secondary WINS servers. You can configure only the primary WINS server, or both. The WINS server addresses can be the IP address of the local PC NetLink system running the WINS service, or another PC NetLink system running the WINS service, or a Windows NT server running the WINS service.

If either primary or secondary WINS servers are configured, you can use the WINS proxy setting to allow this PC NetLink system to provide WINS proxy service to other computers that have not been configured to use WINS servers to resolve NetBIOS names. Be discreet in using this option, as it joins the NetBIOS name spaces for both b-node and h-node NetBIOS nodes on the local subnet, and can cause unexpected name conflicts.

NetBIOS Scope

NetBIOS scope is a seldom-used feature that limits the computers with which a particular network device can communicate.

The chief use of scope is in wide area networks (WANs) or other large networks, where it can prevent conflicts caused by two or more network interfaces having the same NetBIOS name.

Consider a network belonging to a shoe manufacturer where two machines, both earmarked for use by sales personnel, exist on the same subnet.

One machine is used by those selling sneakers, and the other by those selling boots. If both machines had the NetBIOS name “sales,” problems would result. However, if one machine is given the scope name “sneakers” and the other “boots,” then both machines could retain the NetBIOS name “sales” without any conflict. Note however, that both machines could then only communicate with other machines possessing the same scope.

PC NetLink Server Manager Security

Another security consideration involves users’ privileges to administer the PC NetLink program by way of the PC NetLink Server Manager tool. You can choose settings that affect security on subsequent PC NetLink Server Manager sessions. Data Integrity uses public key signatures to protect data passed between the server and the client. Authentication takes place behind the scenes and involves rechecking credentials with each transaction. See “How to Secure PC NetLink Server Manager Transactions” on page 82.

Tuning PC NetLink Parameters for Maximum Performance

Tuning the performance of a complex computer system is a difficult task requiring specialized knowledge. The Performance Tuning interface of PC NetLink Server Manager (see “How to Tune PC NetLink for Optimum Performance” on page 83) lets you make some simple adjustments. You can also view ongoing performance data by way of PC NetLink Server Manager, and adjust performance thresholds that, when exceeded, generate alarms (see “How to Set PC NetLink Server Performance Alarms” on page 84).

Editing appropriate parameters in the PC NetLink Registry and the `lanman.ini` file gives you much more control over performance, but this should only be undertaken by knowledgeable persons.

Following is a cursory introduction to the concepts involved. For a full treatment of the subject, refer to *Sun Performance and Tuning*, Prentice Hall, ISBN 0130952494.

Processes and Virtual Circuits

PC NetLink software runs on a Solaris-based server and provides file and print services to PC clients. For the purposes of tuning system performance, it helps to think of PC NetLink as a collection of *processes*, each being an independent agent responsible for handling requests from one or more clients.

When a client requests a service—perhaps the opening of a file—PC NetLink software establishes a connection between the requesting client and the appropriate process. That connection is known as a *virtual circuit*.

Of the several factors that can affect performance, the two most important may be the total number of processes running on the computer and the number of virtual circuits per process.

The situation is analogous to a large telephone switchboard in the days before electronic switches replaced human operators. Each process can be thought of as an operator, with each call arriving at the switchboard being a virtual circuit.

If the number of phone calls is great, the average time it takes for the operator to respond to a specific call increases, reducing performance.

One way to prevent the operators from being bogged down is to limit the number of simultaneous calls that can arrive at the switchboard. In essence, this is what the slider does in the PC NetLink Server Manager Performance Tuning tab labeled "Speed-Memory Balance" (see page 84).

As you adjust this slider, you change two Registry parameters called `MinVCPerProc` and `MaxVCPerProc` (see "Registry Keys and Values" on page 192 in Appendix A, "PC NetLink Registry"), limiting the number of virtual circuits per process. These changes, which take effect upon restarting PC NetLink software, are dynamically reflected in the Technical Details display area.

Of course, reducing the number of virtual circuits per process may mean that you'll need more processes to handle the overall volume of client requests.

A given server can handle only so many processes. Each process requires a fixed amount of memory and computational resources. You can do serious harm to your system by pushing it to run more processes than it can accommodate. To help you prevent this, the statistic, "Maximum Processes per Server (Derived)," is shown in the Technical Details display area.

Note that the `lanman.ini` file parameter, `maxclients` (see "File Parameters" on page 27) also has a bearing on the total number of processes running on the server at any time.

Client Workload

Some applications make unusually high demands on PC NetLink for file and print services. These applications include engineering CAD programs, video server software, and benchmarking tools.

When clients run demanding applications like these, PC NetLink's responsiveness may be less than what you'd expect given the number of clients being supported. In such cases, you may need to set the Performance Tuining policy's "Speed-Memory Balance" slider further toward "Optimize for Speed" to achieve reasonable performance. See "How to Tune PC NetLink for Optimum Performance" on page 83 for details.

Solaris File System Security and Permissions

You can control the access that users have to files and directories on PC NetLink servers by securing them through *permissions*.

Every permission that you set specifies the access that a group, user, or others can have to the directory or file. For example, when you set Read permission for the group called `Coworkers` on the file `MY_IDEAS.DOC`, the users in that group can display the file's data and attributes, but they cannot edit the file or delete it.

The PC NetLink program offers the following permissions that you can set on directories and files for users, groups, and others:

- *Read (R)* – Allows individuals or groups to see the file or contents of a folder, but not to edit, delete, or execute it.

Note – In the Solaris operating environment, Read permission is far more restrictive than the similarly named permission in the Windows NT environment. In the Windows NT environment, Read permission is advisory only—a user on a Windows NT client machine would still be able to edit a nominally Read-only file. In the Solaris environment—the environment in which all PC NetLink files and directories are stored and managed—a user would be prohibited from editing a Read-only file. You can override the more restrictive Solaris permissions to become fully compatible with Windows NT-style permissions, however. See "How to Set Solaris File System Integration Policies" on page 90 for instructions.

- *Write (W)* – Allows individuals or groups to see and edit the file or contents of a folder.
- *Execute (X)* – Allows individuals or groups to run executable programs, but not to see or edit the code itself.
- *Full Access (RWX)* – Allows individuals or groups to see, edit, and run any file, directory, or executable program so designated.

- *No Access* – Denies all permission (achieved by not setting any of the above permissions).

You establish permissions on files and directories, but the permissions that you establish actually affect the computer users. The Solaris operating environment differentiates among people to whom the permissions apply:

- *User* – If you own a Solaris system file or directory, you can assign it access permissions for yourself. For example, to prevent unauthorized users from executing a program, you can assign execute permissions to yourself only.
- *Group* – This setting, in the context of the PC NetLink program, is not the same as group permissions in the Solaris operating environment. In the Solaris file system, group permissions grant to other members of your Solaris group access to files and directories that you own. In the PC NetLink environment, however, *Windows NT* groups—not Solaris groups—are created, and Solaris group permissions have no effect on them.
- *Other* – You can assign access permissions to files and directories that you own for all Solaris system users other than yourself and the users in your group. Depending on your needs, you can allow these other users to read or change your files and directories or you can prevent such access. Restricting access to others does not affect your own access to the files and directories.

Standard permissions are combinations of individual permissions that depend on the nature of the files and directories and the makeup of groups. To work effectively with PC NetLink file and directory security, keep the following points about setting permissions in mind:

- Users cannot use a directory or file unless they have been granted permission to do so or belong to a group that has permission to do so.
- Permissions are cumulative, except that setting a No Access permission—not indicating Read, Write, or Execute on a file or directory—overrides all other permissions. For example, if the `Coworkers` group has Write permission for a file while the `Finance` group has only Read permission, and John is a member of both groups, John will be granted Read and Write permissions. However, if you remove the `Finance` group's only permission for the file to effectively become No Access, John will not be able to use the file—even though he is a member of a group that has access to it.
- When you create files and subdirectories in a PC NetLink directory, they inherit permissions from the directory. For example, if you add a file to a directory that allows the `Coworkers` group Write permission and the `Finance` group Read permission, the same permissions will apply to the file.
- The user who creates a file or directory is ordinarily the owner of that file or directory—though you can change that default. The owner can control access to the file or directory by changing the permissions set on it.

- The easiest way to administer security is to set permissions for groups, not individual users. Typically, a user needs access to many files. If the user is a member of a group that has access to the files, you can terminate the user's access by removing the user from the group rather than by changing the permissions on each of the files. Note that setting permissions for an individual user does not override the access granted to the user through groups to which the user belongs.

Note – When you copy PC NetLink files or directories, security permissions set on them are discarded in addition to ownership and auditing information. The files inherit a new set of permissions from the directory into which you have copied them. If the new directory does not specify permissions for files, only a file's owner (the person who copied the file) will have permission to use the file.

In addition to files and directories, shares carry their own permissions in a Windows NT environment. In case of permission conflicts among files, directories, and shares, clients see the *most* restrictive permissions among the conflicting sets.

Ownership of Files and Directories

Every file and directory has an *owner*. The owner controls how permissions are set on the file or directory and can grant permissions to others.

When a file or directory is created, the person creating the file or directory automatically becomes its owner. It is expected that administrators will create most files on network servers, such as when they install applications on the server. Therefore, most files on a server will be owned by administrators, except for data files created by users and files in users' home directories.

Ownership can be transferred in the following ways:

- The current owner can grant an implied ownership ability to other users by setting Write permission on the files or directories for Group or Others. This enables other people to copy the file, and "inherit" ownership of the duplicate.
- An administrator can take ownership of any file on the computer at any time. For example, if an employee leaves the company suddenly, the administrator can take control of the employee's files, no matter what permissions have been set.

Note – Although an administrator can take ownership, the administrator cannot transfer ownership to others. This restriction keeps the administrator accountable.

The administrator also can take file ownership by using the `net perms` command. For more information, type `net help perms` at the PC NetLink command prompt.

In addition to files and directories, computer *processes* also have an owner. A computer process is initiated whenever an executable program is run, and the process is known to the system by a unique identifier. In the Solaris environment, this is called a *Process Identifier*, or *PID*.

Unlike file or directory ownership, however, process "ownership" changes whenever the program is executed. While an executable program—a spreadsheet, for example—is originally owned by the person who installed it on the network, its User and Group PID ownership changes when a person runs it. The spreadsheet process owned by root at installation will now be owned by the user and the user's group at execution. Because this change in process ownership has security implications, the PC NetLink program enables you to regulate it.

File-locking is also an important security concern, particularly in your heterogeneous environment of Windows NT and Solaris. While PC NetLink software accords the same file-locking security on network-based files and directories as Windows NT does, locked files may still be accessible directly from a Solaris computer account. PC NetLink software enables you to preclude that from happening, though it is not set by default as it may degrade overall system performance. If your network includes users who will access files from both Windows NT and Solaris network client machines, you should change this setting to honor Windows NT file-locking from Solaris accounts. See "How to Set Solaris File System Integration Policies" on page 90.

Note – During PC NetLink installation, users and groups who will be associated with the PC NetLink program were added to the system's local password and group files. If your site uses a Solaris name service such as NIS or NIS+ in the Solaris environment, you should put the group information into the name service maps. When creating files from a Windows NT Workstation and writing to a directory on the Solaris system, the owner is the user who creates the file and the default group is `DOS---`. The `DOS---` group is not recognized by Solaris servers that are not running PC NetLink software. While the user information is, in fact, retrieved from the name service maps, the group information will not be correctly displayed unless the listing of the file is performed on the PC NetLink system itself (default lookup: `files nis`). If you are viewing these files from another Solaris system, the group ID will not be resolved correctly. By putting the group information into the name service maps, you allow the files to be consistent between the local system files and the maps.

UPS Power Failure Notification

You can send a power failure message to all Windows NT network users who are connected to a computer by using the Send Message command on the Computer menu in Windows NT Server Manager. For example, you can do this before you disconnect one or more users or before you stop the server service on that computer.

Using PC NetLink Server Manager, you can warn users of server shutdown because of power loss when an uninterruptible power supply (UPS) service is available.

For alerts to be sent, the Alerter service must be running on the PC NetLink server from which the alert is originated. See "How to Start Individual Services" on page 42. For client machines to receive the alerts, their Microsoft Windows Messenger service must be running.

Note – The UPS Power Failure Notification feature depends on the particular UPS power monitoring software that comes with your specific UPS product. PC NetLink software provides power failure notification to clients when it receives a `SIGPWR` (Signal 19) in the `lmx.ctrl` process that is running on the PC NetLink machine. When you set up your UPS monitoring software, you must modify it to send a `SIGPWR` (or `kill -19`) to the process ID of the `lmx.ctrl` process. See the `man` pages for `signal`, `ps`, and `kill` for further information.

User Account Mapping for `/etc/passwd` Files

You can associate a PC NetLink user account with a Solaris system user account on the Solaris system that is running PC NetLink software. To create this type of association, you use the PC NetLink Server Manager tool or the `mapuname` command. (For more information about the `mapuname` command, type `man mapuname` at the PC NetLink command prompt.) After you map a PC NetLink user account to a Solaris system user account, any file that the PC NetLink server user creates will be owned by the Solaris system user account.

Note – This option is useful only to those sites that use the `mapuname` command to associate Windows NT and Solaris accounts, and who keep their Solaris accounts in a local `/etc/passwd` file (that is, those who do *not* use NIS or NIS+ name services). If this is the case and you choose this option, then if you use the Windows NT User Manager tool to change the user's Windows NT home directory to a shared path on the PC NetLink system, it edits `/etc/passwd` so that the user's Solaris account has the same home directory on the server.

Having both PC NetLink and Solaris system user accounts allows your Solaris system files to be owned by your Solaris system user account and to be accessed through your PC NetLink user account. You should map Solaris system user accounts to PC NetLink software users on the Solaris systems where their home directories reside—this is the default, though you can change it.

Assigning Solaris system user accounts to PC NetLink user accounts ensures that Solaris system user accounts are created only when necessary. It also gives administrators complete control over the mapping of PC NetLink user accounts to Solaris system user accounts.

You use the PC NetLink Server Manager tool to assign Solaris system user accounts automatically to new PC NetLink user accounts. See "How to Edit User Account Mapping Policies" on page 93. The Solaris system user account name that is assigned to the PC NetLink user account will be the same as or similar to the PC NetLink user account name. Differences can arise in cases of long, duplicate, or special character PC NetLink user account names.

If you were to map a PC NetLink user account to a nonexistent Solaris system user account, or if the Solaris system account for a PC NetLink user is deleted, the PC NetLink user will not have access to any shared resources on the Solaris system. To ensure that the PC NetLink user can continue to access the system, delete the account mapping or re-map the user to another Solaris system user account.

As administrator, you also have the ability to enable or disable users with Solaris accounts from logging on to the Solaris system, and to choose whether to synchronize PC NetLink home directories with users' Solaris home directories.

User Account Management Utilities

PC NetLink software provides a pair of Solaris user account management utilities, called `passwd2sam` and `sam2passwd`.

`passwd2sam`

The `passwd2sam` user account management utility places user account information that is stored in a Solaris name service—such as FILES, NIS, and NIS+—into the PC NetLink Security Accounts Manager (SAM) database. If the PC NetLink system is configured as a BDC in an existing Windows NT domain, `passwd2sam` operations will transfer to the domain's PDC.

Note – Using this utility does *not* add users' passwords to the PC NetLink SAM database, because passwords are one-way encrypted; that is, they cannot be decrypted for automatic transfer from one account to the other.

The `passwd2sam` user account management utility supports three modes of operation:

- It adds Solaris user accounts into the PC NetLink Security Accounts Manager database. This is the default mode of operation. Solaris user accounts can be added from the running Solaris name service or by a user-specified `/etc/passwd` formatted input file.
- It deletes Solaris user accounts from the PC NetLink Security Accounts Manager database. Solaris user accounts are deleted from the PC NetLink program by a user-specified `/etc/passwd` formatted input file.
- It finds and disables Windows NT domain user accounts that have been added by `passwd2sam` and subsequently deleted from a Solaris name service. This mode will find and disable PC NetLink user accounts that have been removed from a Solaris name service.

You must format all input files to `passwd2sam` as `/etc/passwd` entries. See the `passwd2sam(1)` man page for details on invocation options and arguments.

sam2passwd

The other user account management utility provided by PC NetLink software is `sam2passwd`. The `sam2passwd` user account management utility records PC NetLink user accounts, and then creates the following `/etc/passwd` formatted file containing the PC NetLink user accounts:

```
/var/opt/lanman/dirsync/sam2passwd.passwd
```

This file contains non-privileged PC NetLink user accounts that you can add to Solaris name service maps or to a local `/etc/passwd` file (on which you then run the `/user/bin/pwconv` command).

The `sam2passwd` utility is provided to assist you in migrating user accounts into your running Solaris name service, but does not actually perform the operation. See the `sam2passwd(1)` man page for details on invocation options and arguments.

▼ How to Change Computer Browsing Policy

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose computer browsing policy you want to change.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

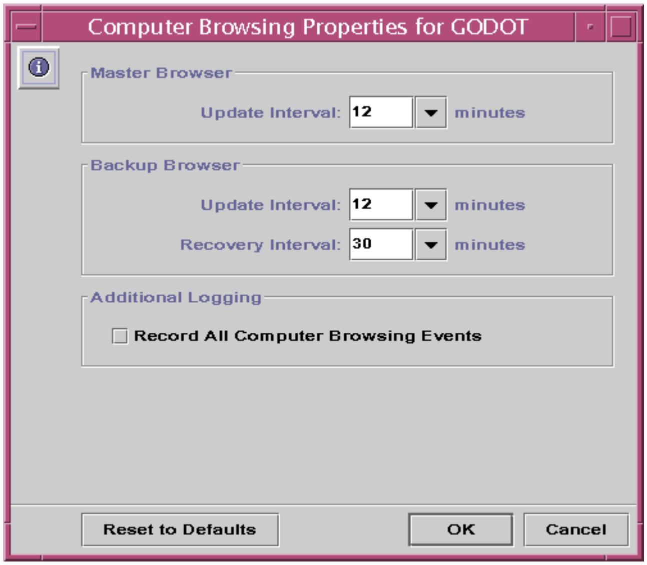
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click Computer Browsing.**

   The following screen appears.



Computer Browsing Properties for GODOT

Master Browser

Update Interval: 12 minutes

Backup Browser

Update Interval: 12 minutes

Recovery Interval: 30 minutes

Additional Logging

☐ Record All Computer Browsing Events

5. **Using the provided drop-down lists and check box, make any changes to the Master Browser and Backup Browser update and recovery intervals, and list of browsing events that should be included.**

   Checking Record All Computer Browsing Events makes the event list more inclusive than the default.

   Note that you must enter a value greater than “0” for both the Master and the Backup browsers’ update intervals.

6. **Click OK, Cancel, or Reset to Defaults.**

   If you click OK to make any changes, PC NetLink Server Manager will automatically stop and then restart your browsing service to make the changes effective.

▼ How to Set Up File Name Mapping

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose file name mapping policy you want to change.**

   For instructions, see “How to Log On Using PC NetLink Server Manager” on page 36. To make any changes, you must be logged on as root.

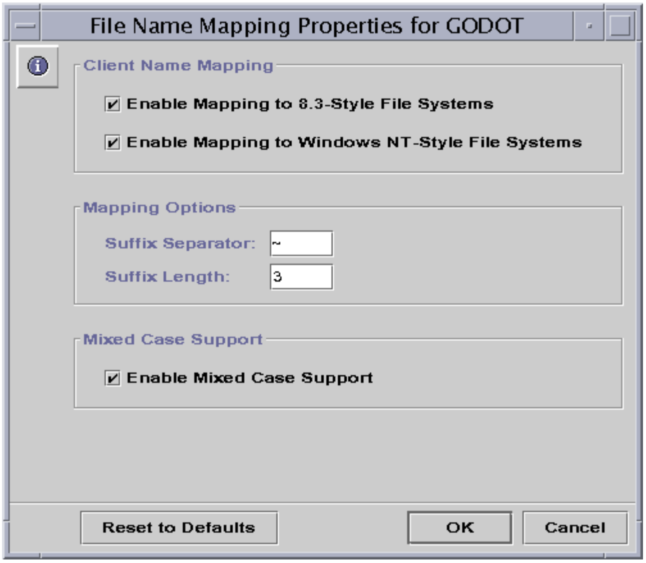
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click File Name Mapping.**

   The following screen appears.



File Name Mapping Properties for GODOT

Client Name Mapping

☑ Enable Mapping to 8.3-Style File Systems

☑ Enable Mapping to Windows NT-Style File Systems

Mapping Options

Suffix Separator: ~

Suffix Length: 3

Mixed Case Support

☑ Enable Mixed Case Support

5. **Create or change file name mapping policies according to the following guidelines:**

   - Check Enable Mapping to 8.3-Style File Systems if some of your client machines are running Windows for Workgroups.
   - Check Enable Mapping to Windows NT-Style File Systems so that Solaris file names with characters that are invalid in Windows NT are changed to “legal” characters.
   - Enter a new value in the Suffix Separator text field if you have reason to change the default; the default separator is a tilde (~).
   - Enter a new value in the Suffix Length text field if you have reason to change the default from three. This value does *not* include the separator.
   - Check Enable Mixed-Case Support if you want to allow file names to be created with both uppercase and lowercase characters, and you want case to be a factor in finding files. Note that checking this box may degrade performance.

6. **Click OK, Cancel, or Reset to Defaults.**

▼ How to Edit NetBIOS Policy

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose NetBIOS policy you want to change.**

   For instructions, see “How to Log On Using PC NetLink Server Manager” on page 36. To make any changes, you must be logged on as root.

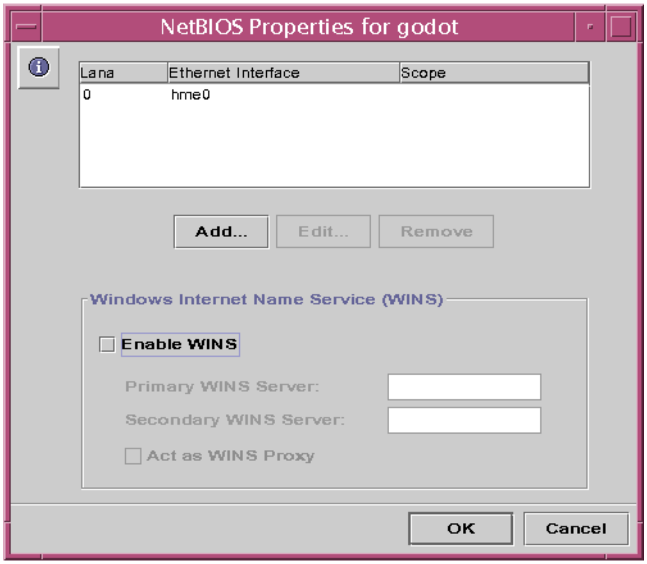
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click NetBIOS.**

   The following screen appears.


NetBIOS Properties for godot
Add...
Edit...
Remove
Windows Internet Name Service (WINS)
OK
Cancel

Lana	Ethernet Interface	Scope
0	hme0	

□ Enable WINS

Primary WINS Server:

Secondary WINS Server:

□ Act as WINS Proxy

   The NetBIOS Properties wizard displays the current network device, its automatically assigned Lana number, and its scope (if assigned). The wizard enables you to add, edit, or remove an Ethernet interface Lana entry.

5. **In the Ethernet Interface table, click to highlight the name of the device that you want to configure.**

   For background information on NetBIOS, see “NetBIOS” on page 64.

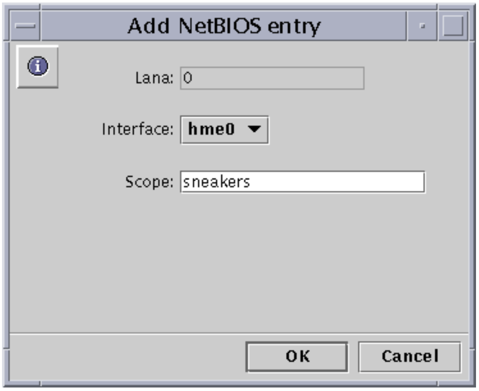
6. **Depending on whether you want to add, edit, or remove an interface and its Lana entry, do the following:**

   - If you want to *add* an interface and Lana entry, go on to the next step.
   - If you want to *edit* an interface and Lana entry, go to Step 7.

- If you want to *remove* an interface and Lana entry, go on to Step 8.

7. **Click Add.**

   The following screen appears.



Add NetBIOS entry

Lana: 0

Interface: hme0

Scope: sneakers

   a. **Click the drop-down Interface list to choose the available interface you want to add.**

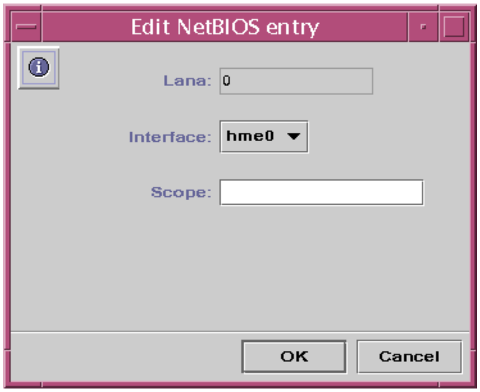
   b. **(Optional) In the Scope text field, type the name of the scope that you want the added device to serve.**

      The scope name can contain a maximum of 63 characters consisting of the uppercase or lowercase letters A-Z, the numerals 0-9, and all standard symbols.

   c. **Click OK.**

8. **Click Edit.**

   The following screen appears.



Edit NetBIOS entry

Lana: 0

Interface: hme0

Scope:

   a. **Click the drop-down Interface list to assign a different available interface to the local system.**

b. **(Optional) In the Scope text field, edit or create the name of the scope that you want the edited device to serve.**

   The scope name can contain a maximum of 63 characters consisting of the uppercase or lowercase letters A-Z, the numerals 0-9, and all standard symbols.

c. **Click OK.**

9. **Click Remove.**

   Note that PC NetLink Server Manager will not permit you to remove a Lana entry if it is the *last* entry left.

▼ How to Configure WINS

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose WINS configuration you want to change.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

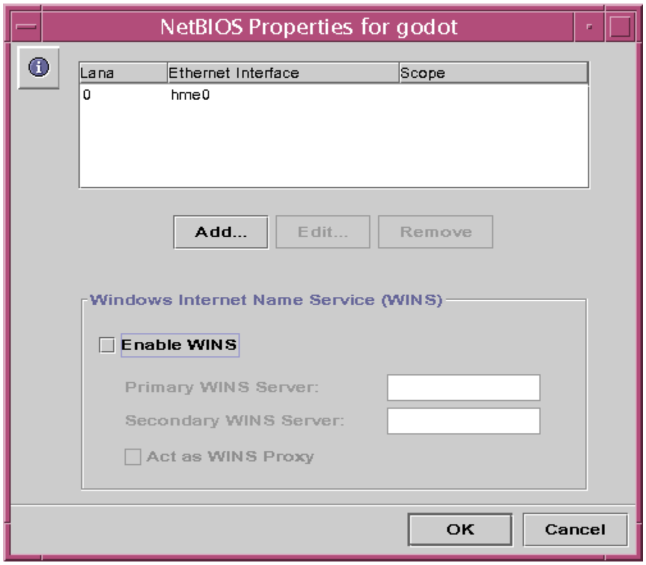
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click NetBIOS.**

   The following screen appears.



NetBIOS Properties for godot

Lana	Ethernet Interface	Scope
0	hme0	

Windows Internet Name Service (WINS)

☐ Enable WINS

Primary WINS Server:

Secondary WINS Server:

☐ Act as WINS Proxy

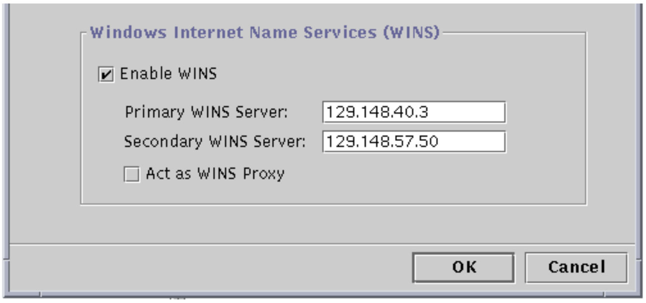
The NetBIOS Properties wizard displays a table of available WINS configuration choices:

- Choose whether the Windows Internet Name Service (WINS) is enabled.
- Choose whether the system you are configuring will be a WINS proxy.
- Identify, by IP address, primary and secondary WINS servers.

5. **To enable WINS on the local system, click the check box next to Enable WINS.**

   The screen changes to activate three WINS configuration choices:

- Primary WINS Server
- Secondary WINS Server
- WINS Proxy



Windows Internet Name Services (WINS)

☑ Enable WINS

Primary WINS Server: 129.148.40.3

Secondary WINS Server: 129.148.57.50

☐ Act as WINS Proxy

6. **In the corresponding text fields, type in the IP addresses for the Primary and, optionally, Secondary WINS servers.**

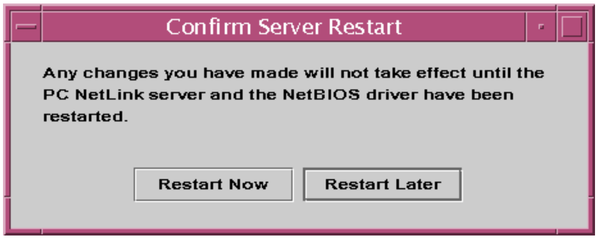
   See “WINS Proxy” on page 65 for a description of primary and secondary WINS servers.

7. **Choose whether you want the system to act as a WINS Proxy.**

   See “WINS Proxy” on page 65 for a description.

8. **Click OK.**

   The following screen appears, notifying you that the PC NetLink program and the NetBIOS driver must be restarted for changes to take effect.



Confirm Server Restart

Any changes you have made will not take effect until the PC NetLink server and the NetBIOS driver have been restarted.

9. **Choose whether to stop and restart the server and the NetBIOS driver immediately or to restart them later.**

   None of the changes you have designated will become effective until the next time you start the PC NetLink program.

Note – If you have designated your PC NetLink server as a WINS server, the Enable WINS option does not start the WINS service automatically after the PC NetLink program is restarted. You need to start the service manually by typing `net start wins` at the system’s command line, or by using PC NetLink Server Manager. For instructions, see “How to Start Individual Services” on page 42. You can configure the PC NetLink program to start the WINS service automatically, however. See “How to Configure Startup for Individual Services” on page 45.

▼ How to Start the WINS Service at the Command Line

- **At the PC NetLink command line, enter the following command:**

```
net start wins
```

▼ How to Secure PC NetLink Server Manager Transactions

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose PC NetLink Server Manager security policies you want to change.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

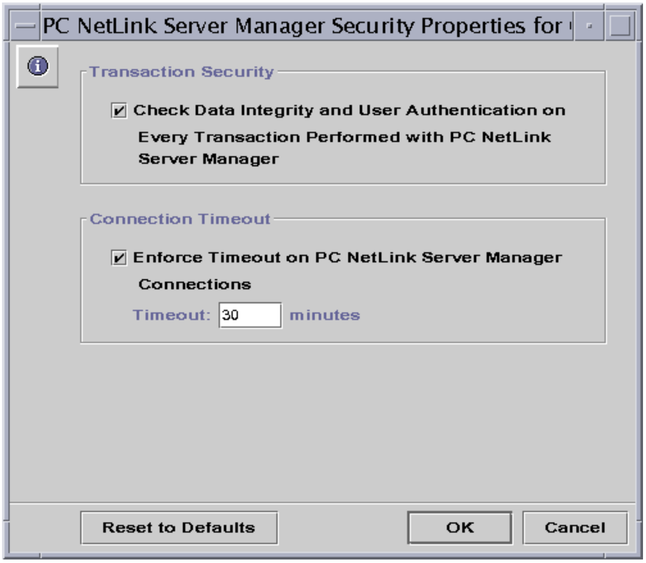
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click PC NetLink Server Manager Security.**

   The following screen appears.



PC NetLink Server Manager Security Properties for

Transaction Security

☑ Check Data Integrity and User Authentication on Every Transaction Performed with PC NetLink Server Manager

Connection Timeout

☑ Enforce Timeout on PC NetLink Server Manager Connections

Timeout: 30 minutes

5. **Do one or both of the following:**

   - Check the Transaction Security box to require client authentication for PC NetLink Server Manager transactions and to invoke public key signatures to protect data that is passed between the server and clients.
   - Click the Connection Timeout box to specify a period of time after which PC NetLink Server Manager connections expire. Specify the time period, in minutes, in the provided text field.

6. **Click OK, Cancel, or Reset to Defaults.**

▼ How to Tune PC NetLink for Optimum Performance

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose performance you want to tune.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

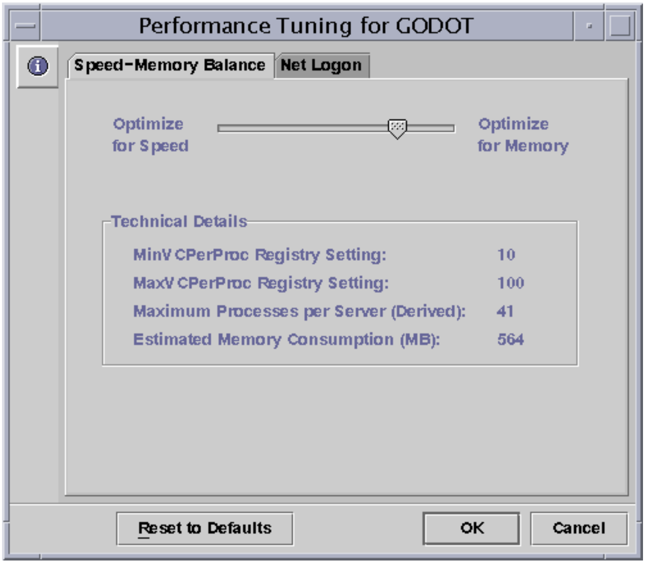
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click Performance Tuning.**

   A screen similar to the following appears.



Technical Details

MinVCPerProc Registry Setting: 10

MaxVCPerProc Registry Setting: 100

Maximum Processes per Server (Derived): 41

Estimated Memory Consumption (MB): 564

Note – Default PC NetLink settings enable optimum performance of most systems in most cases. Do not adjust the default settings unless you are an experienced system administrator. For background information on PC NetLink performance parameters, see "Tuning PC NetLink Parameters for Maximum Performance" on page 66.

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5. **Adjust performance-related parameters according to the following guidelines, organized by the Performance policy's tabs:**

- *Speed-Memory Balance* – The default settings are those specified in the PC NetLink Registry, and are appropriate for most cases. For the default values associated with the Registry entries affected, see the section, “Registry Keys and Values” on page 192 in Appendix A, “PC NetLink Registry,” and consult the entries for “`VCDistribution`,” “`MinVCPerProc`,” and “`MaxVCPerProc`.”

  To change the default values, either to optimize for speed or for memory, use the sliders according to the following guidelines:

  - The leftmost setting maximizes speed. Don’t use this setting unless your system has at least 4 gigabytes of RAM. This may be an appropriate setting to handle unusual client workloads.
  - The rightmost setting minimizes memory consumption, but results in slower system response. You may need to use this setting if your system has less than 1 gigabyte of RAM.

  Read the Context Help associated with other slider positions for explanations of the intermediate settings.

- *Net Logon* – Select Automatically Disconnect Idle Net Logon Connections to establish a timeout, which is disabled by default.

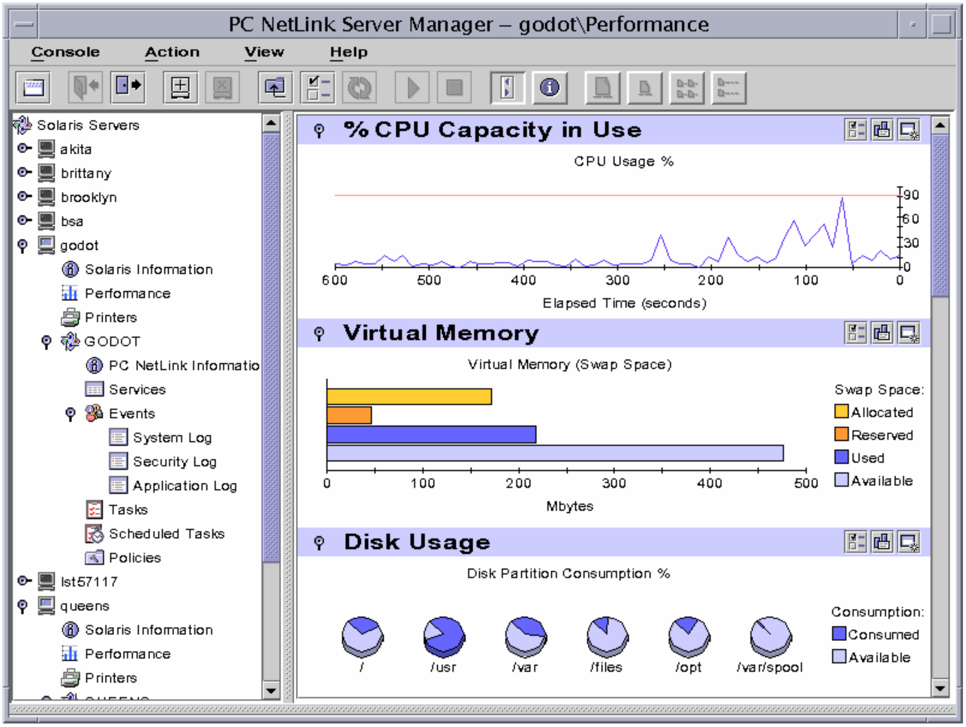
▼ How to Set PC NetLink Server Performance Alarms

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose Solaris information you want to view.**

   For instructions, see “How to Log On Using PC NetLink Server Manager” on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click Performance.**

The following screen appears.



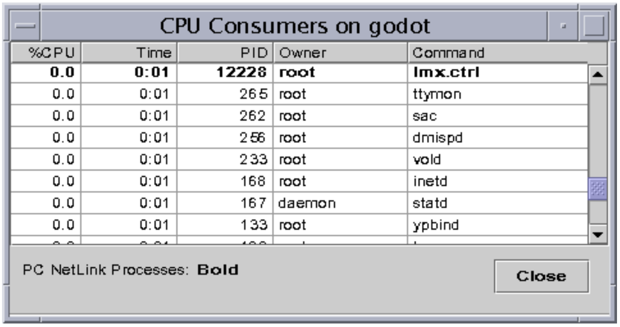
The graphical display reports various established performance parameters at intervals that you can set. The displayed parameters are:

- *% CPU Capacity in Use* – This line graph measures utilization of the monitored server's CPU over a set period of time. Time (in seconds) is measured on the X (horizontal) axis and percentage of total CPU capacity is measured on the Y (vertical) axis. This display also accounts for multiple CPUs. The range of the Y axis is 0 to 100*n*, with *n* representing the number of CPUs. For example, if you were to keep the default alarm threshold set at 90%, and you have a two-CPU system, then you will see the alarm threshold line at 180%: 90% times two CPUs.
- *Virtual Memory (also known as swap space)* – This bar chart illustrates the amount of virtual memory that is allocated, reserved, used, and available to the monitored server. When you place the mouse pointer over any of the bars, a number appears indicating the absolute value of the bar.
- *Disk Usage* – These pie charts illustrate available and consumed disk space on each of the server's *local* disk partitions. When you place the mouse pointer over any of the pie charts, a number appears indicating the absolute value of the chart.

- *Disk Throughput* – Measuring transfers-per-minute, kilobytes-per-minute, and average service time, these bar graphs illustrate utilization of each *local* disk partition in the monitored system. When you place the mouse pointer over any of the bars, a number appears indicating the absolute value of the bar.
- *Network Throughput* – This line graph reports transmission of network packets, packet collisions, and packet transmission errors over the course of time, measured in seconds.
- *PC NetLink Throughput* – This line graph reports the average service times, in milliseconds, of PC NetLink services to Windows NT clients, and, measured in seconds, bytes received over time from Windows NT clients and sent to clients by the monitored PC NetLink server.

Each of the parameters offers more detailed "drill-down" views of the generated statistics. You reveal these views by clicking the following icon:

This icon is located in the center of the three icons that are at the extreme right of the parameters' title. Representative of the drill-down detailed view is, for example, the listing of CPU consumers on a PC NetLink server named "godot," which is the drill-down view of the % CPU Capacity in Use parameter.



CPU Consumers on godot

%CPU	Time	PID	Owner	Command
0.0	**0:01**	**12228**	**root**	**lmx.ctrl**
0.0	0:01	265	root	ttymon
0.0	0:01	262	root	sac
0.0	0:01	256	root	dmispd
0.0	0:01	233	root	vold
0.0	0:01	168	root	inetd
0.0	0:01	167	daemon	statd
0.0	0:01	133	root	ypbind

PC NetLink Processes: **Bold**

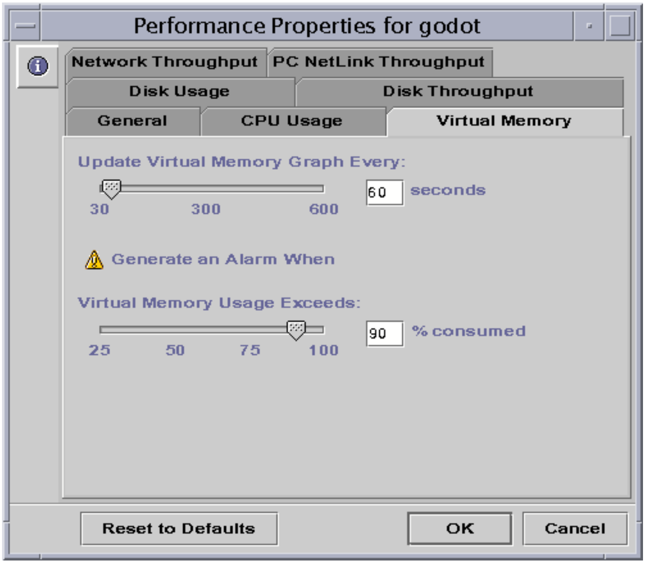
In all of these displays, exclusive PC NetLink processes are shown in boldface type.

To focus your attention on one specific performance parameter, you can use the "tear-off" window feature. This feature creates a separate window with information pertaining only to the parameter you selected. To display a tear-off window, you click the icon at the right of the group of three icons discussed above. It looks like the following:

Clicking the icon at the left of the group of three icons reveals the Performance Properties window, which you will use in the following step. It looks like the following:

3. **In the title bar of any of the performance parameter displays, click the Performance Properties window icon.**

   The following window appears.



Performance Properties for godot

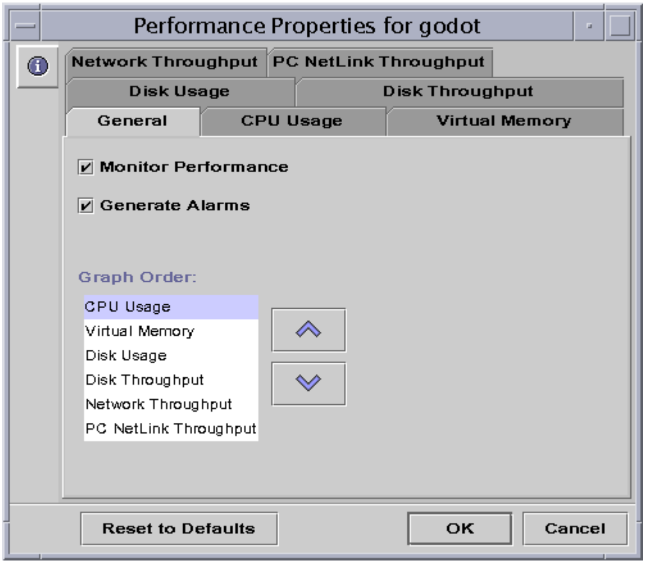
Update Virtual Memory Graph Every: 60 seconds

⚠ Generate an Alarm When

Virtual Memory Usage Exceeds: 90 % consumed

4. **Click the General tab.**

   The following window appears.



Performance Properties for godot

☑ Monitor Performance

☑ Generate Alarms

Graph Order:

CPU Usage
Virtual Memory
Disk Usage
Disk Throughput
Network Throughput
PC NetLink Throughput

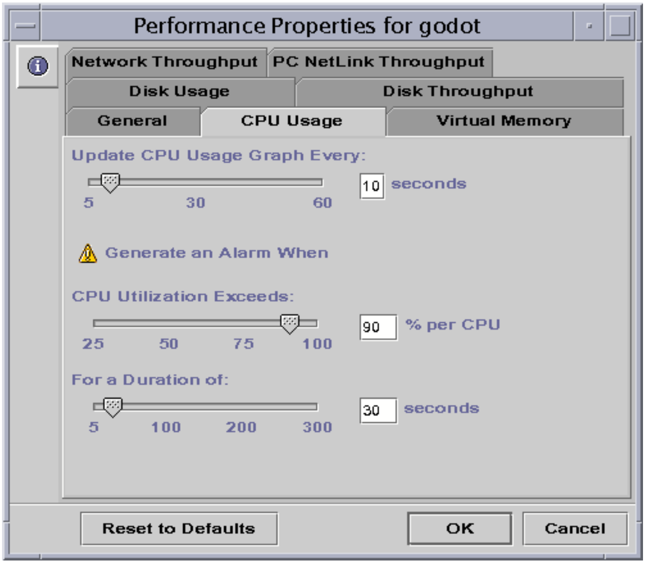
5. **Check or uncheck Monitor Performance and Generate Alarms according to the performance monitoring and performance alarm policy you want to set for this PC NetLink server.**

6. **Depending on your policy, do one of the following:**

   - If you are finished electing whether to monitor performance or show alarms and are satisfied with the defaults, click OK to put the policy into effect or Cancel to make no changes and dismiss the wizard.
   - If you have elected to generate alarms but want to adjust the threshold at which alarms are generated, continue with Step 7.

7. **Click the tab that represents the performance parameter whose alarm threshold you want to change.**

   In the following example, CPU Usage is the parameter to be adjusted.



Performance Properties for godot

Update CPU Usage Graph Every: 10 seconds

Generate an Alarm When

CPU Utilization Exceeds: 90 % per CPU

For a Duration of: 30 seconds

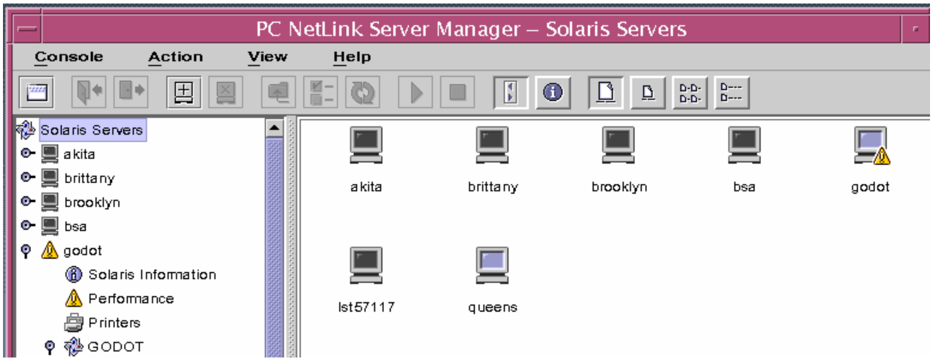
8. **Using the sliders, adjust performance alarm thresholds according to your policy.**

9. **Click OK to dismiss the window and make the changes effective, Cancel to dismiss the window and leave thresholds unchanged, or Reset to Defaults. If you choose Reset to Defaults, click OK to dismiss the window.**

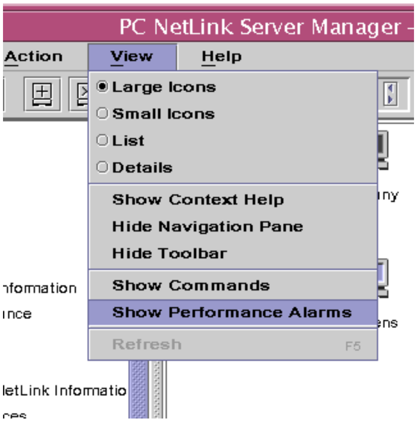
▼ How to Investigate Performance Alarms

1. **In the main Results window and Navigation pane of PC NetLink Server Manager, look for any server name with an alarm symbol.**

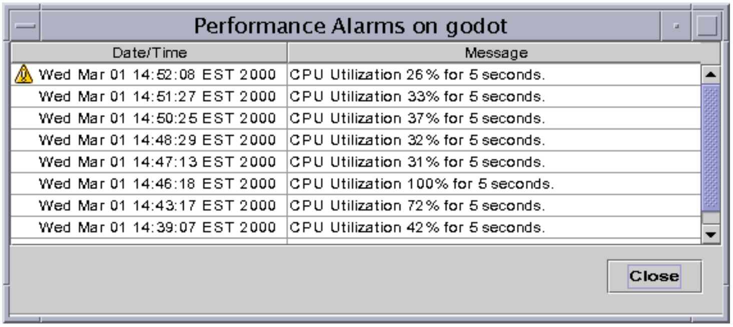
   In the following illustration, the PC NetLink server named godot has an alarm associated with it.



2. **With the name of the server highlighted, choose Show Performance Alarms from the View menu.**



A screen similar to the following appears. (Note that the CPU alarm threshold, for purposes of this illustration, has been set to an impractically low level of 25% for five seconds. The default of 90% for 30 seconds is more realistic under normal conditions.)



Performance Alarms on godot

Date/Time	Message
⚠ Wed Mar 01 14:52:08 EST 2000	CPU Utilization 26% for 5 seconds.
Wed Mar 01 14:51:27 EST 2000	CPU Utilization 33% for 5 seconds.
Wed Mar 01 14:50:25 EST 2000	CPU Utilization 37% for 5 seconds.
Wed Mar 01 14:48:29 EST 2000	CPU Utilization 32% for 5 seconds.
Wed Mar 01 14:47:13 EST 2000	CPU Utilization 31% for 5 seconds.
Wed Mar 01 14:46:18 EST 2000	CPU Utilization 100% for 5 seconds.
Wed Mar 01 14:43:17 EST 2000	CPU Utilization 72% for 5 seconds.
Wed Mar 01 14:39:07 EST 2000	CPU Utilization 42% for 5 seconds.

▼ How to Set Solaris File System Integration Policies

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose Solaris file integration policies you want to change.**

   For instructions, see “How to Log On Using PC NetLink Server Manager” on page 36. To make any changes, you must be logged on as root.

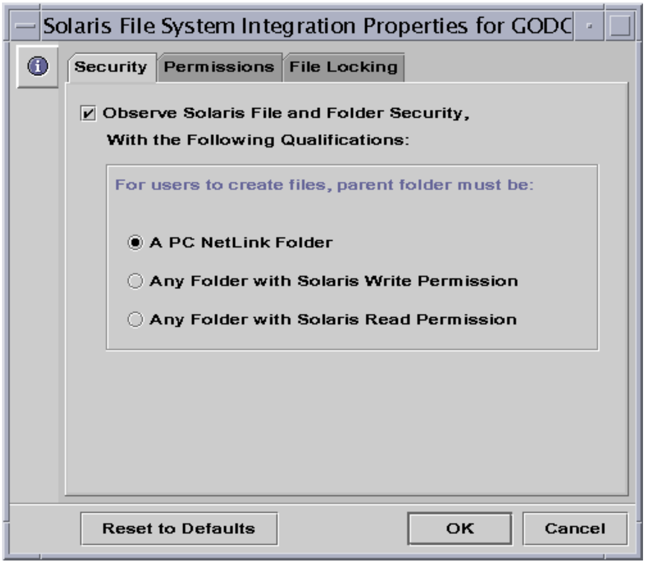
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click Solaris File System Integration.**

   The following screen appears.



☑ Observe Solaris File and Folder Security,
With the Following Qualifications:

For users to create files, parent folder must be:

● A PC NetLink Folder

○ Any Folder with Solaris Write Permission

○ Any Folder with Solaris Read Permission

5. **Set PC NetLink file creation policies according to the following guidelines, using the Security, Permissions, or File Locking tabs:**

- *Security* – To establish policy for file creation within PC NetLink folders:

  Ignore Solaris permissions – Leave unchecked the Observe Solaris File and Folder Security...Qualifications option to ignore Solaris permissions. With this option unchecked, Windows NT file and directory permissions are the only permissions that will prevail over file and directory creation and access for reading. PC NetLink software users with appropriate Windows NT permissions can create files within PC NetLink folders.

  Observe Solaris permissions – Check Observe Solaris File and Folder Security...Qualifications and A PC NetLink Folder to require users to have Solaris Write permission to create a file within a PC NetLink folder only—it will not affect any other Solaris file system folder. This is the most restrictive option, in that it doesn't grant any permissions in any other Solaris directories or files.

  - Check Any Folder with Solaris Write Permission to ease the restriction, by enabling PC NetLink software users to create files within PC NetLink folders and any other Solaris file system folder for which they have Write permission.
  - Check Any Folder with Solaris Read Permission to specify that only minimal Solaris permissions be in place on any PC NetLink folder or any other Solaris folder. In effect, this option grants Write permission to any Solaris operating environment-based folder.

- *Permissions* – To establish default User, Group, and Other file and folder permissions, check the box next to the permissions that you want to set.
- *File Locking* – To cause PC NetLink software to observe Windows NT file locking—thereby preventing users with Solaris accounts from accessing the locked files—check Reflect Client-Created Record Locks in Solaris File System. (Note that checking this box may slow down performance.)

6. **Click OK, Cancel, or Reset to Defaults.**

▼ How to Use UPS Power Failure Notification

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose UPS power failure notification policy you want to change.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root. Also see the Note on page 72 for important information about the UPS policy.

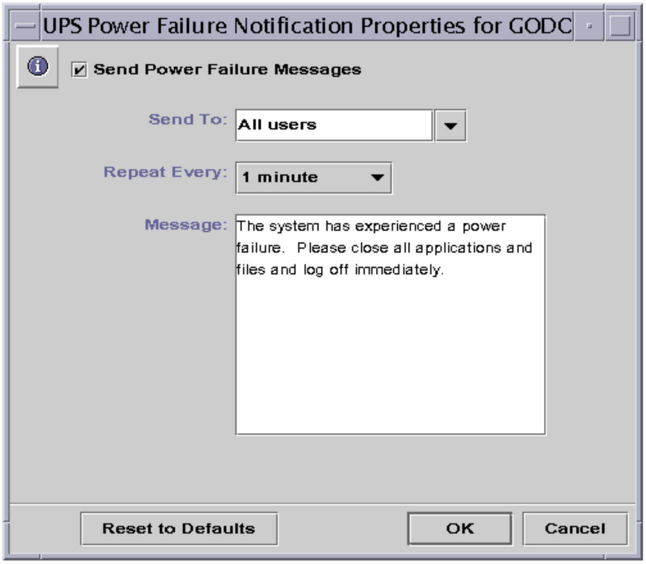
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click UPS Power Failure Notification.**

   The following screen appears.



UPS Power Failure Notification Properties for GODC

☑ Send Power Failure Messages

Send To: All users

Repeat Every: 1 minute

Message: The system has experienced a power failure. Please close all applications and files and log off immediately.

5. **Check Send Power Failure Messages.**

6. **Either select from the drop-down list, or type directly into the text field, the NetBIOS names of all the users or systems that you want to notify.**

   Select All Users if you want to send the message to everyone.

7. **Using the drop-down list, designate how often you want the notification to be repeated.**

8. **In the Message text field, type the message that you want to send.**

9. **Click OK, Cancel, or Reset to Defaults.**

▼ How to Edit User Account Mapping Policies

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose user account mapping policy you want to change.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

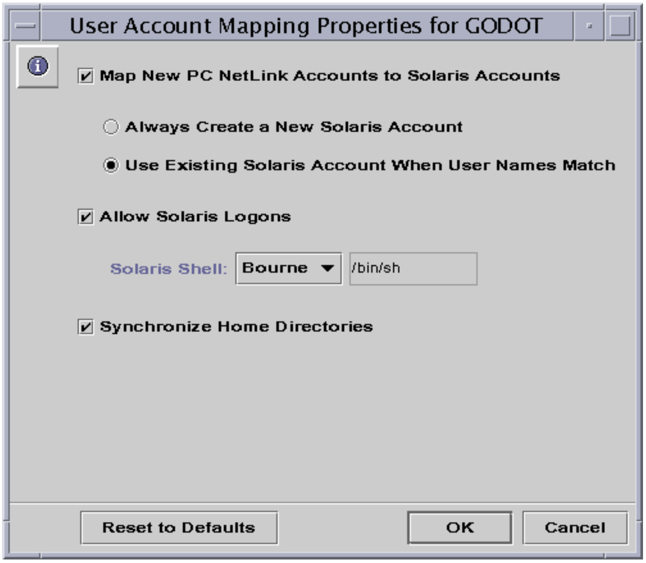
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Policies.**

4. **Double-click User Account Mapping.**

   The following screen appears.



User Account Mapping Properties for GODOT

☑ Map New PC NetLink Accounts to Solaris Accounts

○ Always Create a New Solaris Account

● Use Existing Solaris Account When User Names Match

☑ Allow Solaris Logons

Solaris Shell: Bourne /bin/sh

☑ Synchronize Home Directories

5. **Establish or edit user account mapping policies according to the following guidelines (see "User Account Mapping for `/etc/passwd` Files" on page 72 for background information on these policies):**

   - Check Map New PC NetLink Accounts to Solaris Accounts to create a unique Solaris account for a user simultaneously with the creation of his or her new account in the Windows NT domain served by the PC NetLink system. If you have checked this option, you then have other options, described in the remainder of this list.
   - Choose the option of always creating a new Solaris account for the user, or using a Solaris account that exists for the user. Note that a Solaris account exists independently of both Windows NT and PC NetLink systems.

Note – Checking the Always Create a New Solaris Account option will cause the system to create a new Solaris account by way of a local `/etc/passwd` file *only*. If your site uses a Solaris name service such as NIS or NIS+, do *not* check this option.

   - Choose whether to permit a user with a Solaris account to use that account independently of NT and PC NetLink software, by checking Allow Solaris Logons or leaving it unchecked. If you choose to permit Solaris logons, use the Solaris Shell drop-down list to choose a command shell, or choose Other and enter the shell name in the text field.
   - Choose Synchronize Home Directories for automatic synchronization of PC NetLink home directories with Solaris home directories. (See the following Note.)

Note – The Synchronize Home Directories option is useful only to those sites that use the `mapuname` command to associate Windows NT and Solaris accounts, and who keep their Solaris accounts in a local `/etc/passwd` file (that is, those who do *not* use NIS or NIS+ name services). If this is the case and you choose this option, then if you use the Windows NT User Manager tool to change the user's Windows NT home directory to a shared path on the PC NetLink system, it edits `/etc/passwd` so that the user's Solaris account has the same home directory on the server.

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6. **Click OK, Cancel, or Reset to Defaults.**

About Event Monitoring

An *event* is any significant occurrence in the system (or in an application). Some critical events are noted in on-screen messages. An event that does not require immediate attention is noted in an *event log*. Event logging starts automatically every time you start the PC NetLink program. With an event log displayed by the PC NetLink Server Manager tool, you can troubleshoot various problems and monitor PC NetLink security events.

PC NetLink software records events in the following types of logs:

- *System log* – Contains events logged by PC NetLink system components. For example, the failure of a service to start during startup is recorded in the system log. The types of events that are logged by system components are determined by the PC NetLink program.
- *Security log* – Contains various security-related data, such as valid and invalid logon attempts and events related to resource use, such as creating, opening, or deleting files or other objects.
- *Application log* – Contains events logged by applications. For example, a database program might record a file error in the application log. Application developers decide which events to monitor.

System and Application logs can be viewed by all users; Security logs are accessible only to system administrators.

Interpreting an Event

Event logs consist of a *header*, a *description* of the event (based on the event type), and *additional data*. Most Security log entries consist of the header and a description.

PC NetLink Server Manager displays events from each log separately. Each line shows information about one event, including date, time, source, category, event ID, user account, and computer name.

Event Header

An event header contains the following information:

- *Date* – The date the event occurred.
- *Time* – The time the event occurred.
- *Source* – The software module that logged the event, which can be either an application name or a component of the system or of a large application, such as a service name.
- *Category* – A classification of the event by the event source. This information is used primarily in the security log.
- *Event* – A number identifying the particular event type. The first line of the description usually contains the name of the event type. For example, 6005 is the ID of the event that occurs when the log service is started. The first line of the

description of such an event is “The Event log service was started.” The event ID and the source of the event can be used by product support representatives to troubleshoot system problems.

- *User* – The user name of the user on whose behalf the event occurred. If the event is not logged by a user, then the Security ID of the logging entity is displayed.
- *Computer* – The name of the computer on which the event occurred.

Event Description

The format and contents of the event description vary, depending on the event type. The description is often the most useful piece of information, indicating what happened or the significance of the event.

Event Types

The PC NetLink Server Manager logs indicate the event types:

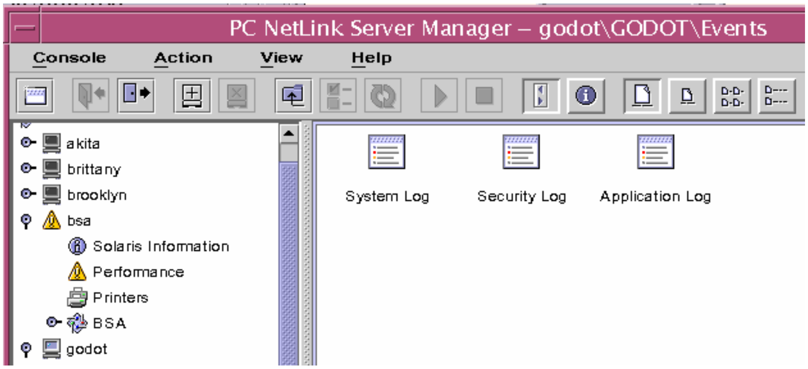
- *Error* – Significant problems, such as a loss of data or loss of functions. For example, an Error event is logged when a service was not loaded during PC NetLink startup.
- *Warning* – Events that are not necessarily significant, but that indicate possible future problems. For example, a Warning event is logged when the server is low on key resources.
- *Information* – Infrequent significant events that describe successful operations of major server services. For example, when a service starts successfully, it would log an Information event.
- *Success Audit* – Audited security access attempts that were successful. For example, a user’s successful attempt to log on to the system is logged as a Success Audit event.
- *Failure Audit* – Audited security access attempts that failed. For example, if a user tried to access a network drive and failed, the attempt is logged as a Failure Audit event.

Additional Data

The data field contains binary data that you can display in bytes or words. The application that was the source of the event record generates this information. Because the data appears in hexadecimal format, only someone who is familiar with the source application can interpret its meaning.

Using PC NetLink Server Manager to View Events

You determine which event log to view by switching between the System, Security, and Application logs that are available in the Events group within PC NetLink Server Manager.



- *Selecting a log* – Double-click the appropriate log icon for event viewing. You can choose to view the logs of any PC NetLink server after you have logged on to it. Once you have opened a log, you can sort by any column by clicking on the column—and reverse-sort by clicking the column again.
- *Refreshing the view* – When you first open a log file, PC NetLink Server Manager displays the current information for that log. This information is not updated automatically. To see the latest events and to remove overwritten entries, choose the Refresh command from the View item on the menu bar.
- *Viewing details about events* – For many events, you can view more information by double-clicking the event. The Event Detail dialog box shows a text description of the selected event and any available binary data for the selected event. This information is generated by the application that was the source of the event record. Because the data appears in hexadecimal format, its meaning can be interpreted only by someone who is familiar with the source application. Not all events generate such data.

Note – To control the types of security events that are audited, you set Audit policies by way of your Windows NT tools. You do not use PC NetLink Server Manager to set Audit policy; therefore, this guide does not include instructions.

Using Event Logs to Troubleshoot Problems

Careful monitoring of event logs can help you to predict and identify the sources of system problems. Logs also can confirm problems with Windows NT application software. If a Windows NT application crashes, an Application event log can provide a record of activity leading up to the event.

The following are guidelines for using event logs to diagnose problems:

- Determine how frequently an error occurs. If a particular event seems related to system problems, search the event log to find other instances of the same event or to judge the frequency of an error.
- Note Event IDs. These numbers match a text description in a source message file. Product-support representatives can use this number to understand what occurred in the system.

Monitoring PC NetLink Security Events

You enable auditing from the Windows NT User Manager for Domains Auditing Policy dialog box. Through auditing, you can track PC NetLink security events. You can specify that an audit entry is to be written to the Security event log whenever certain actions are performed or files are accessed.

An audit entry shows the activity that occurred, the user who performed the action, and the date and time of the activity. You can audit both successful and failed attempts. The audit trail can show who actually performed actions on the network and who tried to perform actions that are not permitted.

Events are not audited by default. If you have Administrator permission, you can specify which types of system events are audited through the Windows NT User Manager for Domains tool.

The Audit policy determines the amount and type of security logging that PC NetLink software performs. For file and object access, you can specify which files and printers to monitor, which types of file and object access to monitor, and for which users or groups. For example, when File and Object Access auditing is enabled, you can use the Security tab in a file or folder’s Properties dialog box to specify which files are audited and what type of file access is audited for those files.

▼ How to Monitor Events

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose event logs you want to view.**

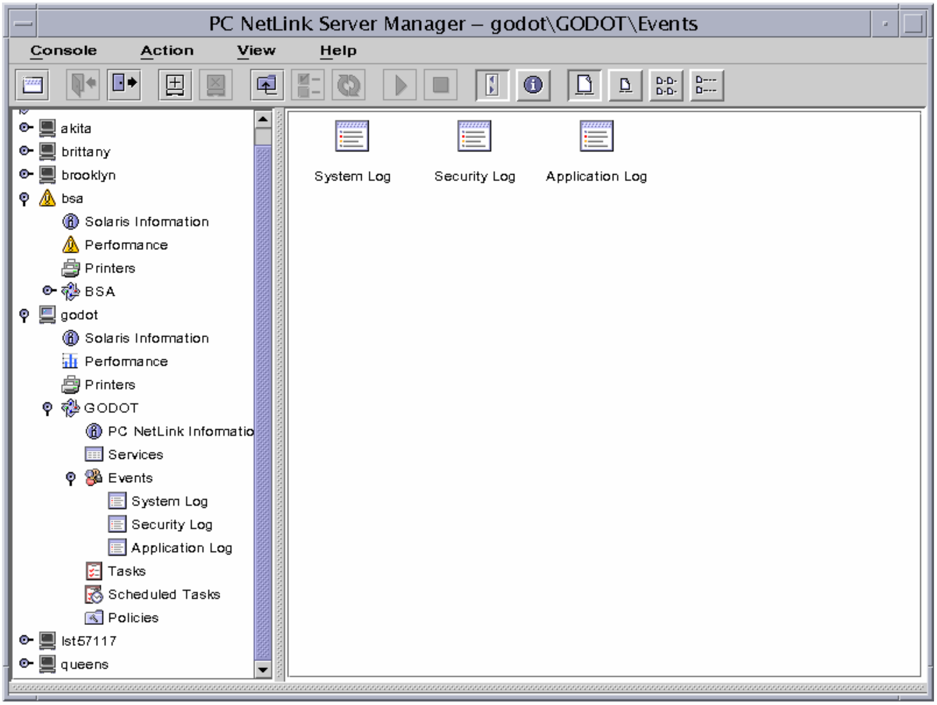
   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Events.**

   The following screen appears.



4. **Double-click the name of the log that you want to view.**

5. **Double-click any line in the log to see more details about the particular event.**

   For background information about interpreting events, see "Interpreting an Event" on page 95.

▼ How to Monitor Events From the Command Prompt

You can use the PC NetLink `elfread` command to read System, Security and Application logs. This command is especially useful when troubleshooting a PC NetLink system that has failed to start. (Events of this type typically are written to the system log.) Use the `elfread` command as a backup to the PC NetLink Server Manager, which is the recommended method of viewing log files when the server is running.

- **At the PC NetLink command prompt, type the following command:**

  `elfread [-od]` *logname*

  Replace *logname* with one of the following log types: System, Security, or Application.

  To display the log file contents listing the oldest event first, use the `-o` option.
  To display detailed information about events, use the `-d` option.

  If no options are specified, a summary of all events in the specified log is displayed in reverse chronological order.

▼ How to View PC NetLink Information

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose PC NetLink information you want to view.**

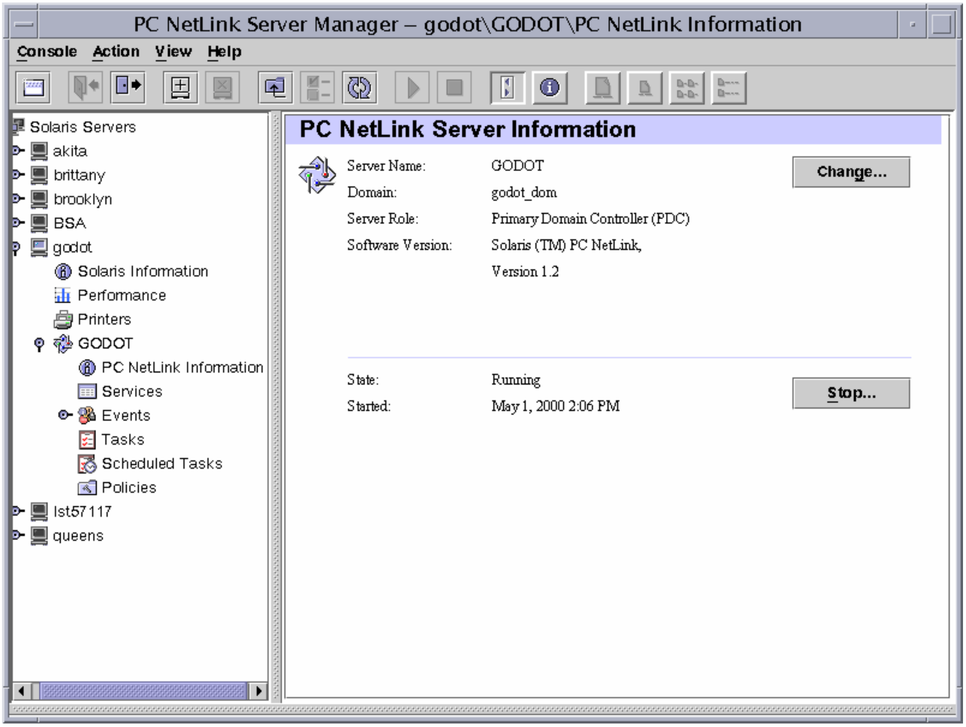
   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click PC NetLink Information.**

   The following screen appears.



PC NetLink Server Information

Server Name: GODOT
Domain: godot_dom
Server Role: Primary Domain Controller (PDC)
Software Version: Solaris (TM) PC NetLink, Version 1.2

State: Running
Started: May 1, 2000 2:06 PM

The data displayed in the Information view is current, though not automatically updated. To update the view with the most recent data, click Refresh in the View menu, or click PC NetLink Information again in the Navigation pane.

The following information is provided:

- PC NetLink server name
- PC NetLink server's domain name
- PC NetLink server's role; if BDC or member server, then the name of the PDC is also provided
- PC NetLink software version number
- State of the server (stopped or running)
- Date and time that the server was last started (if running)
- High availability; if the PC NetLink server is configured for high availability, that fact is noted

In addition to furnishing you with vital information, the Information window includes three buttons from which you can initiate various administrative tasks:

- *Change* – By clicking this button, you can initiate changes to the configuration of the PC NetLink system, including its server name, domain name, and domain role. See the section, "About Domain Configuration and Management" on page 46, along with the instructions that are included in that section.
- *Promote* – Clicking this button (which is available only for BDCs or member servers) enables you to upgrade the role of the server within its domain. See the section, "How to Promote a Server Within Its Domain" on page 59.
- *Stop (Start)* – Depending on whether the PC NetLink program is running or stopped, this button enables you to stop or start the program. See the section, "About Starting and Stopping Services" on page 39, along with the instructions that are included in that section.

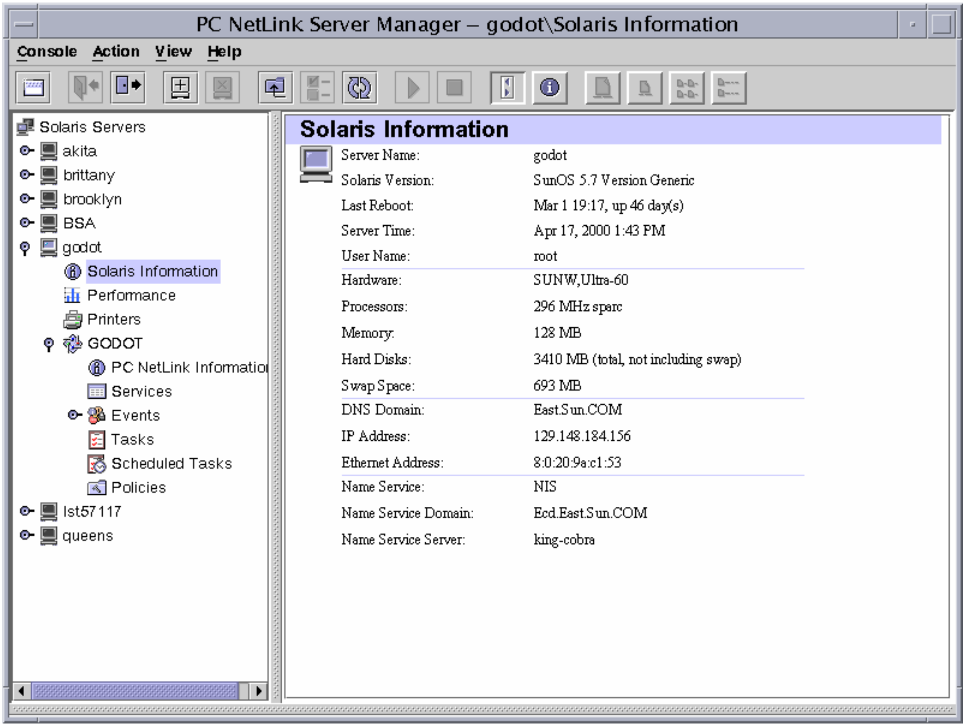
▼ How to View Solaris Information

1. **Using PC NetLink Server Manager, log on to the PC NetLink system whose Solaris information you want to view.**

   For instructions, see "How to Log On Using PC NetLink Server Manager" on page 36. To make any changes, you must be logged on as root.

2. **In the Results pane, double-click Solaris Information.**

The following screen appears.



Solaris Information

Server Name:	godot
Solaris Version:	SunOS 5.7 Version Generic
Last Reboot:	Mar 1 19:17, up 46 day(s)
Server Time:	Apr 17, 2000 1:43 PM
User Name:	root
Hardware:	SUNW,Ultra-60
Processors:	296 MHz sparc
Memory:	128 MB
Hard Disks:	3410 MB (total, not including swap)
Swap Space:	693 MB
DNS Domain:	East.Sun.COM
IP Address:	129.148.184.156
Ethernet Address:	8:0:20:9a:c1:53
Name Service:	NIS
Name Service Domain:	Ecd.East.Sun.COM
Name Service Server:	king-cobra

The data displayed in the Solaris Information view is current, though not automatically updated. To update the view with the most recent data, click Refresh in the View menu, or click PC NetLink Information again in the Navigation pane. The following information is provided:

- Server name
- Solaris operating environment version
- The last time the system was rebooted
- The current date and time on the server
- The name of the *current* user
- The hardware description
- The system’s processor type
- The amount of random access memory
- Total (not including swap) space on disks
- Swap space
- DNS domain name
- Internet Protocol (IP) address of the system
- Ethernet address of the system
- The name service currently in use
- The name service domain name
- The name of the name service server

CHAPTER 4

Setting Up Printing Services

With a PC NetLink server installed in your network, it won't matter whether Microsoft Windows or Solaris clients send their jobs to the printers that it serves. The PC NetLink software will recognize and process both types.

This chapter tells you how to set up a PC NetLink server as a print server, and offers background information that will help you keep printing tasks running smoothly. The process for setting up a Solaris printer to work in the network comprises three tasks:

- "Task 1 of 3 – How to Configure a Solaris Printer" on page 108
- "Task 2 of 3 – How to Set Up the Solaris Printer as a PC NetLink Shared Printer" on page 114
- "Task 3 of 3 – How to Make the PC NetLink Printer Available to Microsoft Windows Clients" on page 115

This chapter also explains:

- "How to Remove a PC NetLink Printer" on page 115
- "How to Change Printer Properties" on page 117

You need to perform the first two setup tasks only once per printer, and you use the PC NetLink Server Manager tool for the Solaris portion of the work. For the final two setup tasks, you use Microsoft Windows tools. The final task, making the new printer available to clients, requires that each client machine user add the printer.

About PC NetLink Printing Services

PC NetLink printing offers the following features:

- Clients can browse the network for available network printers. The browsing function is available from PC NetLink Server Manager (double-click the Printers icon), Network Neighborhood, and the Print Setup wizard of Windows NT and Windows 95 applications.
- As an administrator, you can administer PC NetLink print servers, printers, documents, and printer drivers remotely.
- As an administrator, after your first client installs the printer, you do not have to install printer driver files on other Windows NT and Windows 95 client computers to enable them to use a PC NetLink print server; this installation happens automatically because the driver is installed on the printer driver share. If all printing clients are running Windows NT or Windows 95, it only is necessary to install printer driver files in one place—at the PC NetLink print server.
- Clients can print to all networked printers that have their own direct Ethernet interface and have been configured as PC NetLink system printers.

Note – You cannot share a printer that is connected to a Solaris system that is not running PC NetLink software.

PC NetLink Printing Terms

In PC NetLink terminology, a *shared printer queue* is the mechanism through which a collection of print devices is accessed by LAN users with appropriate permissions. A *print device* is the actual hardware that produces printed output. Print devices can be connected directly to the server (via parallel port), to the network (via a network adapter card), or to a client computer on the network.

The Solaris operating environment, which your PC NetLink server runs, provides *LP Printer* functionality that mediates between the PC NetLink system, which sends clients' print requests to the LP service, and the print devices to which the LP service directs the requests. Users access print devices by sending their print jobs over the network to shared printer queues, which in turn forward the jobs to print devices.

In Windows NT terminology, a *printer* is the software interface between the operating system and the print device. The printer defines where the document will go before it reaches the print device (to a local port, to a file, or to a network print share), when it will go, and various other aspects of the printing process.

In PC NetLink terminology, the shared printer queue is the software interface between the application and the print device. When you administer a PC NetLink print server from Windows NT, a "printer" actually represents a shared printer queue.

A *printer driver* is a program that converts graphics commands into a specific printer language, such as PostScript. When you *add a printer*, you are installing a printer driver and making the printer (shared printer queue) available on the network by sharing it.

A *print server* is the computer that receives documents from clients.

Spooling is the process of writing the contents of a document to a file on disk. This file is called a *spool file*.

The PC NetLink program supports all of the print devices that the *local spooling system* supports. The local spooling system is the process that runs on the PC NetLink server's Solaris system, which handles system printing.

Network-interface print devices have their own network cards; they need not be physically connected to a print server because they are connected directly to the network.

PC NetLink Network Printing

The PC NetLink program supports true network printing. When Windows NT and Windows 95 clients connect to a correctly configured PC NetLink print server, the printer driver is automatically installed on the client computer.

If you install a newer or different printer driver on a PC NetLink server or a Windows NT or Windows 95 client computer, you must update the printer driver manually to have the new version copied on to your computer. You remove and then add the printer to download the printer driver automatically.

Setting Up PC NetLink Printing

Establishing a printer as a PC NetLink shared printer involves three groups of tasks:

- Configuring the printer as a Solaris printer
- Designating the printer as a shared PC NetLink printer
- Making the new printer available to individual clients

Note – Even though it is possible to configure a printer by way of the Solaris command line, it is recommended for experienced Solaris system administrators only. If you do not fit that description, you are advised to use the PC NetLink Server Manager method only.

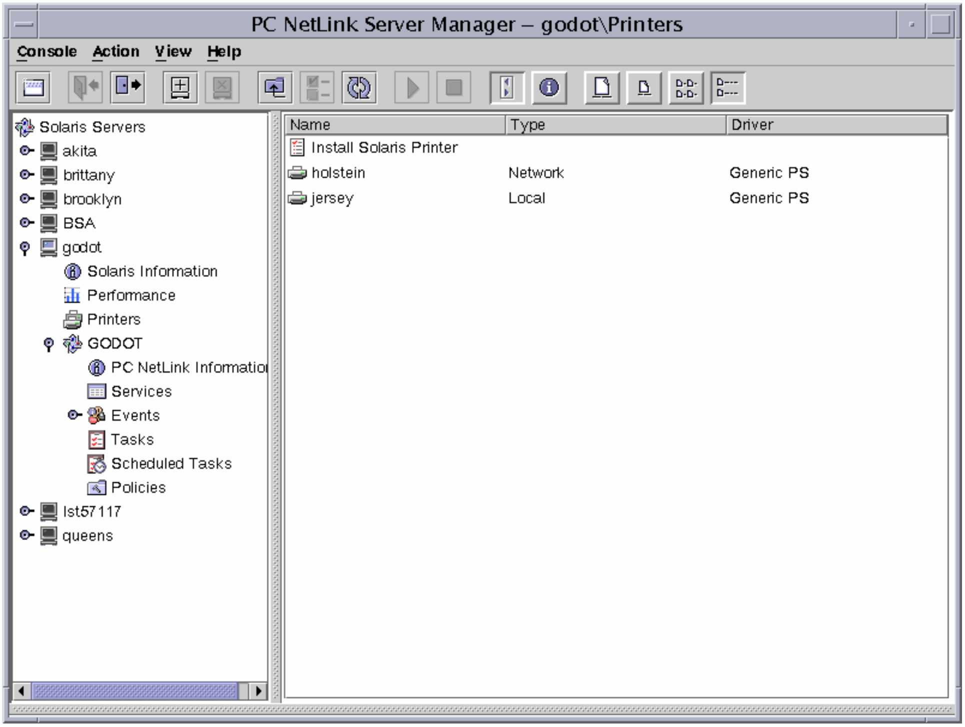
▼ Task 1 of 3 – How to Configure a Solaris Printer

1. **Using the PC NetLink Server Manager tool, log on as root to a PC NetLink server.**

   In the following examples, the server "godot" is a PC NetLink server.

2. **Double-click Printers in the Results pane.**

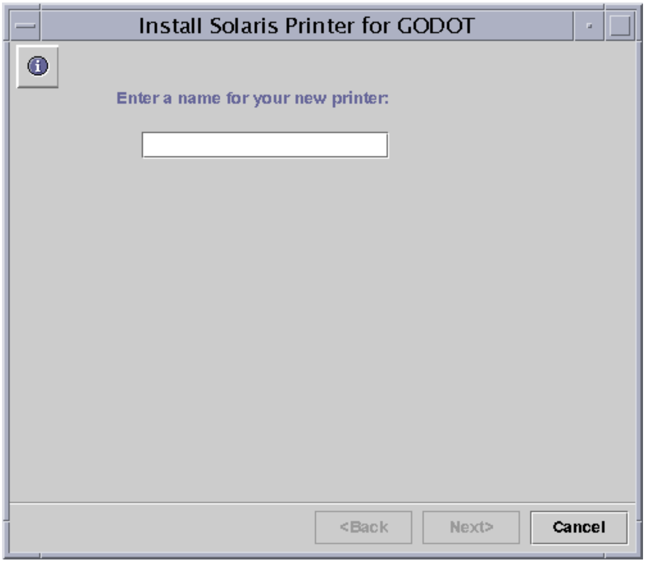
   A screen similar to the following appears, listing any *locally-spooled* Solaris printers and displaying the Install Solaris Printer wizard icon.



Name	Type	Driver
Install Solaris Printer		
holstein	Network	Generic PS
jersey	Local	Generic PS

3. **Double-click Install Solaris Printer.**

   The following dialog box appears.



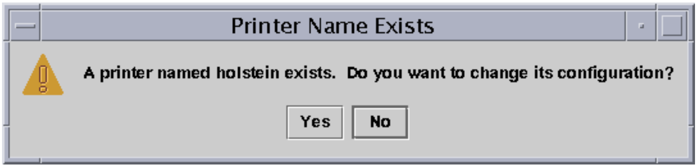
Install Solaris Printer for GODOT

Enter a name for your new printer:

4. **Type a name for the new printer into the provided field.**

   The name you choose will be its Solaris queue name. A printer name must be between 1 to 14 characters and can be made up of only the letters A through Z (uppercase, lowercase, or mixed case), the numerals 0 through 9, or an underline (_). The tool will only permit “legal” characters in the text field, and will not permit going on to the next step unless at least one character has been entered.

   The printer name you enter is checked against all existing Solaris printer names. If you enter the name of an existing printer, a screen similar to the following (with the actual name you chose inserted after “Printer”) will appear, asking for confirmation that you want to change its configuration.



Printer Name Exists

A printer named holstein exists. Do you want to change its configuration?

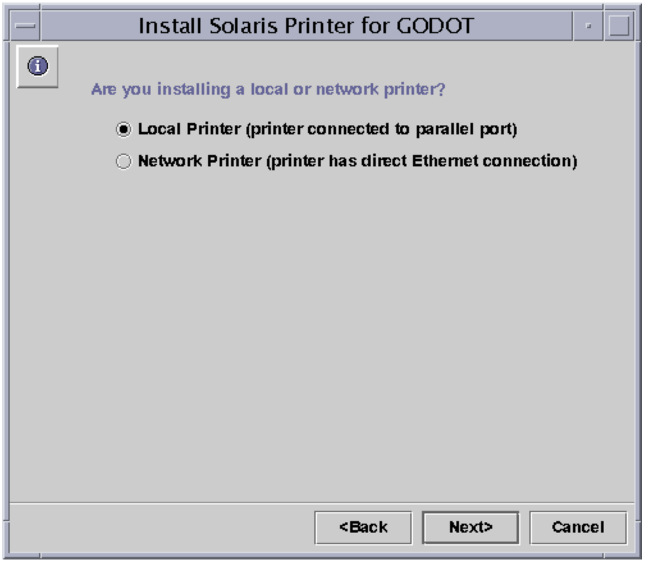
   (If you do not see the Printer Name Exists screen, continue with Step 5.)

   - *If you intended to change the configuration of an existing printer,* choose Yes. At that point, the rest of the settings of the Install Solaris Printer wizard will default to the settings that the printer currently is using. In this manner, the Install Solaris Printer wizard can be used to change the configuration of an existing Solaris printer.

- *If you did not intend to change the configuration of an existing printer,* click the default choice, No. This will return the screen for naming the new printer, and you can enter a different name and proceed to the next step.

5. **Click Next.**

   The following screen appears, requesting information about the printer's local or network status.



Install Solaris Printer for GODOT

Are you installing a local or network printer?

● Local Printer (printer connected to parallel port)

○ Network Printer (printer has direct Ethernet connection)

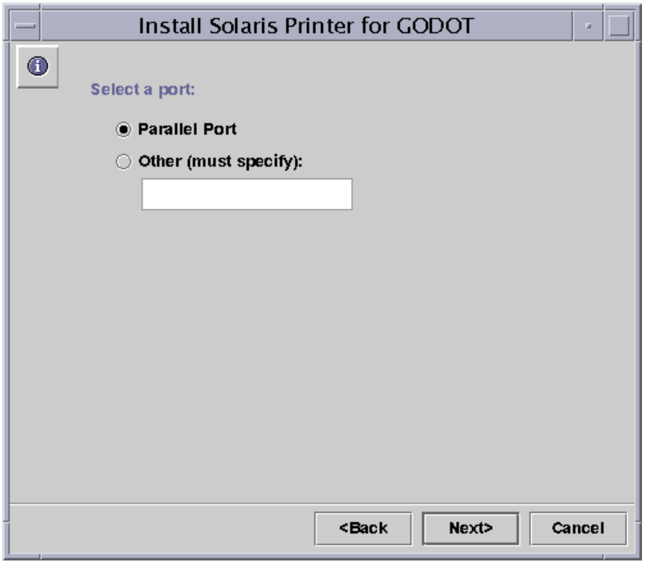
6. **Choose whether to install the printer as a local printer or as a network printer, and then click Next.**

Note – If you intend to use this printer as a PC NetLink network printer, it must be equipped with an Ethernet adapter and be plugged directly into the network. A local PC NetLink printer must be plugged directly into the PC NetLink system.

---

7. **Depending on which choice you make, do one of the following:**

- *Network Printer* — Proceed to Step 8.
- *Local Printer* — Use the ensuing screen to indicate the correct port, then click Next.



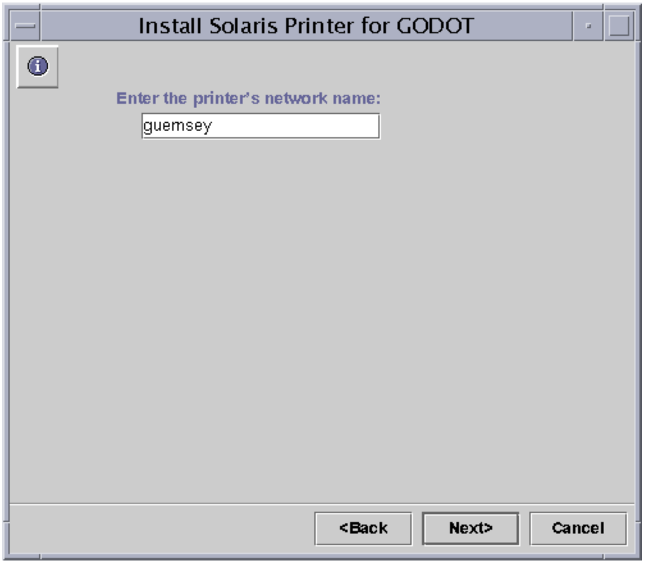
Install Solaris Printer for GODOT

Select a port:

● Parallel Port

○ Other (must specify):

8. **If you chose Network Printer, use the ensuing screen to enter the network name by which the printer is known, then continue with Step 9.**



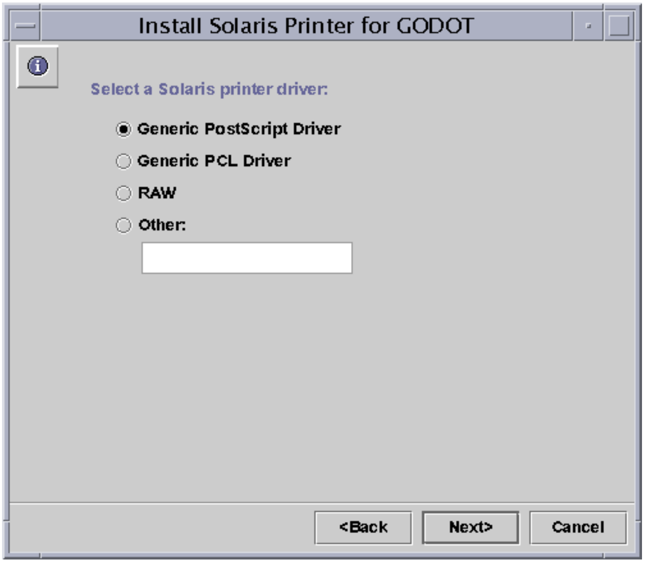
Install Solaris Printer for GODOT

Enter the printer's network name: guemsey

The name that is entered by default into the text field is the same name that you chose in Step 4. If you have reason to identify the printer by a different name on the network, delete the default name and enter the new one.

9. **Click Next.**

   The following screen appears, requesting information about your Solaris printer driver.



Install Solaris Printer for GODOT

Select a Solaris printer driver:

● Generic PostScript Driver

○ Generic PCL Driver

○ RAW

○ Other:

10. **Designate a Solaris printer driver.**

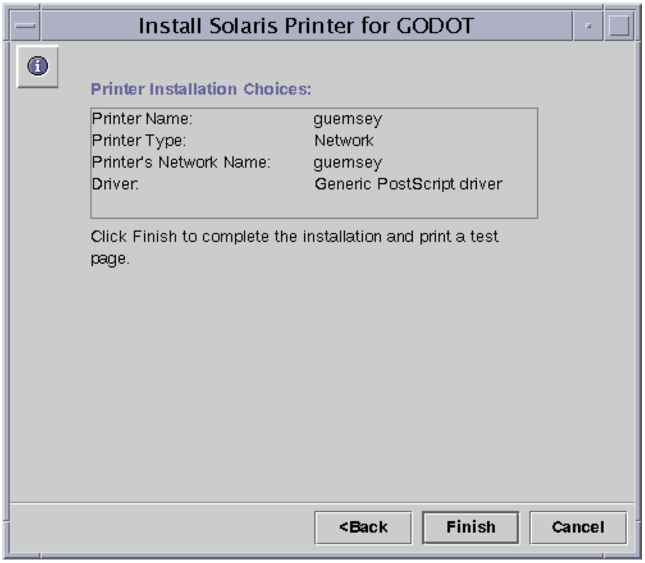
    The default choice is Generic PostScript Driver, which is suitable for most printers. If you are not sure which driver to choose, consult your printer manufacturer’s documentation. Most major printer manufacturers have websites that list the drivers for their products.

    The following is a list of Solaris Ready™ printers, which have been verified by Sun Microsystems as compatible with the Solaris operating environment:

    - Lexmark Optra S series, Optra Se series, Optra Color series, Optra SC series, and Optra N series laser printers
    - Xerox DocuPrint 4512 and 4517 laser printers
    - Xerox DocuPrint N24, N32, and N40 network laser printers
    - Xerox DocuPrint C55 and NC60 color laser printers

11. **Click Next.**

A confirmation screen similar to the following appears.



Install Solaris Printer for GODOT

Printer Installation Choices:

Printer Name:	guemsey
Printer Type:	Network
Printer's Network Name:	guemsey
Driver:	Generic PostScript driver

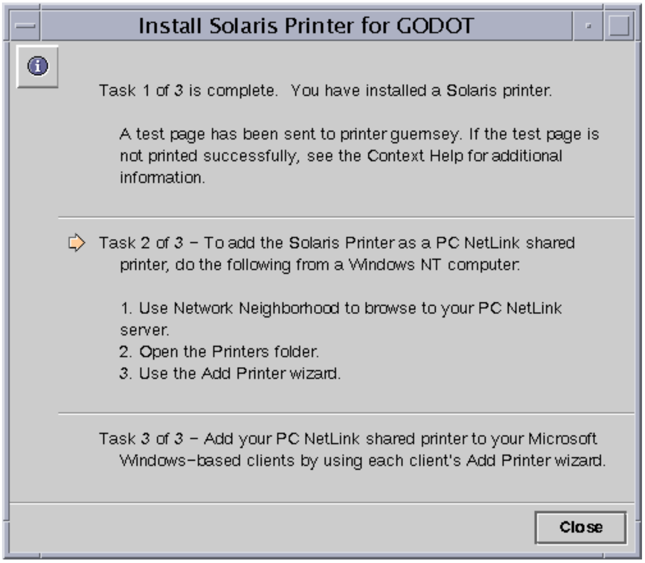
Click Finish to complete the installation and print a test page.

12. **Review and confirm the configuration choices.**

Make sure that your choices are accurately reflected. Click Back to change any of the configuration details that you want, or Cancel to halt the installation entirely and dismiss the window.

13. **Click Finish.**

    The following screen appears.



Install Solaris Printer for GODOT

Task 1 of 3 is complete. You have installed a Solaris printer.

A test page has been sent to printer guernsey. If the test page is not printed successfully, see the Context Help for additional information.

Task 2 of 3 – To add the Solaris Printer as a PC NetLink shared printer, do the following from a Windows NT computer:

1. Use Network Neighborhood to browse to your PC NetLink server.
2. Open the Printers folder.
3. Use the Add Printer wizard.

Task 3 of 3 – Add your PC NetLink shared printer to your Microsoft Windows-based clients by using each client's Add Printer wizard.

14. **Check the test page to be sure that the output is correctly printed.**

    If the Solaris driver you have chosen is either PostScript or PCL, a test page is sent to the printer after it has been properly installed. (No test page will be sent if you have chosen another type of driver.) If you detect a problem with the test page, it is possible that you have configured the printer incorrectly and you will have to begin the process again—paying particular attention to the printer driver that you have chosen.

    If your test page is printed successfully, you have a correctly installed Solaris printer. You can administer this printer from your Solaris command line using any of the standard Solaris printer commands (`lp`, `lpadmin`, `lpstat`, `cancel`, and so forth).

▼ Task 2 of 3 – How to Set Up the Solaris Printer as a PC NetLink Shared Printer

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Caution – You *must* complete the following procedure from a PC that has either Windows NT server or Windows NT workstation software installed. If you use any other type of machine, the installation will fail.

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1. **From a Windows NT workstation or server, use Network Neighborhood to open the PC NetLink system that you are using as the Solaris print server.**

2. **Open the Printers folder.**

3. **Use the Add Printer wizard to add the PC NetLink (Solaris) printer, paying particular attention to the following points that are specific to PC NetLink printers and may diverge from your usual Windows NT Add Printer routine:**

   - *Drivers for different operating systems* – As you use the Add Printer wizard, it presents you with a choice of installing drivers for various operating systems and asks you to choose from the list. *You do not need to make a selection unless you want to add a driver for an operating system in addition to the one that you are currently running*. The software detects the operating system that you are running and chooses it by default.
   - *Printer name* – As you use the Add Printer wizard, it prompts you to supply a printer name—with the name of the printer *driver* displayed as the default. *Do not enter the same name that you chose for the printer in Task 1*. You must use a different name for the printer. You can use the default name or type in a name of your own.

Note – To share a Windows NT-hosted printer with network computers, you select the Sharing tab in the printer's Properties sheet, click Shared, and then provide a *share name*. The system displays by default the name of the shared printer queue.

After you have added the printer in this manner, it is available to your clients.

▼ Task 3 of 3 – How to Make the PC NetLink Printer Available to Microsoft Windows Clients

● **Use each Microsoft Windows-based client's Add Printer wizard to add the PC NetLink shared printer.**

Note – After you have successfully set up your Solaris printer, established it as a PC NetLink shared printer, and made it available to your Microsoft Windows clients, do not use the `net pause` command from your Solaris command line as a method to pause the print queue. That command is interpreted by PC NetLink software as a command to disable the printer rather than merely to pause the queue. Instead, to pause the queue by way of the command line, use the `net print /hold` command.

▼ How to Remove a PC NetLink Printer

1. **At each client, delete the PC NetLink printer from the local Printers folder.**

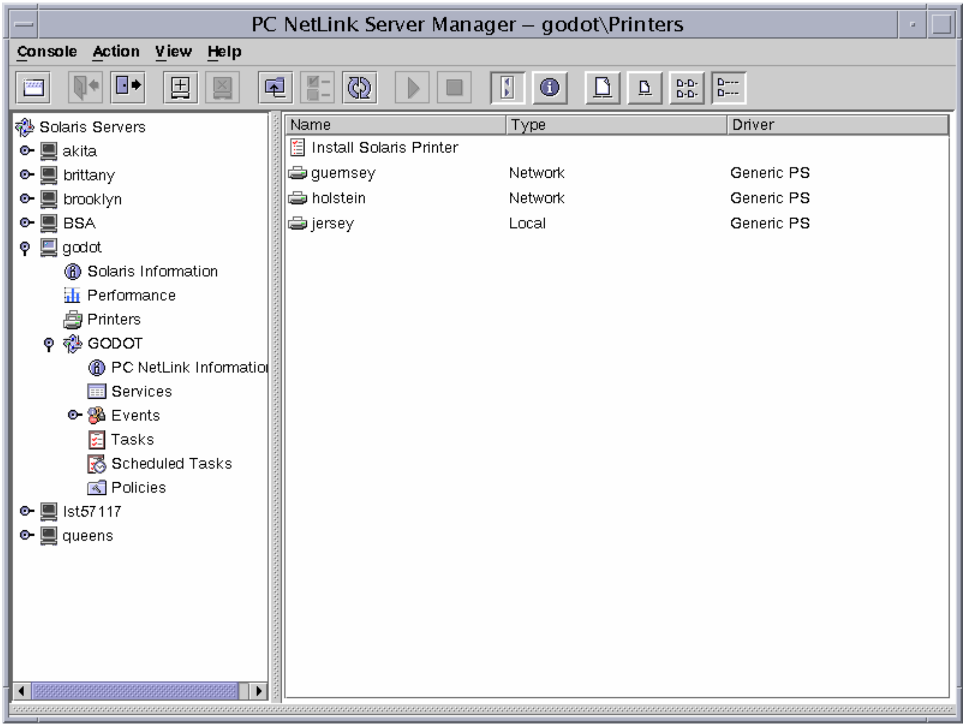
2. **Using Windows NT tools, delete the PC NetLink printer share.**

   Browse via Network Neighborhood to the Printers folder on the server, select the PC NetLink printer, then click Delete.

3. **In PC NetLink Server Manager, log on to the machine that you are using as the print server.**

4. **Double-click Printers.**

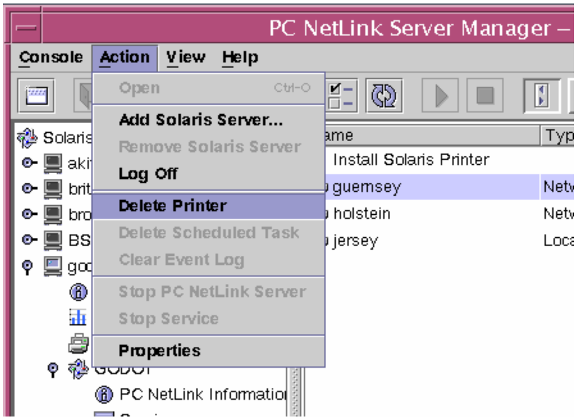
   A screen similar to the following appears, listing the installed printers.



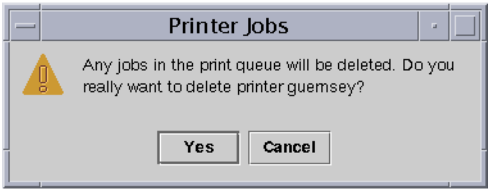
Name	Type	Driver
Install Solaris Printer		
guernsey	Network	Generic PS
holstein	Network	Generic PS
jersey	Local	Generic PS

5. **Click to highlight the name of the printer that you want to delete.**

6. **From the Action menu, choose Delete Printer.**



A warning similar to the following appears, alerting you that any print jobs currently in that printer’s queue will be deleted.


Printer Jobs

Any jobs in the print queue will be deleted. Do you really want to delete printer guemsey?

7. **Click Yes to confirm deletion of the printer, or Cancel.**

   The printer is removed and deleted from the PC NetLink Server Manager printer list.

▼ How to Change Printer Properties

1. **Using the PC NetLink Server Manager tool, log on as root to a PC NetLink server.**

2. **Double-click Printers in the Results pane.**

3. **Double-click the name of the printer whose properties you want to change.**

   The Printer Properties dialog appears, enabling you to change any of the following:

   - Solaris printer name
   - Printer type—either local or network
   - Local printer port—either parallel or “other”
   - Printer’s network name
   - Printer driver—generic PostScript, generic PCL, “raw,” or other

4. **Press OK to save the properties change, or Cancel to quit without making changes.**

CHAPTER 5

Implementing WINS and Maintaining Databases

This chapter provides detailed background information about the Windows Internet Name Service (WINS) that PC NetLink software incorporates, and considers important performance issues that can help you plan your network's implementation of WINS. Major sections dealing with such issues include:

- WINS and its function
- Name resolution services
- WINS server planning

This chapter also describes how to maintain databases—including WINS, the Access Control List (ACL), the PC NetLink Registry, and the Security Accounts Manager (SAM)—on a server running the PC NetLink program.

The following tasks are covered in this chapter:

- "How to Clean Up PC NetLink Databases" on page 146
- "How to Back Up PC NetLink Databases" on page 153
- "How to Restore Backed-Up Databases" on page 158
- "How to View, Modify, or Delete Scheduled Database Maintenance Tasks" on page 161

About WINS and Its Function

Windows Internet Name Service (WINS) is a database of available network resources and the computers that own them. This database is kept on a WINS server. A computer seeking such a resource "asks" the WINS server to look up the address of the machine that owns the resource. This speeds up network performance and reduces traffic when compared with the alternative “broadcast” scheme of identifying network resources.

WINS for PC NetLink systems is fully compatible with Microsoft WINS client implementations, including Microsoft TCP/IP-32 for Windows for Workgroups 3.11, Windows 98, Windows 95, Windows NT Workstation, Windows NT Server, and the Microsoft Network Client, Version 3.0.

PC NetLink WINS can replicate name databases with other PC NetLink WINS computers, and with WINS for Windows NT systems.

Note – You manage the NT functions of PC NetLink WINS and maintain it by using WINS Manager, the same Windows NT-based tool that you use to manage WINS for Windows NT. This allows both PC NetLink-based and Windows NT-based WINS servers to be managed from a single administrative tool on a single computer in the network.

About Name Resolution Services

PC NetLink WINS with TCP/IP requires a unique IP address and computer name for each computer on the network. Although programs use IP addresses to connect computers, administrators use “friendly” names to connect them. As a result, TCP/IP internetworks require a *name resolution service* that converts computer names to IP addresses and IP addresses to computer names.

An *IP address* is the unique address by which all other TCP/IP devices on the internetwork recognize that computer. For TCP/IP and the Internet, the *computer name* is the globally known system name, plus a *Domain Name System* (DNS) domain name. (On the local network, the computer name is the name that was supplied either during PC NetLink or Windows NT setup.) To ensure that both names and IP addresses are unique, a computer using NetBIOS over TCP/IP (also known as NetBT) registers its name and IP address on the network during system startup.

NetBIOS and DNS Computer Names

PC NetLink networking components rely on a naming convention known as *NetBIOS*. In general, NetBIOS computer names consist of a single part.

In contrast, TCP/IP components rely on the DNS naming convention. DNS computer names consist of two parts: a *host name* and a *domain name,* which combined form the *fully qualified domain name* (FQDN).

Fortunately, NetBIOS computer names are compatible with DNS host names, making interoperability possible between the two types of components. PC NetLink software combines the NetBIOS computer name with the DNS domain name to form the FQDN.

Note – In a PC NetLink system, the NetBIOS computer name defaults to the same name as the DNS host name. You can change the default if you need unique names.

A computer can use one or more of the following methods to ensure accurate name resolution in TCP/IP internetworks:

- WINS

  A computer can use WINS if at least one WINS server is available that contains a dynamic database that maps computer names to IP addresses. WINS can be used in conjunction with *broadcast* name resolution for an internetwork where other name resolution methods are inadequate. As described in the following section, WINS is a NetBIOS over TCP/IP mode of operation.

- Broadcast name resolution

  A computer also can use broadcast name resolution, which is a NetBIOS over TCP/IP mode of operation defined in RFC 1001/1002 as *b-node*. This method relies on a computer making IP-level broadcasts to register its name by “announcing” it on the network. Each computer in the broadcast area is responsible for challenging attempts to register a duplicate name and for responding to name queries for its registered name.

- DNS name resolution

  The Domain Name System provides a way to look up name mappings when connecting a computer to foreign hosts using NetBIOS over TCP/IP or applications such as FTP. (PC NetLink software does *not* use this method.)

- An `LMHOSTS` file to specify the NetBIOS computer name and IP address mappings, or a `HOSTS` file to specify the DNS name and IP address.

  On a local computer, the `HOSTS` file (used by Windows Sockets applications to find TCP/IP host names) and `LMHOSTS` file (used by NetBIOS over TCP/IP to find Microsoft networking computer names) can be used to list known IP addresses mapped with corresponding computer names. `LMHOSTS` is used for name resolution for small-scale networks or remote subnets where WINS is not available.

NetBIOS Over TCP/IP (NetBT) Name Resolution

NetBIOS over TCP/IP (NetBT) is the session-layer network service that performs name-to-IP address mapping for name resolution. In the PC NetLink program, NetBT is implemented through WINS and broadcast name resolution. The two most important aspects of the related naming activities are registration and resolution:

- *Registration* – The process used to register a unique name for each computer (node) on the network. A computer typically registers itself when it starts.
- *Resolution* – The process used to determine the specific address for a computer name.

Note – RFCs 1001 and 1002 specify how NetBIOS should be implemented over TCP/IP and define the name resolution nodes.

Defined within NetBT are nodes that specify how network resources are identified and accessed. The NetBT nodes supported by PC NetLink software are:

- *b-node* – Uses broadcast messages to resolve names
- *h-node* – First uses another type of node for name queries and then b-node if the name service is unavailable or if the name is not registered in the database

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Note – The RFCs refer to a NetBIOS Name Server (NBNS). WINS is an enhanced NBNS.

The two most common node types for Windows client computers are b-node and h-node.

For Dynamic Host Configuration Protocol (DHCP) users, the node type may be assigned by the DHCP server (depending on how the client has been configured). When WINS servers are in place on the network, NetBT resolves names on a client computer by communicating with the WINS server. When WINS servers are not in place, NetBT uses b-node broadcast messages to resolve names. NetBT also can use `LMHOSTS` files for name resolution, depending on how TCP/IP is configured on a particular computer.

PC NetLink software can respond to b-node and h-node NetBT nodes.

B-Node (Broadcast Node)

The b-node mode uses broadcasts for name registration and resolution. For example, if `CLIENT_PC1` wants to communicate with `CLIENT_PC2`, it will broadcast to all machines that it is looking for `CLIENT_PC2` and then will wait a specified time for `CLIENT_PC2` to respond.

The b-node mode has two major problems:

- In a large environment, it loads the network with broadcasts.
- Typically, routers do not forward broadcasts, so computers that are on opposite sides of a router will never hear the requests.

H-Node (Hybrid Node)

The h-node mode solves the most significant problems associated with broadcast messages and with routed-environment operations. It is a combination of b-node and another node type that uses broadcast messages as a last effort. If the WINS server is down—making broadcast messages a necessity—the computer continues to poll the WINS server until it can be reached again. The h-node also can be configured to use the `LMHOSTS` file after broadcast name resolution fails.

No broadcast messages are generated if the WINS server is running, and computers can be on opposite sides of routers. If the WINS server is down, b-node is used, allowing computers on the same side of a router to continue to operate as usual.

Note – For Microsoft TCP/IP users who configure TCP/IP manually, h-node is used by default unless the user does not specify addresses for WINS servers when configuring TCP/IP.

Other Combinations

Another variation, known as *modified b-node*, is used in PC NetLink networks to allow messages to go across routers. The modified b-node does not use a WINS server. In this mode, b-node uses a list of computers and addresses stored in an `LMHOSTS` file. If a b-node attempt fails, the system looks in `LMHOSTS` to find a name and then uses the associated address to cross the router. However, each computer must have this list, which creates an administrative burden in maintaining and distributing the list.

Windows for Workgroups 3.11 uses a modified b-node system. Windows NT uses this method if WINS servers are not used on the network. In Windows NT, some extensions have been added to this file to make it easier to manage—but modified b-node is not an ideal solution.

WINS and Broadcast Name Resolution

WINS provides a distributed database for registering and querying dynamic computer name-to-IP address mappings in a routed network environment. WINS solves the problems that occur with name resolution in complex internetworks.

WINS reduces the use of local broadcasts for name resolution and allows users to locate systems easily on remote networks. Additionally, when dynamic addressing through DHCP results in new IP addresses for computers that move between subnets, the changes are updated automatically in the WINS database. Neither the user nor the network administrator needs to make changes manually.

The following sections discuss how name resolution is provided by WINS and name query broadcast messages.

WINS in a Routed Environment

WINS consists of the following two components:

- The WINS server, which handles name queries and registrations
- Client software, which queries for computer name resolution

Windows networking clients (WINS-enabled Windows NT, Windows 98, Windows 95, or Windows for Workgroups 3.11 computers) can use WINS directly. Non-WINS computers on the internetwork that are b-node compatible (as described in RFCs 1001 and 1002) can access WINS through proxies (WINS-enabled computers that listen to name-query broadcasts and then respond for names that are not on the local subnet).

To allow browsing *without* WINS, the network administrator must ensure that the users' primary domain has PC NetLink, Windows NT Server, or Windows NT Workstation computers on both sides of the router to act as master browsers. These computers need correctly configured `LMHOSTS` files with entries for the domain controllers across the subnet.

With WINS, such strategies are not necessary because the WINS servers and proxies transparently provide the support necessary for browsing across routers where domains span the routers.

Note – If a client computer running Windows NT also is DHCP-enabled, and if the administrator specifies WINS server information as part of the DHCP options, the computer by default will be configured with WINS server information.

In a WINS and broadcast name resolution environment, a WINS-enabled client computer behaves in a different manner than a non-WINS-enabled client computer. These differences are apparent in the way these clients handle resolution, registration, release, and renewal, described in the next sections.

Name Resolution

With WINS servers in place on the internetwork, NetBIOS computer names are resolved using two basic methods depending on whether WINS resolution is available and enabled on the client computer. Regardless of which name resolution method is used, the process is not visible to the user after the system is configured.

- *If WINS is not enabled on the client* – The computer registers its name by sending name registration request packets (as broadcast messages) to the local subnet. To find a particular computer, the non-WINS computer sends name query request packets (as broadcast messages) on the local subnet. (This broadcast message cannot be passed on through IP routers.) If local name resolution fails, the local `LMHOSTS` file is consulted. These processes are followed whether the computer is a network server, a workstation, or another device.
- *If WINS is enabled on the client* – The computer first queries the WINS server. If this fails, it sends name registration and query requests (as broadcast messages) in the following series of steps:

1. A client’s name query request is sent first to the WINS server. If the name is found in the WINS database, then the client can establish a session based on the address mapping received from the WINS server.

2. If the WINS server query is unsuccessful and if the client computer is configured as an h-node, the client computer sends name query request packets (as broadcast messages) in the same manner as a non-WINS-enabled computer.

3. Finally, if other methods fail, the local `LMHOSTS` file is checked. (Included in the search are any centralized `LMHOSTS` files referred to in `#INCLUDE` statements in the local file.)

WINS servers accept and respond to User Datagram Protocol (UDP) name queries. Any name-to-IP address mapping registered with a WINS server can be provided reliably as a response to a name query. However, a mapping in the database does not ensure that the related device is currently running, only that a computer claimed the particular IP address and that it currently is a valid mapping.

Name Registration

Name registration ensures that the NetBIOS computer name and IP address are unique for each device.

- *If WINS is enabled on the client* – The name registration request is sent directly to the WINS server to be added to the database. A WINS server accepts or rejects a computer name registration depending on the current contents of its database, as follows:
  - If the database contains a different address for that name, WINS challenges the current entry to determine whether that device still claims the name.
  - If another device is using that name, WINS rejects the new name registration request.
  - Otherwise, WINS accepts the entry and adds it to its local database together with a time stamp, an incremental unique version number, and other information.
- *If WINS is not enabled on the client* – For a non-WINS computer to register its name, a name registration request packet is broadcast to the local network stating its NetBIOS computer name and IP address. Any device on the network that previously claimed that name challenges the name registration (with a negative name registration response), resulting in an error for the computer attempting to register the duplicate name. If the name registration request remains unchallenged for a specific time period, the requesting computer adopts that name and address.

After a non-WINS computer claims a name, it must challenge duplicate name registration attempts (with a negative name registration response) and respond positively to name queries issued on its registered name (with a positive name query response). The positive name query response contains the IP address of the computer so that the two systems can establish a session.

Name Release

When a computer finishes using a particular name, it no longer challenges other registration requests for the name. This is referred to as *releasing* a name.

- *If WINS is enabled on the client* – Whenever a computer is shut down properly, it releases its name to the WINS server, which marks the related database entry as released. If the entry remains released for a certain period of time, the WINS server marks it as extinct, updates the version number, and notifies other WINS servers of the change.
  - If a name is marked released at a WINS server, and a new registration arrives using that name but a different address, the WINS server immediately can give that name to the requesting client because it knows that the old client no longer is using that name. This might happen, for example, when a DHCP-enabled laptop changes subnets.

    - If the computer released its name during an orderly shutdown, the WINS server does not challenge the name when the computer is reconnected. If an orderly shutdown did not occur, the name registration with a new address causes the WINS server to challenge the registration. The challenge fails and the registration succeeds, because the computer no longer has the old address.
- *If WINS is not enabled on the client* – When a non-WINS computer releases a name, a broadcast is made to allow any systems on the network that might have cached the name to remove it. Upon receiving name query packets specifying the deleted name, computers simply ignore the request, allowing other computers on the network to acquire the released name.

Note – For non-WINS computers to be accessible from other subnets, their names must be added as static entries to the WINS database or in the `LMHOSTS` file(s) on the remote system(s) because they will respond only to name queries that originate on their local subnet.

Name Renewal

Client computers periodically are required to renew their NetBIOS name registrations with the WINS server. When a client computer first registers with a WINS server, the WINS server returns a message that indicates when the client will need to renew its registration, as follows:

- Default renewal interval for entries in the WINS database is six days.
- WINS clients register and refresh every three days.
- Primary and backup WINS servers should have the same renewal interval.
- An entry defined as static never expires.

If the entry is owned by the local WINS server, the name is released at the specified time unless the client has renewed it. If the entry is owned by another WINS server, the entry is revalidated at the specified time. If the entry does not exist in the database of the WINS server that owns the entry, it is removed from the local WINS database. A name renewal request is treated as a new name registration.

Caution – Incorrectly adjusting the renewal interval might adversely affect system and network performance.

WINS Proxy

A *WINS proxy* is a WINS-enabled computer that helps resolve name queries for non-WINS enabled computers in routed TCP/IP intranets. By default, non-WINS enabled computers are configured as b-node, which uses IP broadcasts for name queries. The WINS proxy computer listens on the local subnet for IP broadcast name queries.

When a non-WINS enabled computer sends an IP name query broadcast, the WINS proxy accepts the broadcast and checks its cache for the appropriate NetBIOS computer name-to-IP-address mapping. If the WINS proxy has the correct mapping in its cache, the WINS proxy sends this information to the non-WINS computer. If the name-to-IP-address mapping is not in cache, the WINS proxy queries a WINS server for the name-to-IP-address mapping.

If a WINS server is not available on the local subnet, the WINS proxy can query a WINS server across a router. The WINS proxy caches (stores in memory) computer name-to-IP-address mappings it receives from the WINS server. These mappings are used to respond to subsequent IP broadcast name queries from b-node computers on the local subnet.

The name-to-IP-address mappings that the WINS proxy receives from the WINS server are stored in the WINS proxy cache for a limited time. (By installation default, this value is six minutes. The minimum value is one minute.)

When the WINS proxy receives a response from the WINS server, it stores the mapping in its cache and responds to any subsequent name query broadcasts with the mapping received from the WINS server.

The role of the WINS proxy is similar to that of the DHCP/BOOTP relay agent, which forwards DHCP client requests across routers. Because the WINS server does not respond to broadcasts, a computer configured as a WINS proxy should be installed on subnets that include computers that use broadcasts for name resolution.

Note – To configure a Windows NT, Version 4.0, computer as a WINS proxy, you must manually edit that computer's Registry. The EnableProxy keyword must be set to 1 (REG_DWORD). This keyword is located in the following key: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Netbt \Parameters

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WINS and Dial-Up TCP/IP Networking Clients

Dial-up TCP/IP networking clients provide remote networking for telecommuters, mobile workers, and system administrators who monitor and manage servers at multiple branch offices. Users of dial-up TCP/IP networking on Windows 98, Windows 95, or Windows NT computers can dial in to access their networks remotely for services such as file and printer sharing, electronic mail, scheduling, and database access.

Windows 98, Windows 95, and Windows NT support routing TCP/IP traffic over dial-up TCP/IP connections through several different types of dial-up TCP/IP networking servers, including the following:

- UNIX system servers that support either of the industry-standard point-to-point protocol (PPP) or serial line IP (SLIP) dial-up TCP/IP networking standards
- Windows NT remote access service (RAS) servers
- Third-party remote access service servers that support PPP and/or SLIP connections, such as those that are available from CISCO, 3COM, and Bay Networks

Dial-up Windows 98, Windows 95, and Windows NT computers that are configured to route TCP/IP also can be configured to use WINS servers. (For details, see your Microsoft documentation.)

Dial-up Windows 98, Windows 95, and Windows NT computers that are configured to route TCP/IP and use WINS can access remotely their networks for services, including PC NetLink and Windows NT file and print sharing, electronic mail, scheduling, and database access.

About WINS Server Planning

The number of WINS servers that an enterprise requires is based on the number of WINS client connections per server and the network topology. The number of users that can be supported per server varies according to usage patterns, data storage, and processing capabilities of the WINS server computer.

Planning for WINS server implementation on the network typically requires consideration of the issues presented in the following table.

TABLE 5-1 WINS Server Implementation Planning Issues

Planning Issue	Guideline
How many WINS servers are required to ensure distribution of name query and name registration loads throughout the network?	One WINS server can handle NetBIOS name resolution requests for 10,000 computers. However, the location of routers on the network and the distribution of clients in each subnet should be considered when deciding how many WINS servers are required. See the following sections: “Planning for WINS Client Network Traffic,” “Planning for WINS Server Performance,” and “Planning Replication Partners and Proxies.”
Is the WAN bandwidth sufficient to support WINS server and WINS client name registration traffic?	See the next section, “Planning for WINS Client Network Traffic.”
How many WINS servers are needed for disaster recovery, backup, and redundancy requirements?	See “Planning for WINS Server Performance.”
How can a planned distribution of WINS servers throughout the network be validated before installation?	When planning a network configuration, a generally accepted approach is to consider the consequences of two simultaneous failures at different points on the network.

Planning for WINS Client Network Traffic

WINS clients generate the following types of network traffic:

- Name registration
- Name refresh
- Name release
- Name query

When a WINS-enabled client starts on the network, it sends a name registration request for the computer name, user name, domain name, and any additional Microsoft network client services running on the computer. In other words, when a WINS client starts on the network, it generates a minimum of three name registration requests and three entries in the WINS database.

A PC NetLink-based WINS client usually registers more NetBIOS names than other WINS-enabled clients. The name registration requests generated by a computer running under the PC NetLink program include the following:

- Server component
- Domain names
- Replicator service name
- Browser service name
- Additional network program and service names

WINS Client Traffic on Routed Networks

When planning for WINS client traffic on large routed networks, consider the effect of name query, registration, and response traffic routed between subnets.

Name requests and responses that occur at the daily startup of computers must pass through the traffic queues on the routers and may cause delays at peak times.

Daily Startup of WINS Clients

An active WINS client name registration in a WINS server database is replicated to all *pull partners* configured on that WINS server. (See “Configuring Replication Partners” on page 136 for an explanation of pull partners and *push partners*.) After some time, the active name registration is replicated to all WINS servers on the network.

When a WINS client is turned off at the end of the day, it releases the name. When the computer is started the next morning, the WINS client registers the name again with the WINS server and receives a new version ID. This new, active name registration entry is replicated to the WINS server’s pull partners as on the previous day.

Therefore, the number of name registration entries that are replicated each day is roughly equivalent to the number of computers started each day times the number of NetBIOS names registered at each computer.

On large networks (50,000 or more computers), the biggest traffic load may be the name registration requests generated when WINS clients start on the network. Fortunately, the difference in time zones in large enterprise networks provides some distribution of this WINS client startup load.

Roving User

Name challenge traffic occurs when a user stops the computer and then moves and starts the computer on a different subnet with another primary WINS server.

Typically, the name registration request is answered with a Wait for Acknowledgment message (100 bytes), and the new WINS server, assuming the active entry was replicated, challenges the IP address that is currently in its database for this name (Name Query packet, 92 bytes).

When there is no reply, as can be expected in this case, the WINS server repeats the challenge two more times and then updates the name registration entry with the new IP address and a new version ID. The new version ID indicates that the entry must be replicated from its new "owning" WINS server to other WINS servers on the network.

Estimating WINS Client Traffic

You can estimate WINS client traffic based on the behavior of the WINS clients as described in the preceding sections.

However, when estimating WINS client traffic, you also must consider the network topology and the design or configuration of the routers in the network. In some cases it may not always be possible to predict the traffic load on a specific network router because the routers may be designed or configured to autonomously route traffic based on factors other than traffic load.

Planning for WINS Server Replication Across Wide Area Networks

The frequency of WINS database replication between WINS servers is a major planning issue. You should replicate the WINS database frequently enough that the down-time of any WINS server will not affect the reliability of the mapping information in the database of other WINS servers.

However, when planning WINS database replication frequency, you do not want the frequency to interfere with network throughput. This could occur if replication frequency is set to a short time interval.

Consider the network topology when planning for replication frequency. For example, if your network has multiple hubs connected by relatively slow wide area network (WAN) links, you can configure WINS database replication between WINS servers on the slow links to occur less frequently than replication on the local area network or on fast WAN links. This reduces traffic across the slow link and reduces contention between replication traffic and WINS client name queries.

For example, WINS servers at a central local area network site may be configured to replicate every 15 minutes, while database replication between WINS servers in different WAN hubs might be scheduled for every 30 minutes, and replication between WINS servers on different continents might be scheduled to replicate twice a day.

Planning for WINS Server Performance

When planning for a large-scale power outage where many computers will go on line simultaneously, the conservative recommendation is that you plan to include one WINS server and a backup server for every 10,000 computers on the network. A WINS server typically can service 1,500 name registrations per minute and 4,500 queries per minute.

Two factors enhance WINS server performance. WINS server performance can be increased by almost 25 percent on a computer with two processors. WINS server name replication response time can be improved measurably by using a dedicated disk.

After you establish WINS servers on an intranet, you can adjust the time between a WINS client name registration and name renewal. This is referred to as the Renewal interval. Setting this interval to reduce the numbers of registrations can help tune server response time. (The Renewal interval is specified in the WINS Server Configuration dialog box.)

Planning Replication Partners and Proxies

Choosing whether to configure another WINS server as a push partner or pull partner depends on several facts, including the specific configuration of servers at your site, whether the partner is across a wide area network (WAN), and how important it is to distribute changes throughout the network.

You should install only one computer configured as a WINS proxy on each subnet. Configuring more than one WINS proxy per subnet can overload the WINS servers on the same subnet.

In one possible configuration, you can designate one WINS server as the central server, and all other WINS servers as both push partner and pull partner of this central server. Such a configuration ensures that the WINS database on each server contains addresses for every node on the WAN.

Another option is to set up a chain of WINS servers, where each server is both the push partner and pull partner with a nearby WINS server. In such a configuration, the two servers at the ends of the chain would be push and pull partners with each other. Other replication partners can be established for your site’s needs.

Configuring WINS Servers and WINS Client Behavior

You should configure multiple WINS servers on your network to increase the availability and balance the load among servers. When using multiple servers, each WINS server should be configured with at least one other WINS server as its replication partner. You should have multiple WINS servers installed on your network for the following reasons:

- To distribute NetBIOS computer name query and registration processing load
- To provide WINS database redundancy, backup, and disaster recovery

Configuring a WINS server includes specifying information about when database entries are replicated between partners. A *pull partner* is a WINS server that pulls in replicas of database entries from its partner by requesting and then accepting replicas. A *push partner* is a WINS server that sends update notification messages to its partner when its WINS database has changed. When its partner responds to the notification with a replication request, the push partner sends a copy of its current WINS database to the partner.

For each WINS server, you must configure threshold intervals for triggering database replication, based on a specific time, a time period, or a certain number of new records. If you designate a specific time for replication, this occurs one time only. If a time period is specified, replication is repeated at that interval.

Use WINS Manager to configure WINS server management of WINS client mappings by using the configuration options in the WINS Server Configuration (Local) dialog box. The configuration options allow you to specify time intervals that govern WINS client behavior as described in the following table.

TABLE 5-2 WINS Server Time Interval Options

Configuration Option	Description
Renewal Interval	Specifies how often a client reregisters its name. The default is six days.

TABLE 5-2 WINS Server Time Interval Options

Configuration Option	Description
Extinction Interval	Specifies the interval between when an entry is marked as released and when it is marked as extinct. The default is dependent on the Renewal interval and, if the WINS server has replication partners, on the maximum replication time interval. The default is four days.
Extinction Timeout	Specifies the interval between when an entry is marked extinct and when the entry is finally scavenged from the database. The default is dependent on the Renewal interval and, if the WINS server has replication partners, on the maximum replication time interval. The default is six days.
Verify Interval	Specifies the interval after which the WINS server must verify that old names it does not own are still active. The default is dependent on the Extinction interval. The minimum allowable value is 24 days.

The Extinction Interval, Extinction Timeout, and Verify Interval are derived from the Renewal interval and the partner replication interval. The WINS server adjusts the values specified by the administrator to keep the inconsistency between a WINS server and its partners as small as possible.

You can change the following configuration parameters using the Advanced option in the WINS Server Configuration dialog box.

TABLE 5-3 WINS Server Advanced Configuration Options

Configuration Option	Description
Logging Enabled	Specifies whether logging of database changes to `J50.log` files should be turned on. (This option is ignored in PC NetLink WINS.)
Log Detailed Events	Specifies whether logging events is verbose mode. (This requires considerable computer resources and should be turned off if you are tuning for performance.)
Replicate Only With Partners	Specifies that replication occurs only with configured WINS pull or push partners. If this option is not checked, an administrator can ask a WINS server to pull or push from or to a non-listed WINS server partner. By default, this option is checked.
Backup On Termination	Specifies that the database will be backed up automatically when WINS Manager is stopped except when the computer is stopped.

TABLE 5-3 WINS Server Advanced Configuration Options

Configuration Option	Description
Migrate On/Off	Specifies that static unique and multihomed records in the database are treated as dynamic when they conflict with a new registration or replica. This means that if they are no longer valid, they will be overwritten by the new registration or replica. By default, this option is not checked.
Starting Version Count	Specifies the highest version ID number for the database. Usually, you will not need to change this value unless the database becomes corrupted and needs to start fresh. In such a case, set this value to a number higher than appears as the version number counter for this WINS server on all the remote partners that earlier replicated the local WINS server's records. WINS may adjust the value you specify to a higher one to ensure that the database records are replicated quickly to the WINS servers. This value can be seen in the View Database dialog box in WINS Manager.
Database Backup Path	Specifies the directory where the WINS database backups will be stored. If you specify a backup path, WINS automatically performs a full backup of its database to this directory. WINS also uses this directory to perform an automatic restoration of the database in the event that the database is found to be corrupted when WINS is started. Do not specify a network directory.

Configuring Replication Partners

WINS servers communicate among themselves to replicate their databases fully, ensuring that a name registered with one WINS server is eventually replicated to all other WINS servers within the network. All mapping changes converge within the replication period for the entire WINS system, which is the maximum time for propagating changes to all WINS servers. All released names are propagated to all WINS servers after they become extinct, based on the interval specified in WINS Manager.

Use the Replication Partners command in WINS Manager to configure replication partners and replication partner properties. There are two types of replication partners: pull and push:

- A pull partner is a WINS server that pulls (requests) WINS database entries from its push partners. The pull partner pulls new WINS database entries by requesting entries with a higher version number than the last entry it received during the last replication from that push partner.

The pull partner can notify push partners that replication is needed by using either of the following methods: an arbitrary time interval, as configured by the WINS administrator, or immediate replication, initiated by the WINS administrator using WINS Manager.

- A push partner is a WINS server that sends a message to its pull partners that the WINS database has changed. When the pull partners respond to the message with a replication request, the push partner sends a copy of its new WINS database entries to the pull partners.

  The push partner notifies pull partners of replication requirements by using either of the following methods: an arbitrary number of WINS updates (update count), as configured by the WINS administrator, or immediate replication initiated by the WINS administrator by using WINS Manager.

  If you modify the update count using WINS Manager, you then can open the WINS Server Configuration dialog box and click the OK button. As a result, the new value will take effect immediately.

Choosing whether to configure another WINS server as a push partner or pull partner depends on several considerations, including the specific configuration of servers at your site, whether the partner is across a wide area network (WAN), and how important it is to propagate the changes.

Replication is triggered when a WINS server polls another server to get replicated information. This can begin when the WINS server is started, and is repeated based on the configured update count or time interval, or by using WINS Manager to start immediate replication.

Replication also is triggered when a WINS server reaches a threshold set by the administrator. This is an update count for registrations and changes. In this case, the server notifies its pull partners that it has reached this threshold, and the other servers can then decide to pull replicated information.

It is always a good idea for replication partners to be both push and pull partners of each other. The primary and backup WINS servers must be both push and pull partners with each other to ensure that the primary and backup databases are consistent.

Managing Static NetBIOS-to-IP Address Mappings

Static mappings are non-dynamic database entries of NetBIOS computer name-to-IP address mappings for computers on the network that are not WINS-enabled or for special groups of network devices.

Use the Static Mappings command on the Mappings menu in WINS Manager to view, add, edit, delete, import, or filter static mappings.

Once a static name-to-IP address mapping is entered into the WINS server database, it cannot be challenged or removed except by an administrator who must remove it manually using WINS Manager. All changes made to the WINS server database using WINS Manager take effect immediately.

Note – A DHCP-reserved (or static) IP address for a unique name in a multihomed computer overrides an obsolete WINS static mapping if the WINS server advanced configuration option Migration On/Off is checked On.

Static NetBIOS name mappings can be any of the types listed in the following table.

TABLE 5-4 Static NetBIOS Name-Mapping Types

Type Option	Description
Unique	A unique name that maps to a single IP address. Contrast with Multihomed type.
Group	Also referred to as a “Normal Group.” When adding an entry to Group using WINS Manager, you must enter the computer name and IP address. However, the IP addresses of individual members of Group are not stored in the WINS database. Because member addresses are not stored, there is no limit to the number of members that can be added to a group. Broadcast name packets are used to communicate with group members. Contrast with Internet Group type.
Domain Group	A NetBIOS name-to-IP address mapping that has 0x1C as the 16th byte. A Domain Group stores up to a maximum of 25 addresses for members. For registrations after the 25th address, WINS overwrites a replica address or, if none is present, it overwrites the oldest registration.

TABLE 5-4 Static NetBIOS Name-Mapping Types

Type Option	Description
Internet Group	A user-defined group that enables you to classify resources such as printers for easy reference and browsing. The default 16th byte of an Internet Group name is set equal to 0x20. An Internet Group can store up to a maximum of 25 addresses for members. When you add an Internet Group, three unique records are added: • `InternetGroupName<0x20>` • `InternetGroupName<0x3>` • `InternetGroupName<0x0>` This is similar to the Domain Group. Internet Group members can be added as the result of dynamic group registrations. However, a dynamic member does not replace a static member that is added by using WINS Manager or by importing the `LMHOSTS` file. Contrast with Group type.
Multihomed	A unique name that can have more than one address. This is used for multihomed computers. The maximum number of addresses that can be registered as multihomed is 25. For registrations after the 25th address, WINS overwrites a replica address or, if none is present, it overwrites the oldest registration. Contrast with Unique type.

You can configure a WINS server to replicate only Domain, Internet, and Multihomed groups to its replication partners, by manually changing the Replication Type Registry parameter to a value of 1.

This procedure eliminates the replication of information (unique names) that is not needed outside the local domain, while allowing replication of special group information. When a group spans multiple domains that are serviced by other WINS servers, it is desirable to reduce replication traffic.

TABLE 5-5 Basic WINS Server Statistics Descriptions

Statistic	Description
Server Start Time	The time when this WINS server was started.
Database Initialized	The last time static mappings were imported into the WINS database.
Statistics Cleared	The time when statistics for the WINS server were last cleared with the Clear Statistics command from the View menu.
Last Replication Times	The times at which the WINS database was last replicated.
Periodic	The last time the WINS database was replicated based on the replication interval specified in the Preferences dialog box.

TABLE 5-5 Basic WINS Server Statistics Descriptions

Statistic	Description
Admin Trigger	The last time the WINS database was replicated because the administrator chose the Replicate Now button in the Replication Partners dialog box.
Net Update	The last time the WINS database was replicated as a result of a network request, which is a push notification message that requests propagation.
Total Queries Received	The number of name query request messages received by this WINS server. Successful indicates how many names were successfully matched in the database, and Failed indicates how many names this WINS server could not resolve.
Total Releases	The number of messages received that indicate a NetBIOS application has shut itself down. Successful indicates how many names were successfully released, and Failed indicates how many names this WINS server could not release.
Total Registrations	The number of messages received that indicate name registrations for clients.

You can display additional statistics by clicking Detailed Information on the Server menu. The following table describes these detailed information statistics.

TABLE 5-6 Detailed WINS Server Statistics Descriptions

Statistic	Description
Last Address Change	The time at which the last WINS database change was replicated
Last Scavenging Times	The last times that the database was cleaned for specific types of entries
Periodic	The time when the database was cleaned based on the renewal interval specified in WINS Server Configuration (Local)
Admin Trigger	The time when the database was last cleaned because the administrator chose the Initiate Scavenging command
Extinction	The time when the database was last cleaned based on the Extinction interval specified in the WINS Server Configuration dialog box
Verification	The time when the database was last cleaned based on the Verify interval specified in WINS Server Configuration dialog box
Unique Registrations	The number of name registration requests that have been accepted by this WINS server
Unique Conflicts	The number of conflicts encountered during registration of unique names owned by this WINS server

TABLE 5-6 Detailed WINS Server Statistics Descriptions

Statistic	Description
Unique Renewals	The number of renewals received for unique names
Group Registrations	The number of registration requests for groups that have been accepted by this WINS server
Group Conflicts	The number of conflicts encountered during registration of group names
Group Renewals	The number of renewals received for group names

Viewing WINS Server Status

WINS Manager allows you to view administrative and operational information about WINS servers. When you open WINS Manager, the title bar shows the IP address or computer name for the currently selected server, depending on whether you used the address or name to connect to the server. The right pane displays basic statistics about the selected WINS server.

Viewing the WINS Database

You can view actual dynamic and static mappings stored in the WINS database, based on the WINS server that owns the entries. Use WINS Manager to choose the Show Database command from the Mappings menu.

By default, the Show Database dialog box shows all mappings for the WINS database on the currently selected WINS server. You can select a Sort Order option to sort by IP address, computer name, time stamp for the mapping, version ID, or type. To view only a range of mappings, choose the Set Filter button.

This process, called *scavenging*, is done automatically over intervals defined by the relationship between the Renewal and Extinct intervals defined in the WINS Server Configuration (Local) dialog box. You can also clean the database manually.

To scavenge the WINS database, choose the Initiate Scavenging command from the Mappings menu. The following table describes the results of scavenging a WINS database.

TABLE 5-7 Effects of Scavenging WINS Database

State Before Scavenging	State After Scavenging
Owned active names for which the Renewal interval has expired	Marked *released*
Owned released name for which the Extinct interval has expired	Marked *extinct*
Owned extinct names for which the Extinct timeout has expired	Deleted
Replicas of extinct names for which the Extinct interval has expired	Deleted
Replicas of active names for which the Verify interval has expired	Revalidated
Replicas of extinct or deleted names	Deleted

Advanced Configuration Parameters for WINS

This section presents configuration parameters that affect the behavior of WINS and that you can modify only through the Windows NT Registry Editor. For some parameters, WINS can detect Registry changes immediately. For other parameters, you must restart WINS for the changes to take effect.

Caution – You can impair or disable WINS if you make incorrect changes in the Registry while using Registry Editor. Whenever possible, use WINS Manager to make configuration changes rather than using Registry Editor. If you make errors while changing values with Registry Editor, you will not be warned because the Registry Editor does not recognize semantic errors.

The following sections describe the value entries for WINS parameters that can only be set by adding an entry or changing values in Registry Editor.

Registry Parameters for WINS Servers

The Registry parameters for WINS servers are specified under the following key:
`..\SYSTEM\CurrentControlSet\Services\Wins\Parameters`

This lists all of the non-replication-related parameters needed to configure a WINS server. It also contains a `\Datafiles` subkey, which lists all the files that should be read by WINS to initialize or reinitialize its local database.

- `DoStaticDataInit`

Data type = REG_DWORD
Range = 0 or 1
Default = 0 (false—that is, the WINS server does not initialize its database)
If this parameter is set to a non-zero value, the WINS server will initialize its database with records listed in one or more files listed under the \Datafiles subkey. The initialization is done at process invocation and whenever a change is made to one or more values of the \Parameters or \Datafiles keys (unless the change is to modify the default value of DoStaticDataInit to 0).

The following parameters in this subkey can be set using the options available in the WINS Server Configuration dialog box:

- BackupDirPath
- DoBackupOnTerm
- LogDetailedEvents
- LoggingOn
- MigrateOn
- RefreshInterval
- RplOnlyWCnfPnrs
- TombstoneInterval (Extinction interval)
- TombstoneTimeout (Extinction timeout)
- VerifyInterval

Also, the \Wins\Parameters\Datafiles key lists one or more files that the WINS server should read to initialize or reinitialize its local database with static records. If the full path of the file is not listed, the directory of execution for the WINS server is assumed to contain the data file. The parameters can have any names (for example, DF1 or DF2). Their data types must be REG_EXPAND_SZ or REG_SZ.

Registry Parameters for Replication Partners

The \Wins\Partners key has two subkeys, \Pull and \Push, under which are subkeys for the IP addresses of all push and pull partners, respectively, of the WINS server.

Parameters for Push Partners

A push partner, listed under the \Partners\Pull key, is one from which a WINS server pulls replicas and from which it can expect update notification messages. The following parameter appears under the IP address for a specific push partner. You can set this parameter only by changing the value in the Registry:

- MemberPrec

Data type = REG_DWORD
Range = 0 or 1
Default = None

Specifies the order of precedence for this WINS partner, with 0 indicating low precedence and 1 indicating high precedence. Notice that dynamically registered names are always high precedence. When a 1C name is pulled from this WINS partner, the addresses contained in it are given this precedence level. The value can be 0 (low) or 1 (high). Set this value to 1 if this WINS server is serving a geographic location that is nearby.

The following parameters appear under this subkey and can be set in the WINS Server Configuration dialog box:

`..\SYSTEM\CurrentControlSet\Services\Wins\Partners\Pull`

- `InitTimeReplication`
- `CommRetryCount`

The following parameters appear under this subkey and can be set using the Preferences dialog box:

`..\SYSTEM\CurrentControlSet\Services\Wins\Partners`
`\Pull\`*IP Address*

- `SpTime` (Start Time for pull partner default configuration)
- `TimeInterval` (Replication interval)

For `SpTime`, WINS replicates at the set time if it is in the future for that day. After that, it replicates every number of seconds specified by `TimeInterval`. If `SpTime` is in the past for that day, WINS replicates every number of seconds specified by `TimeInterval`, starting from the current time (if `InitTimeReplication` is set to 1).

Parameters for Pull Partners

A pull partner of a WINS server, listed under the `\Partners\Push` key, is one from which it can expect pull requests to pull replicas and to which it sends update notification messages. The following parameters appear under this subkey and can be set using the options available in the WINS Server Configuration (Local) dialog box:

`..\SYSTEM\CurrentControlSet\Services\Wins\Partners\Push`

- `InitTimeReplication`
- `RplOnAddressChg`

The following parameter appears under this subkey and can be set using the options available in the Preferences dialog box:

`..\SYSTEM\CurrentControlSet\Services\`
`Wins\Partners\Push\`*IP Address*

- `UpdateCount`

About Database Management

All databases need to be backed up and cleaned periodically. PC NetLink Server Manager and various Solaris commands are the tools you use to maintain the databases; additionally, PC NetLink Server Manager enables you to schedule a routine for performing most database maintenance tasks automatically.

The following sections describe how to view, back up, restore, clean up, and compact the PC NetLink databases.

Compacting the WINS Database

There is no built-in limit to the number of records that a WINS server can replicate or store. The size of the database is dependent on the number of WINS clients on the network. The WINS database grows over time as a result of clients starting and stopping on the network.

The size of the WINS database is not directly proportional to the number of active client entries. Over time, as some WINS client entries become obsolete and are deleted, there remains some unused space.

To recover space and improve performance, you use PC NetLink Server Manager or the Solaris command line on the PC NetLink server to compact the database.

Backing Up and Restoring the WINS Database

You use the PC NetLink Server Manager, the Solaris command line, or the Windows NT tool, WINS Manager, to back up and restore the WINS database. The following WINS server database files are stored in the `/var/opt/lanman/wins` directory. This directory was created when you installed the PC NetLink program.

- `schema.db` – This file is used by WINS to hold information about the structure of its database.
- `wins.db` – This is the WINS database file.

⚠ **Caution –** Do not remove or tamper with the `schema.db` or `wins.db` files in any manner.

You can also use the Windows NT tool, WINS Manager, to examine the current database backup path and to establish a new one.

Cleaning Up the Databases

Cleaning up (also known as “scavenging”) the WINS database is an administrative task related to backing up the database. Like any database, the WINS server database of address mappings needs to be cleaned periodically.

You should periodically clear the local WINS database of released entries and old entries that were registered at another WINS server and replicated to the local WINS server, but for some reason did not get removed from the local WINS database. Use PC NetLink Server Manager for database cleanup.

Database Maintenance Tasks

The following sections provide detailed instructions for scheduling and performing routine PC NetLink database maintenance tasks. You complete the tasks by using PC NetLink Server Manager.

▼ How to Clean Up PC NetLink Databases

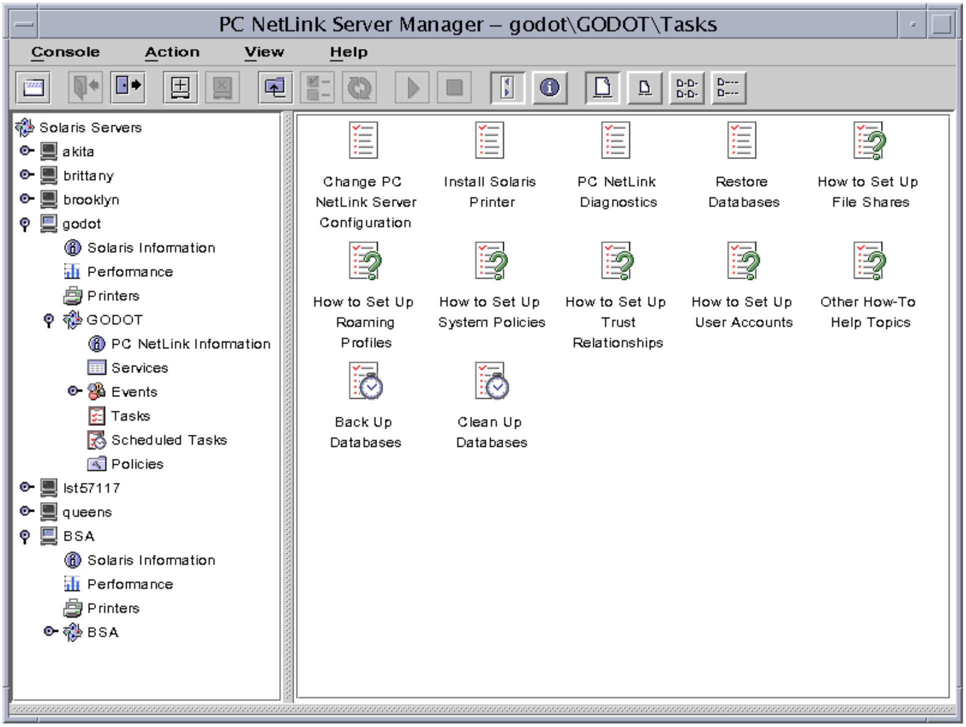
1. **Using PC NetLink Server Manager, log on as root to the PC NetLink server on which you want to clean up one or more databases.**

2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Tasks.**

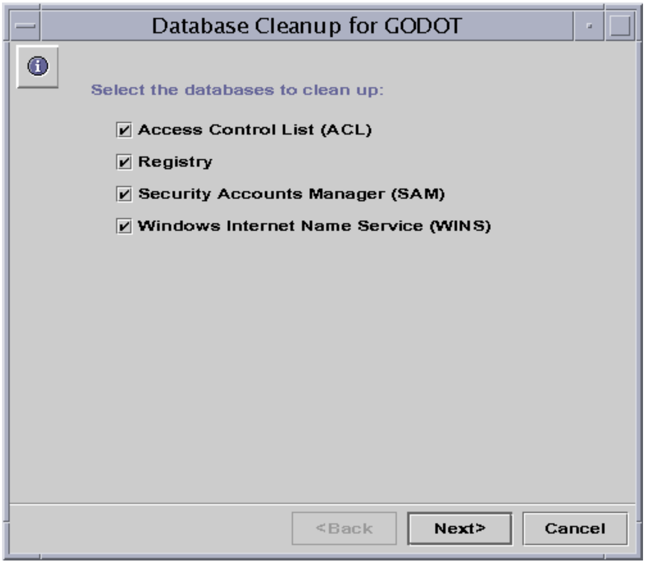
   A screen similar to the following appears.



   Note that two of the tasks—Back Up Databases and Clean Up Databases—are marked with a clock face. This indicates that these are tasks that you can run immediately, or automatically on a periodic schedule that you create.

4. **Double-click Clean Up Databases.**

The resulting screen presents a list of databases to clean up. (Note that the WINS option is greyed-out if you are not using the service.)



Database Cleanup for GODOT

Select the databases to clean up:

☑ Access Control List (ACL)

☑ Registry

☑ Security Accounts Manager (SAM)

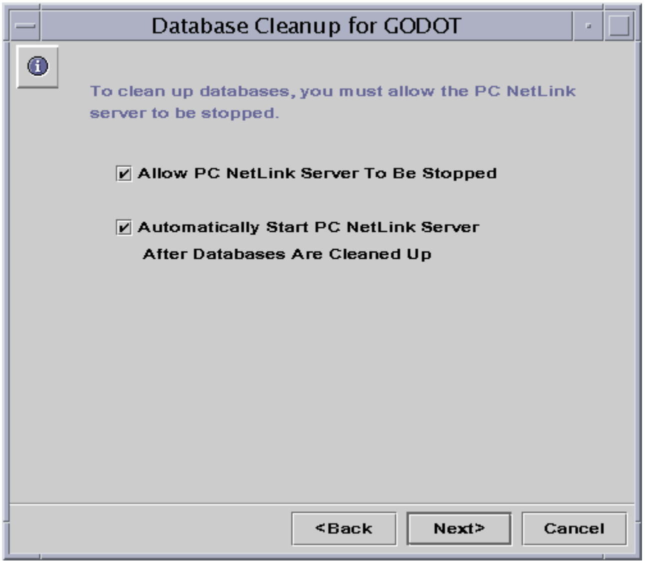
☑ Windows Internet Name Service (WINS)

The Cleanup wizard performs the following tasks on the following databases:

- Checks, repairs, and prunes obsolete entries in the Access Control List (ACL), and synchronizes ACL information with the Solaris file system
- Checks and repairs the Registry
- Checks and repairs the Security Accounts Manager (SAM)
- Checks and removes obsolete entries from the WINS database

5. **Choose all of the databases that you want to clean up, then click Next.**

   The following screen appears.



Database Cleanup for GODOT

To clean up databases, you must allow the PC NetLink server to be stopped.

☑ Allow PC NetLink Server To Be Stopped

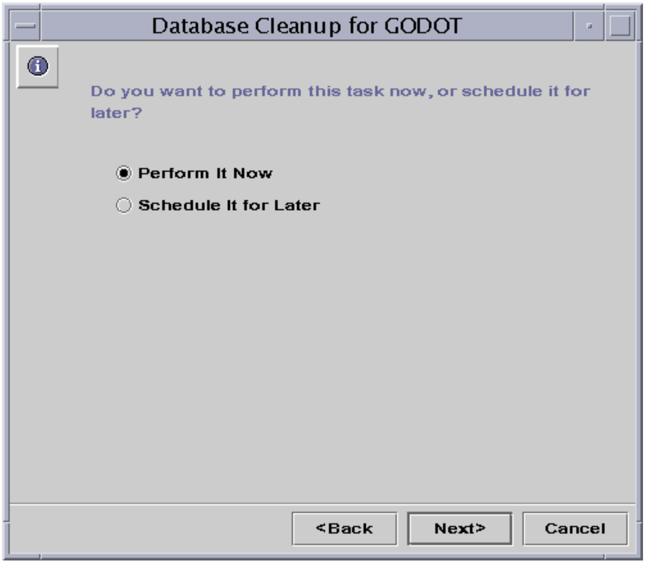
☑ Automatically Start PC NetLink Server After Databases Are Cleaned Up

6. **Choose Allow PC NetLink Server To Be Stopped.**

   You must choose this to proceed. After you have chosen this, you have the option of permitting the system to restart the server automatically after the completion of the task. If you choose to uncheck this option, which is selected by default, you must restart the server manually to complete the task.

7. **Click Next.**

   If you continue the procedure by clicking Next, the resulting screen prompts you for scheduling information.



Database Cleanup for GODOT

Do you want to perform this task now, or schedule it for later?

● Perform It Now

○ Schedule It for Later

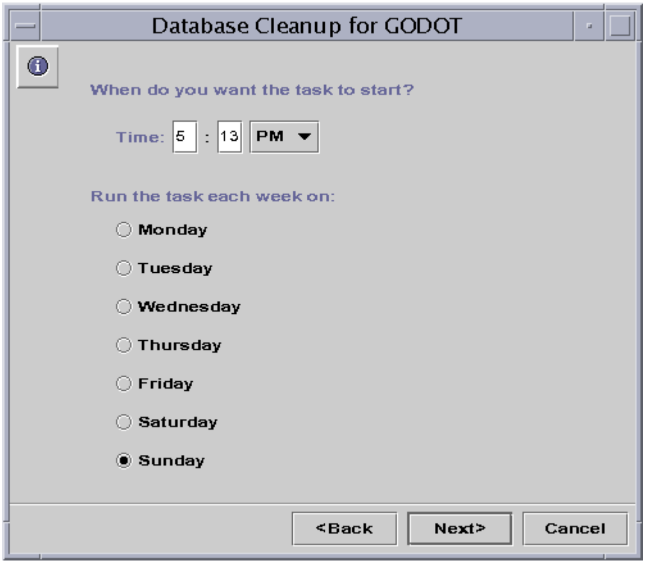
8. **Choose Perform It Now or Schedule It for Later and then click Next.**

9. **Depending on the choice you made, do one of the following:**

   - *Perform It Now* – Skip to Step 14.
   - *Schedule It for Later* – Continue with Step 10.

10. **Choose whether to run the task once, daily, weekly, or monthly, and then click Next.**

    A screen similar to the following appears.



Database Cleanup for GODOT

When do you want the task to start?

Time: 5 : 13 PM

Run the task each week on:

- ○ Monday
- ○ Tuesday
- ○ Wednesday
- ○ Thursday
- ○ Friday
- ○ Saturday
- ● Sunday

The example shows the choices you must make when scheduling the task to be run weekly. Depending on your selection, you must furnish the following information about when you want the task to be run:

- *Just Once* – The time of day (noon is regarded as 12 PM and midnight is regarded as 12 AM in this wizard) and the specfic date.
- *Daily* – The time of day.
- *Weekly* – The time of day and the name of the day.
- *Monthly* – The time of day and the date of the month; note that if you select the 29th of the month, the task will be performed in February during “leap” years only, and if you select the 31st day of the month, the task will be performed during 31-day months only.

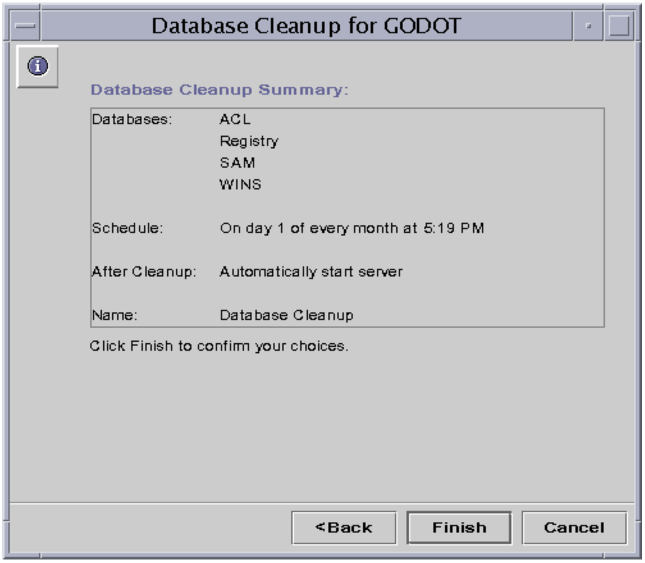
11. **Click Next.**

12. **In the text field of the resulting screen, enter a name for the task or accept the default.**

    The name *must* be unique; it must not be shared with any other task.

13. Click Next.

A summary screen similar to the following appears.



Database Cleanup for GODOT

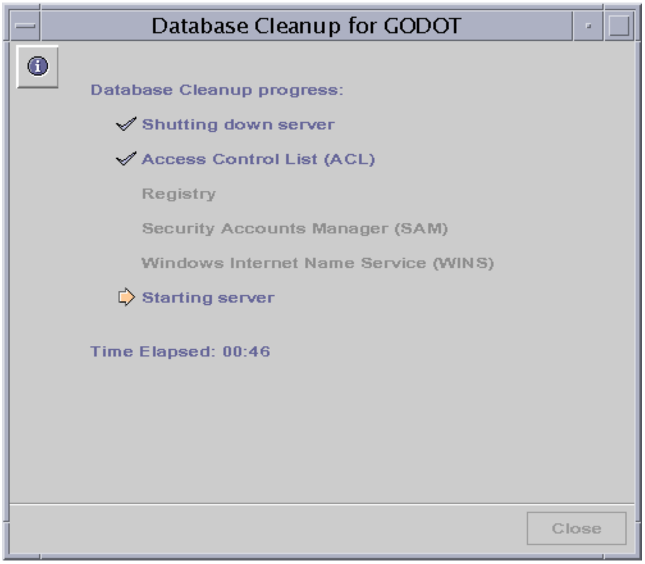
Database Cleanup Summary:

Databases:	ACL Registry SAM WINS
Schedule:	On day 1 of every month at 5:19 PM
After Cleanup:	Automatically start server
Name:	Database Cleanup

Click Finish to confirm your choices.

14. Confirm your choices, then click Finish to schedule the task (or perform it immediately if you chose Perform It Now), Back to correct your choices, or Cancel to dismiss the window and leave the task unscheduled and unperformed.

If you elected to begin the task immediately, the resulting screen informs you of the progress of the task, marking pending activity with an arrow and completed activity with a checkmark.



Database Cleanup for GODOT

Database Cleanup progress:

✓ Shutting down server

✓ Access Control List (ACL)

Registry

Security Accounts Manager (SAM)

Windows Internet Name Service (WINS)

⇨ Starting server

Time Elapsed: 00:46

15. **(Optional) If you did *not* choose to have the PC NetLink server restarted automatically, restart it by following the instructions in "How to Start the PC NetLink Server" on page 40 or "How to Stop the PC NetLink Server From the Command Line" on page 42.**

    Any changes you have made will not become effective until you restart the server.

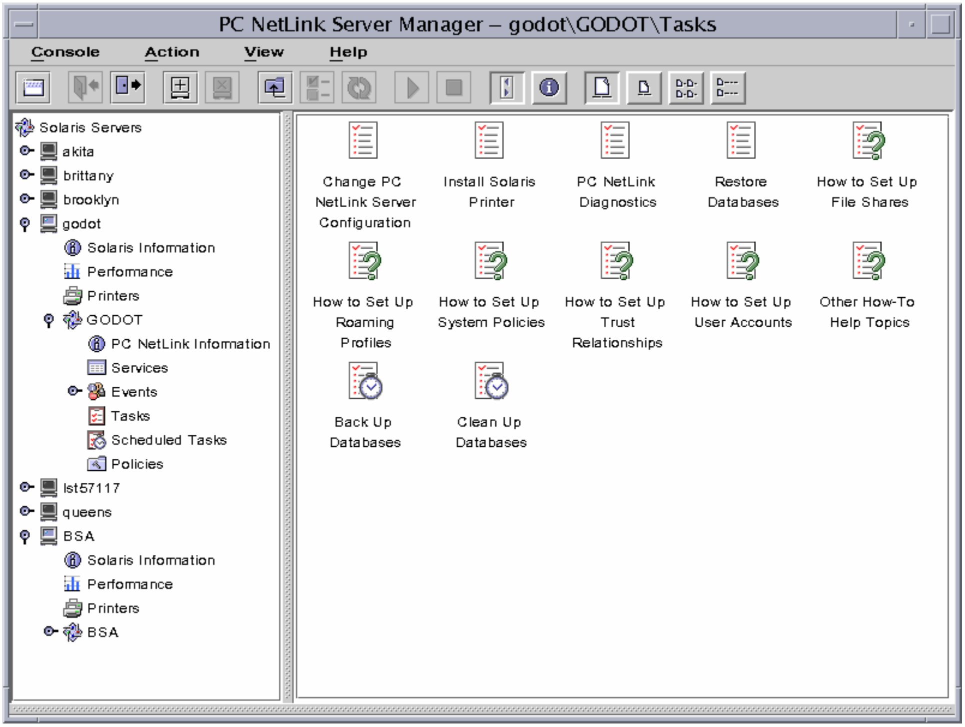
How to Back Up PC NetLink Databases

1. **Using PC NetLink Server Manager, log on as root to the PC NetLink server on which you want to back up one or more databases.**
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Tasks.**

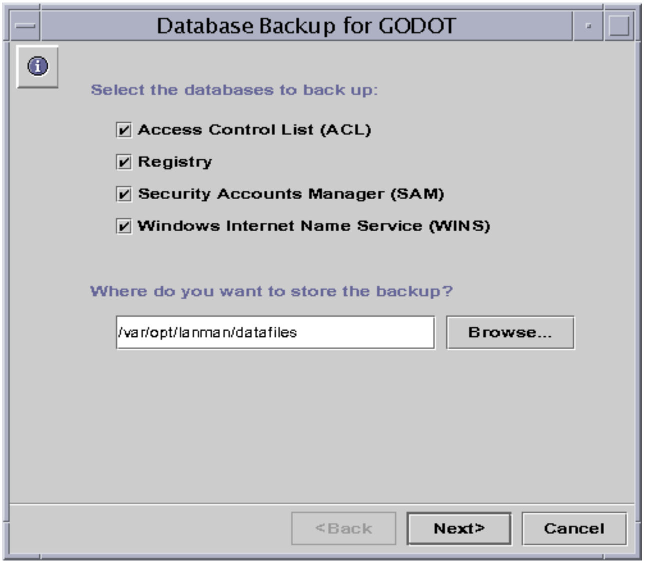
   A screen similar to the following appears.



   Note that two of the tasks—Back Up Databases and Clean Up Databases—are marked with a clock face. This indicates that these are tasks that you can run automatically on a periodic schedule that you create.

4. **Double-click Back Up Databases.**

   The resulting screen presents a list of databases to back up. (Note that the WINS option is greyed-out if you are not using the service.)



Database Backup for GODOT

Select the databases to back up:

☑ Access Control List (ACL)

☑ Registry

☑ Security Accounts Manager (SAM)

☑ Windows Internet Name Service (WINS)

Where do you want to store the backup?

/var/opt/lanman/datafiles

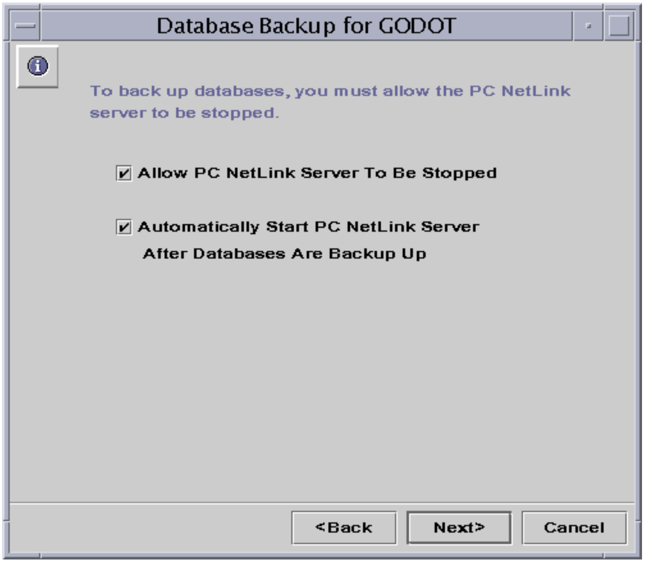
5. **Choose all of the databases that you want to back up.**

6. **In the text field under “Where do you want to store the backup,” accept the default location, browse for a different location, or enter the full path name to a new location.**

   You must store your backup file as a Solaris file in an existing directory on the PC NetLink system, rather than locally. If you specify a path to a nonexistent directory, a dialog box will ask whether you want the wizard to create the directory for you.

7. **Click Next.**

   A screen similar to the following appears.



Database Backup for GODOT

To back up databases, you must allow the PC NetLink server to be stopped.

☑ Allow PC NetLink Server To Be Stopped

☑ Automatically Start PC NetLink Server After Databases Are Backup Up

8. **Choose Allow PC NetLink Server To Be Stopped.**

   You must choose this to proceed. After you have chosen this, you have the option of permitting the system to restart the server automatically after the completion of the task. If you choose to uncheck this option, which is selected by default, you must restart the server manually to complete the task.

9. **Click Next.**

   If you continue the procedure by clicking Next, the resulting screen prompts you for scheduling information.

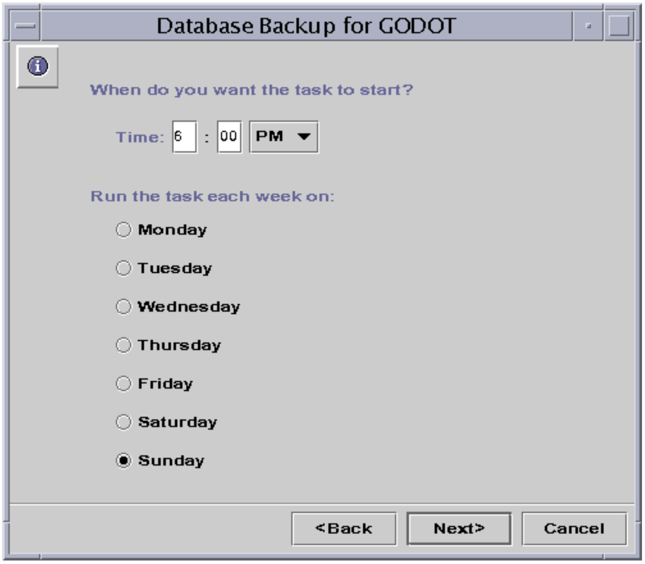
10. **Choose Perform It Now or Schedule It for Later and then click Next.**

11. **Depending on the choice you made, do one of the following:**

    - *Perform It Now* – Skip to Step 16.
    - *Schedule It for Later* – Continue with Step 12.

12. **Choose whether to run the task once, daily, weekly, or monthly, and then click Next.**

    A screen similar to the following appears.

    Database Backup for GODOT

    When do you want the task to start?

    Time: 6 : 00 PM

    Run the task each week on:

    ○ Monday
    ○ Tuesday
    ○ Wednesday
    ○ Thursday
    ○ Friday
    ○ Saturday
    ● Sunday

    The example shows the choices you must make when scheduling the task to be run weekly. Depending on your selection, you must furnish the following information about when you want the task to be run:

    - *Just Once* – The time of day (noon is regarded as 12 PM and midnight is regarded as 12 AM in this wizard) and the specfic date.
    - *Daily* – The time of day.
    - *Weekly* – The time of day and the name of the day.
    - *Monthly* – The time of day and the date of the month; note that if you select the 29th of the month, the task will be performed in February during “leap” years only, and if you select the 31st day of the month, the task will be performed during 31-day months only.

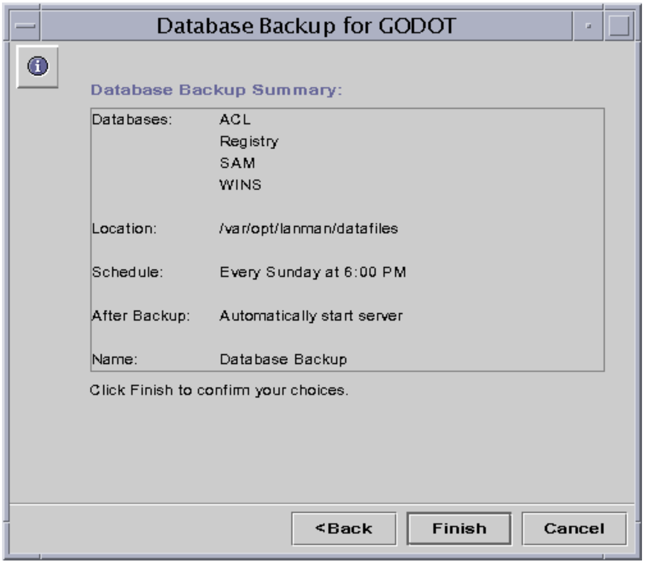
13. **Click Next.**

14. **In the text field of the resulting screen, enter a name for the task or accept the default.**

    The name *must* be unique; it must not be shared with any other task.

15. **Click Next.**

A summary screen similar to the following appears.



Database Backup for GODOT

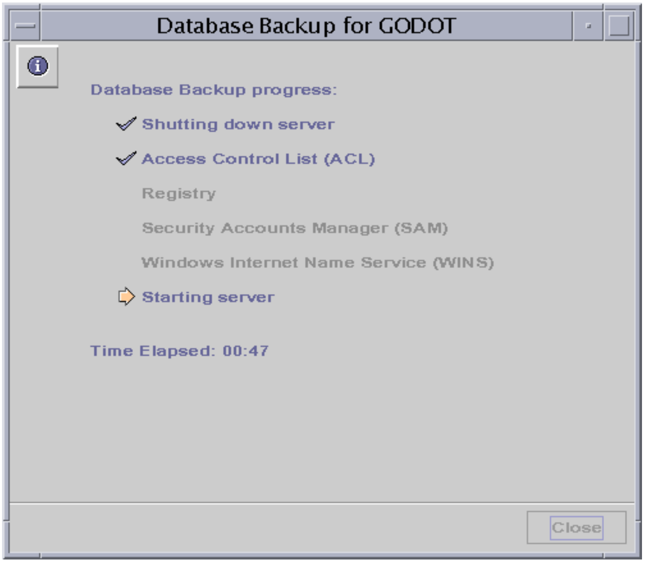
Database Backup Summary:

Databases:	ACL Registry SAM WINS
Location:	/var/opt/lanman/datafiles
Schedule:	Every Sunday at 6:00 PM
After Backup:	Automatically start server
Name:	Database Backup

Click Finish to confirm your choices.

16. **Confirm your choices, then click Finish to schedule the task (or perform it immediately if you chose Perform It Now), Back to correct your choices, or Cancel to dismiss the window and leave the task unscheduled and unperformed.**

If you elected to begin the task immediately, the resulting screen informs you of the progress of the task, marking pending activity with an arrow and completed activity with a checkmark



Database Backup for GODOT

Database Backup progress:

✓ Shutting down server

✓ Access Control List (ACL)

Registry

Security Accounts Manager (SAM)

Windows Internet Name Service (WINS)

⇨ Starting server

Time Elapsed: 00:47

17. **(Optional) If you did *not* choose to have the PC NetLink server restarted automatically, restart it by following the instructions in "How to Start the PC NetLink Server" on page 40 or "How to Start the PC NetLink Server From the Command Line" on page 42.**

    Any changes you have made will not become effective until you restart the server.

▼ How to Restore Backed-Up Databases

1. **Using PC NetLink Server Manager, log on as root to the PC NetLink server on which you want to restore one or more databases.**

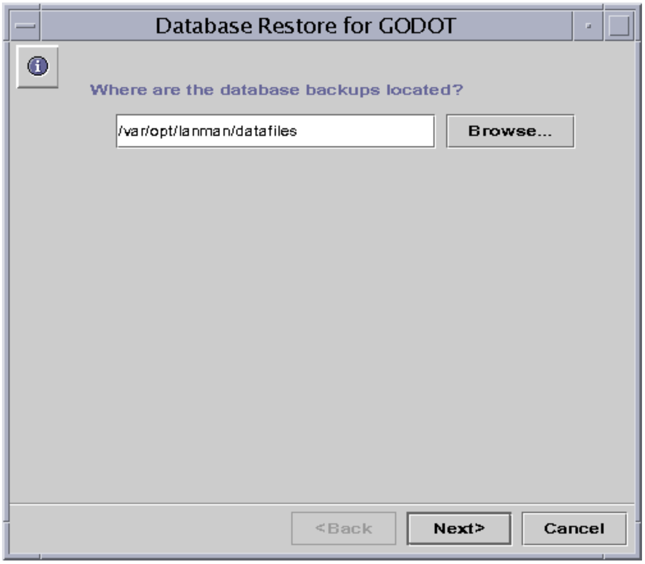
2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Tasks.**

4. **Double-click Restore Databases.**

   A screen similar to the following appears.



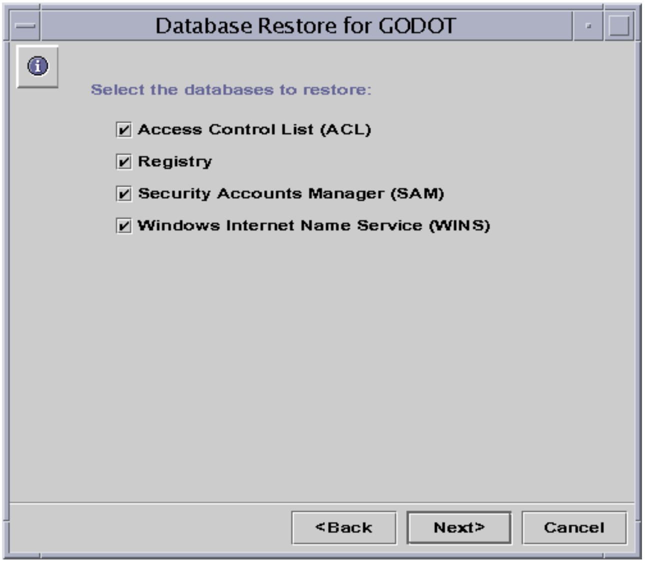
Database Restore for GODOT

Where are the database backups located?

/var/opt/lanman/datafiles

5. **Enter the path name of the backup file (or browse for it), and then click Next.**

   The resulting screen presents a list of databases in the location you specified that you can restore.



Database Restore for GODOT

Select the databases to restore:

☑ Access Control List (ACL)

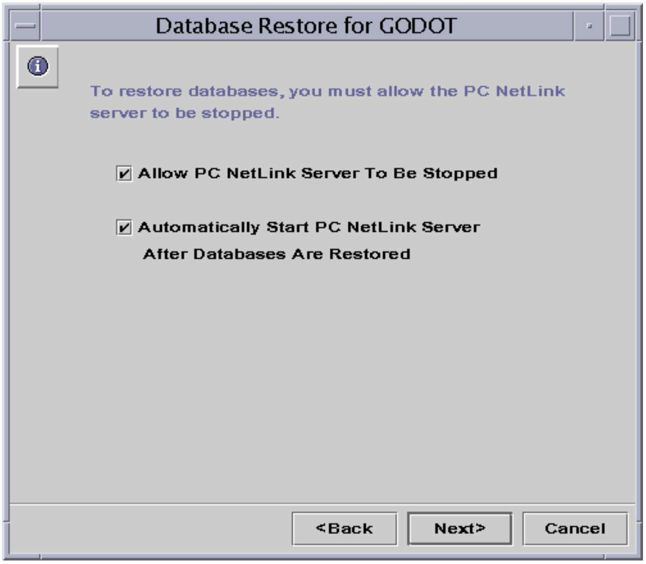
☑ Registry

☑ Security Accounts Manager (SAM)

☑ Windows Internet Name Service (WINS)

6. **Choose all of the backed-up database files that you want to restore, and then click Next.**

   A screen similar to the following appears.



Database Restore for GODOT

To restore databases, you must allow the PC NetLink server to be stopped.

☑ Allow PC NetLink Server To Be Stopped

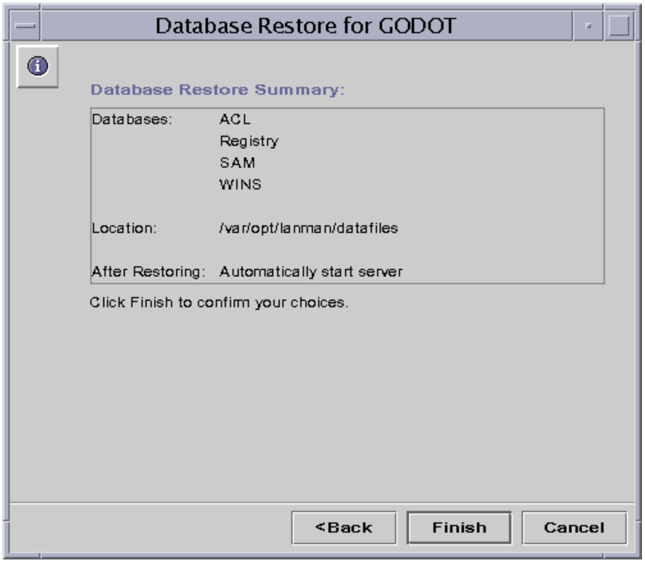
☑ Automatically Start PC NetLink Server After Databases Are Restored

7. **Choose Allow PC NetLink Server To Be Stopped.**

   You must choose this to proceed. After you have chosen this, you have the option of permitting the system to restart the server automatically after the completion of the task. If you choose to uncheck this option, which is selected by default, you must restart the server manually to complete the task.

8. **Click Next.**

   A screen similar to the following appears.



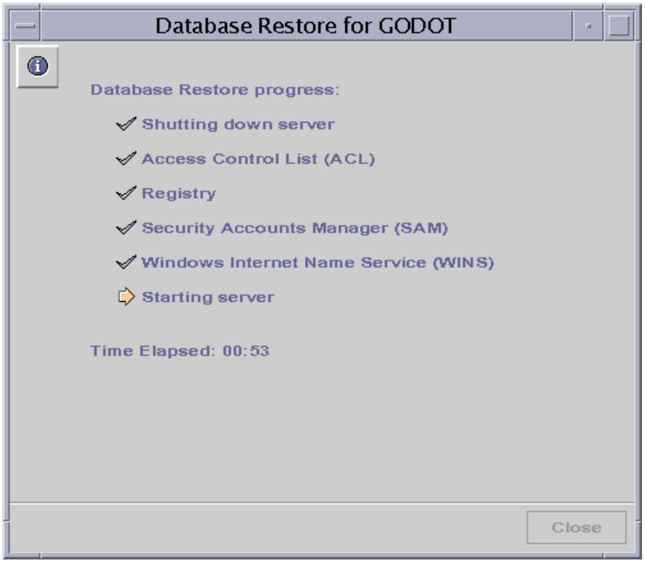
Database Restore Summary:

Databases:	ACL Registry SAM WINS
Location:	/var/opt/lanman/datafiles
After Restoring:	Automatically start server

Click Finish to confirm your choices.

9. **Confirm your choices, then click Finish to initiate the database restoration, Back to correct your choices, or Cancel to dismiss the window and leave the task unperformed.**

   The resulting screen informs you of the progress of the task, marking pending activity with an arrow and completed activity with a checkmark.



Database Restore progress:

✓ Shutting down server

✓ Access Control List (ACL)

✓ Registry

✓ Security Accounts Manager (SAM)

✓ Windows Internet Name Service (WINS)

⇨ Starting server

Time Elapsed: 00:53

10. **(Optional) If you did *not* choose to have the PC NetLink server restarted automatically, restart it by following the instructions in "How to Start the PC NetLink Server" on page 40 or "How to Start the PC NetLink Server From the Command Line" on page 42.**

    Any changes you have made will not become effective until you restart the server.

▼ How to View, Modify, or Delete Scheduled Database Maintenance Tasks

1. **Using PC NetLink Server Manager, log on as root to the PC NetLink server on which you want to back up one or more databases.**

2. **In the Results pane, double-click the icon that represents the server.**

   The Results pane changes, displaying a list of six administrative categories.

3. **Double-click Scheduled Tasks.**

   Any database backup or cleanup tasks that you have previously scheduled are listed, along with the frequency of the task, the date and time that the task will next be run, and the status of the most recent run.

4. **Depending on whether you want to modify or delete the scheduled task, do one of the following:**
    - *Delete the scheduled task* – With the name of the task that you want to delete highlighted, select Delete Scheduled Task from the Action menu.
    - *Modify the scheduled task* – Double-click the name of the scheduled task, then use the resulting dialog box to make your changes.

CHAPTER 6

Troubleshooting

This chapter describes how to troubleshoot a computer running PC NetLink software. It identifies the various tools that are available to you for use in the troubleshooting process and provides a high-level approach to use whenever troubleshooting is required.

Troubleshooting PC NetLink systems involves gathering data about the problem and analyzing that data to determine the specific cause of the problem. The PC NetLink program includes a number of data-gathering tools. Additionally, more complex data-gathering tools may be available from your support personnel.

This chapter includes instructions for the following tasks:

- "How to Access the Diagnostics Wizard" on page 165
- "How to Display Session Information From a Windows NT Workstation" on page 171
- "How to Close Sessions From a Microsoft Windows Computer" on page 171
- "How to Close Open Resources From a Microsoft Windows Computer" on page 172
- "How to Check the Network" on page 178
- "How to Troubleshoot a Shared Resource" on page 184
- "How to Solve Problems With Unknown File Systems" on page 185

There will be times when a particular problem requires more complex data-gathering than the standard PC NetLink product package provides. In these situations, special debugging versions of the software may be needed to gather more detailed data about the problem. This type of data-gathering may require the assistance of a technical support person to help with instructions on how to use the tools involved.

PC NetLink Troubleshooting Tools

PC NetLink software provides a variety of tools that you can use as troubleshooting aids. These tools can be arranged into the following three categories:

- The Diagnostics wizard
- Tools used for assessing the status of the server
- Tools used for automatic notification of the status of the server
- Tools used for debugging specific server problems

The following sections summarize the tools found in each category and briefly describe the use of each in a troubleshooting context.

The Diagnostics Wizard

The Diagnostics wizard runs a series of scripts to assess the status of the server. The scripts run by the Diagnostics wizard coincide with tests you can perform manually, described elsewhere in this chapter.

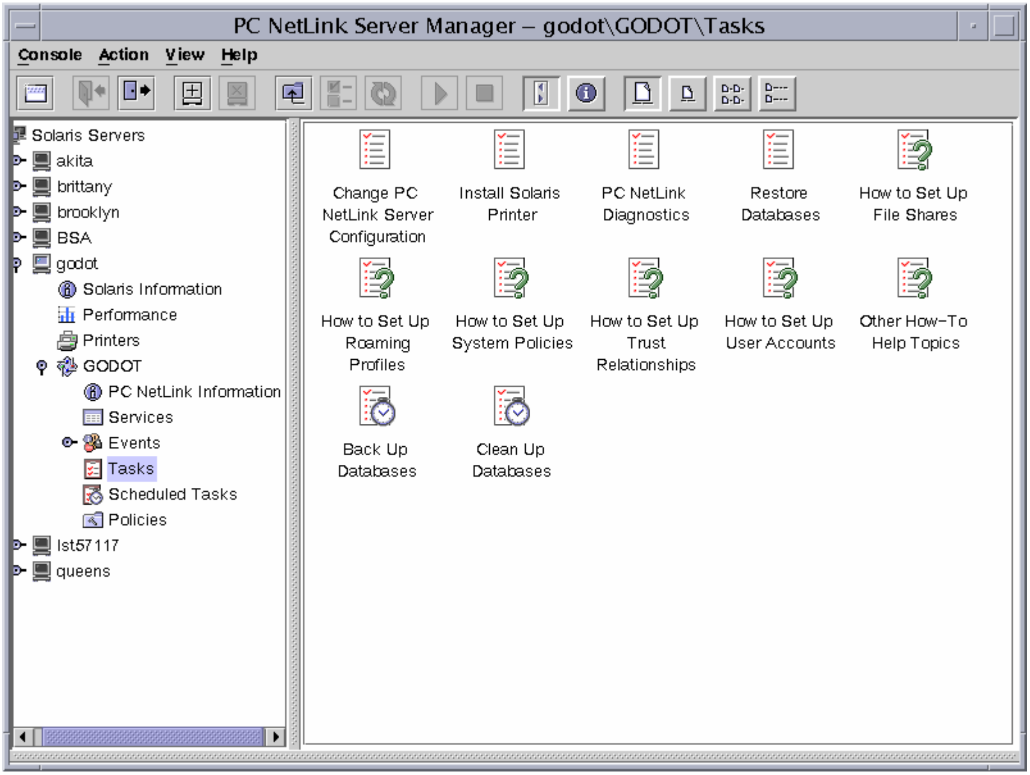
TABLE 6-1 Scripts Run by the Diagnostics Wizard

Diagnostics Wizard Test	Command-Line Tool/Script	See Section
Server machine accessible?	`ping`	"`ping`" on page 175
NetBIOS daemon running?	`ps -eaf | grep nbdaemon`	"Isolating the Problem" on page 177
PC NetLink processes running?	`ps -eaf | grep lmx`	"Is the Server Running?" on page 180
Verified PC NetLink connectivity?	`net start`	"Are All of the Server Services Running?" on page 181
Shares exported?	`net share`	"Are All of the Server Resources Properly Shared?" on page 182
User accounts accessible?	`net user`	"`samcheck`" on page 176

If a particular test fails, the Diagnostics wizard window describes possible problems and their solutions. However, if all of the tests performed by the Diagnostics wizard are completed successfully, yet you still are experiencing problems with your server, it will be necessary to perform more in-depth diagnostic techniques to isolate and solve the problem. See “Troubleshooting Procedures” on page 177 for more information.

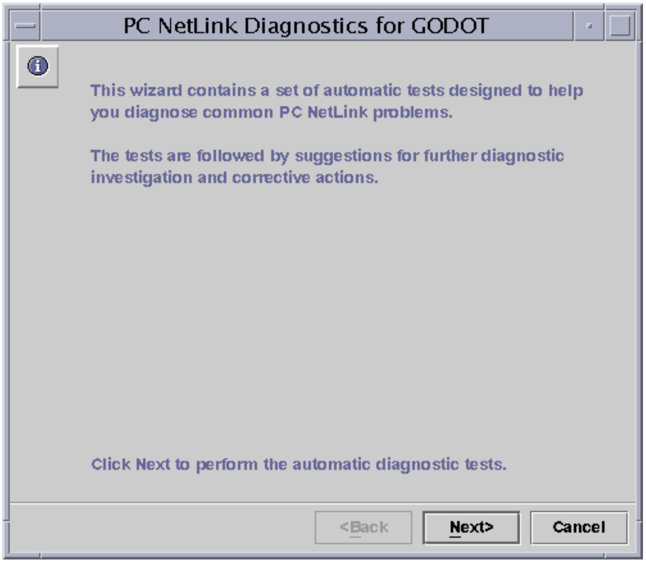
▼ How to Access the Diagnostics Wizard

1. **In the PC NetLink Server Manager main window, select the desired PC NetLink server, expand its tree, and then click Tasks.**



2. **Click PC NetLink Diagnostics.**

The PC NetLink Diagnostics wizard appears.



PC NetLink Diagnostics for GODOT

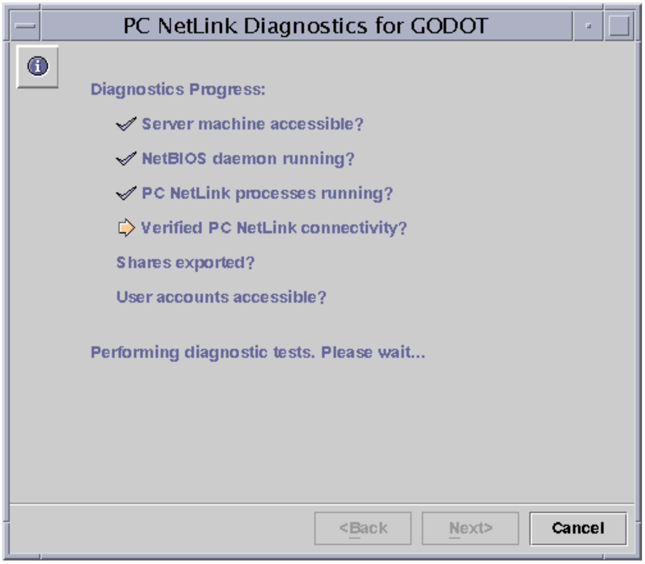
This wizard contains a set of automatic tests designed to help you diagnose common PC NetLink problems.

The tests are followed by suggestions for further diagnostic investigation and corrective actions.

Click Next to perform the automatic diagnostic tests.

3. **Click Next to start the diagnostics process.**

The Diagnostics wizard checks off each test as it is being performed. Click Cancel at any time to cancel the Diagnostics wizard before it is finished.



PC NetLink Diagnostics for GODOT

Diagnostics Progress:

✓ Server machine accessible?

✓ NetBIOS daemon running?

✓ PC NetLink processes running?

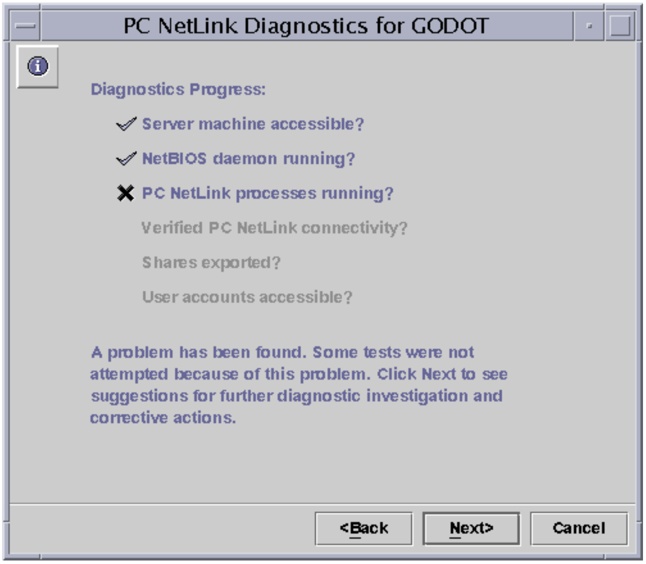
⇨ Verified PC NetLink connectivity?

Shares exported?

User accounts accessible?

Performing diagnostic tests. Please wait...

If any of the tests fail, the Diagnostics wizard indicates a failed test.



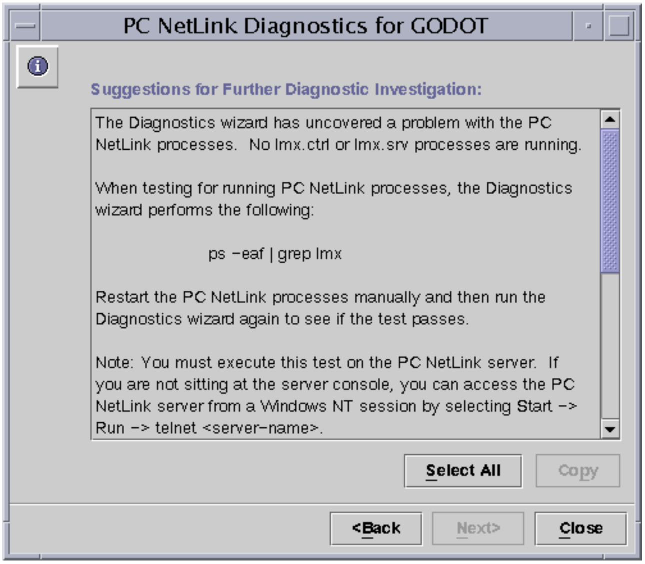
Diagnostics Progress:

- ✓ Server machine accessible?
- ✓ NetBIOS daemon running?
- ✗ PC NetLink processes running?
- Verified PC NetLink connectivity?
- Shares exported?
- User accounts accessible?

A problem has been found. Some tests were not attempted because of this problem. Click Next to see suggestions for further diagnostic investigation and corrective actions.

4. **Click Next.**

   A screen similar to the following appears.



Suggestions for Further Diagnostic Investigation:

The Diagnostics wizard has uncovered a problem with the PC NetLink processes. No lmx.ctrl or lmx.srv processes are running.

When testing for running PC NetLink processes, the Diagnostics wizard performs the following:

```
ps -eaf | grep lmx
```

Restart the PC NetLink processes manually and then run the Diagnostics wizard again to see if the test passes.

Note: You must execute this test on the PC NetLink server. If you are not sitting at the server console, you can access the PC NetLink server from a Windows NT session by selecting Start -> Run -> telnet <server-name>.

The screen displays tips for further diagnosis and correction of the fault. Follow the steps indicated in the Diagnostics wizard Context Help pane, and run the Diagnostics wizard again to see if the fault was corrected.

Note – You can keep the Diagnostics wizard open while performing other tasks.

Other PC NetLink Diagnostic Tools

In addition to the Diagnostics wizard, there are a number of tools and utilities available for further diagnostics.

Event Logs

You can track a number of events related to the daily operation of the server by using the PC NetLink Server Manager event logs (in Chapter 3, see "About Event Monitoring" on page 94). These events are maintained in one of three event logs: System log, Security log, and Application log. Administrators should develop and implement an event logging policy and include a review of event logs as a regular part of troubleshooting activities.

Administrators will find it particularly useful to characterize the typical use of the server by manipulating event log data using a spreadsheet or word processing program. You can use this approach to generate a standard operating profile of the server and to predict trends in server usage.

Note – You can also view event logs by using the `elfread` command. For more information, type `man elfread` at the PC NetLink command prompt.

Server Status

PC NetLink software maintains detailed statistics about its current usage as well as cumulative usage over a particular period of time. It is always helpful to review these statistics on a regular basis as well as when a server problem is encountered.

Performance Monitoring

The Performance Tuning interface of PC NetLink Server Manager (see "How to Tune PC NetLink for Optimum Performance" on page 83) lets you make some simple adjustments. You can also diagnose problems by viewing ongoing performance data presented in PC NetLink Server Manager, and adjust performance thresholds that, when exceeded, generate alarms (see "How to Set PC NetLink Server Performance Alarms" on page 84).

Server Information

To view data about current server use, use "Solaris Information" and "PC NetLink Information" views in PC NetLink Server Manager (see "How to View PC NetLink Information" on page 100). This provides details about current client-server sessions and the resources being used by those sessions.

Solaris Information

- Server name
- Solaris operating environment version
- The last time the system was rebooted
- The current date and time on the server
- The name of the *current* user
- The hardware description
- The system's processor type
- The amount of random access memory
- Total (not including swap) space on disks
- Swap space
- DNS domain name
- Internet Protocol (IP) address of the system
- Ethernet address of the system
- The name service currently in use
- The name service domain name
- The name of the name service server

PC NetLink Information

- PC NetLink server name
- PC NetLink server's domain name
- PC NetLink server's role (if BDC or member server, then the name of the PDC is also provided)
- PC NetLink software version number
- State of the server (stopped or running); if running, it reports the date and time that the server was last started

Cumulative Statistics

To view cumulative server usage data, you can use the `net statistics` command at the PC NetLink command prompt. This command provides cumulative totals for a variety of server activities. Administrators who review the server statistics provided by using this command on a regular basis will find it easier to recognize and address changes in server operation.

The following statistics are maintained for the PC NetLink system, and are available by way of the `net statistics` command.

TABLE 6-2 Cumulative Statistics Descriptions

Statistic	Description
Statistics Since	Tells when this set of statistics began (either at the last server startup or the last time the statistics were cleared).
Sessions accepted	Tells how many times users connected to the server.
Sessions timed-out	Tells how many user sessions were closed because of inactivity.
Sessions errored-out	Tells how many user sessions ended because of error.
Kilobytes sent	Tells how many Kbytes of data the server transmitted.
Kilobytes received	Tells how many Kbytes of data the server received.
Mean response time (msec)	Tells the average response time for processing remote server requests. This always will be 0 for Solaris system servers.
System errors	Does not apply to Solaris system servers.
Permission violations	Tells when a user attempts to access resources without the required permissions.
Password violations	Tells the number of incorrect passwords that were tried.
Files accessed	Tells the number of files that were used.
Comm devices accessed	Not supported in the PC NetLink program.
Print jobs spooled	Tells the number of print jobs that were spooled to printer queues on the server.
Times buffers exhausted	Tells the number of shortages of big and request buffers. Always set to 0 for Solaris system servers.

▼ How to Display Session Information From a Windows NT Workstation

An administrator can display and control sessions between clients and the server. You can use this information to gauge the workload on a particular server.

To display session information from a Windows NT Workstation computer or a Windows client computer using Server Manager:

1. **Start Server Manager.**
2. **Choose the PC NetLink system about which you want to view session information.**
3. **Click the Users button.**

You also can display session information using the `net session` command at the PC NetLink command prompt.

Note – You may see sessions displayed that do not show user names. The sessions are a result of administrative activity and should not be deleted.

▼ How to Close Sessions From a Microsoft Windows Computer

An administrator can disconnect a user from the server at any time. Closing a user session does not prevent the user from reconnecting.

To disconnect a user session from a Windows NT computer or from a Windows client computer using Server Manager:

1. **Start Server Manager.**
2. **Choose the PC NetLink system about which you want to view session information.**
3. **Click the Users button.**
4. **Highlight the user and click the Disconnect button.**

You also can disconnect a user session by using the `net session` command at the PC NetLink command prompt.

▼ How to Close Open Resources From a Microsoft Windows Computer

When a user uses a shared file, the file is open. Sometimes a file will be left open, perhaps even with a lock on it, because of an application program error or some other problem. Such files will remain open and unavailable to other users. An administrator can close these files.

To close an open resource from a Windows NT computer or a Windows client computer using Server Manager:

1. **Start Server Manager.**
2. **Choose the PC NetLink whose data you want to view.**
3. **Click the In Use button.**
4. **Highlight the open resource and click the Close Resource button.**

You also can close an open resource by using the `net file` command at the PC NetLink command prompt.

Print Subsystem Event Logs

PC NetLink software maintains a separate print log for each printer share and each Solaris system printer it uses. These log files record any message generated because of a printer fault or print job error.

An administrator should check these log files periodically to determine whether any such errors are occurring. The logs can be accessed from a client computer by linking to the `PRINTLOG` shared resource.

The logs also can be accessed from the server. They are in the following directory: `/opt/lanman/shares/printlog`

Tools Providing Automatic Status on the Server

Quick response time is critical when dealing with server problems. Being aware of a problem at the time it occurs can decrease greatly the effect that the problem may have on the server user community.

You can configure PC NetLink software to notify specified users when a problem occurs. You can also configure the Solaris system to generate and notify you when problems occur. The following sections discuss these features.

Alerter Service

PC NetLink software includes an Alerter service that you can use to notify specified users of the occurrence of a particular event. An administrator should use this service in order to make server problems known immediately. Prompt action to resolve server problems often can minimize their effect. The following examples illustrate situations that could generate alerts:

- The number of server errors exceeds a threshold set in the PC NetLink Registry.
- The number of bad access attempts exceeds a threshold set in the PC NetLink Registry.
- The number of bad password attempts exceeds a threshold set in the PC NetLink Registry.
- Errors were encountered during start of the Net Logon service.
- A printer is malfunctioning.
- A print request has been deleted or completed.

Solaris System and PC NetLink Features

One of the benefits of PC NetLink software is the availability of the inherent scripting features provided by the Solaris operating system. Combining these features with the data-gathering tools provided by PC NetLink software, an administrator can create a powerful tool that can be used to assess the health of a PC NetLink system at any given time.

For example, using the Solaris system job scheduling feature (`CRON`), various data-gathering tools provided by PC NetLink, and some of the standard Solaris system commands for checking file system integrity and free space, administrators can write scripts that perform various system and server checks and then send the results to Solaris system administrators at regular intervals.

Command-Line Diagnostics and Repair Tools

In addition to the Diagnostics wizard, there are a number of command-line diagnostics and repair tools available in the `/opt/lanman/sbin` directory. These are described below.

`acladm`

The `acladm` command is used to check and repair problems found in the Access Control List.

Be sure to examine the options that are available with this command before executing it. Type the `man acladm` command at the PC NetLink command prompt.

blobadm

The `blobadm` command is useful for testing and fixing the binary structure of blob files, such as the SAM database, ACL, and Registry. Before invoking `blobadm`, try less invasive fixes such as `acladm`, `regcheck`, and `samcheck`, described below. Be sure to examine the options that are available with this command before executing it. For more information on `blobadm`, type `man blobadm` at the PC NetLink command prompt.

Caution – Serious damage to your files could result if `blobadm` is used incorrectly. Be sure to read the man page carefully before using `blobadm`.

lmshell

The `lmshell` command is useful for emulating an MS-DOS client session when you do not have access to an actual MS-DOS client. This command is especially useful when troubleshooting a connectivity problem between a client and server. Using the `lmshell` command, you can mimic a client logon and resource linking by executing the `net logon` and `net use` commands in `lmshell` at the PC NetLink command prompt.

lmstat

The `lmstat` command interrogates the server's shared memory image to gather a variety of data about the current state of the server. This command is especially useful when you want to determine which server process a client session is on.

PC NetLink software is composed of a set of cooperative processes. When the server is running, enter the following command:

```
ps -ef | grep lmx
```

Executing this command generates a display similar to the following:

```
root177261012:03:360:00lmx.alerter
root1771317461012:03:320:00lmx.srv -s 1
root1772217874012:03:350:00lmx.srv -s 2
root177261012:03:360:01lmx.dmn
root177281012:03:360:01lmx.browser
root177441012:03:280:00lmx.ctrl
```

In this example, there are two `lmx.srv` server processes (17713 and 17722). The server may have nine clients with current sessions.

The administrator can find out to which `lmx.srv` process a client is connected by executing the `lmstat -c` command at the server prompt. The system displays output similar to the following:

```
Clients:
BANANA.SERVE~X (nwnum=0, vcnum=0) on 17713
ORANGE (nwnum=0, vcnum=0) on 17713
PEAR (nwnum=0, vcnum=0) on 17722
```

Notice that each client name has an associated process ID number. This is the process ID of the `lmx.srv` process that currently is serving that client. The `vcnum` value specifies whether this is the client computer's first virtual connection (VC) or an additional one.

Being able to determine the process ID of the `lmx.srv` process that is serving a client is particularly useful when using `lmstat -w` or the Solaris system `truss( )` command. Both commands require a process ID as part of their startup arguments. (The `-w` option is not valid on all operating systems.)

ping

The `ping` command is useful for determining if the server is accessible. To run `ping`, type the following at the command prompt:

`ping` *server–name*

If you are unable to ping the server successfully, something is wrong with the server connection to the network, such as the following:

- The server is down.
- There is a broken network connection.
- There is a hardware or driver configuration problem on the server.

If you are unable to ping any host successfully, there is something wrong with your own connection to the network.

regconfig

The `regconfig` command is used to query or change PC NetLink Registry key information. You can use this command to change any value in the Registry. (You also can use the Windows NT Registry Editor to change key values.)

You can also use the `regconfig` command to reinitialize the PC NetLink Registry with system defaults.

For more information about the Registry, see Appendix A, “PC NetLink Registry” on page 187.

regcheck

The regcheck command is used to check and repair the PC NetLink Registry file. This command checks only the internal structure of the PC NetLink Registry file; it does not check the validity of any data that may be stored in it.

If the internal structure of the Registry file is found to be invalid, use the regcheck command to make the necessary repairs.

samcheck

The samcheck command is used to check, dump, and fix the SAM database. You can use this command to determine whether the user accounts database has been corrupted and optionally, to fix it.

The samcheck command also can be used to output the contents of the user accounts database to stdout in human-readable format.

srvconfig

The srvconfig command is used to display the current default settings of all the server parameters in the lanman.ini file. (It also is a good way to check the location and spelling of any parameter you want to modify.)

The lanman.ini file contains several configuration parameters that you can modify. Default settings are used for most of these parameters. However, a certain number of them can be changed, overriding the default values set at server installation.

To display the default settings of the lanman.ini file, use the following command:

```
srvconfig -p | more
```

This command generates a listing of all of the parameters in the lanman.ini file and their default settings.

Troubleshooting Procedures

PC NetLink troubleshooting involves using a systematic approach to isolate the problem and then gathering detailed data in order to identify the specific module causing the problem. The following sections provide simple procedures that you can use to isolate a server problem. It then offers some suggestions on how to gather additional information about the problem.

Isolating the Problem

The PC NetLink program runs on a Solaris system computer. The server depends upon a fully functional NetBIOS network to perform its file- and print-serving functions.

A NetBIOS network typically includes the following components:

- An application that provides a NetBIOS protocol interface
- An application that provides a network transport protocol interface, such as TCP/IP (although some transport implementations include NetBIOS within a common module)
- An application that provides drivers for the network adapter interface (which also may be part of the transport module)

Every NetBIOS network component must be configured and operational in order for PC NetLink software to function in a network environment. Additionally, similar modules must be functioning on the machine that is attempting to use the file and print services of the PC NetLink program, such as a Windows NT Workstation computer or Microsoft Windows client computer.

When a NetBIOS network is not available, the system typically displays the following message when you start the server:

```
unable to post servername on any network
```

Reviewing all of the modules involved in the end-to-end connection between a client and PC NetLink, it is easy to see that isolating a problem is the first step for problem solving in a client-server networking environment.

Before assuming that the problem is with the server, you must ensure that other networking software is functioning properly. This is particularly true with new installations in which the opportunity for a transport or physical network problem is the greatest.

It is fruitless to perform an exhaustive check of every layer of software for a problem that affects only a single client or user. Experience will help you to determine when to use a comprehensive problem isolation procedure or a server-specific problem isolation procedure. The following sections offer guidelines on how to perform both procedures. Use the one that best fits your current problem description.

▼ How to Check the Network

Before assuming that the server is the cause of all network problems, it is worthwhile to perform checks to verify the sanity of the network. This is particularly important when all or a very large portion of server users are reporting a problem at the same time.

Use the following steps to verify the sanity of the network.

Step 1: Verify the Status of the Physical Network

The first item to check is the physical network.

- Check hardware LEDs for connection problems. Most networking hardware provides status indicators that you can use to assess the state of the various network links (for example, network routers, hubs, and interface cards use LEDs). Always check these links for any signs of problems with the physical network such as excessive retransmissions, link integrity mismatches, and jabber conditions.
- Check cable connections. Even in cases in which only a single client is affected, never assume that it is not a bad cable connection. For a single client it is easy to check to determine whether the problem occurs regardless of which server the client tries to use.
- Check the client’s network configuration. If a client cannot “see” anything on a network that is otherwise functioning without incident, then it is safe to assume that the problem is related to that client’s network configuration. However, if that same client can see other nodes on the network but cannot connect to a particular server, then the network path to that server, the server itself, or the account being used by that client are likely candidates for trouble.

There are several third-party products available that you can use to monitor the health of the physical network. It is worthwhile to check network traffic periodically with one of these products to see whether there are problems occurring with the physical network.

Step 2: Verify the Transport Protocol Status

If the physical network appears to be functioning properly, the next step is to determine whether the various computers on the network can "see" each other from the perspective of a transport protocol. Most transport protocol applications include a connectivity test tool that you can use to verify connectivity at the transport level between a client and the server over the network.

If you cannot reach a server machine from a particular client with the `ping` command, then neither will that client be able to connect to the server.

If you cannot ping a server from several client computers, then one of the following conditions may be present:

- The server is not running.
- The transport protocol is not running.
- There is a configuration problem that is disrupting network connectivity.

Review the recommendations in your transport protocol software documentation. If appropriate, continue with the procedures described later in this section on assessing the status of the NetBIOS protocol and PC NetLink software.

Step 3: Verify the NetBIOS Protocol Status

Check the NetBIOS protocol layer. Most NetBIOS modules provide test tools that test the connectivity between NetBIOS names over the network.

Connectivity between nodes using TCP/IP may be available, but if connectivity between NetBIOS names is not working, then PC NetLink software will not work. All PC NetLink communications are based on NetBIOS name sessions. Use the test tools provided with your protocol software to verify NetBIOS level connectivity. If you find a problem, isolate it according to the information provided with the NetBIOS protocol documentation.

Step 4: Verify Solaris System Functionality

If all of the network connectivity modules check out properly, check the Solaris operating environment on the computer hosting the PC NetLink program. The operating system provides a variety of log files that you can consult and system checks that you can perform to verify proper operation. For information on these checks, see your Solaris system administrator documentation.

PC NetLink software is particularly sensitive to the following system problems:

- Insufficient disk space in critical file systems such as `root` (`/`) or `/var`
- Insufficient system memory causing excessive swapping
- CPU bound conditions

- Unbalanced disk loads
- Improperly tuned kernel parameters such as maximum number of open files

Check the performance views available in PC NetLink Server Manager (see “How to Tune PC NetLink for Optimum Performance” on page 83 and “How to Investigate Performance Alarms” on page 89).

Operating system problems usually will affect all or most client computers connected to the server. Do not spend much time on this step if you are troubleshooting an individual client problem.

Step 5: Isolating Problems on the PC NetLink System

If you determine that all of the underlying software is functioning properly, then you should check the PC NetLink system for problems. Problem isolation on the server often is dependent on the type of problem reported by the user community.

If only a single user is experiencing a problem, then you can narrow your focus quickly to the operations that this user is attempting to perform.

If a group of users is experiencing problems but many other users are not, then you should look for a common thread among the users with problems. For example:

- Are they on the same hub?
- Are they using the same applications or printers?
- Are they on the same `lmx.srv` process?
- Are they members of the same PC NetLink group?

If all users of a server are experiencing a problem, then you should start with more basic assessments of the state of the server. These are described in the following sections.

Is the Server Running?

It is worthwhile to verify that the server is actually running. You can do this easily by entering the following command at the system command prompt:

```
ps -ef | grep lmx
```

The system display should include the following (at a minimum):

```
root     3554     3452     Feb 28   19:39    lmx.srv s
root     3452       10     Feb 28    5:03    lmx.ctrl
root     3568       10     Feb 28    2:16    lmx.dmn
```

This display indicates that the three required server processes are in fact running, the daemon (`lmx.dmn`), the control process (`lmx.ctrl`) and at least one worker process (`lmx.srv`). You also may see other processes, such as `lmx.browser` and `lmx.alerter`.

Additional multiple worker processes, each with a unique number displayed at the end of the line, may be displayed. The server spawns new worker processes based on the number of clients supported by the server. As more client sessions are started, more `lmx.srv` processes may be started, each with a unique process ID and number. This is normal.

If the server is not running, use the `net start server` command at the command prompt.

Are All of the Server Services Running?

If one of the required server processes is not running, determine whether all of the server services started properly. A situation can occur when several server processes are running but you still cannot use the server because a particular service did not start. This is especially true for the Net Logon service. To check which services are running, enter the following command at the command prompt:

```
net start
```

The system displays a list of the services that currently are active on the server.

It is critical that the Net Logon and Server services are displayed. If they are not shown, then the server has a problem. Often the Net Logon service will not start because of a problem with the server name, domain name, or domain configuration.

Check the error logs for problems as described in the next section.

Are You Unable to Access PC NetLink Server Manager?

If the server seems to be running properly, and all of the PC NetLink tools are running properly, yet you are unable to start PC NetLink Server Manager, there is probably something wrong with your Java™ installation. Perform the following (as root) to restart the PC NetLink Server Manager:

```
/etc/init.d/slsadmin restart
```

If you are still unable to start the PC NetLink Server Manager, try reinstalling the software, as described in the *Solaris PC NetLink 1.2 Installation Guide*.

Are There Messages in the Error Logs?

You can view the System, Security, and Application logs from a client computer using Event Viewer, from the PC NetLink system using PC NetLink Server Manager, or at the system console using the `elfread` command. You also can view the logs in the `PRINTLOG` share area if there is a printing-related problem. For problems related to server startup, you can check the `lmxstart.log` located in the `/var/opt/lanman/logs` directory.

If there are entries in any of these logs, save them for future reference. Never discard or overwrite error messages since they may indicate the cause of the problem. These logs may have to be supplied to support personnel at a later date.

The following message is particularly indicative of a server problem:

```
A server process has unexpectedly terminated
```

This message indicates that a server process has encountered an unexpected error. Depending on how your server is configured, there may be a core file located on your system.

If the value of the `CoreOk` keyword is set to 1 (yes) in the PC NetLink Registry, then a core file is located somewhere on the system. The `CoreOk` value is in the following key:

```
SYSTEM\CurrentControlSet\Services\
   AdvancedServer\ProcessParameters
```

Go to the root directory, and execute the following command to search the file system for core files:

```
find . -name "core*" -print
```

Save any files that you may find. If the `CoreOk` parameter is set to no, then core files will not be created. You may want to set the `CoreOk` keyword to yes in order to capture core files, which are useful for debugging purposes.

Are All of the Server Resources Properly Shared?

Some server resources are shared automatically every time the server is started. These resources are used in the background by clients while performing other server activities.

The list of resources shared by default includes:

- `ADMIN$`
- `ADMINDOC`
- `C$`
- `D$`

- IPC$
- MSCLIENT
- NETLOGON
- PRINTLOG
- PRINT$
- TOOLS
- USERS

The resources followed by a dollar sign ($) are special resources required for server administration and communication. (An additional special resource — REPL$ — is available when the Directory Replicator service is running.)

Never attempt to delete or re-share these resources. If any of these resources are absent, the server will not function properly. If you detect that one of these resources is missing, stop and restart the server to determine whether they are shared at server startup. If they are not displayed, contact your service representative.

The remaining resources are default resources typically used by clients during logon (NETLOGON), to connect to home directories (USERS), and to access utilities or error logs (DOSUTIL, OS2UTIL, PRINTLOG). These items may be deliberately absent from your server. However, if you did not unshare them, then a problem with the server caused them to be removed.

Can the Server Be Contacted From the Console?

You can conduct a simple test to determine whether the server is communicating over the network. Issue the following command at the system console:

```
net view
```

The system displays the name of the server and other servers operating in the same domain. If your server name is displayed, execute the same command, adding the server name:

```
net view \\asutrial
```

The system displays a list of shared resources *similar* to the following:

```
Shared resources at \\asutrial
PC NetLink Systems
Sharename    Type Used as       Comment
----------------------------------------------------------------
DOSUTIL      Disk               DOS Utilities
LIB          Disk               Programming Aids
NETLOGON     Disk               Logon Scripts Directory
OS2UTIL      Disk               OS/2 Utilities
PRINTLOG     Disk               LP Printer Messages
USERS        Disk               User Directory
```

Other entries may be displayed if you added shared resources to your server.

If either of these commands fails consistently, then there is a problem with broadcast communications over the network. If these commands succeed, you can use the tests in the next section.

Is the Server Supporting a Maximum Number of Users?

When a connectivity problem occurs, ensure that your server has not exceeded the maximum number of clients that it is configured to support. This number is indicated by the `maxclients` parameter in the server `lanman.ini` file. It can be displayed using the `srvconfig -g maxclients` command.

Has the PC NetLink Registry Been Corrupted?

Execute the `regcheck -C` command to determine whether the internal format of the Registry file has been corrupted. If this command detects corruption, execute the `regcheck -R` command to repair the Registry file.

If invalid values have been entered in the PC NetLink Registry, then you can use the `regload` command to reinitialize all Registry values to their defaults.

Can the Server Be Contacted From a Client?

Attempt to log on to the server from a client computer. If the logon is successful, link a virtual drive ID to a shared resource. Then, view the contents of the linked drive.

If you have problems with these steps, isolate each problem using the following procedure.

▼ How to Troubleshoot a Shared Resource

If you can communicate with the server but cannot access a shared resource, do the following:

1. **Verify that the shared resource exists by using the `net view` \\*server–name* command.**

   If the shared resource name is not displayed, then it does not exist. In that event, you must re-share the resource.

2. **Link to the shared resource while logged in as Administrator.**

   If this fails and the resource exists, then the resource may be shared incorrectly. Delete and re-share the resource. If this succeeds, then proceed to the next step.

3. **If the resource is a disk resource, check both levels of permissions associated with the shared resource.**

   First check the share permissions using Server Manager. Then check the permissions on the shared directory using Windows Explorer at an administrative client. Verify that the resource can be used using either group membership or on a per-account basis for that particular user. Also, verify that the access permissions on the resource allow the desired action to be performed (for example, the user has read-only permission but is attempting to edit a file). Also verify that the maximum user limit for a particular shared resource is not being exceeded.

4. **On the shared resource, check the file attributes and the Solaris system access permissions.**

   If necessary, use the Properties menu in Windows Explorer. Use the `udir` command to display Solaris system permissions (user, owner, group).

▼ How to Solve Problems With Unknown File Systems

The PC NetLink program recognizes only the following types of file systems:

- `cdfs`
- `nfs`
- `s5`
- `sfs`
- `ufs`
- `vxfs`

File systems other than those listed above will be treated as an s5 file system. If you want *all* of your unknown file systems to be treated as a type other than s5, set the `fsnosupport` parameter in the `[fsi]` section of the `lanman.ini` file to the name of a recognized file system. Then, stop and restart the server.

If you want to set each unknown file system individually to a specific known file system, follow these steps:

1. **At the Solaris system prompt, type the following command, replacing *pathname* with the actual name of the path to the unknown file system, and press Enter:**

   `df -n` *pathname*

   The system displays the mount point and file system type as specified by the Solaris operating system.

2. **Set the** `fsmap` **parameter in the [** `fsi` **] section of the** `lanman.ini` **file as follows**:

   `unknown:s5,sfs:vxfs,`*unixfilesystem:filesystem*, ...

   Replace *unixfilesystem* with the name of the file system type returned in Step 1. Replace *filesystem* with the name of the PC NetLink file system type you want to use.

3. **Stop and restart the server.**

   The PC NetLink program now will map the Solaris file system to the recognized file system you specified.

APPENDIX **A**

PC NetLink Registry

In the PC NetLink program, most configuration information is centrally stored in a single database called the Registry. Ordinarily, you use PC NetLink Server Manager to change Registry values by way of the graphical user interface. However, you may also use the Windows Registry Editor or the PC NetLink `regconfig` command to change values by editing the Registry database manually. (For an explanation of `regconfig` usage, as root type `/opt/lanman/sbin/regconfig` on a PC NetLink server command line.)

This appendix provides the following information:

- Overview of the PC NetLink Registry structure
- Description of Registry Editor
- Descriptions of the PC NetLink Registry keys and values

PC NetLink Registry Structure

The PC NetLink Registry is a database organized in an hierarchical structure. It is composed of subtrees and their keys, and value entries. A key also can contain additional subkeys.

The following table identifies and defines the PC NetLink Registry subtrees.

TABLE A-1 PC NetLink Registry Subtrees

Root Key Name	Description
`HKEY_LOCAL_MACHINE`	Contains information about the local computer system, including hardware and operating system data such as bus type, system memory, device drivers, and startup control data.
`HKEY_USERS`	Contains all actively loaded user profiles and the default profile. Users who are accessing a server remotely do not have profiles under this key on the server; their profiles are loaded into the Registry on their own computers.

The PC NetLink Registry is stored in the `/var/opt/lanman/datafiles` directory on the PC NetLink server.

Each Registry key can contain data items called value entries. Keys are analogous to folders, and value entries are analogous to files within the folders.

A value entry has three parts, which always appear in the following order: the name of the value, the data type of the value, and the value itself, which can be data of any length.

Data types, such as `REG_SZ` or `REG_EXPAND_SZ`, describe the format of the data, which can be up to 1 Mbyte. Data types from 0 to 0x7fffffff are reserved for definition by the system, and applications should not use these types. Data types from 0x80000000 to 0xffffffff are reserved for use by applications.

The following table lists and defines the data types currently used by the system.

TABLE A-2 Registry Data Types

Data Type	Description
`REG_BINARY`	Binary data. For example: `Component Information : REG_BINARY : 00 00 00...`
`REG_DWORD`	Data represented by a number that is 4 bytes long. Many keys for device drivers and services are this type and can be displayed in Registry Editor in binary, hexadecimal, or decimal format. For example, entries for service error controls are this type: `ErrorControl : REG_DWORD : 0x1`

TABLE A-2 Registry Data Types

Data Type	Description
`REG_EXPAND_SZ`	An expandable data string, which is text that contains a variable to be replaced when called by an application. For example, for the following value, the string %*SystemRoot*% will be replaced by the actual location of the directory containing the PC NetLink system files: `File : REG_EXPAND_SZ : %`*SystemRoot*`%\file.exe`
`REG_MULTI_SZ`	A multiple string. Values that contain lists or multiple values in human readable text are usually this type. Entries are separated by NULL characters. `AlertNames : REG_MULTI_SZ : Administrator tom`
`REG_SZ`	A sequence of characters representing human readable text. For example, a component's description is usually this type: `DisplayName : REG_SZ : Alerter`

Using Registry Editor

You can use the Registry Editor to view Registry entries for the various components in PC NetLink. You can also use Registry Editor to modify or add Registry entries.

The Registry Editor application, Regedt32.exe, does not appear in any default folders. It is installed automatically in the %*SystemRoot*%`\system32` folder on Windows NT systems. Click Run on the Start menu or switch to a command prompt and type `regedt32`.

Connecting to a Remote Registry

To edit the PC NetLink Registry using the Windows NT Registry Editor, you must connect to the PC NetLink system from the Registry Editor of a remote Windows NT computer. To do so, use the Select Computer command in the Registry menu of the Registry Editor.

Connecting to the PC NetLink Registry remotely will result in the display of the `HKEY_USERS` and `HKEY_LOCAL_MACHINE` subtrees.

For more information about connecting to a remote Registry, see your Registry Editor Help.

Caution – Using the Windows 95 Registry Editor to edit the PC NetLink Registry remotely is *not* recommended.

Viewing the Registry

Registry Editor displays the subtrees of the Registry. The hierarchical structure that appears in Registry Editor is similar to the hierarchical directory structures of Windows NT Explorer.

Your ability to make changes to the Registry using Registry Editor depends on your access permissions. Generally, you can make the same kinds of changes using Registry Editor as your permissions allow for other administrative tools.

Registry Editor Commands

You can use the mouse or commands to manipulate the windows and panes in the Registry Editor in the same way as in the Windows NT Explorer. For example:

- Double-click a key name to expand or collapse an entry. Or click commands from the View and Tree menus to control the display of a selected key and its data.
- Use the mouse or arrow keys to move the vertical split bar in each window to control the size of the left and right panes.
- Click Tile or Cascade from the Window menu to arrange the Registry Editor windows.

The following table shows some keyboard methods for managing the display of data in each Registry Editor window.

TABLE A-3 Keyboard Commands for Managing Registry Editor Data Display

Procedure	Keyboard Action
Expand one level of a selected Registry key.	Press Enter.
Expand all of the levels of the predefined handle in the active Registry window.	Press CTRL + *
Expand a branch of a selected Registry key.	Press the numeric keypad asterisk (*) key.
Collapse a branch of a selected Registry key.	Press Enter or - on the numeric keypad.

The following table lists the policies and their associated PC NetLink Registry keys, including locations, that can be modified using the Windows NT Registry Editor or, in some cases, PC NetLink Server Manager.

TABLE A-4 Registry Policies, Keys, and Locations

Policy	PC NetLink Registry Key

Alerter Service	`(SYSTEM\CurrentControlSet\Services\Alerter\Parameters)`
	`IncludeMessageHeader`
	`CountNotOnNetworkCache`
	`NotOnNetworkCacheTimeout`

Computer Browser Service	`(SYSTEM\CurrentControlSet\Services\Browser\Parameters)`
	`MasterUpdate`
	`BackupUpdate`
	`BackupRecovery`
	`MoreLog`

Connected Clients	`(SYSTEM\CurrentControlSet\Services\Netlogon\Parameters)`
	`LogonQuery`
	`QueryDelay`
	`RelogonDelay`

File Name Space Mapping	`(SYSTEM\CurrentControlSet\Services\AdvancedServer\FileServiceParameters)`
	`NameSpaceMapping`
	`UniqueSuffixLength`
	`MixedCaseSupport`
	`TruncatedExtensions`
	`MappingSeparator`

Netlogon Service	`(SYSTEM\CurrentControlSet\Services\Netlogon\Parameters)`
	`Scripts`
	`Pulse`)
	`Update`
	`Randomize`)
	`SSIPasswdAge`)

Server Announcement	`(SYSTEM\CurrentControlSet\Services\LanmanServer\Parameters)`
	`Hidden`
	`SrvAnnounce`
	`LmAnnounce`

Solaris Account Mapping	`(SYSTEM\CurrentControlSet\Services\AdvancedServer\UserServiceParameters)`
	`CreateUnixUser`
	`ForceUniqueUnixUserAccount`
	`NewUserShell`
	`SyncUnixHomeDirectory`

TABLE A-4 Registry Policies, Keys, and Locations

Policy	PC NetLink Registry Key

Solaris File System Integration	`(SYSTEM\CurrentControlSet\Services\AdvancedServer\FileServiceParameters)`
	`IgnoreUnixPermissions`
	`UnixDirectoryCheck`
	`UnixFilePerms`
	`UnixDirectoryPerms`
	`UseUnixLocks`

UPS Service	`(SYSTEM\CurrentControlSet\Services\UPS\Parameters)`
	`IgnoreSIGPWR`
	`PowerFailAddress`
	`PowerFailMessage`
	`PowerMessageInterval`

Users Alerts	`(SYSTEM\CurrentControlSet\Services\LanmanServer\Parameters)`
	`AccessAlert`
	`ErrorAlert`
	`LogonAlert`

Registry Keys and Values

This section describes the PC NetLink Registry keys that are changed during administration. You do not need to be concerned with every key in the PC NetLink Registry; *only those keys that you may have reason to change are described*. Note that you must stop and then restart the PC NetLink program for most changes to the Registry to take effect.

The PC NetLink Registry keys described in this section are defined in subkeys located in the following path:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services`

- `\AdvancedServer`
- `\Alerter`
- `\Browser`
- `\EventLog`
- `\LanmanServer`
- `\LanmanWorkstation`
- `\Netlogon`
- `\Netrun`
- `\Replicator`
- `\UPS`
- `\WINS`

PC NetLink Key Descriptions

The PC NetLink subkey of the PC NetLink Registry contains the following subkeys in the following path:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedSer
ver
```

- `\AlertParameters`
- `\DirectorySyncParameters`
- `\FileServiceParameters`
- `\NetAdminParameters`
- `\Parameters`
- `\ProcessParameters`
- `\RpcParameters`
- `\ShareParameters`
- `\UserServiceParameters`

The following sections describe the entries contained within those subkeys.

Alert Parameters Entries

The Registry path that contains entries for the PC NetLink Alerter service is as follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedSer
ver\AlertParameters
```

- `AlertAdminOnLicenseOverflow` `REG_DWORD` 0 or 1

  Specifies whether the server sends an administrative alert message when the maximum allowable number of clients is exceeded.

  Default: 0 (message will not be sent)

- `AlertUserOnLicenseOverflow` `REG_DWORD` 0 or 1

  Specifies whether the server sends a message to a client that tried to link but failed when the maximum allowable number of clients is exceeded.

  Default: 0 (message will not be sent)

File Service Parameters Entries

The Registry path that contains entries for the PC NetLink File service is as follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedSer
ver\FileServiceParameters
```

- AclCacheSize REG_DWORD 0 - 100

  Specifies the number of entries in the Access Control List (ACL) cache that keeps track of the results or recent access checks performed on PC NetLink resources.

  Default: 6

- EAFilePrefix REG_SZ *Character string*

  Prefix used to name files containing extended attribute data. For example, by default, the extended attributes for file foo are stored in .ea@foo.

  Default: .ea@

- EnableSoftCompat REG_DWORD 0, 1, or 2

  Specifies how PC NetLink handles file opens in read-only compatibility mode. Use 0 to keep the compatibility mode; 1 to translate to read-only/DenyWrite mode for files with special extensions (for example, .EXE, .COM, and .BAT) specified by the value of the EnableSoftFileExtensions key; and 2 to translate to read-only/DenyWrite mode for all file opens.

  Default: 1 (translate files with special extensions to read-only/DenyWrite)

- EnableSoftFileExtensions REG_MULTI_SZ *List*

  Specifies the file extensions for which the compatibility mode will be translated to read-only/DenyWrite if the value of the EnableSoftCompat key is set to 1.

  Default: bat com exe dll cmd

- ForceDirectoryAcl REG_DWORD 0 or 1

  Determines whether the PC NetLink program will create an Access Control List (ACL) for a newly created directory if an explicit Access Control List was not provided by the client computer. If an Access Control List is not created, one will be inherited automatically from its parent directory whenever it is needed.

  Default: 1 (create new Access Control List)

- ForceFileAcl REG_DWORD 0 or 1

  Determines whether the PC NetLink will create an Access Control List for a newly created file if an explicit Access Control List was not provided by the client computer. If an Access Control List is not created, one will be inherited automatically from its parent directory whenever it is needed.

  Default: 0 (will not create new Access Control List)

- ForceFileFlush REG_DWORD 0 or 1

  Specifies whether to force a Solaris fsync(2) system call when a server message block (SMB) flush request is received. Not forcing fsync(2) system calls can improve file server performance; files will be flushed automatically to disk by the Solaris fsflush daemon periodically, regardless of the setting of this key.

Default: 0 (will not force fsync system call)

- IgnoreUnixPermissions REG_DWORD 0 or 1

  Gives users the option to bypass Solaris system permissions when working with files and directories. For example, enabling this option would allow PC NetLink users to write to or delete files for which they have sufficient PC NetLink permissions even though only Solaris system Read permissions had been granted to those files.

  Default: 0 (enforce Solaris system permissions)

  You can change the value of this key by using the Solaris File System Integration policy wizard in PC NetLink Server Manager.

- MappingSeparator REG_SZ *Character string* up to 7 characters

  Specifies the string that will be appended to the file name before its unique suffix to indicate that the name is mapped. This value matters only in Solaris system to Windows NT file name mapping. The default is a tilde (~), the same as in Solaris system to 8.3 mapping, but it is possible to set it to enable the client to easily identify files containing characters illegal in Windows NT. By default, a file named my? will be mapped to my_~xyz. When the value of this key is set to ~slm~, the name will be mapped to my_~slm~xyz. If an invalid parameter is placed in the Registry, the MappingSeparator will be replaced by the default value.

  Default: ~

  You can change the value of this key by using the File Name Mapping policy wizard in PC NetLink Server Manager.

- MaxEASize REG_DWORD 1 - infinity

  Specifies the buffer size in bytes that is allocated for extended attributes.

  Default: 4096

- MaxFileSizeInKB REG_DWORD 100 - infinity

  The maximum file size, in Kbytes, that the PC NetLink program will allow a user to create on the server.

  Default: 20000

- MemoryMapFiles REG_DWORD 0 or 1

  Specifies whether the server uses the Solaris system mmap system call to memory map file data into the server's address space for efficiency. File mapping is attempted only for read-only files.

  Default: 1 (memory map read-only files)

- MixedCaseSupport REG_DWORD 0 or 1

Specifies whether mixed-case support is enabled on the server. Mixed-case support allows clients to access file names containing uppercase characters on the Solaris system. Enabling mixed-case support may negatively affect the server's performance.

Default: 1 (enables mixed case)

You can change the value of this key using the PC NetLink Server Manager.

- `NameSpaceMapping` `REG_DWORD` 0, 1, 2, or 3

  Specifies the type of file name space mapping enabled on the server.

  A value of 0 indicates that there is no name space mapping enabled.

  A value of 1 specifies that only Solaris system to 8.3 mapping is enabled. This allows 8.3-style clients, such as MS-DOS, Windows 3.1, and Windows for Workgroups, to access files with long file names and file names containing characters that are invalid in DOS (+ , ; = [ ] ? " \ < > * | : . [space])

  A value of 2 specifies that only Solaris system to Windows NT mapping is enabled. This allows Windows NT-style clients, such as Windows 95, Windows NT, and OS/2, to access files with file names containing characters that are illegal in Windows NT (? " \ < > * | :).

  A value of 3 specifies that both Solaris system to 8.3 and Solaris system to Windows NT mappings are enabled.

  Default: 3

  You can change the value of this key using the PC NetLink Server Manager.

- `OplockTimeout` `REG_DWORD` 1 - infinity

  The interval of time in seconds that the server waits for acknowledgment from a client of an "oplock" broken notification.

  Default: 30

- `ReadAheadCount` `REG_DWORD` 0 (always read ahead) - infinity

  The number of sequential file accesses by a client that the server must detect before it begins reading ahead.

  Default: 2

- `ReportNTFS` `REG_DWORD` 0 or 1

  Specifies whether to report share Solaris system volumes as NTFS or actual Solaris file system type.

  Default: 1 (report as NTFS)

- `RootOwnsFilesCreatedOnNFS` `REG_DWORD` `0 or 1`

Specifies whether the Solaris superuser, Root, owns all files created within the Solaris file system.

Default: 0 (Root does not own)

- `SyncAclFileOnWrite` `REG_DWORD` 0 or 1

  Determines whether the server will force changes to the Access Control List (ACL) file to be written to disk using an `fsync(2)` system call or whether the server will permit the operating system to write the changes to disk normally.

  Default: 0 (write ACL changes to disk normally)

- `TruncatedExtensions` `REG_DWORD` 0 or 1

  Specifies whether to replace the last character of the file extension of a mapped file name with a tilde (~). This key applies to file extensions that originally were longer than three characters. This feature can be used to distinguish longer file extensions from similar three-character extensions that were unchanged. For example, enabling this feature prevents a file named *file1.document* from being mapped to a file named *file~xyz.doc*, which could cause some clients to consider this file a Microsoft Word file. (This key affects only Solaris system to 8.3 file mapping.)

  Default: 1 (do not replace last character with a tilde)

- `UniqueSuffixLength` `REG_DWORD` 0 - 7

  Specifies the length of the alphanumeric suffix appended to the file name to guarantee the mapping uniqueness. The longer the suffix, the higher the probability that the mapped name is unique. If the mapped name is not unique within a directory, name collisions can occur. They can cause the client to be denied access to the file it needs, or the client may get access to a different file than the one it requested.

  It is not advisable to set `UniqueSuffixLength` to a value less than 3, unless the preservation of a longer file name prefix outweighs possible name collision problems.

  Default: 3

  You can change the value of this key using the PC NetLink Server Manager.

- `UnixCloseCount` `REG_DWORD` 1 - 20

  The number of least recently accessed open files that the server closes transparently to avoid reaching the Solaris system's per-process limit. The server uses a technique called file descriptor multiplexing to allow clients to open far more files than the per-process limits would normally allow.

  Default: 5

- `UnixDirectoryCheck` `REG_DWORD` 0, 1, or 2

Specifies whether the PC NetLink program will allow clients to write to Solaris system directories that do not have Write permissions. Microsoft client software treats the Read-only attribute as advisory and does not limit the behavior of directories. In contrast, the Solaris operating environment treats Read-only permissions as mandatory and prohibits users from writing in directories for which they do not have Write permission.

A value of 0 allows writing only to directories with Write permissions; a value of 1 allows writing to directories belonging to or created by the PC NetLink program (as determined by checking group memberships of directory); and a value of 2 ignores Solaris directory permissions.

Default: 1

You can change the value of this key using the PC NetLink Server Manager.

- `UnixDirectoryPerms`   `REG_DWORD`   0 - 511

  The Solaris system permissions for newly created directories.

  Default: 509 (0775 octal)

  You can change the value of this key using the PC NetLink Server Manager.

- `UnixFilePerms`   `REG_DWORD`   0 - 4095

  The Solaris system permissions for newly created files.

  Default: 1460 (02664 octal)

  You can change the value of this key using the PC NetLink Server Manager.

- `UnixQuotas`   `REG_DWORD`   0 or 1

  Specifies whether the PC NetLink program provides Solaris system disk quota support. This ensures that creating or writing to the file is performed under the Solaris system user ID (UID) of the Solaris system user to which the PC NetLink user is mapped. Each action counts toward that user’s quota; an error message is sent to the client when the quota is exceeded. Two quotas are supported: i-node and block quotas for UFS and NFS file systems. This is true to the extent of the ability of these file systems to support Solaris system quotas.

  Default: 0 (no support for disk quotas)

- `UseEAs`   `REG_DWORD`   0 or 1

  Specifies support for OS/2 extended attributes.

  Default: 0 (no support for extended attributes)

- `UseNFSLocks`   `REG_DWORD`   0 or 1

Specifies whether the server tries to set Solaris system record locks in files as requested by clients. Record locks may not work on NFS files on a server running NFS. If the value of the `UseUnixLocks` key is 0, this feature has no effect on the server.

Default: 0 (do not set locks)

- `UseOplocks` `REG_DWORD` 0 or 1

  Specifies whether PC NetLink grants opportunistic locks to clients who request them on opens.

  Default: 1 (use opportunistic locks)

- `UseUnixLocks` `REG_DWORD` 0 or 1

  Specifies whether record locks created by clients are reflected in the Solaris file system.

  Default: 0 (locks are not reflected in Solaris file system)

  You can change the value of this key using the PC NetLink Server Manager.

- `WriteBehind` `REG_DWORD` 0 or 1

  Specifies whether physical Solaris system writes are performed before or after the server responds to the client. If Solaris system writes are performed before the server responds to the client, then the server appears to be slower (because the response is delayed), but the server can report disk full errors to clients. If Solaris system writes are performed after the response is sent, disk full errors during write SMBs are not reported to the client.

  Default: 0 (Do not enable write behind)

Net Administration Parameters Entries

The Registry path that contains entries for the PC NetLink Net Administration is as follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedSer
ver\NetAdminParameters
```

- `NetAdminGroupName` `REG_SZ` Character string

  The Solaris system group name assigned to the `net admin \\`*server–name* `/c` command.

  Default: DOS---

- `NetAdminPath` `REG_SZ` Character string up to 256 characters

The Solaris system path used to find commands submitted by the `net admin \\`*server–name* `/c` command.

Default: `/opt/lanman/bin:/usr/bin`

- `NetAdminUserName` `REG_SZ` Character string

  The Solaris system user account name assigned to a process executed by the `net admin \\`*server–name* `/c` command.

  Default: `lmxadmin`

Parameters Entries

The Registry path that contains entries for the PC NetLink Parameters is as follows:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedServer\Parameters`

- `CheckPrintQueueInMinutes` `REG_DWORD` 1 - infinity

  The interval in minutes at which the server determines whether a printer queue should be started.

  Default: 10 minutes

- `DisableUpLevelPrinting` `REG_DWORD` 0 or 1

  Specifies whether to disable or enable Windows NT-style printing.

  Do not change this value from the default setting of 0. Doing so will disable all printing services.

  Default: 0

- `MaxDirectoryBufferSize` `REG_DWORD` 1 - infinity

  The maximum size of a buffer that the server will use for a `getdents(2)` system call to read the contents of a Solaris system directory. Because PC NetLink will attempt to allocate these buffers using the GC memory allocator, one should consider increasing the `SizeGcBufferPoolInKB` key if one increases this value.

  Default: 32,768 bytes

- `MaxIpcTryCount` `REG_DWORD` 1 - infinity

  The number of `read()` system calls after which the server checks whether other work could be done by the server. There is a considerable amount of interprocess communication (IPC) between server processes. The server uses the read system call to receive IPC messages, but `read` does not always return the entire message. This key ensures that the server does not keep trying to get an IPC message at the expense of other activities the process could perform.

Default: 20

- `MaxMailslotReadTime` `REG_DWORD` 1 - infinity

  The amount of time in seconds to wait for a local mailslot application to read a class 1 mailslot. A value specified here keeps the server from waiting indefinitely for a message to be delivered.

  Default: 90 seconds

- `MaxMessageSize` `REG_DWORD` 1024 - infinity

  The maximum amount of data that a client can exchange with the server.

  Default: 4156 bytes

- `MaxPrintQueueNameLength` `REG_DWORD` 1 - 255 characters

  Provides dynamic control of the allowable length of the name of a printer queue. LP subsystem commands currently allow class names to be as large as 255 characters, but jobs sent to these classes cannot be controlled and many of the Solaris system commands to manipulate these jobs result in a fatal error. This key is used by printer queue functions to restrict access to queues based on the length of the queue name.

  Default: 14

- `MaxRawSize` `REG_DWORD` 8192 bytes - infinity

  Specifies the maximum size in bytes of the raw send or receive buffers that the PC NetLink program will use for processing Read Block Raw, Write Block Raw, Transaction, Transaction 2, or NT Transaction SMBs.

  Default: 32768

- `MaxServiceWaitTime` `REG_DWORD` 5 seconds - infinity

  Specifies the amount of time in seconds that the server will wait for a service to respond when it changes the following statuses of the services: pause, continue, install, uninstall.

  Default: 60

- `NativeLM` `REG_SZ` Character string

  An additional field in the session setup request/response. This field is generated at run time.

  Default: (Solaris PC NetLink)

- `NativeOS` `REG_SZ` Character string

  An additional field in the session setup request/response. This field is generated at run time.

Default: (platform-dependent)

- SendByeMessage   REG_DWORD   0 or 1

  Specifies whether the server sends a message to every client in the domain in the event that it is going to stop for any reason other than a normal shutdown. The message states that the PC NetLink program has stopped.

  Default: 1 (send a message)

- SizeGcBufferPoolInKB   REG_DWORD   1 - infinity

  The buffer size in Kbytes allocated for each server process for client files.

  Default: 200 Kbytes

Process Parameters Entries

The Registry path that contains entries for the PC NetLink Process Parameters is as follows:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedServer\ProcessParameters

- CoreOk   REG_DWORD   0 or 1

  Specifies whether the server can create a core dump file on disastrous failures.

  Default: 0 (do not create core file)

- KeepSpareServer   REG_DWORD   0 or 1

  Specifies whether the server should have a spare lmx.srv process available for another client. New client connections are likely to be quicker if this key is enabled.

  Default: 1 (start lmx.srv process)

- LockNapInMSec   REG_DWORD   1 - infinity

  Specifies the length of time in milliseconds that the server sleeps when shared memory lock contention occurs. The server retries busy locks at intervals specified in this key until the length of time specified in the value of the MaxLockTimeInSeconds key elapses.

  Default: 10 milliseconds

- MaxLockTimeInSeconds   REG_DWORD   5 - infinity

  The maximum interval in seconds that a server process waits for a shared memory lock to become available.

  Default: 300 seconds (5 minutes)

- MaxVCPerProc REG_DWORD 0 - 101

  The maximum number of virtual circuits that each lmx.srv process should be able to handle. This limit normally is calculated contemporaneously by PC NetLink software using the value of the VCDistribution Registry key and the value of the maxclients parameter in the lanman.ini file. If the value of this key is non-zero, its value is used instead of the calculated value.

  Default: 100 (if set to 0, use value of VCDistribution key)

  You can change the value of this key using the PC NetLink Server Manager.

- MaxVCs REG_DWORD

  The maximum number of virtual circuits that can be established to a PC NetLink server. This key permits administrators to manually override the sizing of shared memory.

  Do not change the value of this key.

- MinSmbWorkerTasks REG_DWORD

  Determines how many SMBWORKER tasks are preallocated by lmx.srv processes on startup. Do not change the value of this key.

- MinVCPerProc REG_DWORD

  The minimum number of virtual circuits that each lmx.srv process should be able to handle. This limit normally is calculated contemporaneously by PC NetLink using the value of the VCDistribution Registry key and the value of the maxclients parameter in the lanman.ini file. If this value is non-zero, its value is used instead of the calculated value.

  Default: 10 (if set to 0, use value of VCDistribution key)

  You can change the value of this key using the PC NetLink Server Manager.

- NumCIStructs REG_DWORD

  Sizes the CLIENTINFO array in shared memory.

  Do not change the value of this key.

- NumCLIENT_SESSION REG_DWORD 5 - 128

  Limits the number of trust relationships that a server can maintain with other domains. This figure should be at least one greater than the number of domains trusted by the server’s domain.

  Default: 5

- NumHashTables REG_DWORD 8 - infinity (powers of 2)

  The number of buckets for the hash table in shared memory to keep track of the various modes that clients have used to open files and set record locks.

Do not change the value of this key.

Default: 128

- NumSERVER_SESSION   REG_DWORD   5 - infinity

  Limits the number of servers and Windows NT clients that can authenticate with the server. This figure should be large because it limits the number of Windows NT clients that can contact the server. On a primary domain controller, it must be at least the number of servers and Windows NT clients in the domain.

  Default: 1000

- NumUStructs   REG_DWORD   1 - infinity

  The number of structures allocated in shared memory to handle record lock and open file records. The sum of open files and record locks cannot exceed the value of this key.

  Default: 15000

- SpareServerTime   REG_DWORD   0 - infinity

  The interval in seconds that a spare lmx.srv process is allowed to run without serving a client before being terminated.

  Default: 120 seconds (2 minutes)

- StopOnCore   REG_DWORD   0 or 1

  Specifies whether the lmx.ctrl process is to stop if it finds that an lmx.srv process has terminated unexpectedly.

  Default: 0 (do not stop PC NetLink)

- VCDistribution   REG_MULTI_SZ   List

  Specifies the distribution of virtual circuits or sessions over lmx.srv processes. The architecture of the server allows multiple sessions to be served by each lmx.srv process on the Solaris system. The server must decide if a new session should be handed off to an existing lmx.srv process or if a new process should be started. This key specifies the distribution of sessions over the lmx.srv processes.

  Values are entered in sets of three integers separated by commas, each set of three numbers on a new line. In each set, the first number specifies the number of clients; the second is the minimum number of virtual circuits each lmx.srv process should support; the third is the maximum number of virtual circuits each process should support.

  Default: 1,5,50
  500,6,65

700,8,80

1000,10,100

The following table describes the meaning of the default values.

TABLE A-5 `lmx.srv` Processes Default Value Meaning

Client Range	Min. Sessions per lmx.srv	Max. Sessions per lmx.srv
1-19	2	12
20-34	2	20
35-49	2	24
50-84	3	28
85-99	4	28
100-129	5	32
130-179	6	36
180-249	8	42
250-349	9	44
350-499	10	50
500-749	10	60
750-999	10	80
1000+	10	101

RPC Parameters Entries

The Registry path that contains entries for the PC NetLink RPC Parameters is as follows:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedServer\RPCParameters`

- `BrowserMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of open browser sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

- `EventlogMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of open event log sessions that an `lmx.srv` process can support simultaneously.

Default: 60

- `LsarpcMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of open LSA RPC sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

- `NetlogonMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of open NetLogon sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

- `SamrMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of SAM sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

- `SpoolssMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of print sessions that an `lmx.srv` process can support simultaneously.

  Default: 50

- `SrvsvcMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of server sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

- `SvcctlMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of service control sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

- `WinregMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of Registry sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

- `WkssvcMaxCalls` `REG_DWORD` 5 - infinity

  The maximum number of workstation sessions that an `lmx.srv` process can support simultaneously.

  Default: 60

Share Parameters Entries

The Registry path that contains entries for the PC NetLink Share Parameters is as follows:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedServer\ShareParameters`

- `KeepAdministrativeShares` `REG_DWORD` 0 or 1

  Specifies whether administrators are prevented from removing the `ADMIN$` and `IPC$` shared resources.

  Default: 1 (prevented from removing shared resources)

- `MakeUnixDirectoriesOnShare` `REG_DWORD` 0 or 1

  When creating a new share using Server Manager, specifies whether PC NetLink software should create a directory automatically if one does not exist.

  Default: 1 (create new directory)

- `ShareReadCount` `REG_DWORD` 1 - infinity

  The number of share entries to read during sharefile operations. A value greater than 1 causes the server to read ahead `SHAREENTRY` structures from the sharefile.

  Default: 10

User Service Parameters Entries

The Registry path that contains entries for the PC NetLink User Service Parameters is as follows:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AdvancedServer\UserServiceParameters`

- `CreateUnixUser` `REG_DWORD` 0 or 1

  Automatically creates and assigns a similarly named Solaris system user account to every new PC NetLink user account created in the domain in which the server is a member. The value of this key must be set to 1 on every server on which Solaris system accounts are to be created. Note that new PC NetLink users are assigned to the Solaris system `lmworld` account.

  Default: 0 (do not create Solaris system user account)

  You can change the value of this key using the PC NetLink Server Manager.

- `Exclude` `REG_SZ` Character string

Specifies existing Solaris system user IDs excluded from being assigned to PC NetLink user accounts. If a PC NetLink user account is created whose name matches an existing Solaris system user account whose ID is contained in the exclude list, a new Solaris system user account will be generated automatically and assigned to the PC NetLink user account. This can be used to ensure that certain existing Solaris system user accounts never are assigned automatically to newly created PC NetLink user accounts, even if the `ForceUniqueUnixUserAccount` key is set to 0.

Default: 0 - 100

- `ForceUniqueUnixUserAccount` `REG_DWORD` 0 or 1

  Specifies whether to assign automatically an existing Solaris system user account to a newly created PC NetLink user account. If you select 1, then the system does not assign existing Solaris system user accounts. Instead, new Solaris system user accounts are generated automatically and assigned to PC NetLink user accounts when they are created.

  Default: 0 (A new PC NetLink user account can be assigned automatically to an existing Solaris system user account with an equal or similar name, provided that the Solaris system user account is not specified in the exclude list.)

  You can change the value of this key using the PC NetLink Server Manager.

- `GroupUpdateTime` `REG_DWORD` 0 - infinity

  The interval in seconds at which the server checks the Solaris system file `/etc/group` for changes.

  Default: 3600 seconds (1 hour)

- `NewUserShell` `REG_SZ` Character string

  The login shell for new user accounts. The default prevents new users from logging in to the Solaris system using a terminal emulator. To enable login, set this key to a real value, such as `/bin/sh`.

  Default: `/bin/false`

  You can change the value of this key using the PC NetLink Server Manager.

- `SyncUnixHomeDirectory` `REG_DWORD` 0 or 1

  Whenever the home directory of a PC NetLink user account changes, this key changes the home directory of the associated Solaris system user account to match the PC NetLink home directory.

  Default: 0 (do not synchronize home directories)

  You can change the value of this key using the PC NetLink Server Manager.

- `UserComment` `REG_SZ` Character string

The comment to assign to all automatically created Solaris system user accounts.

Default: Solaris™ PC NetLink user

- `UserRemark`   `REG_SZ`   0 - 48 characters

  The comment string associated with the USERS shared directory.

  Default: Users Directory

Alerter Service Parameters

The Registry path that contains entries for the PC NetLink Alerter service is as follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Alerter\Par
ameters
```

- `AlertNames`   `REG_MULTI_SZ`   *List*

  A list of the user accounts and computer names that should receive administrative alerts.

  Default: None

- `CountNotOnNetworkCache`   `REG_DWORD`   0 - infinity

  Specifies the number of non-running cached clients to which the Alerter service should not send messages. When the Alerter service tries to send a popup message to a client, NetBIOS name resolution can cause unwanted delays if the client is not on the network. To circumvent this problem, the Alerter service caches the names of clients that are not running and does not send alerts to these clients.

  Default: 10

- `IncludeMessageHeader`   `REG_DWORD`   0 or 1

  Specifies whether the Alerter service should add four lines of header information to messages (sender, recipient, subject, and date).

  Default: 0 (do not include headers)

- `NotOnNetworkCacheTimeout`   `REG_DWORD`   0 - infinity

  Specifies how long in seconds that non-running clients should remain in the server’s cache of clients.

  Default: 120 seconds (2 minutes)

Browser Service Parameters

You can use PC NetLink Server Manager to change the values of all of the following keys. The Registry path that contains entries for the PC NetLink Computer Browser service is as follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Browser\Par
ameters
```

- `BackupRecovery` `REG_DWORD` 60 - infinity

  Specifies the period of time in seconds that must elapse before a server that has ceased being a backup browser can become a backup browser again.

  Default: 1800 seconds (30 minutes)

  You can change the value of this key using the PC NetLink Server Manager.

- `BackupUpdate` `REG_DWORD` 60 - infinity

  Indicates the interval in seconds at which the backup browser refreshes its browse lists with the master browser.

  Default: 720 seconds (12 minutes)

  You can change the value of this key using the PC NetLink Server Manager.

- `MasterUpdate` `REG_DWORD` 60 - infinity

  Indicates the interval in seconds at which the master browser ages its browse lists and updates its lists with the domain master browser.

  Default: 720 seconds (12 minutes)

  You can change the value of this key using the PC NetLink Server Manager.

- `MoreLog` `REG_DWORD` 0 or 1

  Indicates whether the Computer Browser service should record additional system log entries for events such as election packets that the Computer Browser service receives and the role of the browser server (master or backup).

  Default: 0 (do not record additional entries)

EventLog Service Entries

The subkey for EventLog contains at least three subkeys for the three types of logs: Application, Security, and System. These *logfile* subkeys contain subkeys that define the locations of the related event message files and the supported types of events, as follows:

- *Application* – Perflib, Perfmon, Replicator, RemoteBoot
- *Security* – LSA, SC Manager, Security, Security Accounts Manager, Spooler
- *System* – Alerter, Browser, EventLog, NetLogon, Print, Rdr, SAM, server, Service Control Manager, Srv, Wins, workstation

Each of the three *logfile* subkeys for the EventLog service can contain the value entries described in this section. The Registry path for these entries is the following, where *logfile* is System, Application, or Security.

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog\`*logfile*

These entries are described for informational purposes only. This information is usually maintained by Event Viewer.

- `File`   `REG_EXPAND_SZ`   Path and file name

  Specifies the fully qualified path name of the file for this log.

  Default: %*SystemRoot*%`\var\opt\lanman\logs\`*filename*
- `MaxSize`   `REG_DWORD`   Multiples of 64 Kbytes

  Specifies the maximum size of the log file. This value can be set using the Event Viewer.

  Default: 524288 (512 Kbytes)
- `Retention`   `REG_DWORD`   0 to infinity

  Specifies in seconds that records newer than this value will not be overwritten. This is what causes a log full event. This value can be set using the Event Viewer.

  Default: 604,800 seconds (7 days)
- `Sources`   `REG_MULTI_SZ`   List

  Specifies the applications, services, or groups of applications that write events to this log. Each source may be a subkey of the *logfile* subkey. (The `appsources`, `secsources`, and `syssources` keys also are in the `lanman.ini` file.)

  Default: (varies according to log file)

The subkeys under a *logfile* subkey are created by the applications that write events in the related event log. These subkeys contain information specific to the source of an event under the following types of value entries.

- `EventMessageFile`   `REG_EXPAND_SZ`   *Character string*

  Specifies the path and file name for the event identifier text message file.
- `CategoryMessageFile`   `REG_EXPAND_SZ`   *Character string*

Specifies the path and file name for the category text message file. The category and event identifier message strings may be in the same file.

- `CategoryCount` `REG_DWORD` 0 - infinity

  Specifies the number of categories supported.

- `TypesSupported` `REG_DWORD` 0 - infinity

  Specifies a bitmask of supported types.

Net Logon Service Parameters

The Registry path with entries for the PC NetLink Net Logon service follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Netlogon\Pa
rameters
```

- `LogonQuery` `REG_DWORD` 60 - infinity

  Specifies the interval in seconds at which the server checks if linked clients are still active.

  Default: 900 (15 minutes)

- `Pulse` `REG_DWORD` 60 - 3600 (1 hour)

  Specifies the interval in seconds for sending update notices when no updates are occurring to the master user accounts database. This keyword applies only to a primary domain controller and is ignored by other servers.

  Default: 300 (5 minutes)

- `QueryDelay` `REG_DWORD` 1 - infinity

  Specifies the interval in seconds that a client can wait before responding to the server's inquiry about whether it is active.

  Default: 2

- `Randomize` `REG_DWORD` 5 to 120

  Specifies the period in seconds within which a backup domain controller randomizes its request to a primary domain controller for updates after receiving an update notice. This keyword reduces the chance that backup domain controllers in the same domain will simultaneously request an update.

  Default: 30 seconds

- `RelogonDelay` `REG_DWORD` 1 - infinity

  Specifies the interval in seconds that a client can wait before logging back on to the server after the server has been stopped and restarted.

Default: 2

- `Scripts`   `REG_EXPAND_SZ`

  Specifies the location of the logon scripts directory.

  Default on primary domain controller:
  %*SystemRoot*%`\var\opt\lanman\shares\asu\repl\export\scripts`

  Default on backup domain controller:
  %*SystemRoot*%`\var\opt\lanman\shares\asu\repl\import\scripts`
- `SSIPasswdAge`   `REG_DWORD`   86400 (24 hours) - infinity

  Specifies the time in seconds at which a backup domain controller must change the password that it sends to the primary domain controller to verify its eligibility to receive user accounts database updates.

  Default: 604,800 (7 days)
- `Update`   `REG_DWORD`   0 or 1

  If this value is set, the server synchronizes the user accounts database with the primary domain controller every time it starts. This keyword applies only to a backup domain controller and is ignored by the primary domain controller. Note that full synchronization is a very time-consuming operation.

  Default: 0 (do not synchronize)

Netrun Service Parameters

The Registry path that contains entries for the PC NetLink Netrun service is as follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Netrun\Para
meters
```

- `MaxRuns`   `REG_DWORD`   1 - 10

  Sets the maximum number of Netrun requests that can run simultaneously.

  Default: 3
- `RunPath`   `REG_SZ`   Path up to 256 characters

  Sets the path where programs accessible via the Netrun service are located. Only programs located in a runpath can be executed from a client or another server. Separate multiple path entries with colons (`:`).

  Default: `\tmp`

Replicator Service Entries

The Registry path that contains entries for the PC NetLink Directory Replicator service is as follows:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Replicator\Parameters`

- `ExportList` `REG_SZ` *Character string*

  Lists an unlimited number of servers or domains that receive notices when the export directory is updated. These servers subsequently replicate from the export server. If no value is specified, the export server sends a notice to its domain. Separate multiple names with a semicolon (`;`). This value is ignored if the value of the Replicate key is `2` (Import).

  Do not use the UNC name when you specify a computer name; that is, do not include two backslashes (\\) at the beginning of the name.

  Default: (local domain name)

- `ExportPath` `REG_SZ` or `REG_EXPAND_SZ` *Path name*

  Specifies the export path. All files to be replicated must be in a subdirectory of the export directory. This value is ignored if the value of the Replicate key is set to `2` (Import).

  Default: `C:\var\opt\lanman\repl\export`

- `GuardTime` `REG_DWORD` 0 to one-half of *Interval*

  Sets the number of minutes an export directory must be stable (no changes to any files) before import servers can replicate its files.

  This option applies only to directories with tree integrity.

  Default: 2

- `ImportList` `REG_SZ` *Character string*

  Lists an unlimited number of servers or domains from which files and directories are to be replicated. If no value is specified, files and directories will be replicated from the server's domain. Separate multiple names with a semicolon (`;`). This value is ignored if the value of the Replicate key is `1` (Export).

  Do not use the UNC name when you specify a computer name; that is, do not include two backslashes (\\) at the beginning of the name.

- `ImportPath` `REG_SZ` or `REG_EXPAND_SZ` *Path name*

  Specifies the path on the import server to receive replicas from the export servers. This value is ignored if the value of the Replicate key is `1` (Export).

  Default: `C:\var\opt\lanman\repl\import`

- Interval REG_DWORD At least twice as large as GuardTime value

  Specifies how often in minutes an export server checks the replicated directories for changes. Used in conjunction with the Pulse key. Ignored on import servers. The value of Interval must be at least twice as large as the value of GuardTime. Otherwise, the Replicator service will not start.

  Default: 5
- MaxFilesInDirectory REG_DWORD 0 - infinity

  Specifies the maximum number of files in an import directory that can be replicated.

  Default: 2000
- Pulse REG_DWORD 1 - 10

  Specifies in minutes how often the export server repeats the last update notice. These repeat notices are sent even when no changes have occurred, so that import servers that missed the original update notice can get the notice. The server waits the equivalent of (Pulse * Interval) minutes before sending each repeat notice.

  Default: 3
- Random REG_DWORD 1 - 120

  Specifies the maximum time in seconds that the import servers can wait before requesting an update. An import server uses the export server's value of Random to generate a random number of seconds (from 0 to the value of Random). The import server waits this long after receiving an update notice before requesting the replica from the export server. This prevents the export server from being overloaded by simultaneous update requests.

  Default: 60
- Replicate REG_DWORD 1, 2, or 3

  Specifies the Replicator action, according to the following:

  1 = Export – The server maintains a master tree to be replicated.

  2 = Import – The server receives update notices from the export server.

  3 = Both – The server is to export and import directories or files.

  Default: Varies with role of server
- TryUser REG_DWORD 0 or 1

  Specifies whether the import server should try to update directories when a user name is logged on locally.

  Default: 0 (do not try)

- `UnixDirectoryGroup` `REG_SZ` *Character string*

  Specifies the Solaris system group account name for replicated directories.

  Default: `DOS`
- `UnixDirectoryOwner` `REG_SZ` *Character string*

  Specifies the Solaris system user account name for replicated directories.

  Default: `lmxadmin`
- `UnixFileGroup` `REG_SZ` *Character string*

  Specifies the Solaris system group account name for replicated files.

  Default: `DOS`
- `UnixFileOwner` `REG_SZ` *Character string*

  Specifies the Solaris system user account name for replicated files.

  Default: `lmxadmin`

UPS Service Parameters Entries

The Registry path that contains entries for the PC NetLink Uninterruptible Power Supply (UPS) service is as follows:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\UPS\Paramet
ers
```

- `IgnoreSIGPWR` `REG_DWORD` 0 or 1

  Specifies whether UPS service will be enabled.

  Default: 1 (disables UPS service)

  You can change the value of this key using the PC NetLink Server Manager.
- `PowerFailAddress` `REG_SZ` String up to 15 characters

  Specifies the NetBIOS name to which the server sends a message when it receives a `SIGPWR` signal.

  Default: * (all users)

  You can change the value of this key using the PC NetLink Server Manager.
- `PowerFailMessage` `REG_SZ` String up to 500 characters

  The text of the message to be sent by the server when it receives a `SIGPWR` signal.

Default: The system has experienced a power failure. Please close all applications and files and log off immediately.

You can change the value of this key using the PC NetLink Server Manager.

- `PowerMessageInterval`   `REG_DWORD`   0 - infinity

  Specifies the interval in minutes at which the server repeats the message sent when it receives a `SIGPWR` signal. A value of 0 indicates that the message should be sent one time only.

  Default: 1

  You can change the value of this key using the PC NetLink Server Manager.

APPENDIX **B**

Common Windows NT Administration Tasks

This appendix provides instructions for accomplishing many basic Windows NT/PC NetLink administrative tasks that are not covered elsewhere in this book. Intended mainly for the experienced Solaris administrator who performs tasks via the command line and has little Windows NT experience, this appendix focuses on interoperability issues rather than purely Windows NT administration.

This appendix does not provide background information about the Microsoft Windows or Windows NT environments. Many third-party books, as well as documentation from Microsoft, are available for that purpose.

Tasks Included in This Appendix

The tasks included in this appendix are:

- "How to Join a Domain as a BDC When the PDC Is on a Different Subnet" on page 220
- "How to Add LMHOST Functionality to a PC NetLink Server Running as a BDC" on page 221
- "How to Set Up Directory Replication Between Servers on Different Domains" on page 222
- "How to Set Up Windows NT Alerts and Security Auditing" on page 226

PC NetLink Server Manager “How to” Help

PC NetLink Server Manager also offers complete instructions for performing a variety of Windows NT/PC NetLink interoperability tasks. Double-click Tasks and then double-click any of the “How to” icons (illustrated with a question mark) to find the instructions. Topics covered are:

- How to Set Up File Shares
- How to Set Up Roaming Profiles
- How to Set Up System Policies
- How to Set Up Trust Relationships
- How to Set Up User Accounts

Available by double-clicking “Other How-To Help Topics” are:

- How to Enforce Solaris Disk Quotas in a PC NetLink Environment
- How to Create Solaris Home Directory Access From Client PCs
- How to Configure Printer Pooling
- How to Set Up Directory Replication
- How to Migrate a Windows NT Server to a PC NetLink Server

▼ How to Join a Domain as a BDC When the PDC Is on a Different Subnet

When you need to have your PC NetLink server become a backup domain controller (BDC) to a primary domain controller (PDC) in a different subnet, the PC NetLink server must resolve the NetBIOS name of the PDC. There are two ways to do this, depending on whether a WINS server exists in the PDC’s domain.

If a WINS Server Exists

If a WINS server exists in the PDC’s domain, and if the PDC is already registered in this WINS server, then you must register the PC NetLink server in this same WINS server. In this way, the PC NetLink server can resolve the PDC’s NetBIOS name.

Do the following to register the PC NetLink server in the WINS database:

1. **Restart the PC NetLink server by entering the following commands:**

   `winsconf -p` *IP-address-of-WINS-server*

   ```
   net stop server
   ```

   ```
   net start server
   ```

2. **Use the** `joindomain` **command to join the PC NetLink server to the domain.**

If a WINS Server Does Not Exist

If a WINS server does not exist in the PDC's domain, do the following to resolve the NetBIOS name:

1. **Enter the following commands, noting that you type the name of the PDC in uppercase letters, and that you type the IP address in *reverse* order:**

   ```
   cd /opt/SUNWlznb/sbin
   ./nbns_adm -a -N UPPERCASE-NAME-OF-PDC -A reverse-IP-address -P TCP
   ```

2. **Use the `joindomain` command to join the PC NetLink server to the domain.**

How to Add LMHOST Functionality to a PC NetLink Server Running as a BDC

This section tells you how to add `LMHOST` functionality to a PC NetLink BDC server by creating and activating a `fnbnsusr.info` file.

1. **Create a `fnbnsusr.info` file.**

   PC NetLink software has a feature similar to `LMHOST`, configured in `/var/opt/SUNWlznb/fnbnsusr.info`.

   This file has the following format:

   PDC_NAME fill_character last_character reverse_ip_address name_type protocol_type

   Note the following restrictions:

   - PDC and domain names must be in uppercase.
   - The fill character is always `0x20`.
   - The last character should be `0x20` if referring to a server.
   - `0x1B` is used for a BDC, and so on.
   - The IP address must be in *reverse* order.
   - The name type is either unique or group.
   - Protocol type is always `TCP`.

2. **Activate the changes, as root, by typing the following command:**

   ```
   /opt/SUNWlznb/sbin/nbnsName.add
   ```

3. **As root, type the following command to verify that the NetBIOS name is being resolved correctly:**

   ```
   nbutil -f UPPERCASE_NAME_OF_PDC
   ```

   This function will not work correctly unless you have added the NetBIOS name of the PC NetLink BDC server in the `LMHOST` file of the Windows NT-based PDC server. This will take care of some of the `net` commands (issued from the PC

NetLink BDC) needed to contact the PDC server. See Chapter 2, “PC NetLink Administration at the Command Line” on page 11, for additional information about using commands.

▼ How to Set Up Directory Replication Between Servers on Different Domains

A server can play the following roles in directory replication:

- Export server
- Import server
- Both export server and import server

You have to configure the server according to the role it will play. You have to place the files to be replicated on the export server in subdirectories under `C:\Winnt\System32\Repl\Export` on Windows NT servers or on `C:\var\opt\lanman\repl\export` on PC NetLink systems.

Each time you add or modify a file in these subdirectories, the export server sends an update message to the import servers. The Replicator service on the import servers then logs on to the export server as a service and retrieves the files. The replicated files are placed in the same subdirectories’ names under `C:\Winnt\System32\Repl\Import` on Windows NT systems or `C:\var\opt\lanman\repl\import` on Solaris PC NetLink systems.

To achieve directory replication between servers on different domains, a trust relationship has to be defined between the two domains. The user who runs the Replicator service on the import domain has to be added to Replicator Local Group of the export server and also has to be able to perform the “Log on as a Service” operation on the export server.

Configuring the Import Server

To configure the import server, log on as Administrator and do the following:

1. **Open the User Manager tool and create a new user, `repladmin`, adding it to the following groups:**

   - Domain Users
   - Backup Operators
   - Replicator

2. **Assign a password to the `repladmin` account, setting the password to Never expire and not to be Changed on Next Logon; also, no machine restrictions should be set.**

3. **Still using the User Manager tool, add the export server's domain as a Trusting Domain:**

   a. **From the Policies menu, select Trust Relationship.**

   b. **Click the Add button to the right of Trusting Domains. You should see a new window, in which you type the name of the Trusting (Export) Domain, password, and password confirmation.**

Note – Password and Confirm Password are used only at the time the trust relationship is set. You can leave them blank. The value you use for Password and Confirm Password is used in Step 3b of the "Configuring the Export Server" section below, so note them for later use.

---

   c. **Click OK.**

4. **In the Server Manager tool, select the import server and then, from the Computer menu, choose Services.**

   a. **Select the Directory Replicator service and click the Startup button.**

   b. **Select Startup Type as Automatic.**

   c. **On the Logon As option, select This Account and type the name of the user account; such as:** *Import_Domain_Name*`\repladmin`

   d. **Type the password of the** `repladmin` **user in the Password and Confirm Password boxes.**

   e. **Close these dialog boxes.**

   If the operation is successful, this will add `repladmin` to the Replicator Local Group on the import domain and will grant `repladmin` the "Log on as a Service" right on the import domain.

   f. **Restart the Directory Replicator service by clicking the Start button.**

5. **Still using the Server Manager Tool, double-click on the import server.**

   a. **Click the Replication button to open a dialog box.**

   b. **Select the Import Directories option.**

   c. **In the From Path field, type the path to which you want to import the subdirectories. (In most cases, you should be able to use the default path of** `C:\Winnt\system32\Repl\Import` **on Windows NT or** `C:\var\opt\lanman\repl\import` **on Solaris PC NetLink servers.)**

   d. **Click the Add button below the Import Directories and type or select the export domain name or export server name.**

e. Click OK to close the Add window.

f. Click OK to close all windows.

Note – It is very important to verify that the directory into which you are importing files has the correct Solaris permissions; otherwise, it won't work. To do this, enter the following commands at the Solaris server:

```
chmod 777 dirtoexport
chown lmxadmin dirtoexport
chgrp DOS---- dirtoexport
```

It's much easier if the system administrator creates the directories to be exported from a client mapped to the share. Then they have a true Solaris PC NetLink directory.

Configuring the Export Server

To configure the export server, log on to it as Administrator and follow these steps:

1. **In the User Manager tool, create a new user, `repladmin`, and add it to following groups:**
   - Domain Users
   - Backup Operators
   - Replicator

2. **Assign a password to the `repladmin` account, setting the password to Never Expire and not to be Changed on Next Logon.**

3. **Still using the User Manager tool, add the Import Server's domain as a Trusted Domain:**

   a. From the Policies menu, select Trust Relationship.

   b. Click the Add button to the right of Trusted Domains. You should see a new window, in which you type the name of the Trusted (import) Domain and password. Type the password that you typed when you configured the Trusting Domain in Step 3b in "Configuring the Import Server" above.

   c. Click OK.

4. **In the User Manager tool on the export domain, add the `repladmin` account from the import domain to the Replicator Local Group.**

   a. Double-click on the Replicator Group from the Group List at the bottom of the window.

b. **Click the Add button.**

c. **In List Names From, select the import domain name.**

d. **Double-click the** `repladmin` **user account.**

e. **Click OK to close the Add window.**

f. **Click OK to close the Group window.**

5. **From the User Manager pull-down menu, select Policies and then User Rights.**

a. **Select Show Advanced User Rights.**

b. **From the Right options list, select Log on as a Service.**

c. **Click the Add button, then from the new window that appears, select the Replicator group.**

d. **Click the Add button.**

e. **Click OK to close the User Rights window.**

6. **In Server Manager, select the export server and then, from the Computer menu, select Services.**

a. **Choose Startup from the Directory Replicator service menu.**

b. **Select Startup Type as Automatic.**

c. **On the Logon As option, select This Account and type the name of the user account; such as:** *Export_Domain_Name*`\repladmin`

d. **Type the password of the** `repladmin` **user in the Password and Confirm Password boxes.**

e. **Close these dialog boxes.**

If the operation is successful, this will add `repladmin` to the Replicator Local Group on the export domain and will grant `repladmin` the Log on as a Service right on the export domain.

f. **Click the Start button to restart the Directory Replicator service.**

7. **Still using Server Manager, double-click on the export server.**

a. **Click the Replication button to open a dialog box.**

b. **Select the Export Directories option.**

c. **In the From Path field, type the export path name.**

In most cases, you can use the default path of `C:\Winnt\System32\Repl\Export` on Windows NT or `C:\var\opt\lanman\repl\export` on PC NetLink systems.

d. **Click OK to close these dialog boxes.**

8. **Use Server Manager to make sure that the Replicator service was started on both servers.**

Replication will start soon.

If you want to establish a two-way replication (both servers acting as import and export server), you have to establish a two-way trust relationship between the two domains. The `repladmin` users of both domains have to be added to the Replicator Local Group in each domain, and the Replicator Local Group has to be able to "Log on as a Service" in each domain.

▼ How to Set Up Windows NT Alerts and Security Auditing

Two of the most useful administrative features available to a PC NetLink server are the Windows NT Alerter service and the Auditing service. These are native Windows NT services, not unlike the PC NetLink Server Manager Performance Alert policy.

You set up the Windows NT Alerter service by way of Windows NT Server Manager to notify you (or any Windows NT-connected machine that you specify) whenever specific events occur. You set a threshold value, and the Alerter service generates an alert whenever the actual value exceeds or falls below the threshold. You can set alerts to be triggered, for example, based on the number of server sessions or on a specified throughput level. You can have the alerts stored in a dedicated log or even sent immediately and directly to your machine.

Auditing is a key security service that you can use, for example, to monitor who is accessing files or directories on a PC NetLink server. Almost any action performed by a user can be audited. This service is not enabled by default under Windows NT.

Setting Up Alerts

1. **Use PC NetLink Server Manager to make sure the Alerter service is running on the PC NetLink server.**

See Chapter 3, "Configuring and Managing PC NetLink Software" on page 33.

2. **On a Windows NT server, start Performance Monitor.**

   Click the Start button, and then choose Programs, then Administrative Tools, then Performance Monitor.

3. **In Performance Monitor, choose View and then Alerts.**

4. **In the Alerts sheet, choose Edit and then Add to Alerts.**

   Use the following guidelines:

   - *Computer* – Choose the PC NetLink server
   - *Counter* – Pick one; for example, Bytes Total/sec. (For details about the Counter, click Explain.)
   - *Alert If* – Set the over/under value.

Saving Alerts

- **From the File menu, choose Save Alert Settings.**

Using Saved Settings

- **From the File menu, choose Open.**

Setting Up Security Auditing

Note – The following instructions assume that the user has “Managing auditing and Security Log rights.”

---

1. **In Network Neighborhood, highlight a PC NetLink file or folder.**

2. **Under Properties, choose Security and then Auditing.**

3. **In the File Auditing sheet, choose Add, and then pick an option; for example, Everyone.**

4. **Choose an event to audit; for example, Read, Write.**

   View audited events in the Security log.

Viewing the Security Log

1. **In Windows NT Event Viewer, choose Log, then Computer, and select the PC NetLink server.**

2. Choose the Security log.

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