



# Solaris™ PC NetLink 2.0 Installation Guide

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Part No. 816-0327-10  
March 2002, [Revision A](#)

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# Installing PC NetLink 2.0 Software

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This document describes the Solaris™ PC NetLink<sup>1</sup> 2.0 product and explains how to install PC NetLink components.

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## About This Guide

If you want to learn more about the product, read “What’s New in PC NetLink Version 2.0” on page 4 and “PC NetLink Features Introduced in Previous Versions” on page 5.

If you want background information and instructions for installing product components, turn to “Installing PC NetLink 2.0 Software” on page 10.

If you plan to use PC NetLink in a Sun™ Cluster environment, follow installation instructions in the *Solaris PC NetLink 2.0 High Availability Guide*.

If you plan to restore PC NetLink Version 1.2 backups created with Legato NetWorker® or Solstice Backup™ software, follow installation instructions in “How to Install the PC NetLink Backup Module” on page 16.

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

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## Related Online Information

Additional sources of information are available to guide you through installing, configuring, and administering the system.

- The file `install_guide.pdf` is an online version of this document, located on the PC NetLink CD-ROM.
- PC NetLink Server Manager Online Help guides you through system administration and configuration tasks.
- *Solaris PC NetLink 2.0 Administration Guide* explains critical concepts and describes how to administer a PC NetLink system. It is available in PDF and HTML formats.
- *Solaris PC NetLink 2.0 High Availability Guide* explains how to install and configure the PC NetLink high availability agent for use in a clustered environment. It is available in PDF and HTML formats.

TABLE 1 describes these sources and how to access them.

**TABLE 1** Sources of Related Online Information

What's Available	How to Access From the Solaris Operating Environment	How to Access From the Microsoft Windows Operating Environment
This document in PDF format	Load the PC NetLink CD-ROM, then use Adobe Acrobat Reader to open /cdrom/pcnl_2_0_global/doc/en/install_guide.pdf	Load the PC NetLink CD-ROM, then use Adobe Acrobat Reader to open <i>drive</i> :\pcnl_2_0_global\doc\en\install_guide.pdf, where <i>drive</i> is the letter of your CD-ROM drive.
	<i>After installation</i> , use Adobe Acrobat Reader to open /opt/lanman/doc/en/install_guide.pdf	<i>After installation</i> , use Adobe Acrobat Reader to open C:\Program Files\Sun Microsystems\PC NetLink Server Manager\doc\en\install_guide.pdf If you did not install PC NetLink Server Manager in the default location, edit the portion of the path before \doc accordingly.
PC NetLink Server Manager Online Help	<i>After installation</i> , start PC NetLink Server Manager using this command: % /opt/lanman/sbin/slsmgr & Then, click the Help Topics button in the lower right part of the PC NetLink Server Manager window.	<i>After installation</i> , click on Start, select PC NetLink Server Manager from the Programs submenu. Then, click the Help Topics button in the lower right part of the PC NetLink Server Manager window.
<i>Solaris PC NetLink 2.0 Administration Guide</i>		
In PDF format	Load the PC NetLink CD-ROM, then use Adobe Acrobat Reader to open /cdrom/pcnl_2_0_global/doc/en/admin_guide.pdf	Load the PC NetLink CD-ROM, then use Adobe Acrobat Reader to open <i>drive</i> :\pcnl_2_0_global\doc\en\admin_guide.pdf, where <i>drive</i> is the letter of your CD-ROM drive.
	<i>After installation</i> , use Adobe Acrobat Reader to open /opt/lanman/doc/en/admin_guide.pdf	<i>After installation</i> , use Adobe Acrobat Reader to open C:\Program Files\Sun Microsystems\PC NetLink Server Manager\doc\en\admin_guide.pdf If you did not install PC NetLink Server Manager in the default location, edit the portion of the path before \doc accordingly.
In HTML format	<i>After installation</i> , point your browser to file:/opt/lanman/doc/en/admin_guide/index.html	<i>After installation</i> , point your browser to C:\Program Files\Sun Microsystems\PC NetLink Server Manager\doc\en\admin_guide\index.html If you did not install PC NetLink Server Manager in the default location, edit the portion of the path before \doc accordingly.

**TABLE 1** Sources of Related Online Information (*Continued*)

What's Available	How to Access From the Solaris Operating Environment	How to Access From the Microsoft Windows Operating Environment
<i>Solaris PC NetLink 2.0 High Availability Guide</i>		
In PDF format	Load the PC NetLink CD-ROM, then use Adobe Acrobat Reader to open <code>/cdrom/pcnl_2_0_global/doc/en/ha_guide.pdf</code>	Load the PC NetLink CD-ROM, then use Adobe Acrobat Reader to open <code>drive:\pcnl_2_0_global\doc\en\ha_guide.pdf</code> , where <i>drive</i> is the letter of your CD-ROM drive.
	<i>After installation</i> , use Adobe Acrobat Reader to open <code>/opt/lanman/doc/en/ha_guide.pdf</code>	<i>After installation</i> , use Adobe Acrobat Reader to open <code>C:\Program Files\Sun Microsystems\PC NetLink Server Manager\doc\en\ha_guide.pdf</code> . If you did not install PC NetLink Server Manager in the default location, edit the portion of the path before <code>\doc</code> accordingly.
In HTML format	<i>After installation</i> , point your browser to <code>file:/opt/lanman/doc/en/ha_guide/index.html</code>	<i>After installation</i> , point your browser to <code>C:\Program Files\Sun Microsystems\PC NetLink Server Manager\doc\en\ha_guide\index.html</code> . If you did not install PC NetLink Server Manager in the default location, edit the portion of the path before <code>\doc</code> accordingly.

## What's New in PC NetLink Version 2.0

This release of PC NetLink software includes several major new features added since Version 1.2.

- The ability to run up to ten PC NetLink virtual servers on each Solaris physical host, which offers the following advantages:
  - Better reliability
  - Easier migration and consolidation from NT to Solaris
  - Better scalability when consolidating multiple NT servers on a Solaris host
  - More effective use of equipment when PC NetLink is used in a high availability (HA) cluster
- Improved Access Control List (ACL) database scalability. See “About PC NetLink Installation, Upgrade, and Reinstallation” on page 11 for precautions regarding ACL data conversion during a software upgrade. See “Resolving ACL Upgrade Problems” on page 18 for information about resolving possible ACL database upgrade problems.



- Enhanced monitoring of PC NetLink virtual servers in an HA cluster. See the *Solaris PC NetLink 2.0 High Availability Guide*.
- Enhanced password synchronization, enabling a single password change to affect a user's accounts both on Solaris and Windows NT systems.
- Enhanced directory synchronization, using Lightweight Directory Access Protocol (LDAP), in addition to the type of directory synchronization used in PC NetLink Version 1.2.
- The ability to automatically mount users' UNIX home directories.
- Support for Domain Name Service (DNS) in NetBIOS.
- The ability to store UNIX group IDs using DOS attributes.
- Interoperability with clients running the Windows 2000 operating environment.
- An improved PC NetLink Server Manager graphical user interface (GUI).

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## PC NetLink Features Introduced in Previous Versions

PC NetLink software from Sun Microsystems implements Microsoft Windows NT network services in the Solaris operating environment. As a result, PC NetLink software ensures compatibility with Microsoft networking features and desktop environments, while taking advantage of the Solaris operating environment's native ability to function simultaneously as a file, print, communications, and applications server. PC NetLink software provides networking capabilities that are functionally equivalent to those offered by Microsoft Windows NT Server. Solaris servers can take over key roles in a Windows NT local area network (LAN), replacing Windows NT servers or coexisting with them.

A Solaris server running PC NetLink software in a LAN enables you to share computing resources among a community of desktop users, and delivers powerful new network administration and enhanced security features. PC NetLink software interoperates with systems running the following Microsoft operating environments:

- Windows NT Server 4.0
- Windows NT Workstation 4.0
- Windows 98
- Windows 2000

The following sections summarize PC NetLink features available in previous versions.

# Integration With the Solaris Operating Environment

PC NetLink software includes many features of the Solaris operating environment, including 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. See "Security" on page 6 for an overview of PC NetLink security features.

## Interoperability With Other Systems

A server running PC NetLink software can function as a file and print server for a small, isolated community of users, or as the foundation of an enterprise networking scheme for a large network distributed over a wide area.

You can deploy a server running PC NetLink software as either a primary domain controller (PDC), a backup domain controller (BDC), or a member server in a network composed of other servers running PC NetLink software or the Windows NT Server operating environment.

You can replace existing Windows NT servers in your network with Solaris servers running PC NetLink software. You can do this gradually if you want, replacing backup domain controllers and later promoting one to primary domain controller. Your network will continue to behave as it did before, and users can benefit immediately from the new resources offered by PC NetLink software without additional training, because there is no change in the way they access network resources.

A major feature of PC NetLink software is that you can replace several smaller Windows NT servers with a single, larger server running PC NetLink software. The ability to create up to ten virtual servers on a Solaris physical host in Version 2.0 makes this task easier because it requires less consolidation. Except for printer share names, which must be unique on the physical host, resource names can be the same on different virtual servers.

## Security

PC NetLink software offers a logical administrative model that enables efficient management of large networks. An administrator can set up domains and trust relationships between domains to centralize user account and other security information, making the network easier to manage and use. Each user needs only one account and one password. This account can provide the user with access to resources anywhere on the network.

PC NetLink software incorporates enhanced features that support discretionary access control permissions on individual files, directories, and resources, and also includes comprehensive auditing capabilities. These features provide an administrator with a fine level of control over user and resource permissions and auditing.

## Network Services

After installation, PC NetLink software starts several network services automatically so that the capabilities of the network are available as soon as you want to work with the system. You also can choose to start other network services automatically at system startup depending on your system needs.

## Network Activity Tracking

PC NetLink software allows you to monitor network activity and track computer usage. For example, you can view servers and see which resources they are sharing; view which users currently are connected to any network server; see which files are open; log and view security auditing entries; keep sophisticated error logs; and specify that alerts be sent to administrators when certain events occur. You can also use Microsoft's NT Server Tools to monitor network activity.

## Printing

PC NetLink software supports network printers. You can also attach a local printer to a Solaris server running PC NetLink software, and it will appear and function the same as other printers in your domain. If you attach a printer only to a Solaris system that is not running PC NetLink software, it will not be visible to other computers in the domain. See the *Solaris PC NetLink 2.0 Administration Guide* for information about installing a PC NetLink printer on a Solaris system.

## Browsing

From your Microsoft Windows desktop, you can browse domains, workgroups, and computers to look for shared directories and printers. You can specify 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.

## Network File Sharing

PC NetLink software provides reliable and secure sharing of files and directories among Windows NT network users. Discretionary access controls and PC NetLink security on each file and directory provide the ability to specify the groups and users who can access files, to define the levels of access that each group or user is permitted, and to control auditing. Additional features include file ownership and directory replication.

## User Environment Management

PC NetLink supports Windows NT user profiles, which enable administrators to control access to network resources and to manage Windows NT Workstation user desktops.

## Remote Administration

PC NetLink software includes PC NetLink Server Manager software, which enables you to administer PC NetLink from the Solaris server and also from Microsoft Windows and Solaris client machines on your network. Remote administration is supported for network functions, including server management, policy management, and Solaris printer installation.

PC NetLink software can operate and be administered regardless of whether Windows NT is running on the network. In addition, you can use Microsoft network administration tools running on Microsoft Windows client computers for remote administration of Windows NT network services provided by PC NetLink software. The following Windows NT Server Tools are included in the PC NetLink kit:

- Server Manager
- User Manager for Domains
- Event Viewer
- System Policy Editor
- WINS Manager

Depending on your operating environment, some or all of these tools may be available. Sun Microsystems does not support Microsoft's Windows NT Server Tools; for assistance, refer to the online help that accompanies those tools.

# Year 2000 Compliance

Sun Microsystems certifies that PC NetLink software is Year 2000 compliant. This compliance has been appropriately and adequately tested, and meets Sun's Year 2000 compliance standards.

## Member Server

Available at installation time (Custom installation only), the member server option enables a PC NetLink virtual server to act as a Windows NT member server; that is, neither a primary domain controller (PDC) nor a backup domain controller (BDC). Member servers do not assist in user logon validation, so virtually all of their resources are available at all times. For example, you can use a member server as a file and print resource server, assign Administrator rights to the system, and exclude unnecessary access to the system.

After installing the product, you can also reconfigure an existing virtual server as a member server or create a new PC NetLink virtual server as a member server.

## Backup

PC NetLink Version 1.2 included client software that enabled use of the Solstice Backup and Legato NetWorker products to back up Solaris files in shared directories, including Access Control Lists (ACLs) associated with files. This capability is included in the PC NetLink 2.0 base product, and special backup is no longer required.

To enable restoration of backups created using Version 1.2, you must install the backup package `SUNW1z1b` separately after installing the PC NetLink base product, on each server for which you will need to restore a Version 1.2 backup. See "How to Install the PC NetLink Backup Module" on page 16 for installation details.

## High Availability

You can install Solaris PC NetLink software on a Sun Cluster instead of on a single system to provide high availability (HA) capabilities to the PC NetLink network. The cluster provides redundancy and automatic failover capabilities to ensure that the PC NetLink network operates without interruption in the event of a component or system failure. Installation on a Sun Cluster consists of a few extra steps and

configuration. For instructions, see the *Solaris PC NetLink 2.0 High Availability Guide*. See “About Upgrading PC NetLink Servers in a Sun Cluster” on page 12 for special instructions about upgrading nodes in an HA environment.

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## Installing PC NetLink 2.0 Software

PC NetLink software includes server and client components that you can install on computers running the Solaris operating environment, and a client-side administration tool that you can install on computers running Microsoft Windows operating environments. You can also install Windows NT Server Tools on Microsoft Windows clients.

Installing Version 2.0 of the client software removes any previous versions of PC NetLink Server Manager, the client software. You can use PC NetLink Server Manager Version 2.0 to manage servers running PC NetLink Version 1.2, but new features will not be available.

PC NetLink 2.0 installation supports a fresh installation as well as upgrade, reinstall, and uninstall procedures. If you plan to use PC NetLink software in a high availability cluster environment, see the *Solaris PC NetLink 2.0 High Availability Guide*.

## Server System Requirements

You can install and use PC NetLink Solaris components on a Sun Ultra™ 5 system, or on a more advanced system, that meets the following restrictions:

- Solaris 2.6 software or a later release that is compatible with the product, entire distribution installation only.
- 100 Mbytes of free disk space in the /opt directory.
- 100 Mbytes of free disk space in the /var directory; 1024 Mbytes is recommended for a large user environment.
- 48 Mbytes of RAM is recommended for running applications.
- See “About PC NetLink Installation, Upgrade, and Reinstallation” on page 11 for an additional requirement regarding ACL information and disk space required for an upgrade installation.
- To use HA interoperability, the systems must meet all Sun Cluster requirements. See your Sun Cluster documentation.

# About PC NetLink Installation, Upgrade, and Reinstallation

If you install PC NetLink software on a system that does not have any version of PC NetLink packages installed, the installation performs a fresh installation.

If you install PC NetLink on a system that has PC NetLink software packages installed, the installation upgrades or reinstalls your software by removing your existing PC NetLink packages and replacing them with the corresponding packages attached to the installation script. Your system's current data and configuration are left unchanged. If your current installation does not include all PC NetLink components, you will have the opportunity to add additional components.

When you upgrade to PC NetLink Version 2.0, the installation converts your previous file Access Control List (ACL) information in the ACL database file to hidden files in the file system that contains the original ACLs. This creates three additional inodes for every directory that has an explicit ACL and two additional inodes for every file ACL that has an explicit ACL. By default, PC NetLink only creates explicit ACLs for directories. Before beginning the upgrade installation, make sure that file systems containing PC NetLink shares have sufficient inodes to store all the ACLs shown in the ACL database before the upgrade. For information about resolving possible ACL database upgrade problems, see "Resolving ACL Upgrade Problems" on page 18.



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**Caution** – Because you cannot undo the ACL conversion by uninstalling PC NetLink software, be sure to back up your PC NetLink Version 1.2 data before beginning the upgrade.

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On a system with a very large ACL database, upgrade to PC NetLink Version 2.0 software may require as long as twenty hours. During this time, PC NetLink services are not available. If you know that your ACL database is very large, you can remedy this problem. Patch 111878, included on the product CD-ROM, provides an optional `aclupgrade` program that can perform the more time-consuming parts of the ACL database upgrade while the PC NetLink 1.2 system remains in service. After running the `aclupgrade` program, you can upgrade to PC NetLink Version 2.0 software much more quickly. See the file `README.111878-01` on the product CD-ROM for information about installing and using patch 111878.

# About Upgrading PC NetLink Servers in a Sun Cluster

The PC NetLink Version 2.0 software upgrade procedure supports PC NetLink high availability (HA) configurations. PC NetLink software on each node in the HA cluster configuration must be upgraded; the order in which the nodes are upgraded is unimportant. PC NetLink services will be stopped when the first node is being upgraded and will not be available until all the nodes have been upgraded.

The software upgrade procedure requires that the “master” node at the time of the upgrade be the same node that was designated as the master node when PC NetLink was initially configured. See the *Solaris PC NetLink 2.0 High Availability Guide* for assistance in using the `haswitch` command to set the master node correctly. Do not uninstall or deregister the HA configuration before upgrading to PC NetLink Version 2.0 software.

## Installation Suggestion

For best performance and simplest administration, install PC NetLink software on the systems that have the local resources that you want to share within the network, such as files and printers.

Your server should preferably have enough extra local disk space to hold all the data you want to share with Microsoft Windows clients. Although you can share non-local files accessed through NFS, this will increase network load and can result in inconsistent ACL information if the same files are shared with Microsoft Windows clients by two different machines using PC NetLink software.

## Directories and Files Created by Installation

The following table lists directories and files created by PC NetLink 2.0 installation.

**TABLE 2** PC NetLink Directories and Files

Directory	Contents
<code>/opt/lanman</code>	All user commands, executables, libraries, and documentation
<code>/var/opt/lanman/number</code>	All server data files (SAM, Registry, etc.)
<code>/etc/opt/lanman/number</code>	The file <code>lanman.ini</code>



**TABLE 2** PC NetLink Directories and Files (Continued)

Directory	Contents
/opt/SUNWlznb	All NetBIOS related user commands and documentation
/var/opt/SUNWlznb	Data regarding the WINS servers that NetBIOS uses; this directory may be empty if you are not using a WINS server
/etc/opt/SUNWlznb	NetBIOS configuration files

In this table, */number* is the virtual server's instance number.

## System Requirements for PC NetLink Server Manager

You can install PC NetLink Server Manager, the PC NetLink administration tool, on systems running the following operating environments:

- Solaris 2.6 software or a later release that is compatible with the product
- Windows NT Workstation 4.0
- Windows 98
- Windows 2000

Solaris systems should have a minimum of 3 Mbytes of free disk space before beginning installation. For best display results, run PC NetLink Server Manager locally; not on a remote display device.

Systems running Microsoft Windows operating environments should have at least 30 Mbytes of free disk space before beginning installation, and 48 Mbytes of memory.

### ▼ How to Install or Upgrade PC NetLink Solaris Components

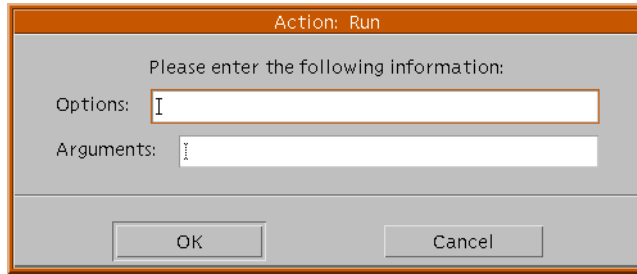
To install PC NetLink Solaris components (including PC NetLink Server Manager):

1. **Log in to the server as root.**
2. **Insert the product CD-ROM into a drive.**

**3. Double-click install in File Manager, or execute the following command:**

```
# /cdrom/pcnl_2_0_global/install
```

If you double-click install and the following window appears, click OK to continue. Do not enter options or arguments.



**4. Follow the prompts that appear on your screen.**

During a fresh installation, you can perform either an Express installation or a Custom installation. Express installation creates a PDC in a new domain, and installs:

- All PC NetLink server components
- PC NetLink Server Manager, the administration tool
- All necessary patches and Java™ components
- Windows NT Server Tools and other client tools

During a new Express installation, you need to enter server, domain, and Administrator account names if you do not want to use the default names, and a password for the Administrator account. After Express installation finishes, you can run PC NetLink Server Manager or NT Server Tools to change this configuration.

Custom installation gives you greater control over how you install and configure PC NetLink. To perform a new Custom installation, you need to specify:

- Which components to install—server, administration tool, or both
- If installing server components, whether the server will become a PDC, BDC, or member server
- Information about server and/or domain names and passwords
- What type of NetBIOS configuration to use
- Whether to install Windows NT Server Tools
- Whether to install client tools

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**Note** – You must be experienced with Windows NT system administration to perform a Custom installation. Otherwise, it will be easier for you to perform an Express installation and then reconfigure the server using PC NetLink Server Manager.

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## ▼ How to Reinstall PC NetLink Solaris Components

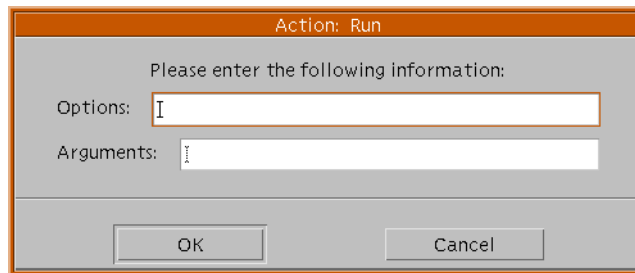
You can run the installation script to reinstall PC NetLink 2.0 software. Your system's current data and configuration are left unchanged. If your current installation does not include all PC NetLink components, you have the opportunity to add additional components.

To reinstall PC NetLink 2.0 software:

1. **Log in to the server as root.**
2. **Insert the product CD-ROM into a drive.**
3. **Double-click `install` in File Manager, or execute the following command:**

```
# /cdrom/pcnl_2_0_global/install
```

*If you double-click `install` and the following window appears, click OK to continue. Do not enter options or arguments.*



4. **Follow the prompts that appear on your screen.**

## ▼ How to Uninstall PC NetLink Solaris Components

Uninstalling PC NetLink 2.0 software removes all PC NetLink software including any client, data, group, user, and log components that may have been created as a result of use or installation of the software.

To uninstall PC NetLink 2.0 software:

1. Log in to the server as root.
2. Execute the following command:

```
# /opt/lanman/sbin/uninstall
```

3. Follow the prompts that appear on your screen.

## ▼ How to Install the PC NetLink Backup Module

If you plan to restore PC NetLink Version 1.2 backups created with Legato NetWorker or Solstice Backup software, you must install the PC NetLink 2.0 backup module. If you do not need to restore PC NetLink Version 1.2 backups, you do not need to install this backup module.

Before you begin the installation, check that the following conditions are true:

- The PC NetLink server component is installed.
- The Solstice Backup or Legator NetWorker client package is installed.
- One of the following versions of backup software is installed somewhere on the network:
  - Solstice Backup 5.1.1
  - Solstice Backup 5.5.1
  - Legato NetWorker 5.5.1
  - Legato NetWorker 5.5.2

---

**Note** – You should install the backup module on each PC NetLink server for which you plan to restore a PC NetLink Version 1.2 backup.

---

To install the PC NetLink 2.0 backup module:

1. Log on to the server as root.
2. Insert the product CD-ROM into a drive.

3. Execute the following command:

```
# pkgadd -d /cdrom/pcnl_2_0_global/PCNL/sparc SUNWlzl1b
```

---

**Note** – Although the Solstice Backup and Legato NetWorker base products enable you to run restore commands when logged in as any user, you must log in as root before using these commands to restore PC NetLink shared directories.

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## ▼ How to Install PC NetLink Server Manager on Microsoft Windows Clients

You can install PC NetLink Server Manager client software on a computer running one of the following operating environments:

- Windows NT 4.0
- Windows 98
- Windows 2000

If you need to continue managing servers running previous versions of PC NetLink software, do not remove previous versions of PC NetLink Server Manager. Respond **no** to the installation prompt that asks if you want to remove the previous version.

To install PC NetLink Server Manager, use the PC NetLink 2.0 CD-ROM or access the `tools` share after PC NetLink software has been installed on the server.

## ▼ From the CD-ROM

Follow these steps to install PC NetLink Server Manager from the PC NetLink 2.0 CD-ROM:

1. **Quit any active Microsoft Windows programs.**
2. **Insert the product CD-ROM into a drive.**

The install screen appears automatically. If the install screen does not appear after a few seconds, choose Run from the Start menu and type `drive:\mswin\intel32\setup.exe`, where *drive* is the letter of the CD-ROM drive into which you loaded the product CD-ROM.

3. **Follow the prompts that appear on your screen.**

## ▼ From the `tools` Share

Follow these steps to install PC NetLink Server Manager from the share `/opt/lanman/shares/tools`. PC NetLink software must be installed on the server and you must be authenticated in your domain. The client computer must be on the same subnetwork as the server, or you must use WINS.

1. **Quit any active Microsoft Windows programs.**
2. **Open the `tools` share and follow the instructions in the file `readme_en.txt`.**

## ▼ How to Install Windows NT Server Tools on Microsoft Windows Clients

Follow these steps to install Windows NT Server Tools from the `tools` share. PC NetLink software must be installed on the server and you must be authenticated in your domain. The client computer must be on the same subnetwork as the server, or you must use WINS.

1. **Quit any active Microsoft Windows programs.**
2. **Open the `tools` share and follow the instructions in the file `readme_en.txt`.**  
Sun Microsystems does not supply localized versions of Microsoft NT Server Tools. Check with Microsoft for availability of these tools.

---

# Resolving ACL Upgrade Problems

If the installation determines that one or more of your file systems has too few inodes to support the required ACL upgrade, there are two ways to proceed with the upgrade:

- Remove unnecessary ACLs so that the number of existing free inodes will be sufficient
- Re-create the file system or systems with more inodes

Removing unnecessary ACLs is usually more convenient. With either approach, you should make sure there are at least three inodes free for each ACL to be stored in the file system. The installation message tells you how many inodes are available and how many are required. To calculate the approximate number of ACLs to remove, find the difference of these two numbers and divide by three.

## ▼ How to Remove Unnecessary ACLs

PC NetLink implements “ACL inheritance” so that ACLs for plain files can be generated dynamically based on the ACL for the containing directory. In this way, PC NetLink software can usually avoid storing an ACL for plain files. However, if a user changes an ACL for a plain file, the changed ACL is stored. ACLs for plain files are also stored after a Windows NT user sets the security permissions on a directory and checks the box Replace Permissions on Subdirectories. After that operation, all the ACLs on plain files below that directory are unnecessary because they are all the same as would be inherited from the containing directory.

If you are certain that all important access control settings are stored using *directory* ACLs, then it may be appropriate to simply delete all *file* ACLs.

- **After making sure that all your access policies are adequately represented by directory ACLs, use the following command to delete all file ACLs:**

```
# acladm -X
```

If deleting all file ACLs is not appropriate for your file system, you may be able to remove unnecessary ACLs by hand or by using scripts. For example, you may want to examine all ACLs on files that are more than four levels deep in the directory hierarchy and then delete a subset of those using a script like the following:

```
# Make a list of all the files with ACLs
acladm -E > /tmp/acladm-E
# Select those with four or more slashes
egrep '^/.*/*.*/*.*/*.*' /tmp/acladm-E > /tmp/acls2rm
# Sort the list
sort -o /tmp/acls2rm /tmp/acls2rm
# Edit this file to contain ONLY the file names for the ACLs
# that are to be removed
dtpad /tmp/acls2rm
# Remove all the ACLs in that list
/opt/lanman/sbin/rmacl - < /tmp/acls2rm
```

## ▼ How to Re-create the File System With More Inodes

The details of this operation are beyond the scope of this documentation, but the general procedure follows.

### **1. Make a full backup of the file system.**

For details, see the man page for the `ufsdump` command or the manuals for your backup software.

### **2. Recreate the file system.**

For details, see the man page for the `newfs` command and note in particular the `-i nbpi` (bytes-per-inode) option.

### **3. Restore the file system data from the full backup you created in Step 1.**

For details, see the man page for the `ufsrestore` command or the manuals for your backup software.