



TM

**NetWare Client™ for DOS and  
MS Windows User Guide**

**N O V E L L®**

**NetWare®**

**NETWORK COMPUTING PRODUCTS**

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**NetWare Client for DOS and MS Windows User Guide  
December 1994  
Part Number 100-002077-001**



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# **H**ow to Use This Manual

## **Introduction**

*NetWare® Client™ for DOS and MS Windows User Guide* has three purposes: to help you set up and install your client software, to help you set up and connect your client workstations to the network, and to introduce client User Tools for managing access and connections on a NetWare network.

This manual is for users and supervisors new to NetWare client networking and for network supervisors responsible for setting up and managing NetWare client workstations.

This manual covers concepts and procedures for installing and using NetWare client software on NetWare 2, 3, and 4 networks. References are made to each version of NetWare. Ignore any references which do not pertain to the version of NetWare you are connecting to.

Use *NetWare Client for DOS and MS Windows Technical Reference* for advanced setup and troubleshooting of your NetWare client workstations.

# Documentation Conventions

This manual uses the following Novell® conventions:

## Asterisk ( \* )

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## Commands

Boldface characters indicate items that you type, such as commands and options. You can use any combination of uppercase and lowercase letters.

For example:

**C:\A INSTALL**

## Delimiter Bar ( | )

In syntax examples, a delimiter bar separating two command options indicates that you can choose one of the options.

For example:

**-S | -R**

Do *not* type the bar.



## DOS Commands

DOS commands and command option letters are shown in uppercase letters. For example: FTPD.

Because DOS is not case-sensitive, you can type DOS commands in uppercase or lowercase letters.

## DOS Filenames, Directory Names, and Pathnames

DOS filenames, directory names, and pathnames are shown in uppercase letters. For example, AUTOEXEC.BAT.

Because DOS is not case-sensitive, you can type these names in uppercase or lowercase letters.

## Ellipses

Ellipses in syntax examples indicate that parameters, options, or settings can be repeated.

For example, in the command

**LOGIN SERVER1/SUPERVISOR /option...**







you could replace *option* with any number of available options.

## Emphasis

Italic type indicates emphasized text. For example:

Remember to load the driver *before* you install the application.

## Icons

- Checklist**  Checklists, which often contain prerequisites, are marked with the “Checklist” icon to the left of this text.
- Procedure**  Procedures to follow in order to accomplish a specified task are marked with the “Procedure” icon to the left of this text.
- Note**  Additional or “nonessential” but noteworthy information is marked with the “Note” icon to the left of this text.
- Important**  Vital information about system or software requirements, etc., that deserves particular attention is marked with the “Important” icon to the left of this text.
- Suggestion**  Guidelines or tips about fine-tuning, optimizing, etc., which might be applicable to your site or situation but maybe not to all, are emphasized with the “Suggestion” icon to the left of this text.
- Warning**  Warnings about potential danger to data, hardware, or person are emphasized with the “Warning” icon to the left of this text.

## Key Names

Angle brackets surround the name of a key. For example, <Enter> corresponds to the Enter key on your keyboard. <Ctrl>+<c> means hold down the Ctrl key and simultaneously type the letter c (in lowercase, in this case).

## NET.CFG File Section Headings and Parameter Settings

NET.CFG section headings and parameter settings are shown in uppercase when used as a reference item and lower case when used in syntax or working examples.

For example:

[Begin example]

NETBIOS VERIFY TIMEOUT specifies how often in (ticks) NetBIOS sends a keep-alive packet to the other side of a session to preserve the session.

If no packets are being exchanged on the NetBIOS session by the software that established the session, NetBIOS sends packets at regular intervals to make sure that the session is still valid.

**Syntax**            **netbios verify timeout** *number*

Replace *number* with a number of ticks.

**Default**            54 (approximately 3 seconds)

**Range**             4 to 65,535

**Example**            To make NetBIOS wait longer before sending a request-for-acknowledgment packet, you could place the following lines in your NET.CFG file:

```
netbios
netbios verify timeout 1350
```

[End example]

Because interpretation of this file is not case-sensitive, you can type its contents in uppercase or lowercase letters.

## Options

In syntax examples, braces indicate that you are required to choose one of the enclosed options. For example, the following notation means that you must include a 0 or a 1 in the command:

**{0, 1}**

## Square Brackets

In syntax examples, boldface type enclosed in square brackets indicates command options that you can type as needed. For example:

**FTP [ -D ] [ -F ]**

## System Response

Monospace type shows system-generated responses that appear on your workstation screen. For example:

TNVT220 >

## UNIX Commands

UNIX<sup>®</sup> commands are shown in boldface letters. For example, **vi**. Because UNIX is case-sensitive, these commands are usually lowercase. Type UNIX commands exactly as shown.

## UNIX Filenames, Directory Names, and Pathnames

UNIX filenames, directory names, and pathnames are shown in italics. For example, */etc/hosts*.

Because UNIX is case-sensitive, these names usually are in lowercase letters. Type UNIX filenames exactly as shown.

## Variables

Italic type indicates variables—descriptive item names, such as command parameters—that you replace with appropriate values.

For example, in the command

```
FTP -F remote_host
```

you type the name of a computer on your network in place of *remote\_host*.

## Supplemental Documentation

The following publications provide supplemental information specifically related to the NetWare Client for DOS and MS Windows technology and software:

- ◆ “The Functions and Operations of the NetWare DOS Requester 1.1,” *Novell Application Notes*, May 94, Vol. 5, No. 5 (Novell part no. 164-000031-005)
- ◆ “Installing and Configuring Novell's Token-Ring Source Routing Drivers,” *NetWare Application Notes*, Oct 91 (Novell part no. 164-000030-010)
- ◆ “Logging In to IBM LAN Server and NetWare from a DOS Workstation,” *NetWare Application Notes*, Nov 91 (Novell part no. 164-000030-011)
- ◆ “Managing Memory in a DOS Workstation: Part 1,” *NetWare Application Notes*, Aug 92 (Novell part no. 164-000031-008)
- ◆ “Managing Memory in a DOS Workstation: Part 2,” *NetWare Application Notes*, Oct 92 (Novell part no. 164-000031-010)
- ◆ “Managing Memory in a DOS Workstation: Using Novell DOS 7,” *NetWare Application Notes*, Oct 93 (Novell part no. 164-000032-010)
- ◆ “Migrating Ethernet Frame Types from 802.3 Raw to IEEE 802.2,” *NetWare Application Notes*, Sep 93 (Novell part no. 164-000032-009)

- ◆ “Multilingual PC Setup with DR DOS,” *NetWare Application Notes*, Sep 93 (Novell part no. 164-000032-009)
- ◆ “NET.CFG Parameters for the NetWare DOS Requester 1.1,” *Novell Application Notes*, Jun 94, Vol. 5, No. 6 (Novell part no. 164-000036-006)
- ◆ “NetWare and LAN Server Client Interoperability via ODINSUP: Part 1,” *NetWare Application Notes*, Sep 92 (Novell part no. 164-000031-009)
- ◆ “NetWare and LAN Server Client Interoperability via ODINSUP: Part 2,” *NetWare Application Notes*, Nov 92 (Novell part no. 164-000031-011)
- ◆ “NetWare and Windows for Workgroups 3.1 Interoperability,” *NetWare Application Notes*, Mar 93 (Novell part no. 164-000032-003)
- ◆ “ODINSUP Interoperability Configurations for DOS Workstations,” *NetWare Application Notes*, Feb 93 (Novell part no. 164-000032-002)
- ◆ “Using the DOS Requester with NetWare 4.0,” *NetWare Application Notes*, Apr 93 (Novell part no. 164-000032-004)
- ◆ “Understanding Token-Ring Source Routing,” *NetWare Application Notes*, May 91 (Novell part no. 164-000030-005)
- ◆ “Workstation Memory Management: Using QEMM386, 386 To The Max, and MS-DOS 6,” *NetWare Application Notes*, Dec 93 (Novell part no. 164-000032-012)

## Online Help

- ◆ **Context-sensitive help.** If you are using a NetWare menu utility and want more information about how to complete a task, press <F1>.

If you are unsure how to use a command, type the command name and add the */?* option for help. For example, for help with the RIGHTS command, type "RIGHTS */?*".

- ◆ **Online MS Windows help.** The Microsoft\* (MS) Windows help viewer allows you to read NetWare help developed for the MS Windows environment. To access the NetWare help screens within MS Windows, press <F1> or the "?" button.
- ◆ **DynaText online documentation.** The DynaText viewer allows you to read NetWare documentation from your DOS, MS Windows, Macintosh\*, UNIX, or OS/2\* workstation.

All NetWare 4™ and 3.12 documentation except the *Quick Access Guide* are available on the *NetWare Online Documentation* CD-ROM.

## Additional Help Resources

- ◆ **Customer service.** You can contact your Novell Authorized Reseller<sup>CLM</sup> representative for technical assistance.

Most Novell Authorized Resellers have Certified NetWare Engineer<sup>SM</sup> representatives on their staffs ready to assist users with their networking problems.

- ◆ **Novell Authorized Service Center<sup>SM</sup> (NASC) locations.** NASC<sup>SM</sup> facilities are local support providers authorized and supported by Novell. They provide both telephone and on-site assistance, and should be your first source for technical support.

For the Novell Authorized Service Center nearest you, in the U.S. and Canada call 1-800-338-NASC.

- ◆ **Hardware documentation.** Many network problems occur because of malfunctioning hardware.

If you can isolate a problem to a certain computer component or cable segment, check the manuals that came with the hardware involved.

- ◆ **NetWare Management System™ (NMS) services.** NMS™ services helps you manage the cabling system, computers, software, and other components of the network.

For more information about using NMS on your network, contact your Novell Authorized Reseller.

- ◆ **Other Novell publications.** *Novell Application Notes* and the Novell Research Reports™ publications cover technical aspects of NetWare based system design, implementation, and management.

*Application Notes* is a collection of technical articles published monthly. Research Reports is published as the research becomes available.

To purchase subscriptions and back issues of these publications from within the United States or Canada, call the Novell Research Order Desk at 1-800-UPDATE1. From other locations, call 801-429-5380.

- ◆ **Third-party books and periodicals.** Books on NetWare, including books published by Novell Press™ publishing, are available at most bookstores.

In addition, numerous networking periodicals give advice on configuring, managing, and troubleshooting your network.



- ◆ **NetWire® forum on the CompuServe\* bulletin board.** A fairly inexpensive way to get up-to-date advice and patches is through NetWire on the CompuServe bulletin board.

To open a CompuServe account, call one of the following numbers and ask for "Representative 200"

- ◆ In the United States or Canada: 1-800-524-3388
  - ◆ In the United Kingdom: 0800-289-378
  - ◆ In Germany: 0130-37-32
  - ◆ In other European countries: 44-272-255-111
  - ◆ In locations other than the United States, Canada, or Europe, use the appropriate country code for the U.S. and call 614-457-0802. Ask for "Representative 200." This phrase identifies you as a Novell customer.
- ◆ **Technical Support Database and NetWire forum on the Internet.** The Novell FTP sites support access through FTP, Gopher, and World Wide Web (WWW) systems. Over 9,000 documents exist on the WWW system for providing technical hints and information.

To access the Novell Internet sites, log in as ANONYMOUS and use your E-mail address as your password.

Contact one of the following site addresses:

In the United States: [ftp.novell.com](ftp://ftp.novell.com)

In Germany: [ftp.novell.de](ftp://ftp.novell.de)

In the United Kingdom: [ftp.salford.ac.uk](ftp://ftp.salford.ac.uk)

In Canada: [novell.nrc.ca](ftp://novell.nrc.ca)

See public areas in these sites for possible listings of other sites addresses.

- ◆ **FaxBack Service.** Novell provides a FaxBack Service for obtaining additional product information to help with support needs.

To access the Novell FaxBack Service, complete the following steps.

- ◆ Within the continental United States
  1. Dial 1-800-NETWARE (1-800-638-9273).
  2. Press #1 (the "Presale Product Information and Upgrade Information" option).
  3. Again press #1 (the "Receive Product Information via Fax" option).
- ◆ Outside the continental United States

Dial 1-801-429-2772. You are connected directly to the FaxBack Service.

Follow the directions provided on the phone. You are prompted to enter a document number and then a fax number to send the document to.

- ◆ **Network Support Encyclopedia Professional Volume<sup>SM</sup> (NSE Pro) package.** This encyclopedia gives customers access to regularly updated information on products and services—plus patches, fixes, and more—from Novell and other vendors.

The NSE Pro<sup>SM</sup> package is distributed on CD-ROM on a subscription basis. Updates are sent out several times each year. More information is available on NetWire or from your Novell Authorized Reseller.

- ◆ **Troubleshooting hardware and software.** Specialized hardware and software packages, such as the Novell LANalyzer<sup>®</sup> software, are available to help you isolate network problems.

## User Comments

We are continually looking for ways to make our products and our documentation as easy to use as possible.

You can help us by sharing your comments and suggestions about how our documentation could be made more useful to you and about inaccuracies or information gaps it might contain.

Submit your comments either by filling out the "User Comments" form at the end of this document or by writing to us directly at the following address:

Novell, Inc.  
Technical Publications MS C-23-1  
122 East 1700 South  
Provo, UT 84606 USA

We appreciate your comments.





# **B***asic Essentials*

## **Overview**

The NetWare® Client™ software for DOS and Microsoft\* (MS) Windows provides basic connectivity and access to network resources for all of your DOS and MS Windows workstations. In addition, it provides advanced networking services such as rapid data transfer, file and print management, and access to NetWare Directory Services™ software to effectively share and produce information.

The NetWare Client software has been redesigned to better support the increasing need for greater functionality and performance at the workstation for DOS and MS Windows environments. The new design introduces a software component to the DOS environment known as the NetWare DOS Requester™ program. The NetWare DOS Requester replaces the NetWare shell files such as NETX.COM.

The NetWare User Tools program has also been redesigned to provide you with better access to and management of NetWare services for DOS and MS Windows client workstations.

# Contents

This section is divided into three chapters, with the following information discussed on the indicated pages:

<b>Purpose</b>	<b>Chapter</b>	<b>Page</b>
To learn more about basic networks and connections. There is a brief discussion about network resources, users, security, and the file system. You are also introduced to the NetWare Directory Services™ technology and the NetWare 4™ network file system	Chapter 1, "Understanding Networking Basics"	3
To learn about the new NetWare DOS Requester™, which replaces NETX and other NetWare shell files, and other NetWare Client software	Chapter 2, "Understanding the NetWare Client Software"	23
For an overview of how to access and use the features included in the NetWare Tools for your client workstations. There are NetWare Tools for both DOS and MS Windows	Chapter 3, "Understanding Client Tools"	45



chapter

# 1

## ***Understanding Networking Basics***

### **Overview**

This chapter provides a basic overview of the concepts for adding a client workstation to your network and for using the workstation.

<b>Topic</b>	<b>Page</b>
Network Types	4
Network Connections	5
Network Resources	7
The Structure of the File System	10
Network Users	13
Login	14
Network Security	16
Network Printing	19

# Introduction

In order to take advantage of your NetWare® client workstations, you need to understand how your client workstations relate to the NetWare operating system they are connecting to and to review basic networking concepts.

Users connecting to NetWare 2 and NetWare 3™ need to understand how their client workstations relate to NetWare bindery server networks.

Users connecting to a NetWare 4™ network need to understand the NetWare Directory Services™ (NDS) architecture and how it affects their environment.

## Network Types

A network links two or more computers together to share resources and peripherals (such as disk drives, printers, and data). There are two categories of networks: peer-to-peer and client-server.

### Peer-to-Peer Networks

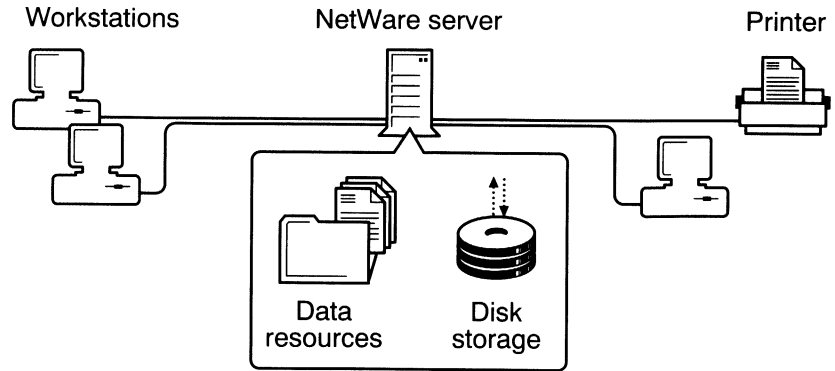
The simplest peer-to-peer network has two workstations connected together, each able to use the resources of the other. All workstations on a peer-to-peer network are (or can be) equal. No one workstation is designated as the main computer or central point of control.

### Client-Server Networks

The client-server network has at least one workstation configured as a NetWare server. As shown in Figure 1-1 on page 5, the server is a computer running the network operating system. The server controls communication and shared network resources. The client workstations are the individual computers connected to the network.



**Figure 1-1**  
**A Simple Client-Server Network**



## Network Connections

You must make two types of connections to use shared network resources:

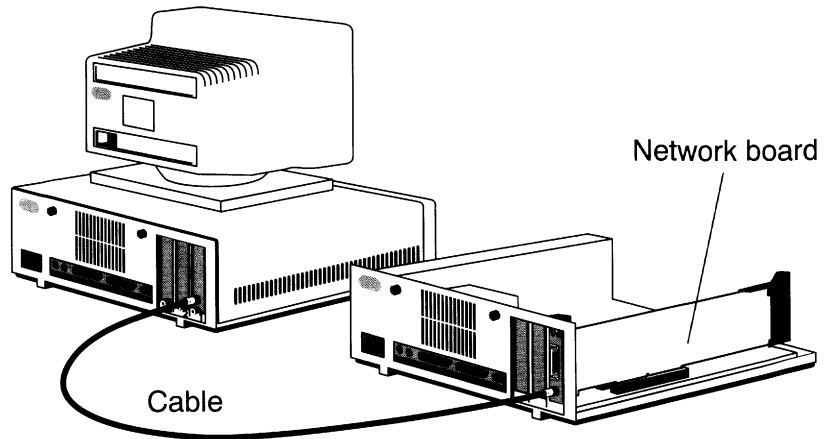
- ◆ A physical connection
- ◆ A logical connection

### Physical Connection

In order for resources and information to be shared on a network, servers, client workstations, and other network devices must be physically connected.

Each device on the network must have a network board. A cable attached to the network board provides the communication pathway, as shown in Figure 1-2 on page 6.

**Figure 1-2  
Network Board and  
Cabling**



The physical connection determines the kind of cable used, the way the cable is configured (called the *topology* of the network), and the way information is transmitted over the cable (called the *protocol*).

## Logical Connection

After the physical connection to the network is made, you must make a logical connection to access the network services.

To make the logical connection on a NetWare network, you must prove that you are an authorized user. This is done when you log in to the network and provide the NetWare operating system your user identification and a valid password. By logging in to a network or attaching to a server, you make a logical connection.

# Network Resources

After connecting to a NetWare network, you have access to physical and logical resources across the network. A definition for each resource is maintained in a database used by the NetWare operating system.

An example of this is a print queue or group name. How you interact with the resource database depends greatly on which version of the NetWare operating system you are running.

## Resources for NetWare 2 and NetWare 3

The NetWare 2 and NetWare 3 operating systems use a flat database structure called a *bindery* for managing network resource definitions. A definition for each network resource is maintained in the bindery.

For example, a definition exists for your user information, such as your username and password. A bindery exists for each server in the network and is independent of resource definitions created on other servers.

The bindery structure for each server is flat, with a single location for accessing and managing network resources. Therefore, when you use network resources in a multiple server network, you must be aware of their physical and logical locations in order to use them.

## Resources for NetWare 4

NetWare 4 uses a global database structure called *NetWare Directory Services (NDS™)* for managing network resource definitions. NDS treats all network resources as objects in a distributed database known as the *Directory database*. This database organizes resources in a hierarchical tree structure, independent of their physical location.

The Directory database supports an entire network of servers. Instead of storing all information on each individual server as in NetWare 2 and 3, information is distributed over a global database and can be accessed by all NetWare servers.

Users can access any network service, such as file services or print services, without having to know the physical location of the server that provides the service.

## Components of a Directory Tree

NetWare Directory Services operates in a logical organization called the *Directory tree*. It is called a Directory tree because objects are stored in a hierarchical tree structure, starting with the root object and branching out.

Three types of objects make up the Directory tree:

- ◆ Root object

The root object is placed at the top of the Directory tree by the installation program.

- ◆ Container objects

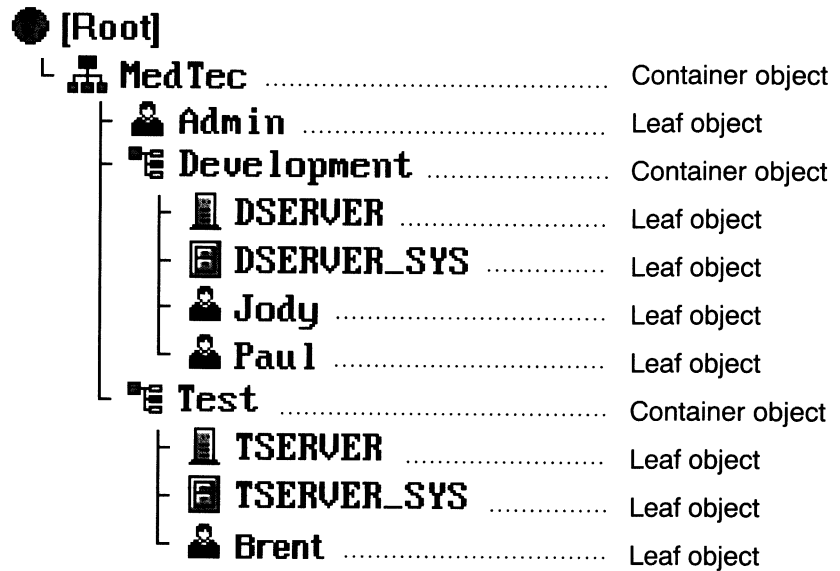
A branch of the Directory tree consists of a container object and all the objects it holds, which can include other container objects.

- ◆ Leaf objects

Leaf objects are at the end of branches and do not contain any other objects. Volume, User, and NetWare Server objects are some examples of leaf objects.

The following figure shows how container objects and leaf objects make up the NetWare Directory tree.

Figure 1-3  
Example of a  
Directory Tree



To refer to where an object is in the Directory tree, the term *context* is used. The position of the object within its container is its context. For example, in the previous figure, the context of User object Jody is Jody.Development.MedTech.

To identify a particular object, you must know its context. To make it easy for users to locate the objects that they work with on a regular basis, you can set up configuration files to specify the context of each object.

This gives the users a more manageable view of the tree; they do not have to know exactly where each object is located in the tree.

# The Structure of the File System

The bindery and NetWare Directory Services help you manage network resources such as NetWare servers and printers, but they do not provide control over the file system (volumes, directories, and files). Graphical and text utilities help you manage both network resources and the file system.

The file system structure is separate from the bindery or NetWare Directory Services structure. Physically, all network information is stored on hard disks that are controlled by a server. But logically, the file system is represented in NetWare 2 and 3 as a volume and in NetWare 4 as a Volume object. This volume is managed under *Bindery emulation* provided in NetWare 4.

Three types of structures make up the file system: volumes, directories, and files.

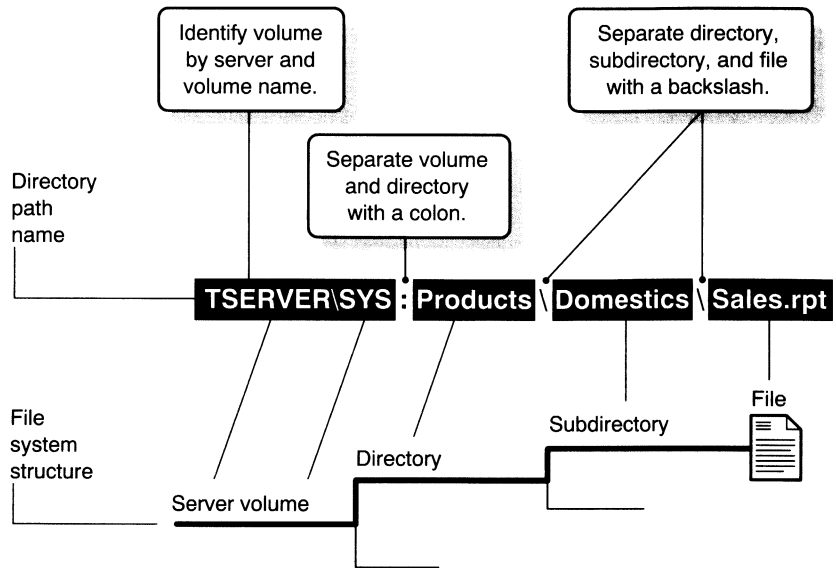
## The File Structure for NetWare 2 and NetWare 3

The file structure in NetWare 2 and NetWare 3 begins with the file server. The physical hard disks in a file server are divided into volumes, much like a set of books. A volume can contain several physical hard disks, or a single hard disk can be divided into multiple volumes.

A volume marks the base of each directory structure. It appears and acts like a DOS root directory or disk drive. Directories are stored at the volume level and subdirectory levels. Files are stored within directories and subdirectories in the same manner as the DOS operating system stores files.

The following figure shows how the file structure of NetWare 2 and 3 networks works.

**Figure 1-4**  
**NetWare 2 and 3 File**  
**System Structure**  
**and Directory Path**



## The File Structure for NetWare 4

The file structure in NetWare 4 begins with the *Volume object*. A Volume object is one type of leaf object. It refers to a physical volume where files are stored and allows NetWare Directory Services to locate files.

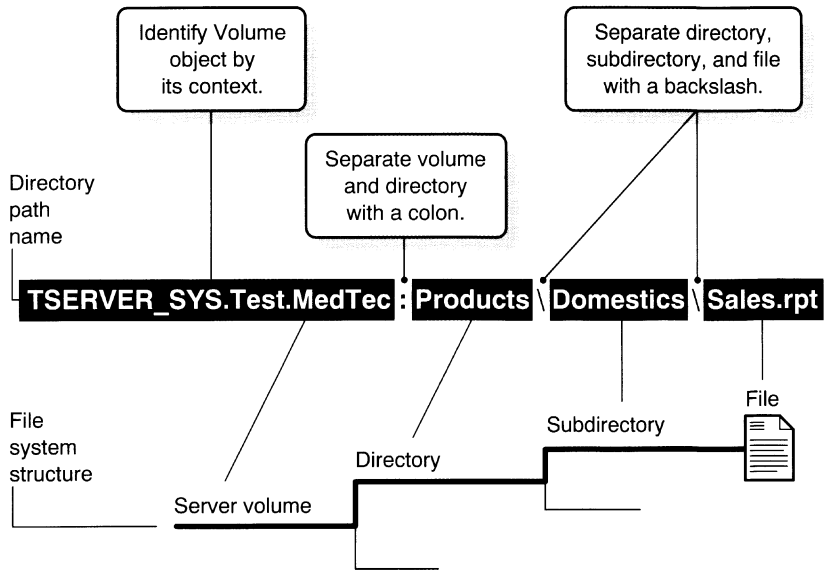
The root directory of a physical volume is also represented as part of a Volume object. It is the highest level of the file system structure. The Volume object provides a link between NetWare Directory Services and each physical volume's file system.

Directories and files are not objects in the Directory tree. They are only a part of the file system. Accessing directories and files within the Directory tree is done by opening a Volume object or setting up Directory Map objects.

You can make it easier for users to find files by setting up Directory Map objects that point to a particular location in a volume's file system structure.

The following figure shows how these structures make up the file system for a NetWare 4 network.

**Figure 1-5**  
**NetWare 4 File**  
**System Structure**  
**and Directory Path**



The position of a file within the file system is its *directory path*.

To identify a file, you must know the context of the Volume object representing the physical volume that contains the file and the directory path through the file system structure, including the name of the file.



## Network Users

Access to a NetWare network is possible only if you are identified to the NetWare operating system as a network user.

### NetWare 2 and NetWare 3 Users

NetWare 2 and NetWare 3 allow for four types of network users, which have varying levels of responsibility on the network:

*Regular network users* are the people who work on the network. They can run applications and work with files according to the rights assigned to them.

*Operators* are regular network users who have been assigned additional privileges. For example, a file server console operator is a network user who is given specific rights to use the FCONSOLE utility.

*Managers* are users who have been given responsibility for creating or managing other users. Workgroup managers can create and manage users; user account managers can manage, but not create, users. Managers function as supervisors over a particular group, but they do not have supervisor equivalence.

*Network supervisors* are responsible for the operation of the whole network. Network supervisors maintain the system, restructuring and updating it as needed.

### NetWare 4 Users

NetWare Directory Services identifies the same network users as NetWare 2 and 3 do. In addition, NetWare 4 identifies a User object named ADMIN.

The first time the network supervisor logs in, it is as User object ADMIN, which is created by default during NetWare 4 installation.

The term *network supervisor* in NetWare 4 merely refers to the person responsible for setting up the network. NetWare 4 allows for multiple users to have supervisory rights—unlike the single supervisor required by NetWare 2 and 3.

When User ADMIN is created on the first NetWare 4 server installed, it can manage all objects because it has the Supervisor right to every object. Initially, ADMIN can also manage all directories and files on every volume in the Directory tree.

User ADMIN does not have any special significance like the user SUPERVISOR did in previous versions of NetWare. It is merely the first User object created and, therefore, is granted rights to create and manage all objects.

To use the network, every user must be assigned a User object in the Directory tree. The User object represents the individual and keeps track of the person's use of the network.

## Login

Before you can use any of the network services, you must attach to and log in to the network.

Bindery users log in to or attach to individual servers. Therefore, they need a password for each server they are logging in to.

NetWare Directory Services users log in to the network. Therefore, they need only one password to gain access to all network resources that they have the right to use.

Starting up and logging in from a client workstation always consists of the same tasks:

1. Booting the client workstation.

This loads the NetWare Client operating system and is done automatically when you either turn on the power or reboot by pressing <Ctrl>+<Alt>+<Del>.

2. Loading the network software and drivers.
3. Changing the default drive to a network drive.
4. Logging in with a username and (usually) a password.

NetWare prompts you for your username and password and then completes the network connection.

The way users actually perform these steps depends on how the network supervisor has set up the network and the client workstation.

All four steps can be accomplished automatically so that the only thing users do is type their passwords. For more information, see Chapter 7, "Setting Up NetWare Client Workstations to Log In," on page 179.

For example, users can log in to the network by typing

```
LOGIN ESAYERS <Enter>
```

or

```
LOGIN servername/ESAYERS <Enter>
```

LOGIN is usually executed from the AUTOEXEC.BAT or another batch file. There is some difference in the command line syntax for the particular NetWare versions.

If you are using NetWare 3.12, see *NetWare 3.12 Utilities Reference* for a complete description of the utility. If you are using NetWare 4, see *NetWare 4 Utilities Reference* for a complete description of the utility.

When users access resources on the network, background authentication processes in NetWare 4 verify that the users are who they say they are.

Once users log in to the network, their trustee rights in the bindery or Directory allow them access in the network.

# Network Security

Security is vital in maintaining a productive network environment. NetWare provides an extensive security system to protect the data on the network.

## Network Security Levels

NetWare 2, 3, and 4 have three levels of security that can be used separately or in various combinations.

## File System Security

File system security consists of rights security and attributes security.

Rights security controls what the user is allowed to access in and do to network directories and files. Rights can be granted at either the directory or file level.

Rights security is administered by granting trustee assignments to objects and by acquiring effective rights through inheritance and security equivalence.

Attribute security assigns various characteristics to individual directories and files. Directory and file attributes have priority over rights security and can prevent tasks that effective rights would allow. Attributes can be used to prevent users from

- ◆ Deleting a file or directory
- ◆ Copying a file
- ◆ Viewing a file or directory
- ◆ Modifying a file
- ◆ Creating a new file

Attributes can also be used to

- ◆ Mark a file for single-user or multiple-user access
- ◆ Mark a file as modified so that a backup program can select it and leave unmodified files alone
- ◆ Protect a file from corruption by ensuring that either all changes are made or no changes are made when a file is modified

## **Login and Password Security**

Login and password security controls who can access the network. The network supervisor uses login and password security to

- ◆ Assign usernames to users of the network
- ◆ Require passwords  
Additional password restrictions include a minimum password length, periodic password changes, unique passwords, and a number of grace logins after password expiration.
- ◆ Control the use of network resources by restricting where and when users can log in
- ◆ Detect intruders who attempt to access an account without the correct password
- ◆ Prevent unauthorized access to the server console

## Server Security

Server security controls access to the server console. Access is controlled in three ways:

- ◆ Supervisor rights to the server are granted to give specific users rights to use a console.
- ◆ Directory rights are granted so that only specific users have access to the SYS:SYSTEM directory, where key server files are stored.
- ◆ Server utilities such as MONITOR and SECURE CONSOLE are used to prevent unauthorized access to the server console.

## Additional Network Security in NetWare 4

NetWare 4 also provides NetWare Directory Services security to the network security it shares with NetWare 2 and 3.

NetWare Directory Services security controls what objects and properties the user is allowed to access.

Object rights control what a trustee can do with an object. These rights control the object as a single piece in the Directory tree, but they don't allow access to information stored within that object—unless the Supervisor object right or property rights are granted.

Property rights control a trustee's access to information stored within the object—that is, the information stored in the object's properties. Each object has several properties to which access is controlled separately.

Rights security is administered by granting trustee assignments to objects and by acquiring effective rights through inheritance and security equivalence.

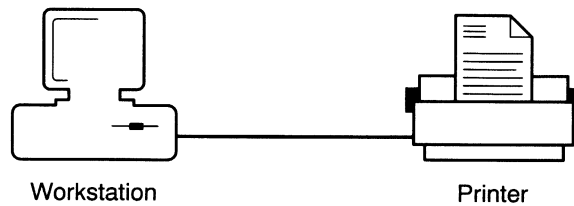
# Network Printing

## Non-Networked Printing

A standalone workstation can only print to a printer attached to one of its ports. Print jobs are sent directly to the attached printer.

As shown in the following figure, a printer connected to a standalone workstation allows print jobs from only that workstation to access the printer.

**Figure 1-6**  
**Standalone Printing**

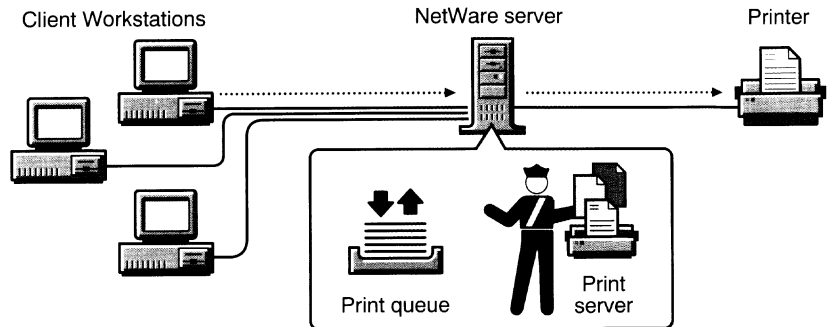


## Network Printing

In network printing, printers are often shared and several intervening steps must take place: storage, intermediate processing, and transmission between various processing locations. These steps can greatly affect the complexity of the print job's journey and the time taken before a print job arrives at the printer.

NetWare uses a print queue, print server, and print driver to allow several network workstations to print to a network printer. The print server takes print jobs from the print queue and sends them to the printer as shown in the following figure.

**Figure 1-7  
Network Printing**



If you are using NetWare 3.12, see *NetWare 3.12 Print Server* for more information on network printing. If you are using NetWare 4, see *NetWare 4 Print Services* for a complete description of the process.



## Where to Go from Here

With a basic understanding of networking and NetWare network functions, you are ready to upgrade or install your NetWare client workstation.

<b>If you want to</b>	<b>See</b>
Get more information about some of the topics discussed in this chapter	“Additional Information” on page 21
Set up client workstation hardware	“Setting Up Workstation Hardware” on page 77
Prepare your NetWare Client software for a NetWare client workstation installation	“Preparing Client Workstations” on page 76
Prepare the installation software	“Preparing the NetWare Client Installation Software” on page 83

## Additional Information

### For NetWare 2.2, NetWare 3.11, and NetWare 3.12

<b>Topic</b>	<b>Reference</b>
NetWare bindery	“Bindery” in <i>NetWare 3.12 Concepts</i>
NetWare file system (directory structure)	“Directory structure” in <i>NetWare 3.12 Concepts</i>
NetWare drives	“Drive mapping” in <i>NetWare 3.12 Concepts</i>
NetWare volumes	“Volume” in <i>NetWare 3.12 Concepts</i>
Network printing	“Printing” in <i>NetWare 3.12 Print Server</i>
Print queues	“Print queue” in <i>NetWare 3.12 Concepts</i>
Print servers	“Print server” in <i>NetWare 3.12 Concepts</i>
Printers	“Printers” in <i>NetWare 3.12 Concepts</i>

## For NetWare 4

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Topic	Reference
Directory tree	"Directory tree" in <i>NetWare 4 Concepts</i>
NetWare Directory Services	Chapter 1, "Understanding NetWare Directory Services," in <i>Introduction to NetWare Directory Services</i>
NetWare drives	Chapter 1, "Understanding NetWare Directory Services," in <i>Introduction to NetWare Directory Services</i>
NetWare file system (directory structure)	"Drive mapping" in <i>NetWare 4 Concepts</i>
NetWare volumes	"Directory structure" in <i>NetWare 4 Concepts</i>
Network printing	"Volume" in <i>NetWare 4 Concepts</i>
Print queues	<i>NetWare 4 Print Services</i>
Print servers	"Print queue" in <i>NetWare 4 Concepts</i>
Printers	"Print server" in <i>NetWare 4 Concepts</i>

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chapter

# 2

## **Understanding the NetWare Client Software**

### **Overview**

This chapter introduces and describes the NetWare<sup>®</sup> DOS Requester<sup>™</sup> and other NetWare Client<sup>™</sup> software that provides the interface between the network and your DOS and Microsoft (MS) Windows client workstations.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
The NetWare DOS Requester Architecture	25
The NetWare Protocols and Transports	31
The Link Support Layer Interface	35
The ODI LAN Driver	35
The NET.CFG File	36
Novell MS Windows Support	37

# Introduction

The core components of the NetWare DOS and MS Windows environment are four terminate-and stay-resident (TSR) programs, listed and described in the following table.

**Table 2-1**  
**Core Components of the NetWare Client for DOS and MS Windows**

TSR Program	Description
<b>Link Support Layer™</b> (LSL)	<p>Puts the packaged requests from the IPXODI driver into the proper format for transmission on the particular physical network that the client workstations are running on.</p> <p>Also takes replies for the various client workstations from the network (via the network LAN driver), removes the network-specific information it has added, and passes the reply to IPXODI.</p>
<b>NetWare DOS Requester</b>	<p>DOS-based client software that provides the interface between DOS and the network. It consists of individual modules that provide various network services.</p> <p>It is loaded when you run the file STARTNET.BAT. This file also loads drivers that the NetWare DOS Requester needs in order to communicate with the network hardware.</p>
<b>ODI™ LAN driver (MLID)</b> (example: NE2000™)	<p>Takes requests from the LSL™ and sends them to the network. It also receives replies from the network and passes them to the LSL software. This LAN driver is specific to the network board installed in your client workstations.</p>
<b>Transport Protocol</b>	<p>Delivers requests and replies between client workstations and the network.</p>
IPXODI (Internetwork Packet Exchange™ Open Data-Link Interface™)	<p>Also handles packet sequencing and acknowledgment for the client-server connection.</p>
SPX™ (Sequenced Packet Exchange)	<p>Takes requests that the NetWare DOS Requester has determined are for the network, “packages” them with transmission information (such as their destination), and hands them to the LSL.</p>
TCP/IP (Transmission Control Protocol/ Internet Protocol)	

When the NetWare Client components are loaded, each component uses a file called NET.CFG to determine the specific software settings it should use. See Chapter 2, “NET.CFG Options Reference,” in *NetWare Client for DOS and MS Windows Technical Reference* for information.

## The NetWare DOS Requester Architecture

The NetWare DOS Requester consists of a group of files that provide NetWare support for DOS and MS Windows client workstations. These files consist of a number of Virtual Loadable Module™ (VLM) files and a single executable file (VLM.EXE) which manages operation of the .VLM files.

Full understanding of the NetWare DOS Requester architecture requires you to understand these components, as discussed in the following sections:

- ◆ Three-Layer Structure
- ◆ VLM Manager
- ◆ Connection Table Manager
- ◆ Backwards Compatibility with NETX Applications
- ◆ File and Print Services
- ◆ Memory Usage

See “NetWare DOS Requester Option” in Chapter 2, “NET.CFG Options Reference,” in *NetWare Client for DOS and MS Windows Technical Reference* for information on configuring this option for optimizing your client workstations.

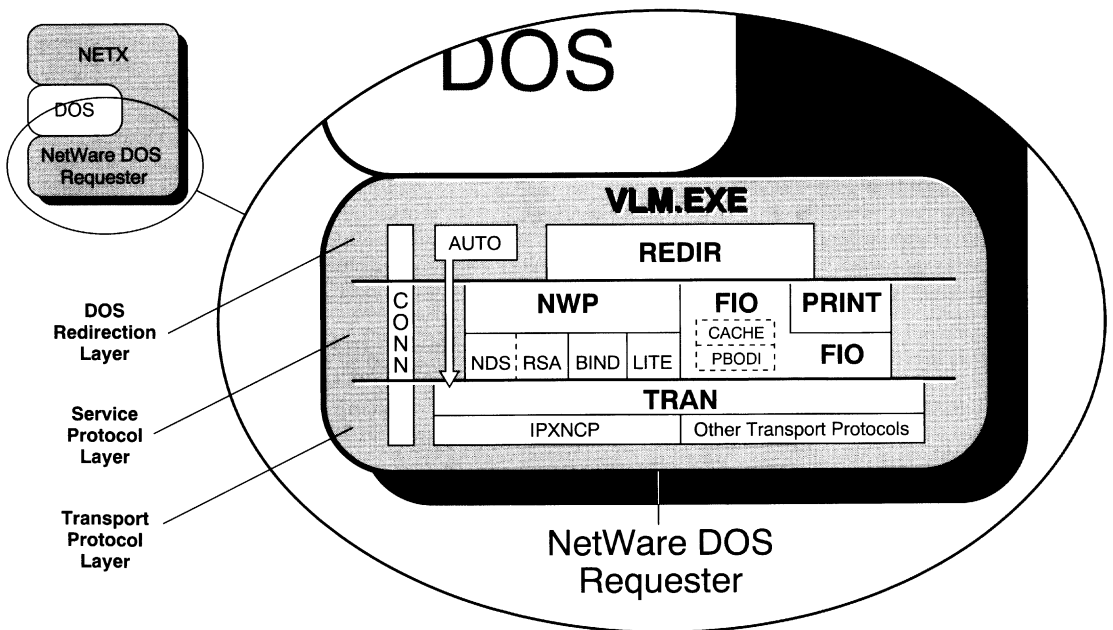
## Three-Layer Structure

The .VLM files are grouped into the following three layers:

- ◆ DOS Redirection Layer
- ◆ Service Protocol Layer
- ◆ Transport Protocol Layer

The following figure shows how these layers and modules fit together. Individual pieces are discussed in further detail in the sections that follow.

Figure 2-1  
**NetWare DOS Requester Layers and Modules**



## DOS Redirection Layer

This layer provides DOS file services through the DOS redirector; its VLM™ program is REDIR.VLM. REDIR performs all the DOS-specific callouts.

Previously, NETX provided its own file services; the NetWare DOS Requester uses the DOS redirector for most file services.

## Service Protocol Layer

This layer consists of the following parallel services.

**Table 2-2**  
**Key Components of the NetWare DOS Requester**

Protocol Layer Service and Module	Description
<b>NetWare Services</b> NWP.VLM	<p>NWP, the NetWare protocol multiplexor, handles each particular network implementation through these child VLM programs:</p> <ul style="list-style-type: none"><li>◆ BIND.VLM for NetWare 2 and NetWare 3™ bindery servers</li><li>◆ NDS.VLM for NetWare 4™ NetWare Directory Services™ servers</li><li>◆ PNW.VLM for Personal NetWare™ (NetWare desktop) servers</li></ul> <p>The NWP services also include logins and logouts, broadcast messages, and establishing and destroying connections.</p>
<b>Security Services</b> RSA.VLM	<p>RSA (Rivest, Shamir, and Adleman, developers of this particular public key encryption system) provides system-level background authentication for the workstation.</p> <p>NetWare uses this encryption system to strengthen user authentication and access control functions.</p>
<b>File Services</b> FIO.VLM	<p>FIO, the file input/output module, is a separate-but-parallel piece that implements a basic file-transfer protocol. This includes cached or noncached read/write, burst mode-based read/write, and large internet packet read/write.</p> <p>The Packet Burst™ protocol in FIO.VLM is based on Open Data-Link Interface interconnectivity strategy and is referred to as PBODI. This functionality allows users to choose performance over memory use and vice versa.</p>

Table 2-2

## Key Components of the NetWare DOS Requester

Protocol Layer Service and Module	Description
<b>Print Services</b> PRINT.VLM	<p>The PRINT module provides printing services using the FIO module for its file writes. Print redirection is handled in the following ways, depending on entries in the NET.CFG file:</p> <ul style="list-style-type: none"><li>◆ Noncached</li><li>◆ Cached</li><li>◆ Via Packet Burst protocol to the server</li><li>◆ Via File Services (FIO)</li></ul>

### Transport Protocol Layer

This layer is responsible for maintaining connections, providing packet transmissions between connections and performing other transport-specific functions.

The IPXNCP module uses the IPX™ protocol as a transport mechanism.

The AUTO.VLM module reconnects a client workstation to a server and rebuilds the workstation's environment—excluding file-specific items—to its original state prior to losing connection.

### Communication and Connection Management

The NetWare DOS Requester contains communication and connection management for controlling the NetWare client software.



## VLM Manager

The VLM Manager (VLM.EXE) controls communication and memory issues between the individual VLM software programs. It is responsible for loading the required modules and disbursing requests to individual modules.

Therefore, instead of loading NETX, EMSNETX, XMSNETX, or BNETX, the user loads only the VLM.EXE program.

The VLM Manager decides whether a given VLM program uses expanded memory, extended memory, conventional memory, or any other memory type supported, without affecting the individual VLM programs.

## Connection Table Manager

The Connection Table Manager (CONN.VLM) spans all the layers of the NetWare DOS Requester architecture.

CONN allows client workstations running the NetWare DOS Requester to establish a configurable number of connections with multiple NetWare servers.

## Backwards Compatibility with NETX Applications

The NETX.VLM program provides backwards compatibility with NETX and other older versions of the shell. Therefore, you do not need to run NETX or other versions of the shell with the NetWare DOS Requester.

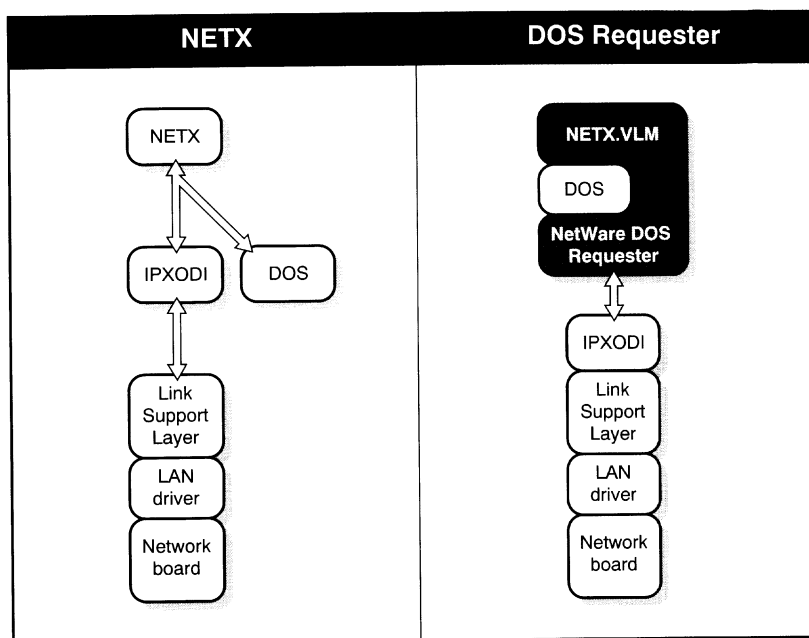
Nevertheless, because the NetWare DOS Requester is a redirector on the back end of DOS, it performs differently than the NetWare Shell software under specific conditions.



See “Compatibility with NetWare Shell Parameters” under “NetWare DOS Requester Option,” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information.

The following figure shows a comparison of the NETX and the NetWare DOS Requester architectures.

**Figure 2-2**  
**Comparison of**  
**NETX and NetWare**  
**DOS Requester**  
**Architecture**



The NetWare DOS Requester offers several improvements over NETX:

- ◆ Provides a modular architecture that has advantages for current and future applications.
- ◆ Takes advantage of memory-swapping technology and DOS redirection capability.
- ◆ Includes the Packet Burst protocol and Large Internet Packet (LIP) support.
- ◆ Supports the installed base of NetWare users by providing backward compatibility with NETX.
- ◆ Supports the NetWare Directory Services architecture in NetWare 4 software.

## File and Print Services

Previously, the NetWare Client shell for DOS intercepted requests for DOS services. At the client workstations, the NetWare shell (NETX) software hooked interrupts in front of DOS and provided network services for files and printing.

The NetWare DOS Requester takes advantage of DOS redirection to provide file and print services. It also uses NetWare shell technology to add features to DOS and provide compatibility with applications that run on the NetWare shell software.

## Memory Usage

The NetWare DOS Requester works with extended memory, expanded memory, and conventional memory. When loading in extended memory, the Requester loads in LIM XMS 2.0 memory, not in the High Memory Area (HMA), meaning that extended memory can coexist with DOS loaded high.

The VLM.EXE program automatically selects the best possible memory use: extended memory first, expanded memory second, and conventional memory only in the absence of enhanced memory options.

## The NetWare Protocols and Transports

The NetWare software that allows client workstations to communicate and be understood on the network is separated into two components, consisting of a *protocol*, which manages data, and a *transport*, which manages application messages. This can be provided by one piece of software or by many.

In order for client workstations to communicate on a network, they must use a protocol that is identical to what is being used on the network.

Sometimes client workstations are configured to use multiple protocols. In this case, workstations can communicate with different networks simultaneously.

For example, a client workstation using both IPX and TCP/IP protocols can communicate with servers configured for IPX or TCP/IP protocols only.



The NetWare client protocols support Level 3 (the network layer) through Level 4 (the transport layer) of the Open Systems Interconnection (OSI) networking reference model from the International Organization for Standardization (ISO).

The NetWare client software provides the following standard protocols:

- ◆ ARP (Address Resolution Protocol)
- ◆ BOOTP (provides TCP/IP configuration information)
- ◆ ICMP (Internet Control Message Protocol)
- ◆ IP (Internet Protocol)
- ◆ IPX/SPX™ (Internetwork Packet Exchange/Sequenced Packet Exchange™)
- ◆ MIB (Management Information Base)
- ◆ NetBIOS (NetBIOS Service Interface)
- ◆ RARP (Reverse Address Resolution Protocol)
- ◆ RPL (Remote Program Load)
- ◆ SNA (System Network Architecture)
- ◆ SNMP (Simple Network Management Protocol)
- ◆ TCP (Transmission Control Protocol)
- ◆ UDP (User Datagram Protocol)
- ◆ XNS (Xerox\* Network System)

For information on optimizing your client workstations for using NetWare transport protocols, see Chapter 2, "NET.CFG Options Reference," in *NetWare Client for DOS and MS Windows Technical Reference*.

## IPXODI Protocol

Although the NetWare DOS Requester intercepts and prepares requests for network transmission, the actual delivery is made by the IPX protocol. The NetWare client software supports this through the Internetwork Exchange Open Data-Link Interface (IPXODI.COM program).

IPXODI attaches a header to each data packet. The header specifies necessary information for targeted network delivery, announcing where the packet came from, where it's going, and what happens after its delivery.

The targeting ability of IPXODI is important but, by itself, does not guarantee successful delivery of a data transmission.

IPXODI transmits data packets as datagrams (self-contained packages that move independently from source to destination) and, therefore, can deliver the packets only on a best-effort basis. Delivery is guaranteed only when using the SPX protocol.

## SPX Protocol

SPX (Sequenced Packet Exchange) is a protocol within IPXODI that is derived from the Novell IPX protocol using the Xerox Sequenced Packet protocol. It enhances IPX by supervising data sent out across the network.

SPX verifies and acknowledges successful packet delivery to any network destination by requesting a verification that the data was received.

Within this verification must be a value that matches the value calculated from the data before transmission. So SPX ensures not only that the data packet arrived, but that it arrived intact.

SPX can track a single data transmission or data transmissions consisting of a series of separate packets. If an acknowledgment request brings no response within a specified time, SPX retransmits it.

After a reasonable number of retransmissions fail to return a positive acknowledgment, SPX assumes the connection has failed and warns the operator of the failure.

## TCP/IP Protocol

The Novell Transmission Control Protocol/Internet Protocol (TCP/IP) software (the TCP/IP.EXE file) provides communication between NetWare (IPX) networks across an IP internet that does not directly support IPX. This is known as IPX/IP tunneling.

NetWare TCP/IP also provides a transport interface for higher-level networking services. This interface provides client workstations data-communication services to the Network File System (NFS), and third-party applications supporting the 4.3 BSD UNIX<sup>®</sup> socket interface, the AT&T\* Streams Transport Layer Interface (TLI), MS Windows Sockets, and NetBIOS interface using the RFC-1001/1002 compliant B-node (broadcast) type of the NetBIOS protocol.

NetWare TCP/IP supports ODI LAN drivers for the following frame types:

- ◆ Ethernet DIX
- ◆ Ethernet 802.2 and SNAP
- ◆ Token-ring 802.2 and SNAP
- ◆ ARCnet\*
- ◆ IBM\* PCN2
- ◆ FDDI
- ◆ SLIP and PPP asynchronous serial line

## The Link Support Layer Interface

The Link Support Layer (LSL) interface is an implementation of the Open Data-Link Interface specification. The LSL program serves as an intermediary between the ODI LAN drivers and communication protocols like IPXODI, ARP, and TCP/IP.

The LSL allows one network board to service several communications protocol stacks. It also allows several network boards to service the same protocol stack.

## The ODI LAN Driver

Every transmission prepared by the NetWare DOS Requester must pass through the network board connecting the workstation to the network. The LAN driver, often referred to as a *Multiple Link Interface Driver™* (MLID™), makes the connection between the physical network board and the logical routines and programs that use it.

A LAN driver is linked both to the specific network board and to the network protocol.

In 1989, Novell and Apple\* jointly developed the Open Data-Link Interface (ODI) specification to provide seamless network integration at the transport, network, and data-link levels.

ODI simplified the development of LAN drivers for a wide variety of network boards and network transport protocol stacks by providing the following functionality:

- ◆ Supports multiple network boards and protocols in a single client workstation
- ◆ Supports multiple protocols on a single network board and topology

- ◆ Supports multiple frame formats over a single network board and topology
- ◆ Provides transport support

This allows a UNIX workstation (using the TCP/IP protocol), for example, to use a NetWare server to queue and print documents and save data files that are shareable with IPX client workstations.

The result is easier access to a wide variety of networked resources without requiring multiple network connections or additional investments in hardware and software.

## The NET.CFG File

NET.CFG is a specialized text file that you create with any ASCII text editor and include on a workstation boot diskette with any other necessary boot files. The NET.CFG file replaces the SHELL.CFG file.

Like the DOS CONFIG.SYS file, the NET.CFG file contains configuration values of the LAN drivers and NetWare DOS Requester that are read and interpreted when your client workstation starts up. These values adjust the operating parameters of the NetWare DOS Requester, IPX, and other NetWare Client software.

You might want to change the values of certain NetWare DOS Requester parameters to modify the client software's reaction in certain routines and processes.

Applications such as database, multitasking, or NetBIOS (involved in peer-to-peer communications or distributed processing) might require parameter values different from the default values to function properly on the network.

You might also find that printing, file retrieval, and other network problems can be solved by adjusting client software parameters.

To find out which parameters you might need to modify, consult the setup reference for each application used on your network.

To create a NET.CFG file and modify the various parameters, see Chapter 2, "NET.CFG Options Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for information.



# Novell MS Windows Support

The following sections explain the integration of MS Windows with the NetWare client software:

- ◆ Accessing the Network from an MS Windows Application
- ◆ Running DOS Applications in Real or Standard Mode
- ◆ Running DOS Applications in Enhanced Mode
- ◆ Receiving Broadcast Messages
- ◆ Printing to Network Queues

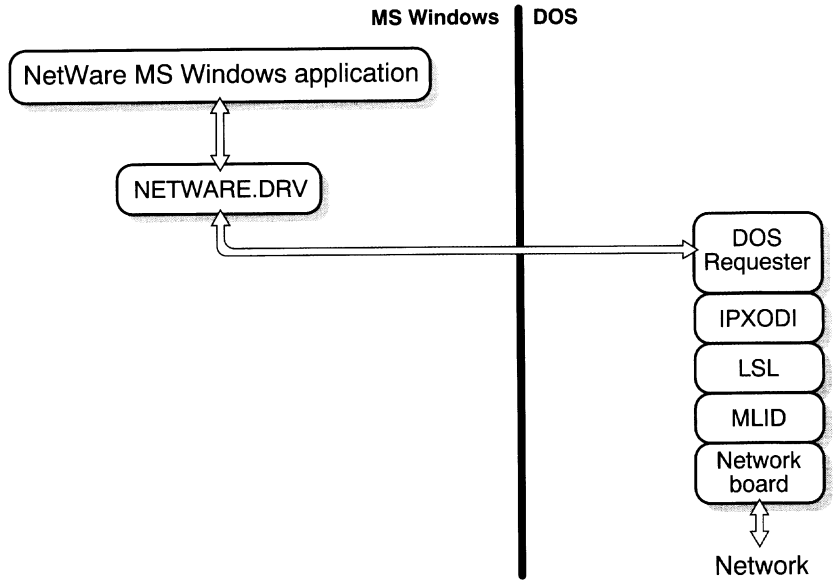
## Accessing the Network from an MS Windows Application

In addition to the core NetWare client software—which consists of the NetWare DOS Requester, IPX protocol, and Link Support Layer support—there are some additional NetWare support files necessary for NetWare client workstations to work properly in an MS Windows environment:

Support File	Description
NETWARE.DRV NETWARE.HLP	The MS Windows network driver and associated help file to provide access to network redirector functionality from MS Windows File Manager.
NWPOPUP.EXE	NetWare messaging utility. Used to receive messages and alerts from a NetWare server.
VIPX.386	Virtual device driver providing virtualization services for NetWare IPX protocol for MS Windows environment and across DOS virtual machines.
VNETWARE.386	Virtual device driver providing virtualization services for NetWare redirector for MS Windows environment and across DOS virtual machines.

The following figure illustrates the MS Windows driver, NETWORK.DRV, which translates between MS Windows and DOS.

**Figure 2-3**  
**Accessing the**  
**Network from an MS**  
**Windows**  
**Application**

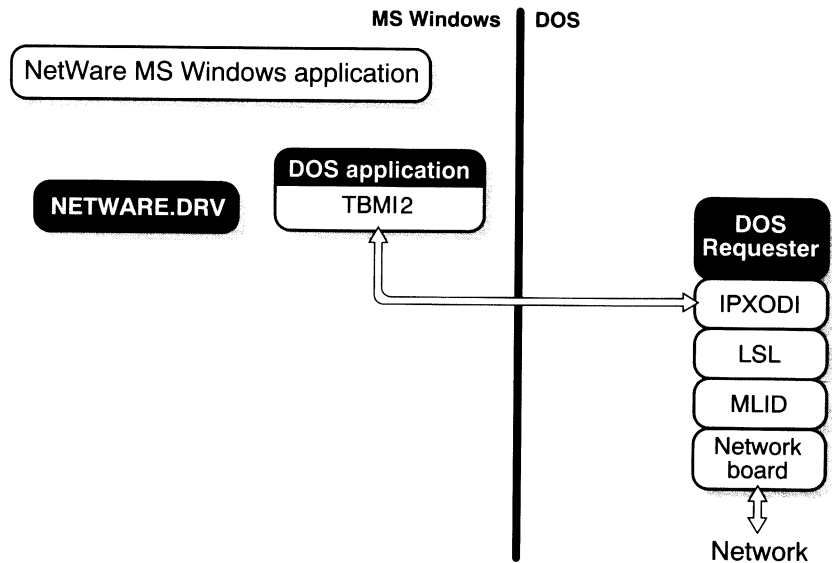


For example, when you use the NetWare User Tools “NetWare Drives Connections” to connect to a network drive, your client workstation uses this driver.

## Running DOS Applications in Real or Standard Mode

The following figure illustrates the NetWare task-switching file for real or standard mode, TBMI2.COM, which synchronizes network calls and responses for DOS sessions.

Figure 2-4  
Running a DOS  
Application in Real  
or Standard Mode

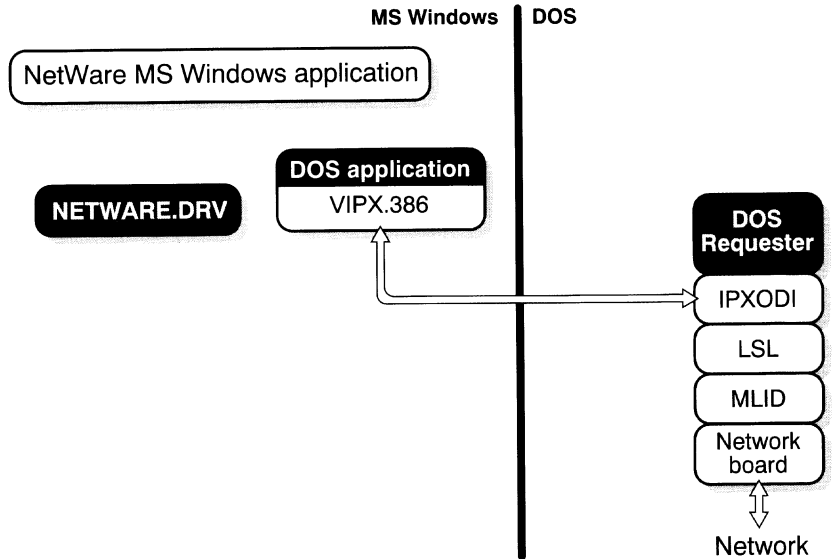


For example, if you are running MS Windows on a 286 machine and you choose the DOS prompt icon to go to a DOS window and check your email, your client workstation uses this file.

## Running DOS Applications in Enhanced Mode

The following figure illustrates the NetWare task-switching file for enhanced mode, VIPX.386, which synchronizes network calls and responses for DOS sessions.

Figure 2-5  
Running a DOS  
Application in  
Enhanced Mode

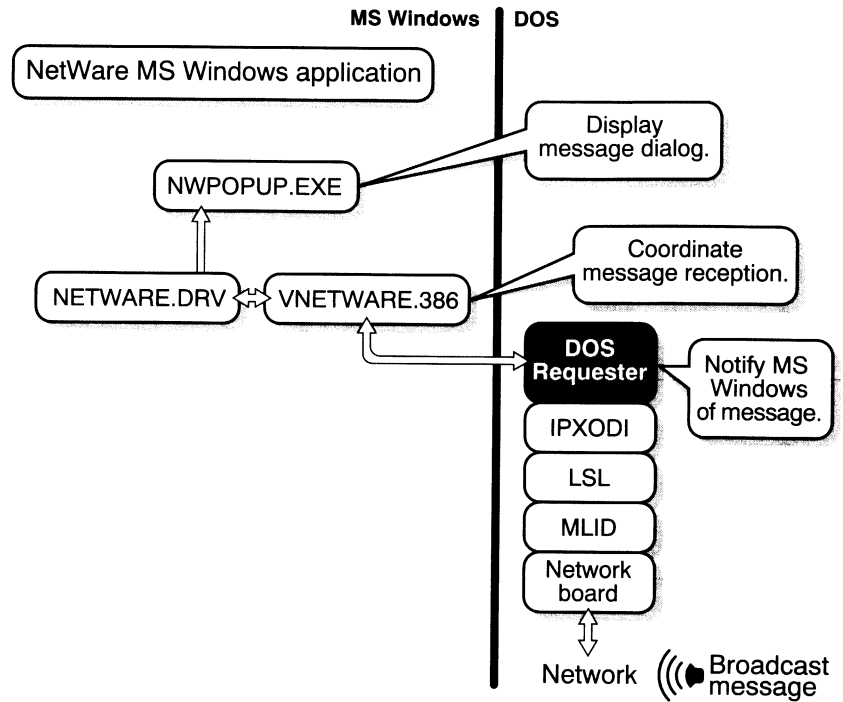


For example, if you are running MS Windows in enhanced mode and you choose the DOS prompt icon to go to a DOS window and check your email, your client workstation uses this file.

## Receiving Broadcast Messages

The following figure illustrates the virtual device driver, VNETWARE.386, which works with the NETWARE.DRV driver and NWPOPUP.EXE program to coordinate and display message dialogs.

Figure 2-6  
Receiving a  
Broadcast Message

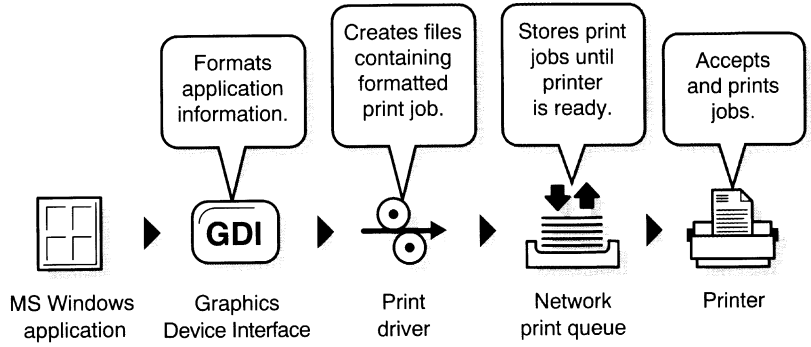


For example, if the secretary sends a message informing you that paychecks have arrived, your client workstation uses this driver.

# Printing to Network Queues

The following figure illustrates the process used when you print to a network queue from an MS Windows application.

**Figure 2-7**  
**Printing to a**  
**Network Queue**



For example, if you print a text file from the MS Windows Notepad application, your client workstation uses these components.

## Where to Go from Here

With a basic understanding of the NetWare Client software, you are ready to prepare for upgrading or installing your NetWare client.

<b>If you want to</b>	<b>See</b>
Get more information about some of the topics discussed in this chapter	"Additional Information" on page 44
Set up client workstation hardware	"Setting Up Workstation Hardware" on page 77
Prepare your client software for a NetWare client workstation installation	"Setting Up Workstation Software" on page 82
Prepare the installation software	"Preparing the NetWare Client Installation Software" on page 83

# Additional Information

## For NetWare 2 and NetWare 3

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Topic	Reference
IPXODI	"IPXODI.COM" in <i>NetWare 3.12 Concepts</i>
Link Support Layer (LSL)	"Link Support Layer" in <i>NetWare 3.12 Concepts</i>
Network board drivers	"LAN driver" in <i>NetWare 3.12 Concepts</i>
NETX	"NetWare Shell Files" in <i>NetWare 3.12 Overview</i>

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## For NetWare 4

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Topic	Reference
IPXODI	"IPXODI" in <i>NetWare 4 Concepts</i>
Link Support Layer (LSL)	"Link Support Layer" in <i>NetWare 4 Concepts</i>
NetWare DOS Requester	"Virtual Loadable Module Software" in <i>Concepts</i>
Network board drivers	"LAN driver" in <i>NetWare 4 Concepts</i>

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chapter

# 3

## **Understanding Client Tools**

### **Overview**

This chapter briefly explains how you can use the NetWare<sup>®</sup> User Tools to perform common network tasks.

<b>Topic</b>	<b>Page</b>
Starting NetWare User Tools for DOS (NETUSER)	46
Using NetWare User Tools for DOS (NETUSER)	48
Exiting NetWare User Tools for DOS (NETUSER)	50
Starting NetWare User Tools for MS Windows	50
Using NetWare User Tools for MS Windows	51
Exiting NetWare User Tools for MS Windows	71

### **Introduction**

Use the NetWare User Tools to display and modify the current status of your client workstation, drive mappings, servers, printers, queues, volumes, and other necessary information.

NetWare User Tools are compatible with NetWare 2, NetWare 3<sup>™</sup>, and NetWare 4<sup>™</sup> networks.

NetWare User Tools are available for both DOS and Microsoft (MS) Windows.

# Prerequisites

Before you start using the NetWare User Tools, you should complete these tasks:



- Install or upgrade your client software

Complete the procedures in Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97.

- If you are using NetWare 4, you should be familiar with the following topics in *Concepts*:

- "Context"
- "NetWare Directory Services"
- "Objects"
- "Print queue"
- "Properties"

- If you are using NetWare 2 or 3, you should be familiar with the following topics in *Concepts*:

- "Bindery"
- "Object"
- "Printing"
- "Property"

## Starting NetWare User Tools for DOS (NETUSER)

The NetWare User Tools for DOS are found in the NETUSER utility. This utility is available only in NetWare 4 packages. It is not included in the NetWare Client Kit or other versions of NetWare.

Because NETUSER is a NetWare 4 utility, you need to already have a connection to the network and be logged in to a NetWare 4 network. The utility files are found in the SYS:PUBLIC directory.

For more information, see Chapter 8, "Logging In from a NetWare Client Workstation," on page 189.

## Prerequisites

Before you can start NETUSER, your client workstation requires the following:



Checklist

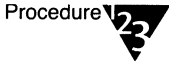
- A physical connection to the network
- DR DOS<sup>®</sup>, Novell DOS<sup>®</sup>, PC-DOS, or MS-DOS\* loaded and running
- Client software installed or upgraded

Complete the procedures in Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97.

- An authenticated connection to the network

For more information, see Chapter 8, "Logging In from a NetWare Client Workstation," on page 189.

## Procedure



Procedure

1. **Map the next network drive to SYS:PUBLIC by typing**

**MAP N SYS:PUBLIC** <Enter>



Note

This mapping might already be set up as a search drive in a login script for your client workstation. Use the MAP utility to view a list of existing drive mappings. If a drive mapping already exists for the SYS:PUBLIC directory, then proceed to Step 2.

2. **Change to the network drive that is mapped to the PUBLIC subdirectory.**

For example, if you mapped network drive G: to PUBLIC, type

**G:** <Enter>

3. **Start NETUSER by typing**

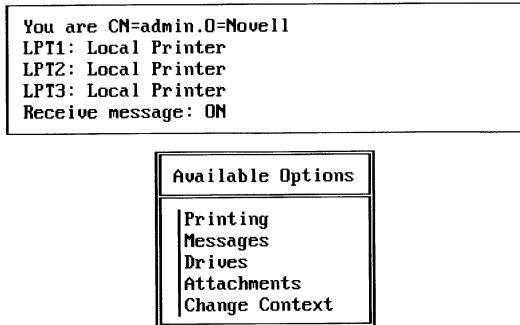
**NETUSER** <Enter>

# Using NetWare User Tools for DOS (NETUSER)

The NetWare User Tools for DOS provides you with a graphical way of accessing network resources, such as volumes, directories, printers, and users.

The following figure shows an example of the NETUSER utility screen.

**Figure 3-1**  
**Menu Options for**  
**NETUSER**



## Accessing Online Help

To see a list of commands and the procedures you can perform with NETUSER, access online help by pressing <F1> at any time.

## Using NetWare User Tools for DOS (NETUSER) Options

### Printing

Use "Printing" to

- ◆ Set up print queues
- ◆ Control network printing
- ◆ View information about network printing
- ◆ Redirect a printer port to the network

## Messages

Use “Messages” to

- ◆ Send a brief message from your client workstation to one or more users or groups on the network
- ◆ Disable or enable incoming messages sent from other clients

## Drives

Use “Drives” to

- ◆ View current drive mappings
- ◆ Create or change network drive mappings
- ◆ Map a drive to a fake root directory
- ◆ Map the next available drive

## Attachments

Use “Attachments” to

- ◆ Create or delete network attachments
- ◆ Change your password
- ◆ View server information
- ◆ Modify login scripts

## Change Context

Use “Change Context” to

- ◆ Browse the Directory tree
- ◆ Change your current context



Note

This option is not available when you are logged in to a NetWare 4 server in bindery mode. For more information, see Chapter 8, "Logging In from a NetWare Client Workstation," on page 189.

## Exiting NetWare User Tools for DOS (NETUSER)

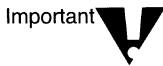
You exit NETUSER through the "Exit?" confirmation prompt. You can display this prompt in two ways:

- ◆ Press <Esc> until the "Exit?" confirmation prompt appears.
- ◆ Press <Alt>+<F10> anywhere within NETUSER to display the "Exit?" confirmation prompt.

To exit NETUSER, choose "Yes" when prompted.

## Starting NetWare User Tools for MS Windows

The NetWare User Tools for MS Windows are found in the NETWARE.DRV file. These tools are available in NetWare 3.12, NetWare 4, and NetWare Client Kits for DOS and MS Windows packages.



Important

This version of the NETWARE.DRV (3.01 or later) is compatible only with the NetWare DOS Requester. For MS Windows support of NetWare Shell files, such as NETX, use version 2.02 of the NETWARE.DRV.

### Prerequisites

Before you can start NetWare User Tools for MS Windows, your client workstation requires the following:



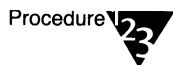
Checklist

- A physical connection to the network
- DR DOS, PC-DOS, Novell DOS, or MS-DOS loaded and running
- Client software installed or upgraded

Complete the procedures in Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97.

- A copy of MS Windows 3.x installed on your client workstation

## Procedure



1. **Start MS Windows.**
2. **Press <F6> or select the “NetWare User Tools” icon in the NetWare program group.**



If the “NetWare User Tools” icon is not displayed, you can also access NetWare User Tools for MS Windows by creating a Program object in the MS Windows Program Manager with NWUSER.EXE. The NWUSER.EXE file is in the MS Windows SYSTEM directory for the NetWare Client software installation.

## Using NetWare User Tools for MS Windows

The NetWare User Tools for MS Windows provides you with graphical access to network resources and allows you to configure and customize your client workstation connections.

You can do the following with the NetWare User Tools for MS Windows:

- ◆ Manage drive mappings
- ◆ Manage printer connections and setup
- ◆ Manage server connections
- ◆ Send messages
- ◆ Modify client workstation settings
- ◆ Set the NetWare User Tools hotkey
- ◆ Change directory and file properties

## Using Quick Keys

Each Tool in the NetWare User Tools for MS Windows can be accessed by using quick keys. The available quick keys are listed in the following table.

**Table 3-1**  
**Quick Keys**

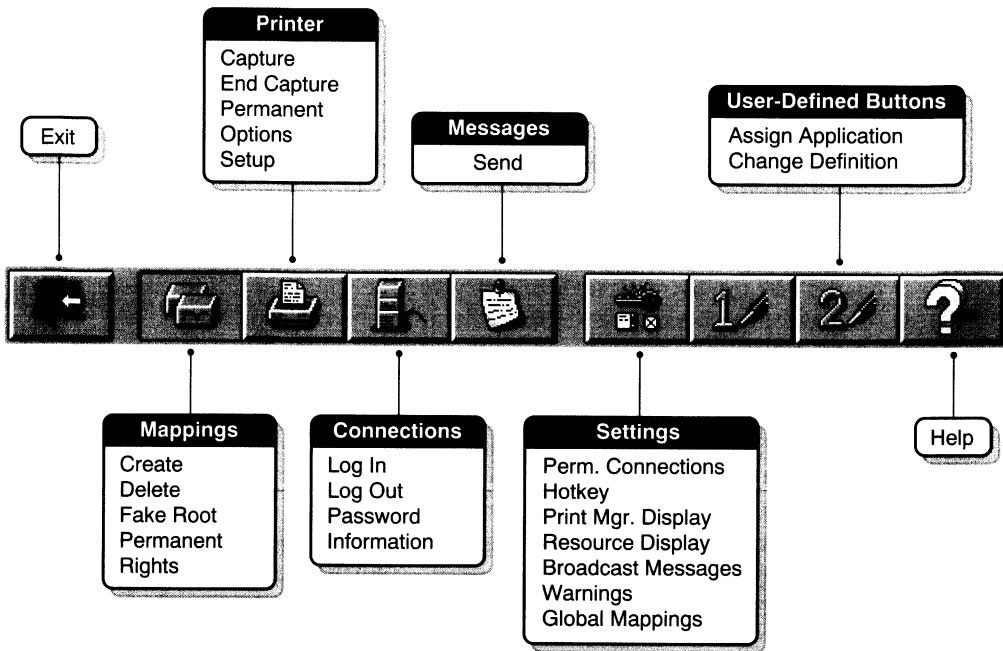
<b>Tool</b>	<b>Quick Key</b>
Exit	<Alt>+<X>
NetWare Drive Connections	<Alt>+<D>
NetWare Printer Connections	<Alt>+<P>
NetWare Connections	<Alt>+<C>
NetWare Send Messages	<Alt>+<M>
NetWare Settings	<Alt>+<S>
NetWare User Tools for MS Windows Help	<Alt>+<H>
User-Defined Button 1	<Alt>+<1>
User-Defined Button 2	<Alt>+<2>

## Using the Menu Bar

The menu bar (see Figure 3-2) shows menu options you can use. To complete a task, first choose the button that corresponds with the task or connection you are performing.



**Figure 3-2**  
**Menu Bar for NetWare User Tools for MS**  
**Windows**



Each time you select a menu option, the corresponding button depresses or a dialog box appears. If an option is grayed, that option is not active or available.

## Accessing Online Help

To see a list of commands and the procedures you can perform with NetWare User Tools for MS Windows, choose the “Help” button from the menu bar.

# Using NetWare User Tools for MS Windows Options

## NetWare Drive Connections

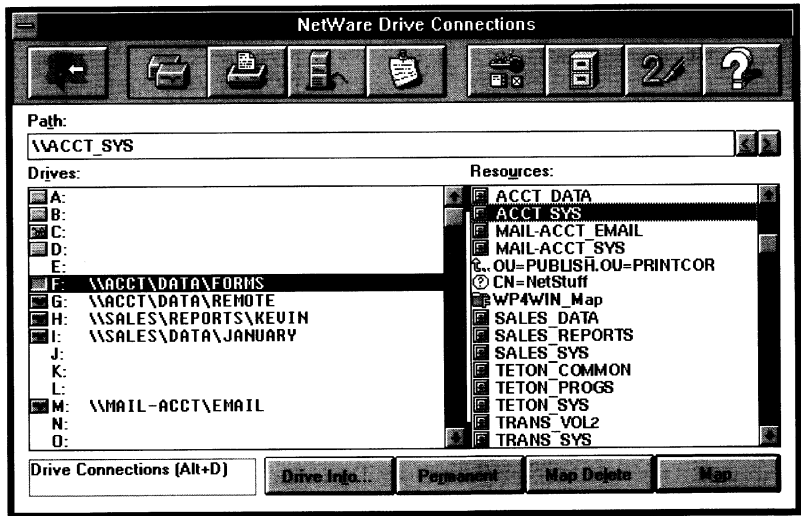
Use the “NetWare Drive Connections” window (see Figure 3-3) to map network resources in the Directory tree and file system to your client workstation drives.

Select the resource you want to connect to in the “Resources” list, and then choose a client workstation drive. Now, choose the “Map” button at the bottom of the window.

If you are using keyboard entry, type in the full path for the drive mapping inside the “Path” field and then choose “Map.”

For example, the following figure illustrates the drive mapping REPORTS\SYS\WORD to the client workstation drive P: using the “NetWare Drive Connections” option.

Figure 3-3  
“NetWare Drive Connections”  
Window



## Using the “NetWare Drive Connections” Window

When using this window, remember

- ◆ Before using “NetWare Drive Connections,” you must first log in to a Directory Services tree or server that contains the object you want to connect to.
- ◆ NetWare User Tools for MS Windows recognizes all drive mappings that existed before MS Windows was started.

However, when you are using a DOS Box inside MS Windows, your previous search drives are disabled unless the “Global Drives & Paths” box is checked in the “NetWare Setting” window.

- ◆ NetWare User Tools supports universal naming conventions (UNC) redirection for network volumes and directories. See “Using Universal Naming Convention (UNC) Paths in MS Windows” on page 211 for more information.
- ◆ The “Permanent” button allows you to specify a drive to reconnect at the startup of MS Windows.

## Viewing the “Resources” List

This list within the “NetWare Drive Connections” window contains the following:

- ◆ Volumes
- ◆ Directories
- ◆ NetWare Directory Services objects
- ◆ NetWare Directory Services containers

The volumes and directories are listed in a hierarchical structure. Choose the “Volume” icon in the “Resources” list to display subdirectories.

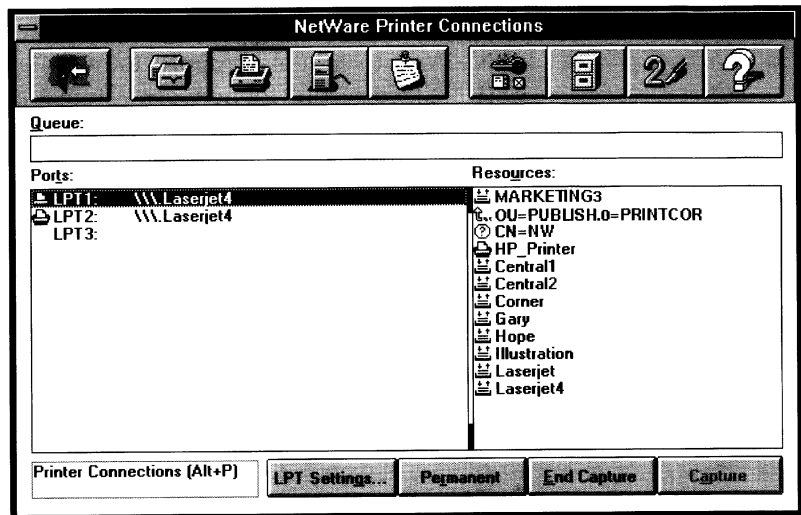
## NetWare Printer Connections

Use this window (see Figure 3-4) to capture network print queues to your client printing ports.

Select the resource you want to connect to in the “Resources” list, and then choose a client workstation port. Now, choose the “Capture” button at the bottom of the window.

If you are using keyboard entry, type in the full queue name for the port capture inside the “Queue” field and then choose “Capture.”

Figure 3-4  
“NetWare Printer  
Connections”  
Window



## Using the “NetWare Printer Connections” Window

When using this window, remember

- ◆ Before using “NetWare Printer Connections,” you must first log in to a server or Directory tree that contains the object you want to connect to.
- ◆ NetWare User Tools for MS Windows recognizes all print queue captures that existed before MS Windows was started.
- ◆ NetWare User Tools supports universal naming conventions (UNC) redirection for network print queues. See “Using Universal Naming Convention (UNC) Port Redirection in MS Windows” on page 231 for more information.
- ◆ The “Permanent” button allows you to specify a print queue to reconnect at the startup of MS Windows.

## Viewing the “Resources” List

This list within the “NetWare Printer Connections” window contains the following:

- ◆ Printer objects
- ◆ Print queue objects

## Setting LPT Options

Choose the “LPT Settings” button at the bottom of the “NetWare Printer Connections” window to access the “Printer Options for LPT” window.

The following table lists and explains the setting options that you can assign.

**Table 3-2**  
**LPT Setting Options**

<b>Option</b>	<b>Explanation</b>
Notify	Provides a confirmation of print job completion.
Formfeed	Places a page break between print jobs.
Copies	Specifies the number of copies to print.
Enable Tabs	Specifies the number of characters in a tab stop.
Enable Timeout	Specifies the amount of time before the print buffer is closed and the job is sent to a printer.
Enable Banner	Allows for a banner page to be printed at the front of your print job.
Form Name	Allows you to select a defined print form.
Auto Endcap	Specifies that the captured printing jobs be closed
Direct	(Personal NetWare only) Lets your print job bypass the print queue if there are no jobs resident.
Hold	Stops a print file from being sent to a queue.

To allow for more than three printer connections, see “Setting the Number of Available Printer Connections” on page 229 for more information.

If you are connecting to a NetWare 3 network, see *Print Server* for more information about each option.

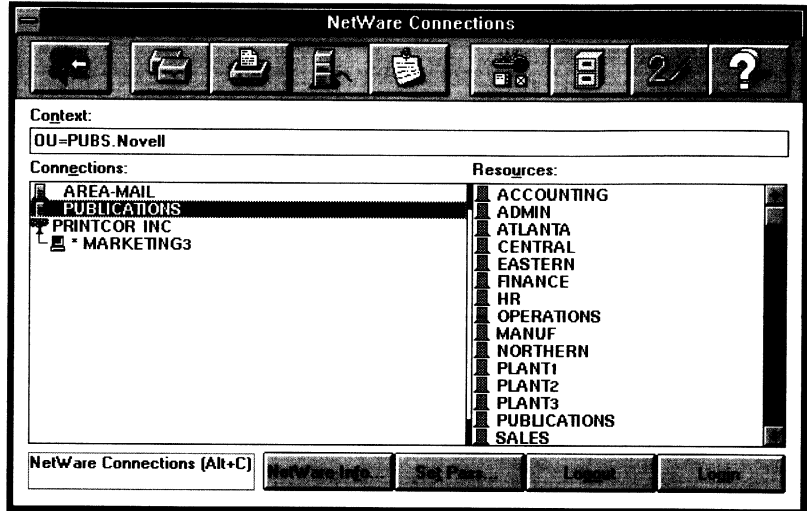
If you are connecting to a NetWare 4 network, see *Print Services* for more information about each option.

## NetWare Connections

Use the “NetWare Connections” window (see Figure 3-5) to connect to Directory trees and network servers.

Select the resource you want to connect to in the “Resources” list, and then choose the “Login” button at the bottom of the window.

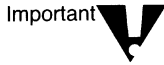
**Figure 3-5**  
**“NetWare**  
**Connections”**  
**Window**



## Using the “NetWare Connections” Window

When using this window, remember

- ◆ “NetWare Connections” can be used for connecting to Directory trees, to NetWare Server objects, or to bindery-based servers.



The “Login” option is the same as the LOGIN /NS command line parameter, which does not run a login script for your client workstation. Use the “Permanent” option in the “NetWare Drive Connections” window to set up your client workstation drive mappings.

If you want to run a login script, your initial login should be done at the command line with the LOGIN utility. Chapter 8, “Logging In from a NetWare Client Workstation,” on page 189 for details.

To attach to more than eight servers, you should add the CONNECTIONS parameter to the NetWare DOS Requester section in your NET.CFG file. See “CONNECTIONS=*number*” under “NetWare DOS Requester Option,” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information.

- ◆ If you are connected to a NetWare 4 network, log out of one Directory tree before logging in to another one.

### Viewing the “Resources” List

The resources displayed in this list within the “NetWare Connections” window depend on the type of network you are connected to. Your context within a Directory tree in NetWare 4 also influences what is being displayed.

The following are some of the possible resources that you can log in to:

- ◆ An Organization
- ◆ An Organizational Unit
- ◆ A NetWare Server Object
- ◆ A bindery server



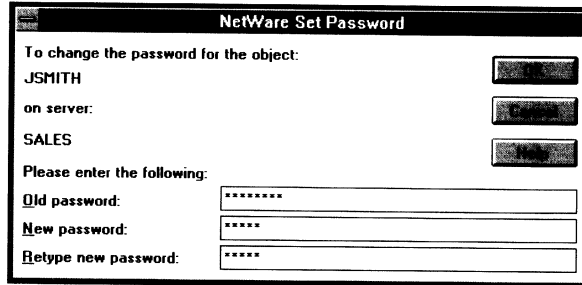
Use the NET.CFG file to set or change your starting context for NetWare 4 networks. See Chapter 2, “NET.CFG Options Reference,” in *NetWare Client for DOS and MS Windows Technical Reference* for more information.



## Setting a New Password

You can modify your existing password by using the “Set Pass” option in the “NetWare Connection” window. Choosing the “Set Pass” button displays a dialog similar to the one in the following figure.

**Figure 3-6**  
**“NetWare Set Password” Dialog**



The screenshot shows a dialog box titled "NetWare Set Password". It contains the following text and fields:

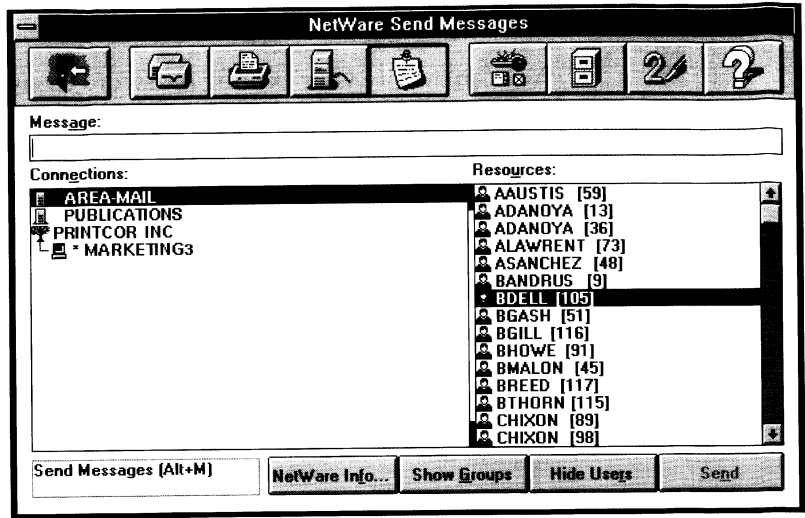
- "To change the password for the object:" followed by a text field containing "JSMITH".
- "on server:" followed by a text field containing "SALES".
- "Please enter the following:" followed by three password input fields:
  - "Old password:" with a field containing "\*\*\*\*\*".
  - "New password:" with a field containing "\*\*\*\*".
  - "Retype new password:" with a field containing "\*\*\*\*".

## NetWare Send Message

Use the “NetWare Send Message” window (see Figure 3-7) to send a message to a user or group of users on the network.

Select the resource you want to send a message to from the “Resources” list, type your message in the “Message” field, and then choose the “Send” button at the bottom of the window.

Figure 3-7  
“NetWare Send  
Message” Window



### Using the “NetWare Send Message” Window

When using this window, remember that you must first log in to a Directory Services tree or server that contains the object that you want to send a message to.

### Viewing the “Resources” List

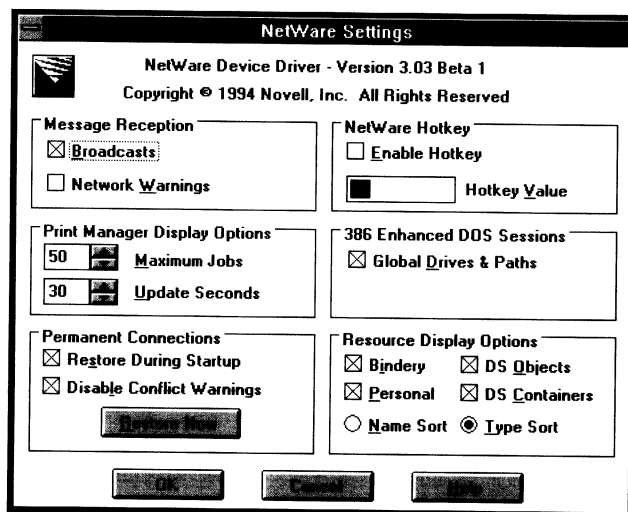
This list within the “NetWare Send Message” window contains users and groups.

Use the show or hide features (the buttons at the bottom of the window) to control the displayed resources in the “Resources” list.

## NetWare Settings

Use the “NetWare Settings” window (see Figure 3-8) to modify display options, message reception, and access to NetWare User Tools for MS Windows. Select the option you want to modify and choose “OK.”

**Figure 3-8**  
**“NetWare Settings”**  
**Window**



### Using the “NetWare Settings” Window

When using this window, remember

- ◆ The settings you choose in this window take effect each time you start MS Windows. These settings are retained in your NETWARE.INI, WIN.INI, and SYSTEM.INI files.
- ◆ NetWare User Tools for MS Windows recognizes the previous settings each time you start MS Windows.

## Using “NetWare Settings”

Use this window to

- ◆ Allow or block incoming messages
- ◆ Set display options
- ◆ Change the hotkey value for NetWare User Tools for MS Windows
- ◆ Allow for persistent connections

The following table lists and explains the setting options that you can assign.

**Table 3-3**  
**“NetWare Settings” Options**

Option	Explanation
Messages Reception	<p>“Broadcasts” allows you to block or receive messages sent to your client by other network stations and servers.</p> <p>By default, this box is checked so that you receive broadcast messages.</p> <p>If you block broadcast messages, all messages sent to your station are lost. You cannot retrieve them later.</p> <p>“Network Warnings” alerts you to the following network problems:</p> <ul style="list-style-type: none"><li>◆ The NetWare VLM is not loaded.</li><li>◆ Your DOS Requester configuration is not set up correctly.</li><li>◆ Memory is insufficient to load network support.</li></ul> <p>By default, this box is checked so you are notified of network problems.</p>

Table 3-3 *continued*

**“NetWare Settings” Options**

Option	Explanation
Print Manager Display	<p>Allows you to configure the look and content of your MS Windows Print Manager display. The following option settings are available:</p> <p>“Maximum Jobs” allows you to set the number of print jobs that can be stored in the Print Manager queue.</p> <ul style="list-style-type: none"><li>◆ Default: 50</li><li>◆ Maximum: 250</li><li>◆ Minimum: 1</li></ul> <p>“Update Seconds” allows you to select how often (in seconds) the Print Manager updates the Print Manager queue.</p> <ul style="list-style-type: none"><li>◆ Default: 30</li><li>◆ Maximum: 65</li><li>◆ Minimum: 1</li></ul>
Permanent Connections	<p>Prompts you to reconnect any network connection made in the previous session of MS Windows.</p> <ul style="list-style-type: none"><li>◆ “Restore During Startup” allows you to restore resource connections made permanent the next time you load MS Windows. Marking this option makes the “NetWare Restore Connections” window appear each time you load MS Windows.</li><li>◆ “Disable Conflict Warnings” allows you to restore resource connections that conflict with current connections made before loading MS Windows. Marking this option makes the “NetWare Restore Connections” window appear each time you load MS Windows.</li><li>◆ “Restore Now” allows you to restore resource connections after MS Windows is loaded and running.</li></ul>
NetWare Hotkey	<p>Mark the “Enable Hotkey” checkbox to activate the “Hotkey Value” field for editing.</p> <p>Specifies any hotkey value you want. The default hotkey is &lt;F6&gt;. The hotkey value for NetWare User Tools for MS Windows takes priority over any other system setting with the same value.</p>

Table 3-3 *continued*

**“NetWare Settings” Options**

Option	Explanation
386 Enhanced DOS Sessions	<p>“Global Drives and Paths” enables MS Windows to support global drive mappings and paths across multiple DOS box sessions.</p> <p>To enable global drive mapping support, add the following heading and command in the MS Windows SYSTEM.INI file:</p> <pre>[NETWARE] NWSharehandles=true</pre>
Resource Display	<ul style="list-style-type: none"><li>◆ “Bindery” displays available bindery servers in the “Resources” list.</li><li>◆ “Personal” displays available Personal NetWare servers in the “Resources” list.</li><li>◆ “DS Object” displays available NetWare Directory Services objects in the “Resources” list.</li><li>◆ “DS Containers” displays available NetWare Directory Services containers in the “Resources” list.</li><li>◆ “Name Sort” displays resources sorted by their name.</li><li>◆ “Type Sort” displays resources sorted by their type.</li></ul>

## User-Defined Buttons 1 and 2

The 1 and 2 buttons on the right side of the menu bar allow you to load additional programs within NetWare User Tools for MS Windows. This can be very useful for accessing the MS Windows File Manager and Print Manager applications.

### Setting the User-Defined Buttons

To define the user-defined buttons, complete the following steps.

#### Procedure



#### 1. Open the “User Defined Path” dialog.

You can open this dialog in either of the following two ways:

- ◆ If no previous path is defined, choose the 1 or 2 button or press <Alt>+<1> or <Alt>+<2>.
- ◆ If a previous path is defined, press <Alt>+<1> or <Alt>+<2>.

#### 2. Type the path and program filename in the “Command Line” field.

For example, to define the MS Windows File Manager to load from NetWare User Tools, you would type

**C:\windows\winfile.exe**

#### 3. Choose “OK.”

An icon for the particular application appears in the button bar.

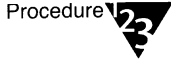
### Changing the User-Defined Path

Once a path is set, you need to use the quick key to access the “User Defined Path” dialog. (Press <Alt>+<1> or <Alt>+<2>.)

# Accessing and Changing Directory and File Attributes

Follow these steps to access and change network file and directory attributes.

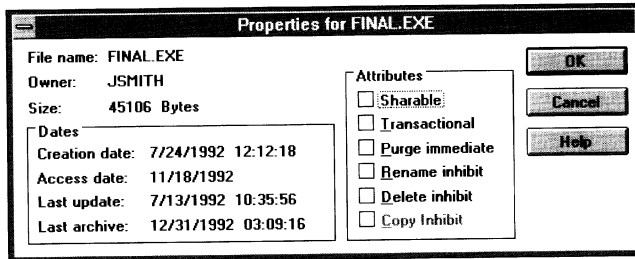
## Procedure



1. Open the MS Windows File Manager.
2. Select the file that you want to set attributes for.
3. From the "File" menu, choose "Properties."
4. From the "Properties" window, choose "NetWare."

The following figure shows the "Properties" window.

**Figure 3-9**  
**File and Directory**  
**"Properties"**  
**Window**



5. Select the appropriate check box to enable or disable an attribute.



## Using the “File and Directories Property” window

When using the “Properties” option, remember that you can set properties for *network* files and directories only. Properties for directories and files on local drives are set within the MS Windows File Manager.

The following table lists the attributes that you can assign.

**Table 3-4**  
**File and Directory Property Attributes**

Attribute	Explanation
Copy Inhibit	(Macintosh clients only) Prevents users from copying a file.
Delete Inhibit	Prevents users from deleting a file.
Purge Immediate	Notifies NetWare to purge a file when it is deleted.
Rename Inhibit	Prevents users from renaming a file.
Shareable	Allows users simultaneous access to a file.
Transactional	Indicates that a file is protected by the Transaction Tracking System™ software.

## Optimizing the NetWare Client Software for MS Windows

You can optimize the NetWare Client software for MS Windows under specific conditions by following a few simple procedures discussed in the following table:

**Table 3-5**  
**Optimizing the NetWare Client Software for MS Windows**

Condition	Explanation
Specifying to display parent dots in list boxes for file and directory navigation	<p>The NetWare server doesn't have directory entries for "." and ".." as DOS does.</p> <p>To see "." and ".." in directory listings, set the value for this parameter to "on." For example:</p> <p><b>SHOW DOTS=ON</b></p> <p>This parameter is supported only by NetWare 2.11 and later.</p>
Disabling the NetWare logo at MS Windows startup	<p>Add the following line to the NETWARE.INI file in the MS Windows directory:</p> <p><b>DISABLELOGO=ON</b></p>
Minimizing the NetWare User Tools window when not in use	<p>Use the following procedure to set up NetWare User Tools for minimizing when not in use:</p> <ol style="list-style-type: none"><li>1. Select the "NetWare User Tools" icon.</li><li>2. From the Program Manager "File" menu, choose "Properties."</li><li>3. Check the "Run Minimized" box and then choose "OK."</li><li>4. Open the "NetWare User Tools" window.</li><li>5. To minimize, choose the "Close" option from the "Control-menu" box.</li></ol>

# Exiting NetWare User Tools for MS Windows

To exit the NetWare User Tools for MS Windows, do one of the following:

- ◆ Choose the “Exit” button from the menu bar.
- ◆ Press <Alt>+<X> or <Alt>+<F4>.
- ◆ Choose the “System Menu” box (the box in the upper-left corner of NetWare User Tools for MS Windows). Choose “Close” from the menu that appears.

## Additional Information

### For NetWare 2 and NetWare 3

Topic	Reference
NetWare bindery	“Bindery” in <i>NetWare 3.12 Concepts</i>
NetWare drives	“Network Drive Mapping” in <i>NetWare 3.12 Concepts</i>
NetWare file system (directory structure)	“Directory Structure” in <i>NetWare 3.12 Concepts</i>
NetWare volumes	“Volume” in <i>NetWare 3.12 Concepts</i>
Network printing	“Printing” in <i>NetWare 3.12 Concepts</i>
Print queues	“Print queue” in <i>NetWare 3.12 Concepts</i>
Print servers	“Print server” in <i>NetWare 3.12 Concepts</i>
Printers	“Printers” in <i>NetWare 3.12 Concepts</i>

## For NetWare 4

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Topic	Reference
Directory tree	"Directory tree" in <i>NetWare 4 Concepts</i> Chapter 1, "Understanding NetWare Directory Services," in <i>Introduction to NetWare Directory Services</i>
NetWare Directory Services	Chapter 1, "Understanding NetWare Directory Services," in <i>Introduction to NetWare Directory Services</i>
NetWare drives	"Drive mapping" in <i>NetWare 4 Concepts</i>
NetWare file system (directory structure)	"Directory structure" in <i>NetWare 4 Concepts</i>
NetWare volumes	"Volume" in <i>NetWare 4 Concepts</i>
Network printing	"Printing" in <i>NetWare 4 Concepts</i>
Print queues	"Print queue" in <i>NetWare 4 Concepts</i>
Print servers	"Print server" in <i>NetWare 4 Concepts</i>
Printers	"Printer" in <i>NetWare 4 Concepts</i>

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# **Installation, Login, and Setup**

## **Overview**

The NetWare<sup>®</sup> Client<sup>™</sup> software allows you to connect to NetWare networks and servers running the NetWare 2, NetWare 3<sup>™</sup>, and NetWare 4<sup>™</sup> families of network operating systems as well as Personal NetWare<sup>™</sup> workgroups.

After you install a NetWare server, you can begin installing the NetWare Client software on client workstations. You need to install the NetWare client software on at least one client workstation to connect to the network or a server before you can begin creating users accounts, network directories, print queues, etc.

# Contents

This section is divided into seven chapters, with the following information discussed on the indicated pages:

<b>Purpose</b>	<b>Chapter</b>	<b>Page</b>
To help prepare the hardware, determine your network board settings, and prepare the client workstation software for installation of the NetWare Client software	Chapter 4, "Preparing to Install or Upgrade the NetWare Client Software"	75
To guide you through the steps for installing the NetWare Client software for DOS and MS Windows workstations. Also provides information about what happens during installation	Chapter 5, "Installing or Upgrading NetWare Client Software"	97
To help prepare the hardware and software necessary for installing diskless workstations on the network	Chapter 6, "Setting Up Remote Client Workstations"	147
To guide you through basic steps for modifying your NET.CFG file to simplify login to a NetWare network	Chapter 7, "Setting Up NetWare Client Workstations to Log In"	179
To provide procedures for logging in to the network from DOS and MS Windows	Chapter 8, "Logging In from a NetWare Client Workstation"	189
To set up files and network directories on client workstations	Chapter 9, "Setting Up and Managing Network Drives"	199
To set up printing on client workstations	Chapter 10, "Setting Up Client Workstation Printing"	217



chapter

# 4

## ***Preparing to Install or Upgrade the NetWare Client Software***

### **Overview**

This chapter explains the task you need to complete before running the NetWare® Client™ installation program or manually installing the NetWare Client software.

<b>Topic</b>	<b>Page</b>
Preparing Client Workstations	76
Preparing the NetWare Client Installation Software	83
Creating Client Installation Diskettes from CD-ROM	84
Setting Up for Installation from a Network Directory	86
Editing the INSTALL.CFG File	91
Using a Third-Party ODI LAN Driver	94
Upgrading Your IPX Driver to ODI	95

# Introduction

Proper preparation is important to the ease and success of your installation or upgrade. Preparation ensures that your hardware and software are configured properly and that you have the necessary information to successfully complete all of your client workstation installations or upgrades.

The complete hardware and software setup for client workstations might require you to complete one or more of the following tasks:

- ◆ Preparing Client Workstations
- ◆ Preparing the NetWare Client Installation Software
- ◆ Creating Client Installation Diskettes from CD-ROM
- ◆ Setting Up for Installation from a Network Directory
- ◆ Editing the INSTALL.CFG File

## Preparing Client Workstations

Preparing client workstations for installing or upgrading the NetWare Client software requires hardware and software setup on each client workstation that you want to use on the network.

The complete setup for preparing workstations requires the following:

- ◆ Setting Up Workstation Hardware
- ◆ Setting Up the Network Board
- ◆ Setting Up Workstation Software

If you are upgrading from a previous version of the NetWare Client software, your current workstation hardware and software configuration should be sufficient. See "Preparing the NetWare Client Installation Software" on page 83 to continue preparing for installation.

Otherwise, continue with the next section.



## Setting Up Workstation Hardware

The following checklist can help you determine what hardware setup you need for installing the NetWare Client software.



- An IBM PC (or compatible) with an XT\*, AT\*, 8088, 286, 386, or 486 (SX, SLC, DX, etc.) processor
- A hard drive or a floppy drive and diskette with the following amount of available disk space:
  - ◆ DOS only: 1.2 MB
  - ◆ DOS and MS Windows: 4 MB



The NetWare Client installation program sends an error message warning you that you have insufficient disk space if the total available disk space is below 5 MB when installing files for both DOS and MS Windows.

- A network board installed in your client workstation
  - ◆ Record the board settings to use during installation. See “Setting Up the Network Board” on page 78 for more information on how to determine and set the board settings.
  - ◆ For information on installing the network board, see the manufacturer’s documentation.
- Network cabling
  - ◆ Each type of network board requires unique cabling. See the manufacturer’s documentation packaged with your network board for requirements.
  - ◆ Token ring network boards require a cable connection to the MAU before installing the NetWare Client software. Otherwise, the NTR2000 driver will not load.
- (Optional) If you are installing a remote boot client workstation, a Novell® (or compatible) Remote Reset PROM inserted in each network board in all client workstations that will boot remotely.

See Chapter 6, “Setting Up Remote Client Workstations,” on page 147 for more information.

## Setting Up the Network Board

When you install the network board, it must be configured. Configuring the network board involves assigning particular values to certain settings on the board. These settings allow the network board to communicate with the workstation hardware and networking software.

In most cases, you should leave your network board set to the factory default settings. If you need to change the default settings, see the manufacturer's documentation.

Some network boards require you to configure the board by setting switches on the board manually, before you place it in the bus slot located in the motherboard of your workstation.

Other boards have a software program that allows you to configure the board after you have placed it inside your workstation.

See the manufacturer's documentation for information about configuring your particular network boards.

You can obtain setting information for your network board by using the following procedures.

<b>If you have</b>	<b>Then</b>
EISA or MCA network boards	Run the workstation's setup or reference program. This program lists the values for your network board settings.
ISA network boards	Look at the network board itself to obtain the specific settings. The documentation provided with your network board will direct you where to find each setting value.
PCI Local Bus network boards	Run the workstation's setup or reference program. This program lists the values for your network board settings.



If you have a network connection already, type "NVER" in the PUBLIC directory at the command line to view board settings.

It is important that you keep a record of the settings you use to configure the network boards, because the NetWare Client installation program requires specific information about the network board installed in each client workstation.

Before loading the client installation program, record the values for the following settings:

◆ Hardware interrupt

In most cases, you can use IRQ3 or IRQ5 for your network board if these are not already used by COM2 and LPT2. If neither IRQ3 nor IRQ5 is available, see the manufacturer's documentation.

The following table shows the IRQ settings that are commonly used by other devices, and the settings that might be available.

IRQ	Device	IRQ	Device
0	Timer output 0	8	Real time clock
1	Keyboard	9	Available
2	EGA/VGA	10	Available
3	COM2	11	Available
4	COM1	12	Available
5	LPT2	13	Co-processor
6	Diskette	14	Hard disk
7	LPT1	15	Available



If you specify an interrupt for the network board that is already being used by another device, you can still install the network board but the network software will not run successfully.

◆ Base I/O port

The base input/output port is a channel used by the network board to transfer information to the CPU. Each hardware device included in your client workstation must have a different base I/O port setting. For more information, see the manufacturer's documentation.

The following table shows a list of standard I/O ports and the devices that commonly use them. If a workstation does not have any one of these devices, the I/O port given in the table for that device might be available for other use.

I/O Port	Device	I/O Port	Device
1F0	AT disk controller	300	Available
200	Game controller/joystick (200-20F)	320	XT hard disk interface
220	Novell network keycard	340	Available
240	Available	360	LPT1 (378-37F)
260	LPT2 (278-27F)	380	SLDC/Sec Bi-Sync interface (380-38C)
280	LCD display on WYSE* 2108 PC	3A0	Primary Bi-Sync interface (3A0-3A9); Monochrome display (3B0-3BB)
2A0	Available	3C0	EGA display control (3C0-3CF); CGA display control (3D0-3DF)
2C0	Available	3E0	COM3 (3E8-3EF); Diskette controller (3F0-3F7); COM1 (3F8-3FF)
2E0	COM4 GPIB-Adapter 0 (2E1); COM2 Information collection from external devices		

#### ◆ Base Memory Address

The base memory address specifies the location in memory that the network board uses to exchange information across the network. It is also known as the RAM start address.

Some network boards do not use RAM; if your network board is one of these, you do not need to specify a value for this setting.

The base memory address often available for the network board is D800 (sometimes written as D8000).



If you use a memory manager (for example, EMM386 or QEMM\*), you might need to exclude this base memory address if the memory manager cannot detect automatically that the memory address is used by the network board.

#### ◆ Media frame type

All client workstations and servers using a single network address must use the same frame type. If you have a network connection already, read the frame type parameter for the LINK DRIVER option in your NET.CFG file.



In NetWare 2 and NetWare 3™, Novell Ethernet LAN drivers defaulted to the Ethernet 802.3 frame type. In NetWare 4™, the default frame type is 802.2 for Ethernet ODI LAN drivers.

If you use the Ethernet 802.2 frame type on client workstations, the workstations cannot connect to a network expecting the Ethernet 802.3 frame type. Place the frame types (Ethernet 802.2 and Ethernet 802.3) in the same order on both the server and client workstations to eliminate a potential conflict.

For information on frame types supported by common network board drivers, see “FRAME *frame\_type*” under “Link Driver Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference*.

#### ◆ Other settings

There are other parameters unique to the network board installed in your client workstation. See the documentation provided with your network board for more information.

For information on ODI LAN driver parameters for your network boards, see “Link Driver Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference*.

## Setting Up Workstation Software

Preparing workstation software requires setup on each client workstation that you want to use on the network.

If you are upgrading your client software from a previous version of the NetWare Client software, your current workstation hardware and software configuration should be sufficient. In this case, go to “Preparing the NetWare Client Installation Software” on page 83 to continue preparing for installation.

The following checklist can help you determine what preparations you need to make for installing the NetWare Client software.

Checklist



- A running copy of Novell DOS™ 7 or later, DR DOS® 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later.
- (Conditional: if using MS Windows) A copy of MS Windows 3.x or Windows for Workgroups (WFWG) 3.11 installed on your client workstation.
- (Optional) If you have DOS and MS Windows client workstations running an IPX.COM file generated by DOSGEN or SHGEN, upgrade your dedicated IPX driver to ODI. See “Upgrading Your IPX Driver to ODI” on page 95 for instructions.

# Preparing the NetWare Client Installation Software

Preparing the NetWare Client installation software depends greatly on the current state and condition of your client workstations and NetWare Client software packaging.

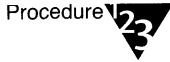
Complete one or more of the following tasks for preparing the installation software:

- ◆ If your client software is on CD-ROM, go to one of the following sections:
  - ◆ To prepare for installing a new client workstation from diskettes, see “Creating Client Installation Diskettes from CD-ROM” on page 84 for more information.
  - ◆ To prepare for installing existing client workstations from a network directory, see “Setting Up for Installation from a Network Directory” on page 86 for more information.
- ◆ If your client software is on diskette, see “Setting Up for Installation from a Network Directory” on page 86 to prepare for installing from a network directory.
- ◆ If your workstation is new and does not have any NetWare Client software installed, see Chapter 5, “Installing or Upgrading NetWare Client Software,” on page 97 to install to a new workstation.
- ◆ If you need to modify the installation configuration file for your particular network, see “Editing the INSTALL.CFG File” on page 91 for more information.
- ◆ If you are using a current copy of compatible third-party ODI LAN drivers, see “Using a Third-Party ODI LAN Driver” on page 94 for more information.

# Creating Client Installation Diskettes from CD-ROM

You can create client diskettes from a workstation either by using a CD-ROM drive connected directly to the workstation as a DOS device, or by mapping a drive to a server with the NetWare 4 *Operating System* CD-ROM mounted as a NetWare volume.

## Procedure



1. **Format four high-density diskettes using the DOS FORMAT command.**
2. **(Local workstation) Install the CD-ROM device according to manufacturer's instructions.**
  - 2a. **Go to the drive corresponding to the CD-ROM.**
  - 2b. **Change to the CLIENT\DOSWIN directory.**
  - 2c. **Go to Step 4.**
3. **(NetWare volume) If you set up the CD-ROM as a NetWare volume, complete the following steps:**
  - 3a. **Map a drive to *CD-ROM\_volume*:CLIENT\DOSWIN.**
  - 3b. **Change to the drive letter mapped to *CD-ROM\_volume*:CLIENT\DOSWIN.**
  - 3c. **Go to Step 4.**
4. **(Conditional: For NetWare 3.12 and 4 only. If you are installing for any other version, skip to Step 6.) Set the "nwlanguage" environment variable by typing the following at the command line:**

```
set nwlanguage=language <Enter>
```

Replace *language* with the appropriate language found in the NLS subdirectory under CLIENT\DOSWIN.



## 5. Type

**makedisk** *drive\_letter*: <Enter>

Replace *drive\_letter* with the diskette drive letter into which you are inserting the empty formatted diskettes. For example, type either

**makedisk a**: <Enter>

or

**makedisk b**: <Enter>

The MAKEDISK utility copies the NetWare Client installation files from the CD-ROM directory to the diskettes. It prompts you to insert new formatted diskettes as necessary.

## 6. Label each diskette with one of the following names:

Diskette Name	Volume Label
<i>NetWare Client for DOS and MS Windows Disk 1</i>	WSDOS_1
<i>NetWare Client for DOS and MS Windows Disk 2</i>	WSDOS_2
<i>NetWare Client for DOS and MS Windows Disk 3</i>	WSDOS_3
<i>NetWare Client for DOS and MS Windows Disk 4</i>	WSDOS_4
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers</i>	WSDOS_5

## 7. Either use the diskettes to install the NetWare Client software on your workstation or continue preparing the installation software by going to one of the following sections:

- ◆ To prepare for installing from a network directory, see “Setting Up for Installation from a Network Directory” on page 86 for more information.
- ◆ To modify the installation configuration file for your particular setup, see “Editing the INSTALL.CFG File” on page 91 for more information.
- ◆ To use the NetWare Client installation program, see Chapter 5, “Installing or Upgrading NetWare Client Software,” on page 97 for information.

# Setting Up for Installation from a Network Directory

Setting up a NetWare server for running the installation program from a network directory requires setup on an existing NetWare server and each client workstation you want to use on the network.

This section applies only to client workstations that already have a previous version of the NetWare Client software installed. If you are installing a new DOS or MS Windows client workstation, see “Editing the INSTALL.CFG File” on page 91 for more information.

The complete network setup for the client installation requires you to complete the following tasks:

- ◆ Copying NetWare Client Files to a Network Directory
- ◆ Mapping a Network Drive for Installation

## Prerequisites

The following checklist can help you set up a network server and your client workstation for installing the NetWare Client software from a network directory. It is the quickest and easiest way to upgrade your NetWare Client software.



- A previous version of the NetWare Client software must be running on your client workstations.
- A copy of the NetWare Client software for DOS and MS Windows must exist on a network server.

The NetWare server installation program has features to copy these files, which should be copied to the PUBLIC\CLIENT\DOSWIN directory on volume SYS:.

See “Copying NetWare Client Files to a Network Directory” on page 87 for more information.

- ❑ You must be logged in to a NetWare server.  
see Chapter 8, “Logging In from a NetWare Client Workstation,” on page 189 for more information.
- ❑ Your client workstation must have a drive mapped to the PUBLIC\CLIENT\DOSWIN directory on volume SYS:.  
See “Mapping a Network Drive for Installation” on page 90 for more information.

## Copying NetWare Client Files to a Network Directory

Depending on the media available, you can copy the NetWare Client software to a network directory in one of the following ways:

- ◆ Using the INSTALL.NLM at the NetWare Server
- ◆ Copying Directly from the CD-ROM
- ◆ Copying Directly from Diskettes

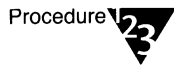
### Using the INSTALL.NLM at the NetWare Server

The NetWare Client software for DOS and MS Windows is usually copied to the PUBLIC directory during installation of NetWare 3.12 and NetWare 4™ servers. See “Copying Directly from the CD-ROM” on page 88 for other NetWare versions.

If you are connecting to a NetWare 3.12 server, see *Installation and Upgrade* for details on using the server installation program.

If you are connecting to a NetWare 4 network, see *Installation* for details on using the server installation program.

## Copying Directly from the CD-ROM

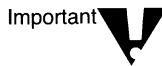


1. Make a subdirectory named **CLIENT\DOSWIN** under **SYS:PUBLIC** for the client files.
2. Install the CD-ROM drive as a DOS device according to manufacturer's instructions.
3. Copy files from the **CLIENT\DOSWIN** directory on the CD-ROM to **SYS:PUBLIC** by typing either

```
NCOPY source_drive:path destination_drive:path /s  
/e /c <Enter>
```

or

```
XCOPY source_drive:path destination_drive:path /s  
/e <Enter>
```



Do not use the DOS COPY command for this procedure. It is important that the directory structure within each subdirectory is maintained. Use the DOS XCOPY or NetWare NCOPY command to complete this procedure.

For example, type

```
NCOPY D:CLIENT\DOSWIN\ H:\PUBLIC\CLIENT\DOSWIN /s  
/e /c <Enter>
```

or

```
XCOPY D:CLIENT\DOSWIN\ H:\PUBLIC\CLIENT\DOSWIN /s  
/e <Enter>
```



You can also set up your CD-ROM drive as a volume on your network. This allows you to run the client installation programs directly from the subdirectories under **CLIENT** on the CD-ROM.

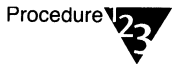
If you are connecting to a NetWare 3™ network, see *Installation and Upgrade* for information.

If you are connecting to a NetWare 4 network, see *Supervising the Network* for information.

**4. Continue preparing the installation program by going to one of the following sections:**

- ◆ To prepare for installing from a network directory, see “Mapping a Network Drive for Installation” on page 90 for more information.
- ◆ To modify the installation configuration file for your particular setup, see “Editing the INSTALL.CFG File” on page 91 for more information.

**Copying Directly from Diskettes**



- 1. Make a subdirectory called CLIENT\DOSWIN under SYS:PUBLIC for the client files.**
- 2. Copy the files from the following client diskettes to the CLIENT\DOSWIN directory:**

Diskette Name	Volume Label
<i>NetWare Client for DOS and MS Windows Disk 1</i>	WSDOS_1
<i>NetWare Client for DOS and MS Windows Disk 2</i>	WSDOS_2
<i>NetWare Client for DOS and MS Windows Disk 3</i>	WSDOS_3
<i>NetWare Client for DOS and MS Windows Disk 4</i>	WSDOS_4
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers</i>	WSDOS_5

**3. Type either**

```
NCOPY source_drive:path destination_drive:path /s  
/e /c <Enter>
```

or

```
XCOPY source_drive:path destination_drive:path /s  
/e <Enter>
```



Do not use the DOS COPY command for this procedure. It is important that the directory structure within each subdirectory is maintained. Use the DOS XCOPY or NetWare NCOPY command to complete this procedure.

For example, type

```
NCOPY A: H:\PUBLIC\CLIENT\DOSWIN /s /e /c <Enter>
```

or

```
XCOPY A: H:\PUBLIC\CLIENT\DOSWIN /s /e <Enter>
```

**4. Continue preparing the installation program by going to one of the following sections:**

- ◆ To prepare for installing from a network directory, see “Mapping a Network Drive for Installation” on page 90 for more information.
- ◆ To modify the installation configuration file for your particular setup, see “Editing the INSTALL.CFG File” on page 91 for more information.

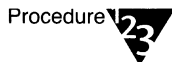
## Mapping a Network Drive for Installation

Map a drive to the volume and directory containing the NetWare Client files on each client workstation that you want to run the installation program on.

The volume and directory are SYS:PUBLIC\CLIENT\DOSWIN for DOS and MS Windows.

The following procedure shows you how to map a drive to the appropriate volume and directory.

### Procedure



**1. Map the next network drive to SYS:PUBLIC by typing**

```
MAP N SYS:PUBLIC <Enter>
```



This mapping might already be set up as a search drive in a login script for your client workstation. Use the MAP utility to view a list of existing drive mappings. If a drive mapping already exists for the SYS:PUBLIC directory, then proceed to Step 2.

**2. Change to the network drive that is mapped to the PUBLIC subdirectory.**

For example, if you mapped network drive G:, type

**G:** <Enter>

**3. Change to the CLIENT\DOSWIN directory under SYS:PUBLIC for the client files by typing**

**CD CLIENT\DOSWIN** <Enter>

**4. Either continue preparing the installation program or begin installing the client software by going to one of the following sections:**

- ◆ To modify the installation configuration file for your particular setup, see “Editing the INSTALL.CFG File” on page 91 for more information.
- ◆ To use the NetWare Client installation program, see Chapter 5, “Installing or Upgrading NetWare Client Software,” on page 97 for more information.

## Editing the INSTALL.CFG File

You can customize the installation program software for DOS and MS Windows to suit your particular networking environment. You should edit the [REQUESTER] section of the INSTALL.CFG file before installing the NetWare Client software on multiple client workstations with similar NET.CFG files.

The NET.CFG file is a configuration file that contains section headings and options that deviate from the established defaults of the NetWare Client software. Use entries in the NET.CFG file to change the client workstation’s network environment or configuration.

For more details on how to edit or create a NET.CFG file, see Chapter 2, “NET.CFG Options Reference,” in *NetWare Client for DOS and MS Windows Technical Reference*.

## Modifying the [REQUESTER] section in the INSTALL.CFG File

The INSTALL.CFG file is found on *NetWare Client for DOS and MS Windows Disk 1* at the root. The default configuration for the [REQUESTER] section includes a line for the FIRST NETWORK DRIVE and NETWARE PROTOCOL parameters only.

You need to edit the INSTALL.CFG file to add lines for other settings under the NetWare DOS Requester™ option heading.

A sample of the [REQUESTER] section in the INSTALL.CFG file is as follows:

```
[REQUESTER]
first network drive = f
netware protocol = nds bind
```

## Suggested Modifications to the [REQUESTER] Section

Make the following modifications for your particular network environment when applicable.

### Change in First Network Drive

In previous versions of the NetWare Client™ software, the first network drive was always the first drive letter not reserved for local use. This setting was made with the DOS LASTDRIVE parameter in the CONFIG.SYS file.

Because the NetWare DOS Requester™ software is a redirector on the back end of DOS, it requires that the LASTDRIVE=Z parameter be added to the CONFIG.SYS file. The first network drive is now set in the NET.CFG file.

See “FIRST NETWORK DRIVE” under “NetWare DOS Requester Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information.

The NetWare DOS Requester uses the first available DOS drive *after* the FIRST NETWORK DRIVE parameter set in the NET.CFG file.



Consequently, client workstations which accessed, for example, a LASTDRIVE=G parameter setting in their CONFIG.SYS are used to seeing drive H: as the first network drive rather than the first drive letter.

To maintain compatibility with existing batch files, you might want to add the FIRST NETWORK DRIVE = *drive\_letter* parameter setting under the NetWare DOS Requester heading in the NET.CFG file by typing the following lines in your INSTALL.CFG file:

```
[REQUESTER]  
  first network drive=drive_letter  
  netware protocol=nds bind
```

Otherwise, pre-existing batch files assuming a specific first drive letter, such as drive H:, must be altered.

## Upgrade of the NetWare DOS Requester

The NetWare Client installation program uses overlay files (.OVL) which are compliant to specific machine types using the %MACHINE variable. Most PC-based workstations already support this variable.

Nevertheless, if overlay files are unavailable for your machine type (such as many Japanese workstations), add a line for the "SHORT MACHINE TYPE" parameter for your type of client workstation.

For example, to specify the machine type for an IBM, you would place the following lines in your INSTALL.CFG file:

```
[REQUESTER]  
  short machine type=ibm
```



The maximum characters allowed in the name is four. See your hardware manufacturer for information about the short name for your hardware.

# Using a Third-Party ODI LAN Driver

The NetWare Client installation software includes drivers for most network boards. If an Open Data-Link Interface™ (ODI) LAN driver is not included for your network board, check the network board packaging for a diskette with a copy of the correct driver. Or contact the network board manufacturer to obtain a driver compatible with NetWare.

You will need a third-party ODI™ LAN driver for the network board installed in your client workstation if an MLID™ file is not provided with the NetWare Client installation software.



If you want to update the LAN driver list to include the third-party driver, you should copy any LAN drivers not currently available from Novell to the *NetWare Client for DOS and MS Windows ODI LAN Drivers* diskette. Copy both the .COM and .INS files for each driver.

## Upgrading Your IPX Driver to ODI

If your client workstations are using a dedicated IPX™ driver, you should upgrade to an Open Data-Link Interface (ODI) specification version.

An ODI version of IPX gives your client workstations greater functionality by supporting multiple communication protocols.

You can upgrade in two ways:

- ◆ Use the client installation program to upgrade during installation.
- ◆ If you have a copy of the NetWare 4 software package, use the WSUPGRD utility to upgrade your version of IPX *prior* to using the installation program. See Appendix B, “Using the WSUPGRD Utility,” on page 343 for more information.

Upgrading prior to installation makes a NetWare Client installation virtually automatic. The installation program recognizes network board settings from loaded LAN drivers which support ODI and prompts you to use the driver and settings it recognizes.

When you use WSUPGRD, your versions of IPX and LAN driver are updated automatically.



The virtual IPX driver for MS Windows (VIPX.386), does not fully support dedicated IPX in an MS Windows DOS box. If you want to run the NetWare Client software for MS Windows, you must upgrade to an ODI LAN driver and other software files compliant with ODI.

## Where to Go from Here

After your hardware and software are prepared, you are ready to begin installation. See Chapter 5, “Installing or Upgrading NetWare Client Software,” on page 97 to continue.





chapter

# 5

## ***Installing or Upgrading NetWare Client Software***

### **Overview**

This chapter explains the procedures for installing or upgrading the NetWare® Client™ software and gives a brief summary of what happens during installation.

<b>Topic</b>	<b>Page</b>
Running the NetWare Client Installation Program	99
What Happens during Installation	117
Installing for MS Windows for Workgroups	123
Setting Up an MS Windows Shared Network Directory for NETX and VLM Client Workstations	126
Installing Client Workstation Files Manually	129
Loading the NetWare Client Software	138
Using Two Network Boards	139

# Introduction

The NetWare Client installation program copies the NetWare DOS Requester™ and other NetWare Client software for DOS and Microsoft (MS) Windows to specified directories on each client workstation. It also provides procedures for editing configuration files for your operating environment to run on NetWare.

The NetWare DOS Requester and other core components of the NetWare Client software direct network requests from the client workstations to the network. After you install the NetWare Client software on your workstation, you can connect to a NetWare network and perform basic network tasks.

See Chapter 2, “Understanding the NetWare Client Software,” on page 23 to learn more about how the NetWare DOS Requester and other NetWare Client software works.

Installing or upgrading the NetWare Client software requires set up on each client workstation that you want to connect to and use with NetWare networks and servers.

The complete setup for client workstations that you want to upgrade or install as new requires you to complete the following tasks:

- ◆ Running the NetWare Client Installation Program
- ◆ (Conditional) Installing for MS Windows for Workgroups
- ◆ (Optional) Setting Up an MS Windows Shared Network Directory for NETX and VLM Client Workstations

# Running the NetWare Client Installation Program

DOS and MS Windows client workstations share the same installation program. To provide for this, the installation program runs within the DOS environment.

## Prerequisites

Review the following checklist to make sure you are prepared to install NetWare Client software.



- Close MS Windows before loading the installation program.  
The client installation program modifies some MS Windows files that are used when in MS Windows. Do not install from an MS Windows DOS Box.
- If you are installing from a network directory, make sure you have a drive mapped to SYS:PUBLIC.  
See "Mapping a Network Drive for Installation" on page 90 for details.
- If you are installing from diskettes, make sure you have working copies of the NetWare Client install disks.

Diskette Name	Volume Label
<i>NetWare Client for DOS and MS Windows Disk 1</i>	WSDOS_1
<i>NetWare Client for DOS and MS Windows Disk 2</i>	WSDOS_2
<i>NetWare Client for DOS and MS Windows Disk 3</i>	WSDOS_3
<i>NetWare Client for DOS and MS Windows Disk 4</i>	WSDOS_4
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers</i>	WSDOS_5

- (Conditional) If you want the installation program to display in a language other than English (the default), set a DOS environment variable for `NWLANGUAGE=preferred_language`.

Replace *preferred\_language* with one of the following languages:

- ◆ DEUTSCH
- ◆ ESPANOL
- ◆ FRANCAIS
- ◆ ITALIANO

For example, to specify Spanish as your preferred language, you would set `NWLANGUAGE=ESPANOL`.

## Loading the Installation Program

For brief instructions, see the Quick Reference Cards for DOS and MS Windows and the screen instructions to complete the installation.

For more detailed information, continue with this section, which explains the following installation tasks:

- ◆ Selecting a Destination Directory for the NetWare Client Files
- ◆ Updating System Files on Your Workstation
- ◆ Installing Support for MS Windows
- ◆ Configuring the Target Service Agent (TSA) Software for a Storage Management Services (SMS) Program
- ◆ Installing LAN Drivers
- ◆ Copying Files

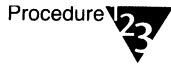
Suggestion



Take advantage of the useful hints about the installation program that are provided at the bottom of the screen.



## Procedure



1. Follow the appropriate set of steps to load the installation program:

Installing from Diskettes	Installing from a Network Directory
<ol style="list-style-type: none"><li>1. Insert <i>NetWare Client for DOS and MS Windows Disk 1</i> into a disk drive.</li><li>2. Change to the letter of the floppy drive that contains the diskette.  For example, type  <b>A:</b> &lt;Enter&gt;</li><li>3. Type  <b>INSTALL</b> &lt;Enter&gt;</li><li>4. Follow the instructions on your screen.</li></ol>	<ol style="list-style-type: none"><li>1. From the SYS:PUBLIC directory, change to the CLIENT\DOSWIN subdirectory.  For example, type  <b>CD CLIENT\DOSWIN</b> &lt;Enter&gt;</li><li>2. Type  <b>INSTALL</b> &lt;Enter&gt;</li><li>3. Follow the instructions on your screen.</li></ol>

The following figure shows an example of the opening screen in the installation program.

Figure 5-1  
Installation Program Opening Screen

```
NetWare Client Install v.90          Thursday August 18, 1994 11:32am
1. Enter the destination directory:
   C:\NWCLIENT
2. Install will modify your DOS configuration files and make
   backups. Allow changes? (Y/N): Yes
3. Install support for MS Windows? (Y/N): Yes
   Enter MS Windows directory: C:\WINDOWS
   Highlight here and Press <Enter> to customize.
4. Configure your workstation for back up by a NetWare server
   running software such as SBACKUP? (Y/N): No
5. Select the driver for your network board.
   Highlight here and press <Enter> to see list.
6. Highlight here and press <Enter> to install.

Install will add this path to AUTOEXEC.BAT if you allow changes to the DOS
configuration files.
Esc=Go Back  Enter=Edit/Select          Alt-F10=Exit
```

## Selecting a Destination Directory for the NetWare Client Files

The installation program searches for the path to any existing copy of the VLM.EXE file. If the VLM.EXE file does not exist, the installation program automatically assigns the default path C:\NWCLIENT.

If another version of the NetWare Client software is running in a different directory, replace the default with the path to that directory (see the following procedure). Otherwise, accept the default path.

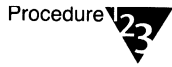


Note The client software included with this installation program is universal to all versions of NetWare.

You will not damage any previous installation of the NetWare Client software by installing this software to the default directory, even if the software already exists in another directory.

## Procedure

To change the directory path of the new NetWare Client software, follow these steps:



- 1. Select the directory path field in Step 1 on the installation program opening screen and press <Enter>.**

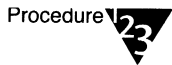
A blinking cursor appears at the end of the path statement in the field.

- 2. Edit the field for your specific target directory and press <Enter>.**

The installation program automatically jumps to Step 2 on the screen (which is explained in the procedure on page 103).

## Updating System Files on Your Workstation

To allow for changes to be made to your AUTOEXEC.BAT and CONFIG.SYS files, follow these steps:



- 1. Select the “Allow Changes? (Y/N)” field in Step 2 on the installation program opening screen and press <Enter>.**

A blinking cursor appears at the end of the path statement in the field.

- 2. To continue type “Y” or “N” and then press <Enter>.**

The installation program automatically jumps to Step 3 on the screen (which is explained on pages 106 and 107).

If you allow for changes, the original system files are saved as AUTOEXEC.BNW and CONFIG.BNW.

If you do not allow for automatic changes to these files during installation, a copy of the necessary changes is saved to the destination directory (NetWare Client directory). The files are named CONFIG.NEW and AUTOEXEC.NEW.

You will be required to make these changes manually after the installation. (See “Creating or Modifying Configuration Files” on page 134 for more information.)



If previous versions of CONFIG.NEW and AUTOEXEC.NEW exist, the installation program overwrites them with the newer information.

You are prompted before any system files set as read-only are copied over. If you choose not to write over the read-only files, the installation program tries to save the files as CONFIG.NEW and AUTOEXEC.NEW files. If these .NEW files already exist and are set as read-only, then the installation program does not save changes to any file.

### **Changes Made to Your AUTOEXEC.BAT File**

Your path statement is modified to add the NetWare Client directory and a line is added to call the start-network batch file from the same directory.

For example, if your NetWare Client directory is NWCLIENT, the modification appears as follows:

```
@CALL C:\NWCLIENT\STARTNET.BAT  
PATH=C:\NWCLIENT;%PATH%
```

### **Changes Made to Your CONFIG.SYS File**

Two line are added to your client workstation's CONFIG.SYS file to set the LASTDRIVE and FILES setting. The modification appears as follows:

```
FILES = 40  
LASTDRIVE = Z
```

The FILES command is added only if the FILES setting is lower than 40 or does not previously exist.

## Installing Support for MS Windows

The installation program copies the necessary files for running Microsoft (MS) Windows on your client workstation. The default path is set to C:\WINDOWS unless the WIN.COM file is found in the DOS PATH. If the WIN.COM file is not found in the PATH, then the default setting is no MS Windows support.

Accept the default path unless you are running one of the following:

- ◆ MS Windows from a different local directory

See “Modifying MS Windows Configuration Files on a Local Directory” on page 106 for more information.

- ◆ MS Windows from a shared network directory

This option is available to network supervisors only.

See “Modifying MS Windows Configuration Files on a Network Directory” on page 107 for more information.

See “Setting Up an MS Windows Shared Network Directory for NETX and VLM Client Workstations” on page 126 for more information.

- ◆ MS Windows from a network directory

This option is for updating users’ personal areas.

See “Modifying MS Windows Configuration Files on a Network Directory” on page 107 for more information.

- ◆ MS Windows for Workgroups

See “Installing for MS Windows for Workgroups” on page 123 for more information.



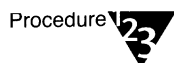
The NetWare Client software for MS Windows is not compatible with the client software for NetWare provided by Microsoft.

If you install MS Windows after installing the NetWare Client software, make sure to neither copy over any NetWare Client software files nor to install the NetWare networking software provided by MS Windows.

## Modifying MS Windows Configuration Files on a Local Directory

To change the directory path of your MS Windows directory for the new NetWare Client software, follow these steps:

### Procedure



1. Select the “Do you wish to install support for MS Windows? (Y/N)” field in Step 3 on the installation program opening screen and press <Enter>.

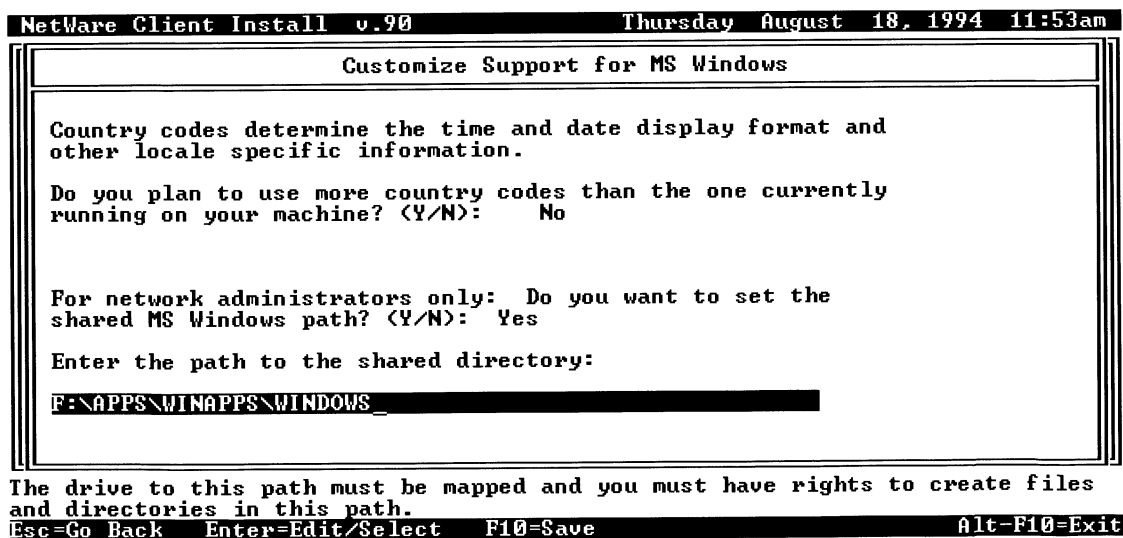
You must type “Y” before pressing <Enter>.

2. Select the “Windows Subdirectory” field in Step 3 on the screen and press <Enter>.

A blinking cursor appears at the end of the path statement in the field.

3. Edit the field by entering your specific MS Windows directory name and press <Enter>.

Figure 5-2  
“Customize  
Support for MS  
Windows” Screen



The installation program jumps to the customize option for MS Windows. Press <Enter> if you want to install multiple country codes for determining the date, time, and locale of client workstations other than the locale you currently have loaded.

The installation program queries the system to determine which locale and country is active and copies only the necessary Unicode\* tables.

**4. To continue type “Y” or “N” and then press <Enter>.**

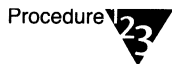
If you type “Y,” the “Customize Support for MS Windows” screen appears.

## Modifying MS Windows Configuration Files on a Network Directory

You must have appropriate rights to the network directory for MS Windows.

To modify MS Windows configuration files on a network directory, follow these steps:

### Procedure



**1. Select the “Do you wish to install support for MS Windows? (Y/N)” field in Step 3 on the installation program opening screen and press <Enter>.**

**2. Edit the field by typing “Y” and press <Enter>.**

The installation program jumps to the “Enter MS Windows directory” field. Skip this option and continue unless you also want to update a personal network copy of MS Windows.

**3. Select the “Highlight here and press <Enter> to customize” option and press <Enter>.**

**4. Select the “For the Network Administrator only: Do you want to set the shared MS Windows path? (Y/N)” field on the screen and press <Enter>.**

A blinking cursor appears at the end of the path statement in the field.

**5. To continue type “Y” or “N” and then press <Enter>.**

If you type “Y,” the “Enter the path to the shared directory:” screen appears.



You must have network supervisor rights and a drive mapped to the location of the shared MS Windows directory to install for a shared copy.

**6. Edit the field by entering the specific network MS Windows directory name and press <Enter>.**



Because of the architectural differences between the current NetWare DOS Requester and the previous NetWare Shell software (NETX), the NETWORK.DRV and NETWORK.HLP files for both client software types are incompatible.

Before installing the NetWare Client software for MS Windows to a shared directory, create a new directory, such as “NETXDRV,” in the shared MS Windows System directory. Then, copy the previous NETWORK.DRV and NETWORK.HLP files that support the NetWare Shell software (NETX) to the NETXDRV subdirectory.

Following installation of the NetWare Client software to a shared MS Windows directory, add or make the following modification to the [boot] heading in the SYSTEM.INI file for each individual client workstation running the NetWare Shell software (NETX):

Replace the line

**network.drv=netware.drv**

with

**network.drv=\*shared\_MS\_Windows\_directory\netxdrv\  
netware.drv**

For example:

**network.drv=\*f:apps\winsys\netxdrv\netware.drv**

Ensure that the necessary changes to the MS Windows .INI files were made (See “MS Windows Configuration Files Are Modified” on page 119 for more information).

For details on where the SYSTEM directory and .INI files are located, see “Loading MS Windows onto the Network,” in Chapter 2 of *NetWare 4 Supervising the Network*.



## Configuring the Target Service Agent (TSA) Software for a Storage Management Services (SMS) Program

Configuring the TSA software on client workstations allows SMS™ architecture-based utilities (such as the NetWare SBACKUP utility or the NetWare Navigator™ utility) access to workstation resources for centralized control on the network.

### Target Service Agent (TSA)

This is a program that processes data moving between a specific target and Storage Management Services™ (SMS) applications, such as SBACKUP or NetWare Navigator.

The SMS application, running on the host, sends requests to the TSA, which

- ◆ Receives commands from the SMS application and processes them so that the target operating system can handle the request for data processing
- ◆ Passes the data request from the SMS application to the target
- ◆ Receives the requested data from the target and returns it to the SMS application in standard SMS format

Servers and client workstations running different software releases, or using different operating systems, require TSAs that are compatible with NetWare in order to communicate with SMS applications approved to work with NetWare.

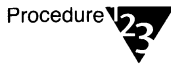
See Chapter 17, “Setting Up the Target Service Agent (TSA) Software,” on page 307 for a complete description of Target Service Agents.

### Storage Management Services (SMS)

These are services that allow data to be backed up and restored. SMS is independent of backup/restore hardware and file systems (such as DOS, OS/2\*, Macintosh, MS Windows, or UNIX®).

## Procedure

To configure a TSA for SMS on your client workstations, follow these steps:



1. Select the “Configure your workstation for backup by a NetWare server running software such as SBackup? (Y/N):” field in Step 4 on the installation program opening screen and press <Enter>.

A blinking cursor appears at the end of the path statement in the field. T

2. To continue type “Y” or “N” and then press <Enter>.

If you type “Y,” the “Configure Target Service Agent for Storage Management Services” window appears.

Figure 5-3  
“Configuring TSA  
for SMS” Screen

```
NetWare Client Install v.90          Thursday August 18, 1994 11:55am
+-----+
| Configure Target Service Agent <TSA> for Storage Management Services <SMS> |
+-----+
| Enter the SMS server name: |
|   SERVER1                 |
| Enter a name for your workstation: |
|   MKT_1045                |
| Enter an optional password: |
|   <Press <Enter> to change.> |
| Set the number <1 - 30> of buffers available for file transfer: 1 |
| Highlight and press <Enter> to select drives. |
+-----+
This is the server that runs the TSA_SMS.NLM for SBACKUP software.
Esc=Exit  Enter=Edit/Select  F10=Save  Alt-F10=Exit
```

### 3. Make any of the following modifications:

- ◆ Entering the SMS Server Name  
Specifies the name of the server you want a client workstation to connect to for management by an SMS application.
- ◆ Entering a Name for Your Workstation  
Sets the client workstation's unique name. The maximum is 48 characters and the minimum is one. You need to specify this option only after the NetWare Directory Services™ software for NetWare 4™ networks has been initialized (or reinitialized) on a server.
- ◆ Entering an Optional Password  
Sets a password for the client workstation. If you use this option, it must be unique and the network supervisor managing the client workstation backup must know it.
- ◆ Setting the Number of Buffers Available for File Transfer  
Sets the TSA 1KB buffers (*number* = 2 through 30). The default is 1. Increasing the number increases throughput speed, but requires more RAM on the client workstation.
- ◆ Selecting a Drive Letter  
Indicates the DOS hard drives where data resides that you want to back up, or the drives where you want to restore data to.  
  
A list of available drives appears when you choose this option. Select the hard drives you want backed up.

For specific details about setting up the TSA software, see Chapter 17, "Setting Up the Target Service Agent (TSA) Software," on page 307.

### 4. Do one of the following:

- ◆ Save changes and exit by pressing <F10>.
- ◆ Return to the main menu by pressing <Esc>.

If changes were made to any field within the TSA configuration window, you are prompted to save or abandon them.

The installation program automatically jumps to Step 5 on the installation program opening screen (which is explained in the procedure on page 114).

## Installing LAN Drivers

*LAN driver* software serves as the link between workstations' operating systems and the network.

A *network board* in your client workstation allows it to communicate with the NetWare server.

The NetWare Client software can support additional network boards and LAN drivers in a client workstation. See "Using Two Network Boards" on page 139 for information and procedures.

All communication on the network consists of *packets* of information being sent between client workstations and servers through network boards and cabling.

There are different kinds of packets, distinguished from each other by the order and type of information in the packet. Each kind of packet has its own definition, called a *frame type*.

Servers and client workstations must be configured to use the same frame types in order to communicate with each other.

Routers must also support the same frame types as the servers and workstations, or packets will not be routed correctly. This will disrupt communication—and if your client workstation does get a connection, it will likely fail.

In NetWare 2 and NetWare 3™ software, Ethernet drivers default to the old Ethernet 802.3 frame type. In NetWare 4 and NetWare Client Kits for DOS and MS Windows, they default to the new Ethernet 802.2 frame type.

Some routers on your network might not support the new Ethernet 802.2 frame type. Your client workstation cannot connect to a network expecting the old Ethernet 802.3 default if you are using the new Ethernet 802.2 default.

To eliminate problems due to conflicting default frame settings, you can define both Ethernet 802.2 and Ethernet 802.3 on your workstation or server.

Define frame types for your client workstation in the NET.CFG file. Include lines similar to the following, replacing *ne2000* with the name of your specific ODI™ LAN driver:

```
link driver ne2000  
  frame ethernet_802.3  
  frame ethernet_802.2
```

The first frame type defined is the only one used for the initial “Get Nearest Server” request.

Therefore, if you have any servers using only one frame type, list that frame type first. This allows your client workstation to make a default connection to those servers.

For information on ODI LAN driver parameters for your network boards, see “Link Driver Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference*.

### **Prerequisite**

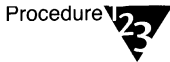
Checklist



- Make sure that the network board you installed is supported by NetWare or includes a driver compatible with NetWare.

The NetWare Client installation software supports a majority of network boards. The following procedure table can help you with installing your particular network board LAN driver.

## Procedure



### 1. Complete the appropriate procedure to install a driver for the particular type of network board you are using.

These procedures correspond with Step 5 on the installation program opening screen (see Figure 5-1 on page 102).

Network Board Type	Procedure
<p>Supported by NetWare and displayed in the list</p> <p>(ODI LAN drivers only. Use an existing LAN driver for network boards with dedicated IPX™ drivers only.</p> <p>Select the “Other drivers” option in the “Network Board” menu and direct the installation program to the path where the driver is located.)</p>	<ol style="list-style-type: none"><li>1. Press &lt;Enter&gt; to select a LAN driver from the <i>NetWare Client for DOS and MS Windows Disk 1</i>.</li><li>If prompted, replace the current diskette with the <i>NetWare Client for DOS and MS Windows ODI LAN Drivers</i>.</li><li>2. Display the list by pressing &lt;Enter&gt; again.</li><li>3. Move through the list by using the arrow keys or the PgDn key.</li><li>4. Select the driver you want to install and press &lt;Enter&gt;.</li></ol>
<p>Supported by NetWare but not displayed in the list</p> <p>(If you are using dedicated IPX LAN drivers, replace with the appropriate ODI LAN driver for your network board.</p> <p>Select the “Other drivers” option in the “Network Board” menu and direct the installation program to the path where the driver is located.)</p>	<ol style="list-style-type: none"><li>1. Press &lt;Enter&gt; and then replace <i>NetWare Client for DOS and MS Windows Disk 1</i> with the driver diskette that was included in your network board kit.</li><li>2. Display the list by pressing &lt;Enter&gt; again.</li><li>3. Move through the list by using the arrow keys or the PgDn key.</li><li>4. Select the driver you want to install and press &lt;Enter&gt;.</li></ol>

A box appears, prompting you to modify the value settings for your network board. The following are some of the main options available:

- ◆ Base I/O port
- ◆ Hardware interrupts
- ◆ Media frame type

There are numerous other options available, depending on your network board type and driver.

Refer to the help at the bottom of the installation program screen for information about an appropriate value setting for each option.



If you are unsure of your client workstation's network board settings, refer to your records or accept the default settings.

If your LAN driver does not load at startup, ensure that the parameter settings for the Link Driver section of the NET.CFG file match the network board hardware settings.

## Copying Files

The installation program copies the core NetWare Client software and other files to the destination directory you selected in Step 1 on the installation program opening screen.

## Swapping Diskettes

When installing the LAN driver from a floppy diskette in the same drive as the destination drive (such as drive A: to A:), enter a different drive (such as drive B:) when the program prompts you to enter the letter for the source drive where the LAN drivers will be copied from.

This causes DOS to recognize drive A: as drive B: and to prompt you to insert the driver diskette without disrupting the process of the installation program.

## Replacing Older Files

### Existing Files

The installation program might prompt you to make decisions about replacing or not replacing existing files.

If you choose to not replace an existing file, your installation might not be successful.

### Read-Only Files

The installation program might prompt you to make decisions about replacing or not replacing read-only configuration files.

If you do not allow for automatic changes to these files during installation, a copy of the necessary changes is saved to the files with a .NEW extension (for example, C:\WINDOWS\SYSTEM.NEW).

You will be required to make these changes manually after the installation. (See "Creating or Modifying Configuration Files" on page 134 for more information.)

If a read-only .NEW file by that name already exists and you do not chose the allow the installation program to write over it, the installation program does not save the changes to a file.



# What Happens during Installation

The following events happen when you install the NetWare Client software.

## A Directory Is Created

A directory is created for the DOS client files according to the target directory specified during installation.

If you are installing for Microsoft (MS) Windows, the MS Windows client files are copied to the specified MS Windows directory. (The default is C:\NWCLIENT for DOS and C:\WINDOWS for MS Windows unless the installation program finds a copy of the VLM.EXE and WIN.COM files in a different location.)

## Files Are Copied

All NetWare Client files for DOS and MS Windows are copied to the directories specified during installation.

Five kinds of files are copied:

- ◆ NetWare User Tools for DOS and MS Windows
- ◆ Virtual Loadable Module™ (VLM) program files
- ◆ VLM™ Manager
- ◆ LAN drivers
- ◆ Unicode tables with corresponding code pages and country codes
- ◆ MS Windows Dynamic Link Library (DLL) files

## DOS and NetWare Configuration Files Are Created or Modified

### CONFIG.SYS and AUTOEXEC.BAT

If you allowed the installation program to modify your system configuration files, then the previous version of your client workstation's CONFIG.SYS and AUTOEXEC.BAT files are automatically saved as CONFIG.BNW and AUTOEXEC.BNW. If these specific .BNW files already exist, then they are overwritten.

If no previous versions of the AUTOEXEC.BAT and CONFIG.SYS files existed, new files are created for you.

The lines **LASTDRIVE=Z** and **FILES=40** are added to the CONFIG.SYS file.

The lines **@CALL drive:\NetWare\_Client\_directory\STARTNET** and **PATH=NetWare\_Client\_directory/%PATH%** are added to the AUTOEXEC.BAT file.

### STARTNET.BAT

The installation program creates a file called STARTNET.BAT in the target directory you specified.

The file contains the following lines, which load the core NetWare Client software:

```
SET NWLANGUAGE=preferred_language  
C:\NetWare_Client_directory\LSL.COM  
C:\NetWare_Client_directory\LAN_driver.COM  
C:\NetWare_Client_directory\IPXODI.COM  
C:\NetWare_Client_directory\VLM.EXE
```

If you installed the TSA software for allowing the client workstation to be backed up from a server, a line for the TSASMS.COM file would be added after the line that loads the VLM.EXE file.

## **NET.CFG**

The installation program reads the existing NET.CFG file or creates a new one if one does not exist in order to set a configuration for the network board installed in your client workstation. Your old NET.CFG file is saved as NET.BNW.

The following is an example of a NET.CFG file for a Novell® NE2000™ Ethernet board:

```
LINK DRIVER NE2000  
PORT 300  
INT 3  
FRAME ETHERNET_802.2  
  
NETWARE DOS REQUESTER  
NETWARE PROTOCOL = NDS BIND  
FIRST NETWORK DRIVE = F
```

## **MS Windows Configuration Files Are Modified**

When you select “Install Support for MS Windows” in Step 3 of the NetWare Client installation program (illustrated in Figure 5-1 on page 102), the installation program makes changes to your SYSTEM.INI, WIN.INI, and PROGMAN.INI files.

## SYSTEM.INI

The installation program adds or makes the following modifications to the SYSTEM.INI file:

### [boot]

- ◆ The line **network.drv=** is replaced by **network.drv=netware.drv**.

If you are installing for Windows for Workgroups (WFWG), the following modification is made:

- ◆ The line **secondnet.drv=** is replaced by **secondnet.drv=netware.drv**.

This loads NetWare User Tools driver when MS Windows is loaded.

The user interface for the NETWARE.DRV file is the NWUSER.EXE file.



### [boot.description]

- ◆ The line **network.drv=** is replaced by **network.drv=NetWare (vx.x)**.

- ◆ If you are installing for Windows for Workgroups (WFWG), the following modification is made:

The line **secondnet.drv=** is replaced by **secondnet.drv=Novell NetWare (workstation shell 4.0 and above)**.

This notifies MS Windows Setup of the NetWare device version you are using.

## [Network]

- ◆ If you are installing for Windows for Workgroups (WFWG), the following modification is made:

The line **winnet=** is replaced by **winnet=novell/00040000**.

This specifies the type of network and version used with WFWG.

- ◆ The line **multinet=** is appended to appear as **multinet=NetWare4**.

This identifies other network operating systems running on the network.

## [386Enh]

- ◆ The line **network=dosnet** is replaced by **network=\*vnetbios;vipx.386;vnetware.386**.

This specifies the type of network used with MS Windows 386 enhanced mode.

- ◆ The line **TimerCriticalSection=** is replaced by **TimerCriticalSection=1000**.

NetWare uses this setting to ensure that network traffic on your client runs smoothly.

- ◆ The line **OverlappedIO=** is replaced by **OverlappedIO=OFF**.

This specifies that virtual machines cannot issue a request to read or write to a disk until any previous read and write requests have been completed.

- ◆ The line **PSPIncrement=** is replaced by **PSPIncrement=5**.

This specifies the amount of additional memory, in 16-byte increments, that MS Windows should reserve in each successive virtual machine.

This setting requires that **UniqueDOSPSP=ON**.

- ◆ The line **ReflectDOSInt2A=** is replaced by **ReflectDOSInt2A=True**.

This specifies that MS Windows will pass on INT 2A signals to the NetWare Client software.

- ◆ The line **UniqueDOSPSP=** is replaced by **UniqueDOSPSP=True**.

This specifies MS Windows should start every application at a new memory address.

## WIN.INI

The installation program adds or makes the following modifications to the WIN.INI file:

### [windows]

The line **load=** is replaced by **load=nwpopup.exe**.

This causes MS Windows to run the NetWare User Tools application as an icon when MS Windows is loaded.

## PROGMAN.INI

The installation program adds or makes the following modifications to the PROGMAN.INI file:

### [Groups]

The line **Groupx=C:\MS\_Windows\_directory\NW.GRP** is added to the list of group files if the NW.GRP file does not exist.

This causes MS Windows to run the NetWare User Tools application as an icon when MS Windows is loaded.

## Icon in NetWare Tools Group Is Created

The installation program adds an icon to the NetWare Tools group if one does not exist already.

If you have a previous installation of the NetWare Client for MS Windows installed on your workstation, the installation program configures the existing icon for this installation and does not create a new icon or a new group.

## Installing for MS Windows for Workgroups

If you are running the NetWare Client software on client workstations running MS Windows for Workgroups (WFWG), you should complete this additional setup before loading the NetWare Client software.

The additional setup required for MS Windows for Workgroups is notifying the WFWG software of the LAN driver type you want to use. You can use either ODI LAN drivers provided in this kit or NDIS drivers provided with WFWG.

If you want to use the NDIS drivers or connect to the MS network software in WFWG, you need to install the ODINSUP driver from Novell. See Chapter 12, "Setting Up the NetWare ODI Support Interface for NDIS Protocols," on page 249 for more information.

### Prerequisites

Ensure the following before running the MS Windows for Workgroups software:



- A working copy of the MS Windows for Workgroups software is installed on each workstation you want to run with the NetWare Client software
- The NetWare Client software is installed or upgraded on each client workstation running the MS Windows for Workgroups software



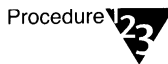
If you install the NetWare Client software on top of a copy of MS Windows for Workgroups that has the "Microsoft Windows Network" disabled, the Network Setup program within MS Windows for Workgroups will not recognize the NetWare Client software.

Ensure that the WINNET= and MULTINET= settings in the [Network] section of the SYSTEM.INI file are set to WINNET=NOVELL/00040000 and MULTINET=NETWARE4 for running the NetWare DOS Requester software.

- The NetWare Client software is loaded and running, with a successful connection in DOS to the network or a NetWare server

### Procedure

To set up and run the NetWare Client software on client workstations running MS Windows for Workgroups, complete the following steps:



#### 1. Load the MS Windows for Workgroups software.

The following error message appears:

```
"Networking functionality will not be available.
Your network adapter or protocols may not be
configured properly. Run Network Setup to check
adapter and protocol settings."
```

#### 2. To continue, choose "OK."

#### 3. In the "Network" group, choose the "Network Setup" icon.

#### 4. From the "Network Setup" dialog box, choose "Drivers."

The "Network Drivers" dialog box appears. MS Windows for Workgroups requires you to select a LAN driver compatible with ODI for your network board.

#### 4a. Remove any existing LAN drivers from the dialog box by selecting a LAN driver and choosing "Remove."

When prompted to make sure you want to remove the selected LAN drivers, choose "Yes."

#### 4b. Choose "Add Adapter."



**4c. From the “Add Network Adapter” dialog box, select the appropriate ODI LAN driver for your network board.**

The Setup program might prompt you to direct it to the location of the correct ODI LAN driver. The correct LAN driver should exist in the NetWare Client directory you selected during installation of the NetWare Client software.

**4d. Setup the appropriate frame type for your network.**



The NWLINK.386 file is a 32-bit IPX/SPX™ compatible transport Vxd used by MS Windows for Workgroups. It defaults to the Ethernet\_802.3 frame type.

Software such as the RCONSOLE utility and other utilities that run in an MS Windows DOS box might fail if the frame type setting is incorrect for your network.

To change the default frame type for the NWLINK.386 file, select “IPX/SPX Compatible Transport” or “IPX/SPX Compatible Transport with NetBIOS,” and then choose “Setup.” Then, select “Frame Type” and change the value to the desired frame type.

**4e. Exit the “Network Drivers” dialog box, by choosing “OK” and then “Exit.”**

Your NetWare Client software installation is now completed.

To modify any client workstations files, continue with the next section.

To load the client software, reboot your client workstation and then go to “Loading the NetWare Client Software” on page 138.

# Setting Up an MS Windows Shared Network Directory for NETX and VLM Client Workstations

To set up a network copy of MS Windows to support individual users that operate multiple client workstations running the current NetWare DOS Requester (VLM) or the NetWare Shell (NETX) software, you need to complete the following procedures.

- ◆ Setting Up Network Directories and Files
- ◆ Setting Up Individual Client Workstations and User Directories

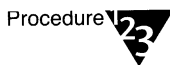
## Setting Up Network Directories and Files

### Prerequisites



- A client workstation logged in to the network, running Novell DOS™ 7 or later, DR DOS® 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later
- Rights to modify a system login script
- A search drive mapped to SYS:PUBLIC

### Procedure



- 1. Install MS Windows using the SETUP /A option and create a shared network directory for the MS Windows System files.**

For example, you could create a directory such as

**F : \APPS\WINSYS**

- 2. Create a directory for NetWare Shell versions of the NETWARE.DRV and NETWARE.HLP files.**

For example, you could create a directory such as

**F : \APPS\WINSYS\NETXDRV**

3. Copy the previous **NETWARE.DRV** and **NETWARE.HLP** files that support the NetWare Shell software (**NETX**) to the **NETXDRV** subdirectory.
4. Run the NetWare Client installation program for DOS and MS Windows and install to the network copy of MS Windows created in Step 1.

See "Modifying MS Windows Configuration Files on a Network Directory" on page 107 for procedures.

5. Create a NetWare group called "**NETXUSERS.**"
6. Add each user that uses a client workstation running the NetWare Shell (**NETX**) software to the "**NETXUSER**" group.
7. Modify the system login script or container login script to include the following **IF...THEN** statement:

```
IF MEMBER OF "NETXUSER" AND %LOGIN_NAME <>
SUPERVISOR THEN #C:\COMMAND /C SYS_SET.BAT
```

Ensure that the information within the quotes is in the proper upper or lower case for the user group you specified.

8. Create the following batch file and save it as **SYS\_SET.BAT** in the **SYS:PUBLIC** directory:

```
@echo OFF
IF "%NETDRV%"=="NETX" goto NETX >nul
NCOPY F:SYSTEM.NET F:SYSTEM.INI >NUL
GOTO END
NETX
NCOPY F:SYSTEM.NTX F:SYSTEM.INI >NUL
:END
```

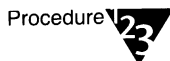
## Setting Up Individual Client Workstations and User Directories

### Prerequisites



- A client workstation logged in to the network, running Novell DOS 7 or later, DR DOS 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later.
- Rights to access user's home directories

### Procedure



- 1. Use the SETUP /N option to install a copy of MS Windows for each user that uses both client types—the NetWare DOS Requester and NetWare Shell.**

The /N parameter creates individual .INI and .GRP files for the each user.

Ensure that you are installing to a unique MS Windows directory for each user that accesses the shared MS Windows System directory.

Allow the software to update the AUTOEXEC.BAT and CONFIG.SYS and files on each client workstation.

- 2. Add the following environment variable to the STARTNET.BAT file on each client workstation running the NetWare Shell software:**

```
SET NETDRV=NETX
```

- 3. Create two versions of the SYSTEM.INI file, one for each type of client software, and save them in each user's individual home directory.**

The SYS\_SET.BAT file created in Step 8 in the previous procedure (see page 127) automatically uses the appropriate SYSTEM.INI for the client software running on a particular client workstation.

For example, you could create a SYSTEM.INI file called SYSTEM.NET that has the following lines in it:

```
[boot]
network.drv=netware.drv
```

```
[386Enh]
network=*vnetbios,vnetware.386,vipx.386
```

And create another file called SYSTEM.NTX:

```
[boot]
network.drv=f:\apps\winsys\netxdrv\netware.drv
```

```
[386Enh]
network=*vnetbios,vnetware.386,vipx.386
```

## Installing Client Workstation Files Manually

It is recommended that you use the installation program to install new and upgrade existing client workstations in order to ensure that all files are copied into their correct location and that configuration files are modified correctly.

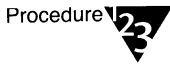
However, you can install the NetWare Client software for DOS and MS Windows manually to suit your particular networking environment.

You might also want to refer to this section if you did not allow the installation program to modify your DOS configuration files. You should ensure that the proper modifications are made before restarting the client workstation.

## Copying and Expanding Files

To manually copy the NetWare Client software files from the NetWare Client for DOS and MS Windows diskettes to the appropriate directories (the default is C:\NWCLIENT), complete the following steps.

### Procedure



1. On each client workstation, create any of the following directories that are appropriate for your environment:

Type of NetWare Client Software	Default Directory
Core DOS software	C:\NWCLIENT
Language software for DOS	C:\NWCLIENT\NLS
MS Windows directory software	C:\WINDOWS
Language software for MS Windows	C:\WINDOWS\NLS
MS Windows SYSTEM directory software	C:\WINDOWS\SYSTEM
Optional DOS software	C:\NWCLIENT

2. Copy the files and directories you need from the NetWare Client for DOS and MS Windows diskettes to the appropriate directories

Type either

```
NCOPY source_drive:path destination_drive:path /s  
/e /c <Enter>
```

or

```
XCOPY source_drive:path destination_drive:path /s  
/e <Enter>
```



Do not use the DOS COPY command for this procedure. It is important that the directory structure within each subdirectory is maintained. Use the DOS XCOPY or NetWare NCOPY command to complete this procedure.

For example, type

```
NCOPY A:NLS\*.* C:\NWCLIENT /s /e /c <Enter>
```

or

```
XCOPY A:NLS\*.* C:\NWCLIENT /s /e <Enter>
```

### 3. To expand a file, type

```
NWUNPACK source_drive:filename  
destination_drive:filename <Enter>
```

For example, to expand the ODINSUP.COM file, you could type

```
NWUNPACK A:ODINSUP.CO_ C:\NWCLIENT\ODINSUP.COM  
<Enter>
```

### 4. Repeat Step 3 until all of the NetWare Client files exist in the appropriate directories.

Following is a complete list of the NetWare Client software files included in this Client kit and NetWare packages.

Table 5-1

#### NetWare Client Kit Software

Software Type	Diskette Name	Directory	Filename
Core DOS software	<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	AUTO.VL_
			BIND.VL_
			CONN.VL_
			FIO.VL_
			GENERAL.VL_
			IPXNCP.VL_
			IPXODI.CO_
			LSL.CO_
			NDS.VL_
			NETX.VL_
			NWP.VLM_
			PRINT.VL_
			REDIR.VL_
			SECURITY.VL_
TRAN.VL_			
VLM.EX_			

Table 5-1 *continued***NetWare Client Kit Software**

<b>Software Type</b>	<b>Diskette Name</b>	<b>Directory</b>	<b>Filename</b>
	<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	ODI LAN Drivers .CO_ and .IN_
<b>Language software for DOS</b>	<i>NetWare Client for DOS and MS Windows Disk 2</i>	\NLS\language	DOSRQSTR.MS_ IPXODI.MS_ LSL.MS_ NESL.MS_ NMR.MS_ README.TX_ RSMONSTK.MS_
	<i>NetWare Client for DOS and MS Windows Disk 3</i>	\NLS\language	MIB2IF.MS_ MIB2PROT.MS_ STPIPX.MS_ STPUDP.MS_ WSASN1.MS_ WSDRVPRN.MS_ WSREG.MS_ WSSNMP.MS_ WSTRAP.MS_
<b>MS Windows directory software</b>	<i>NetWare Client for DOS and MS Windows Disk 3</i>	\	NOVELL.BM_ NOVLOGO1.BM_ NWADMIN.IN_ NWRCON.PI_
<b>Language software for MS Windows</b>	<i>NetWare Client for DOS and MS Windows Disk 4</i>	\	Unicode Tables
	<i>NetWare Client for DOS and MS Windows Disk 4</i>	\NLS\language	NETWARE.HL_



Table 5-1 continued

**NetWare Client Kit Software**

<b>Software Type</b>	<b>Diskette Name</b>	<b>Directory</b>	<b>Filename</b>
<b>MS Windows SYSTEM directory software</b>	<i>NetWare Client for DOS and MS Windows Disk 3</i>	\	NETWARE.DR_ NWCALLS.DL_ NWGDI.DL_ NWIPXSPX.DL_ NWNET.DL_ NWPOPU.PEX_ NWUSER.EX_ PNW.DL_ TLI_SPX.DL_ TLI_TCP.DL_ TLI_WIN.DL_ VIPX.38_ VNETWARE.38_
	<i>NetWare Client for DOS and MS Windows Disk 4</i>	\	NWLOCALE.DL_ NWPSRV.DL_
<b>Optional DOS Software</b>	<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	DOSN.PEX_ HRMIB.EX_ HRMIB.IN_ MIB2IF.VL_ MIB2PROT.VL_ NESL.CO_ NETBIOS.EX_ ODINSUP.CO_ PNW.VL_ ROUTE.CO_ RPL.CO_ RSA.VL_ RSMONSTK.CO_ STPIPX.CO_ STPUDP.CO_ TSASMS.CO_ WSASN1.VL_ WSDRVPRN.VL_ WSREG.VL_ WSSNMP.VL_ WSTRAP.VL_

## Creating or Modifying Configuration Files

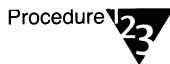
It is necessary to modify the following system files and configuration files with an ASCII text editor:

- ◆ AUTOEXEC.BAT
- ◆ CONFIG.SYS
- ◆ STARTNET.BAT
- ◆ NET.CFG
- ◆ MS Windows Configuration Files

### AUTOEXEC.BAT

In previous client versions, the software was loaded from the AUTOEXEC.BAT file. The current client version now uses a STARTNET.BAT file, which loads the NetWare DOS Requester and LAN driver when the AUTOEXEC.BAT file is run.

#### Procedure



- 1. Insert the line `@CALL drive:\client_directory\STARTNET` at the beginning of your client workstation's AUTOEXEC.BAT file.**
- 2. Delete or disable any previous NetWare shell or LAN driver commands in each client workstation's AUTOEXEC.BAT file that might conflict with the newly installed software.**

If any of the following files exist in the AUTOEXEC.BAT file, delete or disable them:

LSL.COM  
*LAN Driver* (for example, NE2000.COM)  
IPXODI.COM  
NETx.COM (or other NetWare Shell files)  
IPX.COM



If you are modifying the AUTOEXEC.BAT after running the installation program, your original AUTOEXEC.BAT file is saved as AUTOEXEC.BNW in the same directory. This happens only if you allowed the installation program to modify your DOS configuration files.

## CONFIG.SYS

In previous client versions, the software set the first network drive after the DOS LASTDRIVE setting in the CONFIG.SYS file. The current software requires that the LASTDRIVE setting be set to drive Z:.

Add or modify the **LASTDRIVE=Z** line at the end of the CONFIG.SYS file.



If you are modifying the CONFIG.SYS file after running the installation program, your original CONFIG.SYS file is saved as CONFIG.BNW in the same directory. This happens only if you allowed the installation program to modify your DOS configuration files.

## STARTNET.BAT



1. **Create a STARTNET.BAT file in the NetWare Client directory or modify the existing STARTNET.BAT file.**

The default is C:\NWCLIENT.

2. **Add the necessary line to load the STARTNET.BAT in your AUTOEXEC.BAT file or load the STARTNET.BAT file manually each time you want to connect to the network or a server.**
3. **(Conditional) If you are running MS Windows for Workgroups 3.11, you must add a line for the ODIHLP.EXE file.**



Ensure that the ODIHLP.EXE file is loaded in the STARTNET.BAT file *after* loading the transport protocol (The default the IPXODI.COM file). If you currently load the ODIHLP.EXE file in the AUTOEXEC.BAT file, move the line to the STARTNET.BAT file.

The STARTNET.BAT file should appear as follows. If you are creating a new STARTNET.BAT file, add the following lines *in the given order*:

```
set nlanguage=preferred_language  
c:\client directory\lsl.com  
c:\client directory\odi_lan_driver  
c:\client directory\ipxodi.com  
c:\MS Windows directory\odihlp.exe  
c:\client directory\vlm.exe
```



Note

Include the line for the *MS Windows directory* only if you are running MS Windows for Workgroup.

Replace *preferred\_language* with one of the following languages:

ENGLISH  
DEUTSCH  
ESPANOL  
FRANCAIS  
ITALIANO

Replace *client directory* with the directory where the NetWare Client files are found.

Replace *odi\_lan\_driver* with name of the ODI LAN driver that your workstation is using.

Replace *MS Windows directory* with the directory where the MS Windows for Workgroup files are found.

## NET.CFG

Create or modify the NET.CFG file in your NetWare Client directory to configure for login, desktop management, and system integration. Refer to the sections below for more information about additional set up made in the NET.CFG file for NetWare client workstations:

- ◆ Chapter 7, “Setting Up NetWare Client Workstations to Log In,” on page 179.
- ◆ (Optional) Chapter 12, “Setting Up the NetWare ODI Support Interface for NDIS Protocols,” on page 249.
- ◆ (Optional) Chapter 13, “Setting Up the NetWare for IBM LAN Support Program Modules,” on page 265.
- ◆ (Optional) Chapter 14, “Setting Up NetBIOS Protocol Support,” on page 275.
- ◆ (Optional) Chapter 15, “Setting Up Source Routing Support for a Token-Ring Network,” on page 285.
- ◆ (Optional) Chapter 16, “Setting Up Named Pipes Protocol Support,” on page 295.
- ◆ (Optional) Chapter 17, “Setting Up the Target Service Agent (TSA) Software,” on page 307.
- ◆ (Optional) Chapter 18, “Configuring Client Workstations for Desktop SNMP Services,” on page 317.

## MS Windows Configuration Files

Edit the following files in the MS Windows directory:

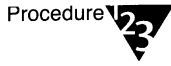
- ◆ SYSTEM.INI
- ◆ WIN.INI
- ◆ PROGMAN.INI

See “MS Windows Configuration Files Are Modified” on page 119 for more information.

# Loading the NetWare Client Software

Loading the NetWare Client software for DOS and MS Windows client workstations requires you to complete the following procedure.

## Procedure



- 1. Ensure that a copy of DOS or MS Windows is set up on each client workstation.**

See "Setting Up Workstation Software" on page 82.

- 2. Ensure that the NetWare Client software files are installed on each client workstation that you want to run DOS or MS Windows.**

See "Running the NetWare Client Installation Program" on page 99 or "Installing Client Workstation Files Manually" on page 129 for more information.

- 3. Ensure that all necessary modifications are made to the client workstation configuration files.**

See "Installing Client Workstation Files Manually" on page 129 for more information.

- 4. Reboot each client workstation. (The STARTNET.BAT file loads the necessary files.)**



If you decide to downgrade the NetWare Client software from version 1.2 to an earlier version, you must delete the LSL.MSG file (version 1.18 or later) that was copied to the NetWare Client directory during installation of the 1.2 files.

The LSL.MSG file is new to the NetWare Client Kit 1.2. The LSL.COM file that shipped with earlier versions of the NetWare Client Kit for DOS and MS Windows does not support the LSL.MSG file.

# Using Two Network Boards

In most cases the ODI (or compatible) LAN drivers provided with the NetWare Client software can share a network board with other communication packages so you do not need to purchase two network boards.

This section describes

- ◆ Reasons for Having Two Network Boards
- ◆ Modifying Client Workstation Files for Two Network Boards

## Reasons for Having Two Network Boards

When using the NetWare Client software, there are two conditions where you might benefit from having more than one network board installed in your client workstations:

- ◆ Different Communication Software Package
- ◆ Physically Separated Networks

If you have two network boards, be aware of the configuration issues in the following sections.

Additional network boards (those after the second defined network board) are ignored by the NetWare Client software.

### Different Communication Software Package

You might want to use two network boards when each board is supported by its own communication software package.

For example, you might want to have MS Windows for Workgroups use one network board for NDIS protocol stacks and NetWare Client software use another network board for IPX protocol stacks. However, this is not necessary if you install the ODINSUP.COM file. See Chapter 12, "Setting Up the NetWare ODI Support Interface for NDIS Protocols," on page 249 for more information.

If you use a separate network board for each communication package that you use then here are no additional steps to set up the second network board under NetWare. This is because the network board is controlled by the other communications package. It might need to be configured under the other communication package.

### **Physically Separated Networks**

You might want to use two network boards with each board being connected to its own network. This makes it possible for a custom application to access both networks at one time.

This means that, although both networks are connected to the same physical machine, there is no communication between the two networks.

### **Modifying Client Workstation Files for Two Network Boards**

Modifying client workstations system and configuration files for two network boards requires you to edit the following files in an ASCII text editor:

- ◆ STARTNET.BAT
- ◆ NET.CFG

#### **STARTNET.BAT**

The NetWare Client installation program allows you to select a single ODI LAN driver. This driver is loaded in the STARTNET.BAT file.

You need to load an additional ODI LAN driver in the STARTNET.BAT file if you have two network boards installed in your client workstation.



The STARTNET.BAT file should appear as follows. If you are creating a new STARTNET.BAT, add the following lines *in the given order*:

```
set nwlanguage=preferred_language  
c:\client_directory\lsl.com  
c:\client_directory\primary_lan_driver  
c:\client_directory\secondary_lan_driver  
c:\client_directory\ipxodi.com  
c:\client_directory\vlm.exe  
c:\MS Windows directory\odihlp.com
```



Include the line for *MS Windows directory* only if you are running MS Windows for Workgroup.

Replace *preferred\_language* with one of the following languages:

ENGLISH  
DEUTSCH  
ESPANOL  
FRANCAIS  
ITALIANO

Replace *client\_directory* with the directory where the NetWare Client files are found.

Replace *primary\_lan\_driver* with name of the ODI LAN driver that your workstation binds to first.

Replace *secondary\_lan\_driver* with name of the ODI LAN driver that your workstation binds to second.

Replace *MS Windows directory* with the directory where the MS Windows for Workgroup files are found.

### Two Different Drivers

If you have two network boards using *different* types of ODI LAN drivers, you must load the LAN drivers separately by adding a Link Driver section for each network board.

For example, if you have an NE2000 network board (the primary board) and a token ring network board, you might include the following lines in the NET.CFG file:

```
link driver ne2000
  int 5
  port 360
  frame ethernet_802.2
  frame ethernet_802.3

link driver ntr2000
  int 5
  port a20
  mem cc000
  frame token-ring
  frame token-ring_snap
```

### Two Identical Drivers



If you have two network boards using the *same* type of ODI LAN driver, do not load the same driver twice in the NET.CFG file and do not specify a "Protocol Stack" option.

Instead, use the Link Driver option in NET.CFG to specify that the same driver is used twice.

Do this by placing two Link Driver sections in the NET.CFG file, each one specifying the driver name and hardware settings used by that network board.

The hardware settings for at least one of the network boards must be modified, because you cannot have two network boards of the same type with both using default hardware settings.

For example, if you have two NE2000 LAN drivers, you might include the following lines in the NET.CFG file:

```
link driver ne2000
  int 5
  port 360
  frame ethernet_802.2
  frame ethernet_802.3
```

```
link driver ne2000
  int 4
  port 320
  frame ethernet_802.2
  frame ethernet_802.3
```

Putting two occurrences of “link driver ne2000” loads the NE200 driver twice.



With two network boards of the same type, the network board which is listed first in the NET.CFG file is the one that IPX uses as primary.

Also, if you do not specify two Link Driver sections, a driver will not be loaded for the second network board, and that board will be ignored.

See “Link Driver Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for information.

If you use two Micro Channel\* or EISA network boards that use the same driver (such as two NE3200™ or two 3C523 LAN drivers), you must still specify a Link Driver section in the NET.CFG file for each network board. However, instead of specifying the hardware settings used on the network board, you can specify the “slot” setting.

The “slot” setting does not indicate the load order. It tells the driver where the network board is located. The driver then scans the network board and determines what hardware settings are in use.

For example, for two NE32000 LAN drivers, you might include the following lines in the NET.CFG file:

```
link driver ne3200
  slot 2
  frame ethernet_802.2
  frame ethernet_802.3
```

```
link driver ne3200
  slot 1
  frame ethernet_802.2
  frame ethernet_802.3
```

In this example, the network board in slot 2 becomes the primary board because the driver for it is loaded first.

To change which network board is primary, reorder the "Link Driver" sections. For example, to set the network board in slot 1 as primary, you would type

```
link driver ne3200
  slot 1
  frame ethernet_802.2
  frame ethernet_802.3
```

```
link driver ne3200
  slot 2
  frame ethernet_802.2
  frame ethernet_802.3
```

# Where to Go from Here

After installation of your NetWare Client software is completed, you can log in to the network. You can also begin setting up your client workstation for additional networking support.

If you want to	See
<hr/> <p>Prepare to log in to the network by doing any of the following:</p>	
◆ Learn more about logging in to NDS	"Understanding Logging In to NetWare Directory Services" on page 184
◆ Set up your client workstation to log in	See Chapter 7, "Setting Up NetWare Client Workstations to Log In," on page 179
◆ Modify your NET.CFG file to simplify login for NetWare 2 and 3 client workstations	"Modifying the NET.CFG File for Logging In to NetWare 2 and NetWare 3" on page 180
◆ Modify your NET.CFG file to simplify login for NetWare 4 client workstations	"Modifying the NET.CFG File for Logging In to NetWare 4" on page 181
<hr/> <p>Begin setting up for additional support by doing any of the following:</p>	
◆ Set up network drives and directories	See Chapter 9, "Setting Up and Managing Network Drives," on page 199
◆ Set up and modify your NET.CFG file	Chapter 2, "NET.CFG Options Reference," in <i>NetWare Client for DOS and MS Windows Technical Reference</i>
◆ Set up printing for a client workstation	See Chapter 10, "Setting Up Client Workstation Printing," on page 217
◆ Set up your client workstation to support applications running in a task-switching environment	See Chapter 11, "Setting Up Network Support for Task-Switching Environments," on page 237





chapter

# 6

## **Setting Up Remote Client Workstations**

### **Overview**

This chapter explains how to set up the network so that client workstations (mostly diskless workstations) can boot from the remote boot disk image files stored on a NetWare<sup>®</sup> server's hard disk.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
Installing a Remote Boot PROM Chip Certified by Novell	149
Setting Up RPL Support	151
Making a Boot Image File Diskette	158
Creating Remote Boot Disk Image Files	162
Booting Remote Workstations	173
Using the RPLFIX.COM Utility	174
Troubleshooting RPL with Older Remote Boot PROMs	176
Configuring the BOOTCONF.SYS File	171

# Introduction

The NetWare software for remote client workstations includes support for remote booting and the IBM architected Remote Program Load (RPL) frames as defined in the *IBM Remote Program Load User's Guide*.

Remote booting is based on the concept of storing the image of a bootable floppy disk on a NetWare volume. Remote boot workstations use this image to boot up and attach to a server.

The RPL technology is based on the same concept of storing an image file of a bootable floppy disk on a NetWare volume. However, RPL relies on a bootstrap program which is downloaded to each remote workstation for attaching to a server.

- ◆ Use more than one disk image file name per node address
- ◆ Support the IBM LAN Support Program software
- ◆ Compatibility with ODI™ LAN drivers and DOS 5.0 and later
- ◆ Support booting a remote client workstations across a source routing bridge

These client workstations do not need a floppy or hard drive to function on the network and are, therefore, called *diskless workstations*.

A diskless workstation relies on a Programmable Read-Only Memory (PROM) chip installed in its network board to communicate with the boot server.

When the workstation is powered on, it uses the boot image stored on a server to load the necessary DOS system and NetWare Client™ software files used for connecting to the network.

The image file can include any files you would normally load from a boot diskette before loading the NetWare DOS Requester™ software (the VLM.EXE file).

NetWare allows you to use a default image file for all diskless workstations on the network, or use customized image files unique to each workstation's particular system and network environment.



Setting up remote booting or RPL on NetWare client workstations requires setup on a NetWare server or RPL server, hardware setup on each remote client workstation, and software setup from a client workstation with a connection to the NetWare server you want the remote workstations to boot from.

The complete setup for a remote boot client workstation requires you to complete the following tasks:

- ◆ Making a Boot Image File Diskette
- ◆ Setting Up RPL Support
- ◆ Making a Boot Image File Diskette
- ◆ Creating Remote Boot Disk Image Files
- ◆ Booting Remote Workstations

## **Installing a Remote Boot PROM Chip Certified by Novell**

Installing a Remote Boot PROM certified by Novell® requires you to complete the following tasks:

- ◆ Insert a Remote Boot PROM in every workstation that you want to boot from the network.
- ◆ Determine the type of Remote Boot PROM that you are using.

## **Installing a Remote Boot PROM Chip Certified by Novell on Your Network Board**

For information on how to complete this procedure, refer to the documentation provided with your Remote Boot PROM Kit certified by Novell.

## Determining the Remote Boot PROM Type

There are three kinds of Remote Boot PROMs used with NetWare networks. The three types are referred to as follows:

- ◆ Old (Novell IPX™ Remote Boot PROM)

At initialization, the Novell IPX Remote Boot PROM sends an IPX GET NEAREST SERVER protocol frame onto the wire. This frame is positive identification that this PROM is a Novell IPX Remote Boot PROM.

This type of Remote Boot PROM supports remote booting and does not require setup for RPL support. See “Making a Boot Image File Diskette” on page 158 to continue.

- ◆ Enhanced (Novell Enhanced Remote Boot PROM)

At initialization, the Novell Enhanced Remote Boot PROM sends an 802.2 FIND protocol frame onto the wire. This frame is positive identification that this PROM is a Novell Enhance Remote Boot PROM that uses the 802.2 FIND-FOUND protocol to attach to a server and download a bootstrap file.



Do not use the RPLODI.COM file with this type of PROM. The RBOOT.RPL has the ability to interface with ODI LAN drivers loading from boot image files.

This type of Remote Boot PROM supports RPL and requires setup for RPL support. See “Setting Up RPL Support” on page 151 to continue.

- ◆ IBM RPL PROM (IBM Remote Program Load PROM)

At initialization the IBM RPL PROM sends an 802.2 FIND protocol frame onto the wire. This frame is positive identification that this PROM uses the 802.2 FIND-FOUND protocol to attach to a server and download a bootstrap file.



Do not use the RPLODI.COM file with this IBM RPL PROM. The ability to interface with ODI LAN drivers loading from boot image files is provided in the following files: TOKEN.RPL, ETHER.RPL, PCN2L.RPL, F1ETH.RPL, RBOOT.RPL.

This type of Remote Boot PROM supports RPL and requires setup for RPL support. See “Setting Up RPL Support” on page 151 to continue.

The *old* type of Remote Boot PROMs support only the raw 802.3 and E-II frame types. The *enhanced* type support the 802.2 frame type only.

Therefore, it is important to know what frame types your server supports to determine whether the type of Remote Boot PROM you are using is supported.

If your server supports the Ethernet frame type E-II, you can then use either type of Remote Boot PROM.

Some procedures for setting up remote booting on your client workstation are specific to the type of Remote Boot PROM you are using. For information on the type of Remote Reset PROM you are using, refer to the manufacturer's documentation.

## Setting Up RPL Support

Setting up RPL support on the network is necessary only for remote workstations using the Novell Enhanced or IBM RPL PROMs. Remote workstations using the "old" or Novell IPX Remote Boot PROM do not need to set up RPL support. See "Making a Boot Image File Diskette" on page 158 for more information.

Setting up RPL support requires you to do the following:

- ◆ Load the RPL.NLM program on the NetWare Server and bind it to the server's LAN driver.
- ◆ Load the RPL.COM file on a local client workstation, if you need to boot from a NetWare server across a source routing bridge.
- ◆ Ensure that the required files are copied to the appropriate directories.
- ◆ Copy newer RPL files to the appropriate directories if existing files are not current.



All of the files necessary for setting up a NetWare remote boot client workstation are located in the RPL directory on *NetWare Client for DOS and MS Windows Disk 2*.

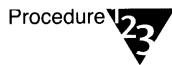
## Loading the RPL.NLM Program

The RPL.NLM file is a NetWare Loadable Module™ (NLM) program that acts as a protocol stack. It responds to the IBM architected Remote Program Load (RPL) frames as defined in the *IBM Remote Program Load User's Guide*.

The RPL.NLM program is used in networks that have diskless workstations installed with the RPL BIOS module known as a *Remote Boot PROM*. Currently, RPL is supported on the following network boards:

- ◆ IBM Ethernet boards (MCA and Model 25SX)
- ◆ IBM PC network boards
- ◆ IBM token-ring network boards
- ◆ Novell (or compatible) and third-party network boards with an Enhanced Remote Boot PROM installed

### Procedure



**1. At the server console, load the RPL.NLM program by typing**

```
LOAD RPL <Enter>
```

**2. Bind the RPL.NLM program to the network board in the server by typing**

```
BIND RPL TO network_board [parameter] <Enter>
```

For example, to bind RPL to an NE2000 LAN driver with the Ethernet\_802.2 frame type, you would type

```
BIND RPL TO NE2000 FRAME=ETHERNET_802.2 <Enter>
```

For details on how to use the BIND parameter for RPL at the command line, see “RPL BIND Parameters” in Chapter 3 of *NetWare Client for DOS and MS Windows Technical Reference*.

When the RPL.NLM program loads, it searches the SYS:LOGIN directory for a BOOTCONF.SYS file. If it finds one, the RPL.NLM program reads the BOOTCONF.SYS file into memory in order to make the file information available when a FIND frame is received from a client workstation. see "Configuring the BOOTCONF.SYS File" on page 171 for more information.

## Loading the RPL.COM File

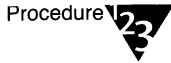
The RPL.COM file is a Terminate-and-Stay-Resident (TSR) program loaded at a client workstation. It responds to the IBM architected Remote Program Load (RPL) frames as defined in the *IBM Remote Program Load User's Guide*.

The RPL.COM file allows a client workstation to function as an RPL Server for downloading the bootstrap file to remote workstations.

It is used in networks that have diskless remote workstations that need to attach to a NetWare server across a source routing bridge with the RPL BIOS module known as a *Remote Boot PROM*. Currently, RPL is supported on the following network boards:

- ◆ IBM Ethernet boards (MCA and Model 25SX)
- ◆ IBM PC network boards
- ◆ IBM token-ring network boards
- ◆ Novell (or compatible) and third-party network boards with an Enhanced Remote Boot PROM installed

## Procedure



1. **Ensure that a Novell Enhanced Remote Boot PROM is installed in the network board at the client workstation you want to set up as an RPL server.**

2. **Create a LOGIN directory at the root of the client workstation by typing**

```
MD LOGIN <Enter>
```

3. **Expand and copy the RPL.COM file and bootstrap programs to the LOGIN directory.**

See "Copying Newer RPL and Boot Files to the Server" on page 157 for more information.

4. **At a client workstation within the same LAN segment as the remote workstations, load the RPL.COM file by typing**

```
RPL <Enter>
```

5. **Bind the RPL.COM program to the network board by adding the following line to the NET.CFG file:**

```
protocol rpl  
    bind network_board [parameter]
```

For example, to bind RPL to an NE2000 LAN driver with the Ethernet\_802.2 frame type, you would type

```
protocol rpl  
    bind ne2000  
    frame ethernet_802.2
```



You must set the PS=*servername* or GNS optional BIND parameter to direct remote workstations to the NetWare server that contains the boot disk image file for each workstation.

See "Protocol RPL" under "Protocol RPL Option" in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information and a list of optional BIND parameters for RPL.

## Ensuring That the Required Files Are in the Appropriate Directories

To boot remote workstations from a NetWare server, the following files must exist on a NetWare server. These files are automatically copied to the appropriate directories when you install the NetWare server software.

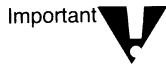
If any of these files do not exist in the LOGIN directory or you assume that the existing files are out of date, see "Copying Newer RPL and Boot Files to the Server" on page 157 for more information.

### Remote Boot Support Programs

If any of your remote booting client workstations are using the older type of Remote Boot PROM, the following RPL support programs should be copied to the SYS:LOGIN directory of the NetWare server (see "Determining the Remote Boot PROM Type" on page 150 for more information):

Program	Description
RPLFIX.COM	<p>Allows computers to Remote Program Load correctly with DOS 5 and later.</p> <p>The current version of the DOSGEN utility also provides the same functionality as the RPLFIX utility.</p>
RPLODI.COM	<p>The DOS TSR acts as an interface between the older type of Remote Boot PROM and Novell ODI LAN drivers. Use this file only if the following conditions exist:</p> <ul style="list-style-type: none"><li>◆ You are loading the LSL™, ODI LAN driver, IPXODI, and NETX or VLM™ software from the boot image file.</li><li>◆ You are using the older type of Remote Boot PROM.</li></ul>

It is not necessary for these programs to reside in the SYS:LOGIN directory. However, it is recommended for ease of use and access during setup.



Certain IBM Micro Channel\* workstations, such as the new 386SLC, have a BIOS image file associated with them. These files are provided by the manufacturer and have a file extension of .IML.

You must create a directory called SYS:\LOGIN\IBMLAN\DCDB\IMAGES on the server and copy all of the .IML files to this directory.

### **Bootstrap Programs**

If any of your remote booting client workstations are using the Enhanced or IBM RPL type of Remote Boot PROM, the following bootstrap programs should reside in the SYS:LOGIN directory of the NetWare server:

<b>Program</b>	<b>Adapter Type</b>
ETHER.RPL	IBM MCA Ethernet
F1ETH.RPL	IBM Model 25SX Ethernet
PCN2L.RPL	IBM PC Baseband Network
RBOOT.RPL	Adapters using Novell Boot ROM Kit
TOKEN.RPL	IBM Token-Ring Network



The appropriate bootstrap program (.RPL) is downloaded to the workstation in response to a SEND.FILE.REQUEST call from the Remote Boot PROM.



Together, these files offer the following features and fixes:

- ◆ The ability to use BOOTCONF.SYS wildcard characters (\* and ?) in specifying node addresses

Also, more than one disk image filename is allowed per node address. BOOTCONF.SYS is parsed by RPL.NLM at the NetWare server to minimize the amount of network traffic.

See “Configuring the BOOTCONF.SYS File” on page 171 for details on how to configure for bootstrap.

- ◆ The ability to boot across a source routing bridge

## Copying Newer RPL and Boot Files to the Server

A current version of the RPL and Boot files are stored in the RPL directory on *NetWare Client for DOS and Windows Disk 2*.

Copy these files to the LOGIN directory on a server by completing the following steps.

### Procedure



1. **Expand and copy the contents of the RPL directory from *NetWare Client for DOS and Windows Disk 2* to the LOGIN directory on a NetWare or RPL server.**

To expand a set of files, type

```
NWUNPACK source_drive:\path\ *.*  
destination_drive:\path <Enter>
```

For example, to expand and copy the files within the RPL directory on *NetWare Client for DOS and Windows Disk 2* to the SYS:LOGIN or LOGIN directory, you could type the following for a NetWare server:

```
NWUNPACK A:RPL\*.* F:\LOGIN <Enter>
```

or type the following for an RPL server:

```
NWUNPACK A:RPL\*.* C:\LOGIN <Enter>
```

# Making a Boot Image File Diskette

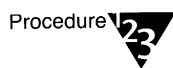
Making a boot image file diskette requires you to do the following:

- ◆ Format a bootable diskette.
- ◆ Create or copy required files to the bootable diskette.

## Formatting a Bootable Diskette

You need to make a DOS bootable diskette that is used to create an image file on the server.

### Procedure



- 1. Format a floppy diskette using the DOS `FORMAT /S` command by typing**

```
FORMAT A: /S <Enter>
```

This copies DOS system files to the diskette for booting.

- 2. Ensure that the `COMMAND.COM` file was copied to the floppy diskette by typing**

```
DIR A: *.* <Enter>
```

A list of all the files on the floppy diskette appears.

## Creating or Copying Required Files

The following files are required for each boot image file diskette:



### AUTOEXEC.BAT

The AUTOEXEC.BAT file should include the following lines:

```
@echo off
set comspec = f:\command.com
ls1
rplodi.com [Required for "older" type PROM only.]
LAN_driver.com
ipxodi
vlm
```



If you are using an "older" type of Remote Boot PROM, you must load the RPLODI.COM file *after* the LSL.COM file and *before* the LAN driver.

If you are creating more than one boot image file diskette, rename the AUTOEXEC.BAT file on the bootable diskette for each remote workstation to a unique filename, such as DOS1.BAT. See "Creating Multiple Remote Boot Disk Image Files" on page 165 for more information.

### COMMAND.COM

Ensure that the correct COMMAND.COM file exists on the bootable diskette for the particular DOS version you want running on the remote workstations.

To check the version, check the file date or boot a workstation with the boot image file diskette and then run the DOS VER command.

#### ❑ CONFIG.SYS

Create a system configuration file. Include the following line in the file:

```
lastdrive = z
```

#### ❑ NET.CFG

Create a network configuration file. The following is an example of a NET.CFG file for a Novell NE2000™ Ethernet board:

```
link driver ne2000  
port 300  
int 3  
frame ethernet_802.2  
  
netware dos requester  
netware protocols = nds,bind,pnw  
preferred server = server_name  
first network drive = f  
show dots = on
```

You can copy the NET.CFG file directly from a client workstation directory (the default is C:\NWCLIENT) to your boot diskette.



You might need to modify the Link Driver section to match your board settings if they differ from the settings used on the client workstation.

After the LAN driver is loaded into memory, you can use any frame type available for your type of network. Place a line after the primary frame type for any other frame types.

❑ NetWare Client and DOS system files

The following files must exist on the boot image file diskette. You must create the AUTOEXEC.BAT and CONFIG.SYS files, and copy or create the NET.CFG file, manually.

AUTOEXEC.BAT  
BIND.VLM (For NetWare 2 and NetWare 3™ networks only)  
COMMAND.COM  
CONFIG.SYS  
CONN.VLM  
FIO.VLM  
GENERAL.VLM  
IPXNCP.VLM  
IPXODI.COM  
LSL.COM  
NDS.VLM (For NetWare 4™ networks only)  
NET.CFG  
*network\_board\_driver.COM*  
NETX.VLM  
NWP.VLM  
PNW.VLM  
PRINT.VLM  
REDIR.VLM  
RPLODI.COM (Use with “old” PROM type only)  
TRAN.VLM  
SECURITY.VLM  
VLM.EXE

You can copy the NetWare Client and DOS system files directly from a client workstation directory (the default is C:\NWCLIENT) to your boot diskette.

After you have made a boot image file diskette, you need to create a remote boot disk image file on a server by running the DOSGEN utility from a connected workstation.

See “Creating Multiple Remote Boot Disk Image Files” on page 165 for more information.

# Creating Remote Boot Disk Image Files

You need to create a remote boot disk image file on a NetWare server for the client workstation you want to remote boot.

## Prerequisites

Before you create boot disk image files on the server, you should have the following:



- A client workstation logged in to the server you will create the disk images on
- A drive mapped to SYS:LOGIN
- A search drive mapped to SYS:SYSTEM
- Rights to the LOGIN and SYSTEM directories
- (Conditional: if you are using an enhanced Boot PROM) A current copy of the .RPL files located in the LOGIN directory on the server  
see “Ensuring That the Required Files Are in the Appropriate Directories” on page 155.
- A copy of the remote boot image file diskette inserted into a floppy drive on the workstation you will do the setup on

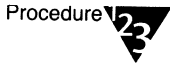
If all of the remote boot workstations use the same boot configuration, create a single boot image file for all the workstations. See “Creating a Single Remote Boot Disk Image File” on page 163.

If you have remote boot workstations that require unique boot configurations, create multiple boot image files for each workstation that has special requirements. See “Creating Multiple Remote Boot Disk Image Files” on page 165.

# Creating a Single Remote Boot Disk Image File

You must create a boot image file on the NetWare server in order for a remote boot or RPL remote workstation to boot from a network server.

## Procedure



**1. Load the NetWare Client software.**

**2. Log in.**

- ◆ If you are logging in to a NetWare 2 or NetWare 3 server, use the name SUPERVISOR.
- ◆ If you are logging in to a NetWare 4 network, use the name ADMIN or a username with ADMIN equivalency.

**3. Enter a password (if needed).**

**4. Map the next drive to SYS:LOGIN by typing**

```
MAP N SYS:LOGIN <Enter>
```

**5. Map the next search drive to SYS:SYSTEM by typing**

```
MAP S16:=SYS:SYSTEM <Enter>
```

**6. Change to the network drive that is mapped to the LOGIN directory.**

For example, if you mapped network drive G: to LOGIN, type

```
G: <Enter>
```

**7. Insert the prepared bootable diskette into a floppy disk drive on the workstation.**

See "Making a Boot Image File Diskette" on page 158 for information and procedures on preparing a bootable diskette.

## 8. Run the DOSGEN program.

For example, if you inserted the bootable diskette into drive A:, you would type the following:

```
DOSGEN A: <Enter>
```

Your screen should show a listing similar to the following:

```
Floppy Type: 3.1/2 inch 1.44 MB  
Total Floppy Space 2880 Sectors  
Transferring Data (2880 Sectors) to "NET$DOS.SYS"
```

The DOSGEN utility creates a disk image file called NET\$DOS.SYS (a copy of the files on the boot diskette) in the LOGIN directory.

## 9. Copy the AUTOEXEC.BAT file from the boot diskette to the LOGIN directory on volume SYS: and all programs you want to run after the VLM.EXE file.

You might get a "Batch file missing" error when you log in if the AUTOEXEC.BAT file is not copied to *both* the LOGIN directory and the user's login directory.

## 10. Flag the NET\$DOS.SYS file in the SYS:LOGIN directory as Shareable by typing

```
FLAG NET$DOS.SYS SH <Enter>
```

Flagging the NET\$DOS.SYS file as Shareable ensures that the file is not locked by another workstation when booting.

## 11. Boot the remote workstations.

See "Booting Remote Workstations" on page 173 for more information.

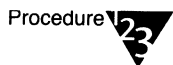


## Creating Multiple Remote Boot Disk Image Files

You must create different boot image files on the NetWare server for each RPL remote workstation that requires a unique boot file. The “old” or Novell IPX Remote Boot PROM does not support multiple boot disk image files. See “Creating a Single Remote Boot Disk Image File” on page 163 for details and procedures.

This requires you to create an individual remote boot image file diskette for each unique configuration. See “Making a Boot Image File Diskette” on page 158 for details and procedures.

### Procedure



1. **Load the NetWare Client software.**
2. **Log in.**
  - ◆ If you are logging in to a NetWare 2 or NetWare 3 server, use the name SUPERVISOR.
  - ◆ If you are logging in to a NetWare 4 network, use the name ADMIN or a username with ADMIN equivalency.

3. **Enter a password (if needed).**

4. **Map the next drive to SYS:LOGIN by typing**

```
MAP N SYS:LOGIN <Enter>
```

5. **Map the next search drive to SYS:SYSTEM by typing**

```
MAP S16:=SYS:SYSTEM <Enter>
```

6. **Change to the network drive that is mapped to the system LOGIN directory.**

For example, if you mapped network drive G: to LOGIN, type

```
G: <Enter>
```

7. Create an AUTOEXEC.BAT file in the system LOGIN directory that contains only a line with twelve spaces in it (use the <Spacebar>).

Create this file with an ASCII text editor and save the file in the LOGIN directory on your server.

8. Create a subdirectory in the system LOGIN directory for each DOS version that you want to create a boot image file for.
9. Copy the operating system files for each DOS version to the appropriate subdirectory using the DOS COPY command.

Do not use the install program to copy the DOS files to the server.

10. Insert one of the prepared bootable diskettes into a floppy disk drive on the workstation.

See "Making a Boot Image File Diskette" on page 158 for information and procedures on preparing a bootable diskette.

11. Use the DOS REN command to rename the AUTOEXEC.BAT file on the bootable diskette to a unique name for a bootable diskette in drive A: by typing

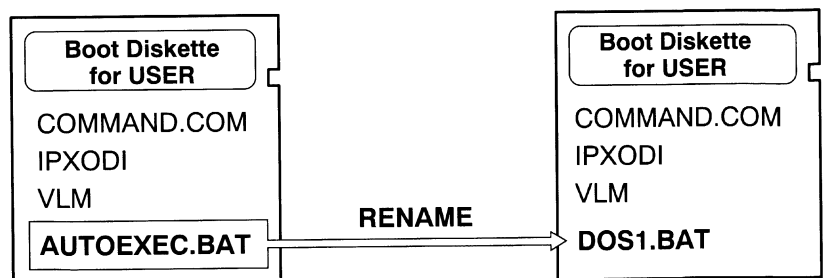
```
REN A:\AUTOEXEC.BAT unique_name.BAT <Enter>
```

For example, you could rename the AUTOEXEC.BAT file for the first workstation to DOS1.BAT by typing

```
REN A:\AUTOEXEC.BAT DOS1.BAT <Enter>
```

The following figure illustrates this process.

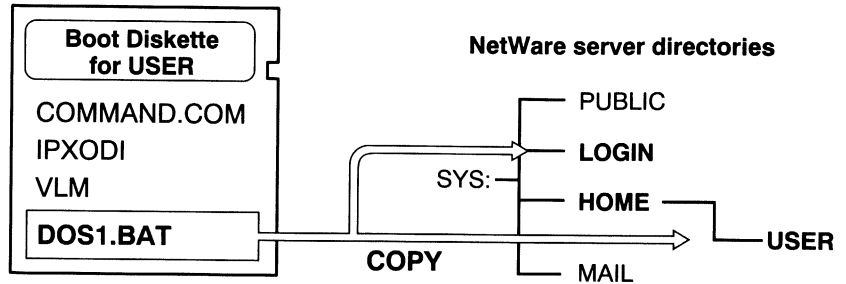
Figure 6-1  
Renaming the  
AUTOEXEC.BAT  
File for Multiple  
Remote Boot Image  
Files



12. Copy the renamed .BAT file (DOS1.BAT, in this example) from the bootable diskette to the system LOGIN directory and home directory for each user that will use the workstation with this configuration.

The following figure illustrates this process.

**Figure 6-2**  
**Copying the Renamed .BAT File for Multiple Remote Boot Image Files**

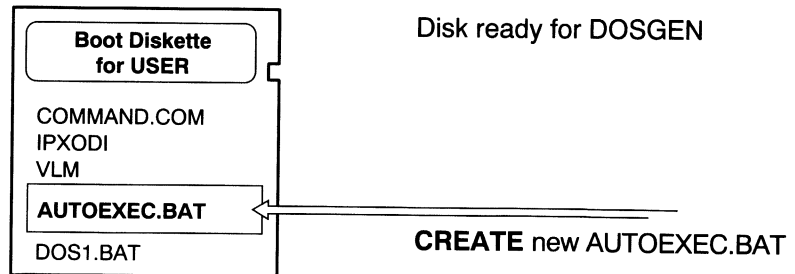


13. Create a new AUTOEXEC.BAT file on each boot diskette to run the renamed batch file.

Create this file with an ASCII text editor and save the file on the bootable diskette.

The following figure illustrates this process.

**Figure 6-3**  
**Creating a New AUTOEXEC.BAT File for Multiple Remote Boot Image Files**



**14. Change to the network drive that is mapped to the system LOGIN directory.**

For example, if you mapped network drive G: to LOGIN, type

**G:** <Enter>

**15. Use the DOSGEN utility to create a uniquely named .SYS file in the system LOGIN directory for each bootable diskette.**

**15a. From the SYS:LOGIN directory (and with the bootable diskette in the disk drive), run the DOSGEN utility by typing the following for each boot diskette:**

```
DOSGEN drive_letter:unique.SYS_file <Enter>
```

For example, if you inserted the boot diskette into drive A: and created a unique .SYS file named DOS1.SYS, you would type the following command:

```
DOSGEN A:DOS1.SYS <Enter>
```

Your screen should show a listing similar to the following:

```
Floppy Type: 3.1/2 inch 1.44 MB  
Total Floppy Space 2880 Sectors  
Transferring Data (2880 Sectors) to "DOS1.SYS"
```

**15b. Record the network number and node address of the workstation that will use the disk image file you just created.**

You need the information to create the BOOTCONF.SYS file.

When you have finished running the DOSGEN utility for two boot diskettes, a list of the image files should look similar to the following:

```
DOS1.SYS Network#=DOC20 Node=5a003b77  
DOS2.SYS Network#=DOC20 Node=1b0276a3
```

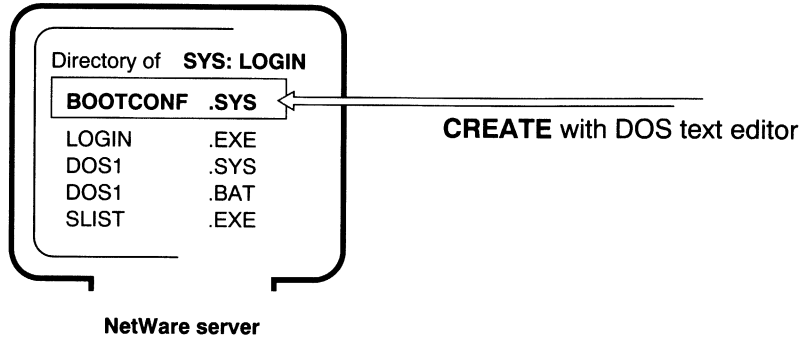
**15c. Repeat Steps 15a and 15b for each boot diskette.**

**16. Create a new, or modify the existing, BOOTCONF.SYS file in the SYS:LOGIN directory.**

The BOOTCONF.SYS file indicates to the client workstations which of the multiple boot image files to use. Create this file with an ASCII text editor and save the file to the SYS:LOGIN directory.

The following figure illustrates this process.

**Figure 6-4  
Creating a  
BOOTCONF.SYS  
file for Multiple  
Remote Boot Image  
Files**



The BOOTCONF.SYS file must have the following to function properly:

- ◆ All custom remote boot disk image filenames (do not include the default NET\$DOS.SYS file)
- ◆ The network address and node address of each workstation that uses the customized boot image files

**16a. Change to the SYS:LOGIN directory.**

**16b. Create or modify the BOOTCONF.SYS file to add information for each new remote boot image file.**

Include a line for each remote boot image file you created, using an entry format containing the following information:

- ◆ The number zero and the letter *x* (0*x*)
- ◆ The network address (the address must be 8 character in length. Use zeros as leader.)
- ◆ A comma (,)
- ◆ The node or station address the address must be 12 character in length. Use zeros as leader.)
- ◆ An equal sign (=)
- ◆ The boot disk image filename

An example for two boot diskettes follows:

```
00xDOC20,00005a003b77=dos1.sys,gns  
00xDOC20,00001b0276a3=dos2.sys,gns
```



You can use wildcard characters in the BOOTCONF.SYS file to specify one disk image file for multiple node addresses and allow for multiple lines per node address. See “Configuring the BOOTCONF.SYS File” on page 171 for more information.

**17. Copy the AUTOEXEC.BAT file from the boot diskette to the login directory specified in each user’s login script.**

You might get a “Batch file missing” error when you log in if the AUTOEXEC.BAT file is not copied to the user’s login directory.

**18. Flag the .SYS and .BAT files in the SYS:LOGIN directory as Shareable by typing**

```
FLG *.SYS SH <Enter>  
FLAG *.BAT SH <Enter>
```

Flagging the .SYS and .BAT files as Shareable ensures that the files are not locked by another workstation when booting.

## 19. Boot the remote workstations.

See “Booting Remote Workstations” on page 173 for details.

# Configuring the BOOTCONF.SYS File

When RPL loads, it searches the LOGIN directory of a NetWare server for a BOOTCONF.SYS file. If it finds the file, it reads the file into a memory buffer so that it can parse the file when a FIND frame is received from a workstation.



BOOTCONF.SYS parsing is done by the RPL utility, not by the bootstrap program, to minimize the amount of traffic on the network during the RPL process.

## Using Wildcard Characters in BOOTCONF.SYS

Wildcard characters (\* and ?) are allowed in the line specifying the node address of the client workstation. This allows the network supervisor more flexibility in building the BOOTCONF.SYS file.

The rules for these wildcard characters are as follows:

- ◆ Use the asterisk (\*) character to specify a range of digits in the node address.

For example, if the node address of the client workstation is 10005A123456, it can be specified as 0x\*123456 in BOOTCONF.SYS. In this example, RPL matches the node address with any node address that ends in 123456.

- ◆ Only one asterisk (\*) is allowed in the node address.
- ◆ Use the question mark character to specify any single digit in the node address.

Using the previous example, the node address could be specified as 0x?????123456, which is equivalent to 0x\*123456.

You can use wildcard characters to specify a default disk image file for all client workstations on the network that do not have a specific disk image file.

You do this by placing one of these lines as the last line in the BOOTCONF.SYS file:

**0x\* = DEFAULT.SYS**

**0x???????????? = DEFAULT.SYS**

Either one of these lines matches all client workstation node addresses. The DEFAULT.SYS (or any name you choose) disk image file is generated by DOSGEN, like any disk image file.

## Specifying Additional Multiple Disk Image Files per Node Address

Each line in the BOOTCONF.SYS file that contains a node address can specify more than one disk image filename, which should be separated by one or more blank characters and which must all fit on one line.

You can enter up to ten disk image filenames for each node address in BOOTCONF.SYS file.



This option is for Enhanced Boot PROMs only.

When the client workstation is started, the bootstrap program prompts you for the disk image file to boot.

For example, if a client workstation's node address is 10005A123456, the line

**0x10005a123456 = ONE.SYS TWO.SYS THREE.DOS**

in the BOOTCONF.SYS file causes the bootstrap program to display the following on the screen:

ONE.SYS TWO.SYS THREE.DOS

The bootstrap program then uses NetWare Core Protocol™ calls to open the selected disk image files.

If any of the filenames do not exist, the screen displays the following:

Unable to OPEN Disk Image File

Then the bootstrap program retries the operation.



## Allowing Multiple Lines per Node Address

This feature is convenient for specifying multiple parameters on the node address line.

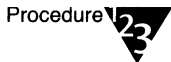
To use this feature, place an ASCII colon (:) at the end of the line. It must be preceded by at least one ASCII blank. For example:

```
0x10005a460025 = NET$DOS.SYS DOS1.SYS :  
DOS2.SYS
```

## Booting Remote Workstations

Boot a remote workstation by completing the following steps.

### Procedure



- 1. Ensure that the remote booting hardware is installed according to manufacturer's instructions.**

See "Installing a Remote Boot PROM Chip Certified by Novell" on page 149 for more information.

- 2. Ensure that the boot server is turned on and has the RPL.NLM or RLP.COM program loaded.**

See "Loading the RPL.NLM Program" on page 152 or "Loading the RPL.COM File" on page 153 for more information.

- 3. (Conditional) If you are attaching to a NetWare server across a source routing bridge, ensure that the RPL server is turned on and the RPL.COM file is loaded.**

See "Loading the RPL.COM File" on page 153 for more information.

- 4. Turn on the diskless workstation.**

- 5. Log in to the network or server.**

See "Logging In from a NetWare Client Workstation" on page 189 for details.

If you are using older Remote Boot PROMs, see “Determining the Remote Boot PROM Type” on page 150 for information.

If you experience any problems booting, see “Troubleshooting RPL with Older Remote Boot PROMs” on page 176 for more information.

## Using the RPLFIX.COM Utility

The RPLFIX utility allows workstations using the older Remote Boot PROM to boot properly with DOS 5.0 or later. Earlier versions of DOS do not require you to run this utility.

The RPLFIX utility modifies the boot image files, so you need to run it only once per image file.



Do not use the RPLFIX.COM utility with IBM RPL PROMs. The .RPL bootstrap programs are already RPLFIX aware.

Run the RPLFIX utility on the image files if the workstation hangs during the boot process or if you are using DOS 5.0 or later. See “Troubleshooting RPL with Older Remote Boot PROMs” on page 176 for more information on troubleshooting diskless workstations.

### Prerequisites

Before you run the RPLFIX utility, you should have the following:



- A client workstation logged in to the server you will create the disk images on
- A drive mapped to SYS:LOGIN
- Rights to the SYS:LOGIN directory
- A copy of the RPLFIX.COM file located in the SYS:LOGIN directory.  
See “Copying Newer RPL and Boot Files to the Server” on page 157 for more information.
- Boot image files for the diskless workstations already created in the SYS:LOGIN directory.  
See “Creating Remote Boot Disk Image Files” on page 162 for more information.

## Procedure

You must run the RPLFIX utility on each boot image file used by a workstation using an older Remote Boot PROM or DOS 5.0 or later.



### 1. Load the NetWare Client software.

### 2. Log in.

- ◆ If you are logging in to a NetWare 2 or 3 server, use the name SUPERVISOR.
- ◆ If you are logging in to a NetWare 4 network, use the name ADMIN or a username with ADMIN equivalency.

### 3. Enter a password (if needed).

### 4. Map the next drive to SYS:LOGIN by typing

```
MAP N SYS:LOGIN <Enter>
```

### 5. Change to the network drive that is mapped to the LOGIN directory.

For example, if you mapped network drive G: to LOGIN, type

```
G: <Enter>
```

### 6. Change to the LOGIN directory where the boot image files are located.

### 7. Run the RPLFIX utility by typing

```
RPLFIX [drive_letter:] boot_image_file <Enter>
```

Replace *drive\_letter* with the drive letter where the image file is located.

Replace *boot\_image\_file* with the name of the file created with the DOSGEN program.

If you created a single boot image file, the file is named NET\$DOS.SYS.

If you created multiple boot image files, look for all the files in the SYS:LOGIN directory with a .SYS extension.

Therefore, for example, if you created a single boot image file in the SYS:LOGIN directory on drive G:, you would type the following:

```
RPLFIX G:NET$DOS.SYS <Enter>
```

#### **8. Flag the boot image files you used the RPLFIX utility on as Shareable by typing**

```
FLAG *.SYS SH <Enter>
```

Flagging the boot files as Shareable ensures that the files are not locked by another workstation when booting.

#### **9. Boot the remote workstations.**

See “Booting Remote Workstations” on page 173 for more information.

## **Troubleshooting RPL with Older Remote Boot PROMs**

- ◆ If you get the error message “Error opening boot disk image file,” you should do one or all of the following:
  - ◆ Place a copy of the disk image file on the other server that your workstation is logging in to. You are probably attaching to another server that does not contain the remote boot disk image file.
  - ◆ Run the RPLFIX utility. see “Using the RPLFIX.COM Utility” on page 174 for more information.
  - ◆ Ensure that the BOOTCONF.SYS file is configured correctly. See “Configuring the BOOTCONF.SYS File” on page 171 for more information.
- ◆ If you get the error message “Batch file missing,” make sure the AUTOEXEC.BAT or unique .BAT file is in *both* the SYS:LOGIN directory and the user’s login directory for each user using a remote boot workstation.
- ◆ If a client workstation using a Remote Boot PROM doesn’t boot, test the boot image file diskette (bootable diskette) for that workstation.  
  
Insert the bootable diskette in a floppy drive on the remote boot client workstation or another workstation with a floppy disk drive.

Ensure that the client workstation you test the diskette on has the same hardware and software configurations as the remote boot workstation does.

Run the DOSGEN /V parameter to ensure that the disk image file is not corrupt.

- ◆ If a client workstation using a Remote Boot PROM doesn't boot, ensure that the type of Remote Boot PROM used supports the frame type used on your network.

The "old" type of Remote Boot PROM does not support the default 802.2 used with current Ethernet networks.

See "Determining the Remote Boot PROM Type" on page 150 for information about what frame types are supported.

- ◆ If a client workstation hangs after loading the LAN driver, replace the current LAN driver with a copy of the RPLODI.COM file and modify the change in the STARTNET.BAT file.
- ◆ If a client workstation hangs while loading DOS, run the RPLFIX utility.
- ◆ If you get the error message "Insert disk with \COMMAND.COM in drive A:," set the DOS COMSPEC parameter to drive F: (the default LOGIN directory) and copy the COMMAND.COM file to the LOGIN directory.

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for RPL	Chapter 2, "NetWare DOS Requester Options," in <i>NetWare Client for DOS and MS Windows Technical Reference</i>
Using command line options RPL	Chapter 3, "Command Line Parameters Reference," in <i>NetWare Client for DOS and MS Windows Technical Reference</i>





chapter

# 7

## **Setting Up NetWare Client Workstations to Log In**

### **Overview**

This chapter explains how to modify your NET.CFG file to simplify logging in to a NetWare® network.

Topic	Page
Modifying the NET.CFG File for Logging In to NetWare 2 and NetWare 3	180
Modifying the NET.CFG File for Logging In to NetWare 4	181
Understanding Logging In to NetWare Directory Services (For NetWare 4 only)	184

### **Introduction**

Proper client workstation setup can make logging in to the network virtually transparent. This chapter assumes that the following tasks are completed:

- ◆ A User object or user account is created for each user
- ◆ NetWare Client™ software is installed
- ◆ A home directory is created for each user

Important



Users with NetWare 2 or 3 client workstation connections to a Netware 4 network must have a User object created in the container where the bindery-based server's context is set. (Bindery services is set by default for every NetWare 4 server that is installed.) NetWare 2 or 3 users do not need to know their context because they log in to the server rather than to the Directory tree.

# Modifying the NET.CFG File for Logging In to NetWare 2 and NetWare 3

When logging in to a NetWare 2 or NetWare 3™ network, you attach to an individual server. Then you make additional attachments to other servers that you have a user account on.

## Using the Preferred Server Parameter

Use the Preferred Server parameter in the NET.CFG file to direct the client software to the server where your user information is located.

For networks with multiple servers, this parameter is very useful for speeding up logging in to the network. This parameter also allows you to log in with only your username.

The parameter is as follows:

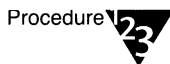
```
preferred server = server_name
```



Note

Do not use both the Preferred Server and Preferred Tree parameters simultaneously. The second parameter will override the first.

## Adding the Preferred Server Parameter to the NET.CFG File



Procedure

### 1. Open your NET.CFG file in a text editor.

Your client's NET.CFG file was copied to the target directory for DOS files specified during software installation.

### 2. Under the NetWare DOS Requester™ heading, type

```
preferred server=server_name
```

For example, type

```
preferred server=mktsales
```



## Example of the NetWare DOS Requester Section

```
NetWare DOS Requester
  Preferred Server=mktsales
  First Network Drive=f
```

## Modifying the NET.CFG File for Logging In to NetWare 4

When logging in to NetWare 4™, you don't attach to individual servers as with previous versions of NetWare, but you log in to the entire network.

With your Distinguished Name (DN), you can simplify the login process by adding information to your client workstation's NET.CFG file. To do this, you need to add lines under the NetWare DOS Requester heading in the NET.CFG file.

If you add lines for the following parameters, you will not need to type your Distinguished Name each time you log in to the network after booting your client workstation:

- ◆ Name Context
- ◆ Preferred Tree

You must know your name context before making these modifications, or you cannot add entries for the parameters. For information about setting your client workstation's name context, see "Understanding Logging In to NetWare Directory Services" on page 184.

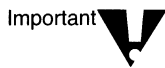
## Using the Name Context Parameter

By using the name context parameter in the NET.CFG file, you inform the NetWare DOS Requester of your name context within the Directory tree. The LOGIN utility can then locate your User object and connect you to the network.

The parameter is as follows:

```
name context="name_context"
```

The default for this parameter is at the root, which might cause confusion if duplicate usernames exist within a Directory tree.



If you are using an earlier version of the NetWare shell on your client workstation, the Name Context parameter is invalid. NetWare 4 creates a User object for client workstations using NetWare shell files in the same container as the NetWare Server object that you will log in to.

Bindery services is set by default for every NetWare Server object that is installed. Therefore, users log in directly to a server rather than to the Directory tree.

## Using the Preferred Tree Parameter

By using the Preferred Tree parameter in the NET.CFG file, you direct the NetWare DOS Requester to the Directory tree where your name context is set. The LOGIN utility can then save time by searching only the preferred Directory tree.

Add this parameter to your NET.CFG file if you are using NetWare 4 on a network with multiple Directory trees.

The parameter is as follows:

```
preferred tree=tree_name
```

The default for this parameter is at the root. Because of this, it is important that this parameter is used to avoid confusion if duplicate usernames exist within separate Directory trees.



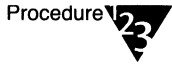
Do not use both the Preferred Server and Preferred Tree parameters simultaneously. The second parameter will override the first.

## Modifying the NetWare DOS Requester Option

The Netware DOS Requester option allows you to configure the way your client workstation software interacts with the network.

To modify this option's section in your NET.CFG file, complete these steps.

### Procedure



**1. Open your NET.CFG file with a text editor.**

The NET.CFG file is located in your client workstation directory. This is the destination directory specified during client software installation.

**2. Under the NetWare DOS Requester heading, type**

```
name context="complete_name"
```

For example, type

```
name context="esayers.sales.novell us"
```

**3. (Conditional) If your network has multiple Directory trees, type**

```
preferred tree=preferred_tree_name
```

For example, type

```
preferred tree=novell us
```

## Example of the NetWare DOS Requester Section

### NetWare DOS Requester

```
name context "Esayers.sales.novell us"  
preferred tree=novell us  
first network drive=f
```

## Understanding Logging In to NetWare Directory Services

NetWare Directory Services™ architecture makes logging in to the network convenient.

User information resides in a global database. Each user is assigned a position, or *context*, within the global database that informs the network where the user's User object is located in relationship to the entire network.



Note

In the NET.CFG file, the context of your User object is referred to as your *name context*.

Your User object is given a name called its *common name*. When you log in to the network, the LOGIN utility must know where your particular User object is located—its context.

Your User object's context also forms its *Distinguished Name*. The path from the object to the root of the tree constitutes the object's Distinguished Name, which is unique—different from all other objects' Distinguished Name.

Your User object's Distinguished Name is a bottom-up traversal of the tree, from the object up to the root.

## Using the Correct Format of Your Distinguished Name for Logging In to the Network

When you use a Distinguished Name of a User object, its common name is listed first, followed by a period (.); then the name of the Organizational Unit (a container object), also followed by a period; and on up through the Organization object name (and the Country object name, if used).

So your User object's Distinguished Name could be represented by

Common name.Organizational Unit name.Organization object name.Country object name

The actual structure of your Distinguished Name depends on the way your network is defined.

## Specifying the Name Type of an Object

A *name type* distinguishes the class of object that you are referring to, such as a User object or an Organizational Unit object.

For example, you could express

ESAYERS.SALES.NOVELL US

as

CN=ESAYERS.OU=SALES.O=NOVELL US

where CN is the common name of the User object, OU is the Organizational Unit name, and O is the Organization name.

When you move from one container object to another, you must always include the name type of an object when typing out its Distinguished Name or context.

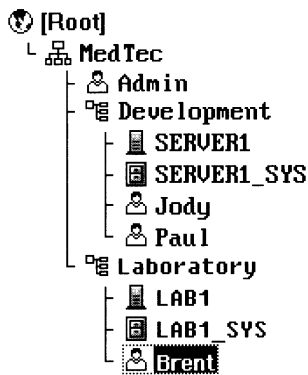


You also must always include the name types of the objects in Distinguished Names or contexts when you include the Country object in your Directory tree. Therefore, even when you refer to objects located in the same container object, you must designate their name types (CN, OU, or O).

## Changing Your Context

When you move from one container object to another, you *change contexts*. Whenever you change contexts, you might need to indicate the Distinguished Name of the object you are changing context to.

For example, in the following figure, if the User object named Brent located in Test.MedTec wants information from the Server object called SERVER1 that is located in the context Development.MedTec, then Brent must refer to the context of the Server object when changing context to access SERVER1.



Once you are logged in, use the following utilities to change the context of your User object within the Directory tree:

- ◆ The CX utility at the DOS command line
- ◆ The “Change Context” option in the NETUSER utility for DOS
- ◆ The “Drive Connections” window in NetWare User Tools for MS Windows

## Logging In to Your Context



### 1. Type

**LOGIN** *context* <Enter>

Replace *context* with your Distinguished Name. For example, type

**LOGIN ESAYERS.SALES.NOVELL US** <Enter>

### 2. Enter your user password (if required).

## Additional Information

For more details, see Chapter 1, “Understanding NetWare Directory Services,” in *Introduction to NetWare Directory Services*.







chapter

# 8

## ***Logging In from a NetWare Client Workstation***

### **Overview**

This chapter explains how to log in to a NetWare<sup>®</sup> server or network from a NetWare client workstation in the following ways.

<b>Topic</b>	<b>Page</b>
Logging In from the DOS Prompt	191
Logging In to a NetWare 2 or NetWare 3 Network	191
Logging In to a NetWare 4 Network	192
Logging In to NetWare 4 with a NetWare Bindery Connection	193
Logging In from MS Windows	193
Logging Out of a NetWare Server or Network	195

### **Introduction**

Logging in to a NetWare server or network is the procedure that provides your client workstation access to network resources such as network directories, printers, and applications.

When you initiate a login request, the NetWare operating system looks for your specific security rights and then prompts you to enter a password.

All security information is placed into the NetWare server's connection list and your client workstation is logged in.

At this point, the LOGIN utility executes one or more login scripts (which initialize environment variables, maps network drives, etc.).

With the necessary modifications made to your NET.CFG file, you need only your username and password to log in to a preferred server for NetWare 2 and NetWare 3™ networks, or a preferred tree and name context for NetWare 4™ networks.

## Prerequisites

Ensure the following before logging in:



- The NetWare Client™ software is loaded
  - ◆ If your client workstation can use an Open Data-Link Interface™ (ODI) network board driver, load the following software:  
  
LSL.COM  
Network board driver (for example, NE2000.COM)  
IPXODI.COM  
VLM.EXE
  - ◆ If your client uses only a dedicated IPX™ driver (not an ODI™ driver), load the following programs:  
  
IPX.COM  
VLM.EXE
- (Conditional: if using MS Windows) The NetWare Client software has been loaded before MS Windows was loaded
- (Recommended) The NET.CFG file is modified for login
  - ◆ If you do not modify the NET.CFG file, the Distinguished Name (complete name) for each login is required.

See Chapter 7, “Setting Up NetWare Client Workstations to Log In,” on page 179 for information.

# Logging In from the DOS Prompt

The login program connects your client workstation to a server or the network. The NetWare Client software automatically maps the first network drive of your client workstation.

See the following sections for specific login procedures:

- ◆ Logging In to a NetWare 2 or NetWare 3 Network (page 191)
- ◆ Logging In to a NetWare 4 Network (page 192)
- ◆ Logging In to NetWare 4 with a NetWare Bindery Connection (page 193)

## Logging In to a NetWare 2 or NetWare 3 Network



### 1. Change to the first network drive by typing

**F:** <Enter>

The NetWare DOS Requester™ software automatically maps the first network drive for your client workstation.

The default drive is F:. To change the default, edit the FIRST NETWORK DRIVE parameter in your NET.CFG file.

See Chapter 2, “NetWare DOS Requester Option,” in *NetWare Client for DOS and MS Windows Technical Reference* for procedures.

### 2. Log in to the network in one of the following ways:

#### 2a. If a default (preferred) server is set in your NET.CFG file, you can log in using only your username by typing

**LOGIN** *username* <Enter>

For example, type

**LOGIN** **ESAYERS** <Enter>

See Chapter 7, “Setting Up NetWare Client Workstations to Log In,” on page 179 for more details.

- 2b. **If a default (preferred) server is not set in your NET.CFG file, or if you want to log in to a server other than the default, type**

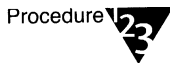
```
LOGIN servername\username <Enter>
```

For example, type

```
LOGIN TSMKT\ESAYERS <Enter>
```

3. **Enter your password (if required).**

## Logging In to a NetWare 4 Network



1. **Change to the first network drive by typing**

```
F: <Enter>
```

The NetWare DOS Requester software automatically maps the first network drive for your client workstation.

The default drive is F:. To change the default, edit the FIRST NETWORK DRIVE parameter in your NET.CFG file.

See Chapter 2, "NetWare DOS Requester Option," in *NetWare Client for DOS and MS Windows Technical Reference* for procedures.

2. **Log in to the network in one of the following ways:**

- 2a. **If your name context is set in your NET.CFG file, log in to the Directory tree using only your username by typing**

```
LOGIN username <Enter>
```

For example, type

```
LOGIN ESAYERS <Enter>
```

See Chapter 7, "Setting Up NetWare Client Workstations to Log In," on page 179 for more details.

**2b. To log in to a specific server, type**

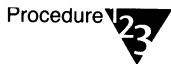
**LOGIN** *servername\username* <Enter>

For example, type

**LOGIN TSMKT\ESAYERS** <Enter>

**3. Enter your password (if required).**

## Logging In to NetWare 4 with a NetWare Bindery Connection



**1. Type**

**LOGIN** *server/username* /B <Enter>

Replace *server* with the name of the bindery server. Replace *username* with your username.

For example:

**LOGIN TSMKT/ESAYERS /B** <Enter>

**2. Enter your password (if required).**

## Logging In from MS Windows

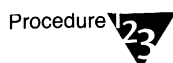
You can use the NetWare User Tools in MS Windows to log in to NetWare 2, NetWare 3, and NetWare 4 by completing these steps.



The “Login” option under NetWare User Tools for MS Windows authenticates you to NetWare Directory Services™ in NetWare 4 or to a NetWare server in NetWare 2 and NetWare 3 networks. It does not run a login script for your client workstation.

If you want to run a login script, your initial login should be done at the DOS command line with the LOGIN utility before loading MS Windows.

## Procedure



1. **Load the NetWare User Tools (NWUSER.EXE) by choosing the “NetWare User Tools” icon from the NetWare group.**

The “NetWare User Tools” interface screen appears.

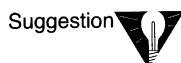
2. **From the menu bar, choose the “NetWare Connections” icon.**

The “NetWare Connections” window displays available resources.

3. **From the “Resources” list, choose the resource that you want to log in to.**

4. **Choose “Login.”**

You might be prompted to enter a password before login is completed. Choose the “Guest” radial button if you do not have an account established on the server or network that you want to connect to.



If you prefer logging in directly from MS Windows, you can simulate some login script functionality by using the “Permanent” option in the “NetWare Drive Connections” window to set up your client workstation drive mappings.

## Logging Out of a NetWare Server or Network

Logging out of a NetWare server or network is the procedure that breaks the network connections and deletes drive mappings and printer port captures that were made to the network.

If you log out without specifying a NetWare server name in the LOGOUT command, the client workstation's resource connections to all servers or to the network are terminated.

Therefore, to log out from one server and remain attached to the other servers, specify the server name in the LOGOUT command.

Also, make sure at least one of the remaining drives is mapped to the PUBLIC directory of a NetWare server that you are still attached to. Otherwise, you can't access NetWare utilities.

### Logging Out from DOS

Log out in one of the following ways:

- ◆ If you want to log out from the network or all connected servers, type

```
LOGOUT <Enter>
```

- ◆ If you want to log out from a specific server, type

```
LOGOUT servername <Enter>
```

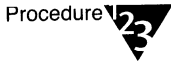
Replace *servername* with the name of the server you want to disconnect from. For example:

```
LOGOUT TSMKT <Enter>
```

## Logging Out from MS Windows

You can use the NetWare User Tools in MS Windows to log out from NetWare 2, 3, and 4 servers or networks by completing these steps.

### Procedure



1. **Load the NetWare User Tools by choosing the “NetWare User Tools” icon from the NetWare group.**

The “NetWare User Tools” interface screen appears.

2. **From the menu bar, choose the “NetWare Connections” icon.**

The “NetWare Connections” window displays available resources.

3. **Choose the resource that you want to log out from.**

4. **Choose “Logout.”**



## Where to Go from Here

After logging in, you can begin setting up your client workstation for additional networking support:

<b>If you want to</b>	<b>See</b>
Modify your NET.CFG file to simplify login	Chapter 7, "Setting Up NetWare Client Workstations to Log In," on page 179
Set up and modify your NET.CFG file	Chapter 2, "NET.CFG Options Reference," in <i>NetWare Client for DOS and MS Windows Technical Reference</i>
Improve client workstation performance	Chapter 1, "Optimizing the NetWare Client Software," in <i>NetWare Client for DOS and MS Windows Technical Reference</i>
Set up network drives and directories	Chapter 9, "Setting Up and Managing Network Drives," on page 199
Set up printing for a client workstation	Chapter 10, "Setting Up Client Workstation Printing," on page 217
Set up your client workstation to support applications running in a task-switching environment	Chapter 11, "Setting Up Network Support for Task-Switching Environments," on page 237





chapter

# 9

## ***Setting Up and Managing Network Drives***

### **Overview**

This chapter explains how to set up and manage network drives on your NetWare® client workstations.

<b>Topic</b>	<b>Page</b>
Using NetWare Utilities to Set Up and Manage Drive Mappings	201
The MAP Utility	202
The NetWare User Tools for DOS (the NETUSER Utility)	207
The NetWare User Tools for MS Windows (the NWUSER.EXE Program)	208
Using Universal Naming Convention (UNC) Paths in MS Windows	211

# Introduction

NetWare allows you to set up and manage network drives on each client workstation. This gives client workstations the ability to store and access files and applications in a central file system.

This ability is provided through drive mappings which specify particular locations within volumes and directories on the network.

These drive mappings permit easier navigation of the directory structure and access to hard disks on NetWare servers and other storage media, such as, CD-ROM devices and tape drives.

There are three types of drive mappings in a NetWare environment:

- ◆ Local drives

Point to disk drives installed in a client workstation. DOS reserves the first five letters (A–E) as local drive mappings.

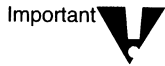
- ◆ Network drives

Point to specific volumes or directories on a network. The number of network drives you have available depends on the setting for the DOS LASTDRIVE parameter in the CONFIG.SYS file.

In previous versions of the NetWare Client™ software, the first network drive was always the first drive letter not reserved for local use. This setting was made with the DOS LASTDRIVE parameter in the CONFIG.SYS file.

Because the NetWare DOS Requester™ software is a redirector on the back end of DOS, it requires that the LASTDRIVE=Z parameter be added to the CONFIG.SYS file. The first network drive is now set in the NET.CFG file.

See “FIRST NETWORK DRIVE” under “NetWare DOS Requester Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information.



The NetWare DOS Requester uses the first available DOS drive *after* the FIRST NETWORK DRIVE parameter set in the NET.CFG.

Consequently, client workstations which accessed, for example, a LASTDRIVE = G parameter setting in their CONFIG.SYS are used to seeing drive H: as the first network drive and not the first drive letter after the last local drive letter.

To maintain compatibility with existing batch files, you might want to add, for example, the FIRST NETWORK DRIVE = H parameter setting under the NetWare DOS Requester heading in the NET.CFG file.

Otherwise, batch files assuming drive H: as the first drive must be altered.

◆ Search drives

Point to specific volumes or directories on a network and add the network volumes or directories to the DOS path.

## Using NetWare Utilities to Set Up and Manage Drive Mappings

NetWare provides you with the following three utilities to set up and manage network drives and search drives for each client workstation in your network:

◆ The MAP Utility

A DOS text utility available in all version of NetWare.

◆ The NetWare User Tools for DOS (the NETUSER Utility)

A DOS menu utility available only in NetWare 4 software.

◆ The NetWare User Tools for MS Windows (the NWUSER.EXE Program)

An MS Windows graphical utility available in the NetWare Client Kits for DOS and MS Windows, and in NetWare 3.12 and NetWare 4™ software.

For online help and information on available options, use the `/?` or `/H` parameter with text utilities and the F1 key with menu and graphical utilities.

## Prerequisites

Before you can use any of the drive mapping utilities, your client workstation requires the following:



- A physical connection to the network
- Novell DOS™, DR DOS®, PC-DOS, or MS-DOS loaded and running
- (Conditional: if using MS Windows) A copy of MS Windows 3.x or Windows for Workgroups 3.11 installed and running
- The NetWare Client files loaded and running  
See Chapter 5, “Installing or Upgrading NetWare Client Software,” on page 97 for more information.
- A connection to the network  
See Chapter 8, “Logging In from a NetWare Client Workstation,” on page 189 for more information.

## The MAP Utility

MAP allows you to assign drives to network directories. Use MAP to

- ◆ View drive mappings
- ◆ Create or change network or search drive mappings
- ◆ Assign a drive to a fake root directory (for applications that must use a root directory)

MAP is a NetWare workstation utility located in the SYS:PUBLIC directory. A default drive mapping should exist for the SYS:PUBLIC directory (the default is drive Z:).

To use the MAP utility, you would specify the type of drive mapping and assignment you want by using the following syntax:

```
MAP [option...] drive:= [volume:| path]
```

For example, if your username is MARIA and you want to map drive F: to your home directory on file server SALES, you would type

```
MAP F:= SALES\SYS:HOME\MARIA <Enter>
```

See the following references for more information about the MAP utility:

Version	Reference
NetWare 2	"MAP" in <i>Using the Network</i>
NetWare 3	"MAP" in <i>Utilities Reference</i>
NetWare 4	"MAP" in <i>Utilities Reference</i>

### Assigning Drive Mappings in a Specific Order

In many cases, you might find it useful to map network drives in the following order:

- ◆ Map the first network drive to the user's home directory.
- ◆ If users are running MS Windows from the network, map a drive to each user's directory that contains user-specific files.
- ◆ Map remaining drives to any directories that users work in frequently, such as project directories or network applications.

### Assigning Drive Mappings for Diverse Environments

Instead of specifying drive letters such as H or G, it can be useful to use an asterisk followed by a number *n* to represent the *n*th network drive.

For example, if your first network drive is F: and you use "MAP \*3:=", then that drive is assigned as H: (because MAP \*1:=F:, MAP\*2:=G:, MAP\*3:=H:, etc.). Or, if your first network drive is D: and you use "MAP \*4:=", that drive is assigned as G:.

This allows drive letters to reorder themselves automatically when local drives are removed or added or when the first network drive is changed.

This also allows users to log in from workstations with a different number of local drives than their regular workstations.

You can map a local drive (usually A: through C:) to a network directory, but you cannot access the local drive until you remove the network drive mapping.

You cannot map a redirected drive, such as a CD-ROM drive, to a network drive.

## Assigning Search Drives

You can add network volumes or directories to the DOS path by using the SEARCH drive option in the MAP utility. This is useful for network applications and files that you want access to regardless of the current directory you are working in.



Note

There is a maximum of 16 NetWare search drives allowed.

When you map a search drive, you use a search drive number (an S followed by a number). This search drive number assigns the next available drive letter to the mapping, starting with Z and working backwards through the English alphabet.

The letter is put into the DOS path statement. If you already have drives in the path statement, MAP S1 will overwrite the first one in the path.

To prevent search drive assignments from overriding existing DOS PATH letters, use the INSERT option when assigning search drives. For example, type "MAP INS S16:=*path*".

To ensure that you can access NetWare utilities, DOS directories, and applications, you should map search drives to the following directories *in the order given*:

- ◆ Map the first search drive (S1:) to the SYS:PUBLIC directory, which contains the NetWare utilities for DOS and MS Windows client workstations.
- ◆ Map the second search drive (S2:) to the DOS directory if you access DOS from the network.



- ◆ Map the third and subsequent search drives (S3:, S4:, etc.) to directories containing network applications, project files and frequently used data directories.
- ◆ If you are running MS Windows from the network, map a search drive to the MS Windows directory for the MS Windows group.

To avoid inadvertently changing the order of any search drives that must be mapped to a specific drive letter, you can map all remaining search drives with the number S16: or use INS to insert a drive mapping.

If you have an application that requires a particular drive letter, you can use the following command to map the search drive:

**MAP S16:=drive:=path**

If you map a search drive using a number already assigned to a search drive, NetWare makes the old search drive a network drive.

### Assigning Drives to Directory Map Objects (NetWare 4 only)

Another way to map a drive to a directory is to create a Directory Map object that points to the directory. Then, if you move the directory, you need to change only the Directory Map object rather than all assignments to that directory.

For example, to map a search drive to a Directory Map object whose Distinguished Name is APPL.SALES\_LA.NOVELL\_US, type

**MAP S2:=.APPL.SALES\_LA.NOVELL\_US <Enter>**

In the above example, the Directory Map object's name begins with a period, which indicates that the drive is mapped to the drive root.

If your User object exists in the same context as the Directory Map object, such as the example SALES\_LA.NOVELL\_US, the MAP command does not have to specify the Distinguished Name for the Directory Map object.

Instead, you would type

**MAP S2:=APPL <Enter>**



Note

It is best to use Map objects in your current context. Don't use Distinguished Names that point to other contexts. If your map is in another context, you should create an alias that points to the real Directory Map object. See "Alias object" in *Concepts* for more information.

See Chapter 3, "Creating Login Script," in *Supervising the Network* for more information about Directory Map objects.

## Using Login Scripts or Profiles to Make Drive Mappings Permanent

You can use login scripts or profiles to automatically set up drive mappings when you log in to the network. Login scripts and profiles are similar to configurable batch files and are executed by the LOGIN utility.

You can use login scripts and profiles to

- ◆ Map drives and search drives to directories
- ◆ Display messages
- ◆ Set environment variables
- ◆ Execute programs or menus

Login scripts and profiles work the same way for both DOS and MS Windows workstations. However, you must run a login script or profile *before* loading MS Windows. You cannot run them from an MS Windows session or DOS box.

See the following references for more information about login scripts and profiles:

Version	Reference
NetWare 2	"Plan and Create Login Scripts," in "Logging in and out" of <i>Using the Network</i>
NetWare 3	Chapter 4, "Creating Login Scripts," in <i>Installation and Upgrade</i>
NetWare 4	Chapter 3, "Creating Login Scripts," in <i>Supervising the Network</i>

## The NetWare User Tools for DOS (the NETUSER Utility)

NETUSER allows you to assign drives to network directories. Use NETUSER to

- ◆ View drive mappings
- ◆ Create or change network or search drive mappings
- ◆ Assign a drive to a fake root directory (for applications that must use a root directory)

NETUSER is a NetWare workstation utility located in the SYS:PUBLIC directory. A default drive mapping should exist for the SYS:PUBLIC directory (the default is drive Z:).

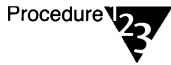


Note

The NETUSER utility is available in NetWare 4 networks only.

Specify the type of drive mapping and assignment you want by completing the following procedure.

### Procedure



Procedure

**1. Change to the SYS:PUBLIC directory.**

**2. Load NetWare User Tools for DOS by typing**

**NETUSER** <Enter>

The NETUSER utility menu appears.

**3. Choose “Drives.”**

The “Available Options” window appears.

**4. Choose “Drive Mapping” or “Search Mapping” from the list.**

Either the “Current Drive Mappings” or the “Current Search Mappings” window appears.

**5. To add a network or search drive mapping, press <Ins> and follow the screen prompts.**

## 6. Exit NETUSER.

Press <Esc> until the “Exit?” menu box appears. Then select “Yes” and press <Enter>.

Or press <Alt>+<F10> anywhere within NETUSER to display the “Exit?” menu box. Then select “Yes” and press <Enter>.

## The NetWare User Tools for MS Windows (the NWUSER.EXE Program)

The NetWare User Tools for MS Windows program allows you to assign drives to network directories using the “Drive Connections” window. Use this window to

- ◆ View drive mappings
- ◆ Create or change network drive mappings
- ◆ Assign a drive to a fake root directory (for applications that must use a root directory)

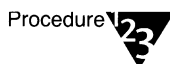
The NETWARE.DRV file provides the drive mapping function for the NetWare User Tools for MS Windows. It resides in the SYSTEM subdirectory of your MS Windows directory (the default is C:\WINDOWS\SYSTEM).



The NetWare User Tools for MS Windows program is available in NetWare 3.12 and NetWare 4, and in NetWare Client Kits for DOS and MS Windows packages.

Specify the type of drive mapping and assignment you want by completing the following procedure.

### Procedure



1. **Run MS Windows.**
2. **Press <F6> or select the “NetWare User Tools” icon in the NetWare program group.**

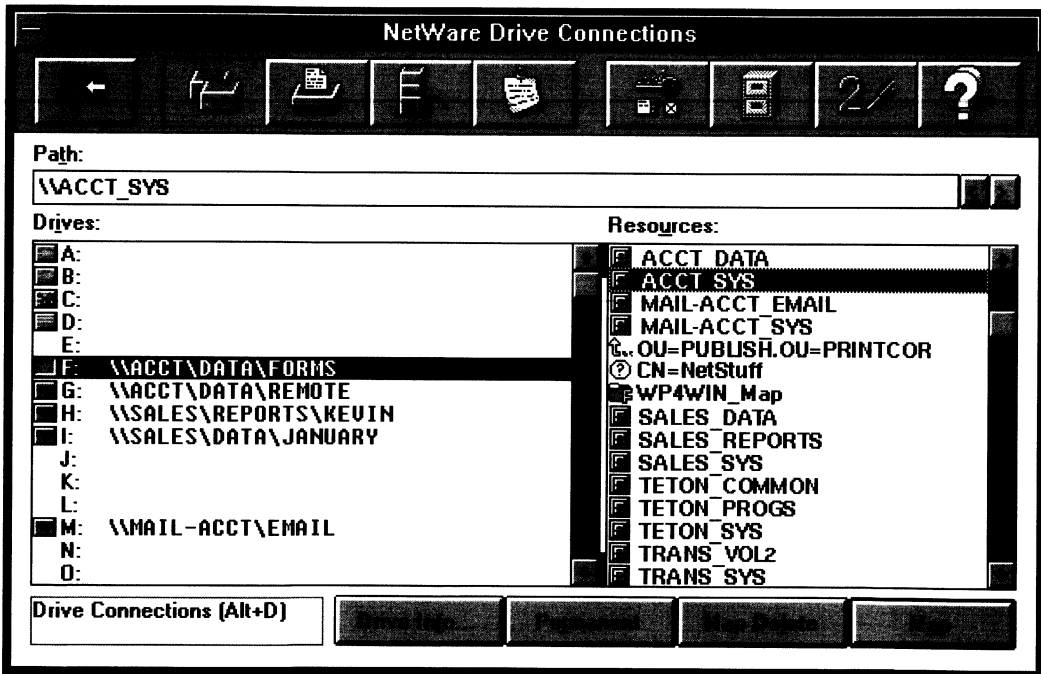
If the icon is not displayed, you can also access NetWare User Tools for MS Windows by creating a Program object in the MS Windows Program Manager with NWUSER.EXE. (The NWUSER.EXE file is in your target directory for the client installation.)

3. Choose "NetWare Drive Connections."
4. From the "Resources" list, select the resource you want to connect to, and then choose a client workstation drive.
5. Choose "Map" at the bottom of the window.

If you are using keyboard entry, first type in the full path for the drive mapping inside the "Path" field, and then choose "Map."

For example, the following figure illustrates the drive mapping REPORTS\SYS\WORD to the client workstation drive P: using the "NetWare Drive Connections" window.

Figure 9-1  
"NetWare Drive Connections" Window



## Using the “NetWare Drive Connections” Window

Remember the following:

- ◆ Before using “NetWare Drive Connections,” you must first log in to a Directory tree or a server that contains the object you want to connect to.
- ◆ NetWare User Tools for MS Windows recognizes all drive mappings that existed before MS Windows was started.

However, when you are using a DOS Box inside MS Windows, your previous search drives are disabled.

## Viewing the “Resources” List

The “Resources” list contains the following:

- ◆ Volumes
- ◆ Directories
- ◆ NetWare Directory Services™ objects
- ◆ NetWare Directory Services containers

The volumes and directories are listed in a hierarchical structure. To display subdirectories, choose the “Volume” icon from the “Resources” list.

## Making Drive Mappings Permanent

You can use the “Permanent” setting in the “NetWare Drive Connections” window much like a login or profile script in DOS.

After creating a drive mapping, make it permanent by opening the “NetWare Settings” window and marking the “Restore During Startup” box. (The “NetWare Setting” button is on the upper button bar, represented by a icon with a key, a check box, and a screen.)

Each time you load MS Windows, the NetWare User Tools automatically restores the drive mappings you made permanent in a previous session.

# Using Universal Naming Convention (UNC) Paths in MS Windows

NetWare supports the use of Universal Naming Convention (UNC) redirection for path statements in dialog boxes within the following MS Windows conventions:

Program Group (.GRP) Files  
Program Items Files  
Program Information Files (PIFs)  
Referencing Files

UNC paths provide you with

- ◆ The ability to use a network resource without formally mapping to it
- ◆ The use of applications and programs within MS Windows to access network volumes and directories
- ◆ The ability to assign network applications, volumes, and directories to icons within MS Windows

## Program Group (.GRP) Files

To have access to program groups located on a network server without formally mapping to the resource, use UNC redirection in the “Program Group Properties” dialog boxes as follows.

### Procedure



1. From the Program Manager “File” menu, choose “New.”
2. Select “Program Group” and then choose “OK.”

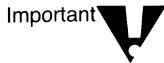
3. In the “Group File” text box, enter the UNC path for the .GRP file.

To assign a path, enter

```
\\servername\volume\path\groupname.GRP
```

For example, to assign the DATABASE.GRP file on the server ACCOUNTING, you could enter

```
\\ACCOUNTING\SYS\APPS\DATABASE.GRP
```

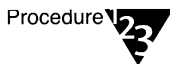


If you are redirecting a resource that is a NetWare Directory Services object in NetWare 4, you must specify *three* backslashes (\\\) before the servername.

## Program Items Files

To have access to program items located on a network server without formally mapping to the resource, use UNC redirection in the “Program Item Properties” dialog boxes as follows.

### Procedure



1. From the Program Manager “File” menu, choose “New.”
2. Select “Program Item” and then choose “OK.”
3. In the “Command Line” text box, enter the UNC path for the application.

To assign a path, enter

```
\\servername\volume\path\filename
```

For example, to assign a path to an MS Windows word processing application called WRDPRC.EXE on the server MARKETING, you could enter

```
\\MARKETING\SYS\APPS\WRDPRC.EXE
```



If you are redirecting a resource that is a NetWare Directory Services object in NetWare 4, you must specify *three* backslashes (\\\) before the servername.



When using UNC paths for programs, you might receive the following message:

The specified path points to a file that may not be available during later Windows sessions. Do you want to continue?

If you choose “Yes,” then the icon for the program item is built.

UNC redirection for programs is dependent upon the modules or parts that the program uses, where they are located, and how they are loaded. UNC might not function for all applications.

UNC redirection can work even if the executable file relies on another file to run. For example, if the MS-DOS 5.0 EDIT.COM and QBASIC.EXE files (the latter is needed to run the former) are both copied onto the network share, UNC redirection works properly.

## Program Information Files (PIFs)

To have access to a DOS application located on a network server without formally connecting to the resource, use UNC redirection in the PIF command line as follows.

### Procedure



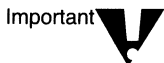
1. Run the PIF Editor.
2. In the “Program Filename” text box, enter the UNC path for the application.

To assign a path, enter

```
\\servername\volume\path\filename
```

For example, to assign a path to an DOS word processing application called WRDPRC.EXE on the server MARKETING, you could enter

```
\\MARKETING\SYS\APPS\WRDPRC.EXE
```



If you are redirecting a resource that is a NetWare Directory Services object in NetWare 4, you must specify *three* backslashes (\\\) before the servername.

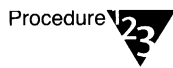
UNC redirection for programs is dependent upon the modules or parts that the program uses, where they are located, and how they are loaded. UNC redirection might not function for all applications.

UNC redirection can work even if the executable file relies on another file to run. For example, if the MS-DOS 5.0 EDIT.COM and QBASIC.EXE files (the latter is needed to run the former) are both copied onto the network share, UNC redirection works properly.

## Referencing Files

To copy or move files and directories to a network volume or directory, or to open a file or save it as another filename, without formally mapping to the resource, you can use UNC redirection as follows.

### Referencing Files and Directories in the “File” or “Move” Text Box



1. **Run File Manager.**
2. **Select the file you want to copy or move.**
3. **From the “File” menu, choose “Move” or “Copy.”**
4. **In the “To” text box, enter the UNC path.**

To assign a path, enter

```
\\servername\volume\path\
```

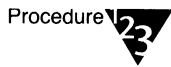
For example, to assign a path in order to move or copy a file to the SYS:CONTACT directory on the server SALES, you would enter

```
\\SALES\SYS\CONTACTS\
```



If you are redirecting a resource that is a NetWare Directory Services object in NetWare 4, you must specify *three* backslashes (\\) before the servername.

## Referencing a File in the “Open” or “Save As” Text Box



1. Run File Manager.
2. From the “File” menu, select “Open” or “Save As.”
3. In the “File Name” text box, enter the UNC path including the filename.

Enter

```
\\servername\volume\path\filename
```

For example, to assign a path to open the REPORTS.TXT file in the SYS:CONTACT directory on the server SALES, you would enter

```
\\SALES\SYS\CONTACTS\REPORTS.TXT
```



If you are redirecting a resource that is a NetWare Directory Services object in NetWare 4, you must specify *three* backslashes (\\) before the servername.

## Additional Information

Topic	Reference
NetWare drives	“Drive mapping” in <i>NetWare 4 Concepts</i>
NetWare file system (directory structure)	“Directory structure” in <i>NetWare 4 Concepts</i>
NetWare volumes	“Volume” in <i>NetWare 4 Concepts</i>





chapter

# 10

## Setting Up Client Workstation Printing

### Overview

This chapter explains how to set up network printing on your NetWare® client workstation.

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The CAPTURE Utility	219
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### Introduction

NetWare uses a print queue, a print server, and often a print driver to allow several network client workstations to print to a network printer.

The print server takes print jobs from the print queue and sends them to the printer. A print driver is used in cases where the application that the print job is being sent from is not NetWare Aware™ (not developed using NetWare APIs) and, therefore, it requires specific setup so that communication from the application to the printer is in a language that the printer understands.

Printing from DOS and MS Windows client workstations is usually accomplished through applications. Many applications require you to install print drivers that are specific to that program.

If you are logged in to the network and your application supports direct printing through NetWare, you do not have to perform any setup.

If you want to print from an application which is not NetWare Aware, or print directly from the screen, you must set up and configure your local printerport (LPT1) to send print jobs to a print queue.

## Using NetWare Utilities to Set Up Network Printing

NetWare provides you with the following three utilities to set up printing for client workstations in your network:

- ◆ The CAPTURE Utility

A DOS text utility available in all version of NetWare.

- ◆ The NetWare User Tools for DOS (the NETUSER Utility)

A DOS menu utility available in NetWare 4™ only.

- ◆ The NetWare User Tools for MS Windows (the NWUSER.EXE Program)

An MS Windows graphical utility available in the NetWare Client™ Kits for DOS and MS Windows, and in NetWare 3.12 and NetWare 4 software.

For online help and information on available options, use the `/?` or `/H` parameter with text utilities and the F1 key with menu and graphical utilities.

## Prerequisites

Before you can use any of the print setup utilities, your client workstation requires the following:



- A physical connection to the network
- Novell® DOS™, DR DOS®, PC-DOS, or MS-DOS loaded and running
- (Conditional: if you are using MS Windows) A copy of MS Windows 3.x or MS Windows for Workgroups 3.11 installed and running
- The NetWare Client™ files loaded and running  
See Chapter 5, “Installing or Upgrading NetWare Client Software,” on page 97 for more information.
- A connection to the network  
See Chapter 8, “Logging In from a NetWare Client Workstation,” on page 189 for more information.
- Access to network printing resources

## The CAPTURE Utility

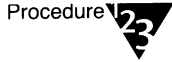
Use CAPTURE to

- ◆ Set up connection to print queues
- ◆ Control network printing
- ◆ View information about network printing
- ◆ Redirect a printer port to the network

## Using CAPTURE at the Command Line

Use CAPTURE at the command line to set up printing by completing the following procedure.

### Procedure



1. **Type the following command at a DOS prompt:**

**CAPTURE** [*option*] <Enter>

See Chapter 3, "Command Line Parameters Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for a listing of available options and descriptions.

2. **(Conditional) If you are running applications that print to a port, such as LPT1, set up the correct print driver within each application for the printer you are sending jobs to.**

See the manufacturer's documentation for information about print drivers.

Once you have captured a port to a network printer or print queue, all printing from the screen or applications to LPT1 will be redirected to the designated server and queue.



You can't use CAPTURE with COM ports (you can use it only with LPT ports). However, the DOS MODE command allows you to redirect COM ports to LPT ports. For more information, see your DOS manual or the documentation that came with your printer.



## Example

An example of a common command line statement for the CAPTURE utility is as follows:

```
CAPTURE /Q=LASERJET4 /S=SALES /P=P1 /TI=5
```

This command indicates the following:

- ◆ Capture to print queue LaserJet4
- ◆ The server connection is to Sales
- ◆ Capture to network printer P1
- ◆ Timeout in 5 seconds

## Using CAPTURE Login Scripts or Profiles

You can use login scripts or profiles to automatically set up port captures when you log in to the network. Login scripts and profiles are similar to configurable batch files and are executed by the LOGIN utility.

You can use login scripts and profiles to

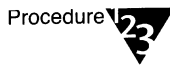
- ◆ Capture ports to network printer and queues
- ◆ Display messages
- ◆ Set environment variables
- ◆ Execute programs or menus

Login scripts and profiles work the same way for both DOS and MS Windows workstations. However, you must run the login script or profile *before* loading MS Windows. You cannot run them from an MS Windows session or DOS box.

See the following references for more information about login scripts and profiles:

Version	Reference
NetWare 2	“Plan and Create Login Scripts,” in <i>Using the Network</i>
NetWare 3	Chapter 4, “Creating Login Scripts,” in <i>Installation and Upgrade</i>
NetWare 4	Chapter 3, “Creating Login Scripts,” in <i>Supervising the Network</i>

## Setting the Number of Available Printer Connections



1. **Edit the NetWare Client configuration (NET.CFG) file with an ASCII text editor.**

2. **Add the following lines to the file:**

```
NetWare DOS Requester  
network printers = number
```

Replace *number* with the number of printer connections.

Maximum = 9

Default = 3

For example, to allow for the maximum number of printer connections, you would type

```
NetWare DOS Requester  
network printers = 9
```

3. **Save your changes and exit the ASCII text editor.**

## The NetWare User Tools for DOS (the NETUSER Utility)

NETUSER allows you to assign LPT ports to network printers and queues.

Use NETUSER to

- ◆ Set up print queues
- ◆ Control network printing
- ◆ View information about network printing
- ◆ Redirect a printer port to the network

The NETUSER utility is a NetWare workstation utility located in the SYS:PUBLIC directory. A default drive mapping should exist for the SYS:PUBLIC directory (the default is drive Z:).

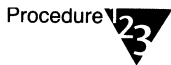


Note

The NETUSER utility is available in NetWare 4 networks only.

Specify the port assignment you want by completing the following procedure.

### Procedure



Procedure

1. **Change to the SYS:PUBLIC directory.**
2. **Load NetWare User Tools for DOS by typing**

**NETUSER** <Enter>

The NETUSER utility menu appears.

3. **Choose “Printing.”**

The “Available Ports” window appears.

4. **Choose a port from the list.**

The “Available Options” window appears.

## 5. Choose “Change Printers.”

The “Printer/Print Queues” window appears.



If the print queue you want to capture is not listed, make sure that you chose the correct server containing this print queue.

## 6. Select a print queue name from the list.

If you don’t know the queue name, use the arrow keys to scan the list of available print queues.

## 7. To capture the print queue to the port you specified, press <Enter>.

Your screen then returns to the previous window, and your current client workstation information in the top portion of the screen is updated.

## 8. Exit NETUSER.

Press <Esc> until the “Exit?” menu box appears. Then select “Yes” and press <Enter>.

Or press <Alt>+<F10> anywhere within NETUSER to display the “Exit?” menu box. Then select “Yes” and press <Enter>.

If you are running applications that print to a port, such as LPT1, see the manufacturer’s documentation for information about print drivers.

## The NetWare User Tools for MS Windows (the NWUSER.EXE Program)

Setting up client workstation printing in MS Windows requires you to first set up the Print Manager in MS Windows, and then access the “NetWare Printer Connections” option in NetWare User Tools for MS Windows.

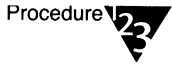
The NETWARE.DRV file provides the port capturing function for the NetWare User Tools for MS Windows. It resides in the SYSTEM directory of your MS Windows directory (The default is C:\WINDOWS\SYSTEM).



The NetWare User Tools program is available in NetWare 3.12 and NetWare 4 software, and in NetWare Client Kits for DOS and MS Windows packages.

Specify the port assignment you want by completing the following procedure.

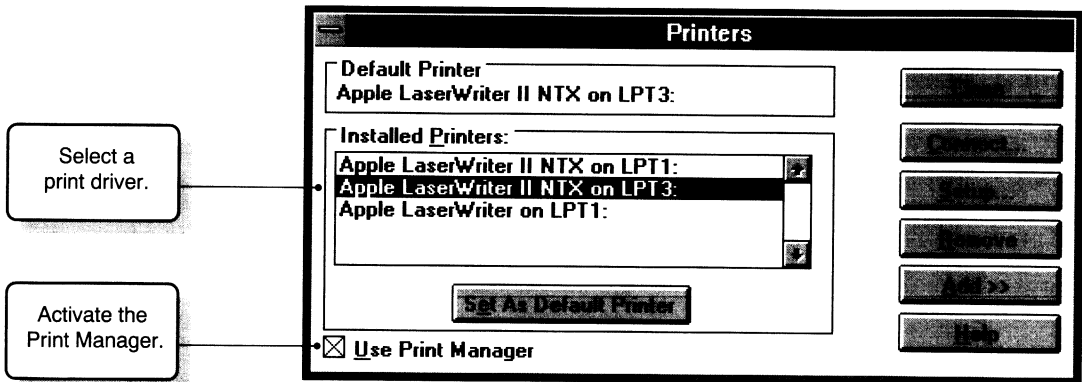
### Procedure



1. Run MS Windows.
2. Open the Print Manager.
  - 2a. In the MS Windows Control Panel, choose the “Printer” icon.

The “Printers” dialog appears.

Figure 10-1  
“Printers” Dialog



- 2b. Mark the “Use Print Manager” box.

The Print Manager is activated.

### 3. From the “Installed Printers” list, select a printer.

If the printer you want is not listed:

- ◆ Choose “Add” to display the list of available printers.
- ◆ Select the printer you want from the “List of Printers.”
- ◆ Choose “Install.”

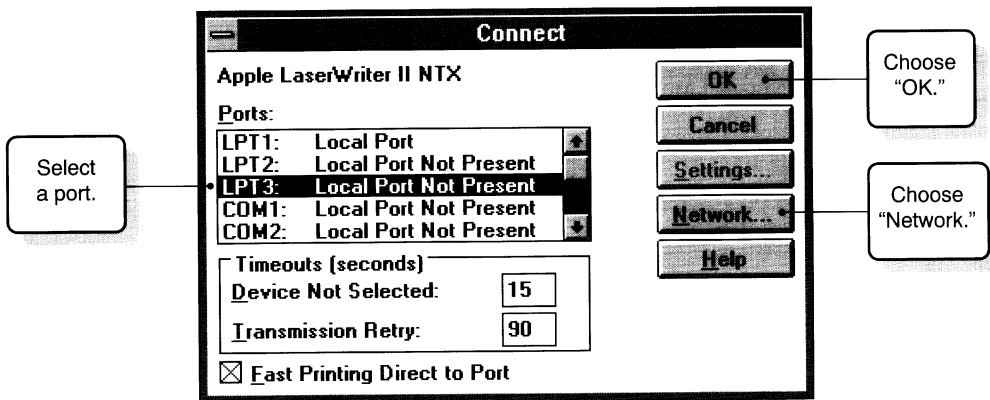
MS Windows prompts you to insert an MS Windows diskette and then copies the print driver for the selected printer to the MS Windows directory.

### 4. Assign printing ports to network print queues.

#### 4a. From the “Printers” dialog, choose “Connect.”

The “Connect” dialog appears.

Figure 10-2  
“Connect” Dialog



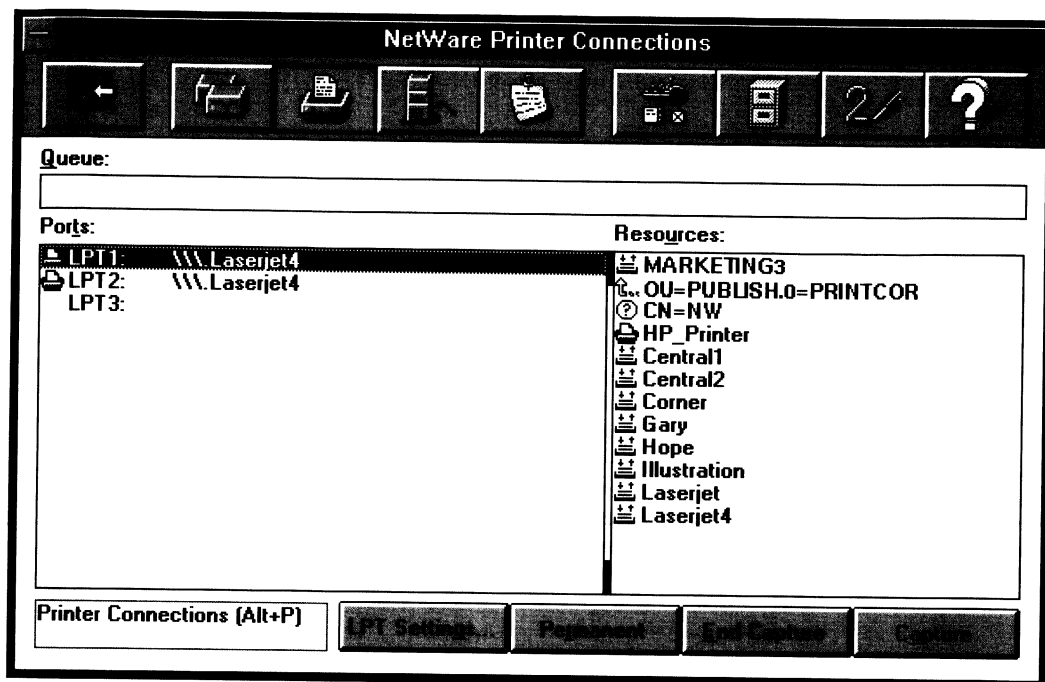
#### 4b. Select a port from the “Ports” list.

If you have a local printer, we recommend that you leave it assigned to the port that it is already connected to.

#### 4c. Choose “Network.”

The “NetWare Printer Connections” window appears.

Figure 10-3  
"NetWare Printer Connections" Window



- 4d. Choose the same port from the "Ports" list that you selected in Step 4b on page 226.
- 4e. Choose a print queue name from the "Resources" list.  
If you don't know the queue name, use the browser to see available print queues.
- 4f. Choose "Capture."
- 4g. Exit the "NetWare Printer Connections" window by choosing the "Exit" button (the left-most button of the upper menu bar).

You return to the "Connect" dialog you were in at Step 4a.

**4h. Choose “OK.”**

You return to the “Printers” dialog you were in at Step 2a.

**4i. Choose “Close” to exit the “Printer” dialog.**

You return to the Control Panel.

**5. Close the “Control Panel” window.**

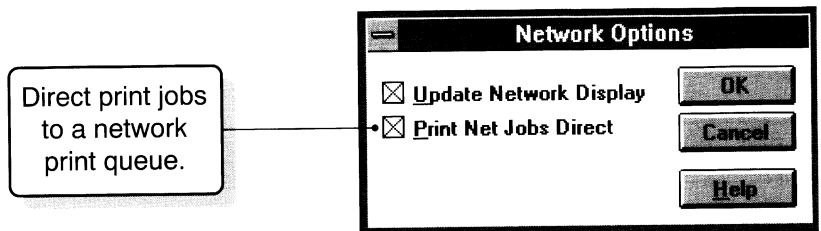
**6. Choose the “Print Manager” icon.**

**7. From the “Print Manager” window, select “Options.”**

**8. From the “Options” menu, choose “Network Settings.”**

The “Network Options” dialog appears.

**Figure 10-4**  
**“Network Options”**  
**Dialog**



**9. Mark the “Print Net Jobs Direct” checkbox.**

With this option marked, MS Windows bypasses the Print Manager and prints directly to the network print queue, giving you optimal printing performance.

**10. Exit the “Network Options” dialog box by choosing “OK.”**

If you are running applications that print to a port, such as LPT1, see the manufacturer’s documentation for information about print drivers.



## Using a Local Printer on the Network

To access a parallel or serial printer through the network that is cabled to a workstation running MS Windows 3.0 or 3.1, do only *one* of the following:

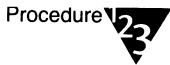
- ◆ Configure the printers to use polled mode instead of a specific interrupt number.
- ◆ Set the workstation to use a specific interrupt.

Add the following lines to the SYSTEM.INI file under the [386Enh] section:

```
lpt1autoassign=0  
lpt1irq=-1
```

Replace *lpt1* with the port that the printer is cabled to (LPT2, COM1, COM2, etc.).

## Setting the Number of Available Printer Connections



1. **Open the Netware Client configuration (NET.CFG) file in an ASCII text editor.**
2. **Add the following lines to the file:**

```
NetWare DOS Requester  
network printers = number
```

Replace *number* with the number of printer connections.

Maximum = 9

Default = 3

For example, to allow for the maximum number of printer connections, you would type

```
NetWare DOS Requester  
network printers = 9
```

3. Save the changes and then close the NET.CFG file.
4. Open the MS Windows WIN.INI file in an ASCII text editor.
5. Add as many lines as you need under the [port] section.

For example:

```
[port]
lp1:=
lp2:=
lp3:=
lp4:=
net1:=
record.prn=
```

Add a filename to a line under the [ports] option to have print files print directly to this file. The filename should have a .PRN file extension followed by an equal sign.

This causes the named file to appear in the Control Panel "Printer Configuration" dialog box. Any print jobs sent to this file direct their output to it.

# Using Universal Naming Convention (UNC) Port Redirection in MS Windows

NetWare supports the use of Universal Naming Convention (UNC) redirection for entries in the [ports] section of the WIN.INI file.

UNC port redirection provides you with the ability to use a network print resource without formally capturing a port to it.

## Prerequisites

Before setting up UNC redirection for network printers and queues, your client workstation requires the following:



- The NetWare User Tools and NetWare Client files for MS Windows loaded and running

See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.

- A connection to the network

See Chapter 8, "Logging In from a NetWare Client Workstation," on page 189 for more information.

- Access to network printing resources

- Any necessary modifications to the NET.CFG file made for the number of network printer connection allowed

See "Setting the Number of Available Printer Connections" on page 229 for more information.

To print to a network resource without formally capturing a port to it, use UNC port redirection as explained in the following procedure.

## Procedure

Procedure



1. Open the MS Windows WIN.INI file in an ASCII text editor.
2. Add the necessary lines under the [ports] section for the printers or queues you want to set up.

For example:

```
[ports]
lpt1:=
lpt2:=
\\servername\queuename=
```

For example, to set up a UNC port redirection for the print queue LASERJET4 on server MARKETING, you would add the following lines:

```
[ports]
lpt1:=
lpt2:=
\\marketing\laserjet4=
```

Important



If you are redirecting a resource that is a NetWare Directory Services™ object in NetWare 4, you must specify *three* backslashes (\\\) before the servername.

3. Save your changes and exit the ASCII text editor.
4. Run MS Windows.
5. Open the Control Panel.
6. Choose the “Printers” icon.
7. Choose “Connect.”
8. Select the new port.
9. Exit the Control Panel.
10. Send a print job from any application to the new port.

When you print to this printer, the output is redirected to the network printer defined by the UNC entry in the [ports] section.



Note When this port is selected in the “Printers Connect” dialog box in Control Panel, the “Network” button will be dimmed (unavailable). When a standard LPT port is selected, the “Network” button is available again.

UNC redirection for programs is dependent upon the modules or parts that the program uses, where they are located, and how they are loaded. UNC redirection might not function for all applications.

## Additional Information

Topic	Reference
Setting up printing functionality in the NET.CFG file	Chapter 2, “NetWare DOS Requester Option,” in <i>NetWare Client for DOS and MS Windows Technical Reference</i>
Setting up print queues	“Print queue” in <i>NetWare 4 Concepts</i>
Setting up print servers	“Print server” in <i>NetWare 4 Concepts</i>
Setting up network printing	Chapter 2, “Planning and Setting Up NetWare Print Services” in <i>Print Services (NetWare 4 only)</i>





# ***Integration with Other Systems***

## **Overview**

Novell® has a scalable, modular family of networking services to support your range of information-sharing needs.

The NetWare® Client™ software was designed to integrate with many of the industry standard networking services to provide heterogeneous connectivity and client-server solutions for your client workstations.

# Contents

This section is divided into six chapters, with the following information discussed on the indicated pages:

<b>Purpose</b>	<b>Chapter</b>	<b>Page</b>
To set up your client workstations to support applications running in a task-switching environment using TBMI2	Chapter 11, "Setting Up Network Support for Task-Switching Environments"	237
To learn how to connect between two network driver interfaces: Network Driver Interface Specification (NDIS) and the Open Data-link Interface™ Specification	Chapter 12, "Setting Up the NetWare ODI Support Interface for NDIS Protocols"	249
To learn how to set up the NetWare IBM LAN Support program software	Chapter 13, "Setting Up the NetWare for IBM LAN Support Program Modules"	265
To learn how to set up the NetWare NetBIOS emulator	Chapter 14, "Setting Up NetBIOS Protocol Support"	275
To learn how to use the Source Routing driver	Chapter 15, "Setting Up Source Routing Support for a Token-Ring Network"	285
To learn how to set up Named Pipes extenders	Chapter 16, "Setting Up Named Pipes Protocol Support"	295





chapter

# 11

## **Setting Up Network Support for Task-Switching Environments**

### **Overview**

This chapter describes how to use the NetWare® task-switching files and gives advice about which parameters to review in the NET.CFG file if problems arise while you are using these files.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
Installing a Task-Switching Environment	239
Installing the Task-Switching Support Software and NetWare Client Files	239
Modifying the DOS System and NetWare Client Configuration Files	241
Loading the Task-Switching Support Software	244
Unloading the Task-Switching Support Software	245
Troubleshooting TBM12	246

# Introduction

The task-switching support software for NetWare, the TBMI2.COM and TASKID.COM files, acts as a buffer and manager between IPX™ and SPX™ requests and an application's calling process during task switching.

When a task switch is made during an application's call process, the NetWare task-switching support software ensures that IPX and SPX transport protocols send the call to the proper network resource. This prevents any communication breakdown between IPX and software processes when a task switch is made.

You might need this support if you use a DOS task switcher or if you switch DOS sessions within MS Windows in standard or real mode. If your application does require the NetWare task-switching support software and you do not use it, your client workstation might hang or experience session failure.



If the only IPX/SPX™ application you are using is NetWare DOS Requester™, you don't need to load the task-switching files. If you are not sure whether your application needs task-switching support, go ahead and run the task-switching files; they use only a small amount of memory.

After running the application, enter the /D command line parameter and look at the number in the "Far Call Usage" field. If this number is zero, your application has not used the task-switching files, so you can run it without them.

You *must* use the NetWare task-switching support files if your environment has any of the following characteristics:

- ◆ You plan to switch between applications in DOS or DOS sessions in MS Windows
- ◆ Your application bypasses the NetWare DOS Requester software *and* accesses IPX or SPX directly
- ◆ You are running MS Windows in standard or real mode

Setting up the task-switching support requires setup on each client workstation that you want to use in task-switching environments.

The complete setup for client workstations using the task-switching support software requires you to complete the following tasks:

1. Installing a Task-Switching Environment
2. Installing the Task-Switching Support Software and NetWare Client Files
3. Modifying the DOS System and NetWare Client Configuration Files

## **Installing a Task-Switching Environment**

Some well known task-switching environments are Microsoft (MS) Windows, the MS-DOS 5.0 task switcher, DESQview\*, and the Novell DOS Task Manager.

You need to install and load the task-switching software before setting up and configuring client workstations for a task-switching environment. See the documentation provided with the software for information on installation and setup.

## **Installing the Task-Switching Support Software and NetWare Client Files**

### **Copying the Files to the NetWare Client Directory Automatically**

The task-switching support software files (TASKID.COM and TBMI2.COM) are automatically copied to the NetWare Client directory when you run the NetWare Client installation software.

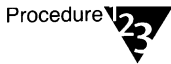
See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.

# Copying the Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation software, you must manually copy the task-switching support software files and other client files to the NetWare Client directory.

To manually copy the TASKID.COM and TBMI2.COM files and other client files from the NetWare Client for DOS and MS Windows diskettes, complete the following steps.

### Procedure



1. Expand and copy the following files from the NetWare Client for DOS and MS Windows diskettes to the NetWare Client directory (the default is C:\NWCLIENT).

Diskette Name	Directory	Filename
<i>NetWare Client for DOS and MS Windows Disk 1</i>	\	IPXODI.CO_ LSL.CO_ VLM.EX_ filename.VL_
<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	TASKID.CO_ TBMI2.CO_
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	lan_driver.CO_

To expand a file, type

```
NWUNPACK source_drive:path\filename  
destination_drive:path\filename <Enter>
```

For example, to expand the TBMI2.COM file, you could type

```
NWUNPACK A:TBMI2.CO_ C:\NWCLIENT\TBMI2.COM <Enter>
```

2. Repeat Step 1 until the TASKID.COM, TBMI2.COM, and NetWare Client files exist in the NetWare Client directory.

# Modifying the DOS System and NetWare Client Configuration Files

Modifying the DOS system and NetWare Client configuration files requires you to edit the CONFIG.SYS, STARTNET.BAT, and NET.CFG files with ASCII text editor.

## Modifying the CONFIG.SYS File

Modify the CONFIG.SYS file with an ASCII text editor to set the LASTDRIVE variable to Z for the NetWare DOS Requester software.

### Procedure



1. **Open the CONFIG.SYS file in an ASCII text editor.**

For example, to use the Novell DOS™ 7 System Editor at the command line to edit the CONFIG.SYS file in the root directory, you would type

```
EDIT C:\CONFIG.SYS <Enter>
```

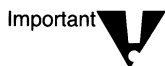
2. **Set the LASTDRIVE variable to Z by adding the following line to the file:**

```
LASTDRIVE = Z
```

3. **Save your changes and exit the ASCII text editor.**

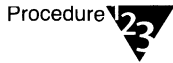
## Modifying the STARTNET.BAT File

Modify the STARTNET.BAT file with an ASCII text editor to load the Link Support Layer™ (the LSL.COM file), the ODI™ LAN driver, the task-switching support software (the TBMI2.COM file), and the NetWare DOS Requester software.



Ensure that the TBMI2.COM file is loaded in the STARTNET.BAT file *before* loading a task-switching environment. If you are currently loading task-switching software in your AUTOEXEC.BAT file, move the line to the STARTNET.BAT file.

## Procedure



1. Add the following lines, *in the given order*, to the STARTNET.BAT file to load one of the task-switching support software files and the NetWare Client files:

```
cd path
ls1
odi_lan_driver
ipxodi
vlm
tbmi2
```

Replace *path* with the directory where the TBMI2.COM and NET.CFG files are found. The TBMI2.COM file cannot execute unless it can access the NET.CFG file in the proper directory path.

Replace *odi\_lan\_driver* with the name of the ODI LAN driver that your workstation is using.

To automatically unload the TBMI2.COM file after closing that task-switching environment, use the /U command line parameter after the command that loads a task-switching environment.

For example, to unload the TBMI2.COM file after closing the Novell DOS TASKMGR.EXE file, add the following lines:

```
tbmi2
c:\nwdos\taskmgr
tmbi2 /u
```

2. Save your changes and exit the ASCII text editor.



You can also use command line parameters to override NET.CFG parameters at the command line. See Chapter 3, "Command Line Parameters Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for more information.

## Modifying the NET.CFG File

The task-switching support software (the TBMI2.COM and TASKID.COM files) allows you to specify variables for the following parameters in your NET.CFG file:

DATA ECB COUNT  
ECB COUNT  
INT64  
INT7A  
USE MAX PACKETS  
USING WINDOWS 3.0

See “TBMI2 Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for details on how to configure your client workstation for task-switching environments.

If you want to set parameters in a batch file or override NET.CFG settings at the command line, see Chapter 3, “Command Line Parameters Reference,” in *NetWare Client for DOS and MS Windows Technical Reference* for details on how to use command line parameters for the TBMI2 and TASKID software

To configure the parameters for the task-switching support software, complete the following procedure.

### Procedure



**1. Open your NET.CFG file with an ASCII text editor.**

For example, to use the Novell DOS 7 System Editor at the command line to edit the NET.CFG file in the NetWare Client directory (the default is C:\NWCLIENT), you would type

```
EDIT C:\NWCLIENT\NET.CFG <Enter>
```

**2. Make the necessary configurations for your particular task-switching software.**

See the manufacturer’s documentation for information.

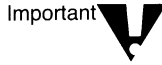
**3. Save your changes and exit the NET.CFG file.**



Note

You can also use command line parameters to override NET.CFG parameters at the command line. See Chapter 3, "Command Line Parameters Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for more information.

## Loading the Task-Switching Support Software

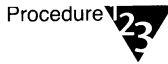


Important

If you are running MS Windows in enhanced mode or not switching between DOS sessions within MS Windows, then do *not* use the TBMI2 software.

Loading the TBMI2.COM file for task-switching environments requires you to complete the following procedures.

### For DOS and MS Windows 3.1 and Later



Procedure

**1. Ensure that your task-switching environment is setup and running.**

See "Installing a Task-Switching Environment" on page 239 for more information.

**2. Ensure that the TBMI2.COM and NetWare Client software files are installed on each client workstation that you want to run in a task-switching environment.**

See "Installing the Task-Switching Support Software and NetWare Client Files" on page 239 for more information.

**3. Ensure that all necessary modifications are made to the client workstation configuration files.**

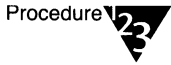
See "Modifying the DOS System and NetWare Client Configuration Files" on page 241 for more information.

**4. Reboot each client workstation.**

The STARTNET.BAT file loads the TBMI2.COM and NetWare Client software files.



## For MS Windows 3.0



1. Complete the previous procedure, "For DOS and MS Windows 3.1 and Later."
2. Run MS Windows.
3. Open a DOS session.
4. At the new system prompt, load TASKID by typing

**TASKID** <Enter>

For each DOS session you open, repeat Step 4 before running an application from the system prompt within that session.

## Unloading the Task-Switching Support Software



1. Before closing a DOS session with the EXIT command in MS Windows 3.0, unload the TASKID.COM file by typing

**TASKID /U** <Enter>

If you do not unload TASKID *before* you close a DOS session in MS Windows 3.0, your computer might hang.

2. Unload the TBMI2.COM file by typing

**TBMI2 /U** <Enter>

You do not need to unload TBMI2 after you exit MS Windows unless you want to free memory.

# Troubleshooting TBMI2

If you have problems while using the TBMI2.COM file, you might need to change configuration parameters in the NET.CFG file.

See "TBMI2 Option" in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for details on how to configure your client workstation for task-switching environments.

View configuration parameters by typing "TBMI2 /D" at the command line.

Check the values associated with the following:

- ◆ "Configured Data ECBs," which tells you how many buffers are available

- ◆ "Max Buffers Used," which tells you how many buffers are used

If the number of buffers used approaches or equals the number of buffers available, increase the number of buffers available using the ECB Count and Data ECB Count parameters in the NET.CFG file.

- ◆ "Unavail Buffer Count," which tells you how many buffers are unavailable

If the count is more than zero, increase the number of buffers available using the ECB Count and Data ECB Count parameters in the NET.CFG file.



The COMCHECK and RCONSOLE utilities use too many buffers that need to be allocated for TBMI2.

To use either of these utilities under MS Windows, do not load the TBMI2.COM file and do not switch out of the DOS session running either the COMCHECK or RCONSOLE utility before exiting either of the utilities.

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for TBMI2	“TBMI2 Option” in Chapter 2 of <i>NetWare Client for DOS and MS Windows Technical Reference</i>
Using command line parameters	Chapter 3, “Command Line Parameters Reference” of <i>NetWare Client for DOS and MS Windows Technical Reference</i>





chapter

# 12

## ***Setting Up the NetWare ODI Support Interface for NDIS Protocols***

### **Overview**

This chapter explains how to set up client workstations to support connections to other networks that use the Network Driver Interface Specification (NDIS) protocol, and to access network resources as if they were available from just one network.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
Installing MAC Drivers and an NDIS Protocol Manager on Client Workstations	251
Installing the ODINSUP.COM and NetWare Client Files	252
Binding ODI LAN Drivers to the NDIS Protocol Stack	253
Modifying the DOS System and NetWare Client Configuration Files	256
Loading the ODINSUP Software	262
Unloading the ODINSUP Software	263

# Introduction

The ODI™ NDIS support module (ODINSUP) is an Open Data-Link Interface™ (ODI) protocol stack that interfaces between NDIS and NetWare® Client™ LAN drivers.

ODINSUP translates NDIS transmissions from NDIS-based applications into a form that complies with the ODI drivers.

ODINSUP also translates transmissions received from the network into a form understood by the NDIS Protocol Manager (PROTMAN).

NDIS specifies two type of drivers: one for hardware manipulation, and one for protocol handling. Hardware-related drivers are also called NDIS MAC (Media Access Control) drivers. Protocol handling drivers are called NDIS PROTMAN drivers.

By separating these functions, NDIS allows you to have multiple protocols with the same physical adapter, or to use only one driver per physical adapter. The NDIS Protocol Manager regulates transactions between hardware and protocol drivers.

ODINSUP provides an NDIS MAC interface for each physical adapter in the system. ODINSUP can be bound with a NET.CFG option to a maximum of four adapters and can generate a separate and distinct MAC interface for each one. This is the equivalent of having the corresponding NDIS-compliant drivers loaded, plus having a full ODI interface.

ODINSUP provides the following benefits:

- ◆ No reconfiguration or rebooting necessary to switch between NDIS-based networks and NetWare networks
- ◆ Compatibility between applications written to NDIS and ODI (or compliant) drivers
- ◆ ODI protocol stacks and NDIS protocol stacks can share the same adapter when the ODINSUP module is used

Setting up the ODI support interface for NDIS protocols requires you to complete the following tasks:

1. Installing MAC Drivers and an NDIS Protocol Manager on Client Workstations
2. Installing the ODINSUP.COM and NetWare Client Files
3. Binding ODI LAN Drivers to the NDIS Protocol Stack
4. Modifying the DOS System and NetWare Client Configuration Files

## **Installing MAC Drivers and an NDIS Protocol Manager on Client Workstations**

ODINSUP is designed for NetWare users that want to use NDIS-based networks such as 3+Share\* or LAN Manager\* and to also log in to a NetWare network. See the manufacturers' documentation for instruction on installation and setup of NDIS MAC and PROTMAN drivers.

If you are upgrading client workstations using NDIS MAC drivers, verify first that the client workstations can connect to the NDIS-based network to ensure that the hardware connection is good. Once you install the NetWare Client for DOS and MS Windows files, the NDIS protocol cannot use the network board to make connections until you have completely set up ODINSUP as instructed in this chapter.

# Installing the ODINSUP.COM and NetWare Client Files

## Copying the Files to the NetWare Client Directory Automatically

ODINSUP.COM and the other client files are automatically copied to the NetWare Client directory when you run the NetWare Client installation software.

See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.

## Copying the Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation software, you must manually copy the ODINSUP.COM and other client files to the NetWare Client directory.

To manually copy the ODINSUP.COM file and other client files from the NetWare Client for DOS and MS Windows diskettes, complete the following steps.

### Procedure



1. Expand and copy the following files from the NetWare Client for DOS and MS Windows diskettes to the NetWare Client directory (the default is C:\NWCLIENT).

Diskette Name	Directory	Filename
<i>NetWare Client for DOS and MS Windows Disk 1</i>	\	IPXODI.CO_ LSL.CO_ VLM.EX_ filename.VL_
<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	ODINSUP.CO_
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	lan_driver.CO_



To expand a file, type

```
NWUNPACK source_drive:path\filename  
destination_drive:path\filename <Enter>
```

For example, to expand the ODINSUP.COM file, you could type

```
NWUNPACK A:ODINSUP.CO_ C:\NWCLIENT\ODINSUP.COM  
<Enter>
```

2. Repeat Step 1 until the ODINSUP.COM and NetWare Client files exist in the NetWare Client directory.

## Binding ODI LAN Drivers to the NDIS Protocol Stack

The NDIS PROTOCOL.INI file is necessary to tell the NDIS protocols which MAC to bind to and use.

Normally all PROTOCOL.INI information for NDIS MAC drivers can be removed if you are using one NDIS MAC driver and protocol stack only. No ODINSUP-specific information is necessary in the PROTOCOL.INI file.

Binding ODI LAN drivers to the NDIS protocol stack requires you to edit the PROTOCOL.INI file with a text editor to do the following:

- ◆ Bind the NDIS protocol stack to the ODI LAN drivers
- ◆ Remove the line binding the NDIS protocol stack to the NDIS MAC drivers

### Procedure



1. Open the PROTOCOL.INI file with an ASCII text editor.

For example, to use the Novell® DOS™ 7 System Editor at the command line to edit the PROTOCOL.INI file in the BOOT directory, type

```
EDIT C:\BOOT\PROTOCOL.INI <Enter>
```

**2. Find all occurrences of the lines that bind the NDIS MAC drivers.**

You can search for

```
Bindings = NDIS_MAC_driver
```

For example, to search for an NDIS driver for the 3Com\* EtherLink II\* board, find the following line:

```
Bindings = elkinii.dos
```

If you don't know the name of the NDIS driver to search for, see the documentation included with your network board.

**3. Comment out (with a semicolon) all bindings lines found.**

For example, your PROTOCOL.INI file for a 3Com EtherLink II LAN driver might look like the following:

```
[ETHERNET]  
.  
.  
; Bindings = elkinii.dos
```

**4. After each disabled binding line, add a line to bind the NDIS protocol to an ODI LAN driver.**

Follow the same syntax as the line you disable by a comment, using the ODI LAN driver name instead of the NDIS driver name.

For example, to add a line for the 3Com EtherLink II ODI LAN driver 3C503.COM, you would type

```
[ETHERNET]  
.  
.  
; Bindings = elkinii.dos  
Bindings = x3c503
```

Driver names in PROTOCOL.INI cannot start with a number. Therefore, place an *x* before 3Com drivers and other drivers that start with a number (for example: **Bindings = x3C503.**)

5. **(Conditional) If you have two or more network boards using the same ODI LAN driver, type an instance number to bind the NDIS protocol to a particular occurrence of a board.**

By default, the NDIS protocol uses the first network board of that type.

To have NDIS use a board other than the first one found, you can specify an instance number.

Type the instance number at the end of the driver name, with no space between the driver name and the instance number.

For example, if you have two network boards, direct NDIS to use the second board by typing an instance number for the second board at the end of its name, as shown:

```
[ETHERNET]
```

```
.
```

```
.
```

```
; Bindings = elkini.dos
```

```
Bindings = ne20002
```

6. **(Conditional) If you have additional ODI drivers, bind the NDIS protocol to them.**

To bind the NDIS protocol to more than one ODI LAN driver, type both driver names on the same line, separated by a comma.

For example, to bind to both an NE2000 driver and an NE1000 driver, type

```
Bindings = ne2000,ne1000
```

7. **Save and exit the PROTOCOL.INI file.**

# Modifying the DOS System and NetWare Client Configuration Files

Modifying the DOS system and NetWare Client configuration files requires you to edit the CONFIG.SYS, STARTNET.BAT, and NET.CFG files with an ASCII text editor.

## Modifying the CONFIG.SYS File

Modify the CONFIG.SYS file with an ASCII text editor to

- ◆ Set the LASTDRIVE variable to Z for the NetWare DOS Requester™ software
- ◆ Load the NDIS Protocol Manager

### Procedure



#### 1. Open the CONFIG.SYS file with an ASCII text editor.

For example, to use the Novell DOS 7 System Editor at the command line to edit the CONFIG.SYS file in the root directory, you would type

```
EDIT C:\CONFIG.SYS <Enter>
```

#### 2. Set the LASTDRIVE variable to Z by adding the following line to the file:

```
LASTDRIVE = Z
```

#### 3. Load the NDIS Protocol Manager by adding a line similar to the following to the CONFIG.SYS file:

```
device = path protman.dos /i:path
```

Replace both *path* variables with the directory location of the PROTOCOL.INI file.

/I: directs the CONFIG.SYS file to search for the PROTOCOL.INI file in the specified pathname.

The name and path of the NDIS Protocol Manager depends on the NDIS-based operating system you are running. See the manufacturer's documentation for information.

**4. Remove all references to the NDIS LAN drivers from the CONFIG.SYS file.**

For example, if your CONFIG.SYS file had a **device=path elnki.dos** statement to load an ELNKII.DOS NDIS driver, you would remove it from the file.

**5. Save your changes and exit the ASCII text editor.**

## Modifying the STARTNET.BAT File

Modify the STARTNET.BAT file with an ASCII text editor to load the Link Support Layer™ (the LSL.COM file), the ODI LAN driver, the ODINSUP protocol, the protocol stacks, and the NetWare DOS Requester software.

### Procedure



**1. Add the following lines, *in the given order*, to the STARTNET.BAT file to load the ODI components:**

```
cd path
lsl
odi_lan_driver
odinsup
netbind
ipxodi
vlm
```

Replace *path* with the directory where the ODINSUP.COM and NET.CFG files are found. The ODINSUP protocol cannot execute unless it can access the NET.CFG file in the proper directory path.

Replace *odi\_lan\_driver* with the name of the ODI LAN driver that your workstation is using.

**2. Save your changes and exit the ASCII text editor.**

# Modifying the NET.CFG File

Modify the NET.CFG file with an ASCII text editor to

- ◆ Enable the required Ethernet and token ring frame types
- ◆ Bind the ODINSUP protocol to a particular ODI LAN driver
- ◆ Increase the size of the packet that can be transmitted through the Link Support Layer program (if necessary)

## Procedure



### 1. Open the NET.CFG file with an ASCII text editor.

For example, to use the Novell DOS 7 System Editor at the command line to edit the NET.CFG file in the NetWare Client directory (the default is C:\NWCLIENT), you would type

```
EDIT C:\NWCLIENT\NET.CFG <Enter>
```

### 2. Enable the appropriate frame types for the ODINSUP software.

The following table lists the supported frame types for the ODINSUP software.

**Table 12-1**  
**Frame Types Supported by ODINSUP**

<b>Board</b>	<b>Frame Types</b>
Token ring	TOKEN-RING
	TOKEN-RING_SNAP
Ethernet	ETHERNET_802.2
	ETHERNET_802.3
	ETHERNET_SNAP
	ETHERNET_II

**2a. Enter the following line at the top of the NET.CFG file:**

```
link driver odi_lan_driver
```

Replace *odi\_lan\_driver* with the name of your ODI LAN driver. For example, for a token ring LAN driver, enter

```
link driver ntr2000
```

**2b. Under the Link Driver heading, add the lines to enable all frame types supported by the ODI LAN driver.**

For example, to enable all frame types for token ring, add the following lines:

```
link driver ntr2000
    frame token-ring
    frame token-ring_snap
```

Or, to enable all frame types for an Ethernet, add the following lines:

```
link driver ne2000
    frame ethernet_802.2
    frame ethernet_802.3
    frame ethernet_ii
    frame ethernet_snap
```

The first frame defined is the only one used for the initial "Get Nearest Server" request.

Therefore, if you have any servers using only one frame type, list that frame type first. This allows your client workstation to make a default connection to those servers.



Whenever you edit the NET.CFG file, you *must* indent settings, as well as follow the other format requirements.

See Chapter 2, "NET.CFG Options Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for information.

### 3. Bind ODINSUP to one or more ODI LAN drivers.

Do this by adding the Protocol ODINSUP option to your NET.CFG file:

```
protocol odinsup  
  bind odi_lan_driver
```

Replace *odi\_lan\_driver* with the name of your ODI LAN driver.

ODINSUP can be bound to a maximum of four ODI LAN drivers for each network board in your client workstation.

When ODINSUP is bound to an ODI LAN driver, the network board for that driver is used for the NDIS-based network transmissions.

For example, for a token-ring ODI LAN driver, add the following lines:

```
protocol odinsup  
  bind ntr2000
```

If you have multiple network boards using the same ODI LAN driver, specify an instance number.

By default, ODINSUP searches the network board slots in order and binds only to the first board of that type that it finds.

To have ODINSUP bind to ODI LAN drivers additional to the first one found, you must specify an instance number.

For example, if you have two token-ring network boards, bind ODINSUP to both boards by typing an instance number for the second one, as shown:

```
protocol odinsup  
  bind ntr2000  
  bind ntr2000 2
```

See "Protocol ODINSUP Option" in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information.



#### 4. (Optional) Increase the size of the packet transmitted through the Link Support Layer (LSL)

Increasing the packet size might improve transmission speed if you are using a Token Ring 16/4 board.

For other boards, see the board documentation to determine the maximum packet size supported.

If the board supports a packet size larger than 1514 (the Link Support Layer default), transmission speed might improve if you increase the LSL™ default to the board's maximum allowed size.

To increase the default, add the following lines to the NET.CFG file:

**link support**

```
buffers number buffer_size
```

Replace *number* with a number of buffers greater than 1.

Replace *buffer\_size* with a number of bytes greater than 576.

The NetWare Client files for DOS and MS Windows cannot use more than 64 KB of memory for communication buffers. Header information takes 5 KB.

This means that the buffer number multiplied by the buffer size (plus the header information) cannot be greater than 65,536 bytes.

For example, 14 buffers multiplied by 4222 bytes equals 58,828 bytes. Therefore, you might type

**link support**

```
buffers 14 4222
```



For Token Ring 16/4 boards, NetWare Client files will probably have maximum performance if you specify 14 buffers, each with a size of 4222 bytes, as shown in the previous example.

For NDIS protocol stacks requiring a RECEIVE LOOK AHEAD data size larger than the maximum size supported by the LAN driver (MLID), you should use the BUFFERED parameter in the "Protocol ODINSUP" section of the NET.CFG file. This allocates a double buffer size in memory to satisfy the necessary data size needed for the NDIS protocol stack.

#### 5. Save your changes and exit the NET.CFG file.

# Loading the ODINSUP Software

Loading the ODINSUP.COM file requires you to complete the following procedure.

## Procedure



- 1. Ensure that your NDIS-based network and NDIS board drivers are setup and running.**

See “Installing MAC Drivers and an NDIS Protocol Manager on Client Workstations” on page 251 for more information.

- 2. Ensure that the ODINSUP.COM and NetWare Client software files are installed on each client workstation that you want to connect to both NetWare and NDIS-based networks.**

See “Installing the ODINSUP.COM and NetWare Client Files” on page 252 and “Binding ODI LAN Drivers to the NDIS Protocol Stack” on page 253 for more information.

- 3. Ensure that all necessary modifications are made to the client workstation configuration files.**

See “Modifying the DOS System and NetWare Client Configuration Files” on page 256 for more information.

- 4. Reboot each client workstation.**

The STARTNET.BAT file loads the ODINSUP.COM and NetWare Client software files.

# Unloading the ODINSUP Software



1. **Unload all VLM™ files by typing**

`VLM /U <Enter>`

2. **Unload IPXODI by typing**

`IPXODI /U <Enter>`

3. **Unload ODINSUP by typing**

`ODINSUP /U <Enter>`



Always unload the files in reverse order from the order in which you loaded them. Unloading the files in any order other than reverse order is impossible.

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for ODINSUP	"Protocol ODINSUP Option" in Chapter 2 of <i>NetWare Client for DOS and MS Windows Technical Reference</i>
Setting up ODINSUP with other operating systems	"ODINSUP Interoperability Configurations for DOS Workstations," <i>NetWare Application Notes</i> , Feb 93 (Novell part # 164-000032-002)  "NetWare and LAN Server Client Interoperability via ODINSUP: Part 1," <i>NetWare Application Notes</i> , Sep 92 (Novell part # 164-000031-009)  "NetWare and LAN Server Client Interoperability via ODINSUP: Part 2," <i>NetWare Application Notes</i> , Nov 92 (Novell part # 164-000031-011)





chapter

# 13

## **Setting Up the NetWare for IBM LAN Support Program Modules**

### **Overview**

This chapter explains how to set up client workstations to support using an IBM LAN Support programs that contain network boards which do not support ODI™ (or compliant) LAN drivers for connecting to NetWare® networks.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
Installing an IBM LAN Support Program	267
Installing the LANSUP.COM and NetWare Client Files	267
Modifying the DOS System and NetWare Client Configuration Files	269
Loading the LANSUP.COM File	273
Unloading the LANSUP.COM File	274

# Introduction

The NetWare DOS Requester™ software uses protocol drivers and network drivers written to the Open Data-Link Interface™ (ODI) specification. The IBM LAN Support programs, except for PCNet Support, can use protocol drivers written to the NDIS specification.

The IBM LAN Support module (the LANSUP.COM file) acts as an interface between the NetWare Client™ software and the IBM LAN Support programs. This interface allows IBM LAN Support programs to communicate with NetWare Client through NDIS network drivers.

LANSUP.COM is necessary only when you want the NDIS driver to control the network board while accessing one of the IBM LAN Support programs, or when you do not have an ODI (or compliant) LAN driver for your network board.

NetWare Client support for NDIS protocols must be set up on each client workstation that you want to access the IBM LAN Support programs from.

The complete setup for client workstations using LANSUP.COM requires you to complete the following tasks:

1. Installing an IBM LAN Support Program
2. Installing the LANSUP.COM and NetWare Client Files
3. Modifying the DOS System and NetWare Client Configuration Files

# Installing an IBM LAN Support Program

LANSUP.COM is an interface for the following IBM LAN Support programs:

Extended Services  
LAN Server

You need to install and load one of these programs before setting up and configuring client workstations for a NetWare connection. See the documentation provided with these programs for information on installation and setup.



If you have Extended Services or LAN Services, you might also want to set up the NetBIOS protocol. After completing the procedures in this chapter, See Chapter 14, "Setting Up NetBIOS Protocol Support," on page 275.

## Installing the LANSUP.COM and NetWare Client Files

### Copying the Files to the NetWare Client Directory Automatically

The LANSUP.COM file is automatically copied to the NetWare Client directory when you run the NetWare Client installation software.

See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.



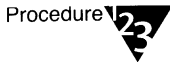
Once you install the NetWare Client for DOS and MS Windows, the Extended Services and LAN Services programs cannot use the network board to make connections until you have completely set up the LANSUP.COM file as instructed in this chapter.

## Copying the Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation software, you must manually copy the LANSUP.COM and other client files to the NetWare Client directory.

To manually copy the LANSUP.COM file and other client files from the NetWare Client for DOS and MS Windows diskettes, complete the following steps.

### Procedure



1. Expand and copy the following files from the NetWare Client for DOS and MS Windows diskettes to the NetWare Client directory (the default is C:\NWCLIENT).

Diskette Name	Directory	Filename
<i>NetWare Client for DOS and MS Windows Disk 1</i>	\	IPXODI.CO_
	\	LSL.CO_
	\	VLM.EX_
	\	filename.VL_
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	LANSUP.CO_ lan_driver.CO_

To expand a file, type

```
NWUNPACK source_drive:path\filename  
destination_drive:path\filename <Enter>
```

For example, to expand the LANSUP.COM file, you could type

```
NWUNPACK A:LANSUP.CO_ C:\NWCLIENT\LANSUP.COM  
<Enter>
```

2. Repeat Step 1 until the LANSUP.COM and NetWare Client files exist in the NetWare Client directory.



# Modifying the DOS System and NetWare Client Configuration Files

Modifying the DOS system and NetWare Client configuration files requires you to edit the CONFIG.SYS, STARTNET.BAT, and NET.CFG files with an ASCII text editor.

## Modifying the CONFIG.SYS File

Modify the CONFIG.SYS file with an ASCII text editor to set the LASTDRIVE variable to Z for the NetWare DOS Requester software.

### Procedure



1. **Open the CONFIG.SYS file with an ASCII text editor.**

For example, to use the Novell® DOS™ 7 System Editor at the command line to edit the CONFIG.SYS file in the root directory, you would type

```
EDIT C:\CONFIG.SYS <Enter>
```

2. **Set the LASTDRIVE variable to Z by adding the following line to the file:**

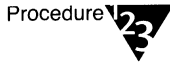
```
LASTDRIVE = Z
```

3. **Save your changes and exit the ASCII text editor.**

## Modifying the STARTNET.BAT File

Modify the STARTNET.BAT file with an ASCII text editor to load the Link Support Layer™ (the LSL.COM file), the LANSUP.COM file, the protocol stacks, and the NetWare DOS Requester software.

### Procedure



1. **Add the following lines, *in the given order*, to the STARTNET.BAT file to load LANSUP.COM and NetWare Client files:**

```
cd path
ls1
lansup
ipxodi
vlm
```

Replace *path* with the directory where the LANSUP.COM and NET.CFG files are found. The LANSUP.COM file cannot execute unless it can access the NET.CFG file in the proper directory path.

2. **Save your changes and exit the ASCII text editor.**

## Modifying the NET.CFG File

The IBM LAN support module (the LANSUP.COM file) requires you to make the following modifications to your NET.CFG file:

- ◆ Specify the frame type for each client workstation

See the following procedure for details on how to configure this parameter for LANSUP.COM.

- ◆ (Optional) Specify variables for the following parameters:

ALTERNATE  
 LINK STATIONS  
 MAX FRAME SIZE  
 NODE ADDRESS  
 OPEN  
 PROTOCOL  
 RPL  
 SAPS

See Chapter 2, "NET.CFG Options Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for details on how to configure these parameters for LANSUP.

Configure the frame type for LANSUP.COM by completing the following procedure.

**Procedure**



**1. Open your NET.CFG file with an ASCII text editor.**

For example, to use the Novell DOS 7 System Editor at the command line to edit the NET.CFG file in the NetWare Client directory (the default is C:\NWCLIENT), you would type

```
EDIT C:\NWCLIENT\NET.CFG <Enter>
```

**2. Enable the appropriate frame types for LAN.COM.**

Because the LANSUP.COM driver uses the Token-Ring Topology Support Module (TSM), LANSUP.COM supports only the following boards and frame types:

**Table 13-1**  
**Frame Types Supported by LANSUP**

Boards	Frame Types
Ethernet	TOKEN-RING
PCNet	TOKEN-RING_SNAP
Token ring	

**2a. Enter the following line at the top of the NET.CFG file:**

```
link driver lansup
```

**2b. Under the Link Driver heading, add the lines to enable frame types.**

For example, to enable a frame type for token ring, add the following lines to the file:

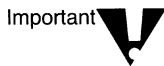
```
link driver lansup
    frame token-ring
```

To enable both frame types for Ethernet, add the following lines:

```
link driver lansup
    frame ethernet_802.2
    frame ethernet_snap
```

The first frame defined is the only one used for the initial Get Nearest Server request.

Therefore, if you have any servers using only one frame type, list that frame type first. This allows your client workstation to make a default connection to those servers.



Whenever you edit the NET.CFG file, you *must* indent settings, as well as follow the other format requirements.

See Chapter 2, "NET.CFG Options Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for information.

**3. Save your changes and exit the NET.CFG file.**

# Loading the LANSUP.COM File

Loading the LANSUP.COM file for the IBM LAN Support programs requires you to complete the following procedure.

## Procedure



- 1. Ensure that your IBM LAN Support programs are set up properly.**

See “Installing an IBM LAN Support Program” on page 267 for more information.

- 2. Ensure that the LANSUP.COM and NetWare Client software files are installed on each client workstation that you want to connect to both NetWare and IBM LAN Support programs.**

See “Installing the LANSUP.COM and NetWare Client Files” on page 267 for more information.

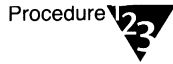
- 3. Ensure that all necessary modifications are made to the client workstation configuration files.**

See “Modifying the DOS System and NetWare Client Configuration Files” on page 269 for more information.

- 4. Reboot each client workstation.**

The STARTNET.BAT file loads the LANSUP.COM and NetWare Client software files.

# Unloading the LANSUP.COM File



1. **Unload all VLM™ files by typing**

**VLM /U** <Enter>

2. **Unload IPXODI by typing**

**IPXODI /U** <Enter>

3. **Unload LANSUP.COM by typing**

**LANSUP /U** <Enter>



Always unload the files in reverse order from the order in which you loaded them. Unloading the files in any order other than reverse order is impossible.

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for LAN Support programs	“Link Driver Option” and “Link Support Option” in Chapter 2 of <i>NetWare Client for DOS and MS Windows Technical Reference</i>



chapter

# 14

## Setting Up NetBIOS Protocol Support

### Overview

This chapter explains how to set up and configure the Novell® NetBIOS protocol emulator for NetBIOS applications running on networks based on the Internet Protocol Exchange™ (IPX) architecture.

The following topics are covered in this chapter.

Topic	Page
Installing a NetBIOS Application	277
Installing the NETBIOS.EXE and NetWare Client Files	277
Modifying the DOS System and NetWare Client Configuration Files	279
Loading the NetBIOS Emulator	282
Unloading the NetBIOS Emulator	283

# Introduction

NetBIOS (Network Basic Input/Output System) is the IBM standard protocol for applications developed to run peer-to-peer communications on the IBM PC Network and the IBM Token-Ring Network. NetBIOS has become widely accepted as a standard for network interfacing.

The NetWare<sup>®</sup> Client<sup>™</sup> for DOS and MS Windows provides a NetBIOS driver that emulates the NetBIOS protocol. This emulator allows the NetWare IPX<sup>™</sup> to interface with the NetBIOS Interrupt 5Ch and an alternate interface, Interrupt 2Ah.

The NetBIOS provided by Novell is an emulator because it does not transmit NetBIOS packets. Instead, NetBIOS packets are encapsulated in IPX packets, and the IPX packets are transmitted.

The NetBIOS protocol was designed for small-scale networks. While Novell has added functionality to the original specification, the NetBIOS emulation still works most effectively with small-scale networks.

Therefore, if your network contains several thousand workstations and your LAN segments are interconnected with more than one router, use SPX<sup>™</sup> instead of NetBIOS if your applications support SPX.

NetWare Client support for the NetBIOS emulator must be set up on each client workstation that you want to access NetBIOS applications from.

The complete setup for client workstations using NetBIOS requires you to complete the following tasks:

1. Installing a NetBIOS Application
2. Installing the NETBIOS.EXE and NetWare Client Files
3. Modifying the DOS System and NetWare Client Configuration Files



## Installing a NetBIOS Application

NetBIOS is the IBM standard protocol for applications developed to run peer-to-peer communications on the IBM PC Network and the IBM Token-Ring Network.

You need to install and load a NetBIOS application on a server *before* setting up and configuring client workstations for a NetBIOS connection.

See the documentation provided with the application for information on installation and setup.

## Installing the NETBIOS.EXE and NetWare Client Files

### Copying the Files to the NetWare Client Directory Automatically

NETBIOS.EXE and the other client files are automatically copied to the NetWare Client directory when you run the NetWare Client installation software.

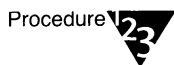
See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.

### Copying the Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation software, you must manually copy the NETBIOS.EXE and other client files to the NetWare Client directory.

To manually copy the NETBIOS.EXE file and other client files from the NetWare Client for DOS and MS Windows diskettes, complete the following steps.

## Procedure



1. Expand and copy the following files from the NetWare Client for DOS and MS Windows diskettes to the NetWare Client directory (the default is C:\NWCLIENT).

Diskette Name	Directory	Filename
<i>NetWare Client for DOS and MS Windows Disk 1</i>	\	IPXODI.CO_ LSL.CO_ VLM.EX_ filename.VL_
<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	NETBIOS.CO_
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	lan_driver.CO_

To expand a file, type

```
NWUNPACK source_drive:path\filename  
destination_drive:path\filename <Enter>
```

For example, to expand the NETBIOS.EXE file, you could type

```
NWUNPACK A:NETBIOS.EX_ C:\NWCLIENT\NETBIOS.EXE  
<Enter>
```

2. Repeat Step 1 until the NETBIOS.EXE and NetWare Client files exist in the NetWare Client directory.

# Modifying the DOS System and NetWare Client Configuration Files

Modifying the DOS system and NetWare Client configuration files requires you to edit the CONFIG.SYS, STARTNET.BAT, and NET.CFG files with an ASCII text editor.

## Modifying the CONFIG.SYS File

Modify the CONFIG.SYS file with an ASCII text editor to set the LASTDRIVE variable to Z for the NetWare DOS Requester™ software.

### Procedure



1. **Open the CONFIG.SYS file with an ASCII text editor.**

For example, to use the Novell DOS™ 7 System Editor at the command line to edit the CONFIG.SYS file in the root directory, you would type

```
EDIT C:\CONFIG.SYS <Enter>
```

2. **Set the LASTDRIVE variable to Z by adding the following line to the file:**

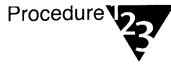
```
LASTDRIVE = Z
```

3. **Save your changes and exit the ASCII text editor.**

## Modifying the STARTNET.BAT File

Modify the STARTNET.BAT file with an ASCII text editor to load the Link Support Layer™ (the LSL.COM file), the ODI™ LAN driver, the NetBIOS emulator (the NETBIOS.EXE file), and the NetWare DOS Requester software.

### Procedure



1. Add the following lines, *in the given order*, to the STARTNET.BAT file to load the NETBIOS.EXE and NetWare Client files:

```
cd path
ls1
odi_lan_driver
ipxodi
netbios
vlm
```

Replace *path* with the directory where the NETBIOS.EXE and NET.CFG files are found. The NETBIOS.EXE file cannot execute unless it can access the NET.CFG file in the proper directory path.

Replace *odi\_lan\_driver* with the name of the ODI LAN driver that your workstation is using.

2. Save your changes and exit the ASCII text editor.

## Modifying the NET.CFG File

The NetBIOS emulator (the NETBIOS.EXE file) allows you to specify variables for the following parameters in your NET.CFG file:

NETBIOS ABORT TIMEOUT  
NETBIOS BROADCAST COUNT  
NETBIOS BROADCAST DELAY  
NETBIOS COMMANDS  
NETBIOS INTERNET  
NETBIOS LISTEN TIMEOUT  
NETBIOS RECEIVE BUFFERS  
NETBIOS RETRY COUNT  
NETBIOS RETRY DELAY  
NETBIOS SEND BUFFERS  
NETBIOS SESSION  
NETBIOS VERIFY TIMEOUT  
NPATCH

See “NetBIOS Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for details on how to configure for NetBIOS support.

Configure the parameters for the Novell NetBIOS software by completing the following procedure.

### Procedure



#### 1. Open your NET.CFG file with an ASCII text editor.

For example, to use the Novell DOS 7 System Editor at the command line to edit the NET.CFG file in the NetWare Client directory (the default is C:\NWCLIENT), you would type

```
EDIT C:\NWCLIENT\NET.CFG <Enter>
```

#### 2. Make the necessary configurations for your particular NetBIOS application.

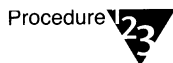
See the manufacturer’s documentation for information.

#### 3. Save your changes and exit the NET.CFG file.

# Loading the NetBIOS Emulator

Loading the NETBIOS.EXE file for NetBIOS applications requires you to complete the following procedure.

## Procedure



**1. Ensure that your NetBIOS applications are set up properly.**

See “Installing a NetBIOS Application” on page 277 for more information.

**2. Ensure that the NETBIOS.EXE and NetWare Client software files are installed on each client workstation that you want to run NetBIOS applications.**

See “Installing the NETBIOS.EXE and NetWare Client Files” on page 277 for more information.

**3. Ensure that all necessary modifications are made to the client workstation configuration files.**

See “Modifying the DOS System and NetWare Client Configuration Files” on page 279 for more information.

**4. Reboot each client workstation.**

The STARTNET.BAT file loads the NETBIOS.EXE and NetWare Client software files.

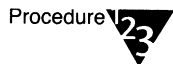


Your DOS or MS Windows client workstation might require up to a minute after you load the NetWare NetBIOS protocol before it is ready to run a NetBIOS application.

# Unloading the NetBIOS Emulator

The following commands, *issued in the order given*, unload the NETBIOS.EXE file.

## Procedure



### 1. Unload all VLM™ files by typing

```
VLM /U <Enter>
```

### 2. Unload NetBIOS by typing

```
NETBIOS /U <Enter>
```



Always unload the files in reverse order from the order in which you loaded them. Unloading the files in any order other than reverse order is impossible.

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for NetBIOS	“NetBIOS Option” in Chapter 2 of <i>NetWare Client for DOS and MS Windows Technical Reference</i>







chapter

# 15

## **Setting Up Source Routing Support for a Token-Ring Network**

### **Overview**

This chapter explains how to use and install the NetWare® source routing driver for token-ring networks.

The following topics are covered in this chapter.

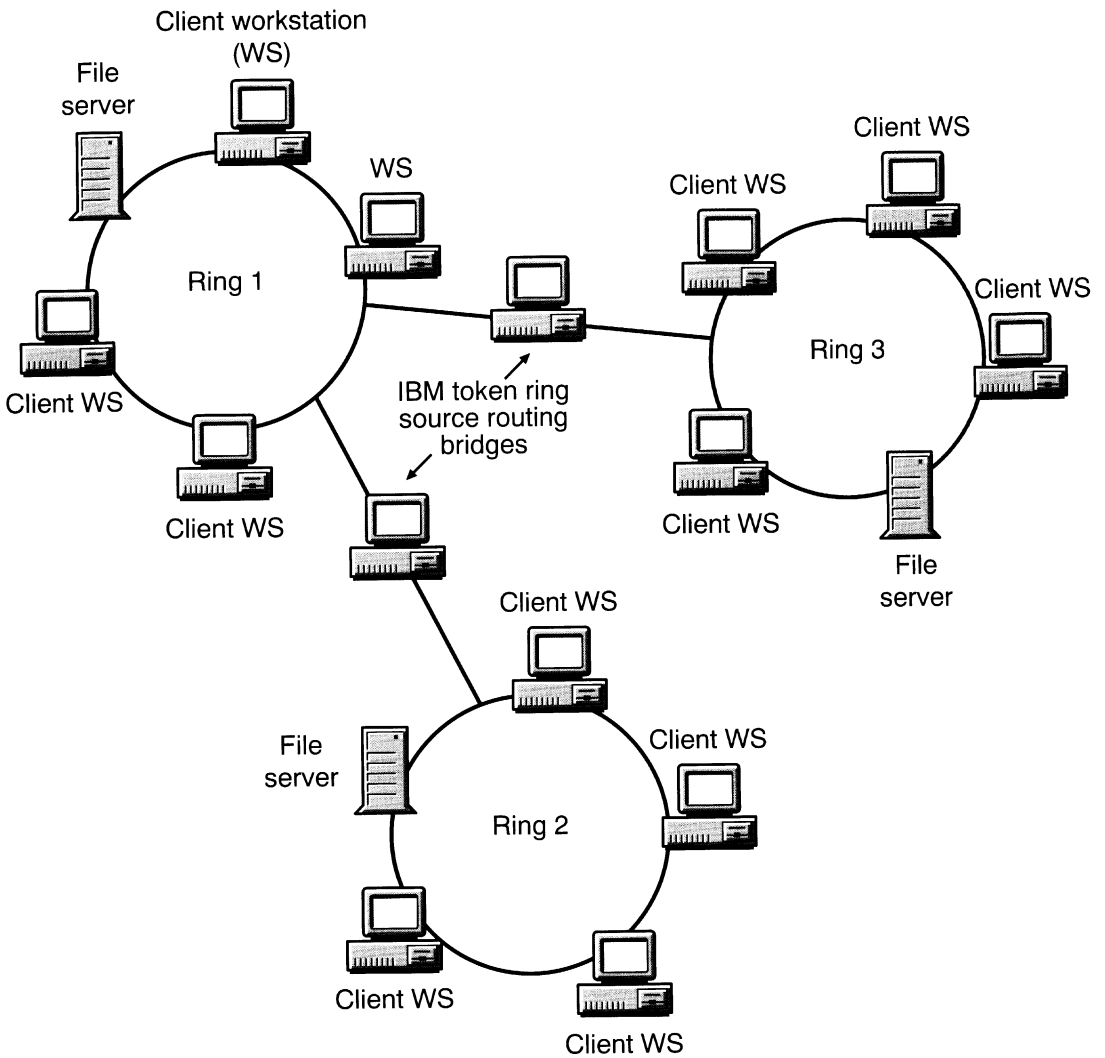
<b>Topic</b>	<b>Page</b>
Installing Source Routing on the Server	287
Installing the ROUTE.COM and NetWare Client Files	288
Modifying the DOS System and NetWare Client Configuration Files	290
Loading the Source Routing Driver	292
Unloading the Source Routing Driver	293

### **Introduction**

The NetWare source routing driver (the ROUTE.COM file) enables communication across IBM token-ring network bridges. Any type of DOS ODI™ protocol stack can use this source routing functionality.

The following figure shows an example of a network configuration using IBM source routing bridges.

**Figure 15-1**  
**Network Configuration Using Source**  
**Routing Bridges**



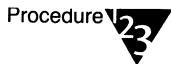
Note The NetWare source routing software can route only IPX packets.

NetWare Client support for the source routing driver (the ROUTE.COM file) must be set up on each client workstation that you want to use on a token-ring network.

The complete setup for client workstations using the ROUTE.COM file requires you to complete the following tasks:

1. Installing Source Routing on the Server
2. Installing the ROUTE.COM and NetWare Client Files
3. Modifying the DOS System and NetWare Client Configuration Files

## Installing Source Routing on the Server



1. **At the server console, load ROUTE.NLM by typing**

```
LOAD ROUTE <Enter>
```

You can also load ROUTE.NLM in a startup file.



ROUTE.NLM is located in the SYS:SYSTEM directory. You can load it with command line parameters. See *Utilities Reference* for more information about the parameters.

2. **(Conditional) If you have two network boards in your server, load ROUTE.NLM again.**

Use the BOARD parameter to specify a board number. For example, you could type

```
LOAD ROUTE BOARD=02 <Enter>
```



You can change any source routing parameter after ROUTE is loaded. Type the LOAD ROUTE command followed by the parameter you want to change.

# Installing the ROUTE.COM and NetWare Client Files

## Copying the Files to the NetWare Client Directory Automatically

ROUTE.COM and the other client files are automatically copied to the NetWare Client™ directory when you run the NetWare Client installation software.

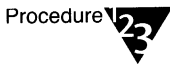
See Chapter 5, “Installing or Upgrading NetWare Client Software,” on page 97 for more information.

## Copying the Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation software, you must manually copy the ROUTE.COM and other client files to the NetWare Client directory.

To manually copy the ROUTE.COM file and other client files from the NetWare Client for DOS and MS Windows diskettes, complete the following steps.

### Procedure



1. **Expand and copy the following files from the NetWare Client for DOS and MS Windows diskettes to the NetWare Client directory (the default is C:\NWCLIENT).**

Diskette Name	Directory	Filename
<i>NetWare Client for DOS and MS Windows Disk 1</i>	\	IPXODI.CO_ LSL.CO_ VLM.EX_ filename.VL_
<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	ROUTE.CO_
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	lan_driver.CO_ NTR2000.CO_ LANSUP.CO_

To expand a file, type

```
NWUNPACK source_drive:path\filename  
destination_drive:path\filename <Enter>
```

For example, to expand the ROUTE.COM file, you could type

```
NWUNPACK A:ROUTE.CO_ C:\NWCLIENT\ROUTE.COM <Enter>
```

**2. Install a token-ring ODI LAN driver.**

The ROUTE.COM file requires this.

Novell® provides the NTR2000.COM file, which replaces the previously used TOKEN.COM file.

See the manufacturer's documentation for information about what token-ring ODI LAN driver to use with your network board.

**3. (Conditional) If you want to connect to both NetWare and an IBM LAN Support program, such as LAN Manager, you should also expand and copy the LANSUP.COM file to the NetWare Client directory on each workstation.**

See Chapter 13, "Setting Up the NetWare for IBM LAN Support Program Modules," on page 265 for information.

**4. Repeat Step 1 until the ROUTE.COM and NetWare Client files exist in the NetWare Client directory.**

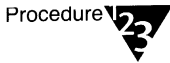
# Modifying the DOS System and NetWare Client Configuration Files

Modifying the DOS system and NetWare Client configuration files requires you to edit the CONFIG.SYS, STARTNET.BAT, and NET.CFG files with an ASCII text editor.

## Modifying the CONFIG.SYS File

Modify the CONFIG.SYS file with an ASCII text editor to set the LASTDRIVE variable to Z for the NetWare DOS Requester™ software.

### Procedure



1. **Open the CONFIG.SYS file with an ASCII text editor.**

For example, to use the Novell® DOS™ 7 System Editor at the command line to edit the CONFIG.SYS file in the root directory, you would type

```
EDIT C:\CONFIG.SYS <Enter>
```

2. **Set the LASTDRIVE variable to Z by adding the following line to the file:**

```
LASTDRIVE = Z
```

3. **Save your changes and exit the ASCII text editor.**

## Modifying the STARTNET.BAT File

Modify the STARTNET.BAT file with an ASCII text editor to load the Link Support Layer™ (the LSL.COM file), the ODI™ LAN driver, the source routing driver (the ROUTE.COM file), and the NetWare DOS Requester software.

### Procedure



1. Add the following lines, *in the given order*, to the STARTNET.BAT file to load the ROUTE.COM and NetWare Client files:

```
cd path
lsl
odi_lan_driver
route
ipxodi
vlm
```

Replace *path* with the directory where the ROUTE.COM and NET.CFG files are found. The ROUTE.COM file cannot execute unless it can access the NET.CFG file in the proper directory path.

Replace *odi\_lan\_driver* with the name of the ODI LAN driver that your workstation is using. For example, Novell provides the NTR2000.COM file or the LANSUP.COM file.



The command to load the ROUTE.COM file should be added after the *odi\_lan\_driver* file, but before the protocol stack you are using, such as the IPXODI.COM file.

Add any necessary command line parameters after the route statement.

Use the following parameters for configuring the ROUTE.COM driver:

```
BOARD=number
CLEAR
DEF
GBR
MBR
NODES=number
REMOVE=number
```



If two frame type are used on your network, load the ROUTE.COM file twice in the STARTNET.BAT file. You must load ROUTE.COM once for each **BOARD=number** statement used.

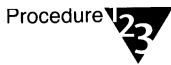
See Chapter 3, "Command Line Parameters Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for descriptions and details on how to use command line parameters for ROUTE.COM.

2. **Save your changes and exit the ASCII text editor.**

## Loading the Source Routing Driver

Loading the ROUTE.COM file requires you to complete the following procedure.

### Procedure



1. **Ensure that the ROUTE.NLM program is loaded on the server you are connecting to.**

See "Installing Source Routing on the Server" on page 287 for more information.

2. **Ensure that the ROUTE.COM and NetWare Client software files are installed on each client workstation that you want to connect to a token-ring network.**

See "Installing the ROUTE.COM and NetWare Client Files" on page 288 for more information.

3. **Ensure that all necessary modifications are made to the client workstation configuration files.**

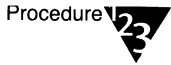
See "Modifying the DOS System and NetWare Client Configuration Files" on page 290 for more information.

4. **Reboot each client workstation.**

The STARTNET.BAT file loads the ROUTE.COM and NetWare Client software files.



# Unloading the Source Routing Driver



1. **Unload all VLM™ files by typing**

**VLM /U** <Enter>

2. **Unload ROUTE.COM by typing**

**ROUTE /U** <Enter>



Always unload the files in reverse order from the order in which you loaded them. Unloading the files in any order other than reverse order is impossible.

## Additional Information

Topic	Reference
Understanding more about source routing	“Source routing” in <i>Concepts</i> “Understanding Token-Ring Source Routing,” <i>NetWare Application Notes</i> , May 91 (Novell part # 164-000030-005) <i>IBM Token-Ring Network Architecture Reference</i>





chapter

# 16

## ***Setting Up Named Pipes Protocol Support***

### **Overview**

This chapter explains how to set up client workstations to use the Named Pipes protocol.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
Installing a Named Pipes Server and Client-Server Application	297
Installing the Named Pipes Extender and NetWare Client Files	298
Modifying the DOS System and NetWare Client Configuration Files	299
Loading the Named Pipes Extender	303
Unloading the Named Pipes Extender	304

# Introduction

Named Pipes are the basis for communication between the client and advanced client-server applications such as Microsoft SQL Server and Microsoft Comm Server software.

Client-server computing provides a mode of distributed network computing in which an application is executed cooperatively by two client workstations.

The client component of the application (the front end) executes on one client workstation, while the server component (the back end) runs on a second client workstation.

Client-server computing allows more effective use of computing resources, higher performance, greater flexibility, simpler upgrades, and (for some applications) greater reliability and data integrity.

For NetWare® client workstations, communication between client-server applications is implemented most frequently using the Named Pipes interprocess communication (IPC) protocol.

A Named Pipes client workstation can be configured to operate in default mode or peer mode.

In default mode, Named Pipes client workstations obtain names for Named Pipes servers by querying an IPX™ (or compatible) router table. In this mode, Named Pipes client workstations request specific server names on an as needed basis.

In peer mode, Named Pipes client workstations maintain their own Named Pipes server table. When the Named Pipes Extender is loaded in peer mode, a General Service Query is issued and the query responses from Named Pipes servers are compiled into a table at each client workstation.

To configure for peer mode, see “NP MAX MACHINE NAMES *number*” under “Named Pipes Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information.

NetWare Client support for the Named Pipes protocol (the DOSNP.EXE file) must be set up on each client workstation that you want to access Named Pipes client-server applications from.

In most cases, you must also set configuration options for the Link Support Layer™ (LSL) software.

The complete setup for client workstations using the Named Pipes protocol requires you to complete the following tasks:

1. Installing a Named Pipes Server and Client-Server Application
2. Installing the Named Pipes Extender and NetWare Client Files
3. Modifying the DOS System and NetWare Client Configuration Files

## **Installing a Named Pipes Server and Client-Server Application**

The NetWare Client™ for OS/2 software allows a Named Pipes server such as an SQL server to function on a Novell® network.

You need to set up a NetWare OS/2 client workstation and configure it for Named Pipes services before setting up and configuring DOS and MS Windows client workstations for a Named Pipes connection. See *NetWare Client for OS/2 User Guide* for information about installation and setup.

You also need to install the client and server portion of the client-server software that you want to run. See the manufacturer's documentation for information.

# Installing the Named Pipes Extender and NetWare Client Files

## Copying the Files to the NetWare Client Directory Automatically

The Named Pipes Extender and other client files are automatically copied to the NetWare Client directory when you run the NetWare Client installation software.

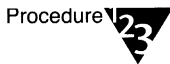
See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.

## Copying the Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation software, you must manually copy the DOSNP.EXE and other client files to the NetWare Client directory.

To manually copy the DOSNP.EXE file and other client files from the NetWare Client for DOS and MS Windows diskettes, complete the following steps.

### Procedure



- 1. Expand and copy the following files from the NetWare Client for DOS and MS Windows diskettes to the NetWare Client directory (the default is C:\NWCLIENT).**

Diskette Name	Directory	Filename
<i>NetWare Client for DOS and MS Windows Disk 1</i>	\	IPXODI.CO_
	\	LSL.CO_
	\	VLM.EX_
	\	filename.VL_
<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	DOSNP.EX_
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	lan_driver.CO_

To expand a file, type

```
NWUNPACK source_drive:path\filename  
destination_drive:path\filename <Enter>
```

For example, to expand the DOSNP.EXE file, you could type

```
NWUNPACK A:DOSNP.EX_ C:\NWCLIENT\DOSNP.EXE <Enter>
```

2. (Conditional) If you are running DOSNP.EXE within MS Windows, expand and copy the NETAPI.DL\_ file from the WINDOWS directory on the WSDOS2\_2 diskette for NetWare Client for OS/2 the SYSTEM directory for MS Windows.
3. Repeat Step 1 until the DOSNP.EXE and NetWare Client files exist in the NetWare Client directory.

## Modifying the DOS System and NetWare Client Configuration Files

Modifying the DOS system and NetWare Client configuration files requires you to edit the CONFIG.SYS, STARTNET.BAT, and NET.CFG files with an ASCII text editor.

### Modifying the CONFIG.SYS File

Modify the CONFIG.SYS file with an ASCII text editor to set the LASTDRIVE variable to Z for the NetWare DOS Requester™ software.

#### Procedure



1. Open the CONFIG.SYS file with an ASCII text editor.

For example, to use the Novell® DOS™ 7 System Editor at the command line to edit the CONFIG.SYS file in the root directory, you would type

```
EDIT C:\CONFIG.SYS <Enter>
```

2. Set the LASTDRIVE variable to Z by adding the following line to the file:

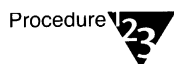
```
LASTDRIVE = Z
```

3. Save your changes and exit the ASCII text editor.

## Modifying the STARTNET.BAT File

Modify the STARTNET.BAT file with an ASCII text editor to load the Link Support Layer (the LSL.COM file), the ODI™ LAN driver, the DOS Named Pipes Extender (the DOSNP.EXE file), and the NetWare DOS Requester software.

### Procedure



1. Add the following lines, *in the given order*, to the STARTNET.BAT file to load the DOSNP.EXE and NetWare Client files:

```
cd path
lsl
odi_lan_driver
ipxodi
vlm
dosnp
```

Replace *path* with the directory where the DOSNP.EXE and NET.CFG files are found. The DOSNP.EXE file cannot execute unless it can access the NET.CFG file in the proper directory path.

Replace *odi\_lan\_driver* with the name of the ODI LAN driver that your client workstation is using.



When a Named Pipes client workstation is configured for default mode, DOSNP.EXE uses the NetWare DOS Requester to search for the table of Named Pipes servers. This requires that the BIND.VLM file be loaded.

If a Named Pipes client workstation is configured for peer mode, then the NetWare DOS Requester is not required to establish a connection to a Named Pipes server.



- 2. (Conditional) If you are running an SQL server program, add the following line for the Microsoft Named Pipe Net Library file after the entry for the VLM.EXE file:**

**dbmmpipe**

Ensure that this file is loading only in the STARTNET.BAT file.



If you are running DOSNP on an MS Windows client workstation, do not load the IPXODI or DOSNP files into high memory.

Also, you do not need to load the DBNMPPIPE file. The DBNMP3.DLL file supports the function in MS Windows. If you need to run an MS-DOS SQL server program from an MS Windows MS-DOS session, load the DBNMPPIPE file in that session.

- 3. Save your changes and exit the ASCII text editor.**

## Modifying the NET.CFG File

The DOS Named Pipes Extender (the DOSNP.EXE file) allows you to specify variables for the following parameters in your NET.CFG file:

NP MAX COMM BUFFERS  
NP MAX MACHINE NAMES  
NP MAX OPEN NAMED PIPES  
NP MAX SESSIONS BUFFERS

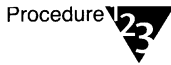
See “Named Pipes Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for details on how to configure for Named Pipes support.



The Named Pipes parameters in the NET.CFG file should be left-justified.

Configure parameters for the DOSNP software by following the following procedure.

## Procedure



### 1. Open your NET.CFG file with an ASCII text editor.

For example, to use the Novell DOS 7 System Editor at the command line to edit the NET.CFG file in the NetWare Client directory (the default is C:\NWCLIENT), you would type

```
EDIT C:\NWCLIENT\NET.CFG <Enter>
```

### 2. Make the necessary configuration changes for your particular client-server application.

See the manufacturer's documentation for information.

- ◆ If you need more than the default four simultaneous Named Pipes connections on a client workstation, add the following line to the file:

```
np max open named pipes number
```

Replace *number* with the total number of Named Pipes that can be opened. The range is 4 through 128.

- ◆ If you need other than the default six communication buffers that the Named Pipes Extender uses, add the following line to the file:

```
np max com buffers number
```

Replace *number* with the maximum number of buffers that can be used. The range is 4 through 40.

- ◆ If you need to configure client workstations for the Named Pipes peer mode, add the following line to the file:

```
np max machine names number
```

Replace *number* with the total number of Named Pipes servers that are maintained in a table at each client workstation. The range is 4 through 50.

This parameter is disabled by deleting the line in the NET.CFG file.

- ◆ If you need more than the default ten sessions open to a Named Pipes servers at one time, add the following line to the file:

**np max sessions** *number*

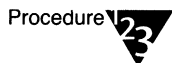
Replace *number* with the total number of Named Pipes servers that can be communicated with at one time. The range is 4 through 50.

3. **Save your changes and exit the NET.CFG file.**

## Loading the Named Pipes Extender

Loading the DOSNP.EXE file for a NetWare connection to a Named Pipes server requires you to complete the following procedure.

### Procedure



1. **Ensure that your Named Pipes server and client-server applications are set up properly.**

See "Installing a Named Pipes Server and Client-Server Application" on page 297 for more information.

2. **Ensure that the DOSNP.EXE and NetWare Client software files are installed on each client workstation that you want to connect to a Named Pipes server.**

See "Installing the Named Pipes Extender and NetWare Client Files" on page 298 for more information.

3. **Ensure that all necessary modifications are made to the client workstation configuration files.**

See "Modifying the DOS System and NetWare Client Configuration Files" on page 299 for more information.

4. **Reboot each client workstation.**

The STARTNET.BAT file loads the DOSNP.EXE and NetWare Client software files.

# Unloading the Named Pipes Extender

Unload DOSNP.EXE by typing

```
DOSNP /U <Enter>
```

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for Named Pipes	"Named Pipes Option" in Chapter 2 of <i>NetWare Client for DOS and MS Windows Technical Reference</i>



# **M***anagement Services*

## **Overview**

The Novell® system management technology provides advanced solutions to centrally manage and control your corporate computing environment.

These solutions are standards-based, modular, and scalable—suitable for simple, standalone LANs as well as large, multi-site computing enterprises.

Novell provides a comprehensive list of system management services that allow you to select the components you need and integrate the appropriate functionality into a customized management package.

The NetWare® Client™ for DOS and MS Windows software provides you with the following management agents:

- ◆ Target Service Agent (TSA) software

Provides support for programs that processes data moving between a specific target and Storage Management Services™ (SMS) applications, such as the NetWare SBACKUP utility or the NetWare Navigator™ program, or other third-party management systems.

- ◆ SNMP Services, hosting MIB II, and Host MIB software

Provides support for client workstations to be managed from the Novell NetWare Management System™ (NMS) software, from other industry-standard SNMP management consoles, or from other third-party management systems.

# Contents

This section is divided into two chapters, with the following information discussed on the indicated pages:

<b>Purpose</b>	<b>Chapter</b>	<b>Page</b>
To learn how to set up the DOS client Target Service Agent to give SMS™ applications the ability to back up information on your client workstations or distribute files	Chapter 17, "Setting Up the Target Service Agent (TSA) Software"	307
To learn how to set up the NetWare Desktop Small Network Management Protocol (SNMP) agent to give NMS™ services and other SNMP-based management systems the ability to access resources on client workstations	Chapter 18, "Configuring Client Workstations for Desktop SNMP Services"	317



chapter

# 17

## **Setting Up the Target Service Agent (TSA) Software**

### **Overview**

This chapter describes how to set up the Novell® Target Service Agent™ (TSA) software for network management through Storage Management Services™ (SMS) applications.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
Installing an SMS Application	309
Installing the TSASMS.COM and NetWare Client Files	309
Modifying the DOS System and NetWare Client Configuration Files	311
Loading the TSA Software	314
Unloading the TSA Software	315

# Introduction

The Novell Target Service Agent (TSA) software (the TSASMS.COM file) is a program that processes data moving between a specific target and Storage Management Services (SMS) applications such as the NetWare SBACKUP utility or the NetWare Navigator™ program.

An SMS™ architecture-based application running on the server sends requests to the TSA software. The TSA software performs the following functions:

- ◆ Receives commands from the SMS application and translates those commands into data requests for the local operating system to handle
- ◆ Transfers the data requests to the local operating system
- ◆ Retrieves the requested data from the local operating system and returns it to the SMS application in standard SMS format

The Novell TSA software has the following features:

- ◆ Operates as a terminate-and-stay-resident (TSR) program
- ◆ Occupies less than 7 KB of memory (using default settings)
- ◆ Supports MS DOS (3.3 and later), DR DOS® (5 and later), and Novell DOS™ (7 and later)
- ◆ Provides several levels of security
- ◆ Provides adjustable read buffers size for increased performance
- ◆ Provides adjustable stack size to reduce the overall memory usage

NetWare Client support for the TSA software (the TSASMS.COM file) must be set up on each client workstation that you want managed by an SMS application.



The complete setup for client workstations using TSA software requires you to complete the following tasks:

1. Installing an SMS Application
2. Installing the TSASMS.COM and NetWare Client Files
3. Modifying the DOS System and NetWare Client Configuration Files

## **Installing an SMS Application**

You need to install and load an SMS application on a server or host before setting up and configuring client workstations to be managed.

See the documentation provided with the application for information on installation and setup.

## **Installing the TSASMS.COM and NetWare Client Files**

### **Copying the Files to the NetWare Client Directory Automatically**

The TSASMS.COM file is automatically copied to the NetWare® Client™ directory when you run the NetWare Client installation software.

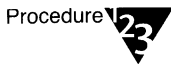
See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.

# Copying the Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation software, you must manually copy the TSASMS.COM and other client files to the NetWare Client directory.

To manually copy the TSASMS.COM file and other client files from the NetWare Client for DOS and MS Windows diskettes, complete the following steps.

## Procedure



1. Expand and copy the following files from the NetWare Client for DOS and MS Windows diskettes to the NetWare Client directory (the default is C:\NWCLIENT).

Diskette Name	Directory	Filename
<i>NetWare Client for DOS and MS Windows Disk 1</i>	\	IPXODI.CO_ LSL.CO_ VLM.EX_ filename.VL_
<i>NetWare Client for DOS and MS Windows Disk 2</i>	\	TSASMS.CO_
<i>NetWare Client for DOS and MS Windows ODI LAN Drivers or NetWare Client for DOS and MS Windows Disk 1</i>	\DOS	lan_driver.CO_

To expand a file, type

```
NWUNPACK source_drive:path\filename  
destination_drive:path\filename <Enter>
```

For example, to expand the TSASMS.COM file, you could type

```
NWUNPACK A:TSASMS.CO_ C:\NWCLIENT\TSASMS.COM  
<Enter>
```

2. Repeat Step 1 until the TSASMS.COM and NetWare Client files exist in the NetWare Client directory.

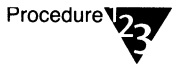
# Modifying the DOS System and NetWare Client Configuration Files

Modifying the DOS system and NetWare Client configuration files requires you to edit the CONFIG.SYS, STARTNET.BAT, and NET.CFG files with an ASCII text editor.

## Modifying the CONFIG.SYS File

Modify the CONFIG.SYS file with an ASCII text editor to set the LASTDRIVE variable to Z for the NetWare DOS Requester™ software.

### Procedure



1. **Open the CONFIG.SYS file with an ASCII text editor.**

For example, to use the Novell DOS 7 System Editor at the command line to edit the CONFIG.SYS file in the root directory, type

```
EDIT C:\CONFIG.SYS <Enter>
```

2. **Set the LASTDRIVE variable to Z by adding the following line to the file:**

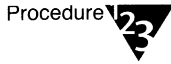
```
LASTDRIVE = Z
```

3. **Save your changes and exit the ASCII text editor.**

## Modifying the STARTNET.BAT File

Modify the STARTNET.BAT file with an ASCII text editor to load the Link Support Layer™ (the LSL.COM file), the ODI™ LAN driver, the TSA software (the TSASMS.COM file), and the NetWare DOS Requester software.

### Procedure



1. Add the following lines, *in the given order*, to the STARTNET.BAT file to load the TSASMS.COM and NetWare Client files:

```
cd path
lsl
odi_lan_driver
ipxodi
vlm
tsasms
```

Replace *path* with the directory where the TSASMS.COM and NET.CFG files are found. The TSASMS.COM file cannot execute unless it can access the NET.CFG file in the proper directory path.

Replace *odi\_lan\_driver* with the name of the ODI LAN driver that your workstation is using.



You can use command line parameters in the STARTNET.BAT file to override NET.CFG parameters. See Chapter 3, "Command Line Parameters Reference," in *NetWare Client for DOS and MS Windows Technical Reference* for more information.

2. Save your changes and exit the ASCII text editor

## Modifying the NET.CFG File

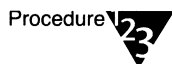
The TSA software (the TSASMS.COM file) allows you to specify variables for the following parameters in your NET.CFG file:

DISK BUFFERS  
DRIVES  
PASSWORD  
STACK SIZE  
TSA SERVER NAME  
WORKSTATION NAME

See “NetWare DOS TSA Option” in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for details on how to configure for the TSA software.

Configure the parameters for the Novell TSA software by completing the following procedure.

### Procedure



**1. Open your NET.CFG file with an ASCII text editor.**

For example, to use the Novell DOS 7 System Editor at the command line to edit the NET.CFG file in the NetWare Client directory (the default is C:\NWCLIENT), you would type

```
EDIT C:\NWCLIENT\NET.CFG <Enter>
```

**2. Make the necessary configurations for your particular SMS application.**

See the manufacturer’s documentation for information.

**3. Save your changes and exit the NET.CFG file.**

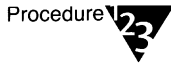


You can use command line parameters in place of NET.CFG parameters to configure settings for your client workstations. See Chapter 3, “Command Line Parameters Reference,” in *NetWare Client for DOS and MS Windows Technical Reference* for more information.

# Loading the TSA Software

Loading the TSASMS.COM file for SMS applications requires you to complete the following steps.

## Procedure



**1. Ensure that your SMS application is set up and running.**

See “Installing an SMS Application” on page 309 for more information.

**2. Ensure that the TSASMS.COM and NetWare Client software files are installed on each client workstation that you want managed by your SMS application.**

See “Installing the TSASMS.COM and NetWare Client Files” on page 309 for more information.

**3. Ensure that all necessary modifications are made to the client workstation configuration files.**

See “Modifying the DOS System and NetWare Client Configuration Files” on page 311 for more information.

**4. Reboot each client workstation.**

The STARTNET.BAT file loads the TSASMS.COM and NetWare Client software files.

# Unloading the TSA Software

Unload the TSASMS.COM file.

**TSASMS /U** <Enter>

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for TSA	"NetWare DOS TSA Option" in Chapter 2 of <i>NetWare Client for DOS and MS Windows Technical Reference</i>







chapter

# 18

## ***Configuring Client Workstations for Desktop SNMP Services***

### **Overview**

This chapter explains how to enable desktop SNMP services on your client workstation and how to modify the NET.CFG file to implement additional SNMP options.

This section is primarily for network supervisors who administer SNMP-based network management systems.

The following topics are covered in this chapter.

<b>Topic</b>	<b>Page</b>
Installing an SNMP Management System Console	319
Installing the Desktop SNMP Software	319
Modifying DOS System and NetWare Client Configuration Files	322
Loading the Desktop SNMP Software	328
Unloading the Desktop SNMP Software	329
Configuring Client Workstations for Better Performance	330

# Introduction

Simple Network Management Protocol (SNMP) is an industry-standard protocol that specifies a format for collecting network management data.

With the Novell® Desktop SNMP services, NetWare client workstations are able to send status information to an SNMP management program running on an IPX™ or TCP/IP network.

Desktop SNMP services can be managed from the Novell NetWare Management System™ (NMS) software, from other industry-standard SNMP management consoles, or from other third-party management systems.

NetWare Client support for Desktop SNMP on NetWare client workstations must be set up on each client workstation that you want managed by an SNMP-based management system.

The complete setup for a Desktop SNMP client workstation requires you to complete the following tasks:

- ◆ Installing an SNMP Management System Console
- ◆ Installing the Desktop SNMP Software
- ◆ Modifying DOS System and NetWare Client Configuration Files
- ◆ Configuring the HRMIB.INI File

## Installing an SNMP Management System Console

The Desktop SNMP services provided with the NetWare Client™ for DOS and MS Windows supports the Novell NetWare Management System software (NMS), other industry-standard SNMP management consoles, or other third-party management systems.

See the documentation provided with these managements systems for information on installation and setup.

## Installing the Desktop SNMP Software

The Desktop SNMP software includes a collection of files that support the Simple Network Management Protocol (SNMP) using the NetWare Virtual Loadable Module™ (VLM) technology.

Support for the Internet Packet Exchange™ (IPX) transport and User Datagram Protocol (UDP) transports is also provided.

- ◆ Desktop SNMP and Management Information Base (MIB) Support Files

The Desktop SNMP VLM™ programs let remote network management systems monitor the IPX™ or UDP/IP protocol stack running on client workstations.

Desktop SNMP also allows remote and local SNMP client workstations complete access to the Management Information Base (MIB) for managing workstation resources.

Desktop SNMP supports the following three MIB-II groups:

- ◆ System and SNMP groups
- ◆ Interfaces groups
- ◆ TCP/IP groups

The following files must exist in the NetWare Client directory for each client workstation.

<b>File</b>	<b>Description</b>
HRMIB.EXE	The Host Resources manager, which collects information about client workstations that are running DOS on the network
HRMIB.INI	The configuration file for the HRMIB.EXE file
MIB2IF.VLM	The MIB-II interfaces groups support
MIB2PROT.VLM	The MIB-II TCP/IP groups support
WSASN1.VLM	The ASN.1 translation module
WSDRVPRN.VLM	The print information collection file for gathering information about print mappings and captured printers
WSREG.VLM	The registration module
WSSNMP.VLM	The Desktop SNMP module, which includes MIB-II System and SNMP groups support
WSTRAP.VLM	The trap module

These files are automatically copied to the NetWare directory when you run the NetWare Client installation program.

See Chapter 5, "Installing or Upgrading NetWare Client Software," on page 97 for more information.

The files with a .VLM extension are loaded by the VLM manager (the VLM.EXE file) using the VLM= parameter in the NET.CFG file. The files with an .EXE extension are loaded from the command line or from a DOS batch file.

### ◆ Transport Providers

The Novell Desktop SNMP requires one of the following two files in the NetWare Client directory to manage your client workstation address for the IPX transport protocol or for the UDP/IP transport protocol:

File	Description
STPUDP.COM	The transport provider module for the UDP/IP protocol
STPIPX.COM	The transport provider module for the IPX protocol

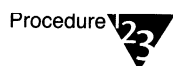
These files are loaded from the command line or from a DOS batch file. Both files can be loaded into memory at the same time.

## Copying the Necessary Files to the NetWare Client Directory Manually

If you choose to not run the NetWare Client installation program, you must manually copy the appropriate files to the NetWare Client directory.

To manually copy the files from the NetWare Client for DOS and MS Windows diskettes, complete the following procedure.

### Procedure



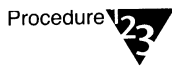
1. **Expand and copy the following files from the *NetWare Client for DOS and MS Windows Disk 2* to the NetWare Client directory (the default is C:\NWCLIENT).**

HRMIB.EXE	HRMIB.INI
MIB2IF.VLM	MIB2PROT.VLM
STPIPX.COM	STPUDP.COM
WSASN1.VLM	WSDRVPRN.MIB
WSDRVPRN.VLM	WSREG.VLM
WSSNMP.VLM	WSTRAP.VLM

See the following references for more information about login scripts and profiles:

Version	Reference
NetWare 2	“Plan and Create Login Scripts,” in <i>Using the Network</i>
NetWare 3	Chapter 4, “Creating Login Scripts,” in <i>Installation and Upgrade</i>
NetWare 4	Chapter 3, “Creating Login Scripts,” in <i>Supervising the Network</i>

## Setting the Number of Available Printer Connections



1. **Edit the NetWare Client configuration (NET.CFG) file with an ASCII text editor.**
2. **Add the following lines to the file:**

```
NetWare DOS Requester  
network printers = number
```

Replace *number* with the number of printer connections.

Maximum = 9

Default = 3

For example, to allow for the maximum number of printer connections, you would type

```
NetWare DOS Requester  
network printers = 9
```

3. **Save your changes and exit the ASCII text editor.**

## Modifying the STARTNET.BAT File

The following modifications to the STARTNET.BAT file are required for each client workstation that you want to load the Desktop SNMP software on.

- ◆ Modify the STARTNET.BAT file to load either one or both of the STPIPX.COM and STPUDP.COM files.
- ◆ Modify the STARTNET.BAT file to load the HRMIB.EXE file.

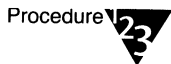


Important

You must have either the IPX or UDP/IP protocol installed on your system to support the transport providers. You can use both types of transport on a single client workstation.

By default, Desktop SNMP services are not enabled when you install the NetWare Client software. To enable Desktop SNMP services, complete the following procedure.

### Procedure



Procedure

1. **Modify the C:\NWCLIENT\STARTNET.BAT file to load the Desktop SNMP transport files.**

Add the following commands in the STARTNET.BAT file *after* the line that loads the VLM.EXE file:

- ◆ If you are using IPX transport, add

**stpipx**

- ◆ If you are using UDP/IP transport, add

**stpudp**



Note

You can add both commands if you use both IPX and UDP/IP transport.

2. **Modify the C:\NWCLIENT\STARTNET.BAT file to load the MIB file.**

Add the following command in the STARTNET.BAT file *after* the line that loads the VLM.EXE file:

**hrmib.exe**



**3. Ensure that the HRMIB.INI file exists in the same directory as the HRMIB.EXE file does.**

If you are running LAN Workplace, make sure you do not load the SNMP.EXE file provided with the LAN Workplace package.

The installation program for LAN Workplace creates a file called LANWP.BAT that loads the LAN Workplace software. Check this file for a line reading **SNMP**. It would be listed directly following the line **TCP/IP**.

If the **SNMP** line is present, delete it or comment it out.

**4. Add the following DOS SET command in the STARTNET.BAT file to set the correct time zone for your area:**

```
set tz = time_zone
```

Refer to your DOS manual for the exact syntax for your particular time zone.

If the time zone is not set in your workstation's environment, traps for SNMP might report an incorrect time.

**5. Save and exit.**

## Modifying the NET.CFG File

The following modifications to the NET.CFG file are required for each client workstation that you want to load the Desktop SNMP software on.

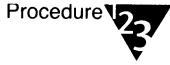
- ◆ Add the necessary lines in the NET.CFG file to load and support the Desktop SNMP software.
- ◆ Set the "TRAP TARGET" address of the NetWare Services Management (NSM) consoles or other SNMP-based managers.

See "Sample NET.CFG File for Desktop SNMP Services" on page 326 for an example.

By default, Desktop SNMP services are not enabled when you install the NetWare Client software. To enable Desktop SNMP services, complete the following procedure.



## Procedure



1. Ensure that the Desktop SNMP files are copied to the NetWare Client directory (the default is C:\NWCLIENT).
2. Modify the NET.CFG file to load the Desktop SNMP .VLM files.

To load the Desktop SNMP .VLM file suite, modify the NET.CFG file on your client workstation in either of the following two ways:

- ◆ To load the Desktop SNMP and the NetWare DOS Requester software, add the following lines to the NET.CFG file *in the order given*:

```
netware dos requester
  vlm = wssnmp.vlm
  vlm = wstrap.vlm
  vlm = wsreg.vlm
  vlm = wsasn1.vlm
  vlm = mib2if.vlm
  vlm = wsdvprn.vlm
  vlm = mib2prot.vlm
```

- ◆ To load only Desktop SNMP, without the NetWare DOS Requester modules, add the following lines to the NET.CFG file *in the order given*:

```
netware dos requester
  use defaults = off
  vlm = wssnmp.vlm
  vlm = wstrap.vlm
  vlm = wsreg.vlm
  vlm = wsasn1.vlm
  vlm = mib2if.vlm
  vlm = wsdvprn.vlm
  vlm = mib2prot.vlm
```

See the following sections in Chapter 2, "NetWare DOS Requester Option," in *NetWare Client for DOS and MS Windows Technical Reference* for details on how to configure for Desktop SNMP:

"Asynchronous timeout"

"Community names"

"MIB-II support"

"Transport providers"

After you have completed the initial configuration of the Desktop SNMP agent, you can further modify the Desktop SNMP options in the NET.CFG file to meet your specific network requirements.

## Sample NET.CFG File for Desktop SNMP Services

Following is a sample of the NET.CFG for Desktop SNMP services:

```
link driver ne2000
  port 300
  int 3
  frame ethernet_802.2
  mem d0000

netware dos requester
  vlm = wssnmp.vlm
  vlm = wstrap.vlm
  vlm = wsreg.vlm
  vlm = wsasn1.vlm
  vlm = mib2if.vlm
  vlm = wsdvprn.vlm
  vlm = mib2prot.vlm
```

```

desktop snmp
  enable monitor community = any
  monitor community = "public"
  enable control community = specific
  control community = "public"
  enable trap community = specific
  trap community = "public"
  sysname = "Suzanne Morley x893"
  syslocation = "Building 2"
  syscontact = "suzanne@acompany.com"
  snmpenableauthentraps = on

transport provider ipx
  trap target = ab123456:0123456789ab
  trap target = cd654321:ba9876543210

transport provider udp
  trap target = 999.88.77.66
  trap target = 888.11.22.33

```

## Configuring the HRMIB.INI File

The Host Resources MIB does not return information about devices attached to the host workstation, such as printers, modems, and tape drives.

If the network management console is to view details of such devices, you must list them in the HRMIB.INI file. Use a ASCII text editor to enter a short description of each device.

The HRMIB.INI file is located in the NetWare Client directory (the default is C:\NWCLIENT).

## Sample Configuration File (HRMIB.INI) for the HRMIB.EXE File

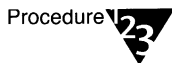
The following is a sample of the HRMIB.INI configuration file for HRMIB.EXE:

```
# List of all printers connected to host
[printers]
HP LaserJet IIip on LPT1:
NEC P20 on LPT2:
# List of all modems connected to host
[modems]
Hayes Optima 144 on COM1:
# List of all tape drives connected to host
[tapes]
Colorado DJ10
HP 35480A SCSI DAT (4-8 GB)
# other devices obtained via DOS APIs
```

## Loading the Desktop SNMP Software

Loading the Desktop SNMP software requires you to complete the following procedure.

### Procedure



- 1. Ensure that the SNMP management system is set up and running.**

See "Installing an SNMP Management System Console" on page 319 for more information.

- 2. Ensure that the Desktop SNMP software is installed on each client workstation that you want managed from the management console.**

See "Installing the Desktop SNMP Software" on page 319 for more information.

3. **Ensure that all necessary modifications are made to the client workstation configuration files.**

See “Modifying DOS System and NetWare Client Configuration Files” on page 322 for more information.

4. **Ensure that the HRMIB.INI is configured properly for each client workstation to include the necessary devices you want managed.**

See “Configuring the HRMIB.INI File” on page 327 for more information.

5. **Reboot each client workstation.**

The VLM manager loads the Desktop SNMP .VLM files along with any other .VLM files your client workstations are configured to load.

## Unloading the Desktop SNMP Software



1. **(Conditional) If UDP/IP support has been loaded, unload STPUDP by typing**

```
STPUDP /U <Enter>
```

2. **(Conditional) If IPX support has been loaded, unload STPIPX by typing**

```
STPIPX /U <Enter>
```

3. **Unload all VLM files by typing**

```
VLM /U <Enter>
```

The VLM /U command unloads all VLM files, not just the Desktop SNMP files.



Always unload the modules in reverse order from the order in which you loaded them. Unloading the modules in any order other than reverse order is impossible.

# Configuring Client Workstations for Better Performance

To improve performance of the Desktop SNMP software, you can configure your client workstation to load one or more Desktop SNMP .VLM files in conventional memory.

To load all .VLM files in conventional memory, use the VLM /MC switch when running the VLM manager. See "NetWare DOS Requester Option" in Chapter 2 of *NetWare Client for DOS and MS Windows Technical Reference* for more information.

To load a Desktop SNMP .VLM files in conventional memory, add lines with the following syntax to the NET.CFG file:

```
netware dos requester  
    vlm = vlm_name.vlm  
    load low vlm_name = on
```

For example, to load Desktop SNMP while loading the WSASN1.VLM and WSREG.VLM files in conventional memory, add the following lines to the NET.CFG file:

```
netware dos requester  
    vlm = wssnmp.vlm  
    vlm = wstrap.vlm  
    vlm = wsreg.vlm  
    vlm = wsasn1.vlm  
    vlm = wsdvprn.vlm  
    load low wsreg = on  
    load low wsasn1 = on
```

## Additional Information

Topic	Reference
Setting up and modifying your NET.CFG file for SNMP	"Desktop SNMP Option" in Chapter 2 of <i>NetWare Client for DOS and MS Windows Technical Reference</i>



# Appendixes

## Overview

The NetWare® Client™ installation program provides a complete installation or upgrade of the NetWare Client software for each DOS and MS Windows client workstation on your network.

If you are installing the NetWare Client software on a new workstation, running the installation program helps to ensure that the workstation is well prepared for connecting to the network or server.

If you are updating NetWare Client files only, you can use the WSUPDATE utility to automate and centralize the process for all client workstations running DOS and MS Windows on your network.

If you are upgrading your client workstations, the WSUGRD utility helps to upgrade dedicated IPX™ drivers to ODI™ drivers before running the installation program. Upgrading these drivers enables the installation to auto-detect software settings for the client workstation hardware and the network frame type. This utility is available in NetWare 4™ software only.

# Contents

This section is divided into two chapters, with the following information discussed on the indicated pages:

<b>Purpose</b>	<b>Chapter</b>	<b>Page</b>
To learn how to use the WSUPDATE utility for updating client workstations with the most current software	Appendix A, "Using the WSUPDATE Utility"	333
To learn how to use the WSUPGRD utility for upgrading client workstations with the most current ODI-based NetWare Client software	Appendix B, "Using the WSUPGRD Utility"	343





appendix

# A

## Using the WSUPDATE Utility

### Overview

This appendix contains information about using the WSUPDATE utility for updating client files automatically.

The following topics are covered in this appendix.

Topic	Page
Updating Files from the Command Line	334
Updating Files from a Login Script or Profile	335

### Introduction

The WSUPDATE utility allows you to copy updates of client files automatically. Use WSUPDATE to

- ◆ Copy new revisions of files
- ◆ Reinstall NetWare Client files
- ◆ Copy updates of your own files

Important



This utility is not recommended for first-time installation of NetWare® Client™ files. WSUPDATE can update only files that exist on the workstation. Use the client installation program for first-time installations.

WSUPDATE also cannot be used for updating RPL client workstations. RPL workstations must be updated through the DOSGEN utility. See “DOSGEN” in *NetWare 4 Utilities Reference*.

# Using WSUPDATE to Update Files on Client Workstations

The WSUPDATE utility allows you to copy updates of files to client workstations automatically, either at the command line or from a login script or profile.

## Updating Files from the Command Line

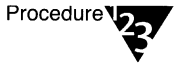
### Prerequisites

Before you load WSUPDATE, ensure that



- The files that are copied to the workstation reside in the same directory as the WSUPDATE utility (the default is SYS:PUBLIC)
- Each workstation you want to update files on has a drive mapped to SYS:PUBLIC

### Procedure



1. **Copy the new files to the SYS:PUBLIC directory.**
2. **Change to the network drive that is mapped to the PUBLIC subdirectory.**

For example, if you mapped network drive G: to PUBLIC, type

G: <Enter>

3. **Load WSUPDATE and specify the file and path you want updated.**

For example, you might type

**WSUPDATE /F=C:\NE2000.COM** <Enter>

The /F option lets you specify the file location.

## Updating Files from a Login Script or Profile

You can add the WSUPDATE command to a system login script or container profile for updating files on client workstations.

Use SYSCON for NetWare 2 and NetWare 3™ workstations. Use the NetWare Administrator graphical utility or the NETADMIN text utility for NetWare 4™ workstations. All three procedures are documented in this section.

### Using SYSCON

This utility is used only with NetWare 2 and 3 networks.

For NetWare 4 networks, use the NWADMIN or NetWare Administrator utility to edit a specific container profile. See “Using NetWare Administrator” on page 336 or “Using NETADMIN” on page 339 for information.

#### Prerequisites



Checklist

- A client workstation logged in to the network, running a copy of Novell DOS™ 7 or later, DR DOS® 5 or later, MS-DOS\* 3 or later, or PC-DOS\* 3 or later
- Rights to modify a system login script
- A search drive mapped to SYS:PUBLIC

#### Procedure



Procedure

1. **Log in to a server as SUPERVISOR by typing**  
**LOGIN SUPERVISOR <Enter>**
2. **Enter a password (if required).**
3. **Load SYSCON by typing**  
**SYSCON <Enter>**
4. **From the “Available Topics” menu, choose “Supervisor Options.”**

**5. Choose “System Login Script.”**

A window appears that allows you to edit or create a login script.

**6. In the login script, map a drive to the network file you want copied to the client workstations.**

For example, if you want to copy the NE2000.COM file from the \DRIVERS directory to drive J: on the workstations, add a drive mapping similar to the following:

```
MAP J:=VOL2:DRIVERS\
```

**7. Insert the WSUPDATE command after the drive mapping into the login script by typing**

```
#WSUPDATE J: filename
```

For example, if you mapped drive J: as shown in Step 6, add the following command after the drive mapping:

```
#WSUPDATE J: NE2000.COM
```

This command searches all local drives of the client workstations and replaces the NE2000.COM file with its newer version on drive J:.

It renames any old NE2000.COM file on the local drives to NE2000.OLD.

**8. To exit the system login script, press <Esc>.**

**9. Confirm and save changes you made in the login script.**

## Using NetWare Administrator

This utility is used only with NetWare 4 networks.

For NetWare 2 and 3 networks, use the SYSCON utility to edit the system login script. See “Using SYSCON” on page 335 for information.

## Prerequisites



- A client workstation logged in to the network, running a copy of MS Windows 3.1 or later and Novell DOS 7 or later, DR DOS 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later
- Rights to modify a Profile container object
- A search drive mapped to SYS:PUBLIC.

## Procedure



1. **Load the NetWare Client software and then start MS Windows.**
2. **Load the NetWare User Tools by choosing the “NetWare User Tools” icon from the NetWare group.**

The “NetWare User Tools” main screen appears.

3. **From the menu bar, choose the “NetWare Connections” icon.**

The “NetWare Connections” window displays available resources.

4. **From the “Resources” list, choose the resource that you want to log in to.**

5. **Choose “Login.”**

The “Log In to NetWare” dialog box appears.

6. **Enter the name “ADMIN” or a username with ADMIN equivalency into the “User Name” field.**

7. **Enter a password (if needed).**

8. **Exit the NetWare User Tools.**

9. **Load NetWare Administrator by choosing the “NWADMIN” icon from the NetWare group.**

The “NetWare Administrator” main screen appears.

**10. From the browser, select the object whose container profile you want to edit.**

- ◆ To modify the login script for a container, select the “Organizational Unit” icon.
- ◆ To modify the login script for a particular User object, select the “User” icon.

A login script can be a property of a container, Profile, or User object.

You might have to browse through the Directory tree to get to the object you want. For information about moving around in the browser and selecting objects, choose “Help” from the menu bar at the top of the “NetWare Administrator” screen.

**11. From the NetWare Administrator menu bar, choose “Object.”**

**12. Choose “Details.”**

**13. Choose the “Login Script” page button.**

**14. In the login script, map a drive to the network file that you want copied to the client workstations.**

For example, if you want to copy the NE2000.COM file from the \DRIVERS directory to drive J: on the workstations, add a drive mapping similar to the following:

```
MAP J:=VOL2:DRIVERS\
```

**15. Insert the WSUPDATE command after the drive mapping in the login script by typing**

```
#WSUPDATE J: filename
```

For example, if you mapped drive J: as shown in Step 15, add the following command after the drive mapping:

```
#WSUPDATE J: NE2000.COM
```

This command searches all local drives of the client workstations and replaces the NE2000.COM file with its newer version on drive J:.

It renames any old NE2000.COM file on the local drives to NE2000.OLD.

**16. Choose “OK” and then save your changes.**

The “NetWare Administrator” main screen appears.

**17. Log in all of the client workstations that you have modified the login scripts for.**

If the workstations are already logged in, log them in to the network again.

This runs the WSUPDATE program and updates the files on all those client workstations.

## Using NETADMIN

This utility is used only with NetWare 4 networks.

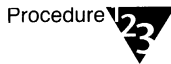
For NetWare 2 and NetWare 3 networks, use the SYSCON utility to edit your login script. See “Using SYSCON” on page 335 for information.

### Prerequisites



- A client workstation logged in to the network, running a copy of Novell DOS 7 or later, DR DOS 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later
- Rights to modify a system login script
- A search drive mapped to SYS:PUBLIC

## Procedure



1. **Load the NetWare Client software.**
2. **Log in to the network with the name "ADMIN" or a username with ADMIN equivalency.**
3. **Enter a password (if required).**
4. **Load NETADMIN by typing**  
  
`NETADMIN <Enter>`
5. **From the "Options" menu, choose "Manage Objects."**
6. **Select the object whose login script you want to edit.**
  - ◆ If the object you want appears on the list, select it and press <F10>.
  - ◆ If the object is not on the list, browse the Directory tree by selecting objects and pressing <Enter> until you see the object you want. Select it and press <F10>.

A login script can be a property of a container, Profile, or User object.

7. **Choose "View or Edit Object Properties."**
8. **Choose "Login Script."**
9. **In the login script, map a drive to the file on the network you want copied to the client workstations.**

For example, if you want to copy the NE2000.COM file from the \DRIVERS directory to drive J: on the workstations, add a drive mapping similar to the following:

```
MAP J:=VOL2:DRIVERS\
```



**10. Insert the WSUPDATE command after the drive mapping in the login script by typing**

```
#WSUPDATE J: filename
```

For example, if you mapped drive J: as shown in Step 9, add the following command after the drive mapping:

```
#WSUPDATE J: NE2000.COM
```

This command searches all local drives of the client workstations and replaces the NE2000.COM file with its newer version on drive J:.

It renames any old NE2000.COM file on the local drives to NE2000.OLD.

**11. To save the login script, press <F10>.**

**12. To exit, press <Esc>.**

**13. Log in all of the client workstations that you have modified the login scripts for.**

If the workstations are already logged in, log them in to the network again.

This runs the WSUPDATE program and updates the files on all those client workstations.

# Additional Information

## For NetWare 2 and NetWare 3

Topic	Reference
Creating login scripts	"SYSCON" in <i>Utilities Reference</i>
Mapping network drives	"MAP" in <i>Utilities Reference</i>

## For NetWare 4

Topic	Reference
Creating login scripts	Chapter 3, "Creating Login Scripts" in <i>Supervising the Network</i>
Mapping network drives	"MAP" in <i>Utilities Reference</i>
Using WSUPDATE	"WSUPDATE" in <i>Utilities Reference</i>



appendix

# B

## *Using the WSUPGRD Utility*

### Overview

This appendix contains information about using the WSUPGRD utility for upgrading dedicated IPX™ LAN drivers to ODI™ LAN drivers. This utility is available in NetWare® 4™ software only.

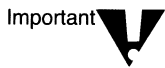
The following topics are covered in this appendix.

Topic	Page
Upgrading IPX LAN Drivers from the Command Line	346
Upgrading IPX LAN Drivers from a Login Script or Profile	347

### Introduction

The WSUPGRD utility upgrades the IPX LAN drivers on your client workstation to the corresponding ODI LAN driver.

If client workstations in your network are running one of the NetWare Client™ shells (NETx), they are running an IPX LAN driver or a corresponding ODI LAN driver.



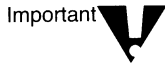
This utility is recommended for large installations with similar hardware and software configurations. If your network has a variety of network boards and LAN driver types, you need to manually upgrade each client workstation.

WSUPGRD cannot be used for upgrading remote boot workstations.

The current NetWare Client installation program provides you with a Novell® ODI LAN driver for network boards. However, the installation program cannot detect board settings from an IPX LAN driver.

Therefore, you must know the type of network board and the hardware settings for each client workstation on the network.

The WSUPGRD utility was designed to automate the upgrade process from IPX to ODI LAN drivers and make the installation of the NetWare Client software easier by providing auto-detection of the LAN driver settings.



If you are running an IPX LAN driver on any client workstations, you should upgrade the LAN drivers on those client workstations to ODI *before* using the NetWare Client installation program.

The NetWare Client installation program automatically detects if an ODI LAN driver is loaded on the client workstations and sets the driver settings for you. This will make upgrading client workstations from a previous version of NetWare with the installation program automatic.

## Prerequisites

A typical upgrade requires the following files in SYS:PUBLIC:



- WSUPGRD.EXE
- LSL.COM
- IPXODI.COM
- Appropriate ODI LAN drivers (for example, NE2000.COM)

## □ Auxiliary files

The auxiliary files are optional but can make upgrading a complex network easier.

### ◆ DRVRXLAT.TXT

This file is in SYS:PUBLIC. It contains one line for each ODI LAN driver type in use on the network.

Each line has the hexadecimal hardware identification of the IPX LAN driver, the path to the files, and the name of the corresponding ODI LAN driver.

If no DRVRXLAT.TXT file exists or if no line with the correct hardware identification is found in the DRVRXLAT.TXT file, then WSUPGRD looks in the PUBLIC directory for an ODI LAN driver with the same name as the existing IPX LAN driver.

If it fails to find an ODI driver, no upgrade is performed.

### ◆ *driver\_name*.LDC

The .LDC files are in the same directory as the ODI LAN drivers of the same name (*driver\_name*.COM).

These files contain lines that are to be copied to the NET.CFG file in addition to any lines the utility creates normally.

## Using the WSUPGRD /I Option

The /I option in WSUPGRD lets you print out the hardware identification for your dedicated IPX LAN driver.

The DRVRXLAT.TXT file contains a master configuration table. Check the master configuration table to make sure that your dedicated-IPX LAN driver identification matches a registered driver. The table lists the driver name, the company name, and the hardware identification.

If the listing in the table does not match the LAN drivers and network boards used in your client workstations, you should *not* use this utility.

If the dedicated IPX LAN driver is not registered, the identification that the IPX LAN driver uses might be registered for a different type of network board.

You cannot use the WSUPGRD /I option with any other WSUPGRD options.

## Using WSUPGRDE to Upgrade Network Board Drivers

The WSUPGRD utility upgrades the IPX LAN drivers on the client workstations to the corresponding ODI LAN drivers, either at the command line or from a login script.

### Upgrading IPX LAN Drivers from the Command Line

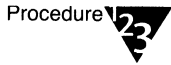
#### Prerequisites

Before you load WSUPGRD, ensure that



- The files that are copied to the client workstation reside in the same directory as the WSUPGRD utility (the default is SYS:PUBLIC)
- Each client workstation you want to upgrade files on has a drive mapped to SYS:PUBLIC

## Procedure



1. **Copy the new files to the SYS:PUBLIC directory.**
2. **Change to the network drive that is mapped to the PUBLIC subdirectory.**

For example, if you mapped network drive G: to PUBLIC, type

**G:** <Enter>

3. **Change to the drive and directory that the client workstation boots from.**

For example, if the client workstation boots from drive C:, type

**C:** <Enter>

4. **Load WSUPGRD and specify the type of LAN driver.**

For example, you might type

**WSUPGRD NE2000** <Enter>

## Upgrading IPX LAN Drivers from a Login Script or Profile

You can add the WSUPGRD command to a system login script or container profile for upgrading LAN drivers.

Use SYSCON for NetWare 2 and NetWare 3 workstations. Use the NetWare Administrator graphical utility or the NETADMIN text utility for NetWare 4 workstations. All three procedures are documented in this section.



If this utility is loaded from a system login script, all of the client workstations that log in to this server must have drivers with the same name.

If this is not the case, users have to run WSUPGRD from the DOS command line supplying the path to and the name of the IPX driver on their respective client workstations.

## Using SYSCON

This utility is used only with NetWare 2 and NetWare 3 networks.

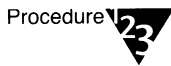
For NetWare 4 networks, use the NetWare Administrator or NETADMIN utility to edit your login script. See “Using NetWare Administrator” on page 350 or “Using NETADMIN” on page 352 for information.

### Prerequisites



- A client workstation logged in to the network, running a copy of Novell DOS™ 7 or later, DR DOS® 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later
- Rights to modify a system login script
- A search drive mapped to SYS:PUBLIC

### Procedure



1. **Log in to a server as SUPERVISOR by typing**

**LOGIN SUPERVISOR** <Enter>

2. **Enter a password (if required).**

3. **At the command line, type**

**SYSCON** <Enter>

4. **From the “Available Topics” menu, choose “Supervisor Options.”**

5. **Choose “System Login Script.”**

A window appears that allows you to edit or create a login script.



**6. Insert the WSUPGRD command into the login script by typing**

```
WSUPGRD odi_lan_driver [option]
```

For example, you might type

```
WSUPGRD NE2000 /N
```

This command upgrades your IPX LAN driver with an NE2000.COM ODI LAN driver without deleting your IPX LAN driver.

**7. To exit the system login script, press <Esc>.**

**8. Confirm and save changes you made in the login script.**

**9. Modify any batch files used to load the NetWare Client software for each client workstation.**

The batch file should contain at least the following lines:

```
LSL
```

```
odi_lan_driver.COM
```

```
IPXODI
```

```
NETx [if using NetWare 3 or earlier]
```

```
VLM [if using NetWare 4]
```

**10. Log in all of the client workstations you have modified the login scripts for.**

If the workstations are already logged in, log them in to the network again.

**11. Run the WSUPGRD program and update the LAN driver.**

## Using NetWare Administrator

This utility is used only with NetWare 4 networks.

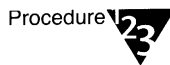
For NetWare 2 and NetWare 3 networks, use the SYSCON utility to edit your login script. See “Using SYSCON” on page 348 for information.

### Prerequisites



- A client workstation logged in to the network, running a copy of MS Windows 3.1 or later and Novell DOS 7 or later, DR DOS 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later
- Rights to modify a system login script
- A search drive mapped to SYS:PUBLIC

### Procedure



- 1. Load the NetWare Client software and then start MS Windows.**
- 2. Load the NetWare User Tools by choosing the “NetWare User Tools” icon from the NetWare group.**

The “NetWare User Tools” main screen appears.

- 3. From the menu bar, choose the “NetWare Connections” icon.**  
The “NetWare Connections” window displays available resources.
- 4. From the “Resources” list, choose the resource that you want to log in to.**

- 5. Choose “Login.”**

The “Log In to NetWare” dialog box appears.

- 6. Enter the name “ADMIN” or a username with ADMIN equivalency into the “User Name” field.**
- 7. Enter a password (if required).**
- 8. Exit the NetWare User Tools.**

**9. Load NetWare Administrator by choosing the “NWADMIN” icon from the NetWare group.**

The “NetWare Administrator” main screen appears.

**10. From the browser, select the object whose login script you want to edit.**

- ◆ To modify the system login script for a container, select the “Organizational Unit” icon.
- ◆ To modify the login script for a particular User object, select the “User” icon.

A login script can be a property of a container, Profile, or User object.

You might have to browse through the Directory tree to get to the object you want. For information about moving around in the browser and selecting objects, choose “Help” from the menu bar at the top of the “NetWare Administrator” screen.

**11. From the NetWare Administrator menu bar, choose “Object.”**

**12. Choose “Details.”**

**13. Choose the “Login Script” page button.**

**14. Insert the WSUPGRD command into the login script by typing**

```
WSUPGRD odi_driver [option]
```

For example, you might type

```
WSUPGRD NE2000 /N
```

This command upgrades your IPX LAN driver with an NE2000.COM ODI LAN driver without deleting your IPX LAN driver.

**15. Choose “OK.”**

The “NetWare Administrator” main screen appears.

**16. Modify any batch files used to load the NetWare Client software for each client workstation.**

The batch file should contain at least the following lines:

**LSL**

*network\_board\_driver.COM*

**IPXODI**

**NETx** [if using NetWare 3 or earlier]

**VLM** [if using NetWare 4]

**17. Log in all of the client workstations you have modified the login scripts for.**

If the workstations are already logged in, log them in again to the network.

This runs the WSUPGRD program and updates the LAN driver on all those client workstations.

## Using NETADMIN

This tool is used only with NetWare 4 networks.

For NetWare 2 and NetWare 3 networks, use the SYSCON utility to edit your login script. See "Using SYSCON" on page 348 for information.

### Prerequisites



- A client workstation logged in to the network, running a copy of Novell DOS 7 or later, DR DOS 5 or later, MS-DOS 3 or later, or PC-DOS 3 or later
- Rights to modify a system login script
- A search drive mapped to SYS:PUBLIC

## Procedure

1. Load the NetWare Client software.
2. Log in to the network with the name **ADMIN** or a username with **ADMIN** equivalency.
3. Enter a password (if required).
4. Load **NETADMIN** by typing  
**NETADMIN** <Enter>
5. From the “Options” menu, choose “Manage Objects.”
6. Select the object whose login script you want to edit.
  - ◆ If the object you want appears on the list, select it and press <F10>.
  - ◆ If the object is not on the list, browse the Directory tree by selecting objects and pressing <Enter> until you see the object you want. Select it and press <F10>.

A login script can be a property of a container, Profile, or User object.
7. Choose “View or Edit Object Properties.”
8. Choose “Login Script.”
9. Insert the **WSUPGRD** command into the login script by typing  
**WSUPGRD** *odi\_driver* [*option*]  
For example, you might type  
**WSUPGRD** **NE2000** /**N**
10. To save the login script, press <F10>.
11. To exit, press <Esc>.

**12. Modify any batch files used to load the NetWare Client software for each workstation.**

The batch file should contain at least the following lines:

```
LSL  
network_board_driver.COM  
IPXODI  
NETx [if using NetWare 3 or earlier]  
VLM [if using NetWare 4]
```

**13. Log in all of the client workstations that you have modified the login scripts for.**

If the workstations are already logged in, log them in to the network again.

This runs the WSUPGRD program and updates the LAN driver on all those client workstations.

## Additional Information

Topic	Reference
Creating login scripts	Chapter 3, "Creating Login Scripts" in <i>Supervising the Network</i>
Mapping network drives	MAP" in <i>Utilities Reference</i>
Using WSUPGRD	"WSUPGRD" in <i>Utilities Reference</i>



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Windows User Guide  
Part #100-002077-001  
December 1994*

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