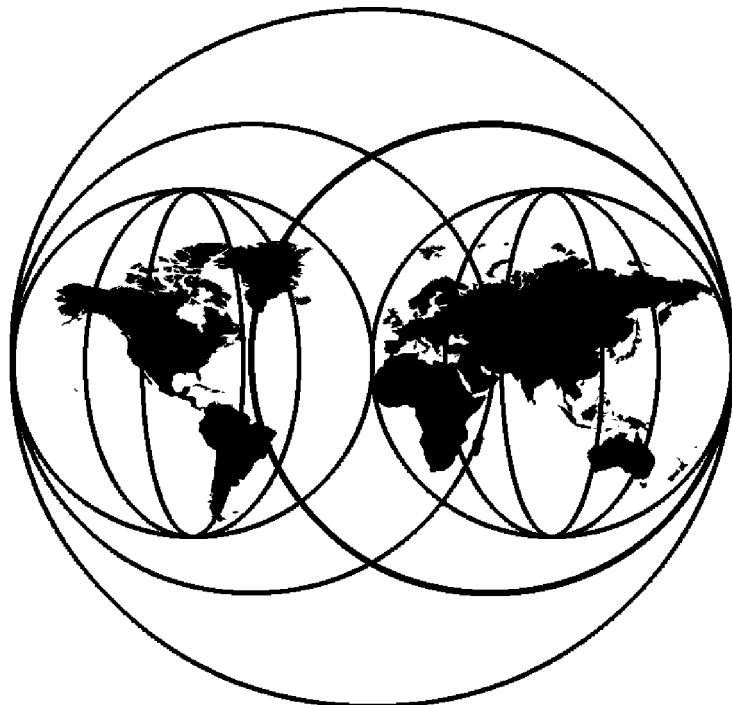


**OS/2 Warp Generation, Volume 2:
Exploring LAN Connectivity
With OS/2 Warp Connect**

July 1995



IBM

**International Technical Support Organization
Austin Center**



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Exploring LAN Connectivity
With OS/2 Warp Connect**

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Take Note!

Before using this information and the product it supports, be sure to read the general information under "Special Notices" on page xxi.

First Edition (July 1995)

This edition applies to the OS/2 Warp Connect Version 3 product.

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Abstract

This redbook discusses the connectivity function of the IBM OS/2 Warp Connect Version 3 product, based on the early experiences of the OS/2 Warp Connect Version 3. This book will highlight the excellence of the product in exploring the LAN connectivity. Information on installation/configuration, component features such as new OS/2 Peer and TCP/IP Version 3, Multiprotocol Network Services (MPTS), and interoperability are discussed.

This document intends to provide a guidance on installing and configuring OS/2 Warp Connect for customers and IBM systems engineers. This document doesn't describe the OS/2 Warp base functions. Please obtain the *OS/2 Warp Generation, Volume 1*, SG24-4552 for the information of base OS/2 functions.

(461 pages)

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Special Notices

This publication is intended to help the customer install and configure IBM OS/2 Warp Connect Version 3. The information in this publication is not intended as the specification of any programming interfaces that are provided by IBM OS/2 Warp Connect Version 3. See the PUBLICATIONS section of the IBM Programming Announcement for IBM OS/2 Warp Connect Version 3 for more information about what publications are considered to be product documentation.

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Preface

This redbook discusses the connectivity function of the IBM OS/2 Warp Connect Version 3 product. We have used the OS/2 Warp Connect Version 3 and experienced the excellence of the product in exploring the LAN connectivity. Information on installation/configuration, component features such as new OS/2 Peer and TCP/IP Version 3, Multiprotocol Network Services (MPTS), and interoperability are discussed. The information provided is based on the experiences of the participants of the project.

This document intends to provide a guidance on installing and configuring OS/2 Warp Connect for customers and IBM systems engineers. This document doesn't describe the OS/2 Warp base functions.

How This Document is Organized

The document is organized as follows:

- Chapter 1, "Introduction to OS/2 Warp Connect"
This chapter introduces the OS/2 Warp Connect product, including new concepts and scenarios of environments in which the product works well.
- Chapter 2, "Installing OS/2 Warp Connect"
This chapter discusses installation options and considerations, as well as step-by-step instructions.
- Chapter 3, "OS/2 Warp Connect IBM Peer for OS/2 Version 1.0"
This chapter describes the new OS/2 Peer product, which allow you to share resources at your workstation with multiple users, while also accessing OS/2 LAN Server resources.
- Chapter 4, "OS/2 Warp Connect OS/2 LAN Requester"
This chapter discusses the OS/2 LAN Requester product, a component you may install rather than the OS/2 Peer if you have a need to administer a LAN Server domain.
- Chapter 5, "OS/2 Warp Connect NetWare Client for OS/2 Version 2.11"
This chapter describes using NetWare client shipped with the product to access your NetWare servers, including information on installing and using the NetWare client in DOS and WIN-OS/2 sessions.
- Chapter 6, "Features Common to the Network Clients"

This chapter discusses features that are common across the OS/2 Peer, OS/2 LAN Requester, and NetWare Client platforms.

- Chapter 7, “Improved Internet Access and TCP/IP Functions”

This chapter describes the new TCP/IP for OS/2 V3 shipped with this product, including installation/configuration information and considerations.

- Chapter 8, “IBM LAN Distance”

This chapter describes the remote LAN access capability included in LAN Distance.

- Chapter 9, “Multi-Protocol Transport Services (MPTS)”

This chapter describes the transport architecture implemented in OS/2 Warp Connect, including configuration information for more advanced installations.

- Chapter 10, “Interoperability”

This chapter discusses how OS/2 Warp Connect can access other vendors' servers, such as Microsoft NTAS, Windows for Workgroups, and NetWare. Also we look at how other vendors' clients can access OS/2 Warp Connect via the OS/2 Peer function.

- Appendix A, “Supported Hardware List”

This appendix describes the hardware support by OS/2 Warp Connect at the time the product was announced.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *IBM OS/2 LAN Server 4.0 Network Administrator Reference, Volume 1: Planning, Installation, and Configuration*, S10H-9680
- *IBM OS/2 LAN Server 4.0 Network Administrator Reference, Volume 2: Performance Tuning*, S10H-9681
- *IBM OS/2 LAN Server 4.0 Network Administrator Reference, Volume 3: Network Administrator Tasks*, S10H-9682
- *OS/2 LAN Server 4.0 Commands and Utilities*, S10H-9686
- *IBM LAN Distance Advanced Guide*, S96F-8598
- *IBM LAN Distance Remote Guide*, S96F-8599

- *Multi-Protocol Transport Services - AnyNet for OS/2: Configuration Guide*, S10H-9693
- *LAN Technical Reference IEEE 802.2 and NETBIOS APIs*, SC30-3587
- *TCP/IP for OS/2 V2.0 Installation and Administration*, SC31-6075
- *IBM TCP/IP Version 2.0 for OS/2 Domain Name Server Guide*, SC31-7174

The following lists the name of the online documentation shipped with the OS/2 Warp Connect product as a part of CD-ROM:

- *OS/2 Warp Connect Up and Running!*
- *OS/2 Warp Connect Easy Start*
- *OS/2 Warp Connect User's Guide*
- *OS/2 Warp Connect Compatibility List*

The following lists books available from the book stores and they are useful for understanding TCP/IP and Internet:

- *The Internet Navigator* by Paul Gilster
- *10 Minute Guide to the Internet* by Peter Kent
- *Internetworking with TCP/IP Volume 1* by Douglas E. Comer
- *The Whole Internet User's Guide and Catalog* by Ed Krol
- *Your OS/2 Warp Internet Connection* by Deborah Morrison

International Technical Support Organization Publications

- *OS/2 Warp Generation, Volume 1: OS/2 Warp Version 3, OS/2 Warp with Windows and BonusPak*, SG24-4552
- *Inside OS/2 LAN Server 4.0*, GG24-4428
- *TCP/IP V2.0 for OS/2 Installation and Interoperability*, GG24-3531
- *Understanding IBM OS/2 LAN Server Performance Tuning*, GG24-4430
- *LAN Server 3.0 System Recovery*, GG24-4043
- *Migrating to OS/2 LAN Server from NetWare*, GG24-4388
- *Migrating to OS/2 LAN Server from Microsoft LAN Manager*, GG24-4387
- *NetWare Client for OS/2 Installation and Configuration*, GG24-3891-01
- *IBM LAN Distance Version 1.1 Configuration and Customization Guide*, GG24-4158-01

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The advisors for this project was:

Toshi Shimizu	ITSO, Austin Center
Berit Kragas	ITSO, Austin Center

The authors of this document are:

John Leaning	IBM New Zealand
Enrique Testini	IBM Italy
David Wood	IBM United Kingdom
Uwe Zimmermann	IBM Germany

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Chapter 1. Introduction to OS/2 Warp Connect

OS/2 Warp is an advanced, 32-bit operating system that provides support for both 16-bit and 32-bit applications. DOS, Windows and OS/2 applications can be used concurrently, and all can be accessed from the OS/2 Warp Desktop. With OS/2 Warp Connect, networking function is integrated to the OS/2 Warp base to enable you to share files and printers among workstations and to connect to IBM, Microsoft, and Novell servers. You can connect to the Internet across LANs and over phone lines, and to your LANs from a remote site across the phone lines.



Warp Connect Overview

OS/2 Warp Connect is a product that combines the capability of a 32-bit operating environment provided by OS/2 Warp with a set of networking components that allow LAN attachment and communication supporting a large variety of protocols standards. Protocols supported are:

- NetBIOS
- IBM IEEE 802.2
- IPX
- TCP/IP

OS/2 Warp Connect also provides the ability to use a specific protocol on the LAN, but present the interface of another protocol to your applications. This allows applications designed for use on one protocol to run in a network that is using a different protocol. This is useful because there is no need to change the topology of the existing network, adding or modifying routers or creating special links. You can have a reduced number of protocols in the network, reducing the cost of administration and maintenance. You can also limit the negative effects of particular protocols (for example broadcast frames) that may reduce the effectiveness of the network.

OS/2 Warp Connect provides the following additional protocol support:

- NetBIOS over IPX allows NetBIOS based applications to run in an IPX-based environment. This requires the NetWare Client for OS/2 Version 2.11 to be installed and configured for NetBIOS emulation.
- NetBIOS over TCP/IP allows NetBIOS-based applications to run in a TCP/IP-based environment.

NetBIOS applications such as IBM Peer for OS/2 Version 1.0 and OS/2 LAN Requester, when using this additional protocol support, can run on a network that only supports TCP/IP or IPX.

OS/2 Warp Connect includes Multi-Protocol Transport Services / AnyNet (MPTS), which provides a socket programming interface to a set of transport independent services that concatenate connections across multiple networking protocols.

In addition to logical connections across multiple protocol networks, Socket/MPTS separates applications from networks by providing a transport independent service, so that messages from the application can be transported over any protocol under this service. However, in order to communicate, the workstations must be running the same protocol.

MPTS with OS/2 Warp Connect provides the following socket services:

- TCP/IP Socket access: Socket applications using the TCP/IP interface. TCP/IP must be configured.
- NetBIOS Socket access: Socket applications using NetBIOS interface. NetBIOS must be configured.

Note

Using IBM TCP/IP for OS/2 Version 3.0 in conjunction with the NetBIOS Socket access, it is possible to run IBM TCP/IP for OS/2 Version 3.0 on a NetBIOS-based network.

Interoperability and Coexistence

OS/2 Warp Connect also allows interoperability and coexistence with the following networking products:

- IBM OS/2 LAN Server 2.0, 3.0 and 4.0
- IBM DOS LAN Services 4.0
- Microsoft LAN Manager 2.2
- Microsoft Windows for Workgroups 3.11
- Microsoft Windows NT Advanced Server 3.1 and 3.5
- Novell NetWare 3.12 and 4.x
- IBM TCP/IP for OS/2 Version 2.0
- Communications Manager/2
- Lotus Notes Server

As a LAN client, OS/2 Warp Connect provides:

OS/2 LAN Server 4.0 Requester functions: Allows access to other computer devices on the LAN, such as hard disks, CD-ROMs, printers or modems, and also administration of OS/2 LAN Server domains using a Graphical User Interface (GUI).

IBM Peer for OS/2 Version 1.0 functions: Allows sharing of multiple resources with multiple users on the LAN. A GUI is provided to locally manage the access and sharing of those resources. IBM Peer for OS/2 Version 1.0 uses all the requester functions of OS/2 LAN Server 4.0 Requester.

NetWare Client for OS/2 Version 2.11: Provides native Novell NetWare 3.x and 4.x support in an OS/2 environment allowing administration and use of resources of NetWare servers.

TCP/IP Functions: Allows client/server connectivity with TCP/IP host systems through Telnet, FTP, REXEC, RSH, BOOTP, ROUTE, and SNMP. It also provides access to the Internet for electronic mail (E-mail) services, file transfer, and connecting to bulletin boards and news services worldwide. This includes applications such as Gopher, NewsReader/2, Web Explorer and Network Dialer.

Remote LAN Access Capability: Allows the access of remote data resources through modems or other devices, by dialing a connection server attached to the remote LAN, or by dialing to another remote client.

OS/2 Warp BonusPak: Includes utilities that enhance the usability of the operating system.

Components

The following are the main components of OS/2 Warp Connect on top of the OS/2 Warp Version 3.

IBM Peer for OS/2 Version 1.0: Provides access to other computer devices in a LAN such as disks, printers or modems that can be located on a server or another peer workstation. It also, provides the ability to share local devices with other users, allowing multiple users to access the same device.

OS/2 LAN Server 4.0 Requester: Provides access to other computer devices in a LAN such as disks, printers or modems that can be located on a server or another peer workstation. It also provides a GUI interface for administration of an OS/2 LAN Server domain.

NetWare Client for OS/2 Version 2.11: Provides support for access to NetWare 3.x and 4.x servers for OS/2, DOS and WIN-OS/2 sessions. This version is the latest from Novell, and includes full support for OS/2 Warp.

IBM TCP/IP for OS/2 Version 3.0: Replacement of the TCP/IP for OS/2 Version 2.0, previously sold separately, and the Internet Connection Kit (IAK), contained in the OS/2 Warp BonusPak. It contains IBM Web Explorer and also allows for simultaneous dial-up access (through SLIP or PPP) and LAN access.

IBM LAN Distance Remote Version 1.11: Provides access to LAN data, resources, and applications from a stand-alone workstation. This can be done by dialing an IBM LAN Distance Connection Server 1.1 attached on a token-ring or Ethernet LAN, or by dialing another IBM LAN Distance Remote Version 1.11 workstation.

Multi-Protocol Transport Services / AnyNet (MPTS): Required by all the other components of OS/2 Warp Connect. It is installed automatically when you select the Easy Installation or Advanced Installation. This is the latest version of the IBM support for LAN adapters and protocols. It includes NetBIOS, TCP/IP, NetBIOS over TCP/IP and NetBIOS over IPX protocol support and also supports connectivity using Infrared adapters and parallel port connections.

Lotus Notes Express: A communication and collaboration platform that requires Lotus Notes Server for sharing information. Includes seven application templates:

- Discussion databases
- Client/server mail

- Phone book
- References databases
- News databases
- Customer tracking
- Service requester

Other Products

OS/2 Warp Connect also includes some non-communication products:

AskPSP: A personal help desk to assist in discovering answers to questions. Contains a database of information about OS/2 Warp, LAN Requester, LAN Distance and Netware Client.

On-line publications: Online documentation for all the components of OS/2 Warp Connect.

BonusPak for OS/2 Warp: The same set of applications that are included with standard OS/2 Warp.

The BonusPak contains:

- IBM Works
- HyperACCESS Lite for OS/2
- CompuServe access software for OS/2
- IBM Person to Person for OS/2
- Multimedia Viewer
- IBM Video IN for OS/2
- IBM Internet Connection for OS/2
- BonusPak Installation Utility

Two Versions of OS/2 Warp Connect

OS/2 Warp Connect is shipped in two different versions:

- OS/2 Warp Connect Version 3 with WIN-OS/2

This version provides WIN-OS/2 (Windows built into OS/2), to provide support for Windows applications. WIN-OS/2 is installed as part of the OS/2 Warp installation and is integrated into the Workplace Shell of OS/2 Warp.

- OS/2 Warp Connect Version 3 (without WIN-OS/2)

This version uses your existing Windows to provide support for Windows applications. OS/2 Warp integrates the installed DOS and Windows applications into the Workplace Shell of OS/2 Warp.

Note: Due to the availability, this product was not used for our testing.

Choosing Correct Version for Migration Purpose

The version of OS/2 Warp Connect that you select depends upon what operating system is currently installed on your machine. OS/2 Warp Connect supports upgrading from many different operating environments.

OS/2 Warp Connect Version 3 with WIN-OS/2

- No installed operating system
- DOS 3.3 or higher
- OS/2 1.x
- OS/2 2.0
- OS/2 2.1 or 2.11
- OS/2 Warp with WIN-OS/2

OS/2 Warp Connect Version 3 without WIN-OS/2

- No installed operating system
- DOS/Windows 3.1 or 3.11
- DOS/Microsoft Windows for Workgroups 3.1 or 3.11
- OS/2 for Windows
- OS/2 Warp without WIN-OS/2

Hardware and Memory Requirements

The *minimum* requirements to install OS/2 Warp Connect with networking support are as follows:

- Intel 386 SX-compatible microprocessor
- 8MB to 12MB of random access memory (RAM)
- 100MB to 140MB free hard disk space
- 1.44MB 3.5-inch diskette drive, configured as drive A
- VGA video support
- IBM-compatible mouse
- OS/2-compatible CD-ROM drive (attached directly, or on another workstation in the network)
- LAN connections require a LAN adapter card supported by IBM LAN Server or Novell Netware (token-ring or Ethernet)
- Internet access requires an Internet-enabled LAN connection or modem

The *minimum* requirements for a workstation that you can perform a remote installation of OS/2 Warp Connect *from* are as follows:

- Intel 386 SX-compatible microprocessor

- 16MB of random access memory (RAM)
- 3MB free hard disk space
- 1.44MB 3.5-inch diskette drive
- OS/2 Warp Version 3 or later
- Access to an OS/2-compatible CD-ROM drive
- LAN adapter card supported by IBM LAN Server

Memory and Hard Disk Space Requirements

Enough free disk space must be available for each product to install successfully. Table 1 represents memory and hard disk requirements. However, it is recommended that you have more free disk space available than listed in the table.

<i>Table 1. Memory and Hard Disk Space Requirements for OS/2 Warp Connect</i>		
Component	Minimum Memory (MB)	Hard Disk Space (MB)
OS/2 Warp Version 3.0	4	48
OS/2 Warp Version 3.0 with WIN-OS/2	4	56
IBM Peer for OS/2 Version 1.0	3	15
OS/2 LAN Server 4.0 Requester	2	20
IBM LAN Distance Remote Version 1.11	6	13
IBM TCP/IP for OS/2 Version 3.0	4	29
NetWare Client for OS/2 Version 2.11	2	3
Network SignON Coordinator	2	1

Notes:

1. Dependent on the amount of memory installed on the client, additional hard disk space of 5 to 10MB is used during installation for swap space and temporary files that are stored during installation.
2. The OS/2 Warp Connect installation program takes 4MB of disk space. It can be deleted after OS/2 Warp Connect is installed.
3. The installation program checks hard disk space to ensure that there is enough available to install and use the products you have selected.
4. The BonusPak takes another 30MB of hard disk space when installed completely.
5. If you plan to remove IBM Peer for OS/2 Version 1.0 or OS/2 LAN Server 4.0 Requester do not remove MPTS when asked if you wish to do so. Other networking products require MPTS.

LAN Adapter Requirements

Your workstation must have a LAN adapter for local or remote OS/2 Warp Connect installation. If the adapter is not connected to a LAN, error messages will occur when OS/2 Warp reboots. Connect your LAN adapter to a LAN and reboot again to get your workstation working properly. If you are installing OS/2 Warp Connect and do not have a LAN adapter installed, you will have the choice of selecting an option for no LAN adapter. You can use this configuration for an IBM LAN Distance connection only, or a TCP/IP dialup only configuration. (In this case you will have to install directly from the CD-ROM since you have no LAN adapter present)

Installing without LAN Adapter

Select **No LAN Adapter** from the adapter driver list. This selection will install the IBM Parallel Port adapter on your workstation, and will allow you to install any combination of OS/2 Warp Connect products. At startup time you will see the following message:

```
The IBM Parallel Port ANDIS MAC Driver is installed.
```

Without a LAN adapter, you are limited in the connectivity functions that you can perform. However, you can use the TCP/IP asynchronous connection (SLIP or PPP) to connect to other TCP/IP systems. Or, you can use LAN Distance Remote to connect over an asynchronous modem to a LAN Distance Connection Server and use IBM Peer for OS/2 or IBM LAN Requester to access a LAN.

Hardware Supported

The following hardware is supported with OS/2 Warp Connect.

CD-ROM Drives: Table 5 on page 275 shows the CD-ROM units that have drivers included in the OS/2 Warp Connect.

LAN Adapters: OS/2 Warp Connect supports a large variety of LAN adapters. Table 13 on page 439 shows the LAN adapters that have drivers included in OS/2 Warp Connect. Table 14 on page 446 shows the LAN adapters that are supported by OS/2 Warp Connect, but are not included in OS/2 Warp Connect. These drivers can be obtained from the driver manufacturers.

PCMCIA: OS/2 Warp supports a number of different implementations. Table 10 on page 325 shows the PCs which OS/2 Warp includes PCMCIA support for.

Modems: Table 15 on page 449 shows a list for the modems supported by IBM LAN Distance and the associated PIF file.

WAN Adapters: Table 16 on page 452 shows the WAN adapters supported by IBM LAN Distance. Table 17 on page 452 shows the IDSN adapter cards supported by IBM LAN Distance.

Special Devices: OS/2 Warp Connect also supports:

- Parallel port links between two PCs. “MPTS - New Driver Support” on page 426 shows the wiring diagrams for the cables required. You need one of the following cables types:
 - PPLINK full-duplex cable
 - LAPLINK/INTERLNK cable
 - JFACOMM half-duplex cable
- Infrared adapters, for a cableless connection

Hardware not listed

Having hardware that is not included in the supported hardware lists does *not* mean that OS/2 Warp Connect cannot be installed or used with that hardware. The supported hardware lists only contain products that have been tested by IBM. Hardware and device drivers are available that have not been tested by IBM.

Finding Drivers Not Included in OS/2 Warp

There is a repository containing many hundreds of megabytes of files, mostly OS/2 device drivers and some information (hints and tips) files. It is available to everyone via the Internet.

The FTP server (repository) can be accessed on the World Wide Web (WWW) using the IBM Web Explorer, available as part of the IBM Internet Connection for OS/2 in OS/2 Warp Connect, or from the OS/2 command line. When you connect to the Internet, you can access the IBM FTP server from either a Web Explorer or FTP command.

From a Web Explorer you type:

```
http://www.europe.ibm.com/getdoc/psmemea/progserv/device/
```

From the OS/2 command line you type:

```
ftp ftp.europe.ibm.com  
user anonymous
```

Follow the instructions for your password, and then enter:

```
cd /psmemea/os2drivers/
```

Software Considerations

The OS/2 Warp Connect network components can be installed separately; however, they have the following software requirements for installation:

- OS/2 Warp or higher is required on the machine set up as a server for the remote installation of the OS/2 Warp Connect products.
- OS/2 Warp is required for IBM TCP/IP for OS/2 Version 3.0.
- OS/2 Warp with CSD XR03003 or higher is required for IBM Peer for OS/2 Version 1.0 interoperability with Microsoft Windows for Workgroups and Microsoft Windows NT.
- MPTS Version 2.60.5 is required for the OS/2 Warp Connect products. This is the version supplied in the OS/2 Warp Connect package.

Windows Application Support

OS/2 Warp Connect with WIN-OS/2 provides support for running your Windows applications on OS/2 Warp. Do not install OS/2 Warp Connect with WIN-OS/2 over OS/2 for Windows or OS/2 Warp. Back up the user data and programs and install with `Format=Yes` to install OS/2 Warp with WIN-OS/2 over those operating systems.

OS/2 Warp Connect (without WIN-OS/2) provides support for running your Windows applications by using the Windows software already installed on your machine. Do not install OS/2 Warp Connect (without WIN-OS/2) over OS/2 2.1, OS/2 2.11, or OS/2 Warp with WIN-OS/2. Back up your user data and programs and install with `Format=Yes` to install OS/2 Warp Connect (without WIN-OS/2) over those operating systems.

Dual Boot Function

A dual boot function is provided when OS/2 Warp is installed over DOS systems or DOS with Windows systems. The installation program saves your `CONFIG.SYS` and `AUTOEXEC.BAT` in the `OS2` directory as `CONFIG.DOS` and `AUTOEXEC.DOS`. For added safety, you should copy the DOS `CONFIG.SYS` and `AUTOEXEC.BAT` files into the directory `C: DOS` before installing OS/2 Warp.

Product Packaging

OS/2 Warp Connect is packaged on the following CD-ROMs:

1. CD-ROM 1 OS/2 Warp Connect main CD includes:
 - OS/2 Warp Connect with WIN-OS/2, or OS/2 Warp Connect without WIN-OS/2
 - IBM Peer for OS/2 Version 1.0 to share printers, files, async ports and access OS/2 LAN Server, Microsoft Windows NT servers, or Microsoft Windows for Workgroups
 - OS/2 LAN Server 4.0 Requester to access OS/2 LAN Server Microsoft Windows NT servers or Microsoft Windows for Workgroups
 - IBM LAN Distance Remote Version 1.11 for remote access to LAN's or other IBM LAN Distance workstations
 - NetWare Client for OS/2 Version 2.11 to access NetWare 3.x and 4.x servers
 - IBM TCP/IP for OS/2 Version 3.0 for LAN and dialup connections (includes Internet connection tools like IBM Web Explorer).
 - AskPSP
 - Direct Installation or creation of product diskettes for the networking products
 - Product publications for viewing or printing
 - OS/2 LAN Server productivity aids
2. CD-ROM 2 OS/2 Warp BonusPak includes:
 - BonusPak Installation Utility
 - IBM Works with spreadsheet, word processing, report writing, charting, Program Information Manager (PIM), and FaxWorks
 - HyperACCESS Lite for OS/2
 - OS/2-based CompuServe access software
 - IBM Person to Person for OS/2
 - Multimedia Viewer for video and sound playing of Internet files installed on your computer to simplify system configuration
 - IBM Video IN for OS/2

More information on these products can be found in the *OS/2 Warp Generation, Volume1: OS/2 Warp Version 3, OS/2 Warp with Windows, OS/2 Warp Connect and BonusPak* redbook.

3. CD-ROM 3 Lotus Notes Express Client Version 3.3 includes:
 - Discussion databases
 - Client/server mail
 - Phone book
 - References databases

- News databases
- Customer tracking
- Service requester

Who Needs OS/2 Warp Connect?

OS/2 Warp Connect is a complete connectivity solution for the many environments, both simple and complex in nature.

Workgroups

Small businesses, office workgroups, autonomous departments and the home office users who are wanting peer or network access, whether local or remote, in one complete package, will benefit from this product.

For this environment, OS/2 Warp Connect provides:

- Easy-to-install, reliable, one-box networking solution
- Seamless links for users to colleagues and the information resources of their organization, whether in the office or on the road
- Peer sharing of applications and printers without special networking hardware, allowing easy access (although with necessary security) to resources
- Ability for users to *create* a LAN over a phone line
- Multitasking benefits provided by OS/2, so users, for example, can access resources on a co-worker's machine while continuing to perform other tasks
- LAN and/or dial-up access to the Information Highway
- Ability to run most PC programs available (DOS, Windows and OS/2) and to do multiple functions at the same time
- A wide range of stand-alone and workgroup productivity applications
- Reduction of the configuration and support time and cost

Corporate

Medium and large corporate customers, desiring a stable, high performance networking solution, will have all of the above benefits. In addition, there are these benefits for a larger environment:

- User access to as many resources as they need, scaling from peer-to-peer to worldwide enterprise networks
- Sharing of local resources while providing simultaneous access to the industry leading file, print and information servers, such as the Internet, OS/2 LAN Server, Microsoft Windows NT Server, Lotus Notes Server and Novell NetWare Server
- Single sign-on to servers and host communications sessions

- Multiple transport protocols (IPX, NetBIOS, TCP/IP), which can be accessed simultaneously, providing an excellent application server platform
- CID installable components to facilitate software distribution/configuration

Everyone

Any user who desires access to the vast resources of the Information Highway via their LAN or telephone line.

Common Scenarios

OS/2 Warp Connect can be considered a super client and, therefore, can be included in a wide variety of scenarios.

The following diagrams show just a few of the many possible example scenarios for using OS/2 Warp Connect.

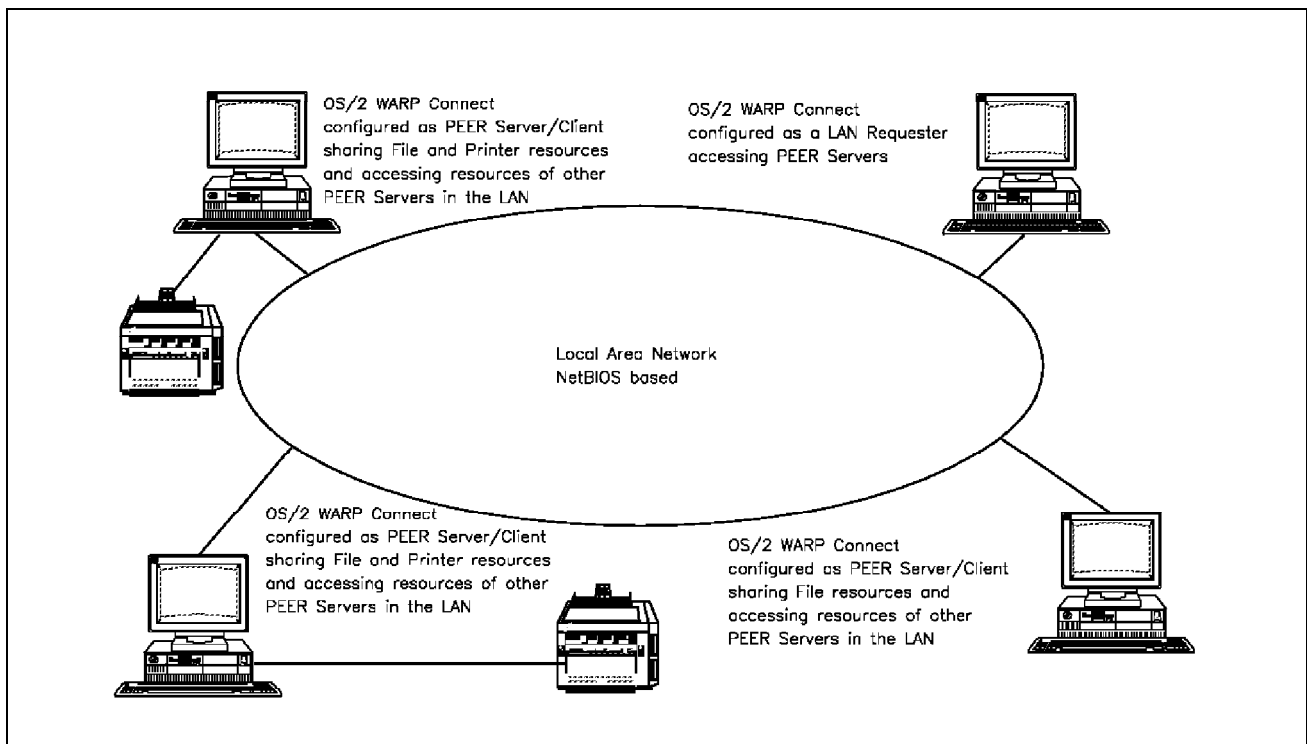


Figure 1. Using IBM Peer for OS/2 Version 1.0

When using OS/2 Warp Connect it is not necessary to have an OS/2 LAN Server somewhere in the LAN to share resources. However, it is always possible to log on to any LAN server in the LAN.

An example of this is represented by a small office environment. Each computer has a number of local resources (such as applications, files, printers, and plotters) that need to be shared on the LAN.

This can be achieved by installing the IBM Peer for OS/2 Version 1.0 component of OS/2 Warp Connect on each computer in the LAN. See Figure 1 on page 13.

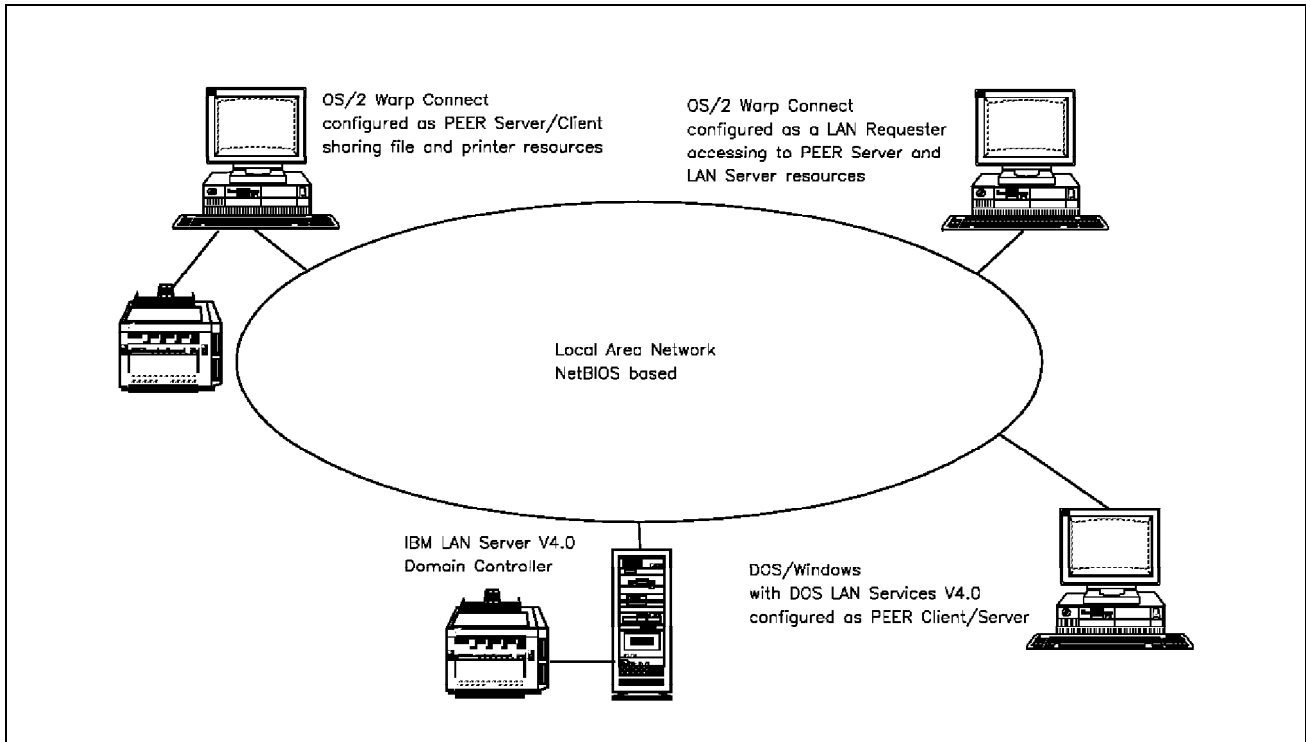


Figure 2. Using IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server

Figure 2 shows that OS/2 Warp Connect configured with IBM Peer for OS/2 Version 1.0 can access resources of another OS/2 or DOS client with peer capability and, at the same time, use resources of OS/2 LAN Server. In this case:

- A user ID and password must be defined in the peer server.
- The same user ID and password must be defined in the domain controller of the OS/2 LAN Server.

When logging on to the domain, the user will be able to access the IBM Peer for OS/2 Version 1.0 resources as well as the domain resources, assuming proper access has been granted.

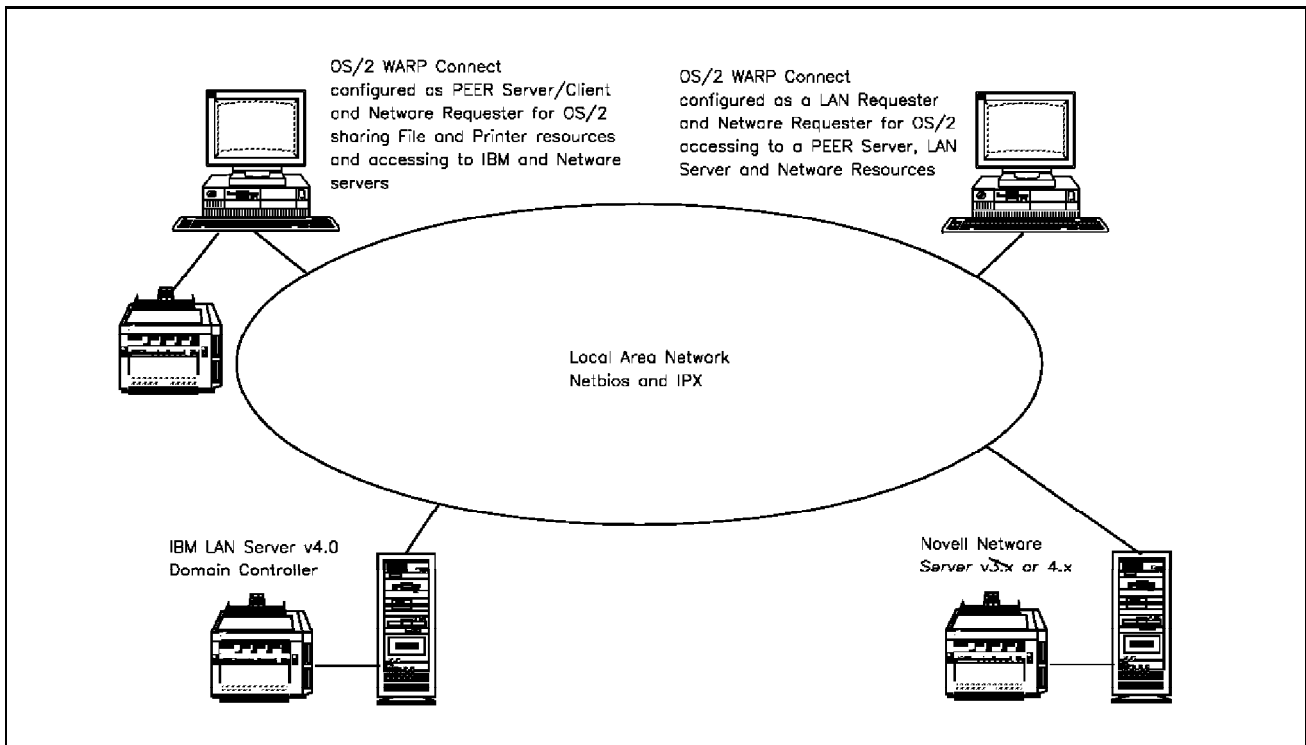


Figure 3. Coexistence with NetWare

As shown in Figure 3, by configuring OS/2 Warp Connect with the NetWare Client for OS/2 Version 2.11 and the IBM Peer for OS/2 Version 1.0 or OS/2 LAN Server 4.0 Requester, you can access resources on an IBM Peer for OS/2 Version 1.0, an OS/2 LAN Server and a NetWare server from one machine. In this case, an extra login is necessary to access the NetWare resources. The user ID and the password do not need to be the same as the ones used for logging on to the domain/peer server.

In this configuration, two different protocols, IPX and NetBIOS, are running at the same time on the LAN.

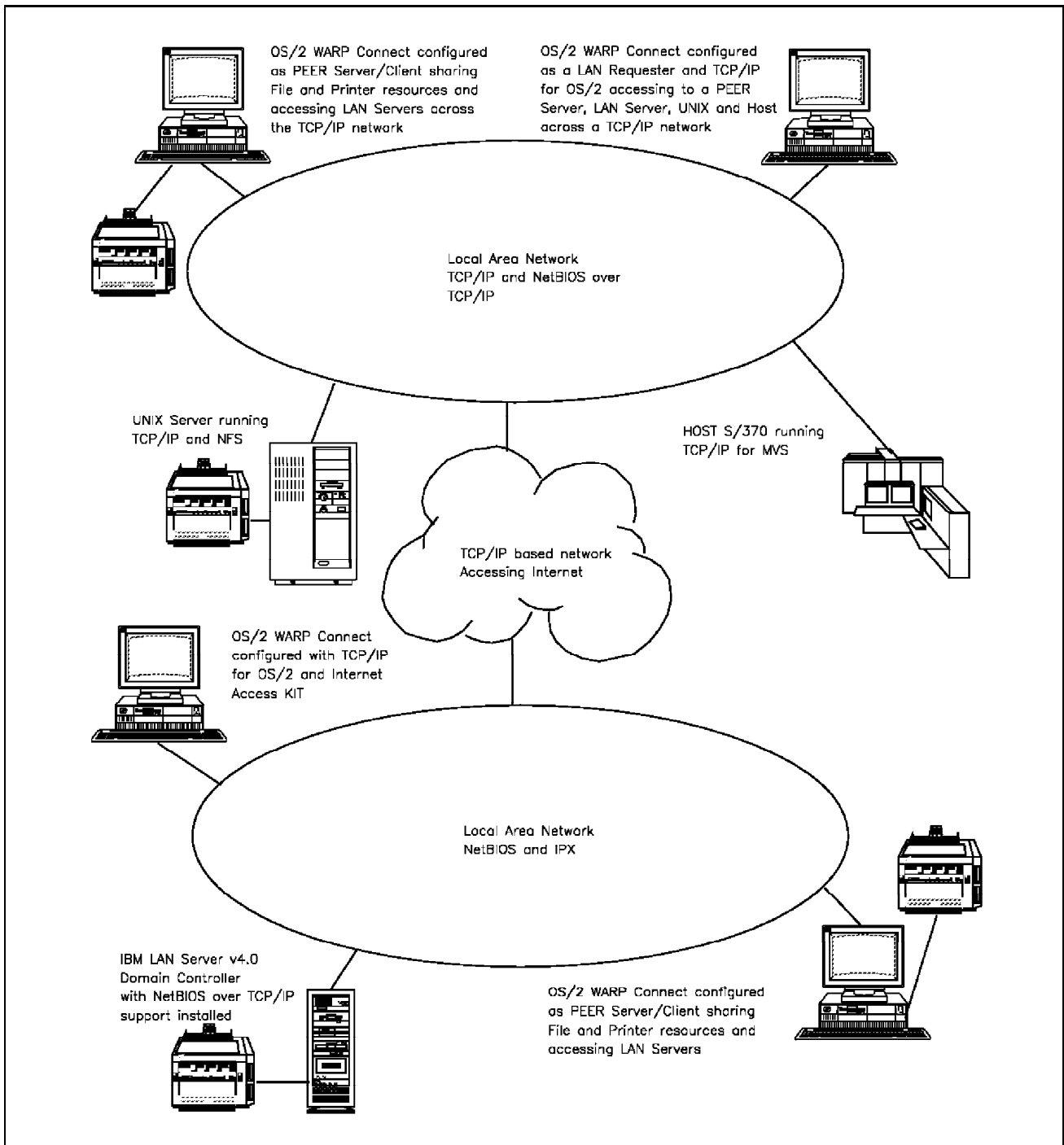


Figure 4. TCP/IP Environment

Figure 4 shows a TCP/IP-based environment in which two or more LANs are connected through a TCP/IP link. In this case, the way for a NetBIOS-based application such as IBM Peer for OS/2 Version 1.0 or OS/2 LAN Server 4.0

Requester to communicate with another NetBIOS-based application without modifying the routing hardware is to use NetBIOS over TCP/IP.

PCs on the same LAN can also communicate using NetBIOS frames which is faster than using the NetBIOS over TCP/IP (TCPBEUI) solution. OS/2 Warp Connect allows both NetBIOS and TCP/IP stacks to run the server/requester protocol and, therefore, it is possible to extend the scope of NetBIOS to routable networks using TCP/IP.

IBM TCP/IP for OS/2 Version 3.0 allows communication with any host running TCP/IP. The IBM Internet Connection for OS/2 included in IBM TCP/IP for OS/2 Version 3.0 allows access to the Internet network.

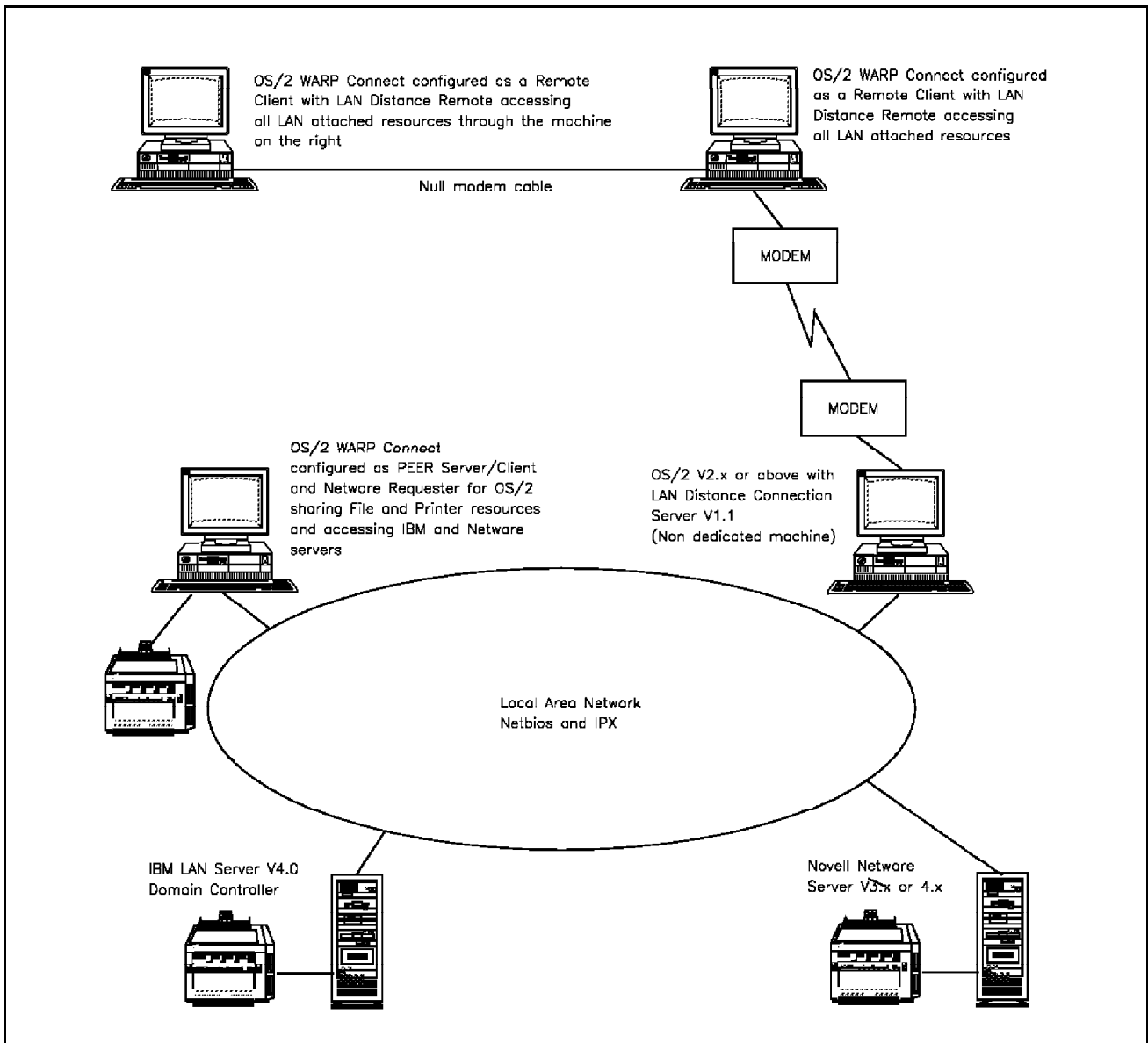


Figure 5. Remote Access Capability

Figure 5 shows how it is possible to access LAN resources from a remotely attached machine. This is achieved using the IBM LAN Distance Remote Version 1.11 component of OS/2 Warp Connect.

There are four possible IBM LAN Distance scenarios:

1. Remote to remote: Two or more PCs connect to each other via a remote attachment. This is also called a virtual LAN and is possible using the IBM LAN Distance Remote Version 1.11 component of OS/2 Warp Connect on every machine.

2. Remote to LAN: One or more PCs connect through a remote link to another machine attached to the LAN. This is possible using the IBM LAN Distance Remote Version 1.11 component of OS/2 Warp Connect on every remote machine and the IBM LAN Distance Connection Server 1.1 product on the LAN-attached machine. The IBM LAN Distance Connection Server 1.1 product is *not* included in OS/2 Warp Connect.
3. LAN to LAN: Two LANs connect through a remote link. In this case, only the IBM LAN Distance Connection Server 1.1 product is needed on both PCs that share the remote connection.
4. A combination of 1 and 2. See Figure 5 on page 18.

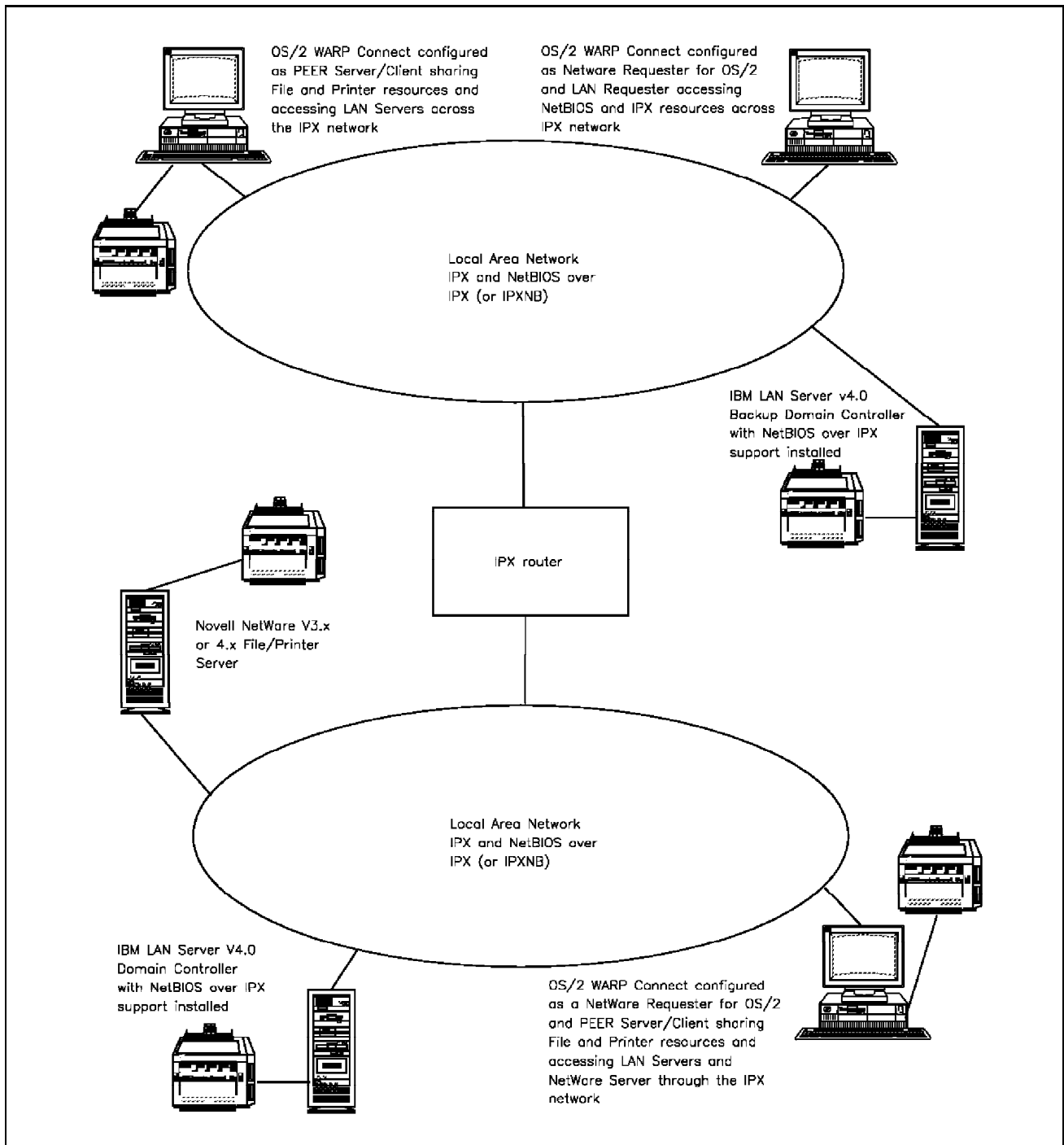


Figure 6. IPX Environment

Figure 6 shows an environment that is using IPX as the protocol. In many cases, LANs are connected by a router supporting IPX. With this scenario, the way a NetBIOS-based application like IBM Peer for OS/2 Version 1.0 or OS/2 LAN Server 4.0 Requester can communicate with another

NetBIOS-based application without modifying the existing routing hardware is by encapsulating NetBIOS frames in IPX frames.

PCs on the same LAN can also communicate using NetBIOS frames. This is faster than using the NetBIOS over IPX solution because it does not require encapsulation. OS/2 Warp Connect allows both NetBIOS and IPXNB stacks to run on the same workstation and, therefore, it is possible to pass NetBIOS frames using IPX routers.

The NetWare Client for OS/2 Version 2.11 component of OS/2 Warp Connect also uses IPX-based applications to get resources from a NetWare server.

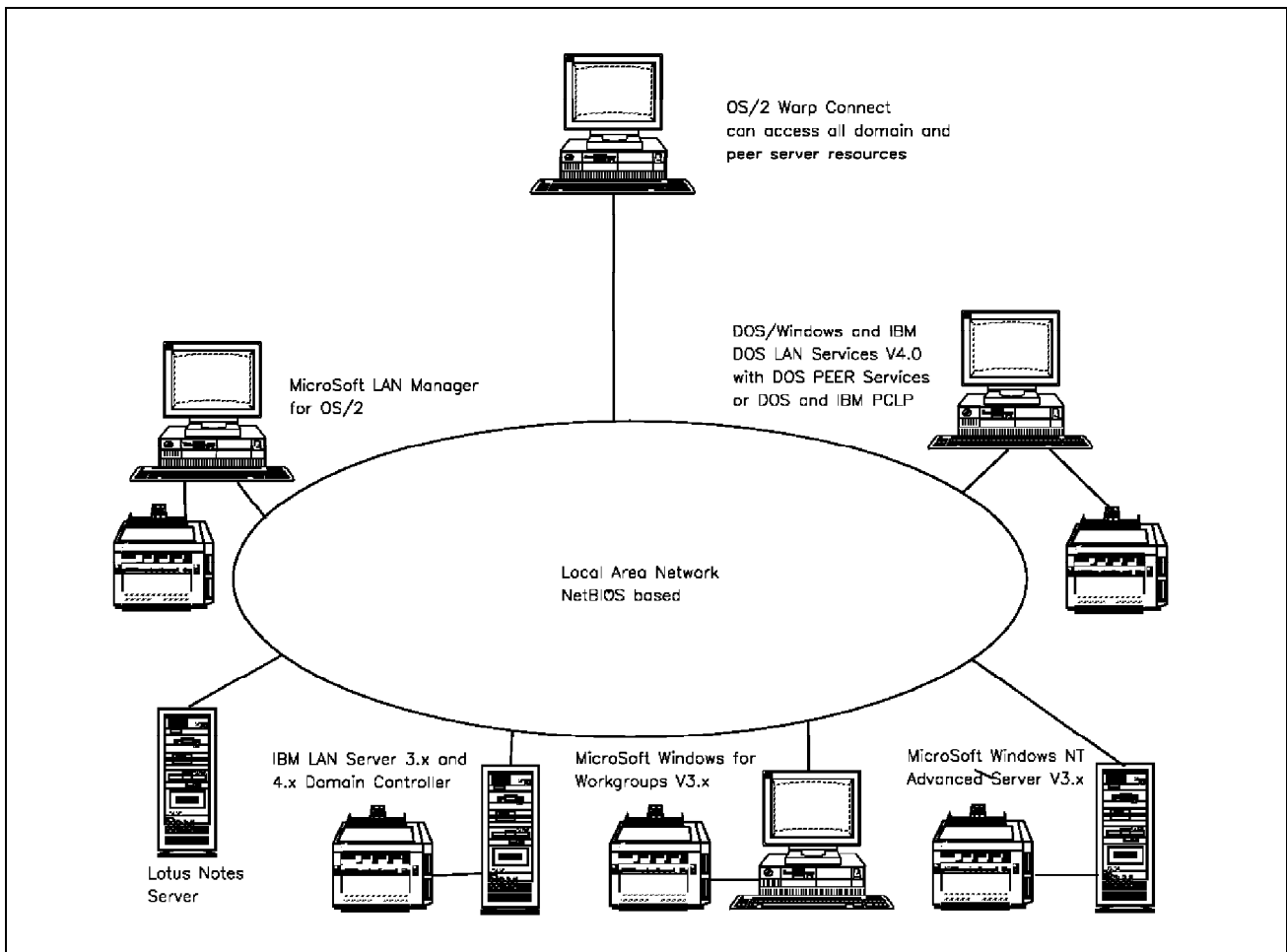


Figure 7. Interoperability

Figure 7 shows how OS/2 Warp Connect can interoperate in a multivendor environment, sharing and accessing resources, using the Network DDE (Dynamic Data Exchange), clipboard, and messaging facilities, and remote administration using the OS/2 LAN Server 4.0 Requester component.

Peer for OS/2 versus LAN Requester

The main differences between IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server 4.0 Requester are:

- The IBM Peer for OS/2 Version 1.0 user cannot administer an OS/2 LAN Server domain using the GUI, since all NETGUI components will not be installed. However, the IBM Peer for OS/2 Version 1.0 user can administer an OS/2 LAN Server domain from the command line interface.
- The OS/2 LAN Server 4.0 Requester user can share its peer resources with only one user at a time, while the IBM Peer for OS/2 Version 1.0 user can share with multiple users.

The following is a comparative table showing the functionality provided by the IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server 4.0 Requester:

Major Functions	Peer for OS/2 1.0	LAN Requester 4.0
Network messaging	Yes	Yes
Network DDE and Clipboard	Yes	Yes
Replication services	Yes	Yes
Logon and logoff support on local UPM	Yes	Yes
NETLOGON service (allow remote clients to log on)	No	No
Allow logging on to a Domain Server	Yes	Yes
Interprocess communication IPC\$	Yes	Yes
Application Programmer Interface	Yes	Yes
Support Local Administration of UPM	Yes	Yes
LAN Domain Administration graphical user interface (GUI)	No	Yes
LAN Domain Administration from the Command Line Interface	Yes	Yes
Can be configured as a Peer Server	Yes	Yes
Multisession Peer Server capability	Yes	No
Error and Audit Log utilities	Yes	Yes
Allows Network SignON Coordinator client/server functions	Yes	Yes
Installation/Configuration Facilities available	Yes	Yes

Accessing the Internet

OS/2 Warp Connect provides two alternatives for accessing the Internet, IBM TCP/IP for OS/2 Version 3.0 or IBM Internet Connection for OS/2.

First, we classify the different types of users that may be interested in accessing the Internet:

- Home user: The user usually has a single PC with a modem connected to his home telephone line and possibly a printer and/or a multimedia card.
- Home or small company: In this case, we have few PCs in a small LAN that share local resources. One of these has a modem attached to the public switched telephone line.
- Medium sized company: In this case, the number of PCs is significantly greater and there could be more than one LAN interconnected by bridges or routers. One of these PCs has a high speed modem attached to a leased line or a connection to a WAN, using for example, X.25.
- Large company: A large number of PCs and networks connected through bridges and routers.

Note: A *Service Provider* is a company that provides access to the Internet to single users or users that cannot access the Internet directly. Usually they have other services and integrate Internet as part of those services. They provide a user ID and password that allow the user to log on to the services and access the Internet.

Internet Access for Home User

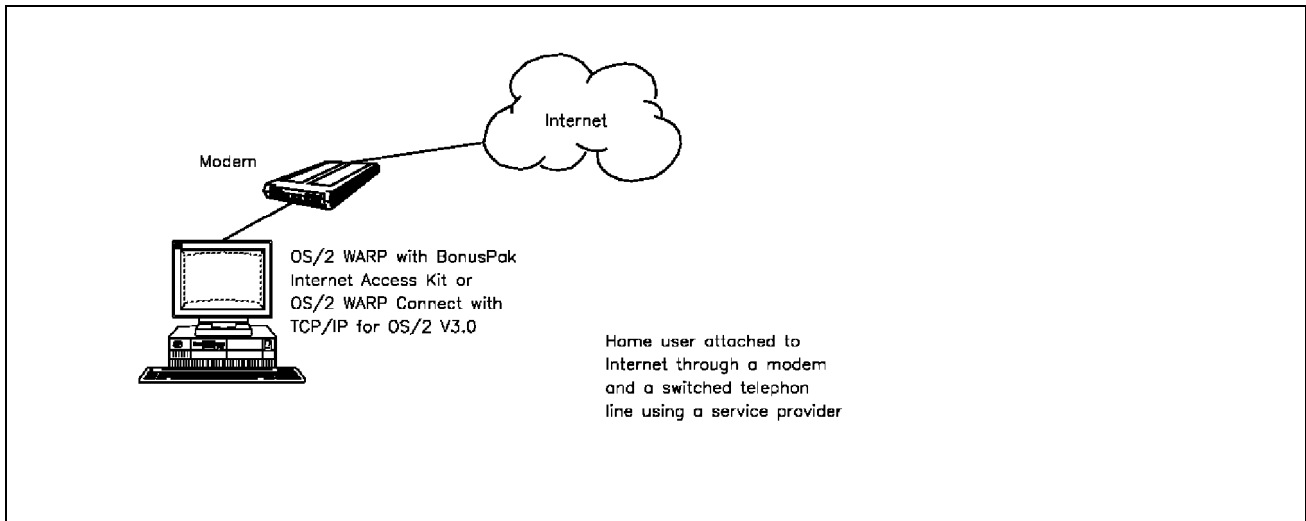


Figure 8. Internet Access for Home User

This type of user requires an application to access the Internet using the serial port on the PC. OS/2 Warp with the IBM Internet Connection for OS/2 of the OS/2 Warp BonusPak satisfies these prerequisites (see Figure 8).

You can also use the IBM Internet Connection for OS/2 that comes with the IBM TCP/IP for OS/2 Version 3.0. In this case, you will find a folder of TCP/IP on the Desktop as well as the IBM Internet Connection for OS/2 folder. This means that the complete TCP/IP is also installed.

Only one connection at a time

IBM Internet Connection for OS/2 has one important limitation. It is a stand-alone program, meaning that only one user at a time can use the connection. Having more than one address from the Service Provider makes no sense if the modem connection is unique, unless security or administrative reasons make this necessary.

Internet Access from Workgroup

The single office home company or small company user might have a LAN and a modem attachment. Generally, every users do not need to be connected to the Internet at the same time. So one or several modem connection to the Internet can be shared with all users. For this configuration, you need:

1. OS/2 Warp Connect with IBM Peer for OS/2 Version 1.0 in the PC that has the modem locally attached, and OS/2 Warp Connect IBM Internet Connection for OS/2 (or OS/2 Warp with the IBM Internet Connection for OS/2 from the OS/2 Warp BonusPak) if you require access to the Internet from this PC.
2. OS/2 Warp Connect with IBM Peer for OS/2 Version 1.0 or OS/2 LAN Server 4.0 Requester and IBM Internet Connection for OS/2 in every PC that has to access the Internet.

Shared Modem Support

It is quite convenient to share (a) modem(s) connected to a workstation either through peer services or LAN Server. The Internet dialer on your peer or requester workstation can use a network COM port. You need to apply APAR PJ18597.

- DIALER.EXE must have a file date of May 11th or later (At least Version 1.43d)
- SLIPPM.EXE must have a file date of May 18th or later (At least Version 1.11)

The above mentioned files provided by OS/2 Warp Connect are older and therefore do not support a network COM port.

The modem is being shared by the IBM Peer for OS/2 Version 1.0 and used from every workstation through the IBM Internet Connection for OS/2 running locally (see Figure 9 on page 26).

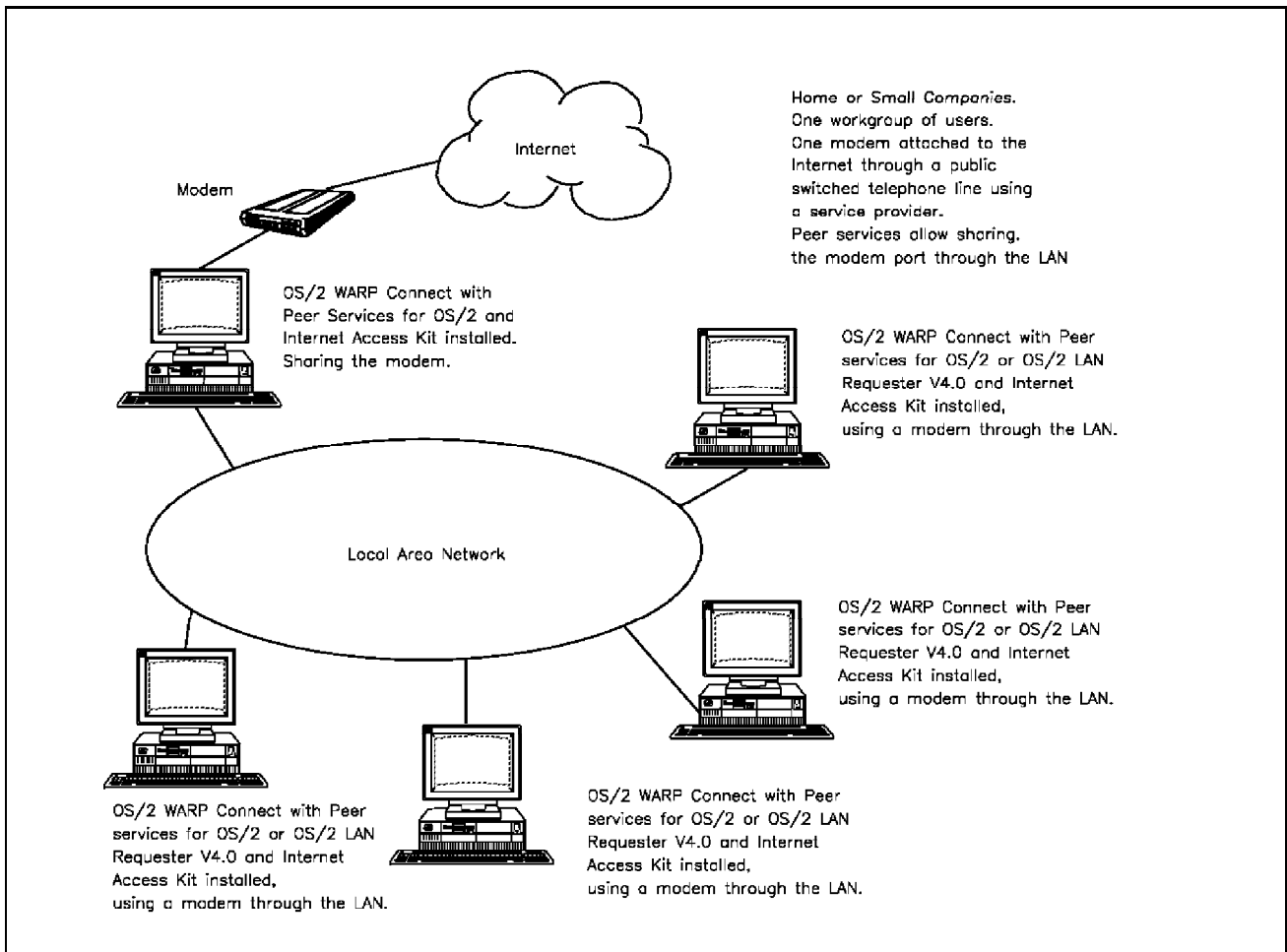


Figure 9. Workgroup Internet Access

With OS/2 Warp Connect you can also share a pool of modems. If you have more than one modem attached locally to a PC, you can create a special kind of LAN resource that represents this pool of modems. You will create a netname for that resource and share it in the LAN. For example, you can create a netname called MODEMS that represents the COM1 and COM2 ports on the IBM Peer for OS/2 Version 1.0 PC.

This is how the you would then access a modem in the pool:

1. From a workstation you can connect to this resource and assign it a COM port. When you attempt to use this COM port, it will look at the modem pool for the first modem in the server that is available, and if it finds one, access is given to that modem, and the port becomes busy to other users.

2. If it doesn't find a modem available in the pool then it queues your request until a modem becomes free. You then have access to the modem and to all other users it appears as busy.

This feature is available in OS/2 LAN Server 4.0 and in OS/2 Warp Connect IBM Peer for OS/2 Version 1.0 (for more details about IBM Peer for OS/2 Version 1.0, see "Sharing a modem for BBS access" on page 140). It allows you to handle multiple connections to the Internet in a peer environment.

Internet Access for Medium Size Workgroup

The user in a medium-sized workgroup or company usually has a more complex environment. Access to the Internet is done through a WAN using, for example, the X.25 protocol to allow multiple virtual circuits and thus, more than one user connected to the Internet at the same time. Another possibility is using a leased line (SLIP or PPP) connection to the Service Provider.

On the other hand, in such companies, it is also possible to have one or many users that need to access the LAN through some kind of remote attachment and access the Internet using the LAN. OS/2 Warp Connect with IBM TCP/IP for OS/2 Version 3.0 is then necessary on each PC. If the gateway is attached through an X.25 link, then the TCP/IP Extended Networking add-on kit will be needed on the gateway PC. For the remote attachment, one or more PCs on the LAN will also need IBM LAN Distance Connection Server 1.1 installed and the remote PC, OS/2 Warp Connect with IBM LAN Distance Remote Version 1.11 and IBM TCP/IP for OS/2 Version 3.0 installed.

In this case, the IBM Internet Connection for OS/2 is not used, and the access is provided using the utilities in the TCP/IP folder on the Desktop. (see Figure 10 on page 28).

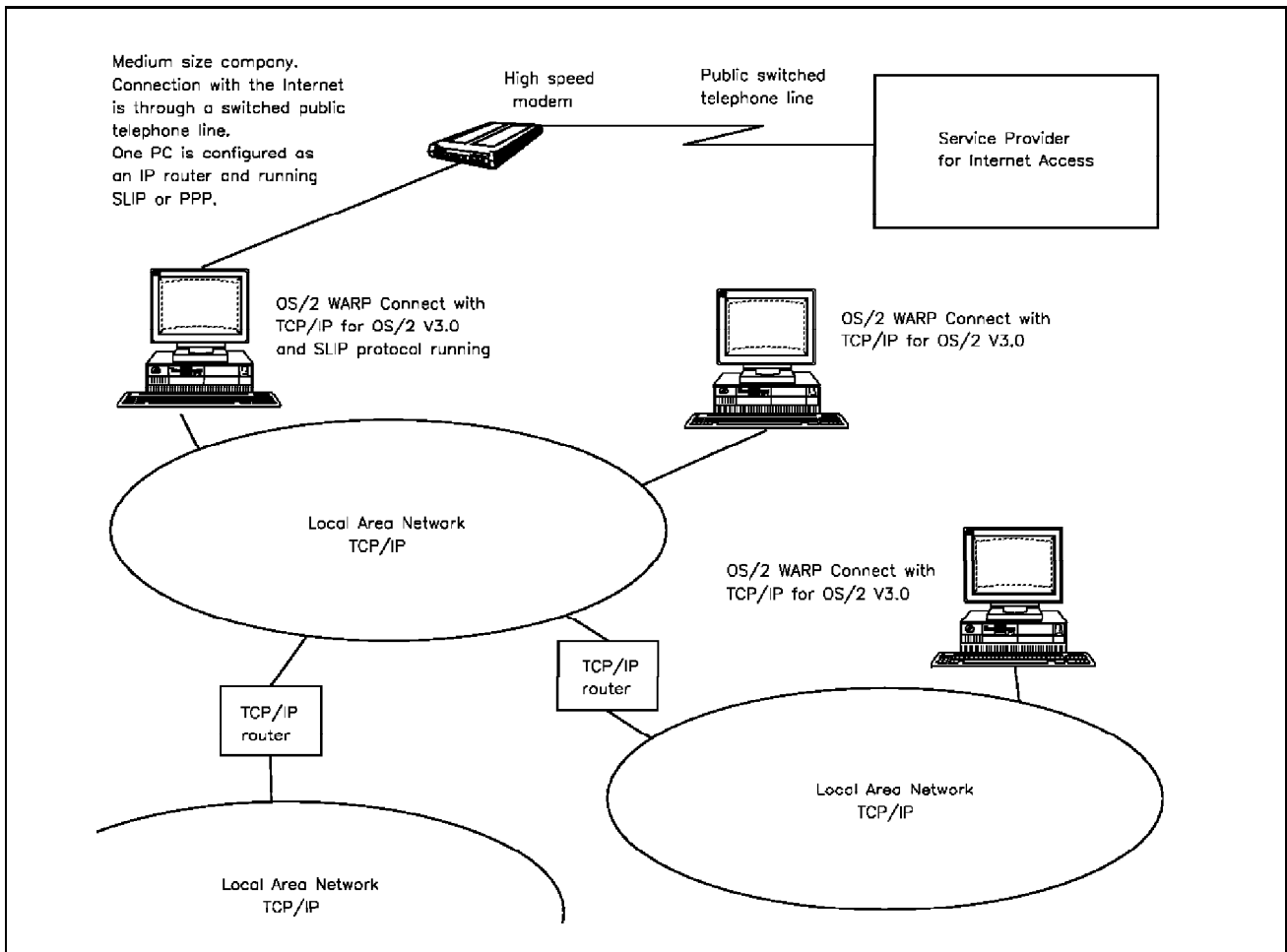


Figure 10. Leased Line Internet Access

Internet Access from Large Workgroup

The large workgroup or company user might have routers or gateways to the Internet. These users do not need a Service Provider because they have a direct access to the Internet. They generally have at least 254 Internet addresses and many users accessing the Internet at the same time.

The solution is essentially similar to the previous situation for medium-sized companies, except there is no X.25 or SLIP attachment. Instead, the remote user can access the Internet through the LAN in the same way that the remote user in the previous case (see the Figure 11 on page 29).

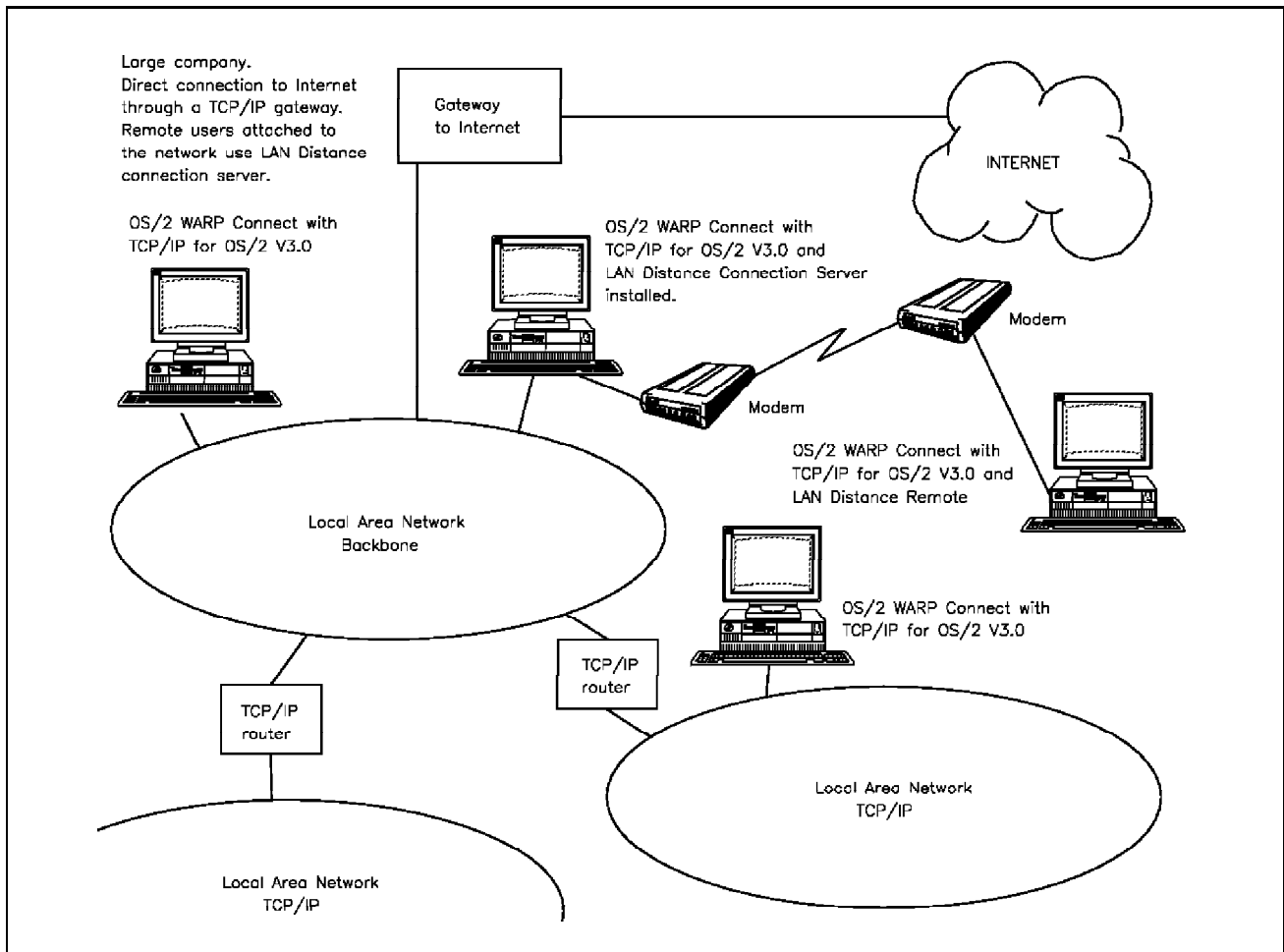


Figure 11. Direct Internet Access

TCP/IP Administration

It's important to emphasize that because of the large quantity of TCP/IP hosts existing in this configuration, administration using TCP/IP routers, gateways, TCP/IP domains and name servers is necessary.

LAN Concepts

The information here deals mainly with the concepts associated with a LAN using products such as OS/2 LAN Server and Microsoft Windows for Workgroups. There is also some information about NetWare LANs.

Domains and Workgroups

What is the difference between a domain and a workgroup?

Domains and workgroups are both logical groups of workstations connected by a local area network (LAN). Workgroups are sometimes called *peer networks* or *peer domains*.

A LAN can contain more than one domain, each operating independently. Domain names must be unique across a LAN. As with OS/2 Peer domains, multiple OS/2 LAN Server domains can be defined on the network in order to simplify the management of the network. PCs defined in a workgroup can interact with PCs in a domain.

Domains

A domain consists of one or more servers that allocate resources as a single logical system. An administrator defines and controls access to resources and users within a domain. An OS/2 LAN Server installation is an example of a domain. Users at workstations access resources located on a central server, or group of servers, that control access to the resources. After you have connected to a network resource, you use that resource the same way you use resources on your workstation.

An OS/2 LAN Server network is a group of workstations connected by adapters and cables just like an OS/2 Peer network. However, there is one important difference. In an OS/2 LAN Server network, resources are controlled only by those workstations defined as servers.

One server on the domain is responsible for managing the primary copy of the user/group database, logon assignments, and application definitions. This primary server is called the *domain controller*. The domain controller must be running before users can log on to the domain and use its resources.

Each network can have multiple domains (and domain controllers). A workstation becomes part of a domain when the user has logged on to the domain. Then that user can access shared resources on the servers in that domain and also *cross-domain* or *external* resources on other domain servers residing on the same physical network. This assumes that permission has been properly granted to the user.

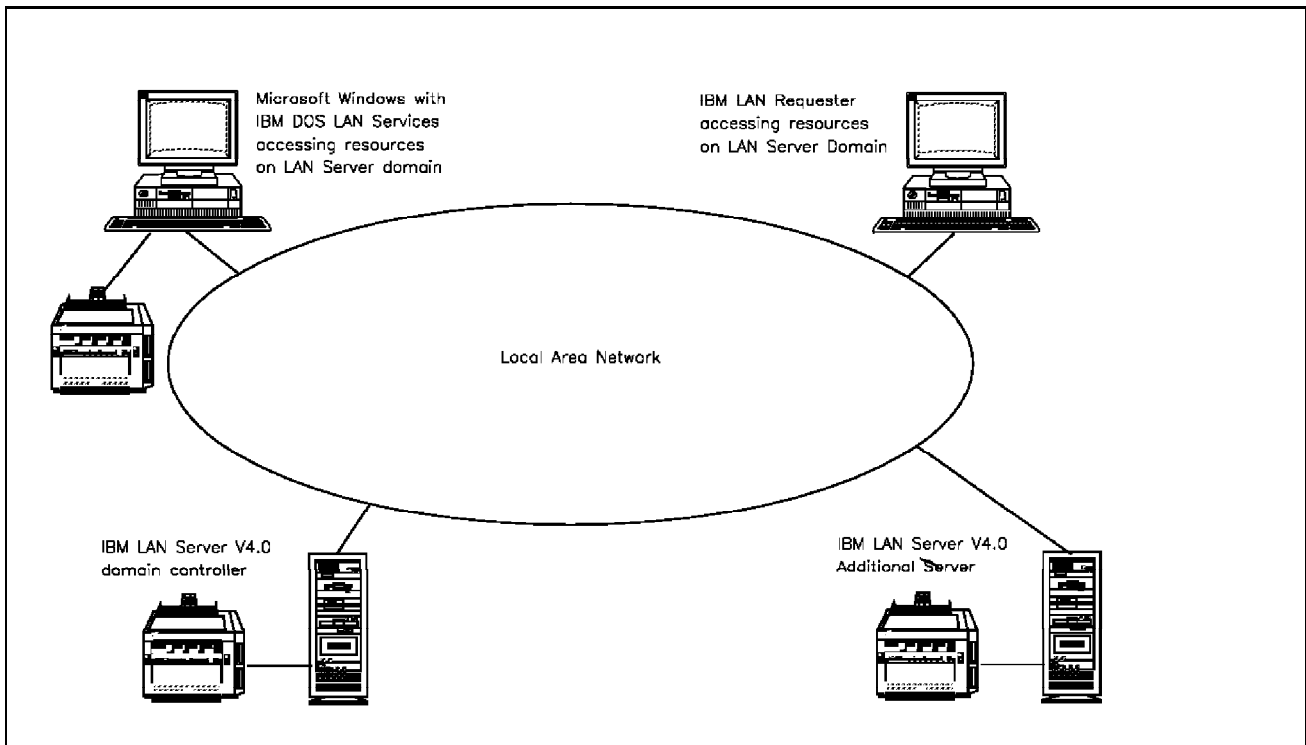


Figure 12. Domain Access

The domain environment allows you to take advantage of some of the more centralized functions that are performed by the domain controller. These are:

- Administration of user and group IDs
- Use of *aliases* (nicknames) for resources, eliminating the need for the user to know the server on which the resource resides, and the location on that server

Workgroups

A workgroup consists of a group of PCs that are sharing resources using some form of peer LAN software, such as IBM Peer for OS/2 Version 1.0 in OS/2 Warp Connect. Workgroups can also be called a peer network.

The peer software allows you and the people you work with to share hardware and software resources that are located on individual workstations. After you have connected to a network resource, you use that resource the same way you use resources on your workstation. The user on the peer workstation needs to control the access to the resources that are being shared on that workstation.

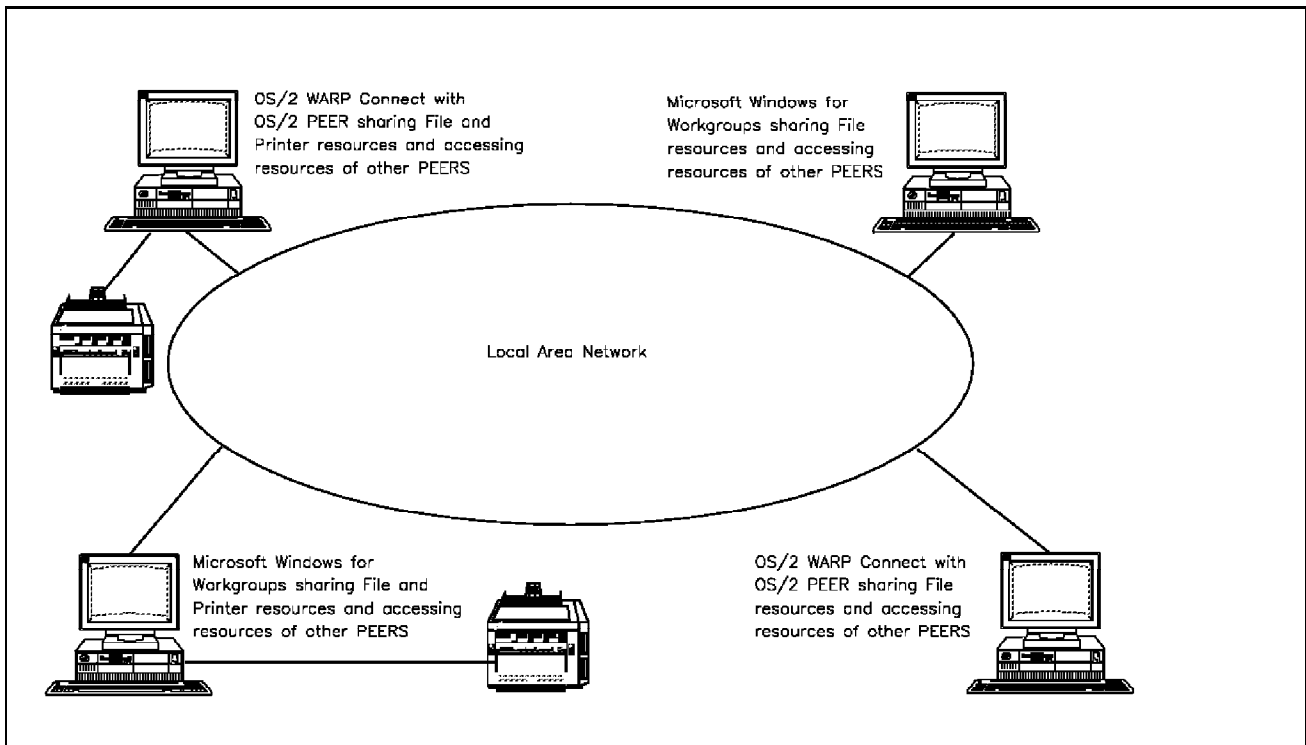


Figure 13. Workgroup or Peer Network

Having your network configured as a workgroup allows you to make use of some of the hardware (for example, a CD-ROM drive) and access data that is located on another user's PC in your organization. Some of the advantages of a workgroup or peer network are:

- Access to limited hardware resources
- Access to data stored on another workstation

Having it All

As you can see from "Domains" on page 30 and "Workgroups" on page 31 the advantages of one configuration are the disadvantages of the other. However, it is possible to have the best of both configurations.

OS/2 Warp Connect workstations using IBM Peer for OS/2 Version 1.0 can be configured for both domain access and as a member of a peer network. This allows the user to have access to the centrally controlled resources on the domain and also take advantage of the peer capabilities. This is shown in Figure 14 on page 33.

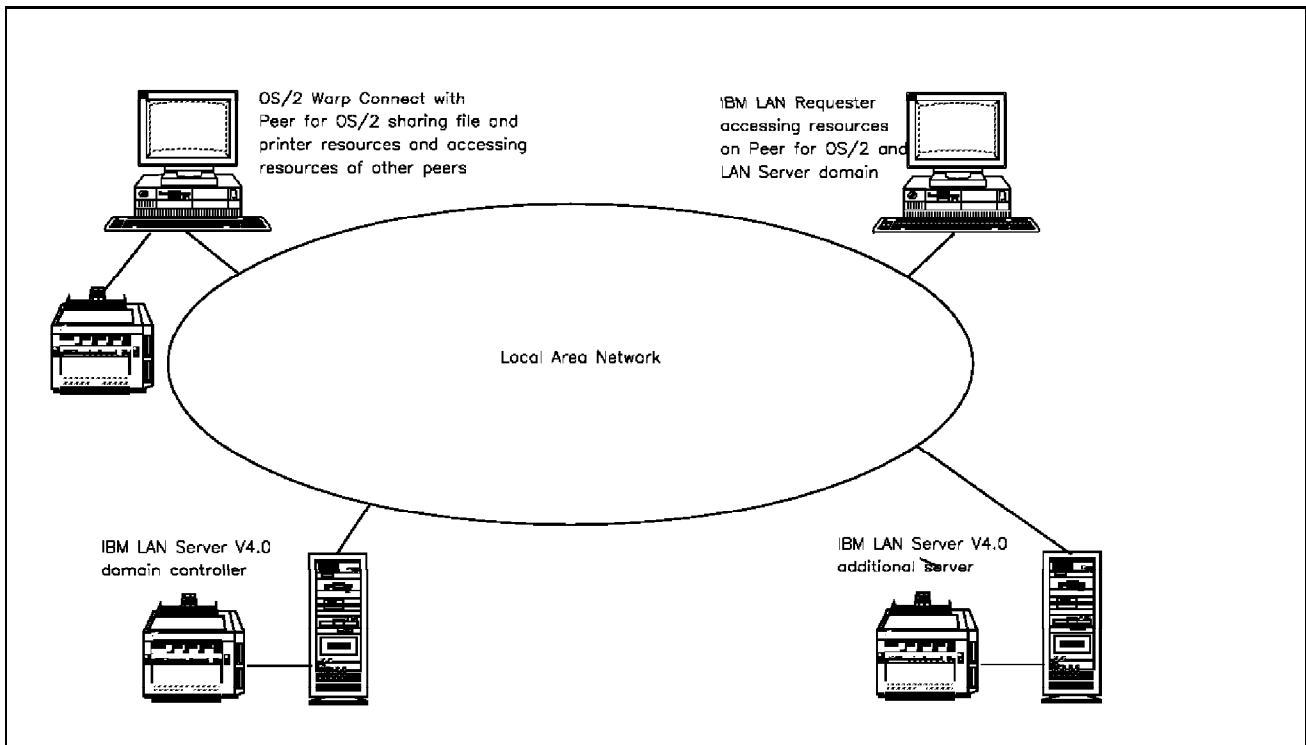


Figure 14. Using OS/2 Peer in a Domain Environment

An IBM Peer for OS/2 Version 1.0 PC cannot be part of the group of servers that make up a domain, therefore, its resources are managed as if it was in a workgroup.

Network Resources

Once you have your PC set up in a domain or workgroup, the next step is accessing resources available on your network. There are three types of network resources:

- File resources
- Printer resources
- Serial device resources

File Resources

A files resource is a directory that contains data files or programs. The administrator or the end user can assign a files resource to a local drive letter (D through Z) to make that directory and its files available for use.

Before a resource can be assigned, the resource needs to be shared at the PC where the files or directory is located. See “Sharing from the Sharing and Connecting Notebook” on page 106 for details on how to share files using IBM Peer for OS/2 Version 1.0.

After a local drive letter (for example, K) has been assigned to a files resource, the user can use the files resource as if it resided on drive K at the workstation. This is possible even though there is no physical drive K on the workstation.

When the user accesses drive K and requests a directory listing, a list of the files in the shared directory is displayed (if the administrator of the resource has given the user permission to view that directory).

Printer Resources

Printers are another type of network resource that can be shared. To handle print jobs more efficiently, print spooler queues and printer pools can be created. Network printers are accessed through shared spooler queues. A spooler queue is an ordered list of print jobs waiting to be printed. A spooler queue can be serviced by one printer or by a group of several printers called a printer pool. A print job waiting in a spooler queue serviced by a printer pool is processed by the first available printer in the pool (unless another queue for that printer pool has a higher priority).

For example, suppose that a user has permission to use a shared network spooler queue called PRINTQ1 and that PRINTQ1 has been assigned to LPT2. Suppose, also, that PRINTQ1 is serviced by a printer pool consisting of two printers. If the user sends a print job to LPT2, the output is printed at one of the two printers in the printer pool.

While the print job waits in the queue, the user can continue with other tasks.

Serial Device Resources

A third type of shared resource is the serial device. Examples are modems, plotters, and serial printers. Such devices are assigned to LPT or COM ports for direct input/output (I/O) use.

A serial device queue is an ordered list of user requests waiting to use a shared serial device. A serial device pool is a group of similar serial devices that services a serial device queue.

A serial device can service more than one queue, each possibly having a different priority. A serial device request waits in a serial device queue until one of the serial devices in its pool becomes available.

While the serial device request waits in a queue, the user cannot proceed with a task that requires the serial device. However, the user can perform other OS/2 tasks in other OS/2 sessions.

Netname and Alias

A netname identifies a shared resource on a server or peer. To define a shared resource, a netname is assigned to the resource. To use such a resource, the user must refer to it by its netname and specify the server where the resource is located.

The server name and the netname are combined into a universal naming convention (UNC) name that identifies a resource in the domain. See “UNC Naming” on page 37 for more information.

In an OS/2 LAN Server Domain an alias can be assigned to a netname. An alias is a nickname for a resource in a particular domain. The alias for a resource must be unique across the entire domain. Because the server name is stored in the alias definition, you do not need to specify the server name when you refer to a shared resource by its alias.

You can share a resource by either a netname or an alias referring to the resource. You create a netname for a resource when you share the resource.

Note: Because peer servers cannot belong to the group of servers that make up a domain, they do not support alias names.

An alias is more permanent than a netname. An alias for a resource exists until you delete the alias. An alias definition contains information to create a netname and to initiate resource sharing. This information enables the OS/2 LAN Server product to share the aliased resource automatically at server startup or when a user requests access to the resource. If you do not want an aliased resource to be shared automatically, you can designate the resource to be shared only when shared by an administrator.

When you share a directory resource by an alias, the LAN Server product creates a netname, identical to the alias, at the server where the resource resides. After you share a resource, you can refer to an aliased resource by either its UNC name or its alias.

If you delete an alias while its resource is shared, the netname remains and you can refer to the resource by its UNC name. If you want to stop an aliased resource from being shared, you can stop the sharing before or after deleting the alias.

When you share a serial device queue by an alias, the LAN Server product creates a netname, identical to the alias, at the server where the resource resides. For a printer queue, the netname matches the queue name rather

than the alias. After you have shared a printer or serial device, you can refer to it by either its UNC name or its alias.

You can share a resource by creating either a netname or an alias referring to the resource. A netname is a name that, in conjunction with the server name, identifies a resource on the network when the resource is shared. An alias is a resource definition that an administrator sets up for a directory, printer, or serial device on a particular server. All shared resources are assigned a netname, even if they are shared by the alias definition.

Naming Resources

Server names, domain names, netnames, and aliases are not case-sensitive.

The name you use must conform to the following rules:

1. The lengths of the names are:
 - A server name can be 1 to 15 characters (bytes).
 - A domain name can be 1 to 15 characters (bytes).
 - A netname can be 1 to 12 characters (bytes).
 - An alias can be 1 to 8 characters (bytes).
2. The following characters, as well as characters with an ASCII value less than the hexadecimal value of 21 or embedded blanks are not valid:
 . " / [] ; : , | < > + = ? *
3. The following names are reserved and cannot be used for server names, domain names, netnames, or aliases:
 - COMM
 - DEV
 - MAILSLLOT
 - PIPE
 - PRINT
 - QUEUES
 - SEM
 - SHAREMEN

Default Resources

The items in the following table are automatically shared when OS/2 LAN Server and IBM Peer for OS/2 Version 1.0 servers are started.

Share Name	Description
IPC\$	The share for interprocess communication (IPC). Examples are named-pipe transactions.

ADMIN\$	The share for remote command-line administration.
D\$	Every local logical drive on a server. For example, a server with drives C, D, and E has the automatic share names of C\$, D\$, and E\$. The IBM Peer for OS/2 Version 1.0 does not automatically share drives.

UNC Naming

A netname identifies a shared resource on a particular server. The netname of a resource on a peer or server must be different from netnames of other resources on that peer or server. However, the same netname can be used at other peers or servers in the domain. Consequently, when referring to a resource by netname, the user must also specify the machine name where the resource resides. This combination of machine name and netname is called the universal naming convention (UNC) name.

A UNC name in an OS/2 LAN Server, IBM Peer for OS/2 Version 1.0 or Microsoft Windows for Workgroups network has the following format:

```
servername netname path
```

UNC name in a Novell NetWare has the following format:

```
servername volume path
```

Both formats are used in the same way. The `path` is optional.

For example, suppose the netname BOBSFILE has been assigned to the directory C: FILES on FRED. The UNC name for that directory would be:

```
FRED BOBSFILE
```

If this directory had a subdirectory called BITMAPS, the UNC name of that subdirectory would be:

```
\\FRED\BOBSFILE\BITMAPS
```

And suppose that the subdirectory BITMAPS contained a file called WARP.BMP. The UNC name of that file would be:

```
\\FRED\BOBSFILE\BITMAPS\WARP.BMP
```

UNC names can be used by APIs as well as DOS and OS/2 applications that are designed to be recognized by the network. UNC names can be used at the OS/2 and DOS prompts, as illustrated by the following COPY command example:

```
COPY \\FRED\MONEY\BITMAPS\WARP.BMP C:\OS2\BITMAP
```

An example of using UNC naming in a Novell NetWare is:

```
COPY \\NW1\SYS\PUBLIC\BITMAPS\WARP.BMP C:\OS2\BITMAP
```

The file to be copied is called WARP.BMP and it is located on NetWare Server NW1, volume SYS:, directory PUBLIC\BITMAPS.

Using Commands with Network Resources

You can use most of the OS/2 commands on network disks, directories, and printers. However, you cannot use some DOS and OS/2 commands with network devices. If you try to use these commands with a network device, you receive an error message. You can use these commands with your local disks and printers.

Note: A redirected drive is a drive that has been accessed on another PC and has a drive letter assigned to it.

You cannot use the following DOS commands with redirected drives:

- BACKUP
- CHKDSK (Check Disk)
- DISKCOMP (Disk Compare) - Use the COMP (Compare) command to compare files.
- DISKCOPY (Disk Copy) - Use the COPY and XCOPY commands to copy files.
- FDISK
- FORMAT
- JOIN
- LABEL - You cannot change the volume label of a network device you are using.
- PRINT - Use the NET PRINT (or NET COPY) command if you are using network devices.
- RECOVER
- RESTORE
- SUBST (Substitute)
- SYS
- VERIFY

The following are the only commands you can use with UNC name:

- TYPE
- PRINT

An example is:

```
PRINT \\BOBSMACHINE\BOBSFILES\CONNECT.TXT
```

You cannot use the following OS/2 commands with redirected drives:

- CHKDSK (Check Disk)
- DISKCOPY (Disk Copy)
- FDISKPM
- JOIN
- LABEL
- RECOVER
- RESTORE
- SHELL

You cannot use the following OS/2 commands with UNC name:

- BACKUP

Chapter 2. Installing OS/2 Warp Connect

The *Easy Start, Up and Running* document and the OS/2 Warp Connect *Readme First* file provided with the OS/2 Warp Connect product contain the hardware and software requirements and an installation road-map to determine the correct installation procedure for your environment.

OS/2 Warp Connect Installation Options

If OS/2 Warp is already installed, you can install the OS/2 Warp Connect's networking products without having to format or reinstall OS/2 Warp. Refer to chapter 3 in *Up and Running* for instructions. However, due to interoperability which ensures ability for different types of network software to interact with each other, we recommend you upgrade current OS/2 Warp implementations. The operating system in use should be at CSD level XR03003, Type 0C or Type WC. Considering for example peer services, prior levels of OS/2 are restricted to interoperability at the command line interface. To verify the current CSD level of an OS/2 operating system issue the `SYSLEVEL` command from the command line.

Notes:

1. If you want to enable the remote installation service of OS/2 Warp Connect, OS/2 Warp as well as MPTS is required to run this feature.
2. When using the remote installation feature, workstations to be installed remotely must have at least 8MB of RAM.

The installation options available with the OS/2 Warp Connect product are numerous and differentiate from each other in complexity and function. There are three installation paths available provided by OS/2 Warp Connect:

- Easy Installation
- Advanced Installation
- Individual Product Installation from CD-ROM or diskettes

Easy Installation

Select Easy Installation to install the following software to the defaulted drive C: on your local workstation:

- **IBM Peer for OS/2 Version 1.0**

This component lets you share directories and printers on your workstation with other users on the network who are running IBM Peer for OS/2 Version 1.0, OS/2 LAN Server, or other compatible peer networking software. With IBM Peer for OS/2 Version 1.0, you can also use applications, directories, and printers shared from other peer workstations or OS/2 LAN Server machines.

- **NetWare Client for OS/2 Version 2.11**

The NetWare Client for OS/2 Version 2.11 lets you to login to NetWare server workstations and use directories and printers on those workstations.

- **Internet Access**

The Internet is a worldwide network of computers linked by network adapters, telephone lines, satellites, and other communication devices. It allows you to communicate and share files with other users on the Internet, and connect to bulletin boards and news services. The Internet connection software supports applications that use the TCP/IP protocol.

Installing Internet Support

The version of Internet support which comes with OS/2 Warp Connect CD-ROM disk 1 is newer than the version that is included in the BonusPak CD-ROM (disk 2). Do not install the BonusPak version since it is not compatible with IBM TCP/IP for OS/2 Version 3.0.

Advanced Installation

Advanced Installation lets you customize your installation. In addition to the products installed with Easy Installation you can install the following products:

- **OS/2 LAN Requester**

With this component, you can log on to an OS/2 LAN Server domain and use shared applications, directories, and printers on servers and peer workstations. OS/2 LAN Requester also provides the graphical user interface of LAN Server 4.0 to graphically administer LAN Server domains. You can have a limited ability to share your workstation's resources (with one user at a time) by reconfiguring after installation.

- **IBM LAN Distance Remote Version 1.11**

IBM LAN Distance Remote Version 1.11 lets you dial into your LAN, for example, when you are traveling and carrying a laptop computer with this software installed. With LAN Distance software, a supported modem, and telephone lines, you can use LAN client software such as IBM Peer for OS/2 Version 1.0 or NetWare Client for OS/2 Version 2.11 to connect to your LAN or connect to other workstations using IBM LAN Distance. Your LAN administrator will need to set up an IBM LAN Distance Connection Server 1.1 to allow you to connect to an OS/2 LAN Server or a Novell NetWare LAN.

IBM LAN Distance Remote Version 1.11 is typically used on laptop computers with a modem, but it can be used on any workstation generally.

Individual Product Installation

Individual Product Installation lets you install the components of OS/2 Warp Connect using its set of installation options and configurations panels. However, one of the advantages of using the Easy Installation or Advanced Installation is, that all the configuration changes required for interoperability of the components is performed for you.

The Individual Product Installation additionally offers you the installation of AskPSP. AskPSP is a knowledge base system that can be used in problem determination. See "AskPSP" on page 242 for more information.

Recommended Installation Path

The preferred method of installation is to use the Easy Installation or Advanced Installation paths. The easy path provides a quick and simple installation, that will usually meet most installation requirements. Technically oriented users typically use the advanced path.

Installation Considerations

OS/2 Warp Connect is available on CD-ROM media only . However, diskettes can be produced for all components of OS/2 Warp Connect. Be aware of the fact that when you install from diskette you cannot take advantage of the integrated installation process which performs all product specific checkings and provides an easy-to-use interface for installing selected groups of components.

The Integrated Installation allows you to install either:

- Local installations at machines with CD-ROM drive
- Remote installations at machines that are connected to a LAN and have access to the machine with a CD-ROM drive

Note: Access will be granted by using prepared startup diskettes to boot at the remote machine.

The installation procedure used locally and remotely are equal except enabling the remote machine to perform *across-the-LAN* installations.

Before you actually start, you need the following information:

- Which components of OS/2 Warp Connect are you going to install?
- Which path (Easy Installation or Advanced Installation) are you going to take to install selected components?
- Do you have technical information available which is required to type in on some installation panels?

Required Installation Information

Dependent on the installation path you have chosen required information must be present and typed in in the appropriate panels that show up before installation itself actually begins. What kind of information will be needed is shown here.

Easy Installation

- Select the components you want to install:
 - IBM Peer for OS/2 Version 1.0
 - NetWare Client for OS/2 Version 2.11
 - Internet Access (TCP/IP)
- Required information needed for IBM Peer for OS/2 Version 1.0:
 - Machine name
 - Machine comment
 - Domain name you will use
- Required information for LAN adapter:
 - Type of LAN adapter (if any)
 - Any adapter settings that vary from adapter defaults
 - Speed (if Token Ring)
 - Memory Address
 - IRQ
 - Locally administered LAN adapter address

Advanced Installation

All information that is needed for Easy Installation must be present.

Additionally:

- On which drive(s) you want the products to be installed
- IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester Information
 - LAN protocol to use (IBM IEEE 802.2, NetBIOS, TCPBEUI and so on)
- TCP/IP configuration information (if you want TCP/IP LAN access)
 - Workstation IP address
 - Subnet mask
 - Default router address
 - Domain name (if used)
 - Name server address (if used)
- IBM LAN Distance Information
 - Type of modem
 - Type of LAN at answering end (token-ring or Ethernet)
 - Default phone number to dial

Installing OS/2 Warp Connect

Generally, there are three methods of installing OS/2 Warp Connect:

- Locally from CD-ROM
- Remotely from CD-ROM
- From diskettes

OS/2 Warp Connect Install / Remove Program

Once OS/2 Warp Connect is installed, the OS/2 Warp Connect Install / Remove program gives you different ways of installing whether remotely or locally. All installation / removal programs reside in the OS/2 Warp Connect Install/Remove folder which itself resides in the OS/2 System folder as shown in Figure 15 on page 46.

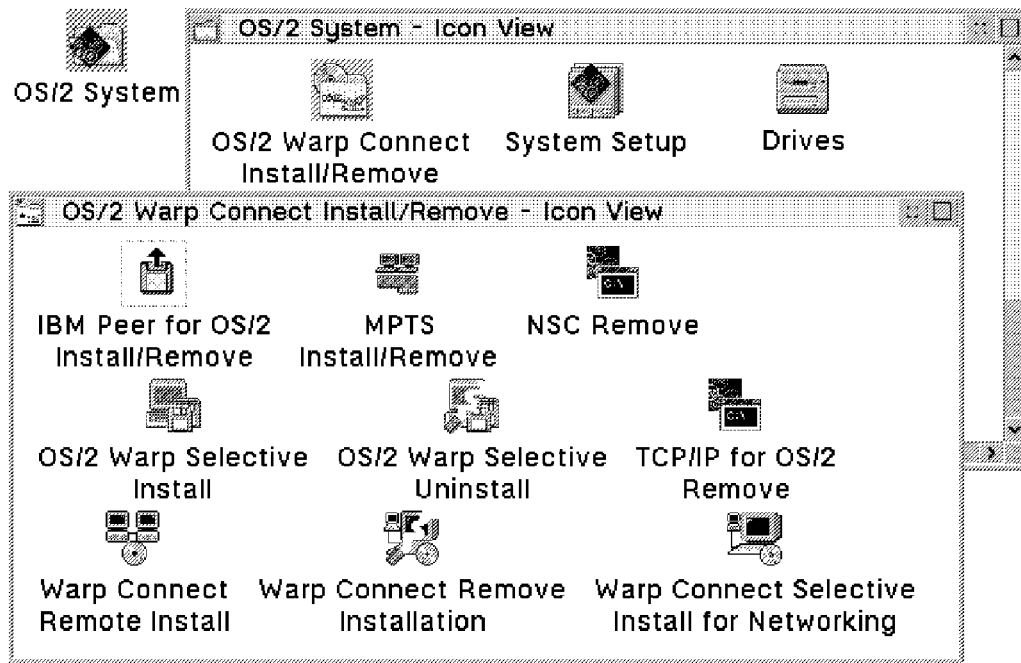


Figure 15. OS/2 Warp Connect Install/Remove Folder

Local Installation from CD-ROM

1. If you do not have the two installation diskettes present you can create them from your OS/2 Warp Connect CD by issuing the `CDINST` command from the root directory of the CD.
2. Put the OS/2 Warp Connect CD into the CD-ROM drive and boot your system from the OS/2 Warp Connect Installation diskette.
3. When prompted insert diskette 1.
4. The OS/2 Warp Connect Welcome panel is displayed (Figure 16 on page 47)

```

                                     Welcome!

Congratulations on your purchase of IBM OS/2 Warp Connect.
OS/2 Warp Connect contains OS/2 Warp Version 3 *, BonusPak,
and the following powerful networking products:

    - IBM Peer for OS/2
    - IBM LAN Requester 4.0
    - Novell NetWare Client 2.11 for OS/2
    - IBM TCP/IP for OS/2 3.0
    - IBM LAN Distance Remote 1.11
    - IBM Network SignON Coordinator/2 1.20

The following panels guide you through the installation of
OS/2 Warp and networking products.

* "OS/2 Warp" or "Operating System/2 Version 3" or "Operating System/2"
  references throughout these programs refer to the OS/2 Warp Version 3
  Operating System product, which is included in OS/2 Warp Connect, plus
  the BonusPak, plus IBM and other networking products.

Enter  F3=Command Prompt

```

Figure 16. OS/2 Warp Connect Welcome Panel

5. After pressing Enter, you will be prompted for the installation method:
Easy Installation or Advanced Installation.

```
Installing OS/2 Warp Connect

Welcome to OS/2!

Use the cursor keys to select an installation method and press Enter.
Press F1 for more information.

1. Easy Installation
- Non-technical users; simple install of OS/2 Warp on drive C
- You choose IBM Peer for OS/2 (includes access to IBM LAN Servers)
- You choose Novell NetWare Client for OS/2
- You choose Internet access using your modem

2. Advanced Installation
- Experienced technical users; installs OS/2 Warp to any available drive
- You choose additional options such as formatting your drive
- You can also choose:
    IBM Peer for OS/2 or IBM LAN Requester
    Novell NetWare Client for OS/2
    IBM LAN Distance Remote
    IBM TCP/IP for OS/2 (includes Internet access)
- You specify additional setup and configuration options

Enter  F3=Command Prompt  F1=Help
```

Figure 17. Installation Method Selection

After having selected the installation method and drive on which you want OS/2 to be installed, system files will be loaded and files will be copied from CD-ROM to your hard disk. If you had an OS/2 version installed before, you would be asked whether you want to have the selected drive formatted or not. Not formatting the drive means OS/2 Warp Connect will upgrade the current installation.

Checking current OS/2 Installations

When OS/2 Warp Connect is going to be installed locally from CD-ROM, no checking will be made whether there is an operating system installed or not. So upgrading a current installation is done by default unless you select to format your selected drive.

The installation progress indicator informs you about which diskettes and files are being copied. When all necessary files have been copied to your hard disk you will get the following message screen which is shown in Figure 18 on page 49.

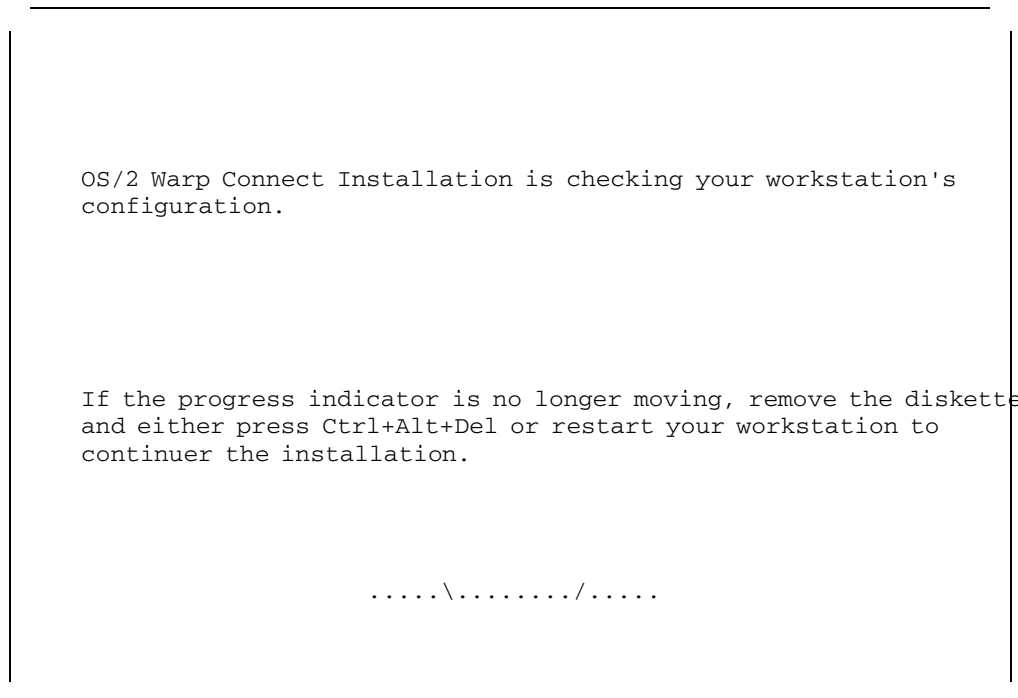


Figure 18. Checking Workstation's Configuration Message Screen

6. After this message screen you normally will be prompted to remove the diskette and press Enter to restart the workstation to continue the installation. If not, just restart your workstation as described in the message screen.
7. The first window you will get after the reboot of the workstation is the OS/2 System Configuration window. Adjust selections to your needs.
8. When you have finished the OS/2 configuration, you will need to select the desired networking support at the OS/2 Warp Connect Install windows. To continue, go to the section "Selecting Networking Support to Install" on page 60.

Local Installation from CD-ROM on Existing OS/2 Warp

If you have a machine with a CD-ROM and OS/2 Warp installed and would like to install OS/2 Warp Connect networking features onto it, follow these steps:

1. Boot the machine that is to be installed with its own OS/2 Warp.
2. Change to the CD-ROM's drive and issue the `INSTALL` command from an OS/2 windowed command prompt.

Note: If you experience peculiar behaviors of the machine on which you issued the install command you may need to issue a different command to bypass the adapter sniffing function. First change to the CD-ROM's drive. Then do the following:

```
CD GRPWARE  
CLTINST /NOSNIFF
```

This is what is going on then:

- Once you have selected the drive on which you want to install the OS/2 Warp Connect Install/Remove Program, necessary files will be copied to the workstation.
 - If MPTS is not installed or MPTS is back-leveled to the one shipped with OS/2 Warp Connect, you will be asked to install/upgrade it. If you have to do so, make sure that you configure MPTS with NetBIOS protocol support if you have not already done so. You will be prompted to reboot your workstation to make the changes active.
 - The OS/2 Warp Connect Install/Remove program creates an additional object in the OS/2 System folder. This object is named **OS/2 Warp Connect Install/Remove**.
3. To continue open the OS/2 Warp Connect Install/Remove folder which is in the OS/2 System folder.
 4. Select either the Warp Connect Selective Install for Networking or the Warp Connect Remote Install object and start it by double-clicking on its object.
 5. Dependent on the selection you have made you will be prompted to create remote boot diskettes. Go to "Create Remote Boot Diskettes" on page 52 for further details.
 6. If you want to do a local installation of networking support select **On this workstation** at the Local versus Remote window and continue with section "Selecting Networking Support to Install" on page 60.

Note: As for different OS/2 Warp levels, please read the first paragraph of the section "OS/2 Warp Connect Installation Options" on page 41.

Local Installation from Diskettes

Once you have created all product diskettes, you can install all parts of OS/2 Warp Connect from diskettes. Review "Creating Product Diskettes" on page 84 for how to create diskettes from the E: PRODINST menu (where E: is the CD-ROM's drive letter). The only limitation of a diskette based installation is:

- You cannot use this workstation as a server for remote initiated installations since the GRPWARE subdirectory does not exist. That means, you will not have the OS/2 Warp Connect Install/Remove folder available, as described in “OS/2 Warp Connect Install / Remove Program” on page 45.

Note: But later on you might extend a diskette based installation by installing a CD-ROM drive on that machine and issuing the `E: INSTALL` command (where `E:` is the CD-ROM's drive letter) as described in “Local Installation from CD-ROM on Existing OS/2 Warp” on page 49.

OS/2 Warp Connect products should be installed in the following order:

1. OS/2 Warp
2. Multi-Protocol Transport Services / AnyNet
3. IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester
4. TCP/IP
5. NetWare Client for OS/2 Version 2.11
6. IBM LAN Distance

Remote Installation from CD-ROM

You easily can install OS/2 Warp Connect on clients remotely. This is useful if you do not have CD-ROMs installed on all machines. Prerequisites are:

1. The client being installed remotely must be connected to a LAN.
2. The workstation that has a CD-ROM must be reachable through the LAN.
3. The OS/2 Warp Connect Install/Remove program must be installed on the machine with the CD-ROM and set up properly.

Note: The OS/2 Warp Connect Install/Remove program is installed automatically on a machine on which OS/2 Warp Connect is installed.

4. Transport protocol is NetBIOS.
5. A pair of remote boot diskettes must be created. This set of diskettes must match the network adapter, that is installed at the remote client. That means, for each network adapter you need to create a pair of boot diskettes. Mark them accordingly.

Create Remote Boot Diskettes

You need to have two formatted diskettes to create one set of remote boot diskettes. The first diskette, that will be created, is the unmodified OS/2 Warp installation diskette. The second diskette, that will be created, is a modified OS/2 Warp diskette 1 with networking support. Once created, you usually never have to create them again.

Note: You need to have a pair of remote boot diskettes for each LAN Adapter.

1. In the OS/2 System folder open the OS/2 Warp Connect Install/Remove folder.
2. Select the Warp Connect Remote Install object and start it by double-clicking on its object.
3. At the Diskette Creation window select the radio button **Yes** to create your set of remote installation diskettes as shown in Figure 19.

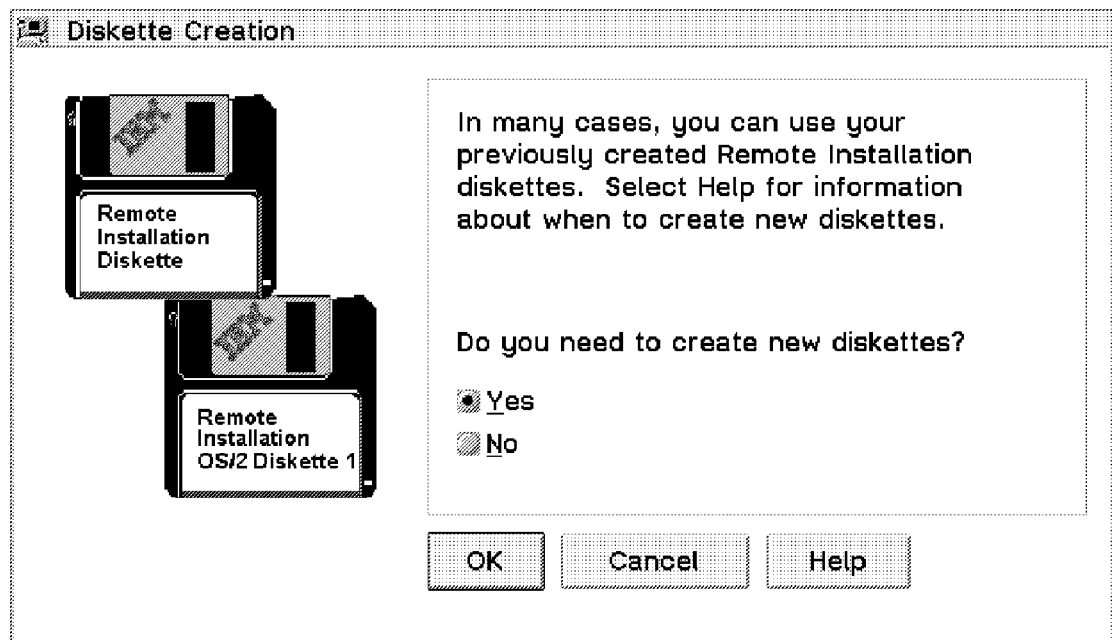


Figure 19. Diskette Creation Window (for Remote Install)

Note: If you have previously created remote install diskettes from this machine you do not need to create them again. In this case select **No** at the Diskette Creation window.

The Select Network Adapter window now will be opened for you and is shown in Figure 20 on page 53.

4. You now need to select the type of LAN adapter, that is installed at the remote workstation you want to create the remote boot diskettes for. If the remote workstation is a laptop, it usually needs PCMCIA socket support. This can be done by putting a check mark in the PCMCIA check box. Then select the the type of PCMCIA workstation. In our example shown in Figure 20, we have selected support for IBM Thinkpad 755 CD. See "PCMCIA Machines Supported by OS/2 Warp Connect" on page 455 for a list of supported PCMCIA machines.

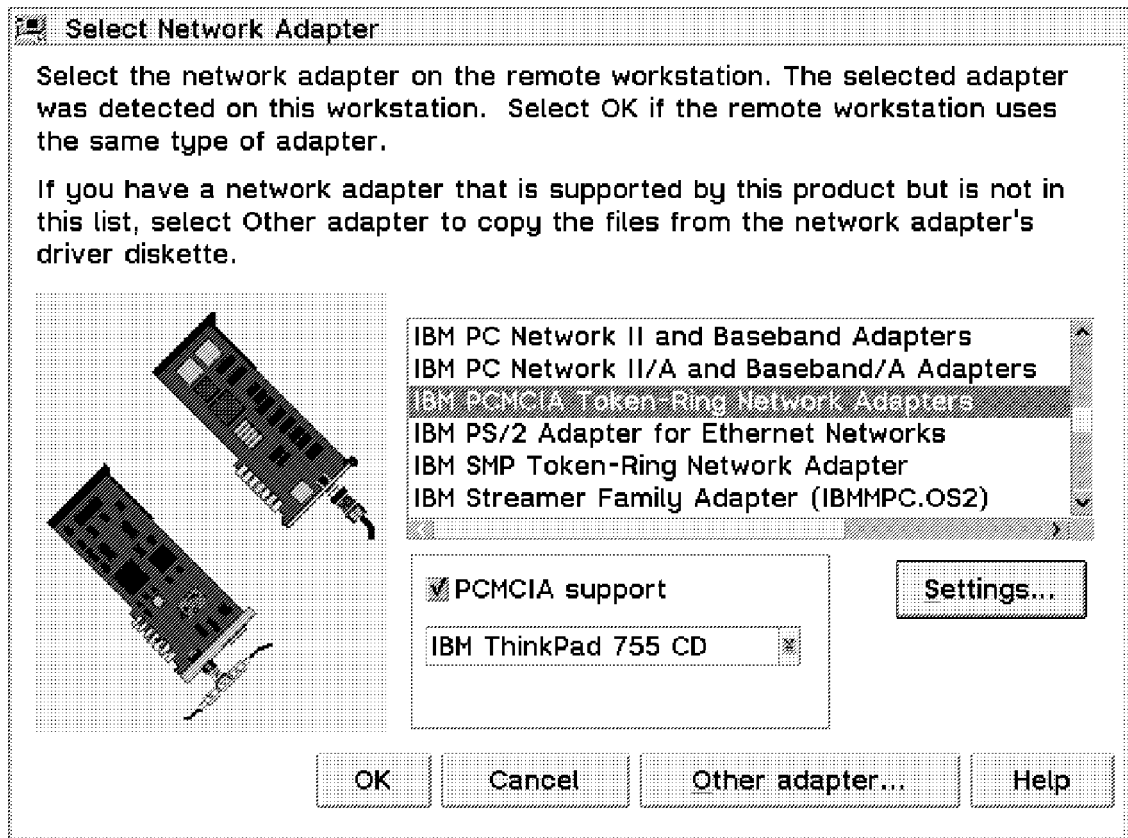


Figure 20. Select Network Adapter Window

5. At the Select Network Adapter window, select **Settings** to modify the LAN adapter settings, as shown in Figure 21 on page 54. Selecting **More** gives you additional parameter settings that may have to be changed by selecting the **Change** button.

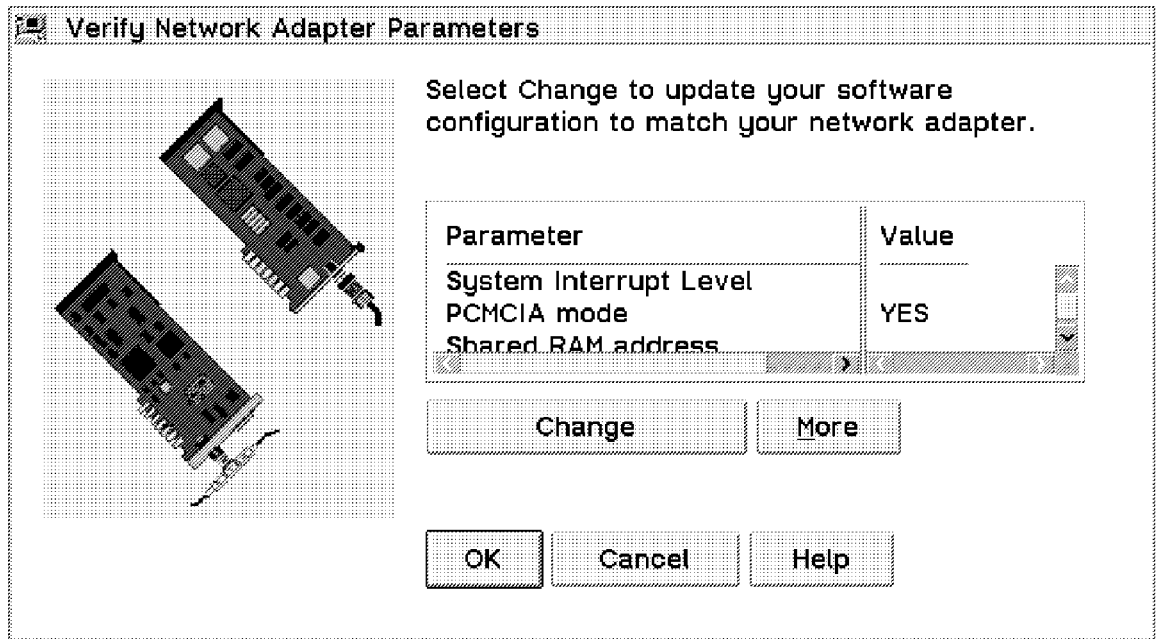


Figure 21. Verify Network Adapter Parameters Window

6. Select **OK** twice, to get the the **Create Installation Diskettes** window which is shown in Figure 22.

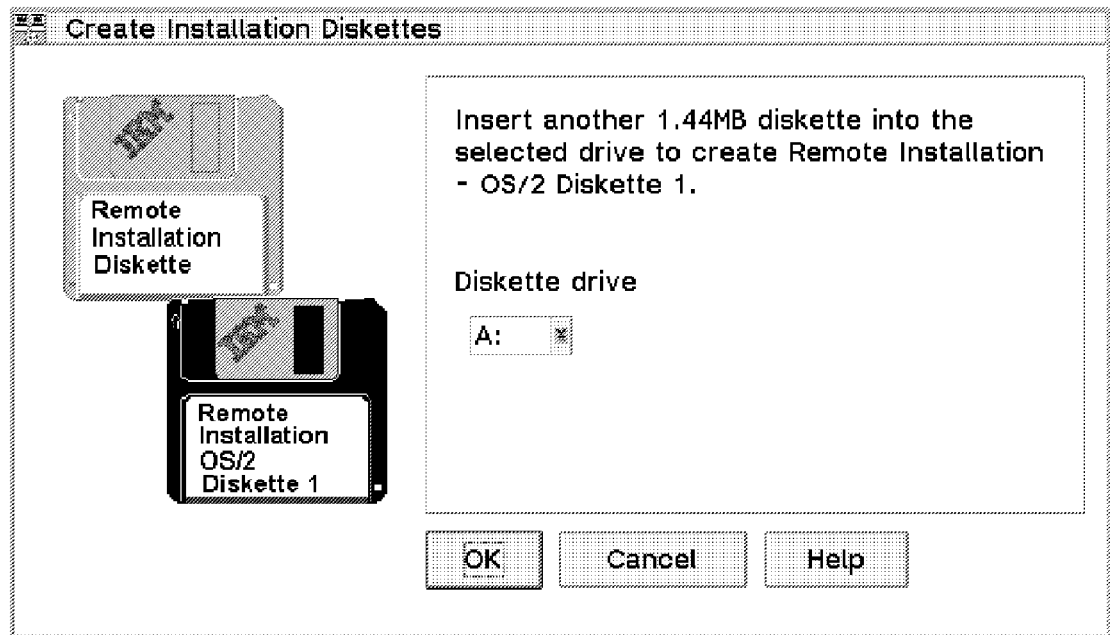


Figure 22. Create Installation Diskettes Window

7. Insert and label diskettes as prompted. Additionally note the type of adapter that these diskettes were made for. In our example shown in

Figure 20 on page 53 we selected the IBM PCMCIA Token-Ring Adapter. At the Verify Network Adapter Parameters window, which is shown in Figure 21, we did not change any parameters. The default ring speed of 4 Mbps is taken. Therefore the diskette label for Remote Installation OS/2 Diskette 1 should contain this additional information (as shown in Figure 23):

```
Remote Installation OS/2 Diskette 1

IBM PCMCIA Token Ring Network Adapter
Ringspeed: 4 mbit/s
```

Figure 23. Diskette Label for Remote Installation OS/2 Diskette 1

Initiate Remote Installation

1. In the OS/2 System folder open the OS/2 Warp Connect Install/Remove folder.
2. Select the Warp Connect Remote Install object and start it by double-clicking on its object.
3. At the Diskette Creation window select **No** if you already have created your set of remote installation diskettes. If not, go back to the section “Create Remote Boot Diskettes” on page 52.
4. The Remote Workstation Installation Steps window that will appear either after you have created or skipped creating remote boot diskettes informs you what to do next to start remote installation at the remote client:
 - a. Insert the remote installation diskette into drive A: of the remote workstation
 - b. Shut down and restart the remote workstation
 - c. Continue OS/2 Warp Connect installation at the remote workstation

The original screen is shown in Figure 24 on page 56.

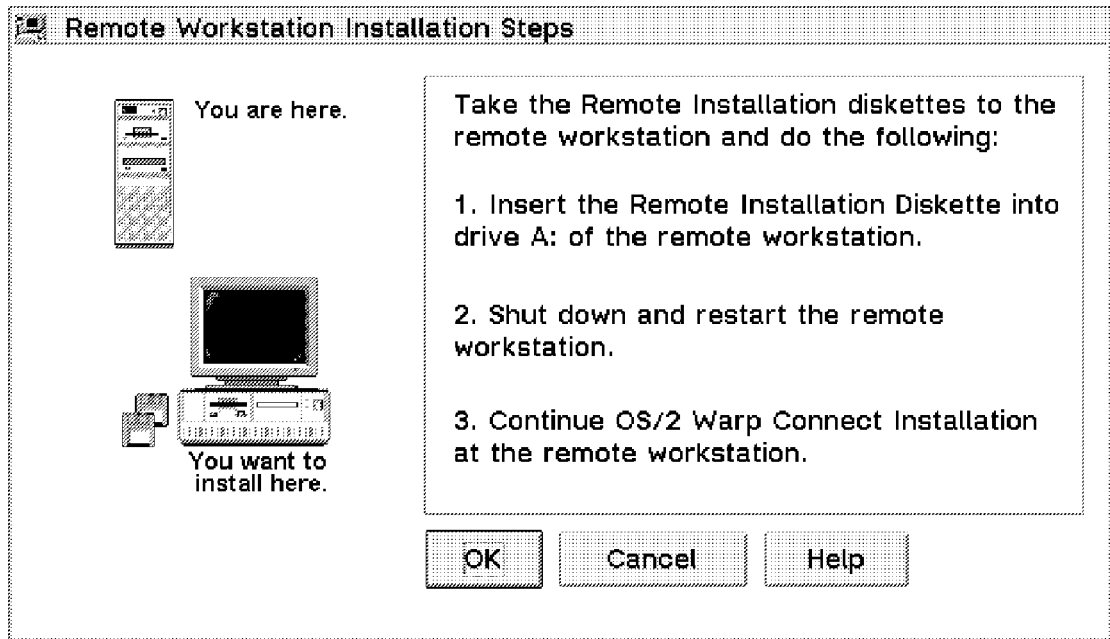


Figure 24. Remote Workstation Installation Steps Window

After the remote client is started with this set of installation diskettes, the Warp Connect Remote Installation Service window will be displayed at your CD-ROM workstation giving information about the status of the remote client (whether a client is logged on or not). The message would be *Installation in progress* as shown in Figure 26 on page 58.

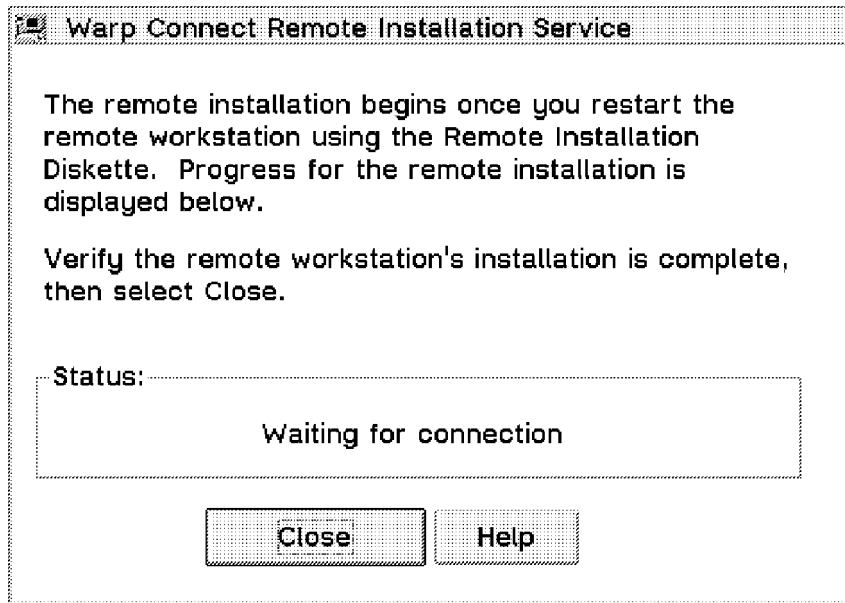


Figure 25. Warp Connect Remote Installation Service Window (Waiting for Connection)

Notes:

- a. You do not have to select the **OK** button at the Remote Workstation Installation Steps window. It automatically will change to the Warp Connect Remote Installation Service window as soon as there is a client logging on.
- b. If you have selected the **OK** button though, the Status panel within the Service window will show a *Waiting for connection* message as shown in Figure 25.
- c. You cannot close the Warp Connect Installation Service window, that means end the connection between this workstation and the remote workstation, unless there are no remote connections to this workstation anymore.

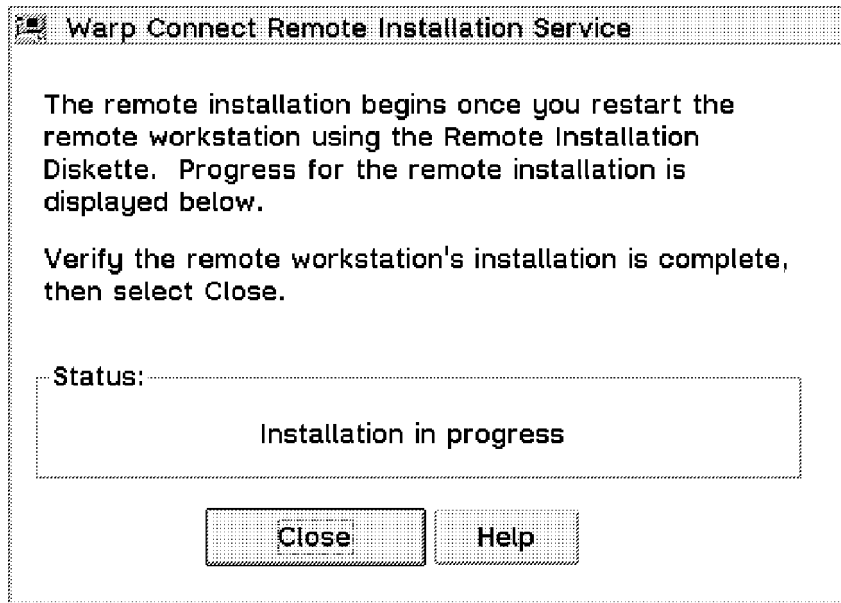


Figure 26. Warp Connect Remote Installation Service Window (Installation in Progress)

5. At the remote workstation, you will first get the welcome screen as shown in Figure 16 on page 47. Press Enter to continue.
6. The Installation procedure will verify if OS/2 Warp is installed. If OS/2 Warp is installed, the following message will appear at the remote workstation:

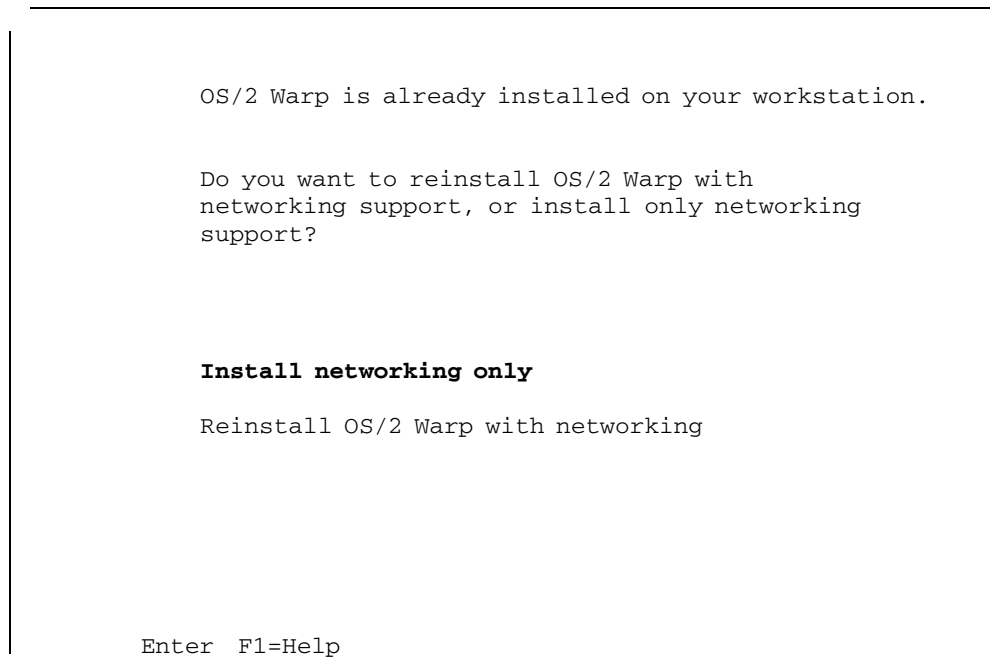


Figure 27. OS/2 Already Installed Message at the Remote Client

Notes:

- a. Have in mind that you should have the latest version of OS/2 Warp installed on your machine due to interoperability issues. OS/2 Warp Connect comes with the most current version of OS/2 Warp.
 - b. To ensure full interoperability with all networking products select **Reinstall OS/2 Warp with networking** to upgrade the current version of OS/2 Warp that is installed on your machine.
7. If you select Install networking only and the remote client has multiple copies of OS/2 Warp installed on multiple logical hard disks, you will be asked on which copy of OS/2 Warp you want to install networking support, as shown in Figure 28 on page 60.

```

Your workstation has multiple versions of OS/2 Warp installed.

Install networking support with which version of OS/2 Warp?

C:      OS/2 Version 3.0.0 (with WIN-OS/2)
D:      OS/2 Version 3.0.0 (without WIN-OS/2)

Enter F1=Help

```

Figure 28. Multiple Versions of OS/2 Installed Message at the Remote Client

The next step the remote installation procedure would do is to install the OS/2 Warp Connect Installation program onto the selected drive. You will have to reboot the remote workstation after that is done.

8. If you selected Reinstall OS/2 Warp with networking, the installation method (easy or advanced) screen for OS/2 Warp will be presented as shown in Figure 17 on page 48. Follow the instructions followed after that screen.
9. Proceed with section “Selecting Networking Support to Install.”

Selecting Networking Support to Install

1. At the Local versus Remote window, which is shown in Figure 29 on page 61, select the **On this workstation** radio button if you install from CD-ROM locally. Otherwise select the other radio button if you want to do remote installations.

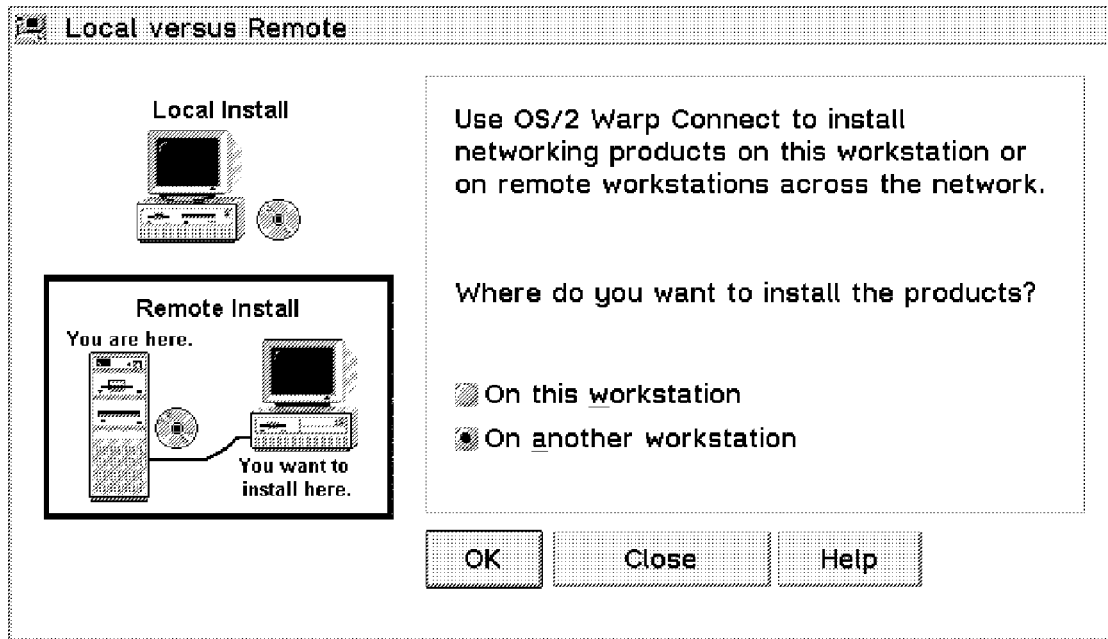


Figure 29. Local versus Remote Window

2. Generally, it doesn't matter from which path you came, if you have selected to install networking support you will get the Installing OS/2 Warp Connect window which is shown in Figure 30.

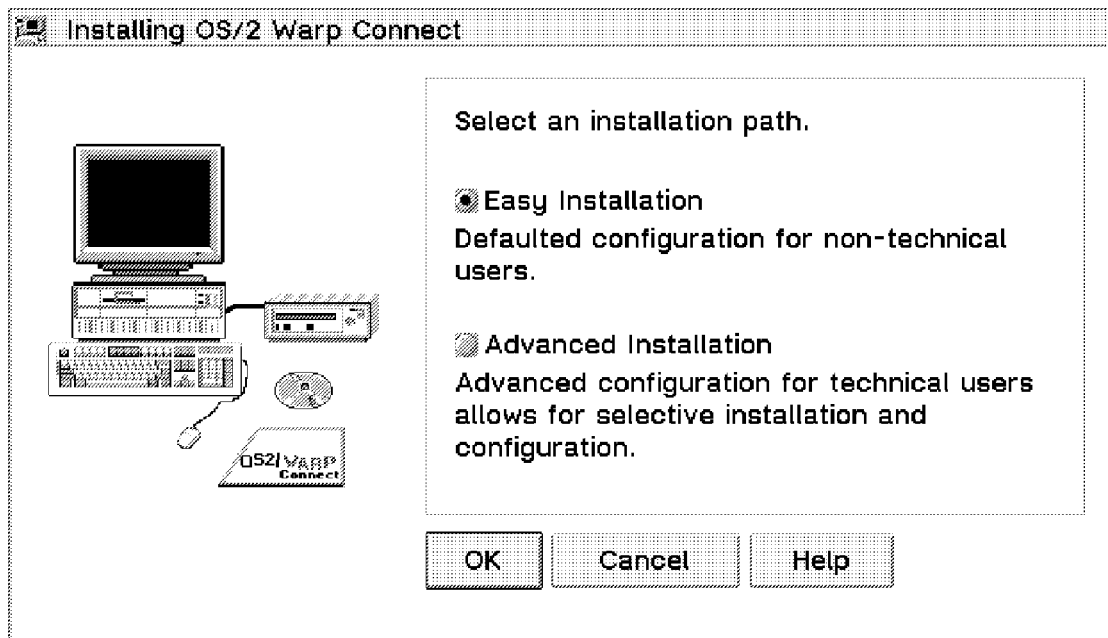


Figure 30. Installing OS/2 Warp Connect Window

3. You will now have to specify the installation path you want to take. If you have selected **Easy Installation**, continue with section “Easy Installation” on page 62. Otherwise, if you have selected **Advanced Installation**, continue with section “Advanced Installation” on page 69.

Easy Installation

Since you have selected the Easy Installation path of OS/2 Warp Connect you can install OS/2 Warp, IBM Peer for OS/2 Version 1.0, NetWare Client for OS/2 Version 2.11 and Internet access on your C: drive. This section shows, what needs to be done, on the Easy Installation path to install networking support.

1. Select **Yes, install OS/2 Peer**, if you want to be able to share and access resources with other workstations.

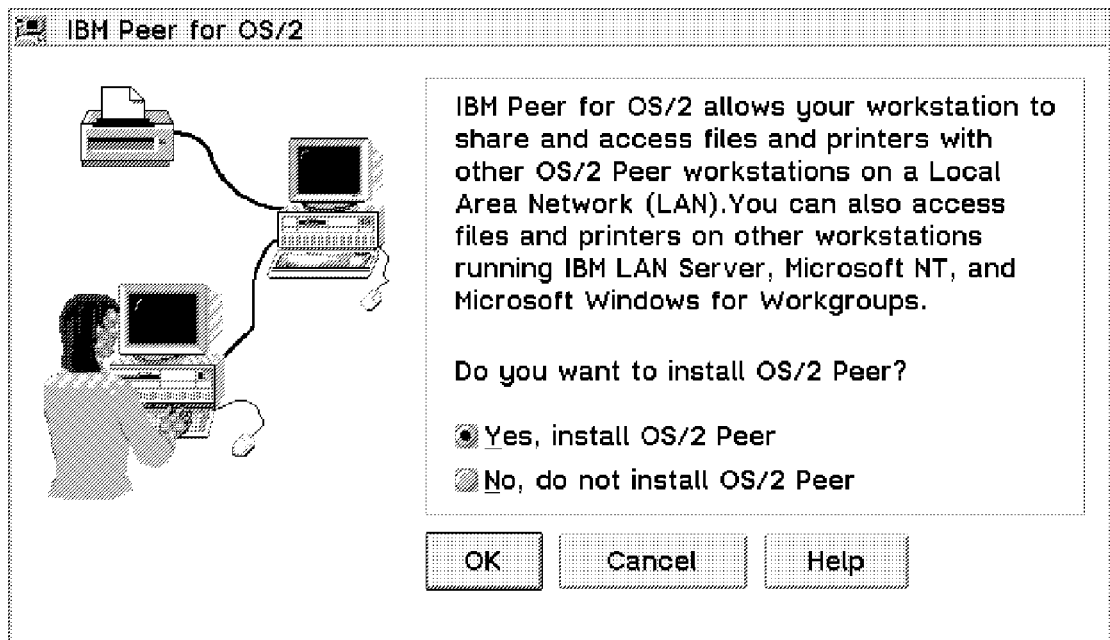


Figure 31. Easy Path: IBM Peer for OS/2 Window

- a. Type a name for your workstation that will identify it in the network. This name is equal to the Computer Name parameter used in the IBMLAN.INI file. Optionally type a description, as shown in Figure 32 on page 63.

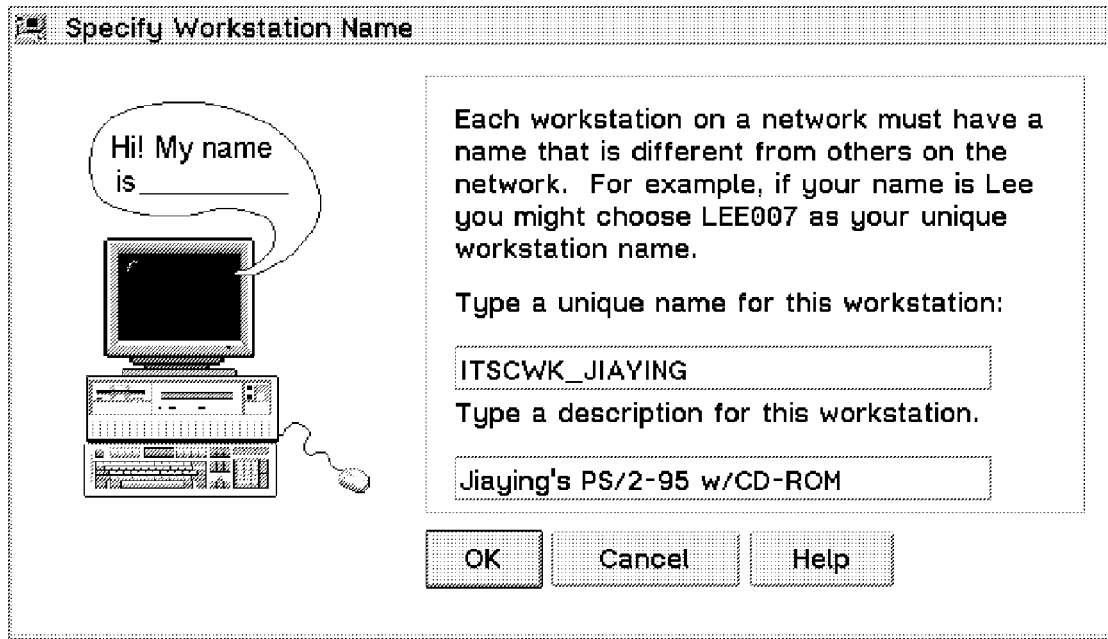


Figure 32. Easy Path: Specify Workstation Name Window

- b. Type the name of the domain you belong to. If you have an OS/2 LAN Server domain in your network, use this domain controller name. If you have a Microsoft Windows for Workgroups workgroup name, use this name to make sharing of resources among different platforms easier. See Figure 33 on page 64.

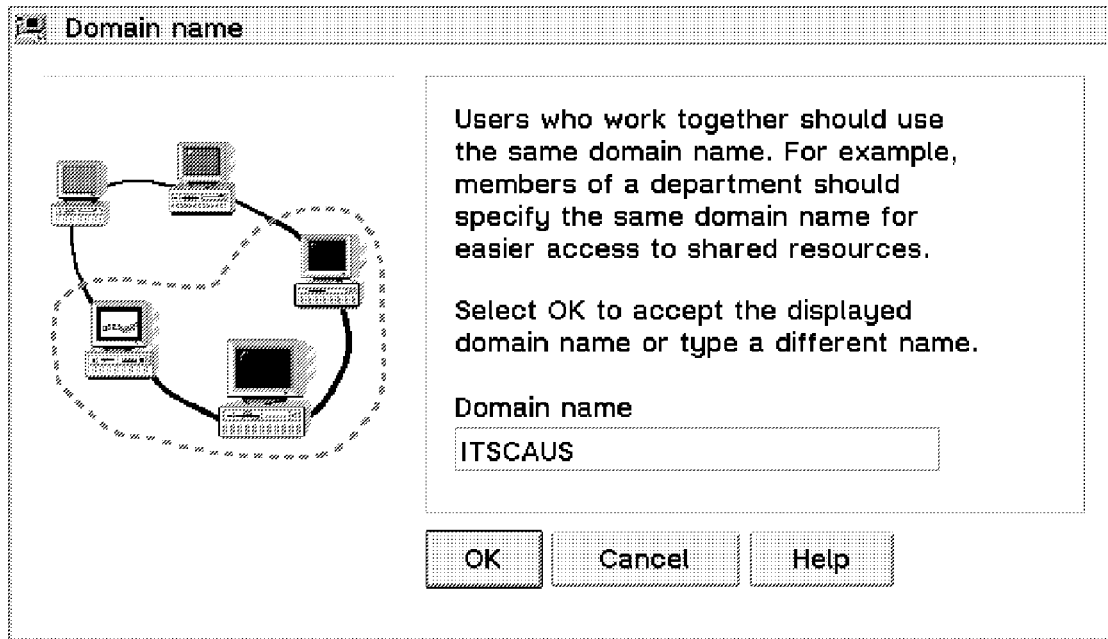


Figure 33. Easy Path: Domain Name Window

2. Select **Yes, install** to install NetWare Client for OS/2 Version 2.11 for access to a NetWare network, as shown in Figure 34.

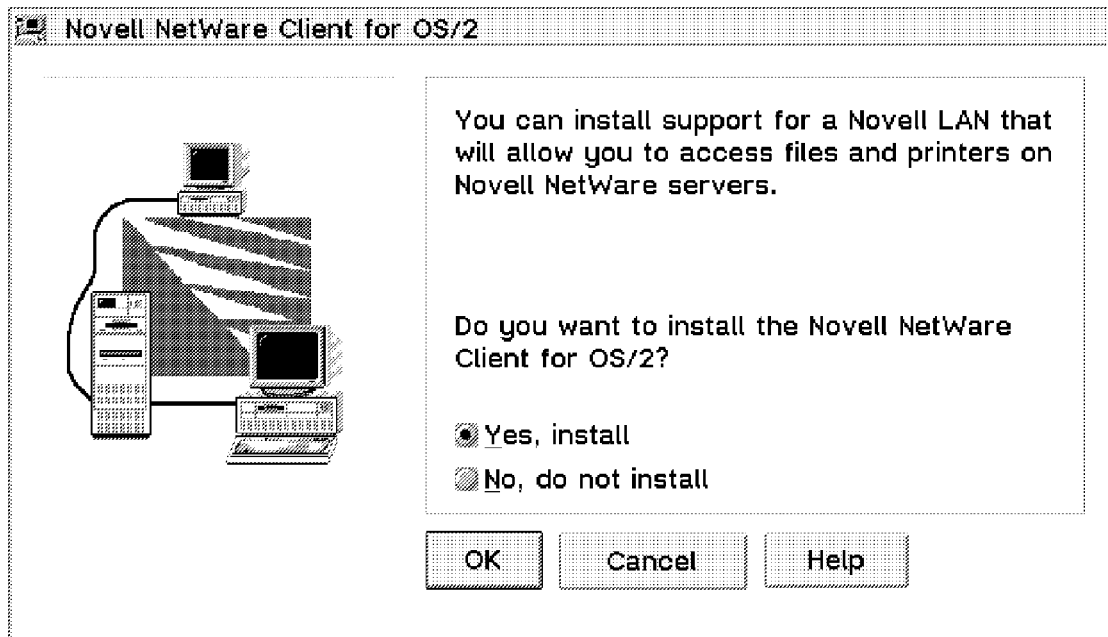


Figure 34. Easy Path: Novell NetWare Client for OS/2 Window

3. At the Internet window, select **Yes** to install Internet dial in access onto your machine, as shown in Figure 35 on page 65. This also installs IBM

TCP/IP for OS/2 Version 3.0, which can be used for additional LAN connections.

Note: In the Easy Installation path, TCP/IP cannot be configured. However, configuration of TCP/IP is needed before it can be used and has to be done when the workstation is rebooted.

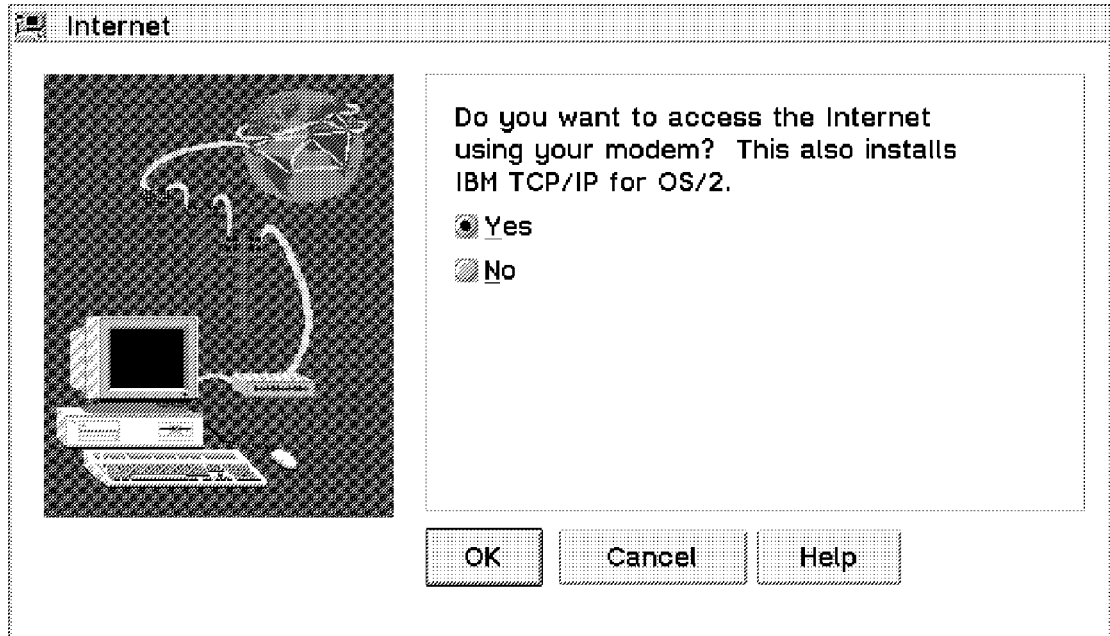


Figure 35. Easy Path: Internet Window

4. Confirm that the network adapter detected is the correct one for the workstation to be installed, as shown in Figure 36 on page 66. If you want to change the adapter type or any of the settings of the adapter, choose **Change Adapter**.

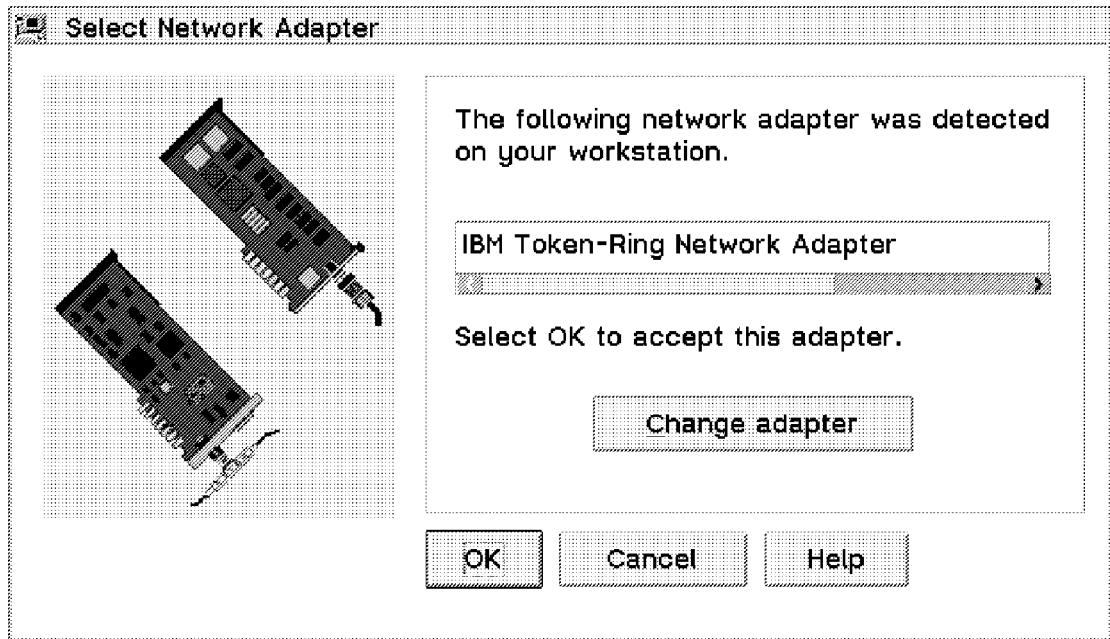


Figure 36. Easy Path: Network Adapter Window

- a. Select the correct adapter for the workstation to be installed (see Figure 37 on page 67), or if your adapter is not listed, select **Other adapter**.

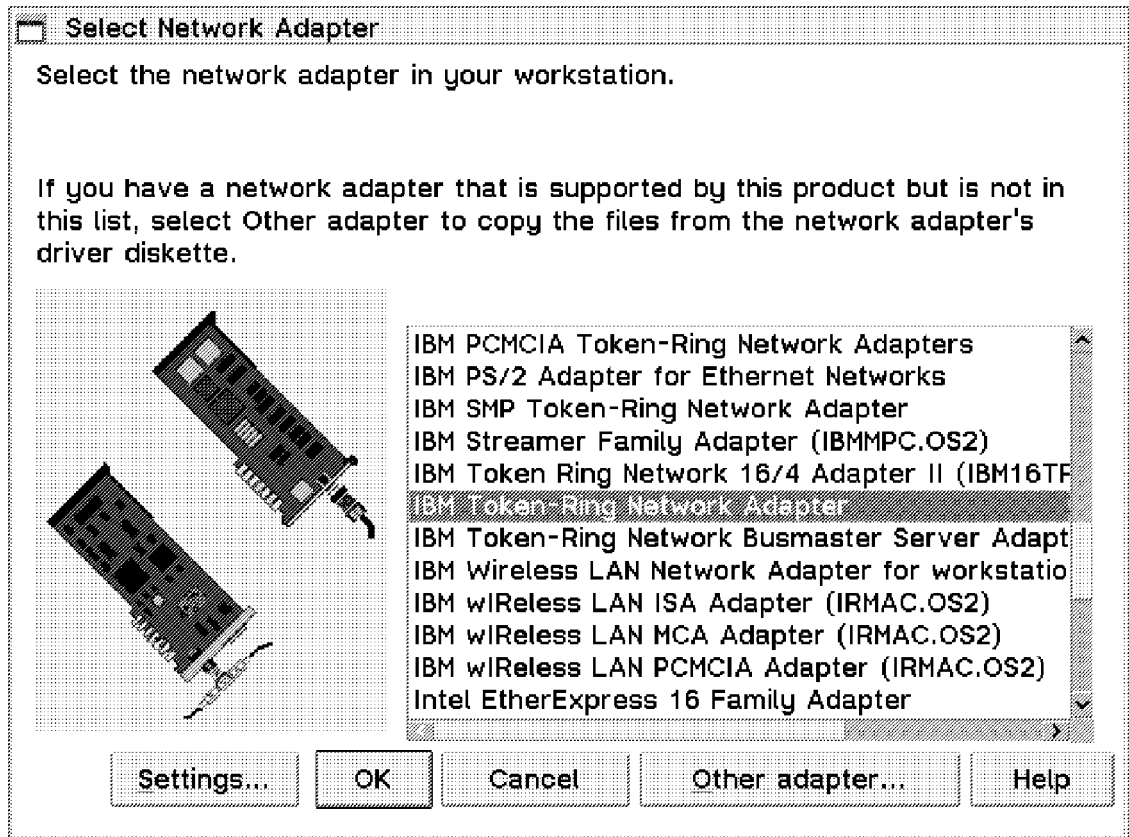


Figure 37. Easy Path : Select Network Adapter Window

- b. Insert your LAN adapter device driver diskette in drive A:, or change the file location path to a directory or drive where the adapter files are stored.

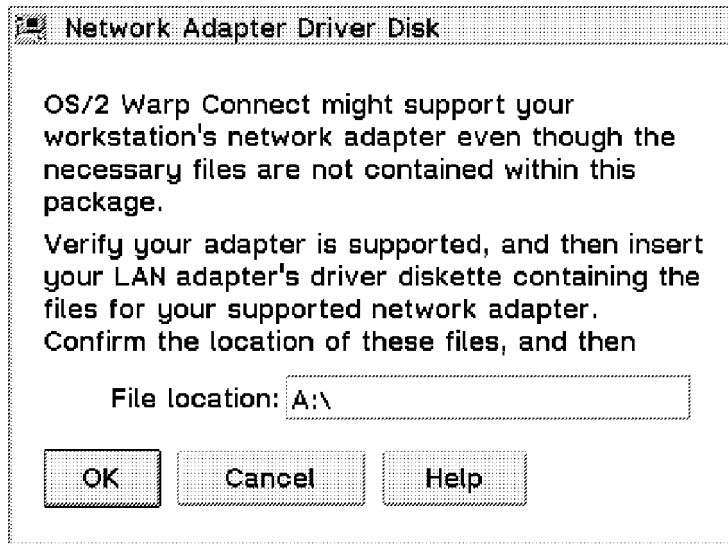


Figure 38. Easy Path: Network Adapter Driver Disk Window

- c. Select **Settings** to change any adapter settings required for your installation. Common changes might be the locally administered adapter address, shared memory or non-default interrupts.

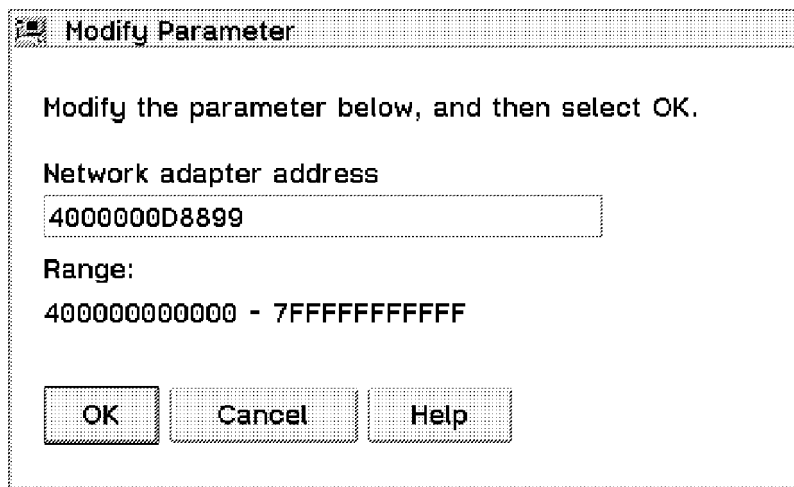


Figure 39. Easy Path: Modify Parameter Window

5. At the Ready to Install window you can select the drives on which you want to install the network components. Select **Change Drives**, as shown in Figure 40 on page 69.

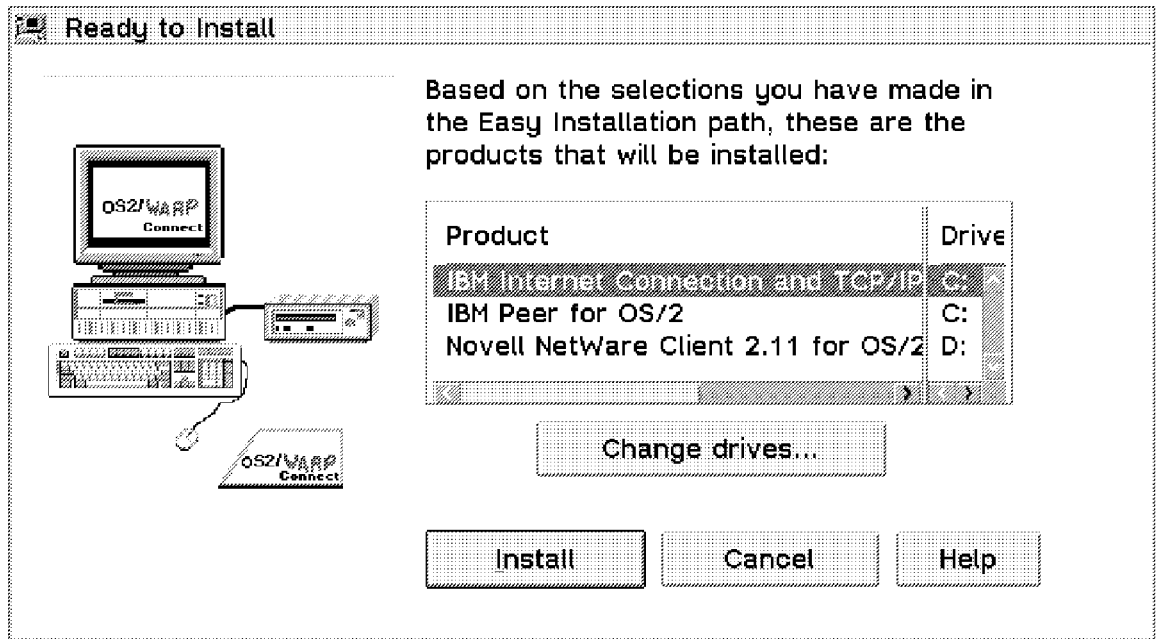


Figure 40. Easy Path: Ready to Install Window

6. Select **Install** at the Ready to Install window to start the installation at the workstation. This panel lists the components that will be installed on your workstation. See Figure 40.

Advanced Installation

Since you have selected the Advanced Installation path of OS/2 Warp Connect you can install OS/2 Warp on any available drive, choose additional options such as formatting drives, install IBM Peer for OS/2 Version 1.0 or OS/2 LAN Server 4.0 Requester, NetWare Client for OS/2 Version 2.11, IBM LAN Distance Remote Version 1.11 and IBM TCP/IP for OS/2 Version 3.0 which includes Internet access and you can specify additional setup and configuration options. (This section shows, what needs to be done on the Advanced Installation path to install networking support.

1. At the Product Selection window, which is shown in Figure 41 on page 70, select the networking products to be installed on the workstation.

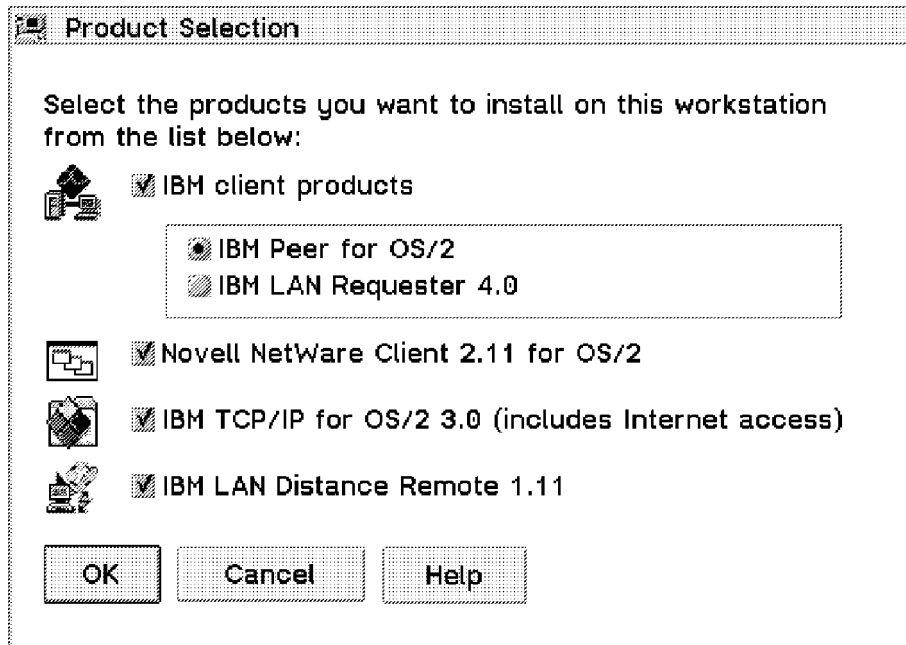


Figure 41. Advanced Path: Product Selection Window

2. By putting check marks into check boxes you select the networking products you want to install. If you selected IBM client product be aware of the default setting that is set which installs IBM Peer for OS/2 Version 1.0 unless you selected IBM LAN Requester. Select **OK** if you have finished selecting networking products.

A settings notebook will be prepared for you that only shows configuration pages of the products you have selected. When finished the Set up selected products settings notebook window will appear on your screen as shown in Figure 42 on page 71.

Additionally a hard disk free space information window will appear which gives you information about how much hard disk space is available of your local hard disks.

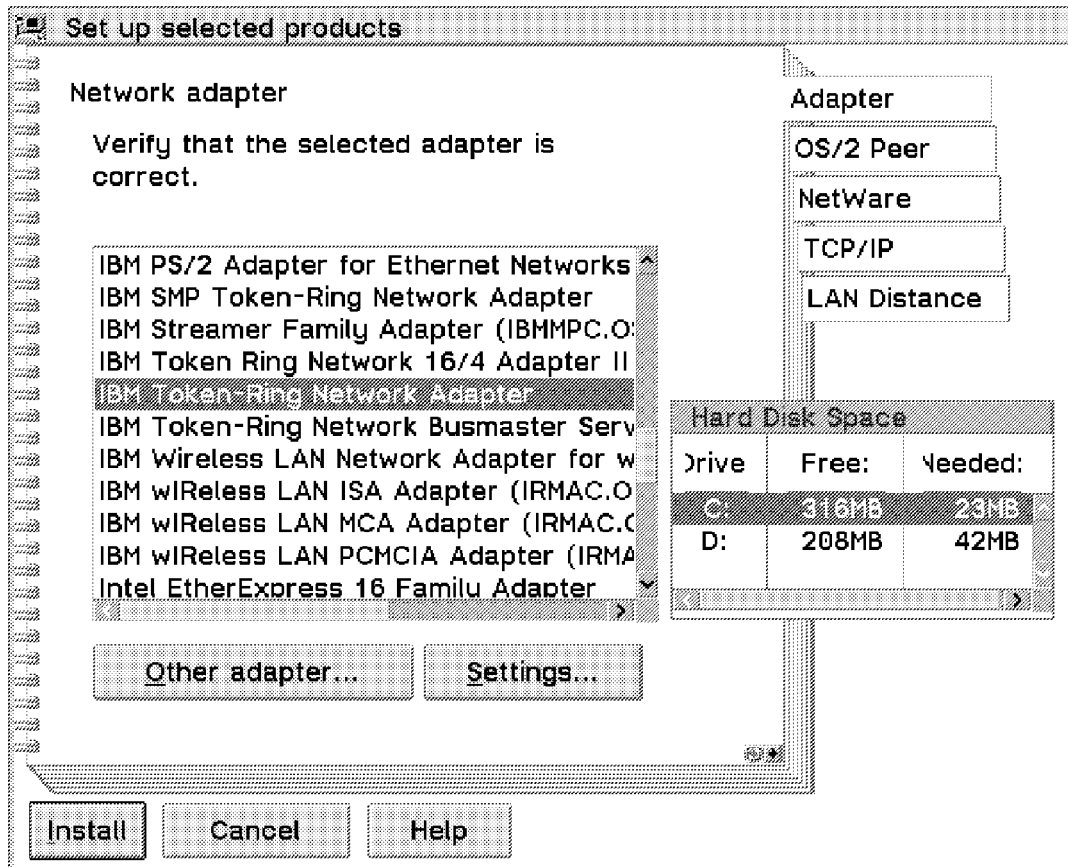


Figure 42. Adapter Page at the Set Up Selected Products Settings Notebook

3. The system is capable of sniffing the network adapter that is installed on your machine. At the Adapter page of the Set up selected products settings notebook, verify the network adapter. You may change settings required for your specific adapter, or add files (.NIF, .OS2) to support network adapters that are not listed.

Note: If you are installing directly from CD-ROM for IBM LAN Distance remote attachment only, select the **IBM Parallel Port** adapter.

4. The next page in the settings notebook, which is named OS/2 Peer, (see Figure 43 on page 72) allows you to configure peer services. Adjust the installation drive, type in the Workstation name, description and domain name.

Note: Because IBM LAN Distance is selected, the TCPBEUI protocol (NetBIOS over TCP/IP) is not configurable. So far IBM LAN Distance does not support NetBIOS over TCP/IP.

The next two pages of peer configuration would configure NetBIOS over TCP/IP. No configuration information can be typed in here though since IBM LAN Distance is selected.

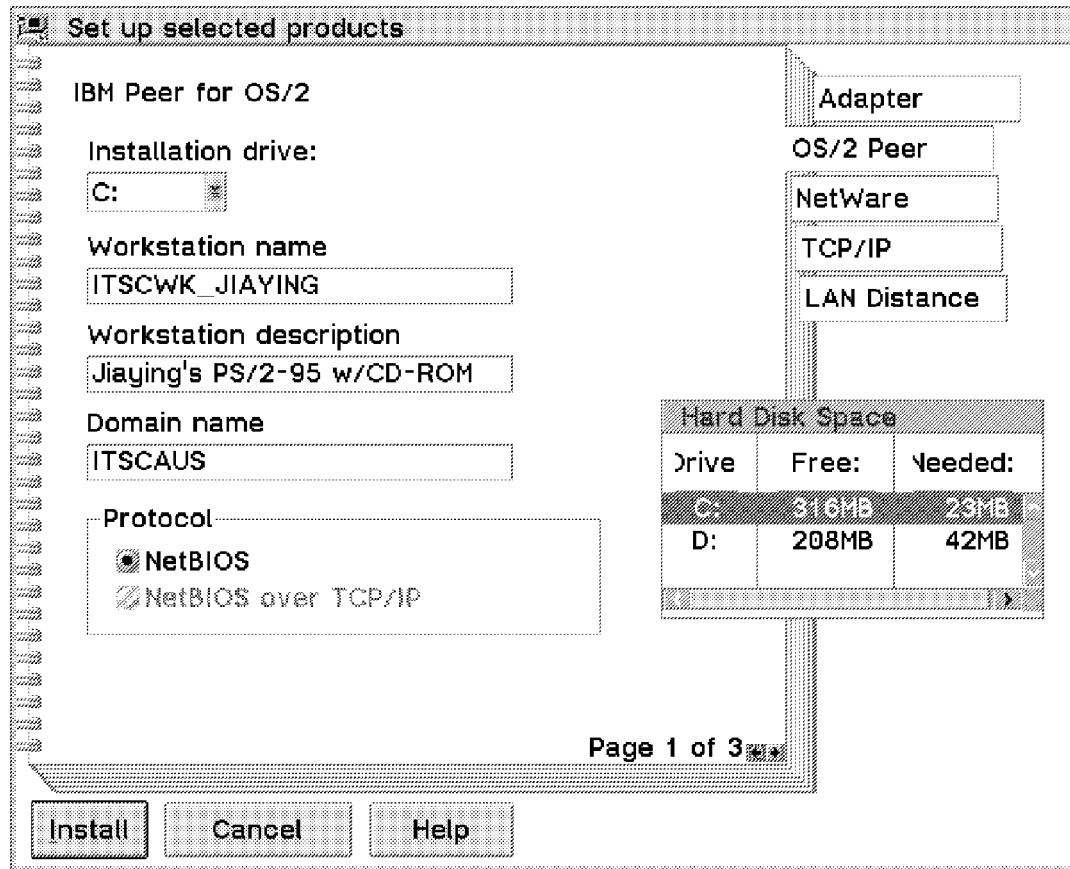


Figure 43. OS/2 Peer Page at the Set Up Selected Products Settings Notebook

5. If you have selected OS/2 LAN Requester at the Product Selection window, follow these instructions:
 - a. At the settings notebook for OS/2 LAN Requester configuration, specify the installation drive on which the OS/2 LAN Requester component is to be installed, type in the workstation's name (requester name), and domain name. In the example shown in Figure 44 on page 73, IBM LAN Distance was not selected so that NetBIOS over TCP/IP is a selectable protocol that can be used. If you selected NetBIOS over TCP/IP, the next two pages of OS/2 LAN Requester settings notebook (pages 2 and 3) are to be selected to configure it.

Note:

You do not need to install the TCP/IP component of OS/2 Warp Connect when you want to have NetBIOS over TCP/IP selectable here.

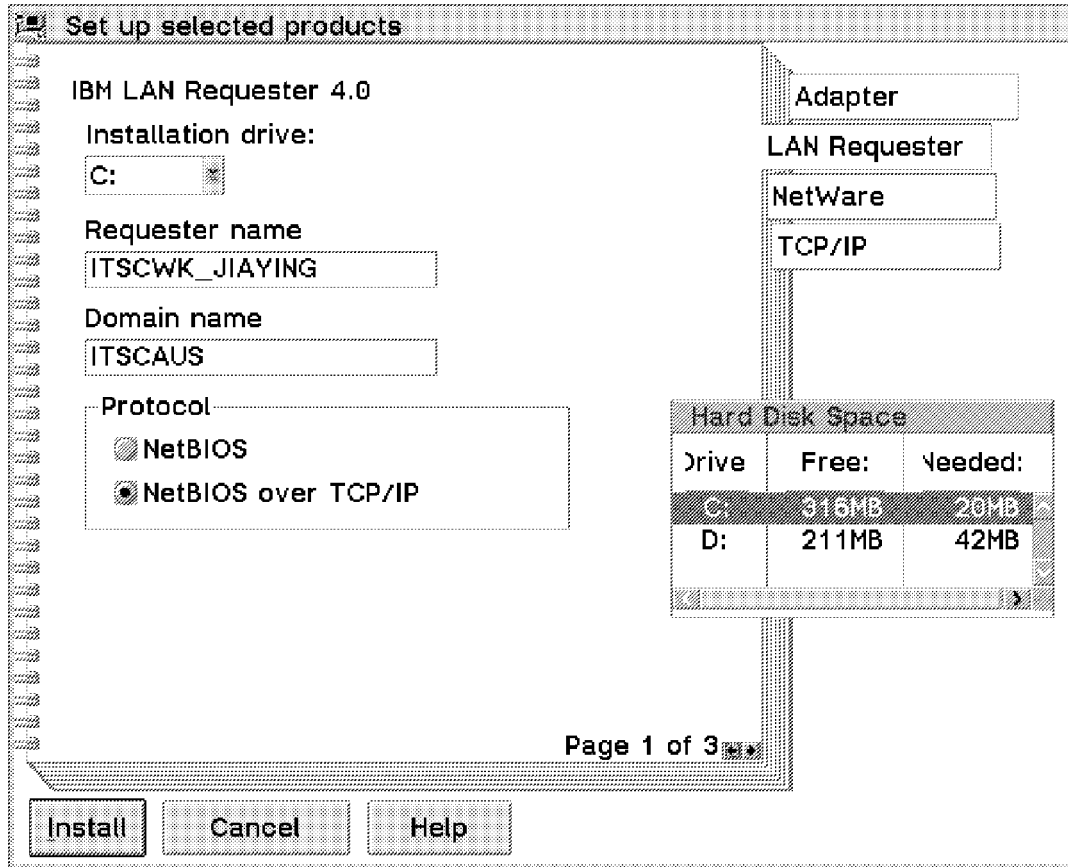


Figure 44. LAN Requester Page 1 of the Set Up Selected Products Settings Notebook

- b. If you have selected NetBIOS over TCP/IP, type in the host name and addresses on the second page as shown in Figure 45 on page 74. If you are not certain what to type in, ask your network administrator to get the correct names and addresses.

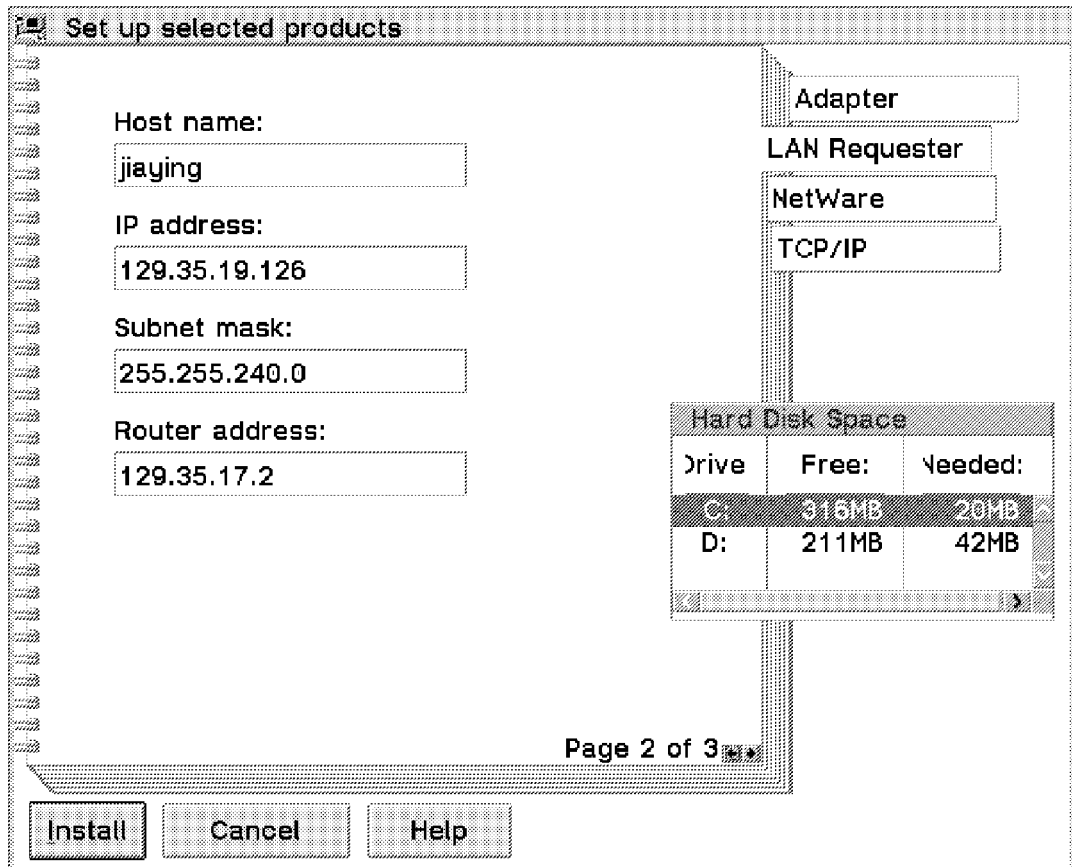


Figure 45. LAN Requester Page 2 of the Set Up Selected Products Settings Notebook

- c. Click on the right arrow of the page to get the third configuration page. Type the domain name and name server address (if required), and the NetBIOS name and address of your server as shown in Figure 46 on page 75. If you are not certain what to type in, ask your network administrator to get the correct names and addresses.

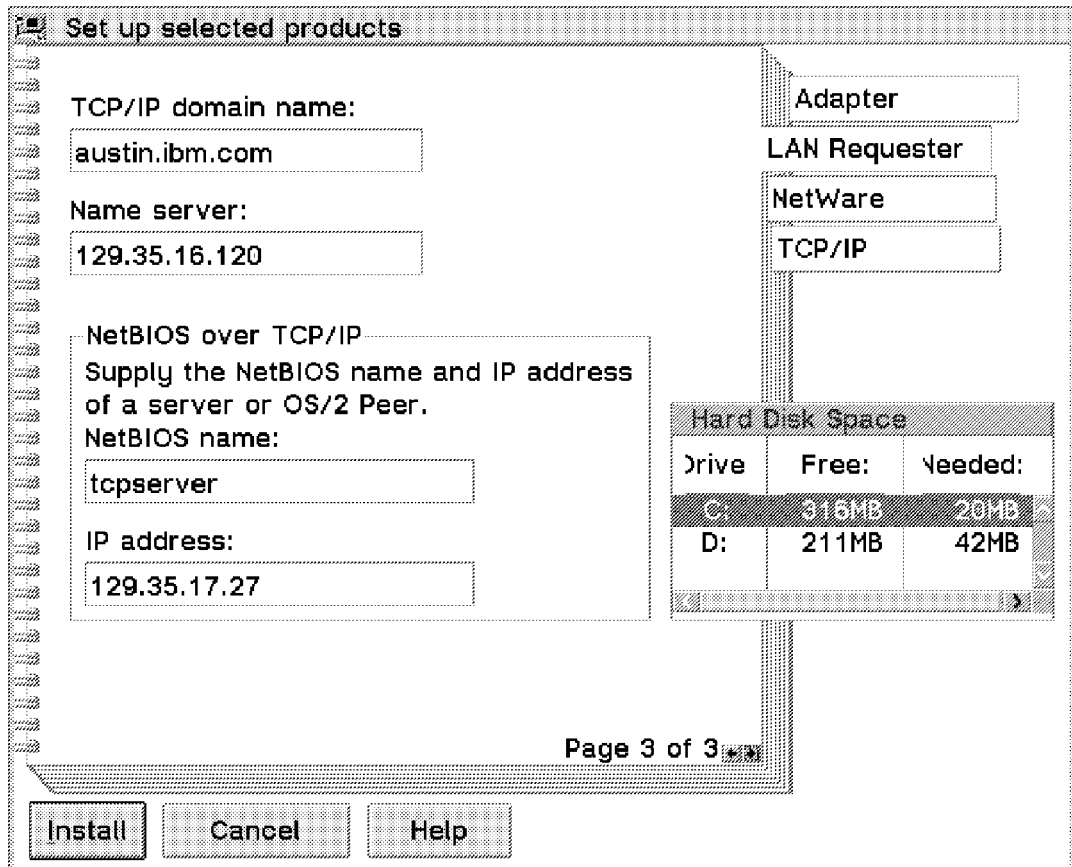


Figure 46. LAN Requester Page 3 of the Set Up Selected Products Settings Notebook

- The next page in the settings notebook is the configuration panel for NetWare Client for OS/2 Version 2.11. The only configuration to be done is to specify the installation drive, as shown in Figure 47 on page 76. The installation program copies all files for NetWare Client for OS/2 Version 2.11 to the hard disk, therefore, you do not need to be connected to the CD-ROM to make or change your NetWare Client for OS/2 Version 2.11 configuration at a later time.

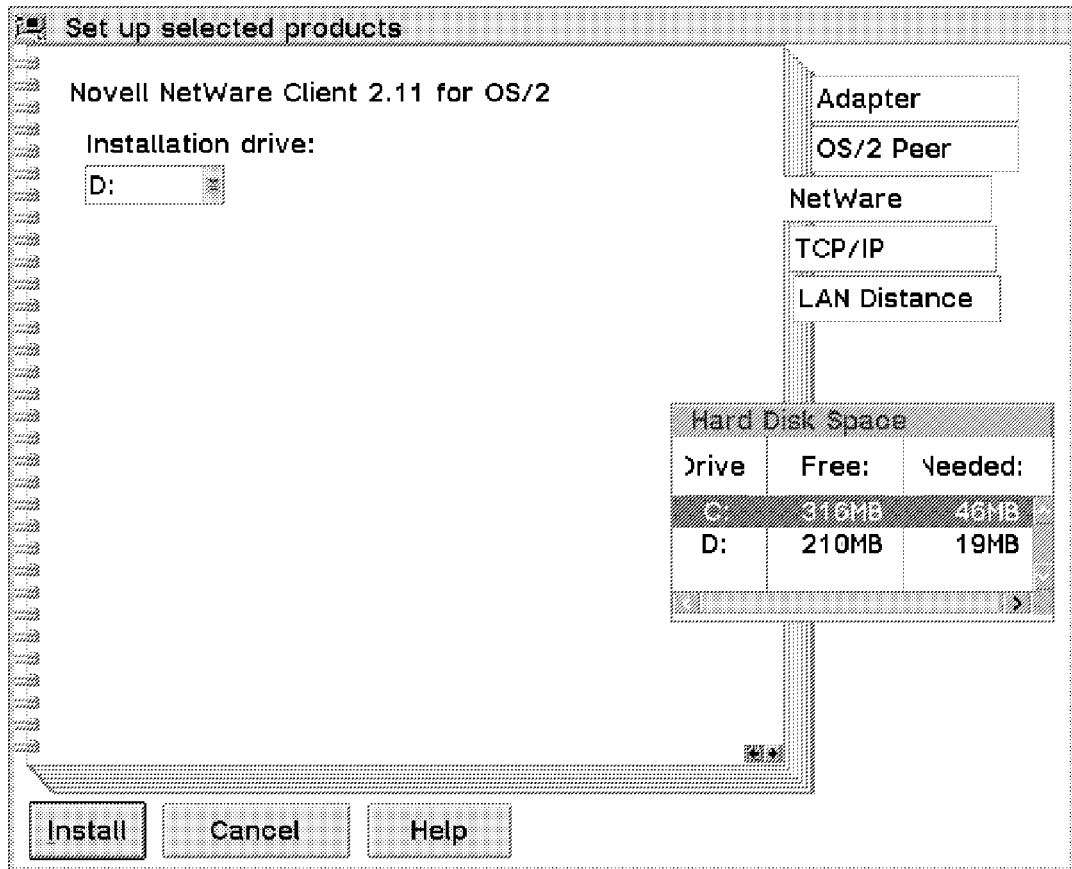


Figure 47. NetWare Client for OS/2 Version 2.11 Page of the Set Up Selected Products Settings Notebook

- The next page in the settings notebook is configuring IBM TCP/IP for OS/2 Version 3.0. Specify the installation drive and type in the host name and addresses as shown in Figure 48 on page 77. This information would normally be supplied to you by your network administrator.

Note: If you have configured NetBIOS over TCP/IP in previous panels, the information typed in at that time will be shown in these panels again and does not have to be changed.

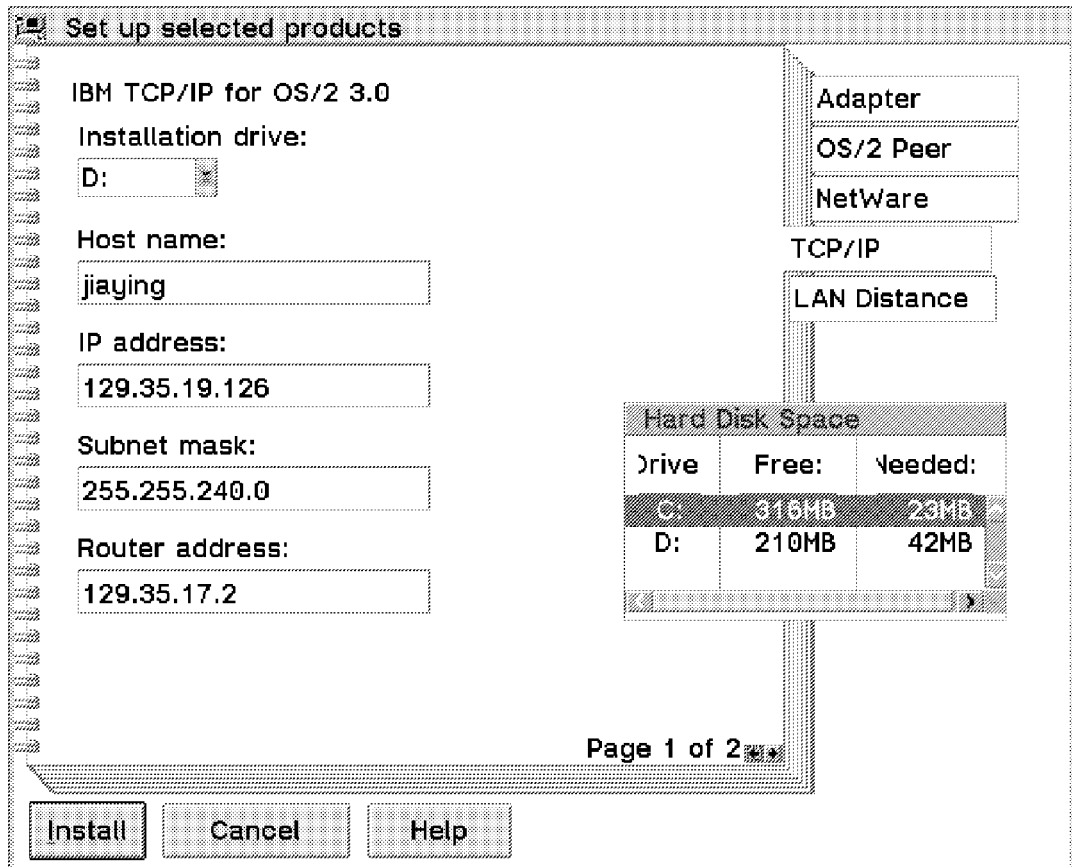


Figure 48. TCP/IP Page 1 of the Set Up Selected Products Settings Notebook

- On the next page, selected by pushing the right arrow on the first page, type the domain name and the name server address (if required) as shown in Figure 49 on page 78. This information would normally be supplied to you by your network administrator. As mentioned above, if you have configured NetBIOS over TCP/IP, all information at that time will be shown here again since there is no difference.

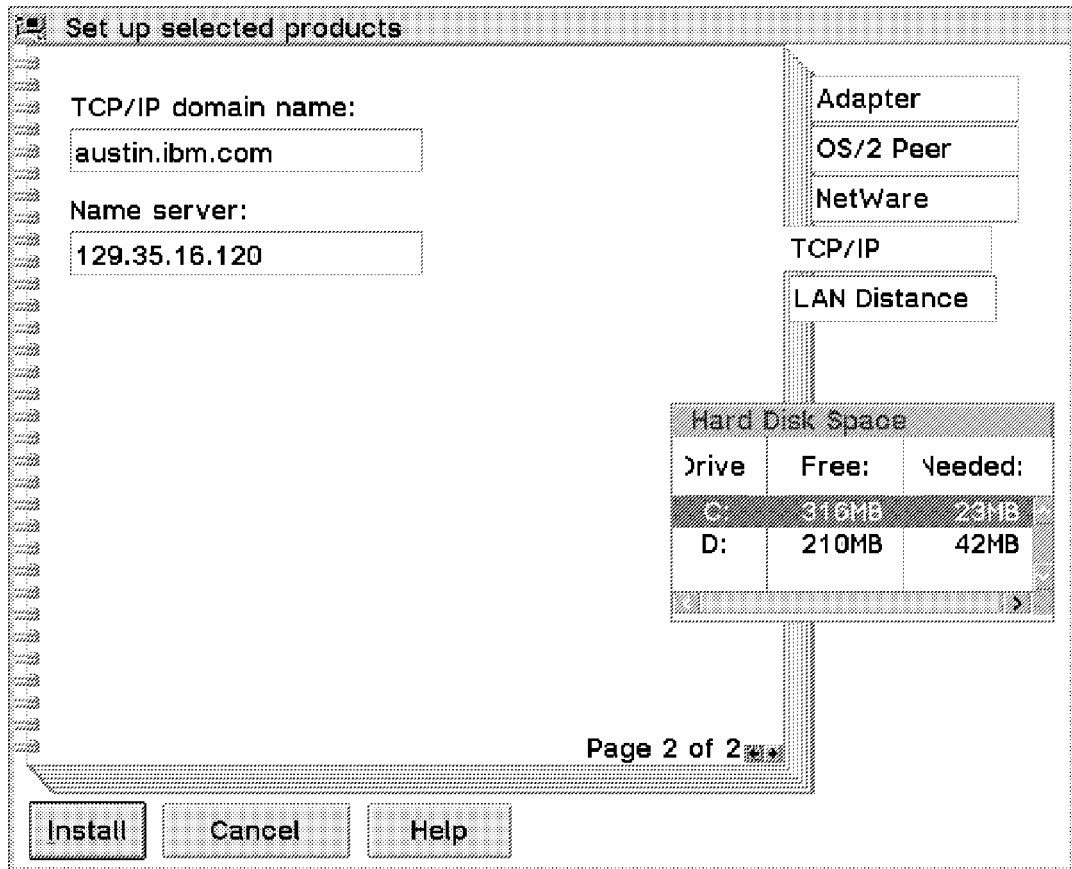


Figure 49. TCP/IP Page 2 of the Set Up Selected Products Settings Notebook

9. The last page in the settings notebook is configuring IBM LAN Distance. Specify the installation drive and enter the default telephone number to use for dialing in. Also select the correct radio button to specify the type of LAN (Token Ring or Ethernet) at the site you will connect to, the type of modem that the machine has, and the COM port to use for the modem. If your modem is on a port other than COM1 or COM2, select COM2, then reconfigure IBM LAN Distance after your installation is complete. See Figure 50 on page 79.

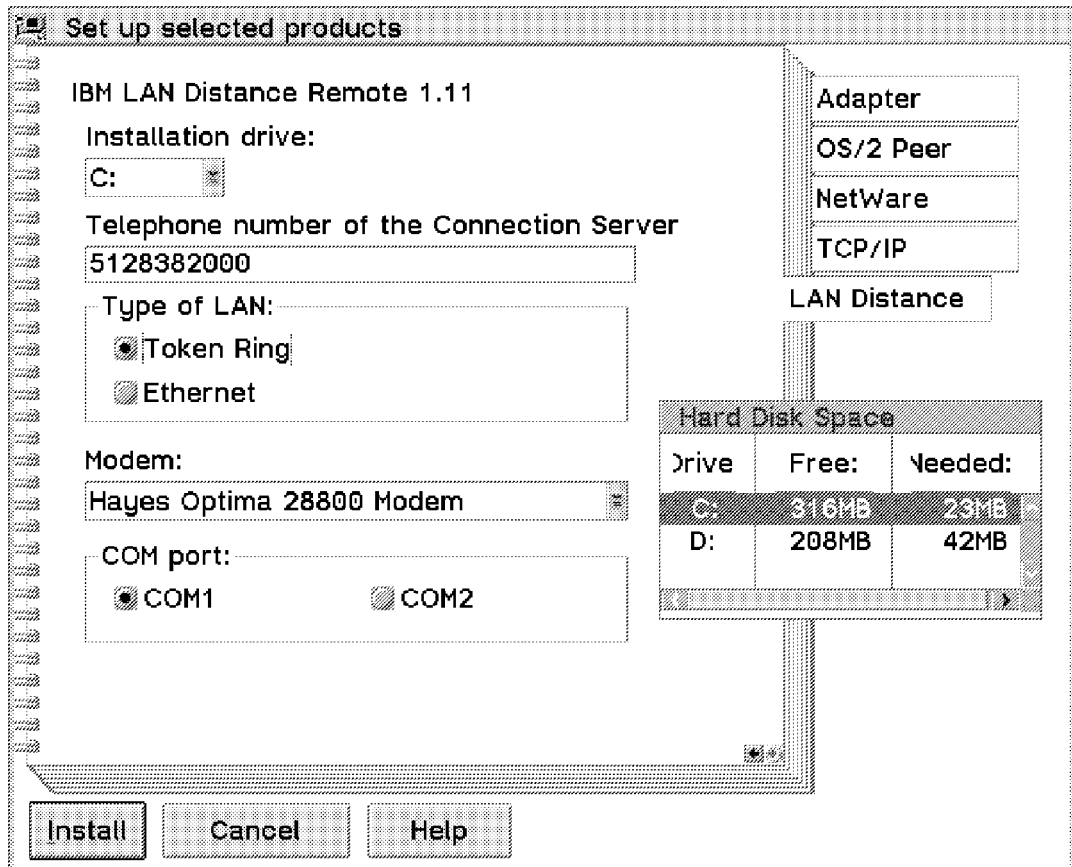


Figure 50. IBM LAN Distance Remote Version 1.11 Page of the Set Up Selected Products Settings Notebook

Notes:

- a. If you are going to use shared modems (shared by LAN Server or peer workstations), select the modem type that is attached to the workstation that is sharing the modem.
 - b. Select the COM port that the modem will be assigned to this workstation.
10. After completing all configuration panels of the Selected Products Settings Notebook, select **Install**.

If you have configured your system to install to a drive or drives that do not have sufficient free space available, the **Install** button will not be selectable.

If you have not typed in required configuration information, you will be returned to those panels that need additional configuring.

If you have successfully typed in all required configuration information, and if there is sufficient disk space available, you will get a confirmation panel as shown in Figure 51 on page 80. Select **Install** to start the installation process or **Cancel** to return to the Product Selection settings notebooks.

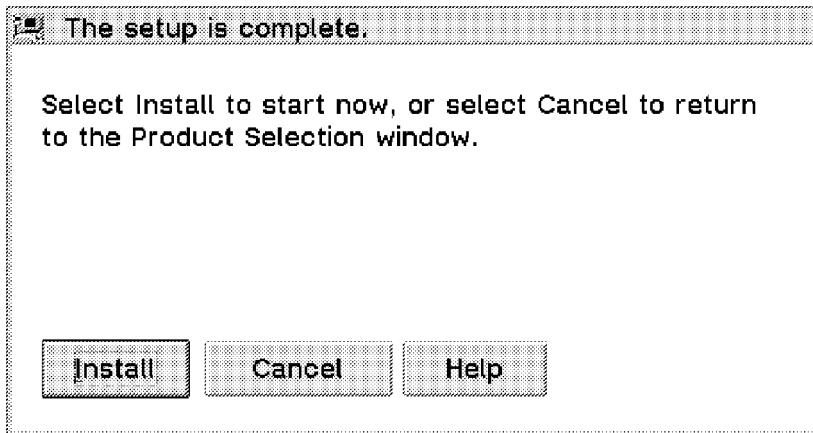


Figure 51. The Setup is Complete Window

The system being installed will perform automatic reboots during installation. When installation has ended, an Installation Completed window will be displayed.

Individual Product Installation

To install the networking products of OS/2 Warp Connect individually, you need the following:

- OS/2 Warp Connect CD-ROM
- Formatted High Density (2MB) diskettes if you are planning to create diskettes
- Machine with a supported CD-ROM drive attached (see “CD-ROM Drives Supported by OS/2 Warp Connect Installation Program” on page 454) and a supported LAN adapter (see “Supported Network Adapter Card Drivers” on page 439)

OS/2 Warp Connect Utilities

The Utilities program of OS/2 Warp Connect allows you to do Individual Product Installation. Functions available are as follows:

- Individual product installations
 - IBM LAN Distance Remote

- IBM LAN Requester
- IBM Multi-Protocol Transport Services
- Novell NetWare Client for OS/2
- IBM Network SignON Coordinator/2
- IBM Peer for OS/2
- IBM TCP/IP Version 3.0 for OS/2
- IBM AskPSP

Select the product you want to install, then click on the **Install** pushbutton.

- Creating product diskettes of all networking products OS/2 Warp Connect offers
- Viewing or printing online publications

Follow these steps if you want to do so:

- For LAN Requester and MPTS, select LANREQ at the Utilities window.
- For Peer, select PEER at the Utilities window.
- To view LAN Distance documentation, first install LAN Distance, then select the LAN Distance Remote Guide in the OS/2 Information folder. To view the document before installation, type at the OS/2 command prompt:

```
VIEW d:\CID\IMG\LDR\LDREM
```

(where d: is CD-ROM drive with OS/2 Warp Connect CD-ROM)

- All other product publications are available in their Desktop folders.

Installation Limitations

No remote installation is available using the Utilities window. If you do not have a CD-ROM drive or are not connected to a LAN to someone who has a CD-ROM drive, create product diskettes, and install from diskettes.

No configuration for component coexistence is performed. This must be done manually when using the Individual Product Installation.

Sequence of Installing Individual Networking Products

Use the following sequence for installing individual networking products. This will reduce the possibility of conflicts.

1. OS/2 Warp
2. IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester
3. NetWare Client for OS/2 Version 2.11
4. TCP/IP
5. LAN Distance Remote

Always install LAN Distance Remote last so it can create a shuttle function to allow operation of your workstation connected or not connected to the LAN.

Warning

If you have to reinstall any networking product after LAN Distance Remote, first remove LAN Distance Remote using the `LDREMOVE` command, located in the `\WAL` directory.

AskPSP

IBM AskPSP provides answers to problems and questions concerning OS/2 Warp, LAN Requester, LAN Distance, and the NetWare Client. It is a personal help desk to assist LAN administrators in discovering solutions to problems.

After installing AskPSP, an AskPSP folder exists on the Desktop that contains icons for products in OS/2 Warp Connect. When you select a product icon, a search tool called CasePoint runs and opens a database of common problems and questions relating to the product selected.

TCP/IP Installation

When installing from diskettes on a workstation without MPTS installed, you will be prompted for MPTS diskettes. If you do not have MPTS diskettes, you can select **Cancel** at the panel that asks you for MPTS diskettes and continue to install TCP/IP.

If you canceled the installation of MPTS, you will experience SYS1201 error at boot up time. This error will no longer be there once you installed MPTS.

After TCP/IP installation is complete, configure MPTS with the TCP/IP protocol and then configure the TCP/IP product. These steps can be completed from the MPTS and from the TCP/IP folders.

OS/2 LAN Requester Installation After IBM Peer for OS/2 Version 1.0 Installation

If you need to install OS/2 LAN Requester after IBM Peer for OS/2 Version 1.0 has been installed, you will need to remove IBM Peer for OS/2 Version 1.0 before installing the OS/2 LAN Requester.

NetWare Client for OS/2 Version 2.11

When installing NetWare Client for OS/2, you should have the following information available:

- ODI LAN driver name
- Network adapter address

Note: If MPTS is installed and configured for NetBIOS, the IBMCOM LANTRAN.LOG file will contain the adapter address.

You will also need to configure (or reconfigure) MPTS for NetWare Requester Support and add the network adapter address. See “NetWare Client for OS/2 Version 2.11” on page 387 for information on how to configure MPTS.

When the installation has completed, the Novell online publications are located in the Novell folder.

Installation

To start the Utilities window that allows you to install products without using the OS/2 Warp Connect Easy Installation or Advanced Installation, to view and print online publications, and to create product installation diskettes, follow these steps:

Type `d: PRODINST`, where `d:` is the CD-ROM drive letter.

The Utilities window will display as shown in Figure 52 on page 84. At this window, select the product and then either the **Install** or the **Diskettes** pushbutton.

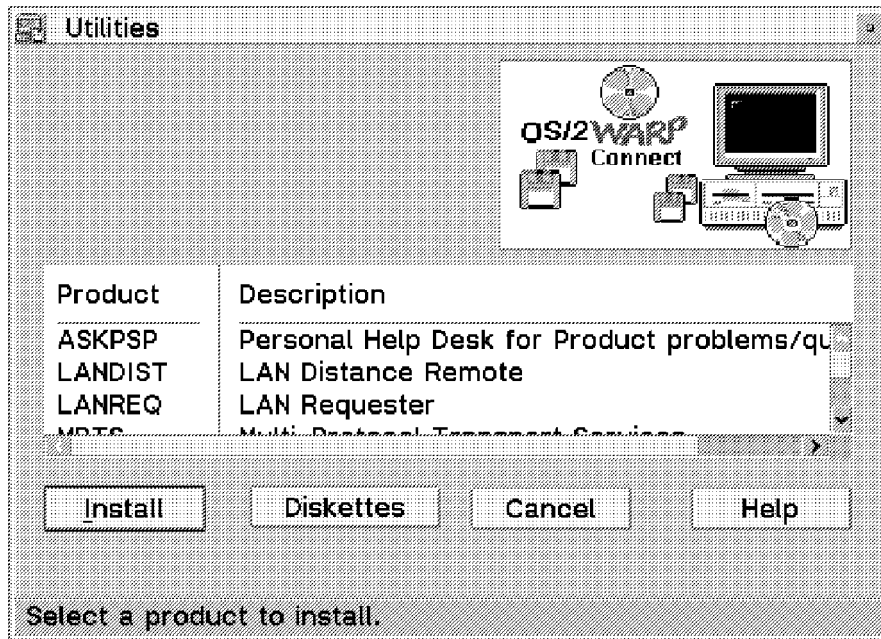


Figure 52. Installation Window

Creating Product Diskettes

To create product diskettes you need to have formatted high density diskettes (2MB).

1. For OS/2 LAN Requester, select **LANREQ** and then select **Diskettes**. Use eight formatted and empty diskettes (three for MPTS and five for LAN Requester). Follow the instructions on the screen. You can skip any diskettes you do not need to create.
2. For IBM Peer for OS/2 Version 1.0, select **PEER** and then select **Diskettes**. Use seven formatted and empty diskettes. Follow the instructions on the screen.
3. For MPTS, select **MPTS** and then select **Diskettes**. Use three formatted and empty diskettes. Follow the instructions on the screen.
4. For IBM LAN Distance Remote, select **LANDIST** and then select **Diskettes**. Use three formatted diskettes. Follow the instructions on the screen.
5. For IBM TCP/IP for OS/2, select **TCPIP** and then select **Diskettes**. Use eight formatted diskettes. Follow the instructions on the screen.

Note: When you install TCP/IP, you must have MPTS. If MPTS has not been installed on the workstation where TCP/IP will be installed, create the MPTS diskettes also.

6. For NetWare Client for OS/2 Version 2.11, select **NETWARE** and then select **Diskettes**. Use seven formatted diskettes. Follow the instructions on the screen.
7. For IBM Network SignON Coordinator/2, select **NSC/2** and then select **Diskettes**. Use one formatted diskette. Follow the instructions on the screen.
8. For AskPSP, you cannot create diskettes for AskPSP. It must be installed directly from the CD-ROM.
9. If you want to create OS/2 Warp product diskettes you need to do the following:
 - Change to the CD-ROM's drive
 - Open a windowed OS/2 command prompt
 - Type `MAKEDSKS` and press Enter

Where to Find Help

Online help is always available. You can get this help from:

- Online books
- OS/2 Warp tutorial
- Pressing the F1 key
- Clicking on a Help pushbutton
- Clicking on the Help choice in a pop-up menu
- Selecting Help from a menu bar
- Typing `Help topic` at the command prompt, where `topic` is what you need help in

There is a large amount of documentation included with the OS/2 Warp Connect package. We will show you where to find it and how to access it.

If you use the OS/2 Warp Connect Integrated Installation program to install the OS/2 Warp Connect components, the majority of the online books are also available in the **Information** folder on the OS/2 Desktop.

In this section we discuss where to find information about each component of OS/2 Warp Connect.

OS/2 Warp



Information

- The *User's Guide to OS/2 Warp* hard copy manual
- Online information, accessed from the Information folder on the Desktop:
 - *OS/2 Warp Tutorial*, an introduction to using OS/2 Warp (also included in the launchpad)
 - *Master Help Index*, an index to all information in OS/2 Warp Connect
 - *OS/2 Warp Glossary*, terms used in the OS/2 Warp product
 - *OS/2 Warp Command Reference*, syntax and examples for OS/2 commands
 - *OS/2 Warp Performance Considerations*, useful information about memory management, tuning applications for better performance and COM port configuration
 - *Printing in OS/2*, information on installing new printers or solving printing problems
 - *Multimedia*, information on using multimedia applications under OS/2
 - *REXX Information*, an introduction to the OS/2 Procedure Language REXX
 - *OS/2 Warp Application Considerations*, helpful hints about running common applications (including games) under OS/2
 - *Windows Programs in OS/2*, options and setup information for running Windows applications under OS/2
 - *Trademark Information*
 - *OS/2 Warp README*, latest information and tips about OS/2 Warp
- On the root directory of the CD-ROM additionally:
 - README.INS, hints and tips installing OS/2 Warp
 - ADVANCE.INS, hints and tips installing OS/2 Warp using the Advanced path
 - EASY.INS, hints and tips installing OS/2 Warp using the Easy path

IBM Peer for OS/2 Version 1.0



OS/2 Peer

- In the Books folder within the IBM Peer for OS/2 Version 1.0 folder you can find following information:
 - *Glossary*

- *Installation Guide*, help for setting up your IBM Peer for OS/2 Version 1.0
- *User's Guide*, help for using the IBM Peer for OS/2 Version 1.0 features
- *Commands and Utilities*, syntax for commands with examples
- *MPTS Configuration Guide*, syntax for commands with examples

OS/2 LAN Server 4.0 Requester



IBM LAN Services

- In the IBM LAN Services folder:
 - *IBM LAN Requester User's Guide*
 - *README.DOC*, latest information and tips about OS/2 LAN Server 4.0 Requester
 - *ERROR.TXT*, LAN Server 4.0 Error Messages Reference

IBM LAN Distance Remote Version 1.11



Information

- Online information, accessed from the Information folder:
 - *LAN Distance Remote Guide*, basic installation and configuration of IBM LAN Distance Remote Version 1.11
- Viewable INF files in the x: WAL directory (Double click on the objects from a directory view or type VIEW name in the x: WAL directory)
 - *README.INF*, updates to IBM LAN Distance since version 1.1
 - *OS2PING.INF*, information on using the OS2PING utility

IBM TCP/IP for OS/2 Version 3.0



TCP/IP

- Online information, accessed from the TCP/IP folder:
 - *Introduction to TCP/IP*
 - *REXX Sockets API*
 - *REXX FTP API*



Information

- In the TCP/IP Information folder:
 - *TCP/IP Command Reference*
 - *Guide to TCP/IP*



Read Me

- In the TCP/IP Read Me folder
 - *READ ME FIRST*



DOS/Windows TCP/IP Access

- In the DOS/Windows TCP/IP Access folder
 - *About DOS/Windows Access*



Information

- In the Ultimedia Mail/2 Lite Information folder:
 - *Frequently asked Questions*
 - *Users Guide*
 - *Tutorial*
 - *Read Me*

IBM Internet Connection for OS/2



IBM Internet Connection for OS/2

- Online information, accessed from the IBM Internet for OS/2 folder:
 - *READ ME FIRST*
 - *Introduction to the IBM Internet Connection*
- Application Templates folder:

- *How do I use Templates?*

Multi-Protocol Transport Services / AnyNet (MPTS)



MPTS

- Online information, in the OS/2 Peer Books folder:
 - *MPTS Configuration Guide*, information on configuring MPTS
- On the CD-ROM:
 - CID IMG IBMPEER IBM100N3 README.UTL, help for MPTS utilities (such as SRVIFS, LCU etc.)
 - CID IMG LSREQ IBM400N3 README.UTL (same as mentioned above)

NetWare Client for OS/2 Version 2.11



Novell

- In the Novell Folder:
 - *NetWare Client*
 - *Netware Utils*
- NETWORK NLS ENGLISH README.DOC

Additional Books

If you are interested in having all available documentation for OS/2 LAN Server 4.0, you can install it locally from CD-ROM by following these steps:

- Open a windowed OS/2 command prompt
- Change to the CD-ROM's drive
- Change to the subdirectory `BOOKINST`
- Type `BOOKINST` and press Enter

After the command has loaded the installation program you can select the books for OS/2 LAN Server 4.0.

The table shown in Table 3 on page 90 gives you an overview, which books are available from CD-ROM. INF files can be viewed by using the OS/2 command: `VIEW`

Table 3 (Page 1 of 2). Online Books delivered on CD-ROM

File Name	Path / Location on CD-ROM	Book Title
LANDOCS.INF	E: ASKPSP ASKPSP BOOKS	AskPSP Information for LAN Systems
OSWHDESK.INF	E: ASKPSP ASKPSP BOOKS	CasePoint Database for AskPSP
A3A41M02.INF	E: BOOKS	OS/2 LAN Server 4.0 Up and Running
A3A4AM02.INF	E: BOOKS	OS/2 LAN Server 4.0 Programming Guide and Reference
A3A4FM02.INF	E: BOOKS	OS/2 LAN Server 4.0 Problem Determination Guide
A3A4GM02.INF	E: BOOKS	OS/2 LAN Server 4.0 Performance Tuning
A3A4HM02.INF	E: BOOKS	DLS and Windows User's Guide
A3A4IM02.INF	E: BOOKS	OS/2 LAN Requester User's Guide
A3A53M02.INF	E: BOOKS	OS/2 LAN Server 4.0 Commands and Utilities
A3A61M02.INF	E: BOOKS	OS/2 LAN Server 4.0 Planning, Installation, and Configuration
A3A62M02.INF	E: BOOKS	OS/2 LAN Server 4.0 Network Administrator Tasks
A3A83M02.INF	E: BOOKS	OS/2 LAN Server 4.0 Easy Start
A3S12M02.INF	E: BOOKS	LAN CID Utility Guide
A3V10M02.INF	E: BOOKS	MPTS Configuration Guide
MPTSCFG.INF	E: CID IMG BOOKS	MPTS Configuration Guide
PEERCMD5.INF	E: CID IMG BOOKS	IBM Peer for OS/2 Commands and Utilities
PEERINST.INF	E: CID IMG BOOKS	IBM Peer for OS/2 Installation Guide
PEERUSER.INF	E: CID IMG BOOKS	IBM Peer for OS/2 User's Guide
NSCUG.INF	E: CID IMG LANTOOLS NSC	Network SignON Coordinator/2 User's Guide
LDREM.INF	E: CID IMG LDR	IBM LAN Distance Remote Guide
README.INF	E: CID IMG LDR LO265R1	IBM LAN Distance for OS/2 version 1.11 README
WR07045.INF	E: CID IMG LDR LO265R3	ServicePak WR07045 Information
A3A4IM02.INF	E: CID IMG LSREQ	OS/2 LAN Requester User's Guide
OS2BOOK.INF	E: CID IMG NWREQ NETWARE NLS ENGLISH	NetWare Client for OS/2 User's Guide
OS2UTIL.INF	E: CID IMG NWREQ NETWARE NLS ENGLISH	Selected NetWare Utilities Reference
README.INF	E: CID IMG TCPAPPS	Important Information about Internet Connection for OS/2 and TCP/IP for OS/2

<i>Table 3 (Page 2 of 2). Online Books delivered on CD-ROM</i>		
File Name	Path / Location on CD-ROM	Book Title
OS2BOOK.INF	E: NETWARE ENGLISH	NetWare Client for OS/2 User's Guide
OS2UTIL.INF	E: NETWARE ENGLISH	Selected NetWare Utilities Reference
NSCUG.INF	E: NSC	Network SignON Coordinator/2 User's Guide

Hints and Tips

If you experience problems such as

Drive improperly stopped

while starting a workstation with boot diskettes, you need to run the `CHKDSK` command to reset the so called dirty bit flag at the workstation's hard disk.

You need to do the following:

1. After the message `Drive improperly stopped` appeared on the screen press `Enter` to continue.
2. At the `Welcome to OS/2` screen, press `F3` to get an `OS/2` command prompt.
 - a. When you do a local installation, the drive's letter appears like this:
`[E: OS2IMAGE DISK_1]` (where `E:` is the CD-ROM's drive letter)
 - b. Change to the `DISK_2` subdirectory by issuing the following command:
`CD .. DISK_2`
 - c. When you do a remote installation, the drive's letter appears like this:
`[A:]`
 - d. Change to the remote drive `Z:` and change to the subdirectory
`OS2IMAGE DISK_2`.
3. Issue the `CHKDSK` command along with the `/F` parameter.
`CHKDSK d: /F`
 where `d:` is the hard disk drive to run `CHKDSK` on
4. When `CHKDSK` is done, type `EXIT` and press `Enter`. The `Welcome to OS/2` screen appears again and you can continue by pressing `Enter`.

Installation on Multiple Remote Workstations

For some installations, it may be preferable to use the OS/2 Warp Connect installation process. The OS/2 Warp Connect installation program ensures that required prerequisites are installed, checks disk space, and performs customization of the installation to ensure successful coexistence of all the component products.

The default Integrated Installation paths allow for installation on a single remote workstation at one time. This can be changed to allow multiple installations, however, the speed of access to the CD-ROM drive restricts the number of machines that can be installed at one time. To get around this limitation, you can copy the files required for installation to a hard disk and install from there.

Another option is to use a CID installation of the OS/2 Warp Connect components. All the component products are CID-enabled.

Multiple Installations from CD

The process of enabling the Integrated Installation on remote workstations to be able to install on multiple machines concurrently is relatively simple.

1. Before you start any Remote Installation program by clicking on following objects within the OS/2 Warp Connect Install/Remove folder (this folder resides in the OS/2 System folder):
 - Warp Connect Remote Install
 - Warp Connect Selective Install for Networking

Edit the file GRPWARE CLIENTS GRPWARE.INI

2. Make following changes to this file:

```
;SRVIFS INI file for GRPWARE - Q8ZERUPA
Name = Q8ZERUPA
GroupName = NO
Adapter = 0
MaxClients = 5
MaxFiles = 9999
ClientWorkers = 30
Path = E:\
Alias = ReadOnly,Single,CDROM,E:\
Alias = ReadWrite,Single,STATUS,D:\GRPWARE\CLIENTS\LADCLT
```

Note: Do not change the server name. But if you want to do so, you must create a new pair of remote boot diskettes. Alternatively edit the

CONFIG.SYS file of all Remote Installation OS/2 Diskettes 1 that you have made so far. You need to adjust the server's name.

3. Change the `MaxClients` parameter to the value that you require. In our example the value is 6.
4. Change the `ClientWorkers` parameter to maintain the 6 to 1 relationship. In our example the value is 5 times 6 = 30.

Warning

You are changing the number of NetBIOS sessions used and number of threads required for the remote installation server to start. *Do not increase the numbers dramatically.*

5. Now start a remote installation program as mentioned at the beginning of this section.
6. At the Local versus Remote window select the radio button for **On another workstation**. See "Remote Installation from CD-ROM" on page 51 and "Initiate Remote Installation" on page 55 for more details.

If you want to do multiple remote installations at once make sure you have enough diskettes of Remote Installation OS/2 Diskette 1. Use for example the `DISKCOPY` command to copy diskettes.

With the speed limitation of CD-ROM drives, it may be faster to not do more than two installations at one time from CD-ROM.

Installation from a Hard Disk

To install from a hard disk, you need to copy three directory trees and a file to your hard disk. This process requires 110MB of free disk space on a single drive. In this example `d:` is the hard disk drive letter, and `e:` is the CD-ROM drive letter.

1. Copy the entire `GRPWARE` tree.

```
MD d: GRPWARE
XCOPY e:\GRPWARE\*.* d:\GRPWARE /S
```

2. Copy the entire `CID` tree.

```
MD d: CID
XCOPY e:\CID\*.* d:\CID /S
```

3. Copy the entire `OS2IMAGE` tree.

```
MD d: OS2IMAGE
XCOPY e:\OS2IMAGE\*.* d:\OS2IMAGE /S
```

4. Copy installation files.

COPY e: *.* d:

Note: The directories must be created from the root directory of the hard disk drive and all files must be copied on the same drive.

5. Run the INSTALL program from d: (the hard drive)
6. Follow the normal installation process, or use the procedure in “Multiple Installations from CD” on page 92 to set up for multiple remote installations.

Adding OS/2 Warp Connect to Your CID Setup

You can copy the product images directly from the CID and OS2IMAGE directory trees on the CD-ROM. Help for creating response and command files is in the individual product documentation.

For more information on setting up and using CID see for example following redbooks:

- GG24-4428 *Inside OS/2 LAN Server 4.0*
- GG24-4295 *The CID Guide*
- GG24-3782 *CID Using NetView DM/2 and NetView DM*

Removing the OS/2 Warp Connect Installation Program from your Workstation



Warp Connect Remove Installation

If you need to remove the OS/2 Warp Connect installation program for some reason, you can find an object named *Warp Connect Remove Installation* within the OS/2 Warp Connect Install/Remove folder. This program will remove the OS/2 Warp Connect installation program and the associated files and directories from your workstation. It will not remove any installed networking products though.

Chapter 3. OS/2 Warp Connect IBM Peer for OS/2 Version 1.0

IBM Peer for OS/2 Version 1.0 is a local area network (LAN) program. It allows you and the people you work with to share hardware and software resources that are located on individual workstations.

The directories (and the applications and files contained in them) on your workstation and the printers and serial devices (such as a modem or a plotter) that are connected to your workstation are *your* resources.

Network resources are resources that are shared across the network. You can share the resources on your workstation with other users on the network just as they can share their resources with you.

After you have connected to a network resource, you use that resource the same way you use resources on your workstation.

OS/2 Peer can do more than just simple resource sharing. The main features and functions of the OS/2 Peer program are:

- Graphical user interface (GUI)
- User and group management
- Access control
- Network resources
- Network DDE and clipboard
- Network messaging
- API support
- Connectivity with other network programs

User Interface

OS/2 Peer has a graphical user interface (GUI) that runs on the OS/2 Desktop and contains icons, windows, pull-down menus, and notebook pages just like the OS/2 GUI. It extends the OS/2 Desktop into the LAN environment by adding network functions to your Desktop objects as well as its own Desktop object, the OS/2 Peer folder. OS/2 Peer enables you to perform most tasks from anywhere on your workstation.

You can also perform most OS/2 Peer tasks from the OS/2 command line. The command line interface runs in an OS/2 window or in the OS/2 full screen. If you prefer, you can use commands to complete tasks instead of

using the GUI. This allows you to create .CMD files to perform common tasks. The OS/2 Peer commands are explained in detail in *Commands and Utilities* (available from the Books icon in the OS/2 Peer folder).

Functions in Common with OS/2 LAN Requester

Because part of the function of the IBM Peer for OS/2 Version 1.0 is to provide requester support for OS/2 LAN Server, many of the functions that are part of the IBM Peer for OS/2 Version 1.0 perform the same as they do in OS/2 LAN Requester. Details for these functions are located in “Functions Common with IBM Peer for OS/2 Version 1.0” on page 159.

Functions that are common between the two are:

- Network Folder
- Network Messaging
- Network DDE and Clipboard
- Audit Log Utility
- Error Log Utility
- User Profile Management Services (view “User Profile Management Services (UPM Services)” on page 127 for information)

Network Folder

Using the network folder, you can perform the following tasks:

- Connecting to resources with current or logon assignments
- Creating Desktop objects from network resources
- Shadowing network objects
- Managing private applications
- Managing public applications
- Printing files
- Connecting to resources with the browser.
- Updating current assignments with drag and drop
- Displaying network objects
- Connecting to a resource by assigning a drive or port
- Disconnecting a current assignment
- Displaying objects assigned to drives
- Creating a shadow of a network resource on the Desktop
- Printing on the Desktop
- Copying or moving files and directories on the network

See “Network Folder” on page 225 for more information on the Network folder.

Network Messaging

The network messaging function allows you to send messages to, and receive messages from, other users on the network. You must be logged on to be able to send and receive messages using network messaging. The network messaging function uses the Messenger service to accomplish these tasks.

See “Network Messaging” on page 159 for detail on using Network Messaging.

Network DDE and Clipboard

The Clipboard is an area of memory that data can be copied into so that it can be shared with users on other workstations.

The Network clipboard also allows you to store data from the clipboard. These pieces of stored data are known as clippings.

See “Network DDE and Clipboard” on page 161 for detail on using Network DDE and Clipboard.

Audit Log Utility

When auditing is enabled on an OS/2 LAN Server server or IBM Peer for OS/2 Version 1.0 machine, a log is created which can be browsed using the Audit Log Utility. The audit log contains information about resource use and security.

See “Audit Log Utility” on page 162 for detail on using the Audit Log Utility.

Error Log Utility

OS/2 LAN Requester and IBM Peer for OS/2 Version 1.0 store every error message in a file called ERROR.DAT. This error log can be viewed and deleted from the Command Line Interface using the `NET ERROR` command. The Error Log Utility is a graphical interface that allows viewing, printing, and output to file.

See “Error Log Utility” for detail on using the Error Log Utility.

Logging On (General View)

The first time your workstation has restarted after IBM Peer for OS/2 Version 1.0 was installed, you are prompted to type in a user ID and password. The user ID typed in will be the peer admin user ID. If you skipped this part, the peer admin user ID is *USERID* along with the password *PASSWORD*.

Notes:

1. If you have a LAN Server environment it is a very good idea to use the same user ID and password for the peer admin ID.
2. Once you have created your own administrator user ID you may delete the standard user ID (you may want to do that for security reasons).

The program being issued from the STARTUP.CMD is CRTUIDP.EXE. The line that issues this program will be removed from the STARTUP.CMD file after you have finished the program.

There are a variety of different ways to log on depending on where the user ID/password verification will be performed. They are:

- **Local logon with local verification**
- Local logon with no verification
- **LAN logon with local verification**
- **LAN logon with domain verification**
- LAN logon with no verification
- Node logon

Note: The **bold** marked subjects are discussed in “Logging On” on page 99.

User Profile Management Services folder contains two icons, Logon and Logoff. The Logon icon will perform logons in the following order (OS/2 LAN Requester for example uses these icons):

1. LAN logon with domain verification
2. Local logon with local verification

However, if the peer option of OS/2 LAN Requester is enabled, the logon sequence is changed to:

1. LAN logon with local verification
2. Local logon with local verification

The OS/2 Peer folder contains icons to perform the following:

- LAN logon with local verification (peer workstation logon)
- LAN logon with domain verification (LAN Server logon; it is the blue colored object)

Logging On

We mainly differentiate three different kinds of logon at the peer workstation a user will be confronted with. That is:

- Doing a local logon to the workstation. This option is mainly used by DB2/2. The equivalent command issued is:

```
LOGON /L
```

The Logon window used is shown in Figure 53.

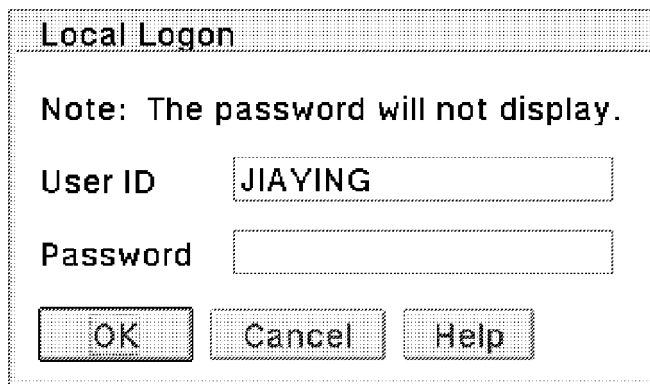


Figure 53. LAN Logon Window (Local Logon for DB2/2)

- Doing a local logon to the LAN. This option is used by OS/2 Peer. This is the necessary logon to administer peer services. The equivalent command issued is:

```
LOGON /V:LOCAL
```

The Logon window used is shown in Figure 54 on page 100.

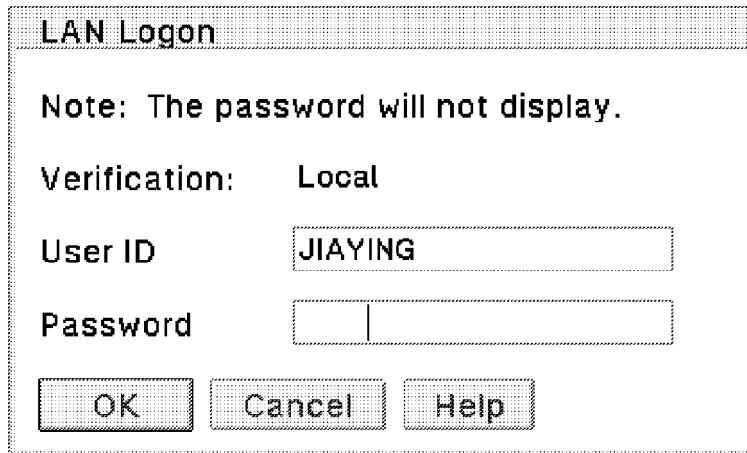


Figure 54. LAN Logon Window (Local Logon to the LAN for OS/2 Peer)

- Doing a logon to a LAN Server. This option is used by all LAN Server versions. You even can log on to LAN Manager and Windows NT Domains. The equivalent command issued is:

```
LOGON /V:DOMAIN
```

The Logon window used is shown in Figure 55.

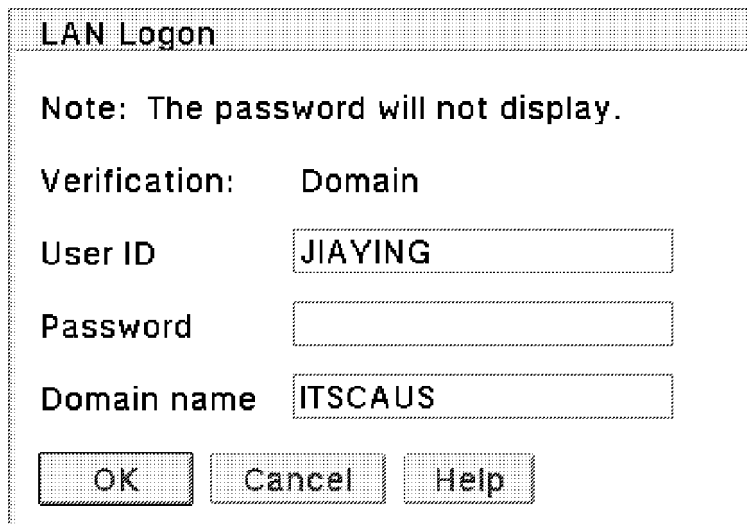


Figure 55. LAN Logon Window (Logon to LAN Server)

Domain Controller and Peer Resources

Make sure the user ID and password for LAN Server Logon matches with the user ID and password used for peer services. If this is not the case you will not be able to administer local resources as peer resources unless you log off from the domain and log on locally to the LAN.

Sharing Resources

Once you are locally logged on to the LAN or to the Domain Controller with your peer admin user ID and password, you can start preparing your workstation's resources to share.

With OS/2 Peer, you can share your resources with other users on your network. The first time you share a resource, OS/2 Peer creates a share profile. A share profile contains all information about a shared resource. Share profiles are displayed in the Sharing and Connecting notebook as share icons.

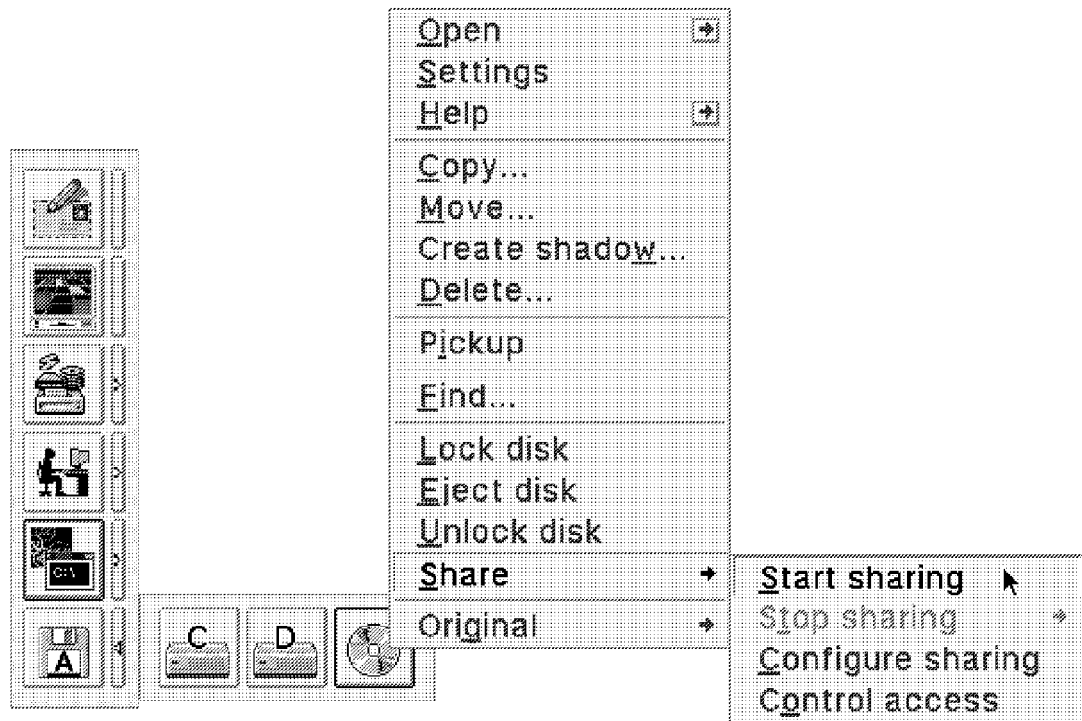


Figure 56. Start Sharing from an Object's Pop-up Menu

There are several different interfaces you can use to start sharing a resource. You can choose the method that best suits the way you like to work. For example, you can start sharing a resource in any of the following ways:

1. By using the **Share** menu item of the object's pop-up menu
 - a. Using mouse button 2, click on an object of the resource you want to share.
 - b. Click on the **Share** arrow to view additional choices.
 - c. Then click on **Start sharing** or **Configure sharing**, as shown in Figure 56 on page 101.
2. By using the **Settings** menu item of the object's pop-up menu
 - a. Using mouse button 2, click on an object of the resource you want to share.
 - b. Click on the **Settings** menu choice.
 - c. Select the **Shares** page as shown in Figure 57 on page 103.

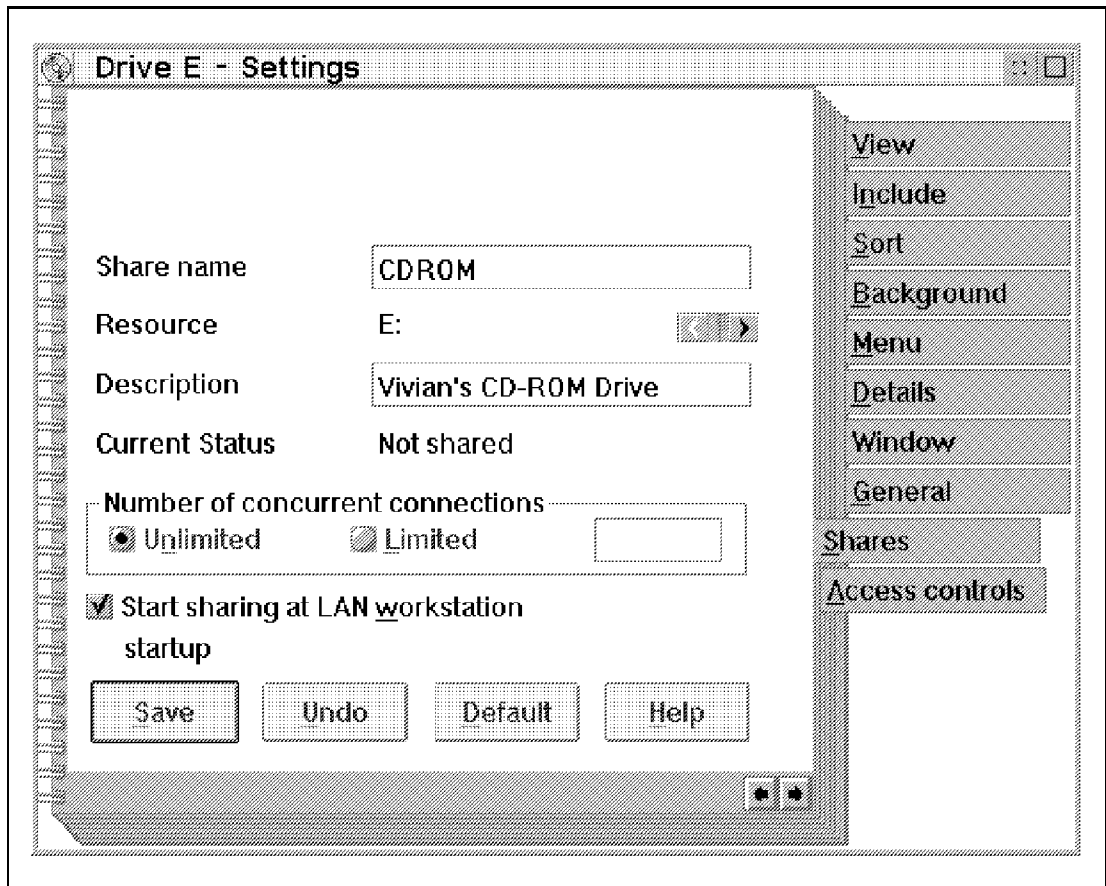


Figure 57. Start Sharing from a Object's Settings Notebook

3. By using the drag-and-drop technique
 - a. From the OS/2 Peer folder start the **Sharing and Connecting** program.
 - b. Select the **Shares** page from the Sharing and Connecting settings notebook.
 - c. Drag and drop a printer or directory resource object into the share page of the Sharing and Connecting settings notebook.
4. By copying existing share objects
 - a. From the OS/2 Peer folder start the **Sharing and Connecting** program.
 - b. Select the **Shares** page from the Sharing and Connecting settings notebook.
 - c. Using mouse button 2, click on the object of the resource you want to copy.
 - d. Click on the **Copy...** menu choice as shown in Figure 58 on page 104.

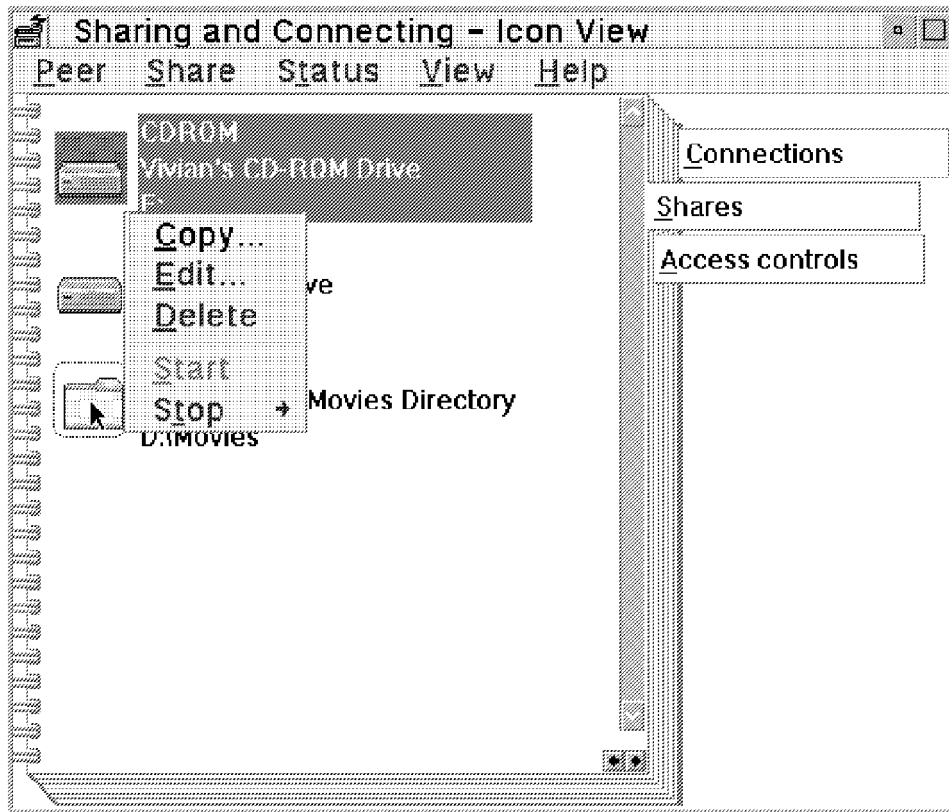


Figure 58. Copying an Existing Share Object

Copying resources means that all access permissions from the existing resource can be copied to the new resource you want to specify.

5. From the pull-down menu of **Share**
 - a. From the OS/2 Peer folder start the **Sharing and Connecting** program.
 - b. Select the **Shares** page from the Sharing and Connecting settings notebook.
 - c. From the action bar, click on the **Share** pull-down menu, as described in “Sharing from the Sharing and Connecting Notebook” on page 106.
6. By using commands
 - a. Use the `NET SHARE` command issued from an OS/2 command line. For example, use the following syntax to share a files resource (a directory):

```

--NET SHARE netname=resource- - - - -
                                -/US:n-   -/R:text-
                                -/UN---

```

Parameter	Description
<i>netname=resource</i>	Specifies the network name of the shared resource.
/US (ERS) : <i>n</i>	Sets the maximum number of users that can use a shared resource at the same time. For a peer workstation, <i>n</i> must be 2 or less.
/UN (LIMITED)	Removes restrictions on the number of users that can use a shared resource at the same time. This parameter is not valid for a peer workstation.
/R (EMARK) : <i>text</i>	Specifies the comment text about the shared resource. The comment must be enclosed in double quotation marks (") and must not exceed 48 bytes.

Example: At Vivian's machine, you want to share the CD-ROM drive, which is her local E: drive.

```
NET SHARE CDROM=E:
```

If the netname includes spaces, type the net name in quotes as shown in the following example:

```
NET SHARE "E DRIVE"=D:
```

See the *Commands and Utilities* online book for more details about the NET SHARE command.

The method using commands does not provide an option to start sharing at startup, unless you include the NET SHARE commands in your STARTUP.CMD file. Shares defined by commands can not be remembered by the Sharing and Connection program.

Not all of these methods are documented in the *IBM Peer for OS/2 Version 1.0 User's Guide*; however, you can get help for these methods by using the online help (F1) provided with OS/2 and OS/2 Peer. Choose the method that works best for you. You can use different methods for different circumstances.

Sharing from the Sharing and Connecting Notebook

Use the following steps to start sharing from the Sharing and Connecting notebook.

1. From the OS/2 Peer folder start the **Sharing and Connecting** program.
2. Select the **Shares** page from the Sharing and Connecting settings notebook.
3. From the action bar, click on the **Share** pull-down menu, as shown in Figure 59.

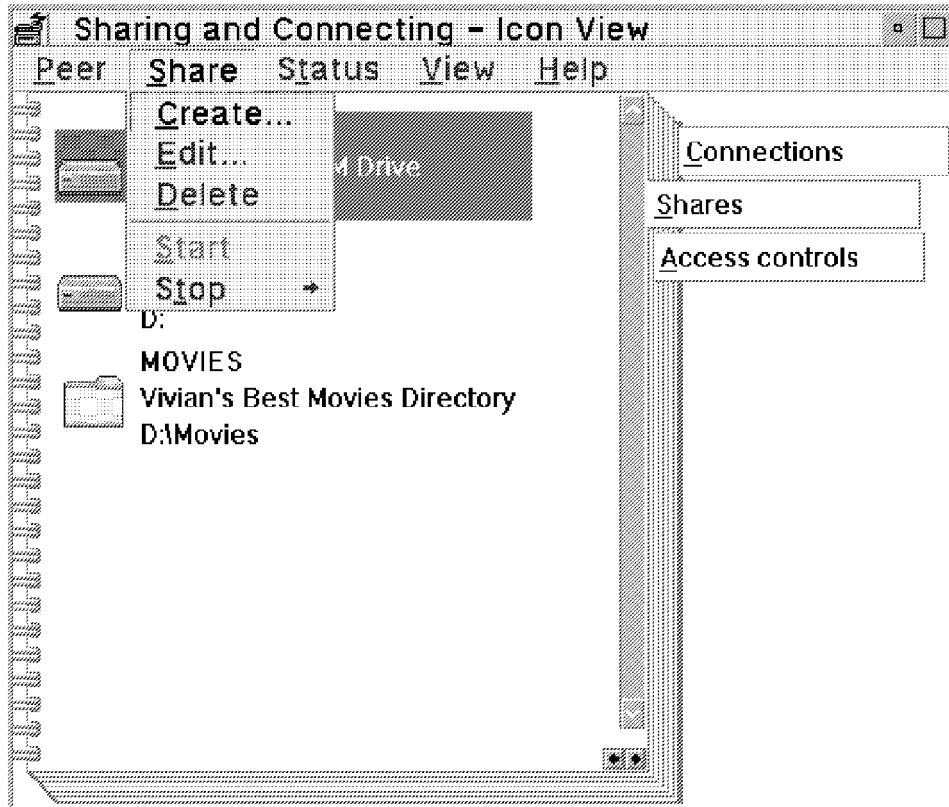


Figure 59. Sharing from the Connecting and Sharing Window

4. Click on the **Create...** menu choice. The Select Resource window is displayed.
5. Select the type of resource that you want to share.
6. Specify the resource that you want to share by doing one of the following.
 - If you want to share an entire drive (especially one with removable media, such as a CD-ROM), select the drive letter, such as E: as shown in the example in Figure 60 on page 107.



Figure 60. Sharing a Drive at the Select a Resource for Sharing Window

- If you want to share a directory, provide the path to the directory. Select **Find** if you do not know the directory path. See Figure 61 on page 108.



Figure 61. Sharing a Directory at the Select a Resource for Sharing Window

- If you are sharing an application, share the directory that contains the application and the files it needs to run. If all the application files are not already in one directory, you should put them in the same directory to simplify sharing the application and to reduce the possibility of receiving errors while running the application. If some of the files must reside in subdirectories, it is especially important to grant the other users access to these subdirectories. For more information, see "Access Control" on page 111.
- If you are sharing a printer or a serial device, select the name of the resource from the pull-down list that is provided when you select on the arrow to the right of the Printer or Serial device entry fields. You can select more than one serial device.



Figure 62. Sharing a Serial Device at the Select a Resource for Sharing Window

7. Select **OK** to continue. The Configure Sharing window is displayed, as shown in Figure 63.

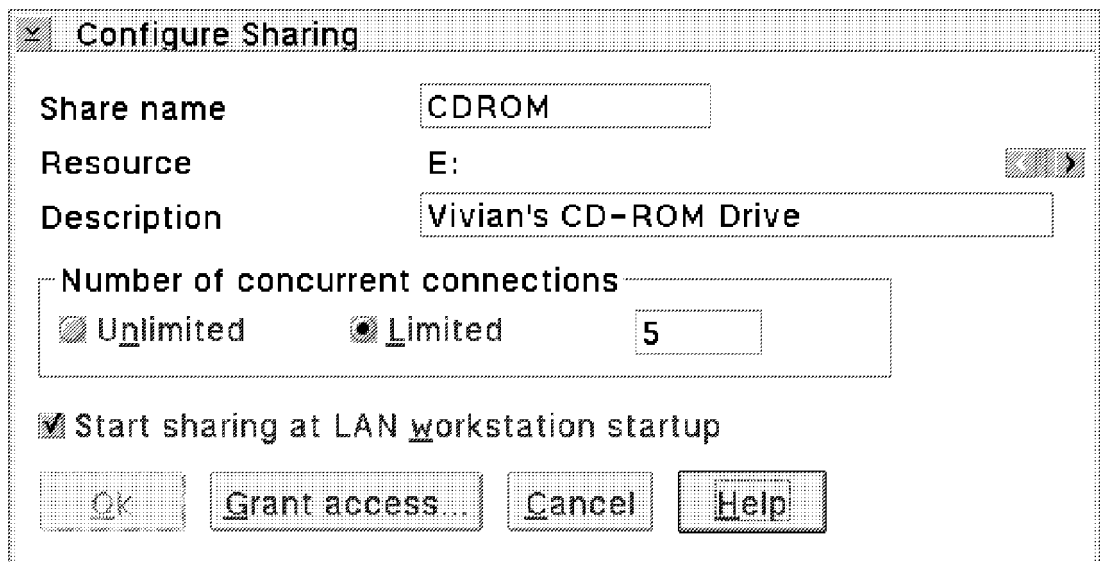


Figure 63. Configure Sharing Window

8. Type the following information in the proper fields, as shown in Figure 63.

Share name Specify the share name of the resource. The name you specify here is also the share profile name. Users specify this name to connect to the resource. OS/2 Peer provides a share name, but you can change it if you want. (Share names for printers cannot be changed.)

Resource Specifies the name of the resource. This field can include the path to the resource. OS/2 Peer supplies the information in this field; you cannot change it.

Description Specify your description of the resource. This field is optional.

Number of concurrent connections

Specify whether you want to limit the number of users who can access this resource at one time. You can select one of the following:

Unlimited Select this to specify that there is no limit to the number of users who can access the resource at one time.

Limited Select this to specify a limit to the number of users who can access the resource at one time. Type the number of users in the field. You can set the limit from 1 user to 65535 users.

9. If you want the resource to be shared automatically when you start your workstation, select **Start sharing** at LAN workstation startup.
10. After you have typed in all necessary information, select **Grant access**. The Grant Access window is displayed, and you can set access to the resource immediately.

Notes:

- a. You must grant access to the resource before other users can connect to it. If you are unsure of which type of access to use, refer to "Access Control" on page 111.
- b. If you want to grant basic access to the resource, go to step 2 in "Granting Basic Access to a Resource" on page 111.
- c. If you want to grant customized access to the resource, go to step 2 in "Granting Customized Access to a Resource" on page 114.

11. After you grant access (using the steps in either “Granting Basic Access to a Resource” on page 111 or “Granting Customized Access to a Resource” on page 114), select **OK**. The share profile is created and displayed as a object on the Shares page in the Sharing and Connecting notebook. Also, an access profile is created and displayed as an object on the Access control page in the Sharing and Connecting notebook. If you chose to apply the access profile for a directory, access profiles would also be created for any subdirectories.

Access Control

When you grant access to your resources, you choose either basic or customized access for each resource. You might want to control access to shared resources for security reasons. If you decide to grant basic access to your resources, then all users, groups of users, and guests (users who are not defined on your peer workstation) have the same access to your resources. If you decide to customize access to your resources, you can specify the type of access for each resource for each user, each group of users, and all guests.

When you grant access to a resource, you create an access control profile. An access control profile specifies which users have access to a shared resource on the peer workstation and specifies what type of access these users have. An access object is the icon on the Access Controls page of the Sharing and Connecting notebook that represents each access control profile. OS/2 Peer allows you to create an access object and control access to the resource from several different places.

Note

By default, OS/2 Peer provides access for users and guests to printers and serial ports. It provides no access to drives and directories.

Granting Basic Access to a Resource

If you want to grant all users, groups, and guests the same type of access, follow these steps. If you want to grant different levels of access to different users, groups, and to guests, go to “Granting Customized Access to a Resource” on page 114 and follow those steps.

1. Perform one of the following actions:
 - a. If you selected **Grant Access** from the Configure Sharing window, go to step 2.
 - b. To create or modify access through the Desktop:

- Select the icon of the resource with mouse button 2 to display its pop-up menu.
 - Select the arrow to the right of Share, and then select **Control access**.
- c. To create access through OS/2 Peer when the resource is not shared:
- Open the Sharing and Connecting notebook to the Access controls page.
 - Select **Access** from the menu bar of the Sharing and Connecting notebook and select **Create**.
 - Complete the Select Resource window as described in step 6 in “Sharing from the Sharing and Connecting Notebook” on page 106.
- d. To modify access through OS/2 Peer:
- Open the Sharing and Connecting notebook to the Access controls page.
 - Select the access icon for the resource you want modify.
 - Select **Access** from the menu bar.
 - Select **Access permissions** on the Access page of the resource's settings notebook.

You can also use the `NET ACCESS` command to control access to resources. For more information, refer to *Commands and Utilities*.

2. The Grant Access window is displayed. Select **Basic - one access for all users**. After you select this option, the Grant Access window for basic access looks like Figure 64 on page 113.

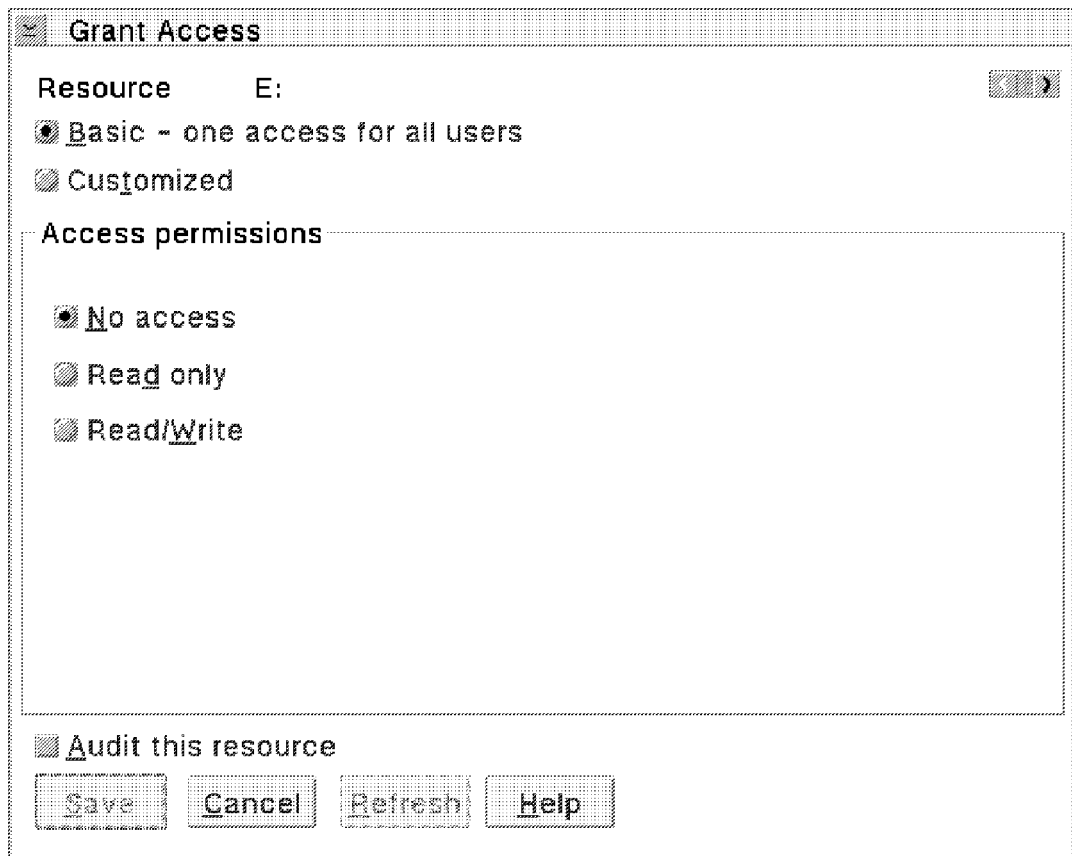


Figure 64. Grant Access Window (Basic)

3. Select the access permission that you want to give to users, groups, and guests. If you want to know more about the types of access, either refer to the *Basic Access* section of the *OS/2 Peer User's Guide* or access the online Help by selecting Help (or pressing F1).
4. If you want to enable auditing for this resource, select **Audit this resource**. When you choose to audit a resource, any future use of the resource via the network is recorded in the audit log. The audit log can be viewed and managed from the Audit Log utility, which is located in the OS/2 Peer folder. For more information about auditing, refer to *Accessing Audit Logs* in the *IBM Peer for OS/2 Version 1.0 Users Guide*.
5. Select **Save** to save and activate the specified access. If this resource is a directory that has subdirectories, a message is displayed asking if you want to apply the access control profile to the subdirectories.
6. If you are prompted to apply access, select **Yes** if you want to apply the access to all subdirectories. Typically, you should select **Yes**.

7. If you are granting access to a resource that you are sharing for the first time, the Configure Sharing window is displayed. Select **OK** to create the share profile and start sharing the resource.

Granting Customized Access to a Resource

If you want to grant different levels of access to different users, groups, or guests, follow these steps. If you want to grant all users, groups, and guests the same type of access, go to “Granting Basic Access to a Resource” on page 111 and follow those steps.

To grant access to a resource:

1. Perform one of the following actions:
 - a. If you selected **Grant Access** from the Create a Share window, go to step 2.
 - b. To create or modify access through the Desktop.
 - Select the icon for a resource with mouse button 2 to display the pop-up menu for the resource.
 - Select the arrow to the right of Share, and select **Control access** from the Share menu.
 - c. To specify access through OS/2 Peer when the resource is not shared:
 - Open the Sharing and Connecting notebook to the Access Controls page.
 - Select **Access** from the menu bar of the Sharing and Connecting notebook and select **Create**.
 - Complete the Select Resource window as described in step 6 in “Sharing from the Sharing and Connecting Notebook” on page 106.
 - d. To modify access through OS/2 Peer:
 - Open the Sharing and Connecting notebook to the Access controls page.
 - Select the access icon for the resource you want to modify.
 - Select **Access** from the menu bar and select **Open**.
 - Select **Access Permissions** on the Access page of the resource settings notebook.

You can also use the `NET ACCESS` command to control access to resources. For more information, refer to *Commands and Utilities*.

2. The Grant Access window is displayed. Select **Customized**. The Grant Access window for customized access looks like this:

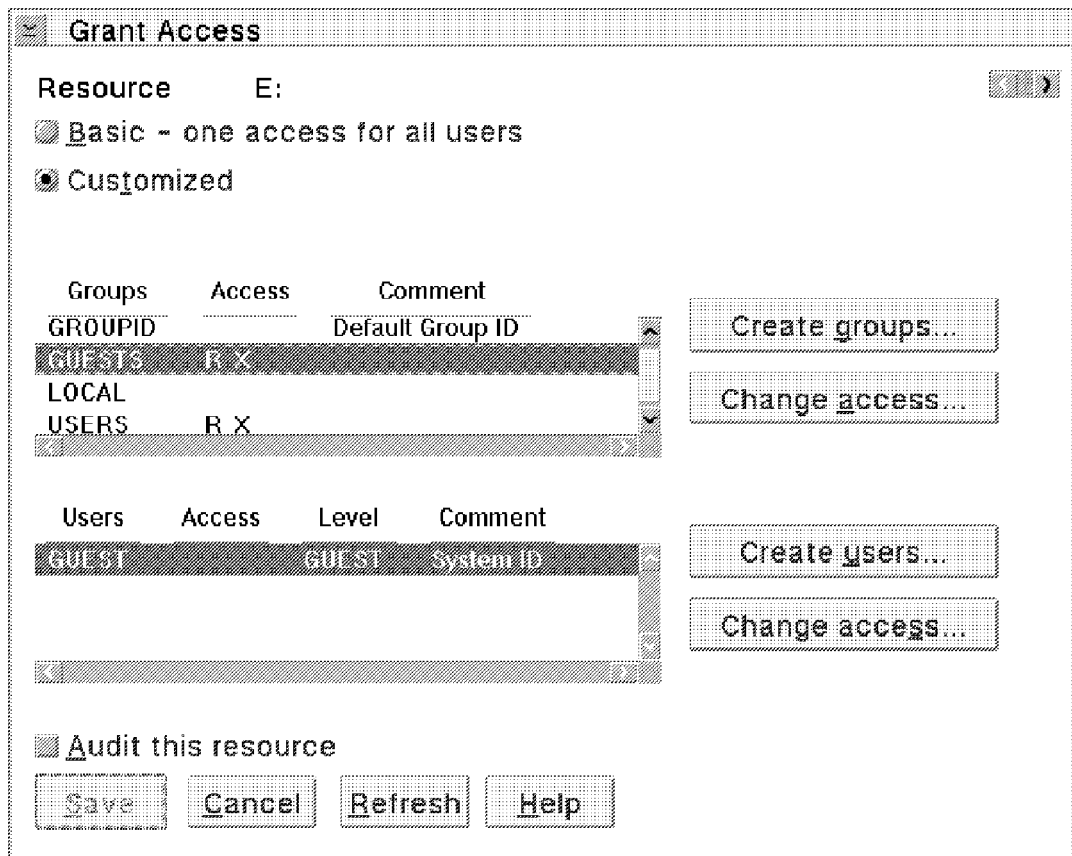


Figure 65. Grant Access Window (Customized Access)

All the users and groups that are defined at this peer workstation are listed with the current access permissions for the resource. Users and groups can be granted more than one type of access permission. If you want to know more about the access permissions, either refer to the *Customized Access* section in the *OS/2 Peer Users Guide* or access the online Help by selecting **Help** (or pressing F1).

3. Select the user or group for which you want to customize access.
 - If you want to change or add users or groups on this workstation, select **Create users** or **Create groups**. The User Profile Management-User Profile Window is displayed. See “Adding Users” on page 134.
 - If you want to change the access permissions a user or group has to the resource, highlight the user or group, and select **Change access** to the right of the appropriate list. The Change Access Permissions window is displayed. Highlight the user or group. Go to step 4 to change the access permissions for the selected user or group.

- If you do not want to change the current access permissions for any of the users or groups, go to step 8.
4. If you selected **Change access**, the Change Access Permissions window is displayed. This window shows the current access permissions granted to the selected user or group for this resource. In the following example, Read and Execute permission for drive E: are granted to the USERS group.

Note: By default, all user IDs that are created automatically belong to the USERS group.

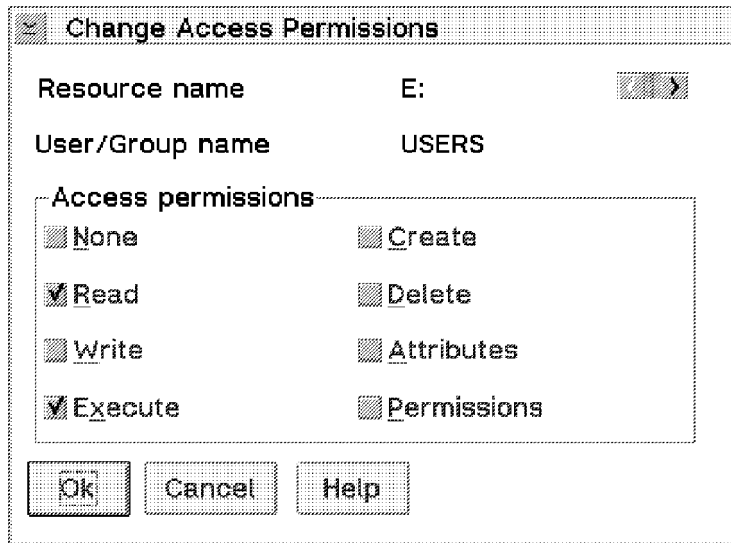


Figure 66. Change Access Permissions window

5. Select the appropriate check boxes to give the user or group the desired access permissions for the resource. You can select more than one access permission (unless you select the **None** permission). If you want to know more about the access permissions, either refer to *Customized Access* or access the online Help by selecting **Help** (or pressing F1).
6. Select **OK** after you have selected the desired access permissions. The Grant Access window is displayed, showing the access permissions you granted.
7. If you want to enable auditing for this resource, select **Audit this resource**. When you choose to audit a resource, any future use of the resource via the network is recorded in the audit log. The audit log can be viewed and managed from the Audit Log utility, which is located in the OS/2 Peer folder. For more information about auditing, refer to the *Accessing Audit Logs* section of the *OS/2 Peer User's Guide*.

8. Select **Save** to save and activate the specified access.
If this resource is a directory that has subdirectories, a message is displayed asking if you want to apply the access control profile to the subdirectories. See the *Applying Access to Subdirectories* section of the *OS/2 Peer User's Guide*.
9. If you are prompted to apply access, select **Yes** if you want to apply the access to all subdirectories. Typically, you should select **Yes**.
10. If you are granting access to a resource that you are sharing for the first time, the Configure Sharing window is displayed. Select **OK** to create the share profile and start sharing the resource.

Stopping the Sharing of Resources

You can use the same interfaces you used to start sharing a resource to stop sharing it. Again, choose the method that best suits the way you like to work. For example, you can stop sharing a resource in any of the following ways:

- Select **Share** from the pop-up menu of a resource, and then select **Stop sharing** from the Share menu.
- Select **Share** from the Shares page of the Sharing and Connecting notebook menu bar, and then select **Delete**.
- Delete an existing share object in the Sharing and Connecting notebook. Using mouse button 2, click on an object of the resource you want to delete. Click on the **Delete** menu choice.
- Use the `NET SHARE` command issued from an OS/2 command line. For example, use the following syntax to stop sharing a resource:

```
--NET SHARE-- -netname- /D-----  
                -pathname---  
                -devicename-
```

Parameter	Description
<i>netname</i>	Specifies the network name of the shared resource.
<i>pathname</i>	Specifies the path to the shared files.
<i>devicename</i>	Specifies the name of the local shared printer port or serial port.
<code>/D (DELETE)</code>	Cancels the shared resource.

Example: Don wants to cancel sharing his d drive.

```
NET SHARE "DONS D DRIVE" /D
```

If you want to use spaces in the netname, type the name in quotes as shown in the above example. Be also aware of the fact, that commands do not alter sharename profiles.

Stopping Sharing from the Sharing and Connecting Notebook

In the Sharing and Connecting notebook, you can stop sharing a resource in the following two ways:

- By Stopping the share
- By Deleting the share

When you *stop* a share, you do not delete the existing share profile. You can start the share again, and the old share profile is used. When you *delete* a share, you delete its share profile. If you want to share the resource again, you must recreate a share profile for it.

To stop a share:

1. On the Desktop, open OS/2 Peer
2. Open Sharing and Connecting
3. Select **Shares** to display the Shares page
4. Select the share object that you want to stop
5. Select **Share** from the menu bar
6. Select **Stop**
7. Select **Keep Share Configuration**

To delete a share profile:

1. On the Desktop, open OS/2 Peer
2. Open Sharing and Connecting
3. Select **Shares** to display the Shares page
4. Select the share profile you want to delete
5. Select **Share** from the menu bar
6. Select **Delete**
7. Select **Yes** on the Delete Connection window to delete the connection profile, or select **No** to cancel the deletion request

You can also delete a share by following the steps for stopping a share, by selecting **Delete Share Configuration** instead of **Keep Share Configuration**.

Connecting to Shared Resources

With OS/2 Peer, you can connect to resources that are shared by other users on your network.

There are several different interfaces you can use to start sharing a resource. You can choose the method that best suits the way you like to work. For example, you can connect to a shared a resource in any of the following ways:

- Select **Connections** from the Sharing and Connecting action bar, and then select **Create**, as shown in “Connecting from the Sharing and Connecting Notebook” on page 120.
- Copy an existing connection object in the Sharing and Connecting notebook. Using mouse button 2, click on an object of the resource you want to copy.
- Click on the **Copy** menu choice.
- Use the `NET USE` command on the OS/2 command line. For example, use the following syntax to connect to a resource using its universal naming convention (UNC) name:

```
--NET USE-----  --\\machinename\netname-----  
      -devicename-  -aliasname-----  -/C-  
-----  
      -password-
```

Parameter	Description
<i>devicename</i>	Specifies the drive, printer port, or serial port currently connected to a shared resource. The name can be from following list: <ul style="list-style-type: none">- Drive letter from D through Z (a drive that is not already in use)- Printer port from LPT1 through LPT9- Serial device port from COM1 through COM9
<i>machinename netname</i>	Specifies the UNC name containing the server name or peer workstation name and netname of the shared resource.

<i>aliasname</i>	Specifies the LAN Server domain alias of the shared resource.
<i>/C (OMM)</i>	Requests use of the device for direct input/output.
<i>password</i>	Allows connection to resources that require a password.

Example: You want to use Vivian's CD-ROM drive.

```
NET USE L: ITSCWK_VIVIAN CDROM
```

If the netname contains spaces, double quotation must be used in the following fashion:

```
NET USE L: " WFWSERVER WFW CD ROM" password
NET USE M: "\\WFW WKST\CD ROM" password
```

Note: Remember, as with other NET commands, which do not alter resource profiles, the NET USE command does not create resource profiles.

- Use the Network Folder (see “Network Folder” on page 225)

Connecting from the Sharing and Connecting Notebook

When using the Sharing and Connecting notebook to connect to a shared resource, you must create a connection profile for that resource. The first time you connect to a resource, you create the connection profile. You can use the Sharing and Connecting notebook to create connection profiles.

A connection profile is used to set up the parameters needed to connect to a shared resource on another workstation. A connection icon is the object on the Connections page of the Sharing and Connecting notebook that represents each connection profile. When you create a connection profile through the Sharing and Connecting notebook, you can specify whether you want to connect to the resource each time you log on to your workstation and whether you want to be prompted for a password for that resource when you log on. You must specify a password if either of the following situations exists:

- Your password on the workstation where the resource is located is different from the one you use to log on to your own workstation.
- You are connecting to a resource on a LAN Server domain that is controlled using share-level security. Talk to the administrator of the resource if a password is required.

- You are connecting to a resource on a workstation that uses Microsoft Word for Windows. Ask the administrator of that workstation if a password is required.

To create a connection profile and start a connection:

1. From the OS/2 Peer folder start the **Sharing and Connecting** program.
2. Select the **Connections** page from the Sharing and Connecting settings notebook.
3. From the action bar, click on the **Connection** pull-down menu, and then **Create**, as shown in Figure 67.

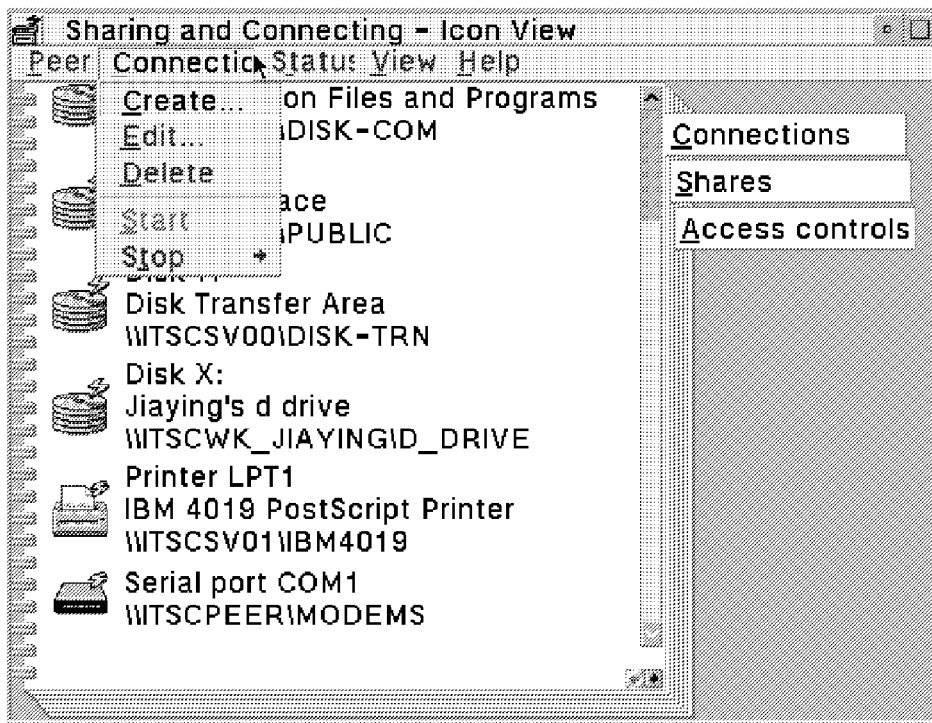


Figure 67. Sharing and Connecting Window Connection Options

4. The Create a Connection window is displayed as shown in Figure 68 on page 122. Type the following information in the appropriate fields.

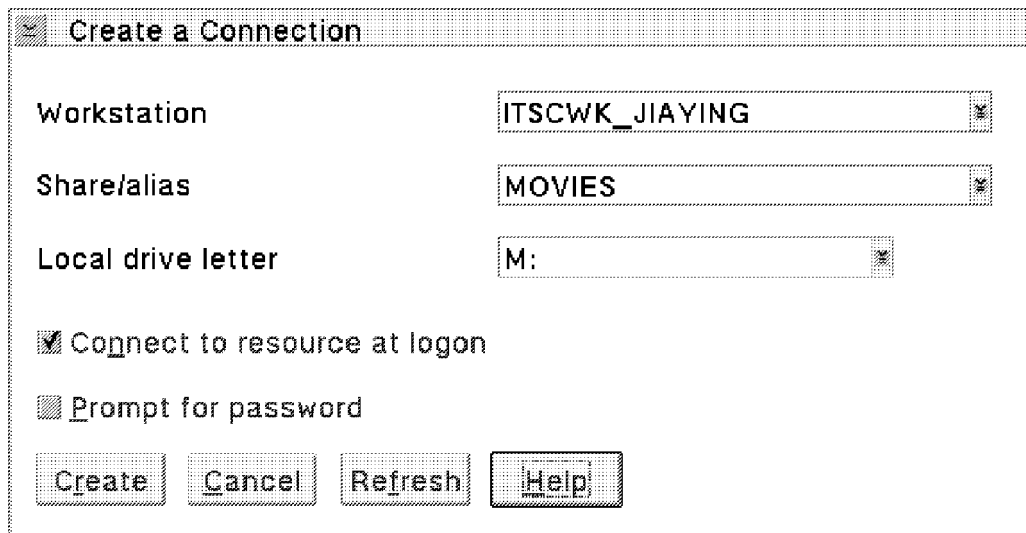


Figure 68. Create a Connection Window

Workstation Specify the name of the peer workstation or domain where the resource that you want to connect to is located. A list of all of the peer workstations and servers in your domain is displayed. You can select a name from the pull-down menu or enter the location of the resource you want to connect to. In this example we connect to a directory resource on the ITSCWK_JIAYING workstation.

Share/Alias Specify the share name or alias of the resources that are available at the selected domain or workstation. You can select a name that from the pull-down menu or enter the share name or alias of the resource you want to connect to. In this example we connect to the MOVIES netname / alias.

Local drive letter, Local printer, Local serial device

Specify unassigned local drive letters, local printer ports, or local serial device ports that you can connect to. If you are connecting to a shared directory, the **Local drive letter** field is displayed. If you are connecting to a shared printer, the **Local printer field** is displayed. If you are connecting to a serial device, the **Local serial device** field is displayed. In our example, we used drive M.

5. If you want to connect to this resource automatically each time you log on to the workstation, select **Connect to resource at logon**. The default is to connect at logon.
6. If you are connecting to an OS/2 LAN Requester configured as a peer, or a Microsoft Windows for Workgroups workstation you may need to

specify a password when you connect to the resource, select **Prompt for password**. If this box is checked, the Specify Password window is displayed when you try to connect to the resource.

7. Select **Create**. The connection object is created and the connection started.

Disconnecting from Shared Resources

After you have finished using a shared resource, you may want to disconnect from it. Disconnecting frees network resources at your workstation and at the remote workstation. For resources with limited access, the resources can allow other people to connect to the resources.

You can disconnect from shared resources using the same methods as to connect to a shared resource.

1. From the OS/2 Peer folder start the **Sharing and Connecting** program.
2. Select the **Connections** page from the Sharing and Connecting settings notebook.
 - a. Deleting a connection from the **Connection** pull-down menu
 - Click on the object of the resource you want to disconnect from.
 - Open the **Connection** pull-down menu from the action bar.
 - Select **Delete** as described in “Disconnecting from the Sharing and Connecting Notebook” on page 124.
 - b. By using the **Delete** menu choice of the object's pop-up menu
 - Using mouse button 2, click on the object of the resource you want to be disconnected from.
 - Click on the **Delete** menu choice
 - c. By using the **Stop** menu choice of the object's pop-up menu
 - Using mouse button 2, click on the object of the resource you want to be disconnected from.
 - Click on the right arrow of **Stop** to view additional choices
 - Click on the desired menu choice, either **Keep connection information** if you want to temporarily disconnect from the resource or **Delete connection information** if you want to finally delete the connection.
3. By using NET USE commands
 - Use the NET USE command on the OS/2 command line. Syntax is:

```
--NET USE-- -devicename-----/D-----  
-\\machinename\netname-
```

Parameter	Description
<i>devicename</i>	Specifies the drive, printer port, or serial port currently connected to a shared resource. The name can be from following list: <ul style="list-style-type: none">- Drive letter from D through Z (a drive that is not already in use)- Printer port from LPT1 through LPT9- Serial device port from COM1 through COM9
<i>machinename netname</i>	Specifies the UNC name containing the server name or peer workstation name and netname of the shared resource.
<i>/D (ELETE)</i>	Ends the NET USE connection.

Example: You want to disconnect from Vivian's CD-ROM drive which you previously assigned as your L: drive.

```
NET USE L: /D
```

Note: When using NET USE commands with the /D parameter, resource profiles will not be deleted.

4. Use the Network folder. For more information, see "Network Folder" on page 225.

Disconnecting from the Sharing and Connecting Notebook

In the Sharing and Connecting notebook you can disconnect from a resource in the following two ways:

- By Stopping the connection
- By Deleting the connection

When you *stop* a connection, you do not delete the existing connection profile. You can start the connection again, and the old connection profile is used. When you *delete* a connection, you delete its connection profile. If you want to connect to the resource again, you must create a connection to it.

To stop a connection:

1. On the Desktop, open the OS/2 Peer folder.
2. Open Sharing and Connecting. The Sharing and Connecting notebook is displayed.
3. Select **Connections** to display the Connections page.
4. Select the connection object that you want to stop.
5. Select **Connection** from the menu bar of the Sharing and Connecting notebook.
6. Select **Stop**.
7. Select **Keep Connection Configuration**

To delete a connection profile:

1. On the Desktop, open the OS/2 Peer folder.
2. Open Sharing and Connecting. The Sharing and Connecting notebook is displayed.
3. Select **Connections** to display the Connections page.
4. Select the connection profile you want to delete.
5. Select **Connection** from the action bar.
6. Select **Delete**.
7. Select **Yes** on the Delete Connection window to delete the connection profile, or select **No** to cancel the deletion request.

You can also delete a share by following the steps for stopping a connection, but selecting **Delete Connection Configuration** instead of **Keep Connection Configuration**.

Working with Multiple Domains

IBM Peer for OS/2 Version 1.0 handles workgroups in the same way that it handles domains. Therefore IBM Peer for OS/2 Version 1.0 refers to both domains and workgroups as *domains*. Your network can have more than one domain on it. If so, you may at times need to connect to resources, send messages to, copy data from the clipboard, or link to data on peer workstations on other domains. You can access peer workstations on other domains on your network more easily if these domains are listed in the `othdomains` parameter in your IBMLAN.INI file. Before you can add another domain to the `othdomains` parameter, you must first know the name of the domain you want to add.

When you add a domain to the `othdomains` parameter, icons for servers and peer workstations in the domains are added to the LAN Server and OS/2 Peer Resources folder in the Network folder and to the workstation list in the Sharing and Connecting notebook.

The `othdomains` parameter supports up to four domain names. If you have a network with more than four domains, the machines in the domains not specified in the `othdomains` parameter can be accessed by using their machine names.

To add a domain to the `othdomains` parameter:

1. Use any ASCII editor to edit `d: IBMLAN IBMLAN.INI`, where `d` is the disk where OS/2 Peer is installed.
2. In the Requester section, add the name of the other domains to the `othdomains` parameter. You can type up to four domain names. Separate multiple domain names with a comma and no space, for example:

```
othdomains = FINANCE, PERSONNEL
```
3. Save the changes to the `IBMLAN.INI` file and close it.
4. Determine which network users have connections to your resources, as described in *Viewing List of Open Files* and *Viewing Active Sessions*.
5. Tell users with connections to your resources that you are about to close their connections. See "Network Messaging" on page 159 for directions on sending a message.

Consequences of stopping Requester service

Stopping the Requester service stops all services and logs off any logged-on users. Network users who have connections to your resources lose their connections, and they can possibly lose data.

6. Stop the Requester service and restart it so that your `othdomains` parameter change goes into effect. Do this by typing `NET STOP REQ` at an OS/2 command prompt. After the service is successfully stopped, start it again by typing `NET START REQ`.

IBM Peer for OS/2 Version 1.0 allows you to connect to other networks. (See Chapter 10, "Interoperability" on page 429 for a list.) One of the easiest networks to connect to is the OS/2 LAN Server. When you log on to IBM Peer for OS/2 Version 1.0, you are logging on to a network in which all users have the option of sharing their resources with others. The users decide which resources at their workstations are shared and which other users can access them.

When you log on to a conventional OS/2 LAN Server network, you are logging on to a network in which there is at least one dedicated server and in which most of the users' workstations are requesters. In this environment, it is mainly the servers sharing resources. Resources are grouped in domains, where a domain consists of one or more servers. A network administrator controls the access for all other users. See "Domains and Workgroups" on page 30 for more details on the difference between domain and peer networks.

A local area network (LAN) can contain more than one domain, each operating independently. Domain names must be unique across a LAN. As with OS/2 Peer domains, multiple OS/2 LAN Server domains can be defined on the network in order to simplify the management of the network.

User Profile Management Services (UPM Services)

As with other LAN products from IBM, IBM Peer for OS/2 Version 1.0 uses User Profile Management Services to define users and groups on your peer workstation. UPM Services has two default administrator user IDs:

- USERID with the password PASSWORD.
- Your own user ID and password that you have created at the first time your system has restarted.

Note: If you skipped this part, the first choice is the peer admin user ID. Once you have created your own administrator user ID you may delete the standard user ID (you may want to do that for security reasons).

You need to have an administrator user ID defined on your workstation to be able to administer your peer resources since only an administrator can share resources.

NET.ACC

Since UPM Services uses the NET.ACC file to store user IDs, group IDs, passwords and access rights, care should be taken with this file. If for some reason the NET.ACC file gets corrupted, you may use the FIXACC utility, which is installed on your workstation, by default, to correct the file. Be aware of the fact, once you have used FIXACC, the user ID USERID with the password PASSWORD is registered again.

In this section we also describe what is to be considered when maintaining user passwords on IBM Peer for OS/2 Version 1.0 machines and OS/2 LAN Server domain controller.

Generally there are three methods available:

- User Profile Management Services (UPM Services)
- Forwarded Authentication
- Network SignON Coordinator (NSC/2)

Access to resources on an OS/2 LAN Server is managed in two ways.

1. User Profile Management (UPM) Services provides validation for a user ID and password at logon.
2. OS/2 LAN Server has its own access control system that provides a set of permissions that allow the network administrator to grant users various levels of access to shared resources.

In IBM Peer for OS/2 Version 1.0, security is maintained using the second of these methods, access control to resources. This is called *user-level security*.

UPM Services maintains a database of user IDs and passwords for users that can connect to a specific machine.

UPM Services is a generic interface developed to be used with multiple IBM OS/2 client/server products including IBM Peer for OS/2 Version 1.0, OS/2 LAN Server, DB2/2 for OS/2, CM/2 and other products. It is an OS/2 Presentation Manager utility that provides a set of user and group validation and management functions that help control access to information. UPM Services is used to validate users who access controlled data or use programs that reside on an IBM Peer for OS/2 Version 1.0 workstation or OS/2 LAN Server server. User IDs and optional passwords are used to regulate data access. These IDs and passwords are assigned by a user with administrative authority. UPM Services tasks are performed through a menu interface, with online help to assist both the user and the administrator.

UPM Services is installed by the IBM Peer for OS/2 Version 1.0 and OS/2 LAN Requester components of OS/2 Warp Connect when they are installed. Each installation of UPM Services is specific to the particular workstation where it is installed and validates persons accessing data or using programs residing on that particular workstation. UPM Services can also be installed during the IBM DB2/2, Communications Manager/2 and IBM Extended Services installations.

Starting User Account Management

Once you are logged-on, you can start working with User Profile Management Services.

Starting User Account Management

If you selected to start User Account Management and you are not logged-on, you will get a Logon window. Be aware of the three different kind of Logon windows, so that you know exactly, what you are going to administer: DB2/2, OS/2 Peer or LAN Server (See previous section "Logging On" on page 99 for more details).

In the UPM Services folder which resides on the OS/2 Desktop, you can select the User Account Management object or type UPMACCTS from an OS/2 command line to start User Account Management. From User Account Management, you can add/delete/update user and group information.

After you are successfully logged-on to the LAN locally, you will get the User Profile Management - User Profile window which is displayed in Figure 69.

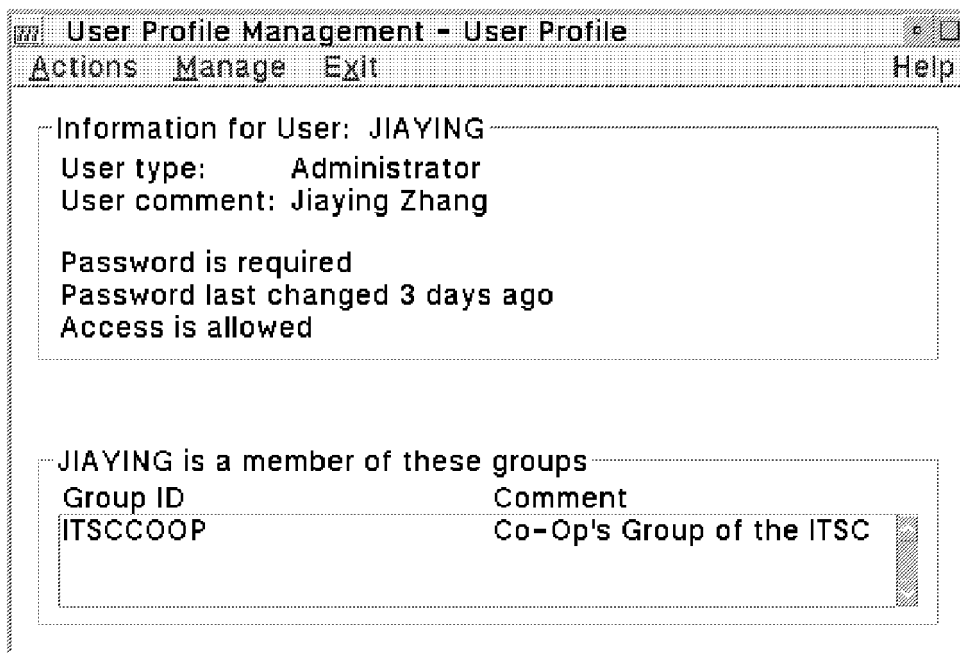


Figure 69. User Profile Management - User Profile Window

Some User Account Management options do not apply to the IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester environments. For example, Figure 70 on page 130 shows the Add a User screen where you see the

option Local Administrator. The Local Administrator option is used by IBM DB2/2, however in the IBM Peer for OS/2 Version 1.0 and OS/2 LAN Requester environments, the Local Administrator option is given the same function as the User options.

If you select the **Manage** pull-down menu from the action bar of the User Profile Management - User Profile window and then select **Manage Users ...** you can add users as shown in Figure 70.

The screenshot shows a dialog box titled "Add a New User". It is divided into several sections. The top section, "Specify new user information", contains two text input fields: "User ID" with the value "ROBIN" and "Comment" with the value "Robin Hood". Below this is the "User Type" section, which has four radio button options: "User" (selected), "Accounts Operator", "Local Administrator", and "Administrator". To the right of "User Type" is the "Logon" section, with two radio button options: "Allowed" (selected) and "Denied". The bottom section is "Password", which includes a "Confirmation" label and two input fields for "Type password twice". To the right of the password fields is the "Options" section, with three radio button options: "Password Required" (selected), "Expire Password", and "Password Optional". At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

Figure 70. Add a New User Window

User Account Management provides four levels of authority: user, user accounts operator, local administrator, and administrator.

- **User:**

Users can perform the following tasks:

- Log on
- View the user profile
- Change their own passwords
- Add comments to the user profile
- Log off

- **User Accounts Operator**

In addition to being able to perform all user tasks, the person with Accounts Operator authority can perform the following additional tasks with User accounts only:

- Administration of user, that is:
 - Add or delete users/groups
 - Change user passwords
 - Specify user status (access allowed or denied)
 - Add and delete users in groups

- **Local Administrator:**

For LAN access control, Local Administrator authority does not differ from User authority. For DB2/2, the person with Local Administrator authority has the same authority as the Administrator but for local databases only. A Local Administrator does not have administrative authority for User Account Management.

- **Administrator:**

In addition to being able to perform all user tasks, the person with Administrator authority can perform the following additional tasks:

- Administration of all users (including administrators):
 - Add or delete users/groups (including other administrators)
 - Specify user authority (either user or administrator)
 - Specify password options (optional or required)
 - Specify user status (access allowed or denied)
 - Add or delete users in groups (including other administrators)

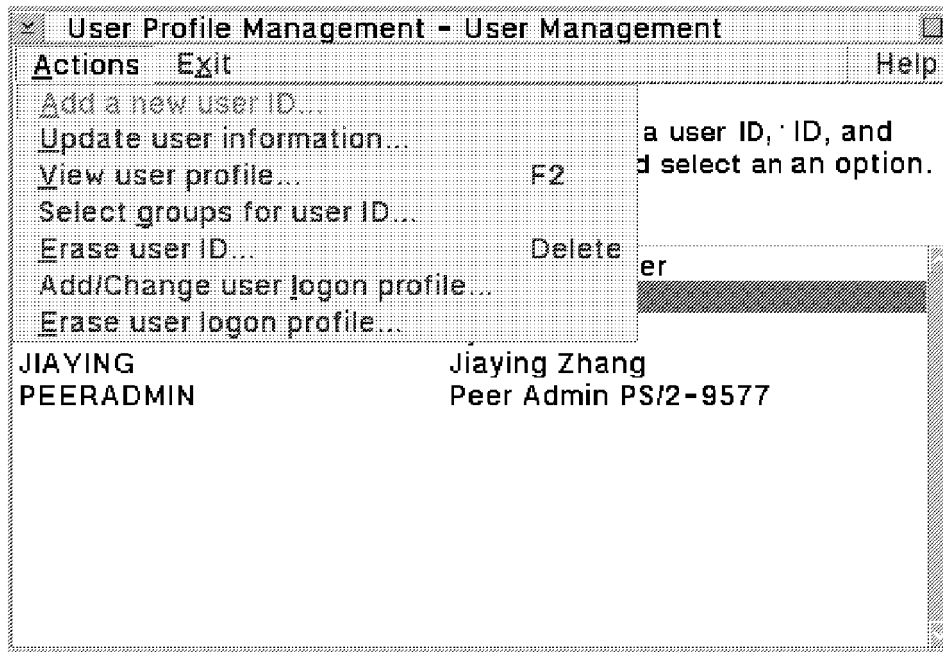


Figure 71. User Profile Management - User Management Window

- Administration for groups of users:
 - Create or delete groups
 - Add/remove users from groups

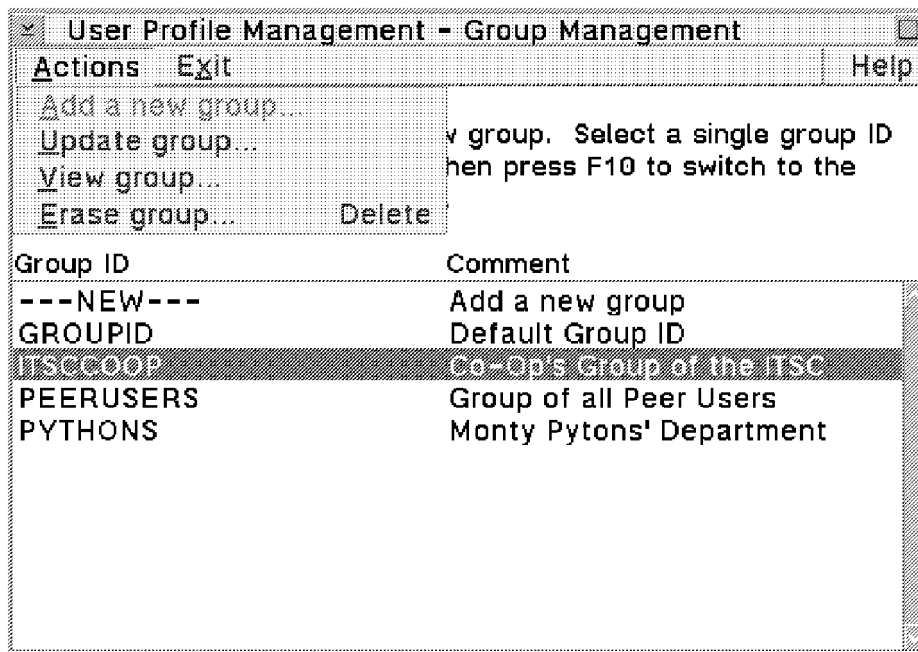


Figure 72. User Profile Management - Group Management Window

An administrator can establish groups so that access to protected objects can be granted to all members of a department or to all persons performing similar tasks. Access can then be granted to the group as a whole. The members of the group can be changed through User Account Management. If a user ID is deleted, it is removed from all groups.

Groups can be managed in the following two ways:

- Users can be added to groups
- Groups can have users defined

Figure 73 shows users being added to the group called ITSCCOOP.

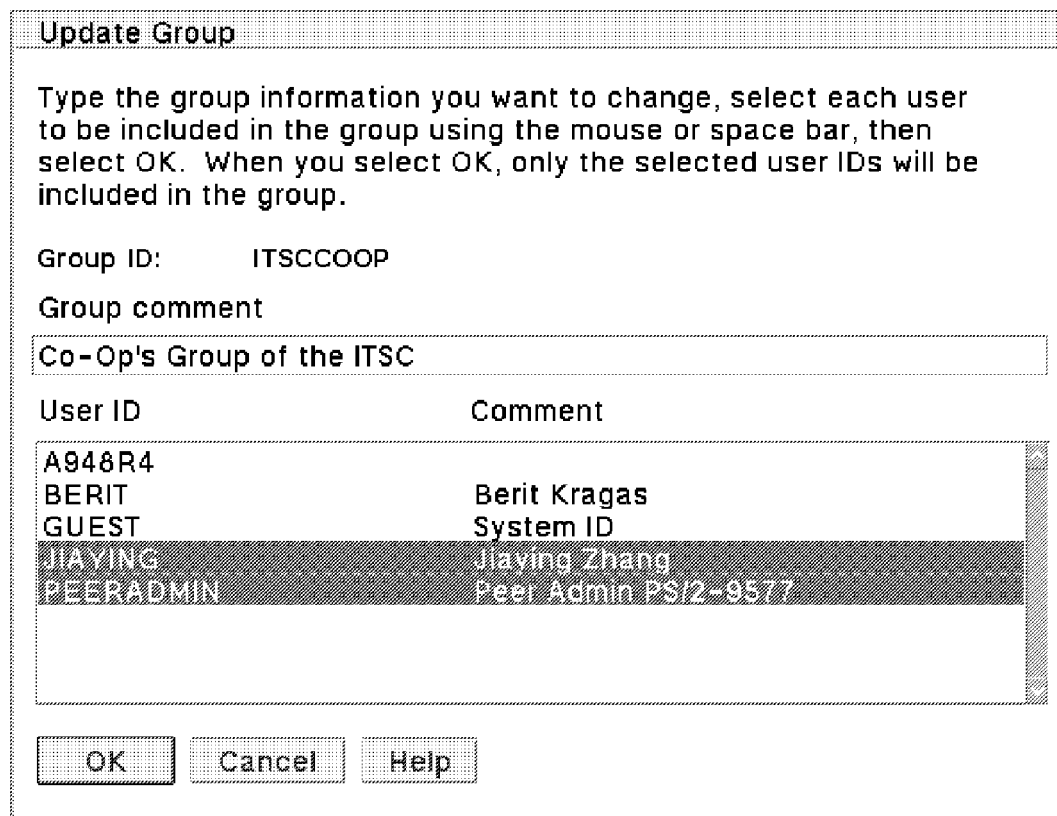


Figure 73. Update Group Window (for adding users to a group)

UPM Services is a shared user-validation function and does not distinguish between administrators accessing different OS/2 components.

When you open User Account Management, in the UPM Services folder , or issue the UPMACCTS command, the User Profile Management - User Profile window is displayed. From this window, you can select one of the following menu bar choices. These menu bar choices allow you to manage user and group account information.

Actions Allows users or administrators to change their passwords and user descriptions, or select destinations to administer (peer workstation, LAN Server domain, or local peer workstation). Network administrators can also use this function to select groups for their user IDs.

Manage Allows an administrator to access the Manage Users and Manage Groups menu choices.

Manage Users

Allows an administrator to perform the following functions:

- Add new users
- Define the user as network administrator, local administrator, or user
- Revoke access from users
- Delete users
- Maintain information for all users of User Account Management

Manage Groups

Allows an administrator to define and maintain groups of authorized users within User Account Management.

Exit Closes the User Profile Management - User Profile window.

For these procedures, you are making changes to the user and group definitions file for the current domain. You can only complete LAN Server user and group tasks that require the User Profile Management, such as giving users logon assignments, in the current domain. To make changes to another domain's user and group definitions file without logging on to that domain, select **Use domain** from the User Profile Management Actions pull-down menu and then select the domain to administer. Your user ID and password must be the same on any domain you select to administer through the **Use domain** function.

Adding Users

To add a user, or generally make administrative changes, do the following:

1. On the Desktop, open the **UPM Services.** folder.
2. Select **User Account Management**

Either you will get the Select Destination window as shown in Figure 74 on page 135 immediately or you will have to select **Select Destination ...** from the Actions pull-down menu at the User Profile Management - User Profile window.

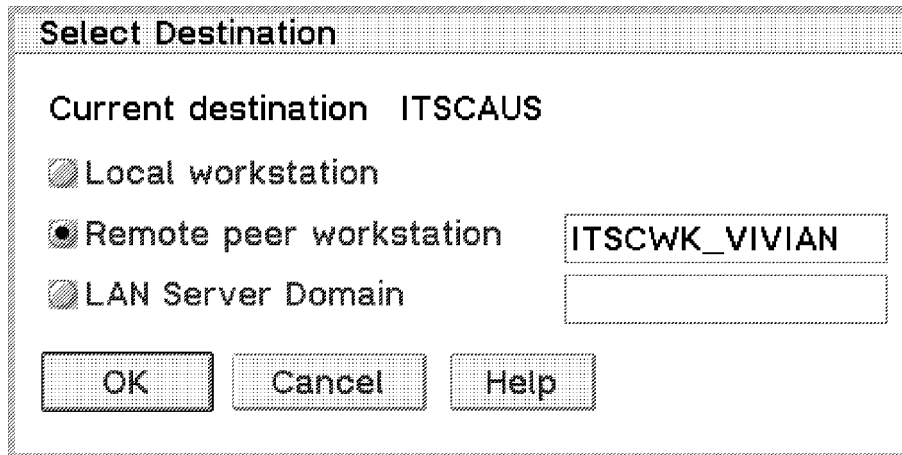


Figure 74. Select Destination Window

Select the destination that you are wanting to add the user to.

- **Local workstation**, to make administrative changes on your peer workstation.
- **Remote peer workstation**, to make administrative changes at another peer workstation in your LAN. Your user ID and password must be defined at the remote peer, as an administrator. Specify the remote peer workstation name.
- **LAN Server domain**, to make administrative changes in an OS/2 LAN Server Domain. Specify the domain name.

Note: If you get a system response claiming a typed character is not valid you might check the current character set used by UPM Services. From an OS/2 command line type `UPMCSET` and press Enter. If the returned message is:

The character set being used is the minimal character set.

Issue the following command from the OS/2 command line:

```
UPMCSET /E
```

The `/E` parameter indicates that user IDs, passwords, and in this case remote peer workstation names are defined using the expanded character set. The opposite would be `/M` which stands for minimal character set.

3. In the User Profile Management-User Profile window, select **Manage** from the action bar.
4. Select **Manage Users** from the pull-down menu.
5. The User Profile Management - User Management window lists all users defined to the current domain. Select **New** from this list.

6. Select **Actions** and **Add a new user ID** from pull-down menu.
7. Complete the Add a New User window with the information describing the new user. The user ID should not be the same as the machine ID.
 - Select **User** or **Administrator** (a LAN network administrator) to specify the user type. If you select **User**, you can also specify whether the user should have accounts operator privilege.

Of the user types definable through UPM Services, only the User and Administrator types are significant to LAN Server. A third User Account Management user type is Local Administrator. A Local Administrator has Database Manager2/2 authority (SYSADM) for local databases (residing on that user's machine) but has only user privileges on the OS/2 LAN. In contrast, a network administrator has network administrator authority and Database Manager SYSADM authority for all databases on the LAN. For further information on the local administrator user type, see the section *Database Manager Considerations when Adding Users* in the *OS/2 Peer User's Guide*.

- In the Password box, specify whether a password is required. The password can be from 4 through 14 characters (bytes) long. If you select **Password Required**, you can also select **Expire Password** if you want to force the user to change the password at the first logon.

Because the password is not displayed when you type it, you are prompted to type the password a second time to confirm it.

If you select **Password Optional**, the user can later choose to add a password without intervention by the administrator.

- The Logon box lets you allow or deny logon to individual users on the domain. If you select **Denied**, you can give the user access authority later by changing this field to **Allowed**.

There are two aspects to updating user information:

- Updating user information fields originally defined on the Add a New User window including:
 - User ID
 - User type (user, local administrator, or administrator)
 - Optional comments about the user ID
 - Password
 - Logon authority (whether the user can log on to the domain)
- Updating group memberships for a user (adding a user to a group, deleting a user from a group)

These tasks can be done through UPM Services.

After you have defined a user, you can select groups to which that user belongs. You can also remove a user from a group.

Groups

You can create user groups to refer to several users at the same time. On an OS/2 LAN, groups are used for access control and messaging purposes.

Groups are a way of simplifying granting access to a group of users. If you grant access to a group, every member of that group is granted the same permissions. You can create up to 250 groups in each domain.

IBM Peer for OS/2 Version 1.0 has one default group defined

- GROUPLD (default group ID)

In an OS/2 LAN Server domain the following six groups are defined automatically

- USERS (IDs with user privileges or groups of all user IDs)
- ADMINS (administrators)
- GROUPLD (default group ID)
- SERVERS (servers defined in the domain)
- LOCAL (empty group used to grant permissions to the local workstation when no one is logged on)
- GUESTS (group of guest IDs)

Adding Groups

Do the following to add a group:

1. On the Desktop, select **UPM Services**.
2. Select **User Account Management** from UPM Services.
3. In the User Profile Management - User Profile window, select **Manage** from the action bar.
4. Select **Manage Groups** from the pull-down menu.
5. The User Profile Management-Group Management window lists all groups currently defined through User Profile Management. Select **New** from this list.
6. Select **Actions** and then select **Add a new group** from the pull-down menu.
7. Complete the Add a New Group window. Specify the group ID and any optional comments. Select the user IDs to belong to the group.

To update group memberships for a user:

1. On the Desktop, select **UPM Services**.
2. Select **User Profile Management** from UPM Services.
3. In the User Profile Management-User Profile window, select **Manage** from the action bar.
4. Select **Manage Users** from the Manage pull-down menu.
5. The User Profile Management-User Management window lists all users currently defined through User Profile Management. Select the user for whom you want to update group membership.
6. Select **Actions** from the action bar.
7. Select **Select groups for user ID** from the pull-down menu.
8. The Select Groups window lists all the group IDs currently defined through UPM Services. The groups currently assigned to the user are highlighted. To add a user to a group, highlight the group ID or IDs to which the user is to belong. Select **OK**. To delete a user ID from a group, deselect the group ID for the group from which you want to delete the user. Select **OK**.

Forwarded Authentication

When OS/2 Peer workstations run in a domain that includes a LAN Server domain controller (version 3.0 or higher), you can take advantage of a function called *forwarded authentication*. This function is useful on LANs where resource security is important. For a high level of security, logon passwords must be changed occasionally, and access to confidential or proprietary information must be restricted to particular user IDs.

Forwarded authentication becomes important when access to peer resources is granted to specific user IDs (in contrast to giving everyone the same access permissions for a resource) and the users change their passwords from time to time. If a user ID has a required password at the peer workstation controlling a resource, then that password is checked against the password with which the user logged on. If the passwords do not match, the user is denied access to the resource.

However, if the passwords do not match but forwarded authentication has been set up, the user ID and logon password are forwarded to the domain controller for validation. If the user ID and password are defined on the domain controller, then the peer controlling the resource allows the user any access that has been granted to the user ID.

If forwarded authentication is set up, users need to maintain their passwords only at their personal workstations and at the domain controller. Users do not need to update their passwords at remote peer workstations unless they need faster authentication of access requests.

Also, if the peer users log on to the domain controller instead of logging on to their individual peer workstations, then only their passwords at the domain controller must be maintained. If the peer users are defined as administrators at their own workstations, they can administer their own workstations even while logged on to the domain controller as ordinary users. This logon method also provides the peer users with any LAN Server logon assignments or public application assignments that are set up for their user IDs.

To set up forwarded authentication, you need a user ID with administrator access at the domain controller and at each of the peer workstations that should forward authentication requests. If your administrative user ID and password are the same across that set of workstations, you can log on just once at any one of those workstations and administer the user IDs of the remaining stations. (To switch among the workstations, use the **Select destination** option in User Account Management.)

Forwarded Authentication Setup

To set up forwarded authentication do the following:

1. At each IBM Peer for OS/2 Version 1.0 workstation, create an ordinary user ID with a required password, using the IBM Peer for OS/2 Version 1.0 workstation machine name as the user ID. (Write down the passwords you assign for later reference.)
2. Create any user IDs that might require password checking for access to the peer workstation's resources. Be sure to leave the **Password Required** option selected (the default).
3. Edit the IBMLAN.INI file of each peer workstation. Make the following changes in the [peer] section:

```
[peer]  
  
    forwardauth = yes
```
4. Stop and restart the Peer service at each peer workstation.
5. At the LAN Server domain controller, create a user ID for each of the peer workstations, with a user type of Administrator. For each peer, specify the same user ID (machine name) and password that you created

earlier on the IBM Peer for OS/2 Version 1.0 workstation, and leave the **Password Required** option selected.

6. At the domain controller, create all user IDs and passwords that might require authentication for access to peer resources. The user IDs must match those you created at the peer workstations, but the passwords can differ.
7. Inform the peer users of their user IDs and passwords, as defined at the domain controller. Also, request that they log on through the LAN Services Logon object.

Network SignON Coordinator

Network SignON Coordinator is an application that is installed into the LAN Tools folder if you install either IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester as part of a OS/2 Warp Connect integrated installation. It allows you to manage user IDs and passwords over a range of networks.

See “Network SignON Coordinator” on page 232 for information on configuring and using Network SignON Coordinator.

Scenarios

This section gives example scenarios in IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server environments.

IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server allow you to create a network resource that is a group of physical resources on the server. This is called *pooling*. Printer devices and Serial devices can be pooled. This combines with another feature called *queueing* to allow multiple users to all have access to a single resource.

Sharing a modem for BBS access

Serial port pooling allows multiple users to have access to a group of hardware resources. In our example, we have a LAN with multiple IBM Peer for OS/2 Version 1.0 workstations. On one of the workstations we have two modems shared in a pool. The pool has one netname (MODEMS). All the users have connected to the MODEMS share, and assigned it to COM3 on their machines.

Note: It is easier to use a modem pool if all the modems are the same type. Otherwise you will need to find a modem initialization string that is compatible with all the modems in the pool.

You can use a shared modem pool to:

1. Share the modems
2. Connect to the modem share from the user workstations
3. Assign the connection to a COM port (such as COM3)
4. Configure your software (such as HyperACCESS Lite from the BonusPak) to use COM3
5. Use your BBS software as if you had a modem directly attached.

You may not be able to use your modem at the same port speed that it can be used if it was attached locally. If you have difficulty connecting to your modem or receive errors while using it, try lowering the port speed to 19200 or lower.

Shared Modem Support

It is quite convenient to share (a) modem(s) connected to a workstation either through peer services or LAN Server. The Internet dialer on your peer or requester workstation can use a network COM port. You need to apply APAR PJ18597.

- DIALER.EXE must have a file date of May 11th or later (At least Version 1.43d)
- SLIPPM.EXE must have a file date of May 18th or later (At least Version 1.11)

The above mentioned files provided by OS/2 Warp Connect are older and therefore do not support a network COM port.

How Pooling Works

A COM port on your machine can be accessed by many applications at the same time. Generally, an application will request an OPEN of the COM port and proceed to use it. It is possible for another application to also use the COM port at the same time. This leads to corruption of the data at the COM port.

In an IBM Peer for OS/2 Version 1.0 or OS/2 LAN Server when a COM port is shared, part of the support that is provided is queueing. Shared COM ports queue any open requests until the COM port is free. If an application on a users workstation has opened the COM port any other requests to open the COM port are queued until the COM port has been closed by the first user. The next open request in the queue is then processed.

With pooling, the available COM ports are managed like a service line. The first open request is handled by the first free COM port. The next open request is handled by the next free COM port. If an open request is received and all the COM ports are busy, the request is queued until one of the COM ports becomes free.

In Figure 75 on page 143, four users are attempting to access the two COM ports in the pool on the IBM Peer for OS/2 Version 1.0 machine. Users 1 and 2 get connections, because none of the modems were being used. The requests from Users 3 and 4 are queued. In this example, User 2 disconnects from the modem while User 1 is still connected. The request from User 3 is now processed by the COM port. User 1 now disconnects and the request from User 4 is passed to the COM port.

The IBMLAN.INI parameter `CHARWAIT` determines how long the user workstation will wait for a connection before it signals the connection as failed. The default is 60 minutes (3600 seconds).

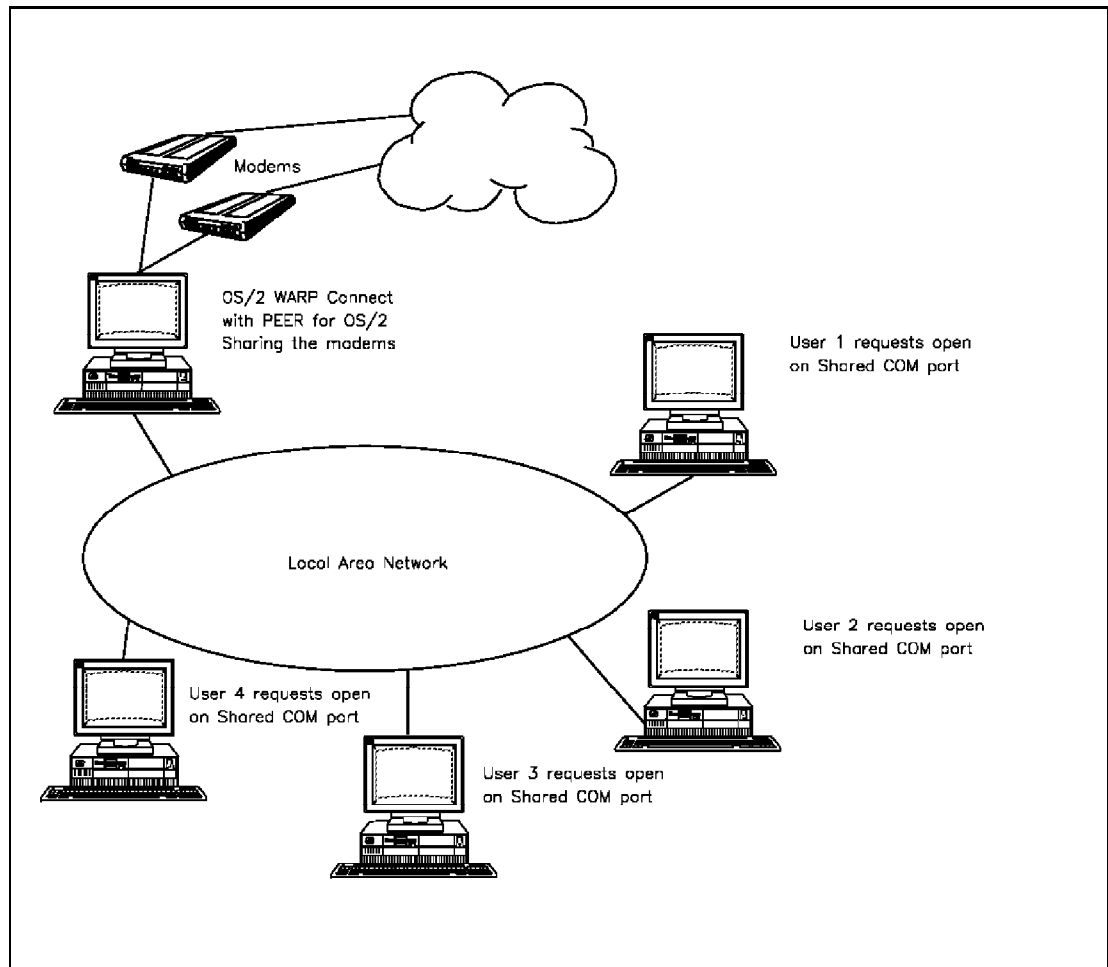


Figure 75. Modem Pooling

Printers

You can you assign more than one port to a single printer queue to *pool printers*. In this way, jobs waiting to print can be processed through any free port, increasing the number of jobs that can print at the same time.

Printer driver consideration

When you pool printers, all the printers connected to these ports must use the same printer driver.

To pool printers, follow these steps:

1. Point to the appropriate printer object.
2. Click mouse button 2.

3. Select **Settings**
4. Select the **Output** tab
5. Hold down the Ctrl key and select two or more ports
6. Close the Settings notebook

Under IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server, when a printer is shared, the share is actually of the printer queue. Therefore, pooling can be used on local printer queues and shared printer queues.

How Printer Pooling Works

Pooling printers is similar to modem pooling (see “Sharing a modem for BBS access” on page 140), except that under OS/2 all printers have a queue for print jobs.

A print queue can be attached to multiple LPT ports. When a print job is sent to the queue, it is passed to the first free printer. Any jobs not being processed by a printer remain in the queue.

In Figure 76 on page 145, four users are attempting to send print jobs to the two printers in the printer pool on the IBM Peer for OS/2 Version 1.0 machine. The print jobs from Users 1 and 2 get passed directly to the printers. The print jobs from Users 3 and 4 are queued. In this example the print job for User 2 finishes while the print job from User 1 is still printing. The print job from User 3 is now processed by the printer. The print job from User 1 now finishes and the print job from User 4 is passed to the printer..

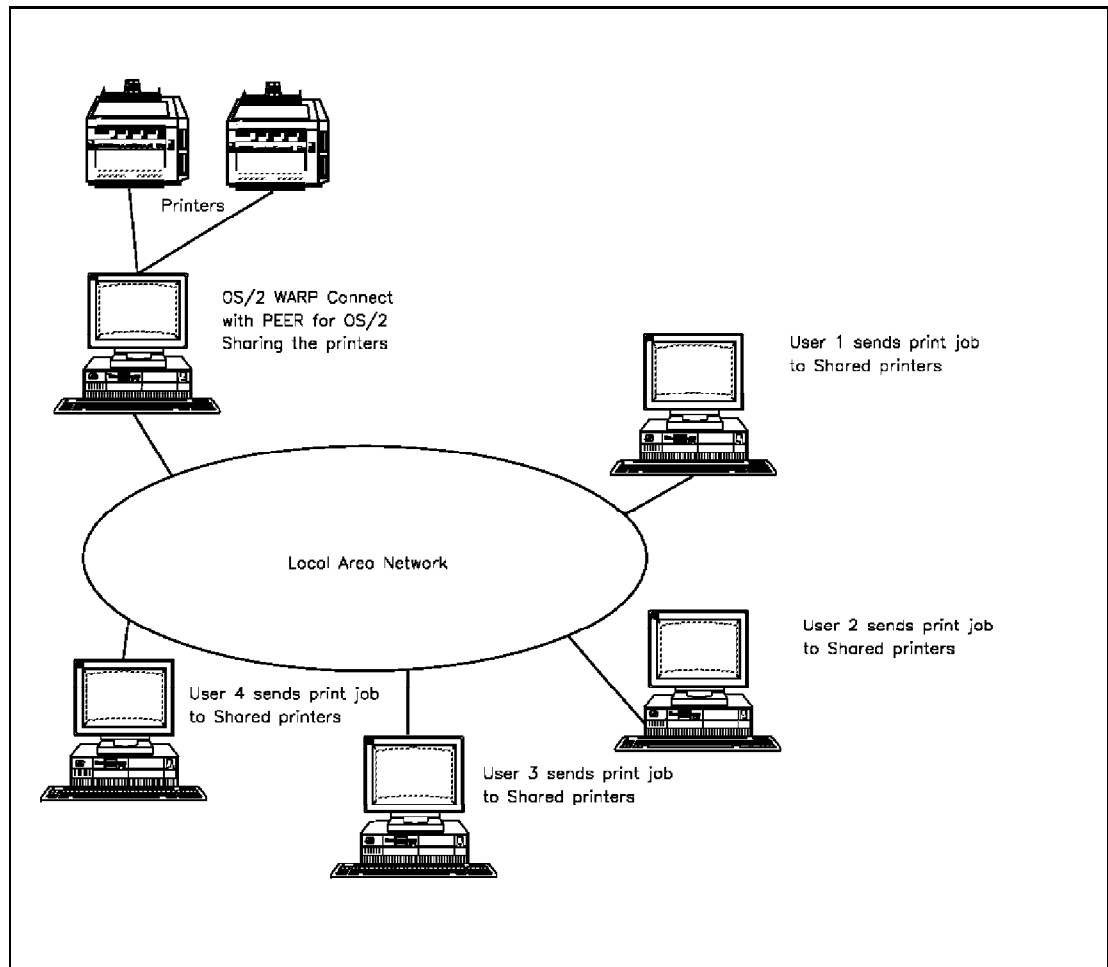


Figure 76. Printer Pooling

Protocol Considerations

IBM Peer for OS/2 Version 1.0 is an SMB (Server Message Block) based application that uses NetBIOS as a transport protocol. For that reason is preferable, when possible, to use native NetBIOS-based networks because it's simpler and faster. Native NetBIOS can be installed on:

- Single LAN
- More than one LAN linked by transparent bridges

If you have another LAN environment, it is still possible to use OS/2 LAN Server 4.0 Requester as well as IBM Peer for OS/2 Version 1.0 by using the function provided in MPTS.

The new version of Multi-Protocol Transport Services / AnyNet provides these two alternatives to a native NetBIOS:

- TCPBEUI or NetBIOS over TCP/IP
- IPXNB or NetBIOS over IPX

Using NetBIOS over TCP/IP, IBM Peer for OS/2 Version 1.0 can access domains or peer servers passing across a TCP/IP based network.

Using NetBIOS over IPX, allows IBM Peer for OS/2 Version 1.0 to cross IPX based routers.

It is also possible to combine NETBEUI with each of the two alternatives and have:

- Native NetBIOS and NetBIOS over TCP/IP
- Native NetBIOS and NetBIOS over IPX
- Native NetBIOS and NetBIOS over IPX and NetBIOS over TCP/IP

Chapter 9, "Multi-Protocol Transport Services (MPTS)" on page 377 has details on setting up multiple protocols, and using MPTS for your LAN connection. Figure 77 on page 147 shows two networks. The upper is a NetBIOS only network. The lower is a multiprotocol network. The IBM Peer for OS/2 Version 1.0 workstations can access an OS/2 LAN Server 4.0 machine over a TCP/IP link using NetBIOS over TCP/IP and can access the IBM Peer for OS/2 Version 1.0 machine over an IPX link using NetBIOS over IPX. They can also access the OS/2 LAN Server 4.0 machine on their local network using NetBIOS.

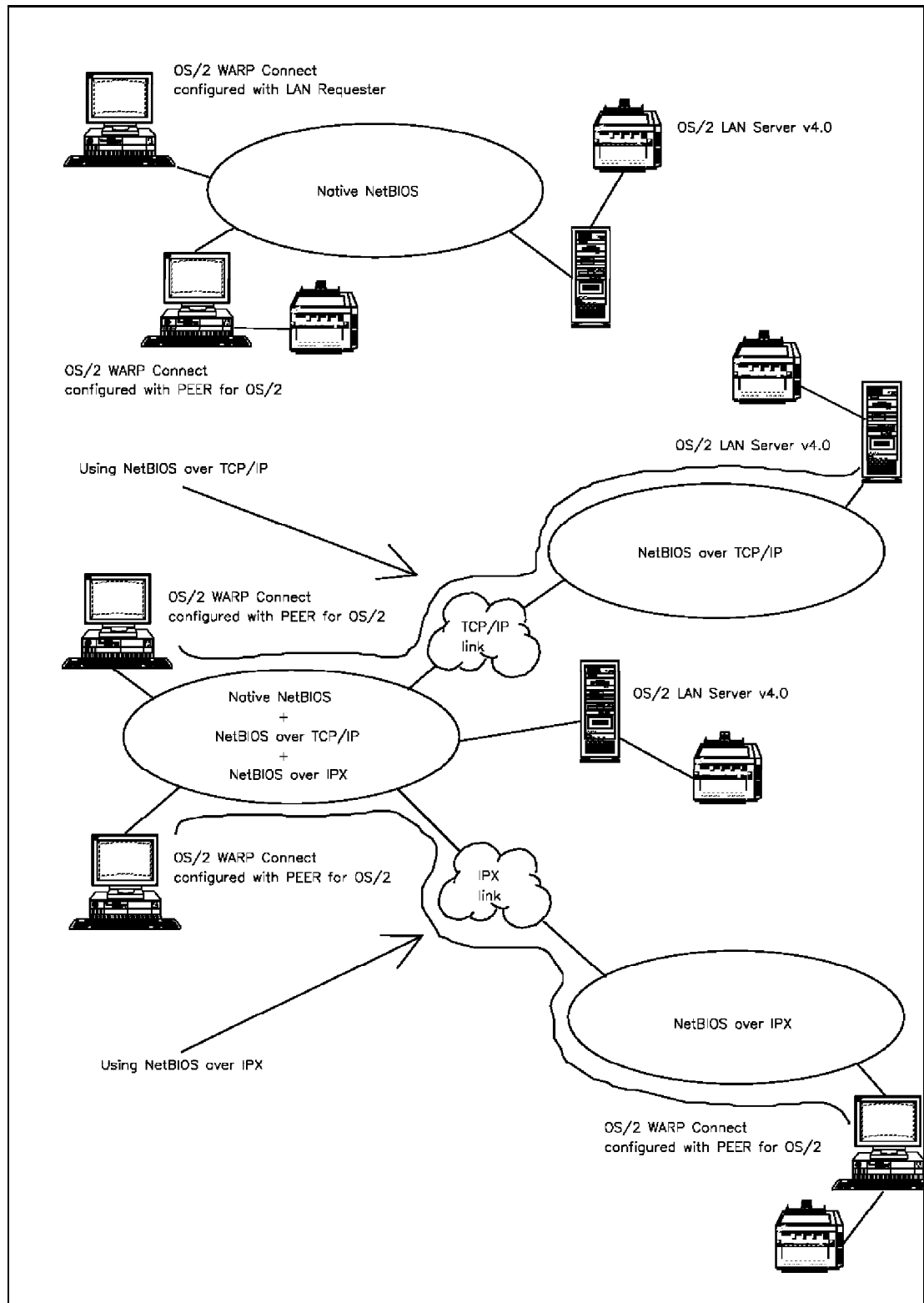


Figure 77. Example of Native NetBIOS and Multiprotocol Environments

Removing IBM Peer for OS/2 Version 1.0

IBM Peer for OS/2 Version 1.0 can be removed from your machine by using the Installation program in the OS/2 Peer folder. Select **Remove Peer from this Workstation**.

Be careful about removing MPTS

The peer removal can also remove MPTS. Select *not* to remove MPTS if you are running any other networking products.

Chapter 4. OS/2 Warp Connect OS/2 LAN Requester

OS/2 LAN Server 4.0 Requester is provided as a component of OS/2 Warp Connect and also as a component of the OS/2 LAN Server 4.0 product.

The main features and functions of the OS/2 LAN Requester program are:

- A graphical user interface (GUI)
- Access to network resources
- Network DDE and clipboard
- Network messaging
- API support
- Connectivity with other network programs

Concept of LAN Server Domain Organization

A *domain* is a named network consisting of a group of workstations linked together to share resources such as directories, printers, modems, and plotters. Each domain consists of the following types of workstations:

- A primary server called the *domain controller* that keeps the master copies of user and group definitions and access control information. The domain controller also maintains shared resources. There must be one and only one domain controller per domain.
- Optionally, additional servers to provide shared resources and serve as backup domain controllers.
- Requesters, from which users can access shared resources on the servers. Requesters can also share resources using the peer capability with a limitation of one session at a time.

Network administrators are responsible for setting up domains and servers and ensuring that all workstations on the domain are interacting properly with each other and with other domains. Network administrators also define and set up logon assignments and public applications so that users can easily access shared resources and applications.

For more information, see “Domains” on page 30.

What is a Requester?

A *requester* is a workstation from which you can log on to a domain or access a peer server (IBM or others), and use resources. After successful logon it is possible to access shared resources (such as directories and printers) and use the processing capability of the servers. Because you can access shared resources from requesters, you can reduce your hardware requirements for the requester workstations.

There are three main types of requesters in the IBM OS/2 LAN environment:

OS/2 LAN Requester: An OS/2 workstation with requester functions of the OS/2 LAN Server product installed and running.

DOS requester: A workstation with DOS LAN Services installed and running. You can install DOS LAN Services on a workstation running DOS with or without Windows 3.1. DOS LAN Services is provided with the OS/2 LAN Server 4.0 product.

Peer workstation: This is a special type of requester. Like a server, a peer workstation shares resources with users on a LAN. A peer workstation can also be used as a requester except for domain administration purposes.

OS/2 LAN Server 4.0 Requester configured as a Peer Server

OS/2 LAN Server 4.0 Requester can also be configured as a peer server. The difference between the peer server capability of OS/2 LAN Server 4.0 Requester and IBM Peer for OS/2 Version 1.0 is that OS/2 LAN Server 4.0 Requester allows only one access to a shared resource at a time, and definitions must be done using the command line interface.

IBM Peer for OS/2 Version 1.0 allows multi-session sharing and has a user-friendly GUI.

OS/2 LAN Server 4.0 Requester on the Desktop

The installation program of OS/2 LAN Requester places a number of folders on the Desktop. These are:

IBM LAN Services: Contains the main programs and information for OS/2 LAN Server 4.0 Requester, as shown in Figure 78 on page 151.

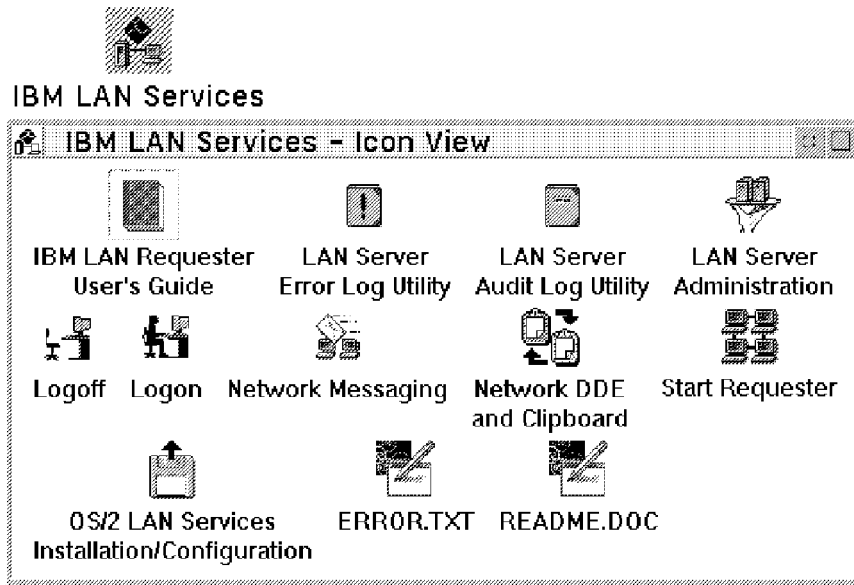


Figure 78. IBM LAN Services Folder

UPM Services: Contains the local database administration of user IDs and group IDs, also known as User Account Management, and delivers the Logon and Logoff objects. The UPM Services folder is shown in Figure 79.

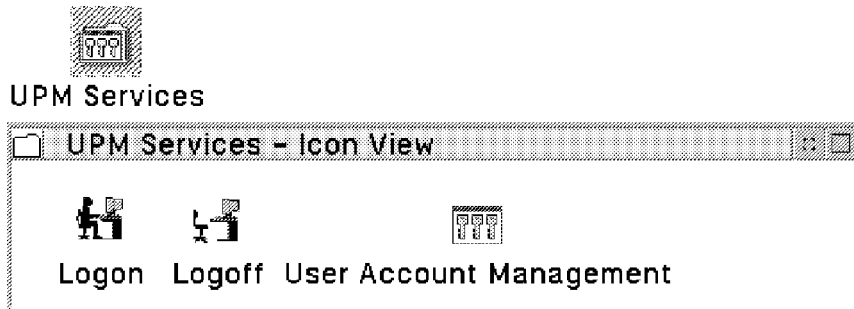


Figure 79. UPM Services

Network Folder: Useful for doing LAN Server administration, assigning local drives as resources, domain/local logging on/off and using the Network Browser. The Network folder is shown in Figure 80 on page 152.

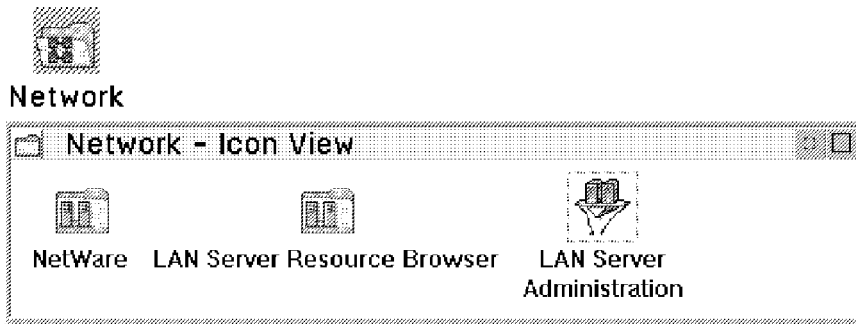


Figure 80. Network Folder

LAN Tools: Contains the Network SignON Coordinator application.

Network Applications Folder: Displays after a user has successfully logged on to a domain, if applications have been assigned to that user ID. This folder contains the network applications defined on the domain for that user.

Note: All network applications will be placed in this folder independent of the operating system the application runs under. OS/2 Warp starts the environment the application needs to run on automatically. Figure 81 shows the Network Applications folder containing OS/2 applications as well as Windows applications.

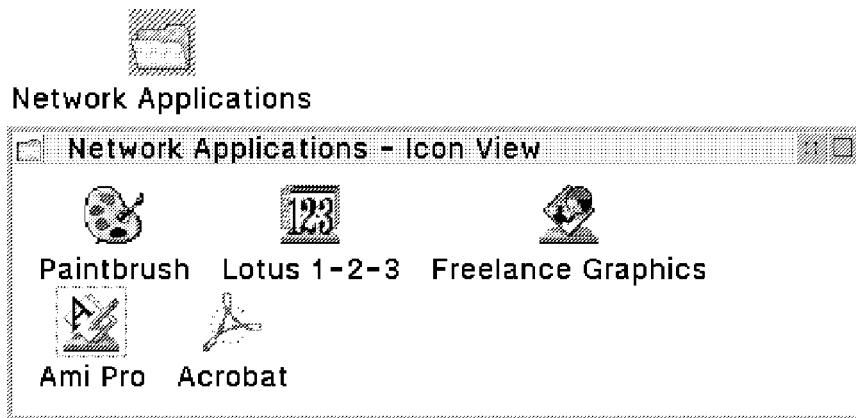


Figure 81. Network Applications Folder

Getting error message help

There is an icon called ERROR.TXT in the IBM LAN Services folder that can be useful when trying to analyze possible causes of errors. If you are experiencing an error and you have the error message ID or some other information identifying the error, take a look at the ERROR.TXT file.

OS/2 LAN Requester Functions

In this section, we give an overview of the various functions a user can do from a workstation with OS/2 LAN Server 4.0 Requester installed.

LAN Server Administration GUI

You can access the LAN Server Administration GUI from the LAN Services folder on the Desktop or from the Network Folder. You can administer up to six domains, each with an icon in this folder.

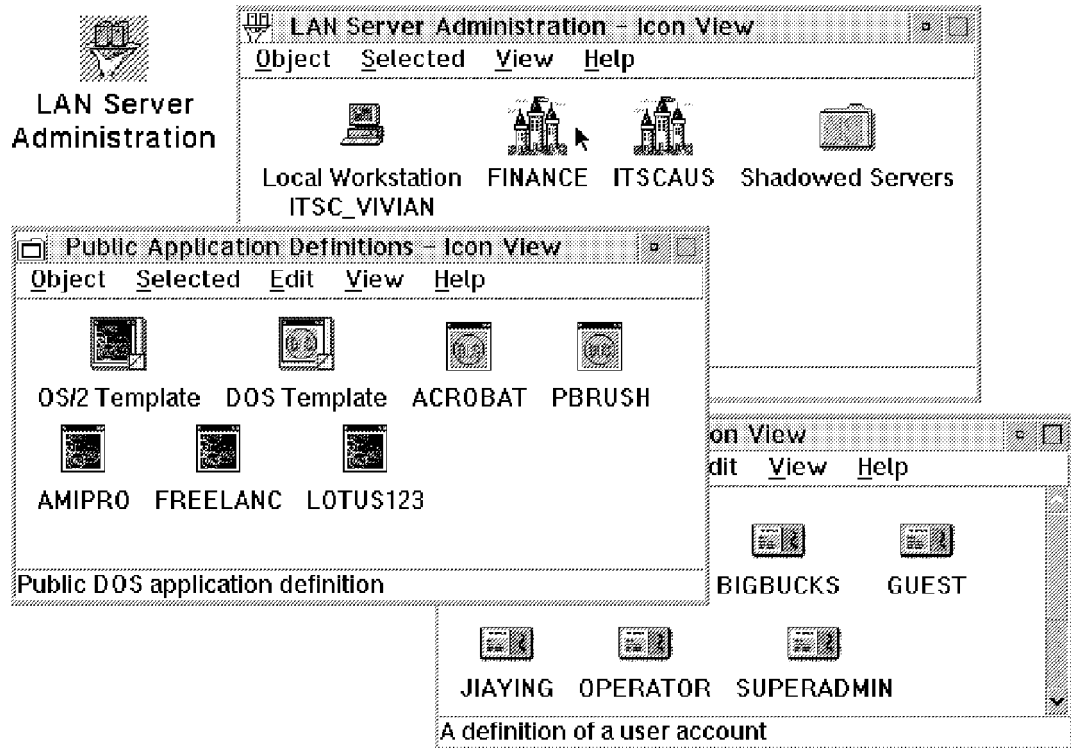


Figure 82. LAN Server Administration Graphical User Interface

From the LAN Server Administration GUI, administrators can do the following:

- Manage domain users/groups, including assigning users logon assignments and network applications
- Manage domain aliases
- Set access control on domain resources
- Manage network applications
- Manage shadowed servers

- Connect to resources for their own use and manage their own network applications

Figure 82 on page 153 shows the LAN Server Administration Graphical User Interface.

README.DOC file

There is an icon called README.DOC in the IBM LAN Services folder where you may find last minute product information that is not in the online manuals. Please read it!

Network Folder

Using the Network folder, users can perform the following tasks:

- Connect to resources with current or logon assignments
- Create Desktop objects from network resources
- Shadow network objects
- Manage your own public and private applications
- Print files
- Connect to resources with the Browser.
- Update current assignments with drag and drop
- Display network objects
- Connect to a resource by assigning a drive or port
- Disconnect a current assignment
- Display objects assigned to drives
- Create a shadow of a network resource on the Desktop
- Print on the Desktop
- Copy or move files and directories on the network

See “Network Folder” on page 225 for more information.

Changing the Remote IPL Configuration

If your workstation starts and performs initial program load (IPL) from a remote server, it is called a *remote IPL* workstation. When you power on your workstation, a remote IPL server sends files to your workstation. You can temporarily change the way remote IPL is configured for your workstation. For example, if you have been using the OS/2 operating system, you may occasionally want to IPL DOS remotely to run a DOS application that does not run under a multiple DOS session on an OS/2 system. The change remains in effect only for the next time the workstation is IPLed.

Your network administrator must set up the operating system you want to IPL on the remote IPL server.

Connecting to Servers

Access to servers on an OS/2 LAN Server is governed in two ways. First, User Profile Management (UPM) Services provides validation for a user ID and password at logon. Second, OS/2 LAN Server has its own access control system that provides a set of permissions that allow the network administrator to grant users various levels of access to shared resources.

Before you can connect to any network resources you need to log on to the domain. There are two types of logon process:

- Domain or LAN logon
- Local logon

User Account Management is a generic interface developed to be used with multiple IBM OS/2 client/server products including IBM Peer for OS/2 Version 1.0, OS/2 LAN Server, DB2/2 for OS/2, CM/2 and other products. It is an OS/2 Presentation Manager utility that provides a set of user and group validation and management functions that help control access to information. UPM Services is used to validate users who access controlled data or use programs that reside on an IBM Peer for OS/2 Version 1.0 workstation or OS/2 LAN Server server. User IDs and optional passwords are used to regulate data access. These IDs and passwords are assigned by a user with administrative authority. UPM Services tasks are performed through a menu interface, with online help to assist both the user and the administrator.

For more details see “Starting User Account Management” on page 129 for details on using User Account Management.

Logon Tips

You can logon to a domain controller either by using the Logon objects which reside in the IBM LAN Services folder as well as the UPM Services folder or by issuing the LOGON command. Either way keep the following in mind:

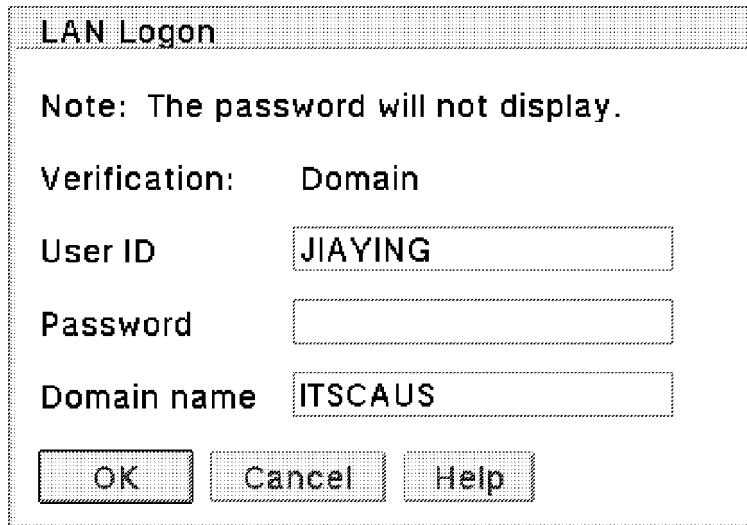


Figure 83. LAN Logon Window (Logon to LAN Server)

- A LAN workstation (domain, additional server, peer server or requester) can log on to a domain or to itself (local logon). No workstation can log on to a peer server.
- The logon command being performed when logging on to the domain controller is equal to the following command syntax:

```
--LOGON-----
      -user ID--/P:password-  -/D:domain-
```

Parameter	Description
user ID	Identifies the user logging on. If user ID, is not specified the Logon window which is shown in Figure 83, is displayed.
/P:password	Specifies the password. If user ID is not specified, /P is ignored.
/D:	Specifies the domain on which a logon is to be attempted. An attempt to start the client is made (if NET START REQ was not performed before), and, if successful, the domain controller completes logon.

Notes:

1. If the client cannot be started, then a local logon to the workstation is attempted. A successful local logon enables working with DB2/2 databases (if you have a DB2/2 environment running). However, since no connection exists to a domain controller, you will now have the ability to work with LAN Server resources.
2. If the LOGON command is issued without any parameters and you are logged on to a domain controller, the user ID and password are verified by the local peer.
3. If you are already logged on to a domain and want to log on to another domain, specify the LOGON command, user ID, and password with the new domain name. This logs you off the old domain and logs you on to the new domain without windows being displayed.

`domain` Specifies the name of the domain controller you want to log on. If `/D:domain` is not specified, the domain name specified in the `IBMLAN` `IBMLAN.INI` file is used as the domain to log on to.

- You can only be logged on to one domain at a time.
- You can easily connect to resources on a domain that you are not logged on to if the user ID and password defined on that domain are the same as the user ID and password that your are logged on with.

For this reason, if you want to access multiple LAN domains and peer servers from the same machine, it is best to define the same user ID with the same password on all servers.

Notes:

1. As with any resource, for the user to successfully use the cross-domain resource, access permissions must be set properly. Ensure that either you (if you are the administrator on both domains) or the administrator of the other domain does at least one of the following:
 - a. Set up the user ID (with the *same* passwords) in both domains, and then grant permissions to the resource in the other domain through the user ID.
 - b. Grant the desired access permission to the resource through the GUEST user ID on the external domain.

2. You can do one or both of the above so that users can then access the cross-domain resource transparently; that is, the resource appears to be in the local domain. If the user ID is *not* known to the external domain, then the user will be granted the GUEST user permissions. If the user ID *is* known to the external domain, then the user is granted the permissions for that ID.
3. If the user ID is known on the external domain, but the passwords are not the same on both domains, then the user can still access the cross-domain resource by specifying the external password when requesting resource use, for example:

```
NET USE X: TEMP password
```

- You can perform more than one local logon as local user if the following command was issued previously:

```
LOGON /O:MULTI
```

- Logoff from the UPM Services folder (or type `LOGOFF /L` at the OS/2 command prompt) to check which type of logons are active on the workstation.

Connecting to Resources

After the administrator of the domain has defined a resource as an alias and granted you permission to access the alias, a local device name must be assigned to the alias before you can use it.

A local device name is a drive, COM port, or LPT port defined on your workstation. The type of resource you are using (directory, printer, or serial device) determines the local device name you should use.

Local device names for directories and files are drive letters (C, D, E, and so on). Local device names for printers are printer ports (LPT1, LPT2, and so on). For serial devices, (modems, plotters) you can use either LPT ports or COM ports (COM1, COM2, and so on).

The Network folder and LAN Server Administration GUI are easy-to-use graphical interfaces with which you can assign local device names to resources. You can make two kinds of assignments:

- Logon assignments, which are shared resources made available to you each time you log on.
- Current assignments, which include logon assignments and resources that you want to connect to for the current session.

Functions Common with IBM Peer for OS/2 Version 1.0

Since IBM Peer for OS/2 Version 1.0 provides requester support for OS/2 LAN Server, many OS/2 peer functions are equal to OS/2 LAN Requester.

Network Messaging

The network messaging function allows you to send messages to, and receive messages from, other users on the network. You must be logged on to be able to send and receive messages using network messaging. The network messaging function uses the Messenger service to accomplish these tasks. When a new message arrives on your workstation, the Messenger service adds it to the list of messages waiting to be read and, if you have configured the Popup option, informs you of its arrival through a popup window. Messages can be sent to users who are logged on, or to workstations that are started and running the Messenger service. Functions that can be performed in Network messaging are:

- Send a new message
- Read messages
- Reply to messages
- Delete messages
- Configure Network Messaging



Network Messaging

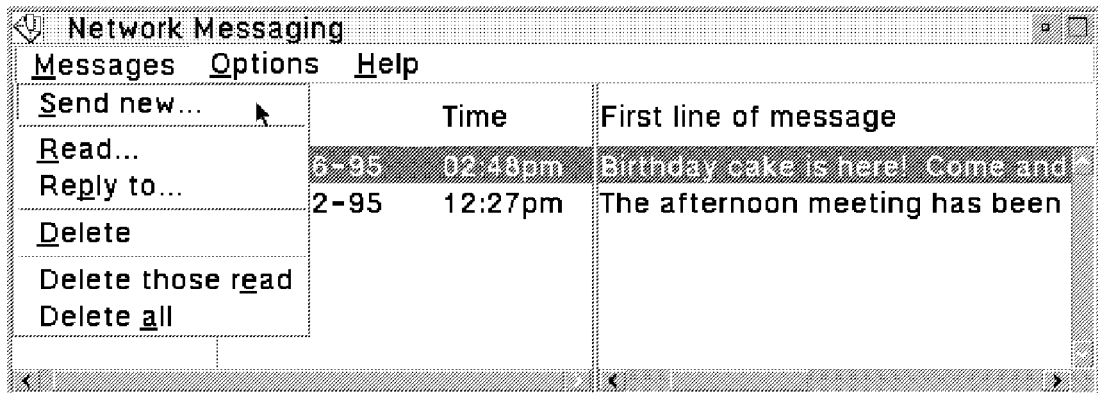


Figure 84. Network Messaging

Network messaging can be configured so that messages arrive without notification, or to remind you that a message has arrived and has not been answered, as shown in Figure 85 on page 160.

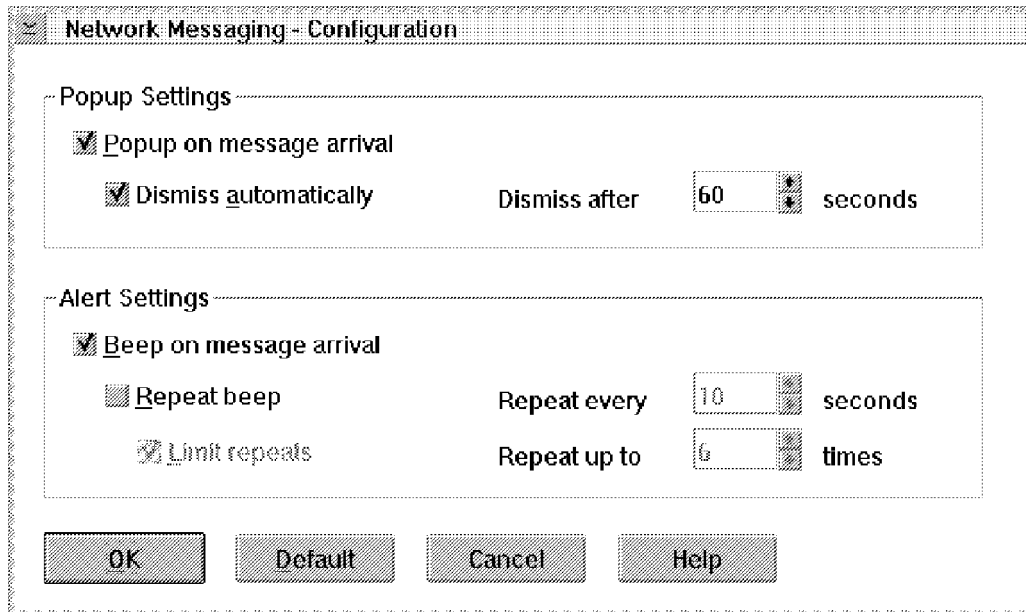


Figure 85. Network Messaging Configuration

Network Messaging is added to the Startup folder when IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester are installed. It starts minimized, with a default of popup when a message is received.

When using Networking Messaging with IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester configured as a peer, the list functions will only show users and groups that have been defined on your workstation using UPM Services as possible recipients of your messages. You can enter the name of any other user you want to send a message to in the destination field. For details on defining users and groups, see "Starting User Account Management" on page 129.

When using Network Messaging with OS/2 LAN Requester, the list functions will show users and groups defined on the OS/2 LAN Server domain controller.

Note: You can only use the list functions if you are defined as an administrator.

All messages you receive are saved in a message log on your workstation until you delete them.

The online IBM Peer for OS/2 Version 1.0 *Users Guide* and OS/2 LAN Requester *Users Guide* provide more information on Network Messaging.

Network DDE and Clipboard

The *network clipboard* is an area of memory that data can be copied into so that it can be shared with users on other workstations.

The network clipboard also allows you to store data from the clipboard. These pieces of stored data are known as *clippings*. Clippings let you share several sets of data at the same time with users at other workstations.

Network Dynamic Data Exchange (DDE) and Clipboard extends DDE capabilities and the clipboard across the network. It enables users running various applications on their local workstations to connect to other remote workstations and share data through the clipboard and files saved from the clipboard.

Network DDE and Clipboard does not create a network clipboard, it allows other users to have access to your local clipboard and allows you to access other users clipboards. With the Network DDE and Clipboard function, you can:

- Set access options
- Use and share data
- View current network connections
- Copy local data to your clipboard
- Copy the contents of a remote clipboard
- Save data as a clipping
- Copy and view a clipping
- Delete a clipping
- Link data over the network
- Allow links to data through your clipboard and clippings
- Link to data on a remote workstation
- Manage existing links

Figure 86 shows you the primary window for Network Clipboard and DDE.

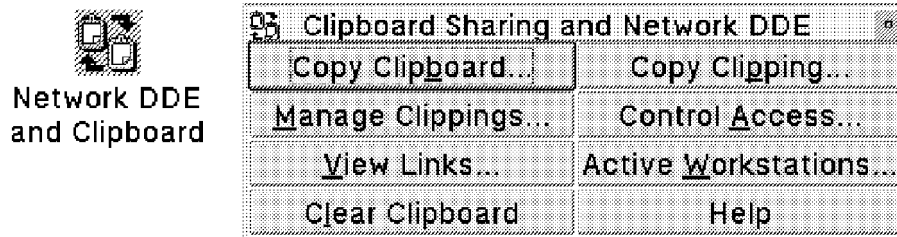


Figure 86. Clipboard Sharing and Network DDE

Access can be controlled to allow users to have access to only specific portions of the Network DDE and Clipboard function, as shown in Figure 87 on page 162.

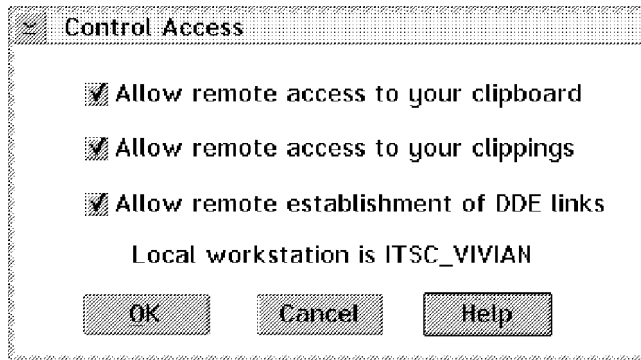


Figure 87. Control Access to Network Clipboard and DDE

For more information, see the online IBM Peer for OS/2 Version 1.0 *Users Guide* and OS/2 LAN Requester *Users Guide*.

Audit Log Utility

When auditing is enabled on an OS/2 LAN Server server or IBM Peer for OS/2 Version 1.0 machine, a log is created which can be browsed using the Audit Log Utility. The audit log contains information about resource use and security. You can use audit log information for accounting, security, studying network use, or problem determination. You can choose which resources are to be included in the audit log.

The audit log, as shown in Figure 88 on page 163, can contain entries for any of the following events:

- Service state changes
- Successful and unsuccessful requests for session connection
- Successful and unsuccessful requests for peer logon
- Successful and unsuccessful share requests
- Changes to user and group accounts database
- Changes to the access control database
- Resource access as defined by resource auditing options
- Logon limit violations


**LAN Server
 Audit Log Utility**

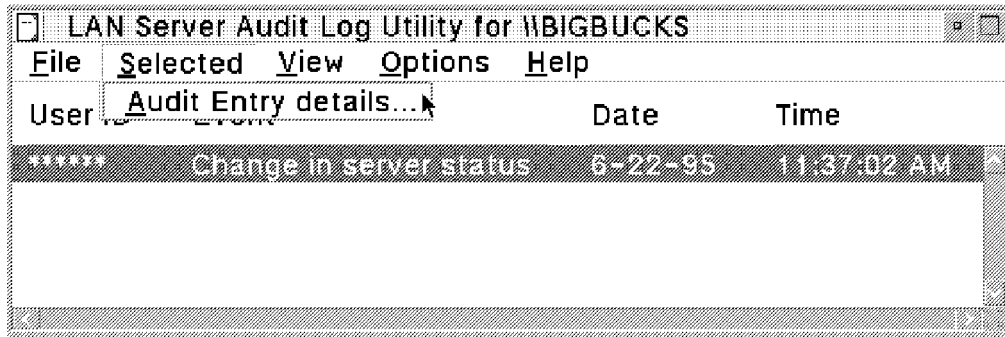


Figure 88. Audit Log Utility

The Audit Log Details can then provide more information about a particular record as shown here:

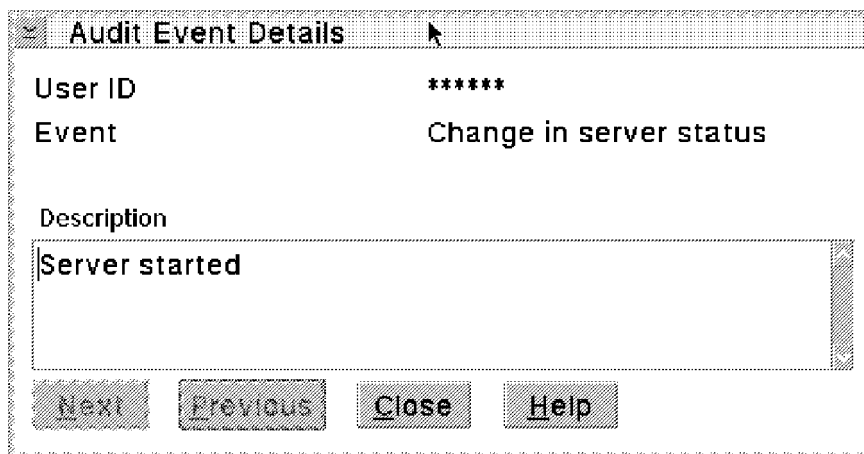


Figure 89. Audit Log Details

Additionally, you can specify that access attempts to a resource be recorded in the audit log when you create an access control profile for that resource.

Note: To access the audit log of another machine, you need to be logged on with a user ID and password that has administrator privilege on the remote machine.

The IBM Peer for OS/2 Version 1.0 *Users Guide* and the OS/2 LAN Requester *Users Guide* provide more detail on using the Audit Log Utility.

Error Log Utility

OS/2 LAN Requester and IBM Peer for OS/2 Version 1.0 store error messages in a file called ERROR.DAT. The Error Log Utility is a graphical interface that allows viewing, printing, and output to file. It also allows you to set the maximum size of that file and to access to the error log of another peer or domain server in the LAN.

The error log records the following types of errors, as shown in Figure 90:

- Network software internal errors
- OS/2 internal errors
- Network service errors

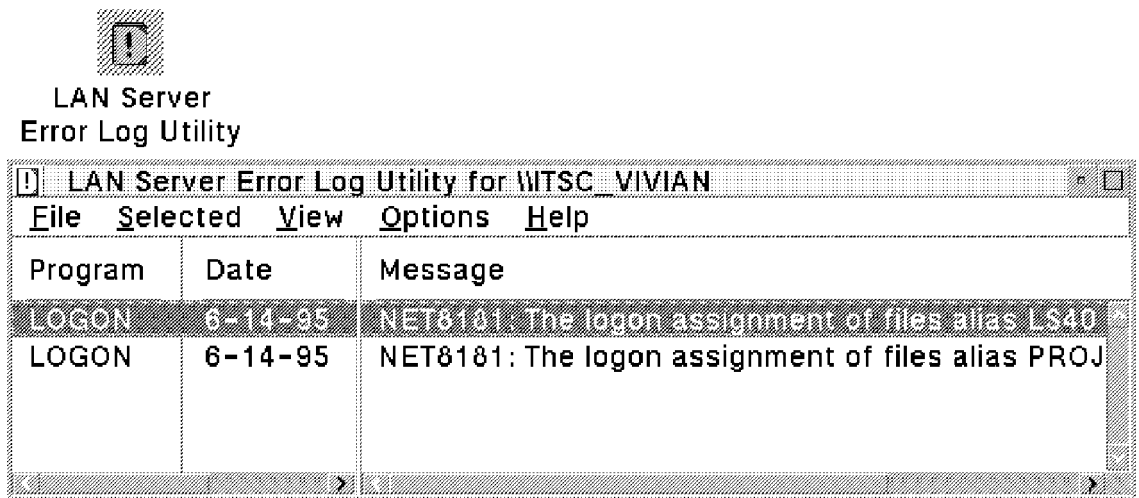


Figure 90. Error Log Utility

The error log contains the following information about each error, as shown in Figure 91 on page 165:

- Name of the service or program that generated the error
- Date and time the error occurred
- Number and text of the error message
- Description or cause of the error

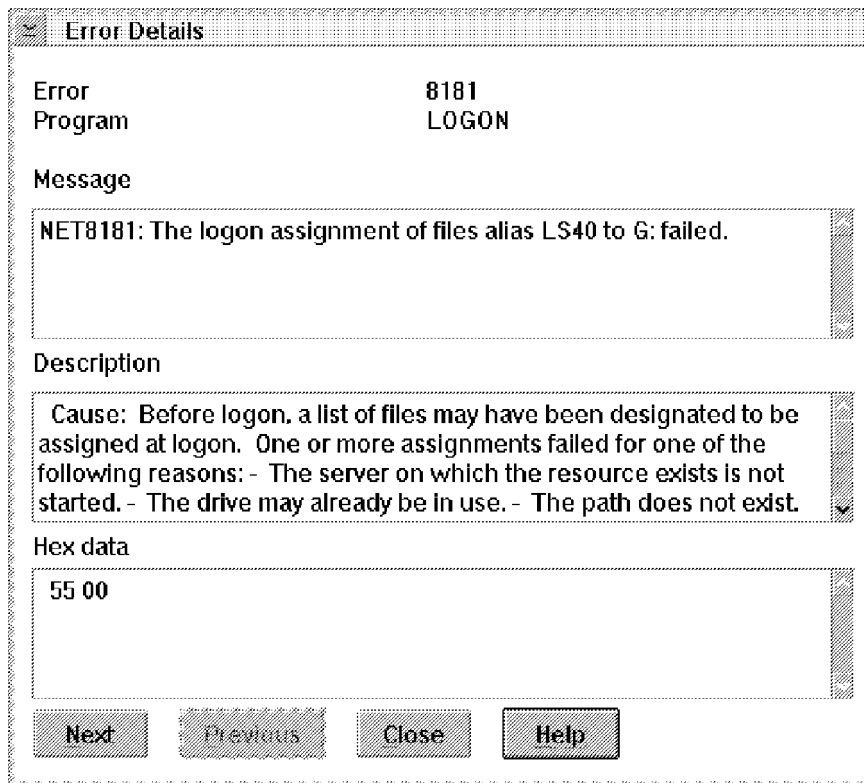


Figure 91. Error Details

You can display, sort, print, and clear error log entries and output them to a file.

You can also use the `NET ERROR` command from an OS/2 command prompt to view and delete errors.

Note: To access the error log of another machine you need to be logged on with a user ID and password that has administrator privilege on the remote machine.

The IBM Peer for OS/2 Version 1.0 *Users Guide* and the OS/2 LAN Requester *Users Guide* provide more detail on using the Error Log Utility.

OS/2 LAN Server 4.0 Requester in a Peer Environment

The OS/2 LAN Server 4.0 Requester Peer service allows the owner to share multiple directories, one printer queue, and one communication device queue with other users on the network. It lets one user at a time create a session with the peer workstation. This differs from a server in a domain

and the OS/2 Peer component, which both allow sessions with multiple requesters.

Since the Peer service of OS/2 LAN Server 4.0 Requester is set up and maintained only from the command line interface, you must be familiar with LAN Server commands before acting as a peer workstation owner or administrator. An owner is the user defined by the username parameter in the server section of IBMLAN.INI file on the peer. OS/2 LAN Server 4.0 Requester configured as a peer server may share resources with any workstation in the LAN and at the same time act as a normal requester using resources of other peer servers or domain servers. The only limitation, other than the use of the command line interface, is that it allows only one session at a time for sharing network resources. This means that if two workstations want to print at the same time to a printer attached to a OS/2 LAN Server 4.0 Requester workstation, then one of these has to wait until the other has finished printing and released their connection. For this reason, it is preferable to use IBM Peer for OS/2 Version 1.0 instead of OS/2 LAN Server 4.0 Requester if no domain administration is required.

Viewing OS/2 LAN Requester Peer Resources

Workstations running the Peer service under LAN Server Version 3.0 or 4.0 are similar to OS/2 Peer in that they can share resources on the LAN. However, remote users cannot view a listing of those resources unless IPC\$ is shared at the peer workstation where the resources reside. (IPC\$ is a special share that enables interprocess communications between workstations.) IPC\$ is not shared by default at OS/2 LAN Requester peers configured for share-level security, a form of sharing in which passwords can be assigned to resources.

To share IPC\$ at a LAN Server peer with share-level security, start the Peer service at that workstation, log on to the peer, and then enter the following OS/2 command:

```
NET SHARE IPC$
```

Interacting with an OS/2 Warp Connect with IBM Peer for OS/2 Version 1.0

IBM Peer for OS/2 Version 1.0 has no NETLOGON service, therefore, users cannot log on directly. However, it is still possible to connect to resources on the IBM Peer for OS/2 Version 1.0 because UPM Services on the IBM Peer for OS/2 Version 1.0 will perform verification of your user ID and password when you attempt to connect to a resource. You are then granted access if your user ID has been given permission.

The functions you can perform on the IBM Peer for OS/2 Version 1.0 workstation depend on the authorization your user ID has.

- If you are a user of the peer server, you can access authorized resources of the peer server using the `NET USE` command.
- If you are an administrator of the peer server, you can administer the IBM Peer for OS/2 Version 1.0 from the command line interface using the `NET ADMIN` command.

Installation

When you select to install the OS/2 Warp Connect with the OS/2 LAN Server 4.0 Requester component, the following services are automatically selected for you:

- Requester
- OS/2 LAN Services Installation/Configuration program
- Graphical User Interface
- User Profile Management
- Network Messaging
- Network DDE and Clipboard

OS/2 LAN Server 4.0 Requester peer services

The Peer services function of OS/2 LAN Server 4.0 Requester is not installed during the OS/2 Warp Connect Easy Installation or Advanced Installation.

Any other services you require can be loaded by using either:

- The Individual Product Installation and reinstalling OS/2 LAN Requester selecting the Tailored Path of the Installation/Configuration program.
- The Individual Product Installation to create diskettes and use the Installation /Configuration program from your IBM LAN Services folder to add the additional services.

Figure 92 on page 168 shows the Install and Remove panel used to add or delete components from your system.

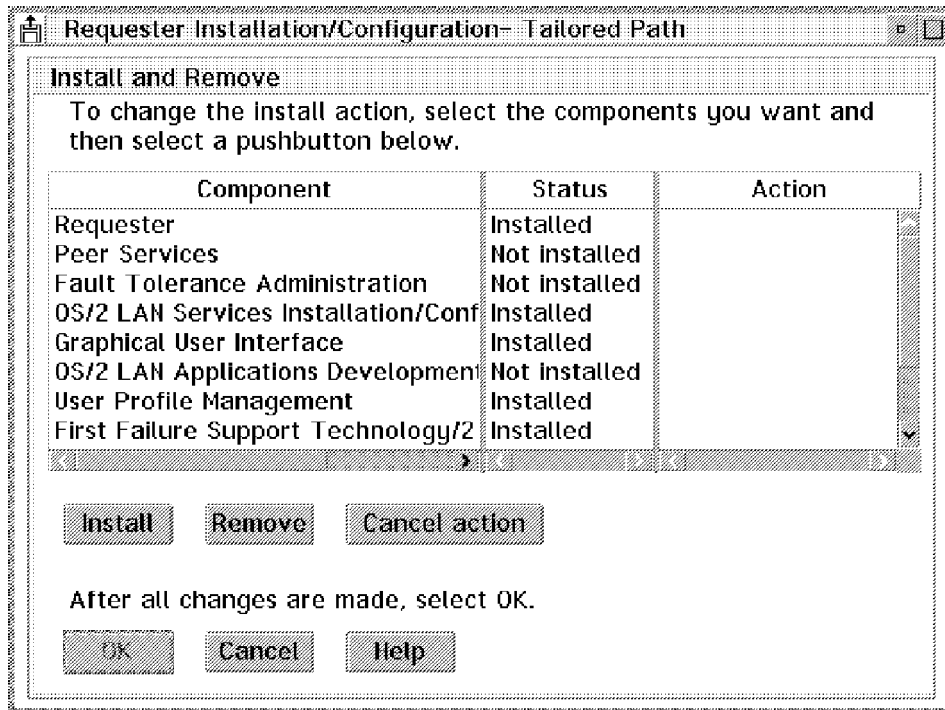


Figure 92. Requester Installation/Configuration - Tailored Path

Protocol Considerations

OS/2 LAN Server 4.0 Requester is a Server Message Block (SMB) based application that uses NetBIOS as a transport protocol. For that reason, it is preferable when possible, to use native NetBIOS-based networks because they are simpler and faster. Native NetBIOS can be installed on:

- Single LAN
- More than one LAN linked by transparent bridges

If you have another LAN environment, it is still possible to use OS/2 LAN Server 4.0 Requester by using the function provided in MPTS.

The new version of Multi-Protocol Transport Services / AnyNet provides two alternatives to native NetBIOS:

- TCPBEUI or NetBIOS over TCP/IP
- IPXNB or NetBIOS over IPX

Using NetBIOS over TCP/IP, OS/2 LAN Server 4.0 Requester can access domains or peer servers passing across a TCP/IP-based network.

Using NetBIOS over IPX, allows OS/2 LAN Server 4.0 Requester to cross IPX-based routers.

It is also possible to combine NETBEUI with each of the two alternatives and have:

- Native NetBIOS and NetBIOS over TCP/IP
- Native NetBIOS and NetBIOS over IPX
- Native NetBIOS and NetBIOS over IPX and NetBIOS over TCP/IP

Figure 93 on page 170 shows two networks. The upper is a NetBIOS only network. The lower is a multiprotocol network.

Chapter 9, “Multi-Protocol Transport Services (MPTS)” on page 377 has details on setting up multiple protocols, and using MPTS for your LAN connection.

In Figure 93 on page 170, the OS/2 LAN Server 4.0 Requester workstations can access an OS/2 LAN Server 4.0 machine over a TCP/IP link using NetBIOS over TCP/IP, and can access the IBM Peer for OS/2 Version 1.0 machine over an IPX link using NetBIOS over IPX. They can also access the OS/2 LAN Server 4.0 machine on their local network using NetBIOS.

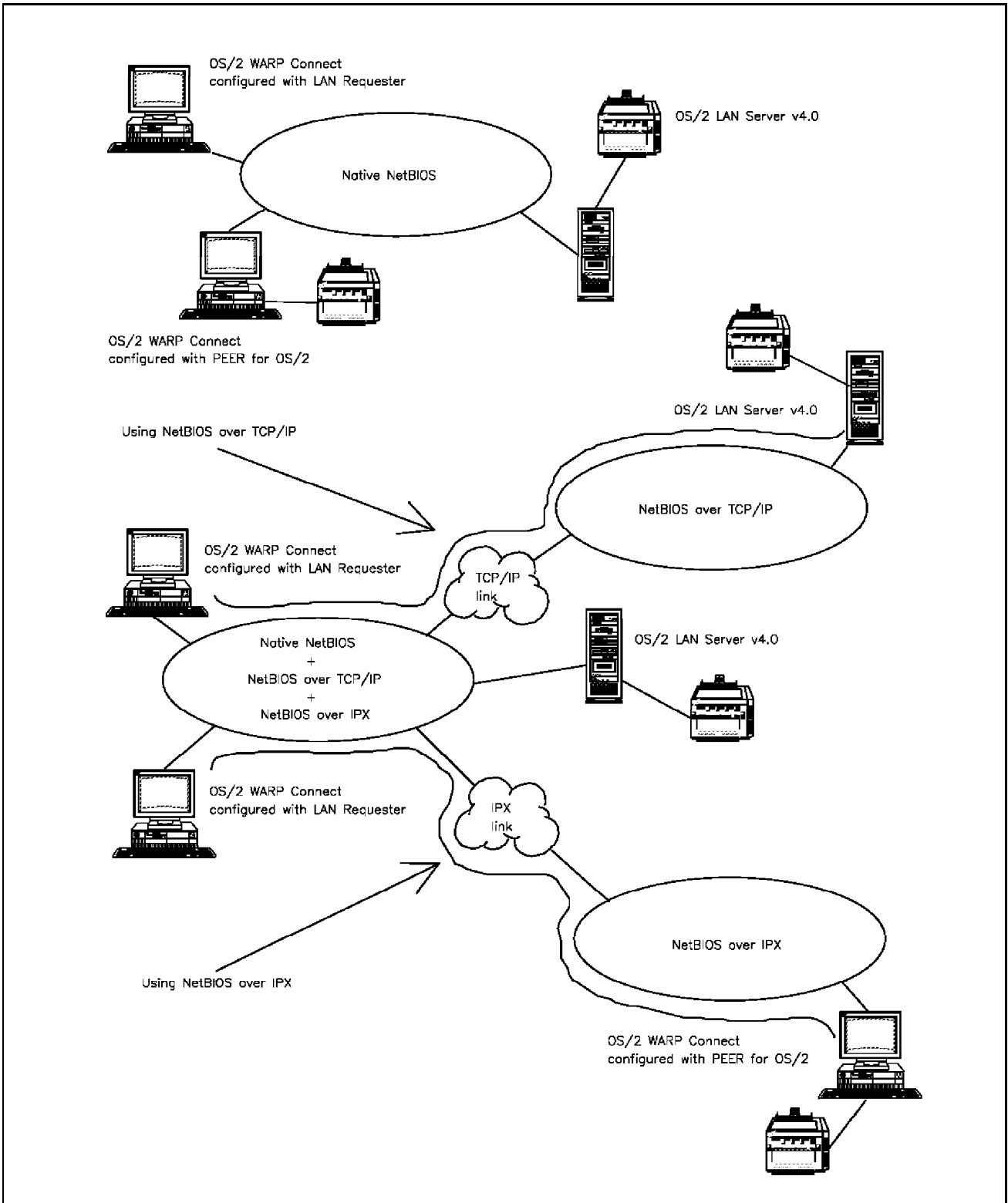


Figure 93. NetBIOS-Based Environment and a Multiprotocol Environment

Using a Network COM Port for Internet Access

It is quite convenient to share (a) modem(s) connected to a workstation either through peer services or LAN Server. The Internet dialer on your peer or requester workstation can use a network COM port. You need to apply APAR PJ18597.

- DIALER.EXE must have a file date of May 11th or later (At least Version 1.43d)
- SLIPPM.EXE must have a file date of May 18th or later (At least Version 1.11)

The above mentioned files provided by OS/2 Warp Connect are older and therefore do not support a network COM port.

Removing OS/2 LAN Server 4.0 Requester

OS/2 LAN Server 4.0 Requester can be removed from your machine by using the OS/2 LAN Services Installation/Configuration program which resides in the IBM LAN Services folder.

1. At the Easy or Tailored Installation/Configuration window select **Tailored**.
2. At the Installation Tasks window select radio button **Remove LAN Requester from this workstation** and then select **OK**.

Removing OS/2 LAN Server 4.0 Requester

The OS/2 LAN Server 4.0 Requester removal can also remove MPTS. You will be prompted whether you also want to remove MPTS or not. Select **No** at the Remove LAN Server and Multi-Protocol Transport Services (MPTS) window to keep MPTS if you are running any other networking products such as TCP/IP.

Chapter 5. OS/2 Warp Connect NetWare Client for OS/2 Version 2.11

The NetWare Client for OS/2 Version 2.11 enables OS/2 workstations to connect to NetWare Servers.

Features of the NetWare Client for OS/2 Version 2.11 are:

- Support for both NetWare 3.x and NetWare 4.x servers
- Support for SFTIII (System Fault Tolerant level 3) for both client and SPX
- Provide access for up to nine parallel ports
- Support for OS/2, DOS and WIN-OS/2 private sessions, DOS and WIN-OS/2 global sessions, VMBoot private sessions, and VMBoot global sessions for login to NetWare 3.x servers

Note: VMBoot is used for support of the NWAdmin utility (for administering a NetWare 4.x network).

There are three ways to install the NetWare Client for OS/2 Version 2.11 from the OS/2 Warp Connect package:

- As part of an Easy Installation
- As part of an Advanced Installation
- From diskettes created from the OS/2 Warp Connect CD-ROM

The recommended method of installing the NetWare Client for OS/2 Version 2.11 is to use the OS/2 Warp Connect integrated installation process.

Information for Users Migrating from DOS to OS/2

This section shows the basic differences between using NetWare from an OS/2 workstation and using NetWare from a DOS workstation.

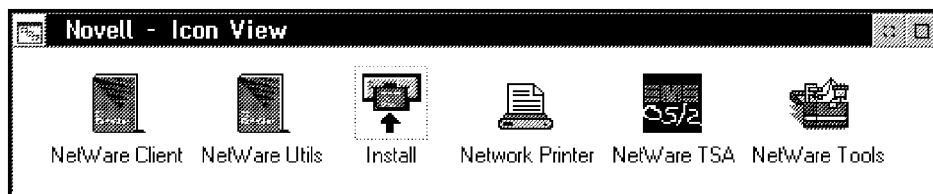


Figure 94. Novell Folder

Login

When you start your workstation, NetWare Client for OS/2 Version 2.11 maps drive L: as the default drive to the SYS:LOGIN directory. This mapping combines with the L:\OS2 path that the NetWare Client for OS/2 Version 2.11 installation program adds to your path statement in CONFIG.SYS, and gives you a search path to the login utilities. (You don't have to change to drive L: to login). See "Mapping to Login Utilities" on page 177 for more information.

NetWare Client for OS/2 Version 2.11 does not support search path mapping. Because of this a LASTDRIVE statement is not required in CONFIG.SYS. Look at "Drive Mappings and Search Drives" on page 177 for more information on path mapping.

You can login from any OS/2 session or the Desktop, and your login applies to all other OS/2 sessions.

Attach function

The Attach function in NetWare Tools does not run a login script. As the name suggests it performs an ATTACH command to the server. To execute a login script, run LOGIN from the command line.

You can also login from virtual DOS sessions running on OS/2. You can set up virtual sessions so that each session can support its own login to the network (private sessions) or so that all sessions - including OS/2 - share a single login to the network (global sessions). Network support from virtual DOS sessions works much the same as network support from regular DOS workstations. See "Using Virtual DOS and WIN-OS/2" on page 189 for more information on virtual sessions.

Automate the Login Process

You can automate the login process with:

- NetWare Tools and the STARTUP.CMD file
- CONFIG.SYS file

Using NetWare Tools and the STARTUP.CMD File

1. Map all drives needed.
2. Capture any printer ports needed.
3. Save the settings to a file, for example, LOG.NWS. The .NWS (for NetWare Settings) extension is automatically added.
4. Add the following to the STARTUP.CMD:

```
NWTOOLS LOG.NWS AUTOEXIT
EXIT
```

Notes:

1. NetWare Tools does not execute a login script.
2. STARTUP.COMD is executed each time OS/2 boots. It should be located at the root of the boot drive. You can create it as an OS/2 command file if it does not exist.
3. See “Using NetWare Tools” on page 199 for more information on how to use NetWare Tools.

Using CONFIG.SYS: Add the following lines to the end of the CONFIG.SYS file:

```
CALL=C: NETWORK NWSTART
CALL=C:\NETWORK\LOGIN server\user
```

where *server* and *user* are replaced by your login server name and your user ID on that server.

Note: A local login script can be specified using the LOGIN.EXE /S option, for example:

```
CALL=C: NETWORK LOGIN /S C: LOG.TXT server\user
```

Login Scripts

The following commands have unique functions or limitations when used in OS/2 login scripts.

Command	Limitation
EXIT	Does not support the filename parameter.
DRIVE	Sets the default for the login process only.
INCLUDE	If you use an include statement, you must specify a Universal Naming Convention (UNC) pathname for the file to be included. An example of using the include command with UNC naming is INCLUDE \\NW1\SYS\PUBLIC\TEST.TXT. The file to be included is called TEST.TXT and it is located on NetWare Server NW1, volume SYS:, directory PUBLIC. See “UNC Naming” on page 37 for more information about UNC naming.
MAP	The NetWare Client for OS/2 Version 2.11 does not support map search drives. See “Drive Mappings and Search Drives” on page 177 for more information.

SET Sets the environment variable during the login process only. Spawned processes inherit any set variables, but the variable disappears when the LOGIN function terminates.

The following login script commands are not supported in OS/2:

- COMSPEC
- DOS BREAK
- MACHINE NAME

When using NetWare 3.x, the OS/2 login script file is located in SYS:PUBLIC NET\$LOG.OS2. If this is the first time you installed OS/2 on your client system, you need to go to the NetWare server SYS:PUBLIC directory and copy NET\$LOG.DAT to NET\$LOG.OS2. Edit the new file and make the necessary changes to DOS-specific lines, such as deleting COMSPEC statements and search drive statements. Then add `MAP P:=SYS PUBLIC` so you will be able to use the NetWare Utilities.

When using NetWare Directory Services (NDS) under NetWare 4.x, the container login script is used for both DOS and OS/2 users. Profile login scripts are typically used for OS/2 users.

Note: NetWare 4.x supports *if OS="OS2" then...else...end* statements in the container login script.

Utilities

For convenience, the NetWare utilities used with OS/2 have the same names as NetWare utilities for DOS. The OS/2 utilities are different executable files than DOS utilities, and are located in the SYS:PUBLIC\OS2 and SYS:LOGIN\OS2 directories. If you run a NetWare DOS utility in OS/2, OS/2 will start a DOS session to run the utility. See "Mapping to Public Utilities" on page 177 for more information. The *NetWare Utils* online book in the Novell folder has details on using these utilities.

Included are the following OS/2 utility files (not a complete list):

- CX.EXE
- MAP.EXE
- NETX.EXE
- NLIST.EXE
- NPrinter.EXE
- LOGIN.EXE
- SYSCON.EXE
- PCONSOLE.EXE
- FILER.EXE

- MAKEUSER.EXE

Drive Mappings and Search Drives

The NetWare Client for OS/2 Version 2.11 does not support map search drives. The search path function to NetWare utilities and other programs is provided by using the OS/2 SET PATH and SET DPATH commands in the CONFIG.SYS. The online *OS/2 Command Reference* has more details on using the SET PATH and SET DPATH commands.

Mapping to Login Utilities

When you first boot your workstation, NetWare Client for OS/2 Version 2.11 connects to the first server it finds and maps the default login drive to the SYS:LOGIN directory.

This mapping combines with the L: OS2 entry that the NetWare Client for OS/2 Version 2.11 installation puts in your CONFIG.SYS path statement, giving you a search path to the login utilities.

Once you login, the default login drive disappears.

The default login drive can be changed by configuring your NET.CFG file. If the drive letter is changed in the NET.CFG, then the SET PATH statement in your CONFIG.SYS should also be changed to maintain the correct search path.

Mapping to Public Utilities

The NetWare default login script for OS/2 contains the following drive mapping to access public utilities:

```
MAP P: =SYS:PUBLIC
```

This mapping combines with the P: OS2 path that the NetWare Client for OS/2 Version 2.11 installation program puts in your SET PATH statement of your CONFIG.SYS, giving you a search path to the SYS:PUBLIC OS2 directory.

When you type a utility name from any drive other than drive P:, the utility from the OS2 subdirectory is executed.

SYS:PUBLIC mapping

Even though your search path gets set to SYS:PUBLIC OS2 by default, drive P: stays mapped to SYS:PUBLIC.

If you change to drive P:, you are in SYS:PUBLIC, not SYS:PUBLIC OS2. If you run a utility name while in drive P:, the DOS version of the utility is executed.

Configuration Overview

After you've installed NetWare Client for OS/2 Version 2.11 on your workstation, it may need to be configured to run with your network.

When using the NetWare Client for OS/2 Version 2.11 with OS/2 Warp Connect, the configuration options are stored in the NET.CFG file and in the MPTS configuration.

NET.CFG

The NET.CFG file is used to configure the NetWare Client for OS/2 Version 2.11 under OS/2 and has the same purpose as it does under DOS. However, NET.CFG for OS/2 has options and settings that are different from those used in NET.CFG for DOS. Some of them use different syntax and configure software components not included in DOS.

When using the NetWare Client for OS/2 Version 2.11 with OS/2 Warp Connect, the network transport configuration is performed in MPTS. See "NetWare Client for OS/2 Version 2.11" on page 387.

You can create or edit the OS/2 NET.CFG with the NetWare Client for OS/2 Version 2.11 installation program. This program contains online help showing the syntax of all options. (NET.CFG can be edited with an ASCII editor as well.)

You can combine your OS/2 and DOS NET.CFG options in the same NET.CFG file on your OS/2 workstation. When you run a virtual DOS or WIN-OS/2 session, NetWare Client for OS/2 Version 2.11 will use the DOS options. The OS/2 sessions using NetWare Client for OS/2 Version 2.11 ignore the DOS options.

When you start up your workstation, NetWare Client for OS/2 Version 2.11 searches for NET.CFG in the directories specified in the DPATH line in

CONFIG.SYS. If NetWare Client for OS/2 Version 2.11 doesn't find a NET.CFG file, it starts using the default values.

Default NET.CFG

The default NET.CFG installed by OS/2 Warp Connect is as follows:

```
NETWARE REQUESTER
  DIRECTORY SERVICES OFF
;  PREFERRED SERVER servername
```

These default values are suitable for most normal installations.

Situations when NET.CFG configuration is required are:

- You want to change your default login drive
- You want to change the default packet signature security level
- You want to turn off Packet Burst or Large Internet Packet transmissions
- Your workstation will use Named Pipes protocol
- You want your workstation to connect to a preferred Server or Directory tree
- You want to assign more than the default resources to NetBIOS emulation
- You want to combine your OS/2 and DOS configurations
- You want to login to a NetWare 4.x server

If you are going to use NetWare Directory Services (in NetWare 4.x), you will need to edit the NET.CFG file and delete the following line:

```
DIRECTORY SERVICES OFF
```

This will allow you to use NDS and login or attach to NetWare 4.x servers.

Default Login Drive

To change your default login drive from drive L: to drive F, add the following to your NET.CFG:

```
NETWARE REQUESTER
  DEFAULT LOGIN DRIVE F
```

In your CONFIG.SYS in the LIBPATH, DPATH, and PATH lines, you must change all references of L: OS2 to F: OS2.

Preferred Server

Use this NET.CFG setting to specify which NetWare server you want your workstation to attach to when it first accesses the network.

If the server you specify is unavailable, your workstation will attach to the first available server.

```
NETWARE REQUESTER
  PREFERRED SERVER servername
```

Replace `servername` with the name of a server. The server you specify should have the NetWare utilities for OS/2 installed.

Preferred Tree (NetWare 4.x)

This setting is only for sites that have more than one NetWare 4.x directory tree. If you also have specified a preferred server in your NET.CFG file, then the requester can first search for a preferred tree, and then for a preferred server in that tree.

```
NETWARE REQUESTER
  PREFERRED TREE treename
```

Replace `treename` with the name of your tree.

Name Context (NetWare 4.x)

Use this option to set your current position in the NetWare 4.x directory services tree. This allows you to simply type in your user ID when you login, rather than specifying the full context of your user object each time.

If you do not specify a context in your NET.CFG file, you will need to enter a context at the command prompt when you login. The login utility uses this context to search for your user object and connect you to the network. If a context is not specified, the login utility searches for your user object from the root of the tree. If more than one user object exists with the same name, the login utility may not locate the correct user object without a context statement.

```
NETWARE REQUESTER
  NAME CONTEXT = "OU=OS2.OU=ITSC.O=IBM"
```

Note: You may omit the `OU=` and `O=`, for example:

```
NETWARE REQUESTER
  NAME CONTEXT = "OS2.ITSC.IBM"
```


DOS Settings

You can add some DOS settings to your NetWare Client for OS/2 Version 2.11 NET.CFG file. When you start a virtual DOS or WIN-OS/2 session it will use the DOS settings from the NET.CFG.

The DOS setting needs to be started in column 1 of the NET.CFG.

```
NETWARE REQUESTER
  DEFAULT LOGIN DRIVE f
```

```
FILEHANDLES=60
```

Now when a DOS or WIN-OS/2 session starts, it will use the FILEHANDLES=60 setting.

Multi-Protocol Transport Services / AnyNet (MPTS)

Situations when MPTS configuration is required are:

- You want to use more than one LAN adapter
- You have a single LAN adapter, but the adapter is not using factory default settings
- You have an Ethernet network and want to select a specific frame type to use
- Your workstation will use NetBIOS or dual NetBIOS protocols

Default OS/2 Warp Connect frame type settings are:

- Token-ring

```
TOKEN-RING = "yes"
TOKEN-RING_SNAP = "yes "
```
- Ethernet

```
ETHERNET_802.2 = "yes"
ETHERNET_802.3 = "yes"
ETHERNET_II = "yes"
ETHERNET_SNAP = "yes"
```

See "NetWare Client for OS/2 Version 2.11" on page 387 for information on configuring MPTS.

Protocol Support in NetWare Client for OS/2 Version 2.11

NetWare Client for OS/2 Version 2.11 provides four kinds of protocol support:

- IPX
- SPX
- Named Pipes
- NetBIOS (emulation)

NetWare servers and client workstations use IPX as the primary protocol to communicate with each other. They also use SPX for some communications, such as communications between a workstation running NPRINT and a NetWare print server. Support for IPX on the workstation is installed when you install NetWare Client for OS/2 Version 2.11.

In OS/2, IPX is loaded in the CONFIG.SYS file with any other network drivers that are being used.

Check IPX.SYS level

If you install NetWare Client for OS/2 Version 2.11 then ensure that IPX.SYS is dated 5/9/95 or later (check Novell's R211FT.EXE on NetWare) to the NETWARE directory. IPX.SYS can be found in the CID IMG NWREQ directory on the OS/2 Warp Connect CD-ROM. This reduces the occurrence of REQ00815 cannot get connection ID error messages.

DOS virtual sessions in OS/2 use a virtualized version of IPX, called VIPX, rather than the IPX provided with NetWare Client for DOS. VIPX communicates to IPX to allow DOS sessions to communicate on the network. When you install NetWare Client for OS/2 Version 2.11, lines to load IPX and VIPX are automatically placed in the CONFIG.SYS.

The default settings are IPX support for DOS and Windows, global NetWare shell support, and SPX support for OS/2 sessions.

SPX support is required for using NetWare printing services, remote named pipes, and some Windows and OS/2 utilities.

NetBIOS and Named Pipes protocols are provided so that NetWare clients and servers can also function as:

- Distributed application clients and servers
- Non-NetWare network clients and servers
- Terminals connected to main frames or minicomputers

You can select support for these protocols in the NetWare Client for OS/2 Version 2.11 installation program. The protocols you select are then configured into the CONFIG.SYS.

To access Named Pipes and NetWare NetBIOS support over IPX for virtual DOS and WIN-OS/2 sessions on OS/2, you must use the programs provided with NetWare Client for OS/2 Version 2.11.

Client workstations running Named Pipes or NetBIOS can connect to application servers running Named Pipes or NetBIOS.

Several protocols can be installed on the same computer at the same time. While the protocols can use the same network cabling, each protocol might communicate on a separate logical network.

See Chapter 9, “Multi-Protocol Transport Services (MPTS)” on page 377 for more information on using multiple protocols and “NetWare Client for OS/2 Version 2.11” on page 387 for more information about NetWare Client for OS/2 Version 2.11 and MPTS

Installing NetWare NetBIOS Emulation

When you carry out an installation of OS/2 Warp Connect using the Advanced path, you do not get an option to configure NetWare NetBIOS emulation at installation time. Assuming that you have chosen to install the NetWare Client for OS/2 Version 2.11 and either OS/2 LAN Requester or IBM Peer for OS/2 Version 1.0, and the installation has completed successfully, your IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester will be configured to use the NetBIOS protocol. If you require support for NetWare NetBIOS emulation running over IPX, then you need to change your configuration.

The MPTS NetBIOS and the NetWare NetBIOS emulation can coexist on your machine. You need to configure NetWare NetBIOS emulation if you have an application that uses NetBIOS and is located on a server running IPX. An application using NetWare NetBIOS emulation cannot communicate with another application using native NetBIOS. Even if applications are written to the NetBIOS programming interface, IPX protocol stacks cannot talk with NetBIOS protocol stacks. A partner must use the same communication protocol stack.

To change this configuration to use the NetWare NetBIOS emulation you will need to do the following:

1. Start the Install program from the Novell folder.

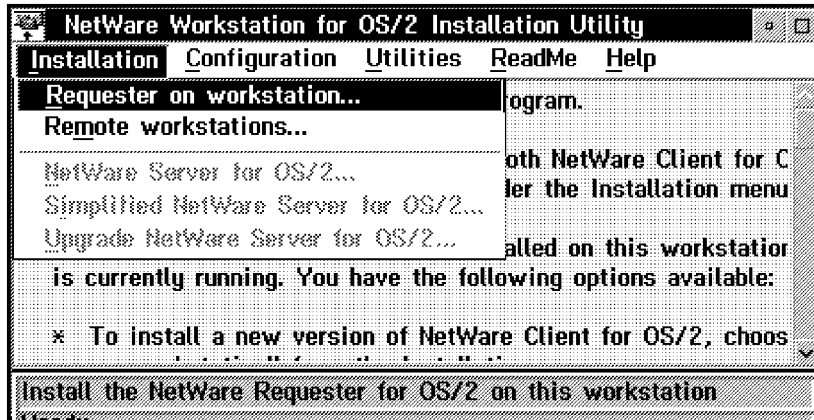


Figure 95. NetWare Installation Utility

2. Select **Installation** and **Requester on workstation**, as shown in Figure 95.
3. Leave the **Target directory for the Requester files** and **Source drive** fields at the defaults if you are reconfiguring your installation. See Figure 96.

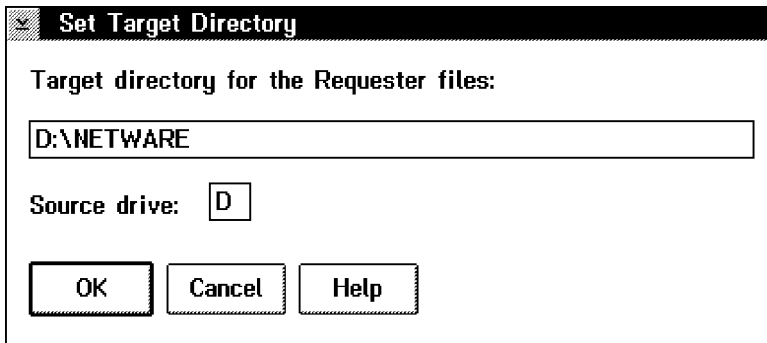


Figure 96. Set Target Directory

4. Select **Only Edit CONFIG.SYS** on the Requester Installation panel.
5. Check the box to *not* update the currently installed LAN driver.
6. Accept the default values on the next few panels until you get to the Optional Protocols panel.
7. Select **NetBIOS Emulation for OS/2 Sessions**, as shown in Figure 97 on page 185.

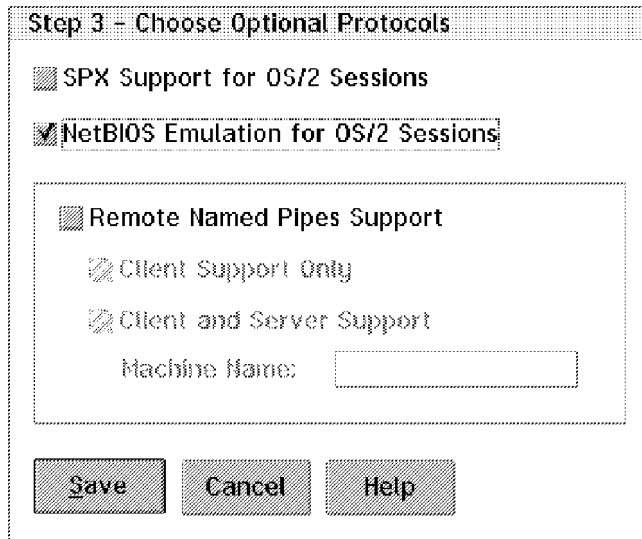


Figure 97. Choose Optional Protocols

8. Having chosen to save CONFIG.SYS, you will return to the NetWare Workstation for OS/2 Installation Utility.
9. Open an OS/2 window and run `NWFIXUP` from the command prompt.

The NetWare Client for OS/2 Version 2.11 does not correctly update your CONFIG.SYS file to use the ODI2NDI driver. Running `NWFIXUP` after any NetWare Client for OS/2 Version 2.11 configuration correctly saves the change in CONFIG.SYS.

10. Choose your configuration.

If you need to change the values of `COMMANDS`, `SESSIONS`, and `NAMES` from the defaults, create and configure your `NET.CFG` file as in the example shown in “Configuring the NetWare NetBIOS Emulation” on page 186.

The following NetWare NetBIOS emulation parameters determine the NetBIOS resources that are available for NetBIOS applications running over NetWare NetBIOS emulation:

- `COMMANDS`

This corresponds with the `NCBS` parameter in the `NETBEUI_NIF` section of the `PROTOCOL.INI` file. The default value is 32.

- `SESSIONS`

This corresponds with the `SESSIONS` parameter in the `NETBEUI_NIF` section of the `PROTOCOL.INI` file. The default value is 16.

- `NAMES`

This corresponds with the `NAMES` parameter in the `NETBEUI_NIF` section of the `PROTOCOL.INI` file. The default value is 24.

Note: If the default values for `COMMANDS`, `SESSIONS`, and `NAMES` are adequate, you do not need to configure the `NET.CFG` file.

Configuring the NetWare NetBIOS Emulation

The following steps are a guideline for configuring NetWare's NetBIOS emulation program.

To configure NetWare's NetBIOS Emulation, start the **Install** program from the Novell Folder.

1. Select **Configuration** and **This workstation** (accept the default path for the `NET.CFG` file).
2. Select **Edit**. The panel in Figure 98 is displayed.
3. Select **NetWare NetBIOS**.

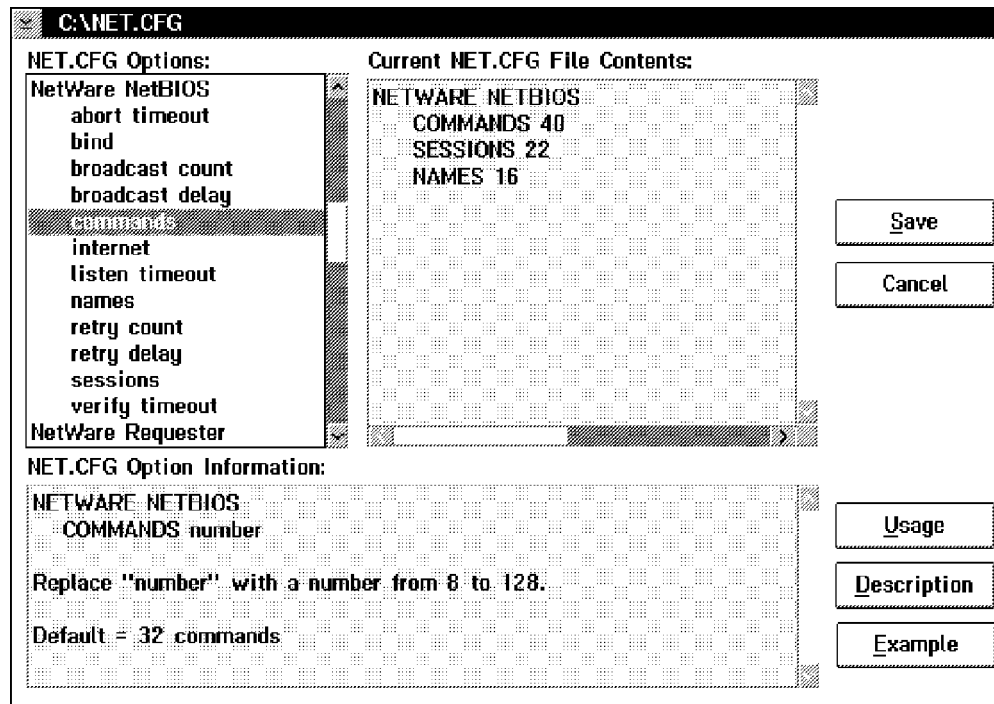


Figure 98. NetWare Client for OS/2 Version 2.11 Configuration Panel

4. Make the appropriate changes to the NetBIOS resource parameters according to the amount of NetBIOS resources needed to run the NetBIOS applications.

5. Save the configuration and close the NetWare Workstation for OS/2 Installation Utility.

Setting Up NetBIOS for Virtual DOS and WIN-OS/2

NetWare Client for OS/2 Version 2.11 and the IBM MPTS program both support the NetBIOS protocol in a virtual session. However, the type of support is different.

NetWare NetBIOS support is not virtualized. This means that the session has a single-connection limitation and cannot use the same NetBIOS driver that is used by OS/2 sessions.

The MPTS NetBIOS support is virtualized, meaning that you can use the virtual NetBIOS support in multiple sessions. You can also use the MPTS or NetWare NetBIOS driver to provide the network support.

The MPTS NetBIOS and the NetWare NetBIOS emulation can coexist on your machine. You need to configure NetWare NetBIOS emulation if you have an application that uses NetBIOS and is located on a server running IPX. An application using NetWare NetBIOS emulation cannot communicate with another application using native NetBIOS. Even if applications are written to the NetBIOS programming interface, IPX protocol stacks cannot talk with NetBIOS protocol stacks. A partner must use the same communication protocol stack. See “NetWare NetBIOS Emulation over IPX” on page 414 for a connectivity diagram when using NetBIOS.

Novell NetBIOS Support

You must load the NETBIOS.EXE TSR program in the DOS session, just as you would to get NetBIOS support on an actual DOS workstation.

When you use NETBIOS.EXE in a virtual session, you cannot get NetBIOS connections from OS/2 sessions or from any other DOS or WIN-OS/2 sessions until NETBIOS.EXE is unloaded. You will only have one NetBIOS connection from a single virtual session. This is true even if your MPTS NetBIOS driver is loaded.

Setup Procedure

1. Enable IPX support for virtual sessions. See “Configuring Virtual Session Network Support” on page 191.
2. Disable NetBIOS support for OS/2 sessions. Novell's NetBIOS solution for DOS boxes is not virtual and doesn't allow other NetBIOS drivers to be running at the same time. Disable NetBIOS support by running the NetWare Client for OS/2 Version 2.11 installation program and

deselecting NetBIOS Emulation for OS/2. See “Installing NetWare NetBIOS Emulation” on page 183.

3. Load NETBIOS.EXE in a single DOS session.
4. Configure NetWare NetBIOS for DOS if necessary.

IBM MPTS NetBIOS Virtual Support

MPTS provides a LAN Virtual Device Driver (LAN VDD) to enable DOS NetBIOS and IEEE 802.2 applications to share a network adapter with OS/2 NetBIOS and IEEE 802.2 applications.

Your virtualized NetBIOS sessions can be supported by the NETBEUI.OS2 driver from IBM, the NETBIOS.SYS driver from Novell, or both.

MPTS NetBIOS support follows the NetBIOS 3.0 (NB30) standard. You can run NetBIOS applications in a virtual session even if those applications do not conform with NB30. However, the need for increasing resources in a session is more likely when running non-NB30 applications.

When virtual sessions are supported by Novell's OS/2 NetBIOS driver, there is a potential resource limitation.

Avoiding Resource Errors

MPTS NetBIOS support for virtual sessions follows the NetBIOS 3.0 (NB30) standard. A NetBIOS 3.0 application reserves a defined number of commands, sessions, and names, when it starts.

If you run NetBIOS applications in several virtual sessions, all resources in one of the NetBIOS components must be reserved and additional applications may not run. You see a resource error when you try to make NetBIOS connections.

You can minimize the possibility that NetBIOS will run out of resources by doing both or either of the following:

- When using virtual NetBIOS connections, increase the default resources allowed for the NETBIOS driver in the MPTS configuration.
- Specify the resources consumed for each virtual session you use. How to specify resources is explained below.

The default `sessions`, `names`, and `commands` settings for `LTSVCFG.COM` are:

```
Sessions=12  
Names=16  
Commands=16
```


These instructions explain how to set resource information for MPTS virtualized NetBIOS. This information is stored using a program called LTVSVCFG.COM. The LTVSVCFG.COM program supports up to four network adapters. You only need to perform this if the numbers of NetBIOS resources required for your application exceed the default values.

1. Open the virtual session.
2. Execute LTVSVCFG.COM with the command line parameters you need.

For example, to set the number of NetBIOS commands to 14, type the following:

```
x: \IBMCOM\LTVSVCFG.COM C=14
```

Three parameters that apply to NetBIOS resources are:

s=number of NetBIOS sessions
n=names
c=commands

For more information about these and other NetBIOS parameters, see the MPTS documentation on NetBIOS and in “NetWare NetBIOS Emulation over IPX” on page 414.

You cannot set parameters for LTVSVCFG.COM to amounts higher than amounts set for the NETBIOS.OS2 or NETBIOS.SYS driver.

The default `sessions`, `names`, and `commands` settings for NETBIOS.SYS driver are:

```
Sessions=16  
Names=24  
Commands=32
```

Using Virtual DOS and WIN-OS/2

From a virtual DOS or WIN-OS/2 session, you can access NetWare 3.x networks. On these networks, you can receive full NetWare support, just as if you were using an actual DOS or Windows workstation. You can also receive support for the IPX, SPX, Named Pipes, and NetBIOS protocols.

NetWare 4.x

You cannot access NetWare 4.x networks from virtual DOS and WIN-OS/2 sessions unless those networks support bindery emulation. If a NetWare 4.x network supports bindery emulation, your DOS or WIN-OS/2 session will be seen as a bindery-based client.

Virtual DOS and WIN-OS/2 Sessions

From a virtual DOS or WIN-OS/2 session, you can have three kinds of NetWare support as follows.

Global Logins (Default)

All DOS, WIN-OS/2, and OS/2, sessions configured for global login support share a single login to a NetWare server. Drives that are mapped in one session apply to the other sessions. A port captured in one session is also captured in other sessions.

This configuration is useful where the number of connections to a server is monitored. All the sessions are using one connection.

Private Logins

All DOS and WIN-OS/2 sessions configured for private login support have their own logins to a NetWare server. Drive mappings and port captures from one session do not apply to the other sessions.

This configuration is useful where users need more than one connection to a server, and where users need logins from DOS or WIN-OS/2 sessions to be separate from logins from OS/2 sessions.

No Logins

Sessions with network support disabled have IPX/SPX support but no NetWare login support.

Enabling Virtual DOS and WIN-OS/2 Sessions

With NetWare Client for OS/2 Version 2.11, you have full NetWare 3.1x functionality for both private and global DOS and WIN-OS/2 sessions. However, you don't have the Netware Directory Services (NDS) functionality provided with NetWare 4.x.

This means you can run NetWare 4.x DOS utilities from a DOS session, but you cannot access Netware Directory Services (using the NWAdmin utility). To a NetWare 4.x server, your client appears to be a NetWare 3.1x bindery emulation client.

To obtain NDS functionality, you need to start your DOS session using a different DOS kernel than the one included with OS/2 and load the NetWare Client for DOS software. The NetWare Client for OS/2 Version 2.11 provides a diskette call VLMBOOT. Using the installation program you can create a private session that uses NetWare Client for DOS. "VLMBOOT" on page 217

describes setting up the VLMBOOT session. You can also create your own session using a real DOS kernel.

Sessions booted from a real DOS kernel can have private or global support. Global sessions booted with a real DOS kernel have NetWare 3.1x support. Private sessions booted with a real DOS kernel can have NetWare 4.x support if you load the NetWare Client for DOS.

When you select support for virtual DOS sessions in the NetWare Client for OS/2 Version 2.11 installation program, the installation program adds lines to the CONFIG.SYS file to load the VIPX and VSHELL components.

The NETWARE_RESOURCES and VIPX_ENABLED properties are also created and added to the DOS Settings notebook of all DOS and Windows icons.

These properties allow you to choose global support, private support, or no network support for each session.

- If you choose global support, VIPX and VSHELL are enabled for the session.
- If you choose private support, VIPX is enabled, VSHELL is not enabled, and you can manually load NETX.EXE.
- If you don't load NETX.EXE, you receive IPX- and SPX-only support.
- If you choose VIPX_ENABLED OFF, then no NetWare support is loaded.

VIPX must be enabled for either global (using VSHELL) or private (using NETX) sessions to work.

Configuring Virtual Session Network Support

Set up NetWare support for virtual DOS and WIN-OS/2 in two ways:

- By setting a default type of support (global, private, none) that applies to all existing DOS and WIN-OS/2 icons, as well as any new icons that are created.

If you choose this default in NetWare Client for OS/2 Version 2.11 Installation program, it is automatically loaded in the CONFIG.SYS file.

- By customizing the type of support for each DOS and WIN-OS/2 icon on your Desktop.

Note: The OS/2 Warp Connect default setting is Global with DOS and WIN-OS/2 support.

Changing Default Support

To change the default support:

1. Run the NetWare Client for OS/2 Version 2.11 Installation program found in the Novell folder.
2. Under the Installation menu, choose **Requester on workstation...**
3. Select the appropriate target directory and choose **OK**.
4. Under the Requester Installation window, select **Only Edit CONFIG.SYS...** Choose **OK**.
5. Under Choose ODI LAN driver, specify to *not* update the current LAN driver, and choose **Continue** (this will already be displaying ODI2NDI, see “NetWare Client for OS/2 Version 2.11” on page 387 for more information on ODI2NDI).
6. Under Choose NetWare Support of DOS and Windows Applications, select the desired default support. Choose **Continue**. Figure 99 shows the Installation panel.

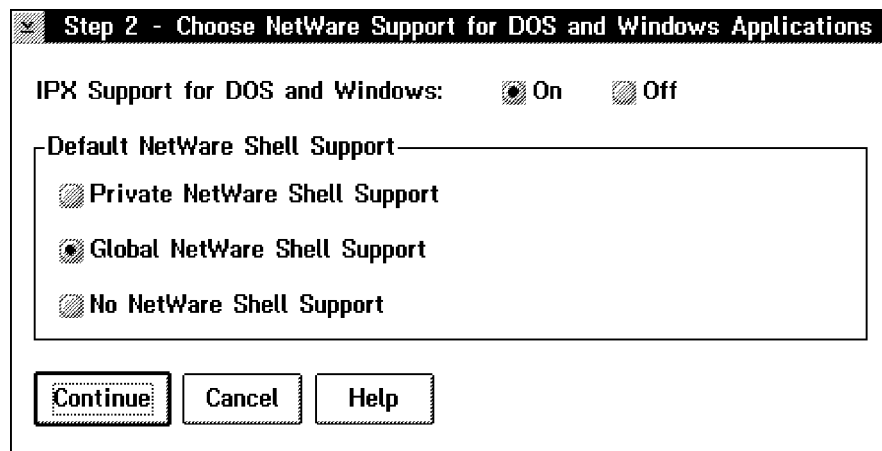


Figure 99. NetWare Support Panel for Virtual DOS and WIN-OS/2

7. Continue installation. Select the AUTOEXEC.BAT file to update for WIN-OS/2 support and add NETX support to your virtual sessions. Figure 100 on page 193 shows the selection panel.

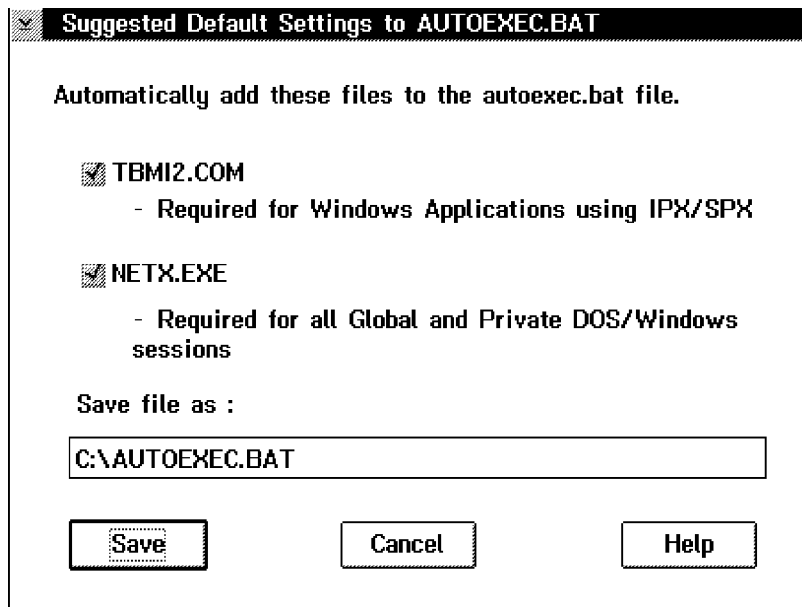


Figure 100. Updating AUTOEXEC.BAT for Virtual Session Support

8. Continue through the installation panels until completion. The panel shown in Figure 101 will appear as you proceed. The DOS_LASTDRIVE setting is only required on private sessions and is set in the program settings for the session. Click on **OK** and continue.



Figure 101. DOS_LASTDRIVE Warning Message

“Customize Desktop Icons” shows how to set up a DOS session for private session support.

Customize Desktop Icons

All sessions started from the customized icon have the type of support you specify. For instructions on customizing NetWare support per icon, see the sections that follow.

To set up icons with different kinds of network support, label the icons for those sessions something that indicates the type of support. For example,

you might want to create Global DOS Full Screen and Private DOS Full Screen icons.

1. Press MB2 on the program icon for the session and select **Settings**
2. Move to the Session page
3. Select the **DOS settings** or **WIN-OS/2 settings**
4. Set the NETWARE_RESOURCES to the desired value. See Figure 102

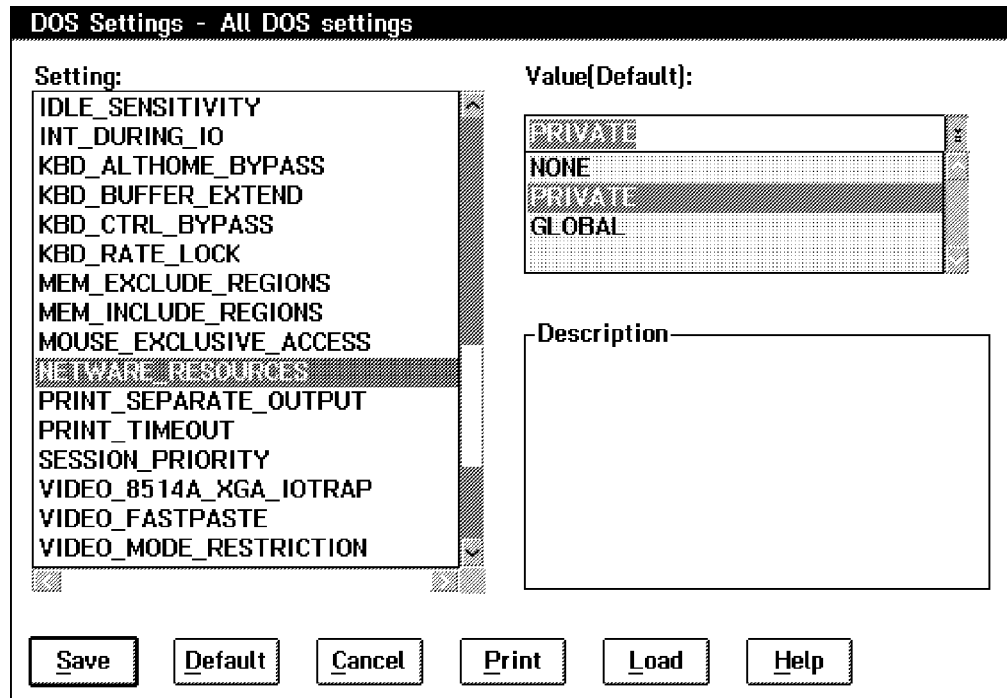


Figure 102. Example of Setting NETWARE_RESOURCES

5. Set VIPX_ENABLED to the required value. See Figure 103 on page 195

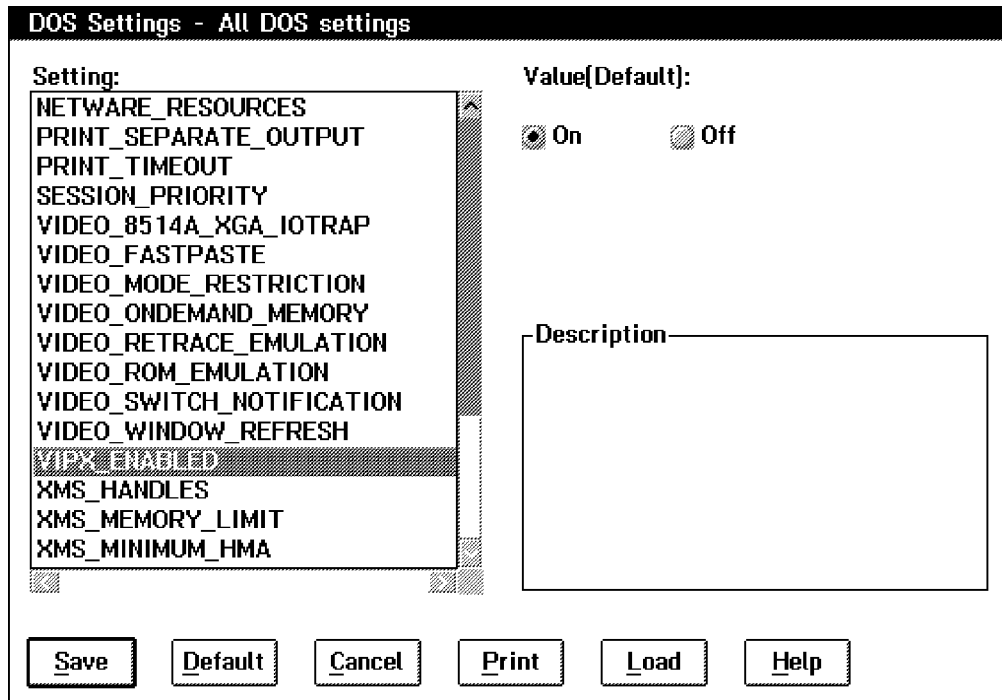


Figure 103. Example of Setting VIPX_ENABLED

6. If this is a private session, set the DOS_LASTDRIVE to the drive required. See Figure 104 on page 196.

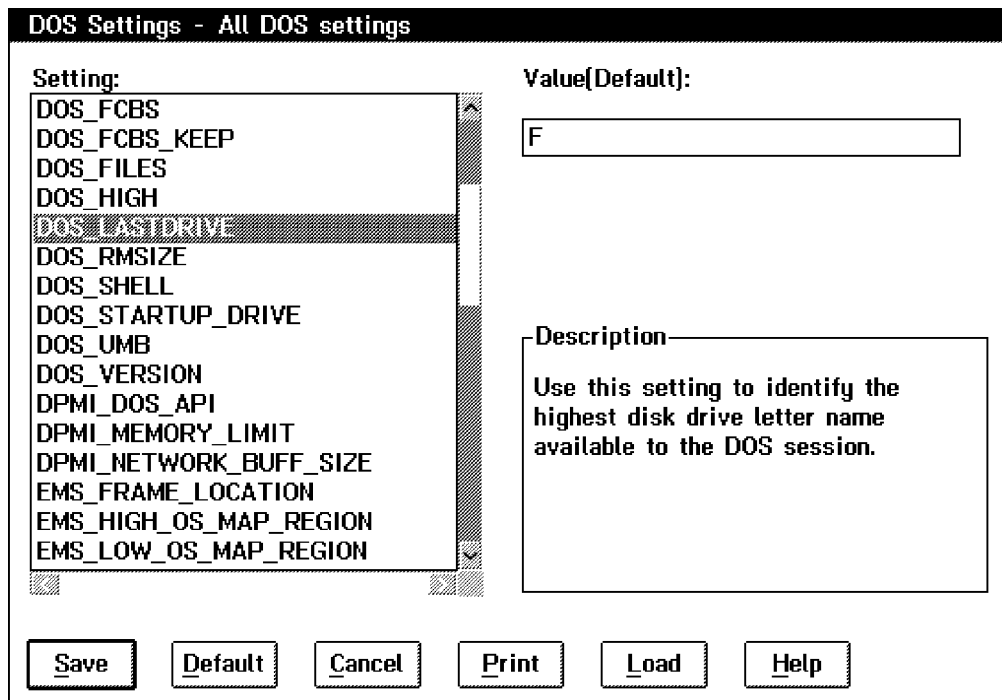


Figure 104. Example of Setting DOS_LASTDRIVE

NetWare 4.x consideration

When logging in from virtual sessions, you do not have Netware Directory Services (NDS) support. This means that you can only login to a NetWare 4.x network that has bindery emulation.

Disabling Network Support in All Virtual Sessions

To disable all network support, run the NetWare Client for OS/2 Version 2.11 Installation program and deselect **Support for DOS and Windows Sessions**. Then reboot your machine. This keeps VIPX.SYS and VSHELL.SYS from loading.

To re-enable support, run the install and select **Support for DOS and Windows Sessions**.

Accessing the Correct Version of DOS

For all virtual sessions you start, the COMSPEC variable must point to the correct version of DOS.

COMSPEC warning

NetWare login scripts often contain a statement assigning COMSPEC to a network drive, so be sure to check, and if necessary, reset the COMSPEC variable in your login script.

If you use the version of DOS included with OS/2, set the COMSPEC variable to the following

```
SET COMSPEC=drive:\OS2\MDOS\COMMAND.COM
```

You can set the COMSPEC variable at the command line, in a DOS login script, or through DOS Setting from the OS/2 Desktop.

Replace drive: with the letter of your boot drive. If you are running another version of DOS, the COMSPEC variable should point to the location of the COMMAND.COM file for that version.

Drive Mappings in Global Sessions

Drive mappings in DOS differ from drive mappings in OS/2. In OS/2, all mapped drives function like root drives, so drives mapped in OS/2 sessions show up as root drives in global DOS sessions. Root drives mapped in global DOS sessions show up as root drives in OS/2 sessions.

Search drive mappings are not used in OS/2. Therefore, search drives mapped in global DOS sessions are ignored in OS/2 sessions. Also, search drives mapped in one global DOS session do not apply to other global DOS sessions. To eliminate confusion, avoid using search drives in a global environment. Instead, set up your environment as outlined in the following procedure.

1. Decide which drives you want mapped in your global environment. Decide which of those drives need to be included in a search path.
2. Edit your NetWare 4.x login script (used in OS/2 sessions) and include MAP statements for all NetWare drives.
3. Edit your NetWare 3.x DOS login script and include MAP ROOT statements for all NetWare drives.

To edit your NetWare 3.x DOS login script, use a text editor to edit the SYS:MAIL\userID\LOGIN file or use a NetWare 3.x utility such as SYSCON.

Use MAP ROOT rather than MAP for consistency between DOS and OS/2 sessions. For easiest maintenance, both login scripts should contain identical map statements.

4. Edit your OS/2 CONFIG.SYS file and include the drive letters you want to be searchable in your PATH statement.

This path is where OS/2 searches for .EXE, .CMD, and .COM files. For example, to include drive H: in the search path, add the following to your path:

```
H: \;
```

Note: If you need OS/2 to search for data files in this path, add this also to the DPATH statement in CONFIG.SYS.

If you need OS/2 to search for DLLs in this path, add this also to the LIBPATH statement in CONFIG.SYS.

5. Edit your AUTOEXEC.BAT file and include a path to the same drives you included in CONFIG.SYS.

This path is where DOS searches for files. For example, to include drive H: in the search path, add the following to the SET PATH line in your AUTOEXEC.BAT file:

```
PATH C: OS2;C: OS2 MDOS;C: OS2 MDOS WINOS2;h: ;
```

PATH statements are limited to 123 characters, so try to map drives to the exact directories you need and minimize the number of subdirectories you specify.

For more information about PATH and DPATH settings or parameters, see the OS/2 online *Command Reference*.

Drive Mappings in Private Sessions

Drive mappings in Private Sessions are the same as under DOS. Search drive mappings can be used, however no drives mapped in one private DOS session apply to any other private or global DOS sessions.

Make sure that your login script is pointing to the correct version of DOS for the session you are starting. See “Accessing the Correct Version of DOS” on page 197 for more details.

Using NetWare Tools

The NetWare Tools found in the Novell folder provide a graphical interface to manage your connections to your Novell network.

NetWare Tools allow you to do the following:

- Manage drive mappings
- Manage printer connections and setup
- Manage Directory tree and server connections
- Display network users
- Send messages

Network Menu

Use the **Network** menu option to modify, save, and reload your workstation network settings. A dialog appears for each option.

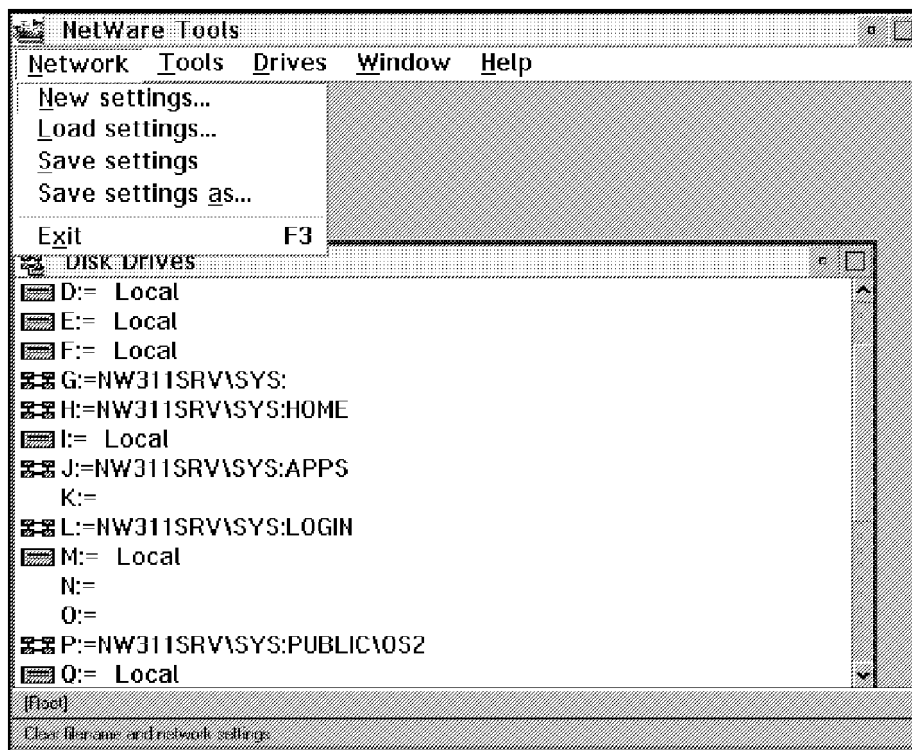


Figure 105. NetWare Tools Network Option

Note: Choosing the **Settings** option disconnects all current server connections. Make sure that all open files and applications are closed.

Tools Menu

Use the **Tools** option to use the NetWare user tools. Choosing the **Tools** option causes a menu box to appear with the following options

- Disk drives
- Printer ports
- Servers
- Directory tree
- User lists
- Print queues

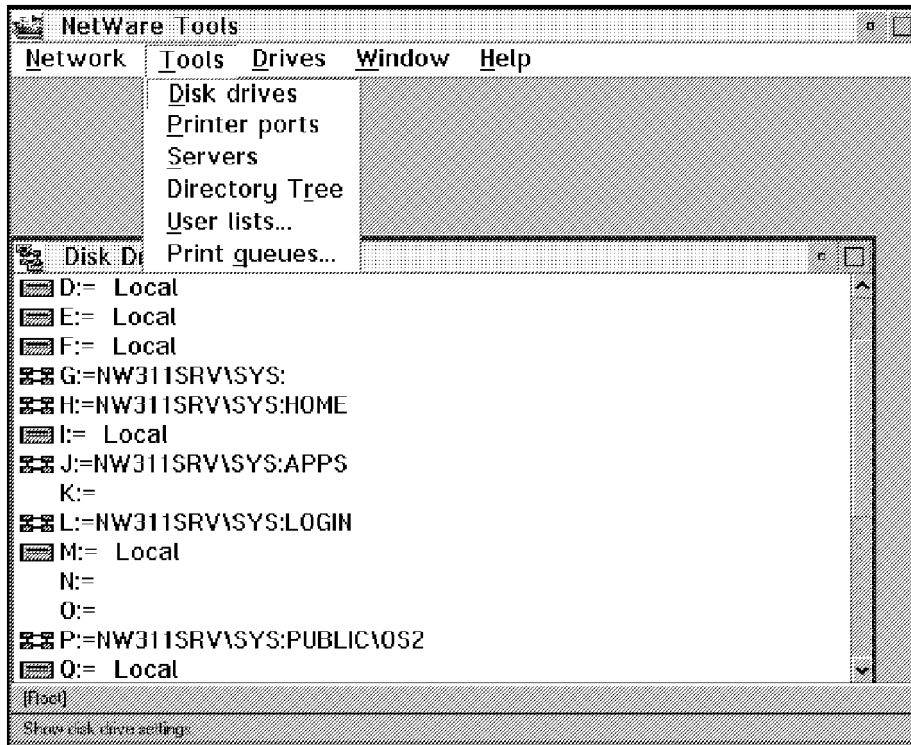


Figure 106. NetWare Tools Tools Option

Window Menu

Use the Window menu to arrange the windows on the screen and switch between views.

Help Menu

Use the **Help** option to access the online help. You can also press the F1 key for help.

Use the **Contents** option to see a list of commands, keyboard instructions, and a comprehensive task list.

Drives Option

Use the **Drives** option to map network resources in the Directory tree and file system to your workstation drives. Choose the drive letter for which you want to map a drive.

A Map window appears. Select the resource you want to connect to in the Volume and Directory lists, then choose the Map button at the bottom of the window. Keyboard entry is done within the Path field.

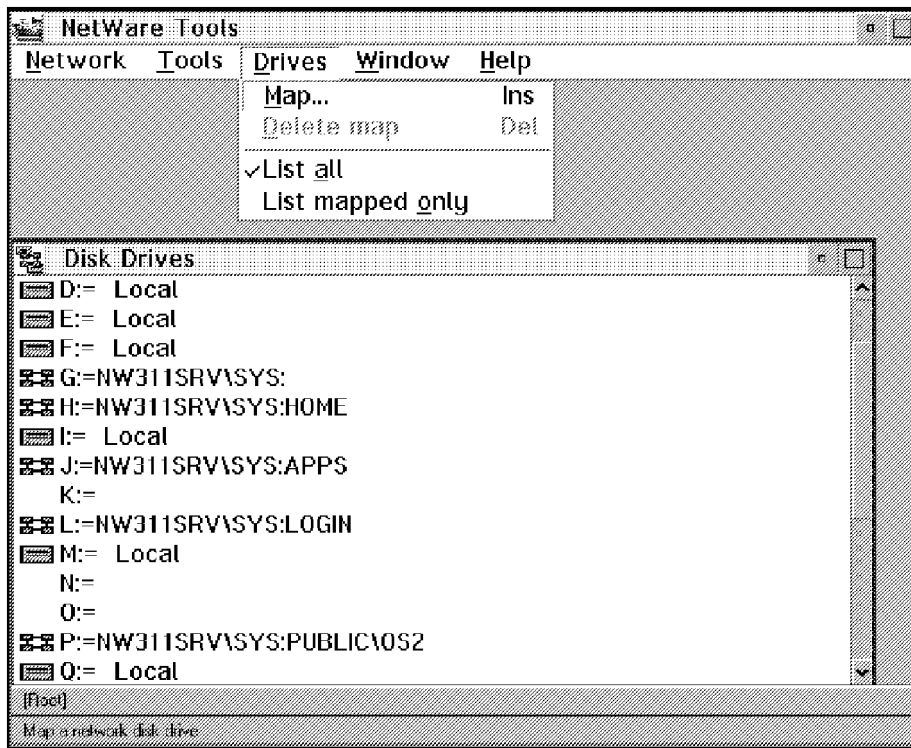


Figure 107. NetWare Tools Drives Option

When using the **Drives** option, remember

- You can attach to a Directory tree or server that contains the drive you want to connect to when in the Map window.

- NWTOOLS will recognize all drive mappings that are made at the command line.

Within the Map window are lists of volumes and directories.

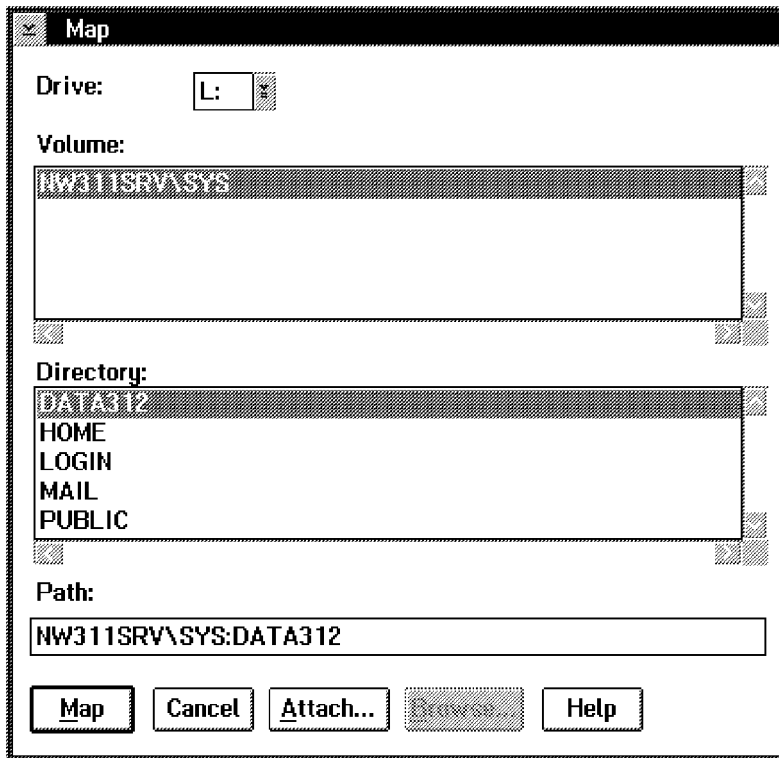


Figure 108. NetWare Tools Map Window

The volumes and directories are listed in a hierarchical structure. Choose the volume to display subdirectories.

Printers Option

Use the **Printers** option to capture network print queues to your workstation printing ports. Choose the printer port you want to capture.

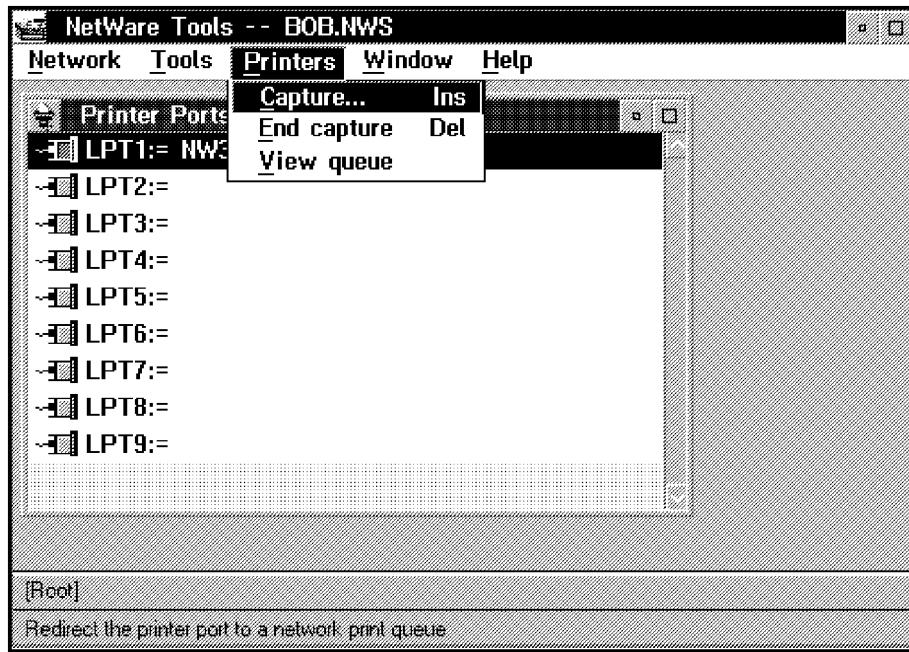


Figure 109. NetWare Tools Printers Option

A Capture window appears. Select the resource you want to capture in the Printer/Queue list, then choose the **Capture** button at the bottom of the window. Keyboard entry is done within the Queue field. See Figure 110 on page 205.

Note

You must highlight the port to which you want to capture a print queue before choosing the Capture option.

You must also highlight the port and print queue name you want to view before choosing the **View Queue** option.

When using the **Printers** option, remember

- You can attach to a Directory tree or server that contains the resource you want to capture when using the Capture window.
- NWTOOLS will recognize all print queue captures made at the command line.

The Print Queues list within the Tools dialog contains the following

- Printer objects
- Print queue objects

Using Capture and View Queue options

If the print queue you want to capture does not appear in the Queue list, check to see if you are first attached to the server containing this resource. Choose **Server** under the Tools menu to see connected servers.

Use the **Printer** option as shown in Figure 110 on page 205 to assign the following settings:

Option	Function
Notify	Confirms print job completion
Formfeed	Places a page break between print jobs
Copies	Specifies the number of copies to print
Tabs Size	Specifies the number of characters in a tab stop
File Contents	Specifies the type of print file being printed
Print Banner	Allows for a banner page to be printed at the front of your print job
Form	Allows you to select a defined print form

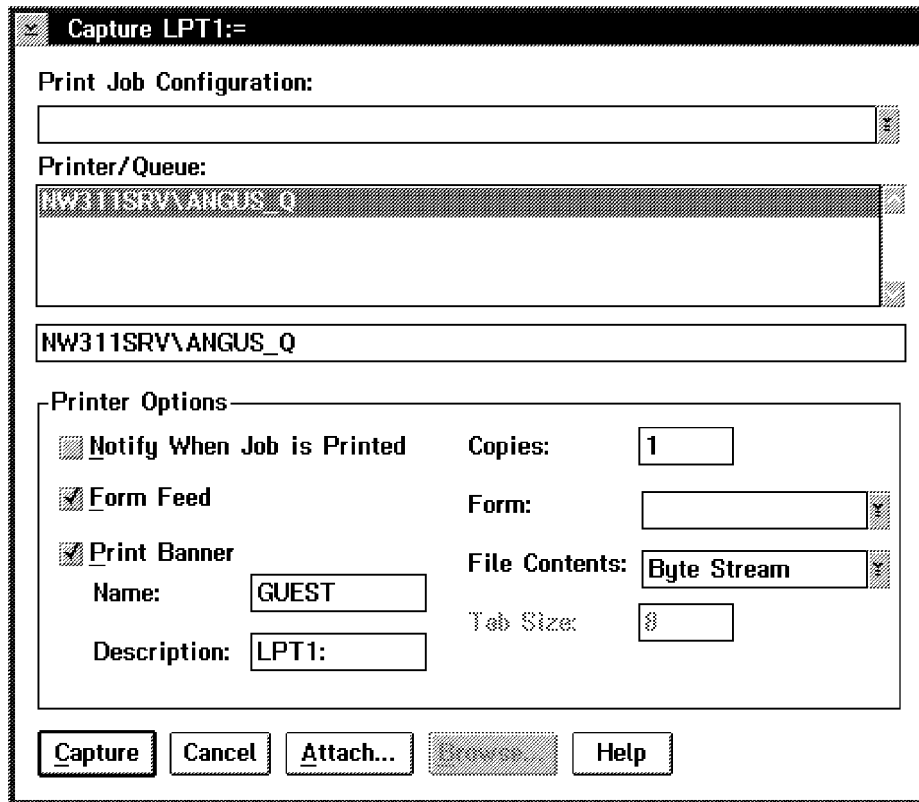


Figure 110. NetWare Tools Capture Window

Tree Option

Note: This tool is used only for NDS servers.

Use the **Tree** option to do the following

- Display resources
- Change Directory trees
- Change context with the network
- Login to the network
- Change password

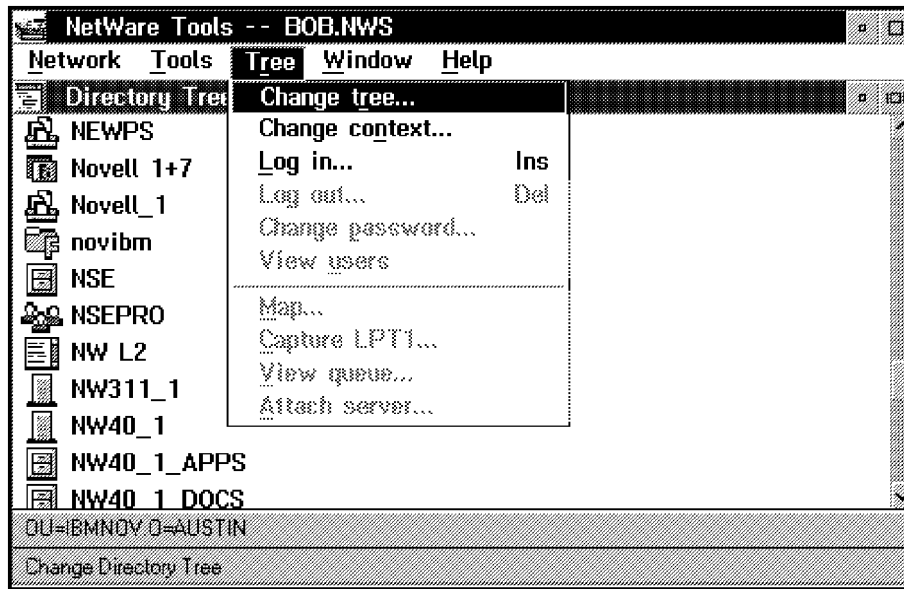


Figure 111. NetWare Tools Tree Option

When using the **Tree** option, it is important that you remember

- This tool is only used with NetWare 4.x networks. For NetWare 2.x and NetWare 3.x networks, use the **Servers** option to attach to network servers.
- The **Login** option does not run a login script for your workstation. Use the **Save Settings** option in the Network menu box to maintain your connections. If you want to run the login script, your initial login should be done at the command line with the LOGIN utility.
- Log out of a Directory tree before logging in to another Directory tree.

Servers Option

Note: This is used for bindery servers.

Use the **Servers** option to do the following:

- Display Directory Services server objects
- Display bindery-based servers
- Attach to bindery-based servers
- Change password

If you do not see your server in the list, select the **Servers** pull-down and the **List all** option. This will display all the server that can be found on the network.

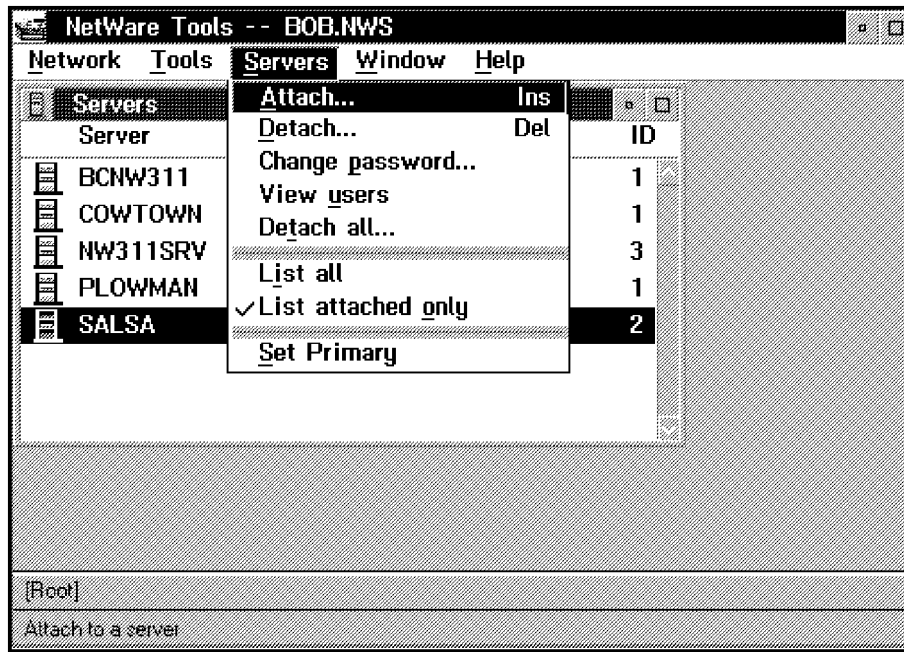


Figure 112. NetWare Tools Servers Option

When using the **Servers** option, it is important that you remember:

- This tool is used with NetWare 2.x and NetWare 3.x networks to attach to network servers.
- The **Attach** option does not run a login script for your workstation. Use the **Save Settings** option in the Network menu box to maintain your connections. If you want to run the login script, your initial login should be done at the command line with the LOGIN utility.

Users Option

Use the **Users** dialog to display network users or groups and send a message to them.

Select the resource you want to send a message to from the user list, and from the Users menu, select **Send Message**. Type your message in the **Messages** field, then choose the **Send** button at the bottom of the dialog.

Notes:

1. You must highlight the users to which you want to send a message before choosing the **Send Message** option.
2. If the user you want to send the message to does not appear in the list, check to see if you are first attached to the server containing this resource. Choose **Server** under the Tools menu to see connected servers.
3. When sending a message, remember that you must first login to a Directory tree or server that contains the object for which you want to send a message before using the **Send Messages** option.

Printing from Your Workstation

Network printing allows all users on the network to share printers. NetWare uses a print queue, a print server, and a printer driver to allow several network workstations to print to a network printer.

A network printer can be connected either directly to a server or to a client workstation, depending on the configuration of the printer and the network.

Network printing requires some initial setup before the network recognizes print files sent from your workstation.

Prerequisites are:

- You must be connected to the network and have access to network printing resources.
- **NetWare Tools** icon should be in your Novell folder on the Desktop.

Setting Up Printing for OS/2

Setting up workstation printing in OS/2 is done within NetWare Tools for OS/2.

The procedure is as follows:

1. Open **NetWare Tools** from the Novell NetWare folder
2. Choose the **Tools** option
3. Choose **Printer Ports**. A Printers window appears and a **Printers** option appears in the menu bar.

4. Choose a port by double-clicking on the port name, or select a port and choose **Printers** from the upper menu bar, then choose **Capture**. A Capture window appears.
5. In the Printers/Queue list, highlight a print queue name, and choose **Capture**.

To maintain your connections, use **Save Settings** from the Network menu.

NPRINTER

Every network printer requires a network printer driver to pass a print job from the network to the printer. The type of driver depends on how the printer is attached to the network. Network-attached printers store their own printer driver. Workstation attached printers need NPRINTER.EXE loaded on the workstation.

Note: When defining a printer, be sure to set up the printer as remote-other rather than parallel.

Prerequisites for using NPRINTER are:

- NetWare server
- Print server, print queue, and printer that have been created and assigned using one of the following:
 - NetWare Administrator
 - PCONSOLE.EXE
- Printer set up as remote-other
- Print server (PSERVER.NLM) loaded on the NetWare server
- Printer attached to one of the following:
 - Network workstation running OS/2
 - Directly to the network
 - NetWare server
- Make sure each printer functions properly in its current environment. If a printer does not function properly in its current environment (non-network or otherwise), it will not work with NetWare print services.

Starting NPRINTER

1. Open **Network Printer** from the Novell folder. If the printer you want to load is already configured, go to Step 3.
2. Configure printer(s).
 - a. Choose **Load** from the Printers menu.
 - b. Choose **Define** from the Load Printers window. A list of printers defined on this workstation displays.
 - c. Choose the **Add** button to define a printer for NPRINTER to load on this workstation.
 - d. Type a printer name in the **Description** field.
 - e. Double-click a print server from the list. A list of printers will appear in the dialog. These printers were created using NetWare Administrator or PCONSOLE.
 - f. Select a printer by highlighting the name. This specifies the printer for NPRINTER to load.
 - g. Check **Load on startup** if you want the NetWare server to attach to this printer when NPRINTER is loaded.
 - h. Choose a print queue. OS/2 print queues are created when you create printers under OS/2.

Note

NPRINTER requires an OS/2 print queue defined on the workstation.

- i. Choose **OK**. The printer now appears in the Define Printers window with any other printers defined on this workstation.
 - j. Choose **Exit** to close the Define Printers window.
3. Choose **Load** from the Printers menu. The Load Printers window appears. If the **Load** option is greyed so that you cannot select it, or if the printer you want is not listed, you must configure a printer.
4. Select a printer and choose **Load**. NPRINTER makes an attachment from the workstation to the NetWare server.

Note: You can unload any or all printer drivers by choosing Unload from the Printers menu. Highlight the printers you want to unload and choose **Unload**, or unload them all by choosing **Unload All**.

Automatic Loading of NPRINTER

1. Open the OS/2 System folder
2. Open the Novell folder.

3. Create a shadow of the Network Printer icon to the Startup folder. Now when OS/2 is booted, NPRINTERR will autoload.
 - Hold down Ctrl and Shift keys and drag the Network Printer icon to the Startup.
 - Click MB2 on the Network Printer icon and select **Create Shadow**. Select the destination to be the Startup folder.

Notes on NPRINTERR

Do *not* capture a port that NPRINTERR is connected to.

If the port that the network printer is connected to is captured and a print job is sent to that port, the print job is put in an infinite loop between the NetWare print queue and the OS/2 workstation. The print job continues to appear and disappear from the NetWare print queue, but it is never printed.

For example, if the network printer is physically connected to the LPT1 port on the OS/2 workstation, do not CAPTURE the LPT1 port or the print job will be put in an infinite loop between the LPT1 port and your workstation.

Note: NPRINTERR for OS/2 cannot be started as minimized.

Installation

The recommended method of installing the NetWare Client for OS/2 Version 2.11 component of OS/2 Warp Connect is to use the Integrated Installation. The Integrated Installation performs all the prerequisite checking required and configures the NetWare Client for OS/2 Version 2.11 for coexistence with the other OS/2 Warp Connect components.

All the files required for any configuration are installed on your machine and your workstation can be configured using the Installation program from the Novell folder.

To change your existing configuration follow the steps in the example.

1. Start the Installation program from the Novell folder.

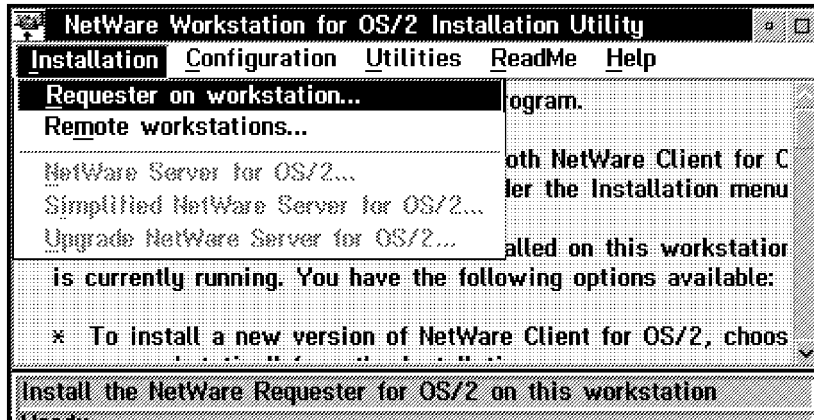


Figure 113. NetWare Installation Utility

2. Select **Installation** and **Requester on workstation**, as shown in Figure 113.
3. Leave the **Target directory for the Requester files** and **Source drive** at the defaults if you are reconfiguring your installation. See Figure 114.

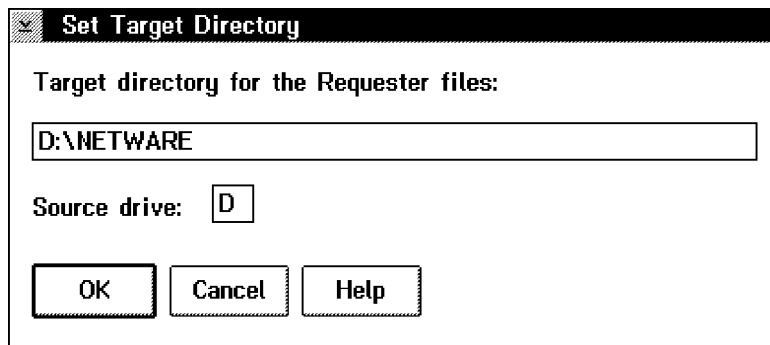


Figure 114. Set Target Directory

4. Select **Only Edit CONFIG.SYS** on the Requester Installation panel, as shown here:



Figure 115. Requester Installation

5. Be sure to check the box to *not* update the current LAN driver.

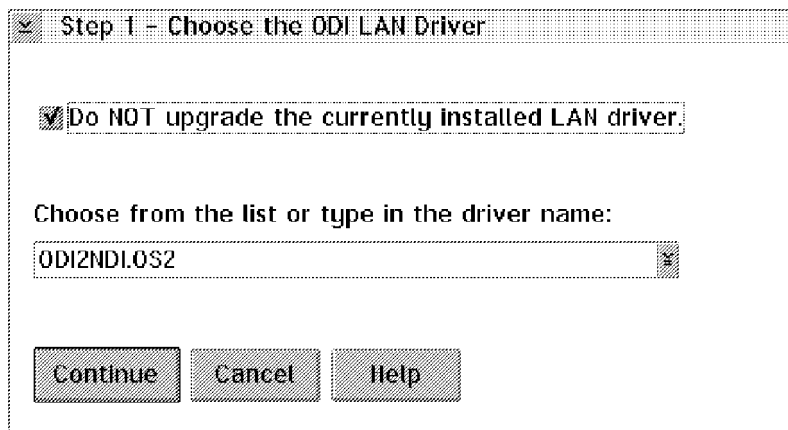


Figure 116. Choose the ODI LAN Driver

6. Choose the type of support for your DOS and WIN-OS2 sessions, as shown in Figure 117 on page 214.

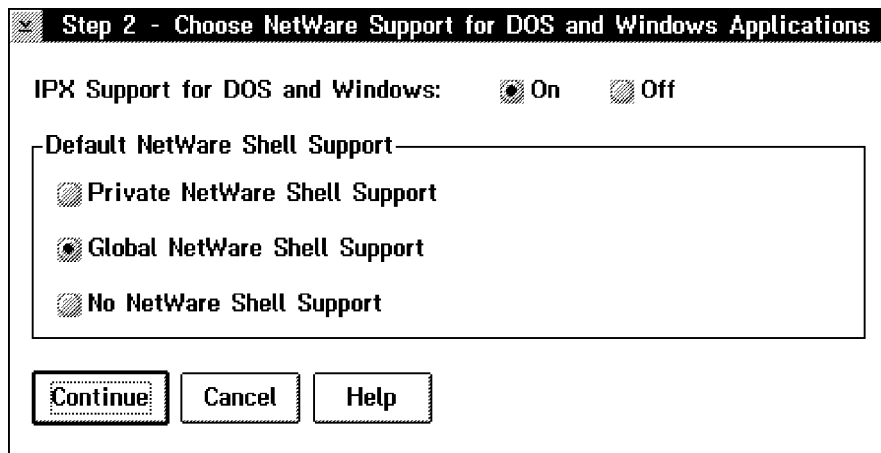


Figure 117. NetWare Support Panel for Virtual DOS and WIN-OS/2

7. Continue installation. Select the AUTOEXEC.BAT file to update for WIN-OS/2 support and add NETX support to your virtual sessions. Figure 118 shows the selection panel.

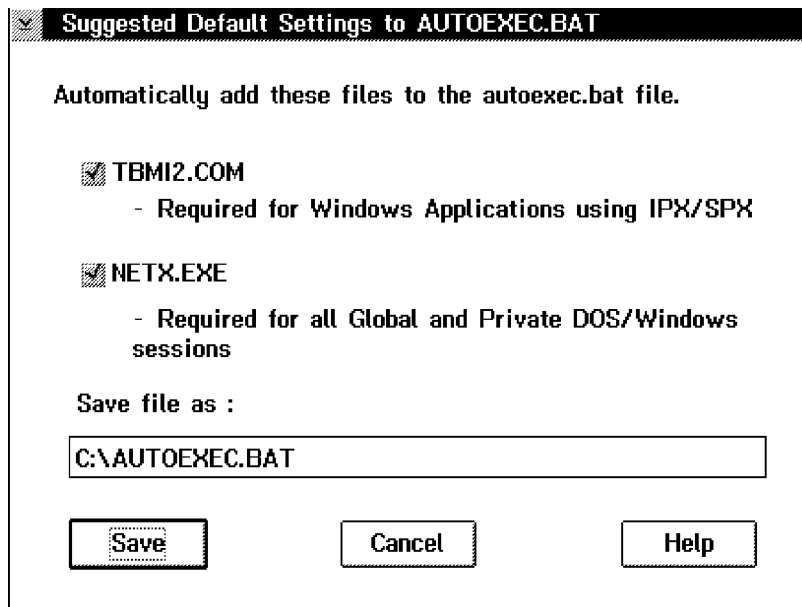


Figure 118. Updating AUTOEXEC.BAT for Virtual Session Support

8. Choose the Optional Protocols that you want to configure, as shown in the following panel:

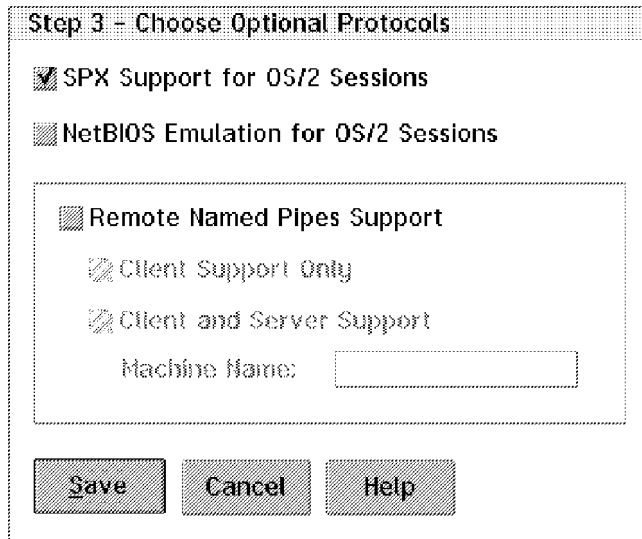


Figure 119. Choose Optional Protocols

9. Having chosen to save CONFIG.SYS, you will return to the NetWare Workstation for OS/2 Installation Utility.
10. Open an OS/2 window and run `NWFIXUP` at the command prompt.

NWFIXUP

The NetWare Client for OS/2 Version 2.11 does not correctly update your CONFIG.SYS file to use the ODI2NDI driver. Run `NWFIXUP` after any NetWare Client for OS/2 Version 2.11 configuration changes that save to the CONFIG.SYS.

To modify your NET.CFG to support your configuration follow these steps:

1. Choose **Configuration** and **This workstation**, as shown in Figure 120 on page 216.

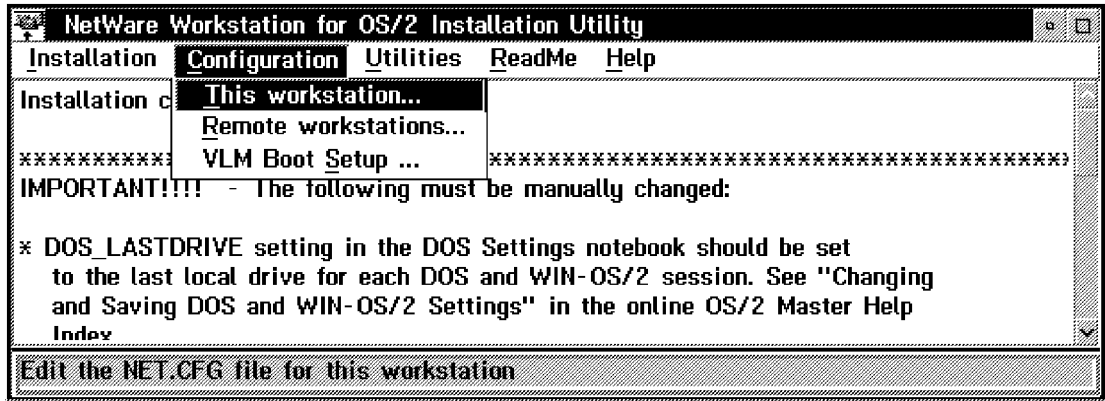


Figure 120. Configure

2. Select the NET.CFG file that you want to edit. The NET.CFG needs to be in a directory that is in the DPATH of the CONFIG.SYS
3. Add any required statements to the NET.CFG and select **SAVE**.

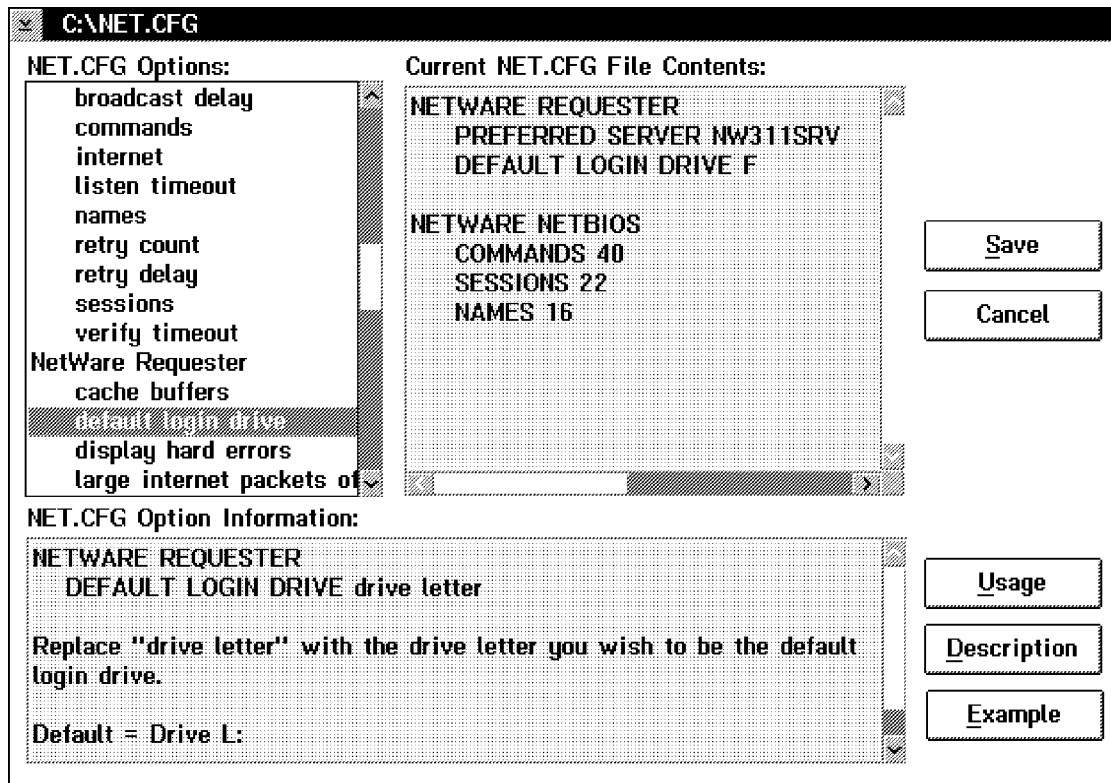


Figure 121. Sample NET.CFG

You can use the Individual Product Installation and install the NetWare Client for OS/2 Version 2.11 as an individual component. However, when you do

this, you also need to configure MPTS for NetWare coexistence if you are also installing any of the other OS/2 Warp Connect components. (See “NetWare Client for OS/2 Version 2.11” on page 387 for information on configuring MPTS for coexistence.)

VLMBOOT



VLMBOOT

The VLMBOOT diskette is provided with the NetWare Client for OS/2 Version 2.11 to enable you to perform administration on a NetWare 4.x server from your OS/2 workstation. The administration utilities are DOS only, but the standard DOS session with NetWare Client for OS/2 Version 2.11 only supports NetWare 3.x bindery type attachment to servers. VLMBOOT creates a DOS private session that loads another version of DOS using NetWare Client for DOS and provides an icon to launch the session from, as shown here:

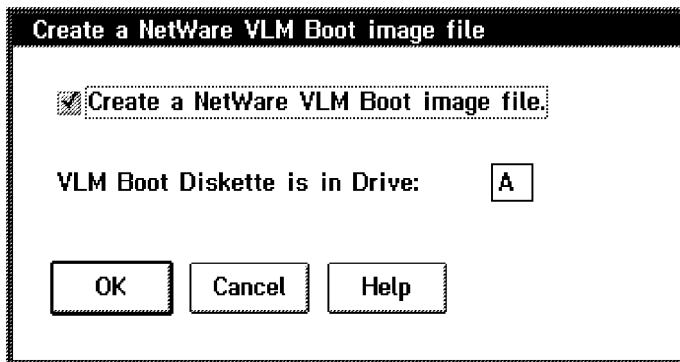


Figure 122. VLMBOOT Icon

To set up for creating the VLMBOOT session, you need to do the following.

1. Create NetWare Client for OS/2 Version 2.11 diskettes
 - a. Create all the NetWare Client for OS/2 Version 2.11 diskettes
 - 1) Run `PRODINST` from your OS/2 Warp Connect CD-ROM
 - 2) Select NetWare Client for OS/2 Version 2.11 and click on **Diskettes**
 - 3) Follow the instructions displayed.
 - b. Create only VLMBOOT diskette

From the OS/2 command prompt type:

e: IMAGES LOADDISKF e: IMAGES NETWARE VLMBOOT.DSK

where e: is the CD-ROM drive letter.

2. Select **Installation** the Novell folder
3. Select **Configuration** and **VLM Boot Setup**, as shown in Figure 123.

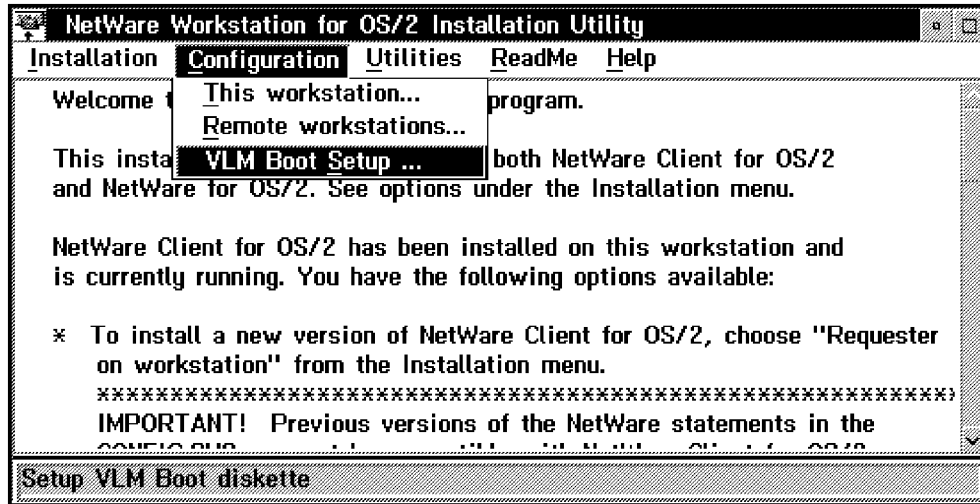


Figure 123. VLM Boot Setup

4. Insert the VLMBOOT diskette created in step 1 in your diskette drive, and press **OK** to modify the diskette CONFIG.SYS and AUTOEXEC.BAT to customize it for your installation environment.

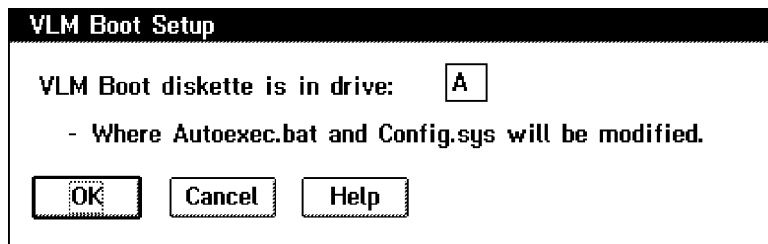


Figure 124. Modify Diskette Files

5. If your OS/2 hard disk is formatted for HPFS, do the following:
 - a. Copy OS2 MDOS FSFILTER.SYS to the diskette
 - b. Edit the diskette CONFIG.SYS, and change the device statement for FSFILTER.SYS to DEVICE=FSFILTER.SYS, as shown in Figure 126 on page 219.
6. Select **OK** to create the VLM Boot image, as shown in Figure 122 on page 217.

7. Start your session using the VLMBOOT icon on the Desktop.

The Create VLMBOOT process does the following things:

- Changes AUTOEXEC.BAT and CONFIG.SYS on diskette to have correct paths to OS/2 directories
- Changes OS/2 AUTOEXEC.BAT to add NETWARE\NETXDLL path
- Moves NETWARE.DRV and NETWARE.HLP from OS2 MDOS WINOS2 SYSTEM to NETWARE NETXDLL
- Adds NETWORK.DRV=NETWARE.DRV and NETWORK.DRV=Novell Network to SYSTEM.INI
- Creates boot image in NETWARE VLMBOOT directory
- Creates Program Icon on the OS/2 Desktop

Things to watch out for

- If your hard disk with OS/2 installed is formatted with HPFS, you need to copy OS2 MDOS FSFILTER.SYS to the diskette after the process has edited the diskette files, but before the boot image is created.
- Edit the diskette CONFIG.SYS and change the device line to DEVICE=FSFILTER.SYS.

```
PATH=A: VLMDLL;A: NWDOS;A: NWCLIENT;C: OS2 MDOS\WINOS2;  
PROMPT $P$G  
A: \NWCLIENT\VLM.EXE  
C: \OS2\MDOS\WINOS2\SYSTEM\TBMI2.COM
```

Figure 125. Sample VLMBOOT Diskette AUTOEXEC.BAT

```
FILES=114  
LASTDRIVE=Z  
HISTORY=ON,256,ON  
SHELL=A:\COMMAND.COM /P /E:2048  
DEVICE=FSFILTER.SYS  
DEVICE=C:\OS2\MDOS\HIMEM.SYS  
DEVICE=D:\NETWARE\DOSVIPX.SYS
```

Figure 126. Sample VLMBOOT Diskette CONFIG.SYS

Removing the NetWare Client for OS/2 Version 2.11

The initial release of Warp Connect will not install the NetWare Client V2.11 over an existing NetWare client. The existing install must first be removed. The following paragraphs contain detailed instructions for removing NetWare.

You must stop all programs and utilities using NetWare requester services.

Use an ASCII text editor (never a Word Processor) to do the editing. The OS/2 System Editor (the E editor) can be used.

Reconfigure MPTS or LAPS

1. LAPS was shipped as part of LAN Server 3.0. MPTS, the LAPS follow-on, was shipped as part of LAN Server 4.0. They provide the LAN transport capability for these client/server packages.

Change directory to IBMCOM. If you receive the error message that The system cannot find the path specified then neither MPTS nor LAPS is installed and you can skip to section five.

2. At the OS/2 command prompt enter MPTS or LAPS, whichever one is accepted by the operating system and brings up the MPTS, or LAPS, logo screen. Click **OK** at the logo.
3. The MPTS or LAPS Services screen will appear. Select **Configure**
4. A Configure panel will appear. Make sure the LAN Adapters and Protocols radio button is selected and click **Configure**.
5. The LAPS Configuration panel will appear. This panel has three sections. In the bottom section, Current Configuration, will be the line
n - IBM NetWare Requester Support
n will be a number, usually 0.
 - Select this line and click **Remove**.
6. The Remove Protocol Driver panel will popup. Click **Yes** to also remove the protocol configuration.
7. The LAPS Configuration panel will reappear. Click the **OK** button in the lower right part of the panel.
8. The Configure panel will reappear. Click **Close** to save your configuration changes.
9. The MPTS or LAPS panel will reappear. Click **Exit**
10. An Update CONFIG.SYS panel will appear. Make sure the drive letter is selected. Click **Exit** to update CONFIG.SYS.

11. A CONFIG.SYS Updated panel will appear. Click **OK**.
12. An Exiting MPTS (or LAPS) panel will appear. Read the instructions. Click **Exit**.

Edit the CONFIG.SYS

1. Save a copy of the CONFIG.SYS, for example, as CONFIG.SAV.
2. In the four CONFIG.SYS statements, LIBPATH, SET PATH, SET DPATH, and SET HELP, remove all occurrences of the following (where n is the NetWare drive and path, usually C:\NETWARE):

```
n;
n\NLS;
n\NLS\ENGLISH;
L:\OS2;
P:\OS2;
L:\NLS;
P:\NLS;
```

For example, the first string is usually C:\NETWARE; .

3. Delete the two statements containing VIPX.SYS and VSHELL.SYS.

These usually appear as:

```
DEVICE=C:\NETWARE\VIPX.SYS
DEVICE=C:\NETWARE\VSHELL.SYS GLOBAL
```

4. Delete the following set of statements from the CONFIG.SYS. Delete the first BEGIN line and the last END line and any and all statements in between, even if not contained in this list, or if present but with some variation.

```
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NETWARE\LSL.SYS
RUN=C:\NETWARE\DDAEMON.EXE
DEVICE=C:\IBMCOM\PROTOCOL\ODI2NDI.OS2
REM -- ODI-Driver Files BEGIN --
REM DEVICE=C:\NETWARE\TOKEN.SYS
REM -- ODI-Driver Files END --
DEVICE=C:\NETWARE\ROUTE.SYS
DEVICE=C:\NETWARE\IPX.SYS
DEVICE=C:\NETWARE\SPX.SYS
RUN=C:\NETWARE\SPDAEMON.EXE
DEVICE=C:\NETWARE\NMPIPE.SYS
DEVICE=C:\NETWARE\NPSEVER.SYS
rem RUN=C:\NETWARE\NPDAEMON.EXE
DEVICE=C:\NETWARE\NWREQ.SYS
```

```
IFS=C:\NETWARE\NWIFS.IFS
RUN=C:\NETWARE\NWDAEMON.EXE
rem DEVICE=C:\NETWARE\NETBIOS.SYS
rem RUN=C:\NETWARE\NBDAEMON.EXE
DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
```

5. Save this corrected version of CONFIG.SYS.

Edit the AUTOEXEC.BAT

1. Save a copy of AUTOEXEC.BAT as AUTOEXEC.SAV.
2. Delete from the AUTOEXEC.BAT any statement containing `STARTNET`.
3. Delete from the AUTOEXEC.BAT any statements containing `TBMI2.COM` or `NETX.EXE`.
4. Save this corrected copy of AUTOEXEC.BAT.

Edit the WIN-OS2 or Windows SYSTEM.INI

1. Change directory to `OS2 MDOS WINOS2 (or WINDOWS)`.
2. Edit SYSTEM.INI and make the following changes:
 - a. In the `[BOOT]` section, look for statements starting with `network.drv =`. If the last part of the statement contains `NETWARE.DRV`, then delete this latter part.
 - b. In the `[BOOT.DESCRPTION]` section, again look for statements starting with `network.drv =`. If the last part of the statement contains either the word `Novell` or `NetWare`, then delete all this latter part.
3. Save this corrected SYSTEM.INI.

Shutdown and Reboot

Shut down the OS/2 system. When prompted, press `<Ctrl-Alt-Del>` to reboot.

Remove Files and Directories

1. Delete the entire `NETWARE` directory and all its subdirectories.
2. Change directory to `OS2 MDOS WINOS2 SYSTEM (or WINDOWS SYSTEM)` and delete any of the following files that are present:

```
NETAPI.DLL
NETWARE.DRV
NETWARE.HLP
NWIPXSPX.DLL
```

NWPOPUP.EXE
NWNETAPI.DLL
TBMI2.COM

3. Save the existing NET.CFG.

Leave NET.CFG alone. It will be picked up and used by the new install.

4. Remove the Novell folder.

Drag and drop the Novell folder into the shredder.

Getting Updates to the NetWare Client and Server

Updates and fixes are provided by Novell. These are available from a number of electronic sites.

- World Wide Web - <http://www.novell.com/>
- FTP - FTP [ftp.novell.com](ftp://ftp.novell.com)
- CompuServe - Go Netwire
- Novell NetWire

The latest updates and fixes are in a file called R211FT.EXE. This is a self extracting file that includes installation instructions. Ensure that your NetWare server is at the latest patch levels, as follows:

- For NetWare 3.11, apply at least these patches:

OS2UTA.EXE
OS2UTB.EXE
OS2UTP.EXE
311IT4.EXE (on CompuServe, issue GO NSD for this patch)
LIBUP5.EXE
LANDR4.EXE
STLTR3.EXE

- For NetWare 3.12 to NetWare 4.02, apply these patches:

OS2UTP.EXE
312PT6.EXE
LIBUP5.EXE
LANDR4.EXE
STLTR3.EXE

- For NetWare 4.1, apply these patches:

410PT1.EXE
410IT4.EXE (on CompuServe, issue GO NSD for this patch)
SPXSTR.EXE

Chapter 6. Features Common to the Network Clients

The Network clients that are part of OS/2 Warp Connect are:

- IBM Peer for OS/2 Version 1.0
- OS/2 LAN Requester
- NetWare Client for OS/2 Version 2.11

There are a number of features that are common with the Network Clients that are included in OS/2 Warp Connect

- MPTS to connect to the network
- Network Folder
- Network SignON Coordinator to manage passwords
- AskPSP

Network Folder

The Network folder is part of the LAN Aware Workplace Shell that is enabled when a Network Client is installed.

It provides the following functions:

- Concurrent access to multiple networks
 - OS/2 LAN Server
 - NetWare
- Logon/logoff (login/logout) capability
- Ability to browse resources on servers
- Access resources on external domains and servers
- Move network resources to the Desktop
- Folder access to network files and directories
- Access to network printers
- Ability to assign drives and ports to network resources

When you open the Network folder, objects for the networks you have installed will be shown.

- LAN Server Resource Browser
- LAN Server and OS/2 Peer Resources
- NetWare

Operationally these all respond in the same way.

Login

The objects are network dependent, so the functions that can be performed vary between network clients.

If you open one of the objects in the Network folder, and you are not logged on, the Login window is displayed. If you have IBM Peer for OS/2 Version 1.0 installed you get an Login window as shown in Figure 127.

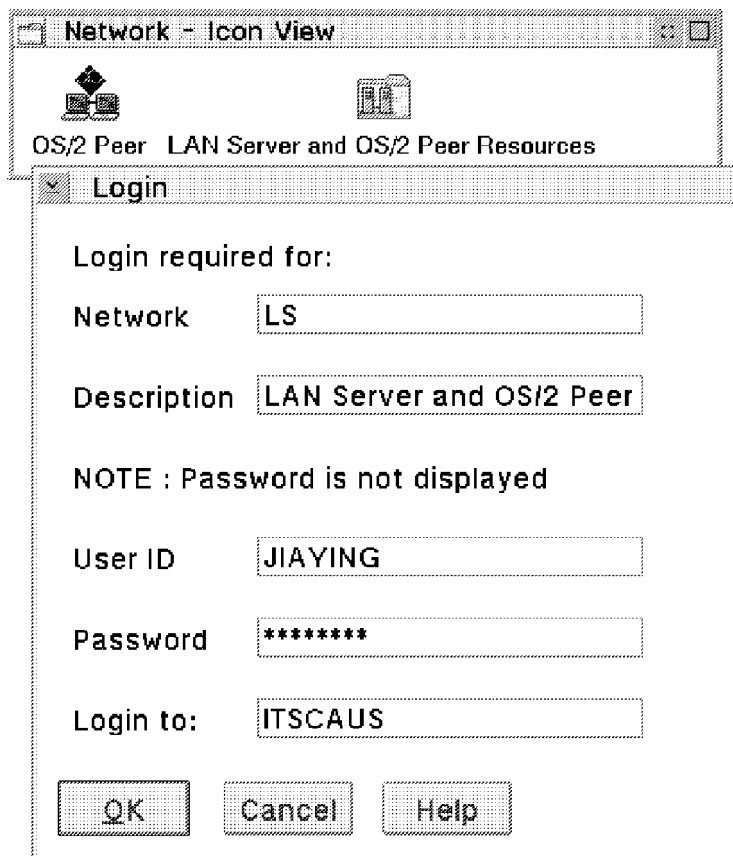


Figure 127. Login window for LAN Server and OS/2 Peer Resources

Local Verification

Only a local logon to the LAN will be performed here which enables you to browse through your peer network. No domain resources can be browsed unless you log on to the domain. If you do so and have the same user ID and password setup on your local workstation (that is the peer admin user ID) then you can browse both, LAN Server as well as peer resources.

The Login window for a NetWare requester is shown in Figure 128 on page 227.

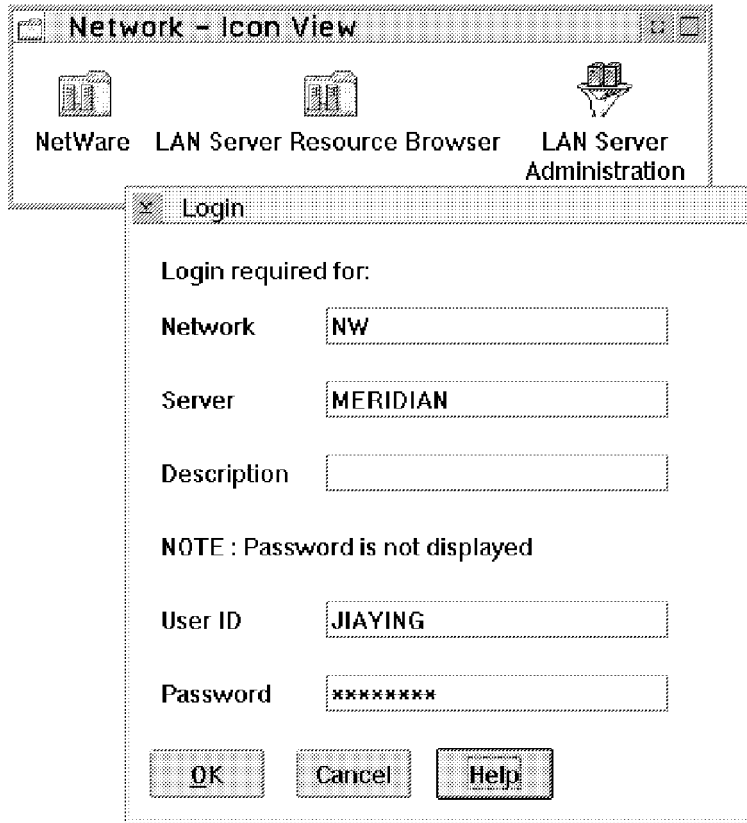


Figure 128. Login Window for NetWare

OS/2 Peer Resources

Once logged on, the servers and peers in the domain browse scope are displayed. You can work directly with Shared folders or Printers on other peer workstations, and if you are part of an OS/2 LAN Server domain, you also have access to the OS/2 LAN Server Aliases. (Figure 129 on page 228)

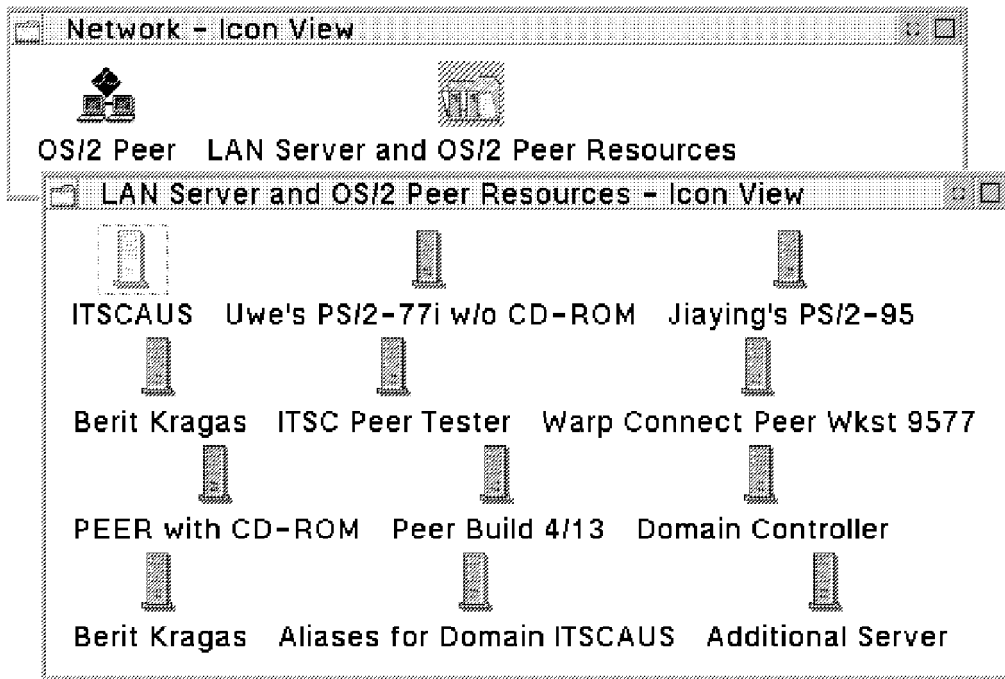


Figure 129. LAN Server and OS/2 Peer Resources Window

NetWare Resources

Once logged in, all the server accessible to the NetWare Client for OS/2 Version 2.11 are displayed.

LAN Server Resources

Once logged on, the servers and peers in the domain browse scope are displayed. You can work directly with Aliases, Shared folders or Printers

Assigning Drives from a Pop-up Menu

OS/2 LAN Server and IBM Peer for OS/2 Version 1.0 Aliases and Shared folders, and NetWare Volumes can be manipulated directly from the Network folder. They can also have a drive letter assigned to them if required by the application that you are using.

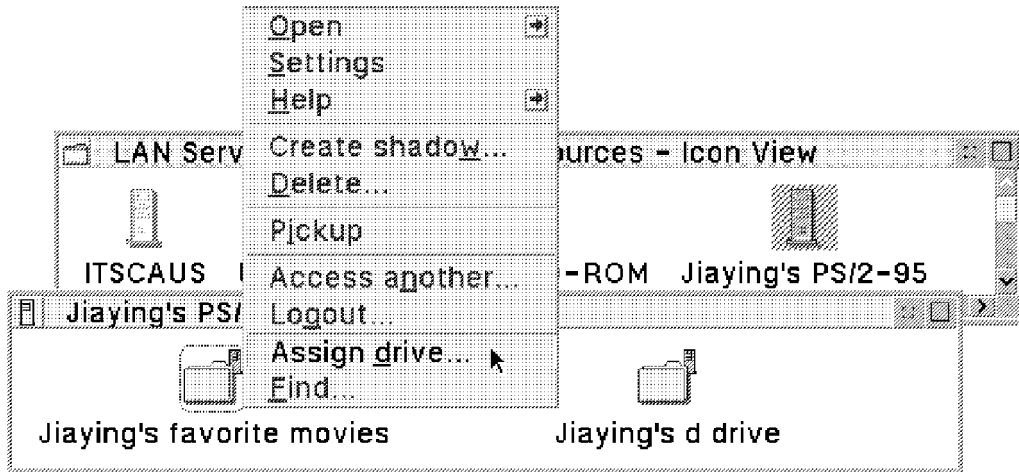


Figure 130. Pop-up Menu to Assign a Drive

You can choose from any of the un-allocated drive letters available on your machine. Here we assigned the drive letter M. (Figure 131)

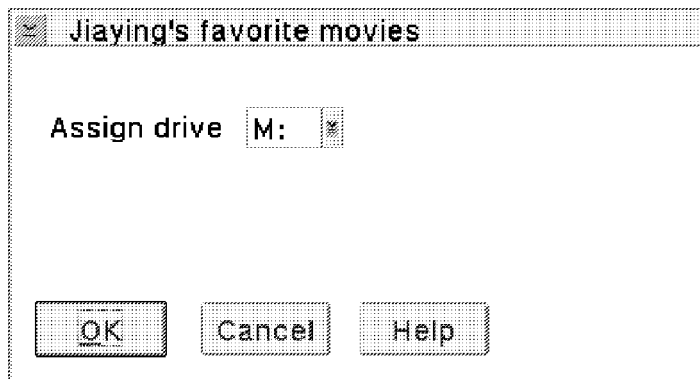


Figure 131. Assign Drive Window

Once a drive letter is assigned you can access the object, by using its drive letter through any application, OS/2 command line or the Drives folder. (Figure 132 on page 230)

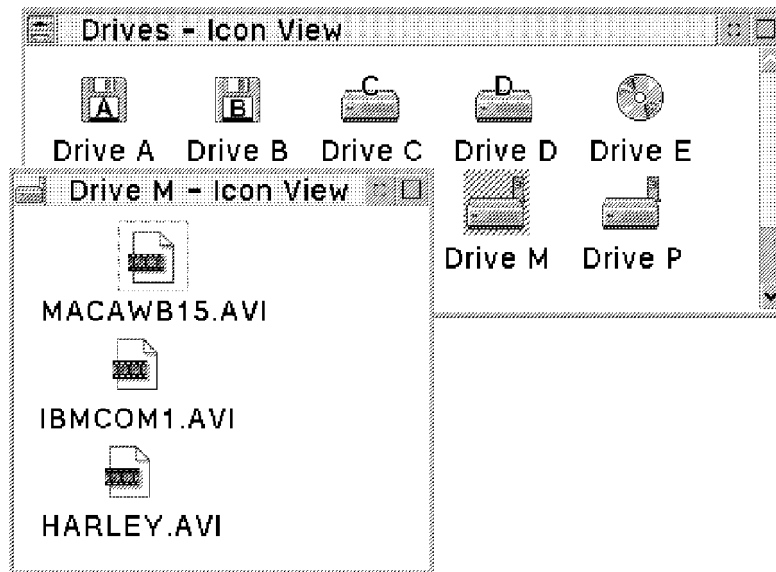


Figure 132. Drives Folder

Assigning Ports to Printers

Within OS/2 you generally do not require a printer to have a port assigned. You can drag and drop data objects directly onto the printer objects. If the application you are using requires a printer to be assigned to a port you can do this by using the Assign Port menu option.

Accessing Servers Outside your Domain

In the NetWare Browser, all servers that are found are displayed. In the browsers for OS/2 LAN Requester and IBM Peer for OS/2 Version 1.0 only the servers in your domain, or listed in the `othdomains` entry of `IBMLAN.INI` are shown.

If you want to access a server that is not within your browse scope, you can use the Access Another menu choice which you get from a server's pop-up menu (using mouse button 2, click on a server object). The Access Another Server window is shown in Figure 133 on page 231.

All the servers within your browse scope are listed, but you can also enter a name of a server or peer name into the server field as well as a domain name.

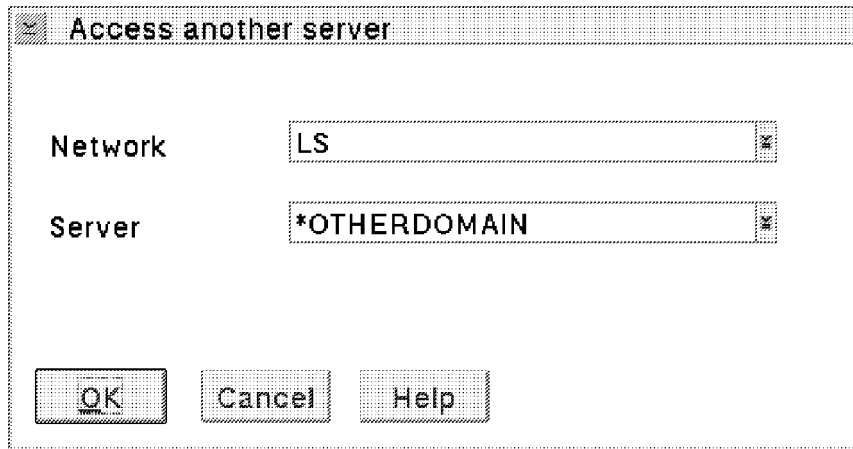


Figure 133. Access Another Server Window

Note: If you want to browse aliases of another domain, place an asterisk (*) before the domain name as shown in our example. Otherwise just select another server name from the pull-down menu or type in a server name.

Using Network Objects

The network objects (printers, aliases, shared directories, applications) can be dragged onto your Desktop if you want to have them more easily accessible. (Figure 134)



Jiaying's favorite movies

Figure 134. Shadow on Desktop

The default drag option is *Create Shadow*. If you try to use a resource that you have copied to your Desktop and you are not logged on, the system will display the Logon panel automatically.

Network objects behave identically to local objects with the following exceptions:

- Objects in the network folder can always be copied or shadowed to your Desktop, but can only be deleted or moved if the user has the network authorization to do it.
- The default drag operation for objects in the network folder is *Create Shadow*. The default for local objects is *Move*.
- Full names (alias description) are used instead of UNC names. (Figure 134 and Figure 135 on page 232)

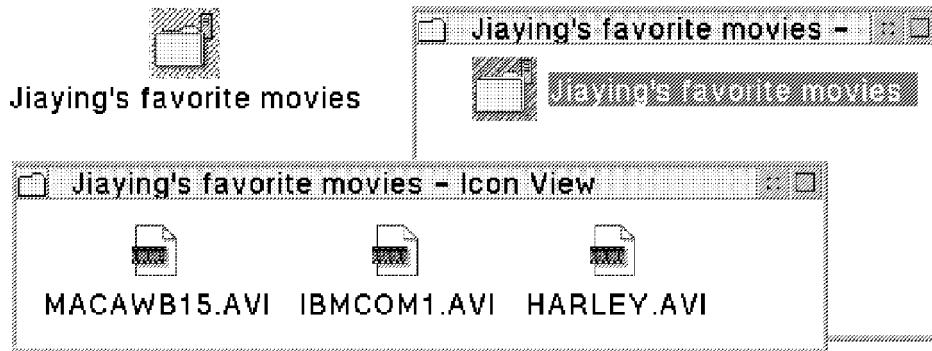


Figure 135. Shadowed Folder Contents

- If a user attempts to access a network object when they are not logged on, the Logon panel will be displayed automatically.

Logging Off

Most of the network objects provide a Logoff (Logout) menu option. (Figure 136) The window that appears is dependent on which type of network the resource is part of. You can log off the network and leave your network folders open. When you try to use a network resource again, you are presented with the Logon window.

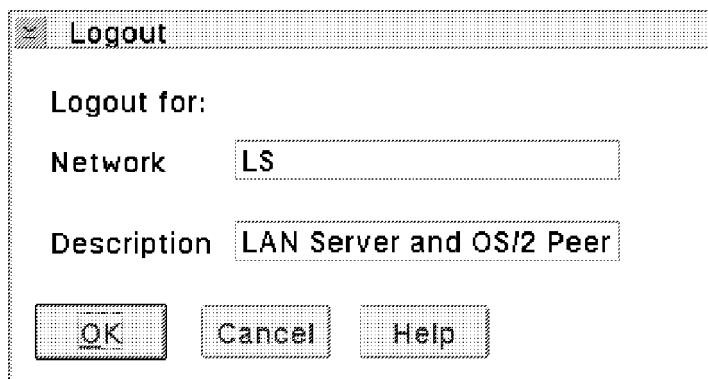


Figure 136. Logout

Network SignON Coordinator

The Network SignON Coordinator Client provides the end user a way to perform a signon/signoff operation. The Client can operate on either an OS/2 or DOS platform and manage passwords and logons in:

- OS/2 LAN Server Domains
- NetWare Servers

- Hosts
- Local facilities

These operations are specified in a user configured ASCII file (NSC.INI) which contains the location definitions which may contain a user ID to be used for request processing. The same location can be defined as many times as is necessary to include all the user IDs that you have at that location.

Network SignON Coordinator will prompt you for your current password and user ID (if not already specified in NSC.INI) which is then combined with location information to process your request.

Options that can be used in NSC are:

- Use a different user ID than the one the end user inputs.
- Specify that the user is to be logged on to a specific Domain.
- Specify an Exit Routine to be executed after Network SignON Coordinator performs the signon/signoff operation. Network SignON Coordinator allows a user to signoff all locations with a single command.
- Change password across all defined Domains in one operation. If the user selects the option to change passwords, the user is prompted to enter and confirm the new password. The password change is then initiated at all locations defined in their Network SignON Coordinator configuration file.

Network SignON Coordinator provides additional functions and options to allow users to tailor the system to fit their needs. These functions and options include:

- Queueing requests to LAN Server domain controllers when they are not available.
- The ability to specify different user IDs on each system while using the same signon password on every system.
- An OS/2 API and toolkit that supports all of the function of Network SignON Coordinator while bypassing the user interface.
- User Exits for additional coordination or synchronization of signons, changing passwords and signoffs.
- Configuration options for user ID character set, minimum/maximum user ID length, and minimum/maximum password length.

To summarize, Network SignON Coordinator is a tool for end users who, by entering their user ID and password once at a menu, have their signon requests processed at any number of OS/2 LAN Server domain controllers.

Note: Users in a double-byte character set (DBCS) environment are limited to using single-byte characters in their user IDs and passwords.

Security

Network SignON Coordinator is not a security product; it is a productivity aid. However, since it does help the user manage passwords, some care has been taken to avoid creating additional security exposures for the user.

Warning

Review the following with respect to your security requirements. If any of these possible exposures is unacceptable, you should not use Network SignON Coordinator.

- Network SignON Coordinator assumes the user has the same password at all locations. If a user's password is compromised, the security exposure may be greater since all locations can be accessed with that password.
- Network SignON Coordinator can remember the user's password once it has been entered, but only if the SAVEPW option is configured. The default operation requires the user to reenter the password each time it is required.

The password is always discarded when Network SignON Coordinator is terminated, even if SAVEPW is configured.

- Network SignON Coordinator does not keep passwords in the clear in memory except when necessary to call external application programming interfaces. The password is masked and distributed using a simple reversible algorithm designed to prevent casual viewing of the password.
- Network SignON Coordinator does not send passwords from Network SignON Coordinator Clients to Network SignON Coordinator Servers in the clear. The password is masked to prevent casual viewing of the password via network analyzers.
- Products supported by Network SignON Coordinator send the passwords across the network using different techniques. For information on how passwords are communicated by these products, consult the product information for that product.

- Network SignON Coordinator provides no function for restricting access to locations. Access to other locations is controlled by each location's own security facility.
- Network SignON Coordinator performs no encryption, and is therefore not subject to any export restriction related to encryption.

Installation

OS/2 Warp Connect installs the OS/2 Client and Server part of Network SignON Coordinator. This allows a workstation to function as both an Network SignON Coordinator OS/2 Client and an Network SignON Coordinator Server.

You can install NSC separately by using the Individual Product Installation.

Configuration

All configuration information for Network SignON Coordinator itself is stored in a flat ASCII file called NSC.INI. An ASCII file editor can be used to modify the file to customize the configuration. The NSC.INI file comes with the defaults for menu interaction. Configurable entries include:

- Minimum and maximum user ID
- Password lengths
- Sound
- Menu shortcut
- Default user ID

The NSC.INI file does not come with any pre-configured LAN Domain Server or Host names. Entries for each LAN Server and host must be added. The default NSC.INI file for an OS/2 client only contains the following line:

```
LOCAL, ON
```

The NSC.INI file may be replicated to multiple directories to allow support of different users or different system views. A copy of the file must either reside in the current directory or in a directory specified in the `DPATH` when executing `NSC`, `NSCRSON`, `NSCRSOFF` or calling the `NSCRSIGN` API.

The NSC.INI file may be modified by any ASCII file editor (for example, the OS/2 Enhanced Editor). Each line defines a configuration option or operation. Any line beginning with an asterisk is considered to be a comment and is ignored. Any text following the first blank (space) character on a line is considered to be comment text and is ignored. Although options are all shown in upper case, they may be entered in upper, lower or mixed case.

An example of a configuration file is shown in Figure 137 on page 236.

```

USERID=BALDRICK
EXIT, ID=1, NAME=D:\NSC\PEERPASS.COMD
LOCAL, ON, EXITID=1
LANSERVER, IBM, NAME=ANYDOM01, ON
LANSERVER, NOVELL, NAME=NW312, USERID=NWUSER

```

Figure 137. OS/2 Client NSC.INI File Example

```

@ECHO OFF
rem %1 = 0 for signon, 1 for signoff, 2 for change password,
rem %2 = Configuration definition index
rem %3 = Return code
rem %4 = User ID
rem %5 = Current Password
rem %6 = New Password
rem
rem exit if not a change password request
IF NOT %1 == 2 GOTO END
rem repeat the NET PASSWORD line with the name of all the peers that
rem you want to change your password on
NET PASSWORD \\BOBSMACHINE %4 %5 %6
NET PASSWORD \\PEERCD %4 %5 %6
:END

```

Figure 138. NSC Exit for Changing Peer Passwords

The example allows a logon to an OS/2 LAN Server domain, and defines user IDs on two IBM Peer for OS/2 Version 1.0 machines that are to be maintained. The NSC Exit PEERPASS.COMD allows passwords to be changed on peer machines.

The following table provides details of the NSC.INI options that may be set.

Table 4 (Page 1 of 3). NSC.INI Configuration File Options

Option	Description	Valid Range	Default Value
USERID	Specifies the user ID to be used for signon operations	Any character that is part of the user ID Character Set	none

<i>Table 4 (Page 2 of 3). NSC.INI Configuration File Options</i>			
Option	Description	Valid Range	Default Value
CHARSET	Specifies characters (other than alphanumerics) that are valid in user IDs and passwords	Graphic ASCII characters, other than a space	All alphanumeric characters plus the non-alphanumeric characters #, @ and \$
MINUIDLEN	Defines the minimum user ID length	1 to 8 characters	4 characters
MAXUIDLEN	Defines the maximum user ID length	1 to 47 characters	8 characters
MINPWLEN	Defines the minimum password length	1 to 8 characters	5 characters
MAXPWLEN	Defines the maximum password length	1 to 8 characters	8 characters
BEEP	The BEEP option allows the user to turn on or off the beeps that are sounded when error messages are displayed or invalid keys are pressed	ON, OFF	ON
SIGNON	Causes the Signon dialog to immediately be displayed when the PM interface (NSC.EXE) is started	none	none
SAVEPW	Specifies that the end user's password should be recorded and used for subsequent password requests in this session	ON, OFF	OFF
CONFIRMEXIT	Defines whether a warning message is displayed before Network SignON Coordinator exits	ON, OFF	OFF

Table 4 (Page 3 of 3). NSC.INI Configuration File Options			
Option	Description	Valid Range	Default Value
DEBUG	Specifies that additional information should be logged when a problem occurs	none	none
<p>Notes:</p> <ol style="list-style-type: none"> 1. Lower case alphabetic characters in the default user ID will be converted to upper case (see User ID Character Set Option). The user ID entered in the Network SignON Coordinator Signon menu becomes the default user ID for each system specified with a DOMAIN, HOST or LOCAL operations. This user ID may be overridden in any of these operations by specifying the USERID parameter for the operation. 2. This option is useful when you use the UPMCSET /E command to extend the user ID character set. You can not specify the alphanumeric characters A through Z, a through z, and 0 through 9. Only graphic ASCII characters other than a space can be specified. (they are 0x21..0x7E, 0x80..0xFE). Lower case extended ASCII characters should be avoided, as they will not be converted to upper case, and may thus not give the desired result when passed to UPM or LAN. You can specify up to 159 characters. This is enough to specify all the non-alphanumeric graphic ASCII characters. No check is made for duplicate characters. 3. When specified the equivalent action of using the mouse to select <i>Actions</i>, <i>Signon</i>, and <i>Default Systems</i> is performed. 4. If you select the Default Signons or Change Password actions, the previously entered password is used. The password is not stored on disk, but hidden and masked in memory. When Network SignON Coordinator is closed, the saved password is no longer available. 5. This option should only be specified for problem determination purposes since user request processing is slower with this option defined. 			

The following is a list of the configuration and signon operation options defined in the configuration file.

Definition	To specify
LOCAL	UPM Local signon
NODE	UPM Node signon
LANSERVER	OS/2 LAN or NetWare Server logon
HOST	Host signon
SERVER	NSC/2 Server machine

The order of the operations is very important since Network SignON Coordinator executes them in order. The SERVER definitions are also stored in the configuration file. Their position in the file relative to the signon operations determines where the signon operations are executed.

Using Network SignON Coordinator

From a OS/2 Warp Connect workstation a user can perform:

- Local logons - For administration of local UPM and logon to other applications like DB2/2
- LAN logon - Used by LAN server for attaching to a domain
- NetWare login - Used to log in to a NetWare Server
- IBM Peer for OS/2 Version 1.0 password management - managing your passwords on IBM Peer for OS/2 Version 1.0 workstations

Network SignON Coordinator uses two signon operations parameters in NSC.INI:

- LOCAL - for local logons and password changes in the local UPM
- LANSERVER - for one LAN (domain) logon and password changes
LANSERVER is also used for NetWare server logins and password changes

Password changes on IBM Peer for OS/2 Version 1.0 workstations are handled by a NSC exit which runs NET PASSWORD commands to change peer passwords.

Note

IBM Peer for OS/2 Version 1.0 workstations do not support logons, however it still possible to maintain client passwords defined in the peer server because Network SignON Coordinator can use the NET PASSWORD command to perform password changes which only requires UPM on the peer workstation.

Network SignON Coordinator used in a pure peer environment is useful to synchronize passwords, not for logging on.

LOCAL

A LOCAL operation is used to make OS/2 UPM password changes and optionally logon to the local UPM. The syntax is:

```
--LOCAL-[ ,ON]-[ ,USERID=<userid>]EXIT=<filename>]-----  
-- [ ,EXITID=<exitid>]-----
```

The ON option requests Network SignON Coordinator to perform a local logon as well as synchronize password changes with UPM.

If the user's account on the local workstation is under a different user ID than the user ID provided to Network SignON Coordinator (from the USERID configuration option, from the command line, from the API, or from the Signon dialog), the USERID= parameter may optionally be specified. Lower case alphabetic characters in the user ID will be converted to upper case. This parameter also allows a user to synchronize passwords for multiple accounts on the client workstation, each with a different USERID= parameter.

If the EXIT parameter is optionally provided, Network SignON Coordinator will execute the specified command file or executable program for each request made for this Local operation. A complete path (up to 80 characters) may be specified if the command file or executable program is not in the PATH.

For example, the NSC OS/2 Client will perform a local logon for the user at signon and change the password on the client workstation when requested and execute the user command file PEERPASS.CMD after each request with the following operation:

```
LOCAL, ON, EXIT=D:\NSC\PEERPASS.CMD
```

```
@ECHO OFF
rem %1 = 0 for signon, 1 for signoff, 2 for change password,
rem %2 = Configuration definition index
rem %3 = Return code
rem %4 = User ID
rem %5 = Current Password
rem %6 = New Password
rem
rem exit if not a change password request
IF NOT %1 == 2 GOTO END
rem repeat the NET PASSWORD line with the name of all the peers that
rem you want to change your password on
NET PASSWORD \\BOBSMACHINE %4 %5 %6
NET PASSWORD \\PEERCD %4 %5 %6
:END
```

Figure 139. NSC Exit for Changing Peer Passwords

Multiple requests for password change operations or any other operation can be defined within the configuration file to be executed either on the Client or at the Server. The EXIT parameter is required for password maintenance of

peer workstations. Using NSC, peer workstations must have the same user ID defined as the user ID defined locally.

LANSERVER

A LANSERVER operation is used to make LAN Server password changes and optionally logon to the LAN Server. You can specify multiple LAN Server definitions to be processed locally, but LANSERVER definitions cannot follow a SERVER definition. The syntax is:

```
--LANSERVER {IBM | NOVELL} [,NAME=<name>] [,ON] -----  
-- [,USERID=<userid>] EXIT=<filename>] EXITID=<exitid>] -----
```

The ON option requests Network SignON Coordinator to perform a logon to an OS/2 LAN Server Domain Controller or NetWare server as well as synchronize password changes.

The value of name is the LAN Server domain or NetWare file servers name.

If the user's account on the server is under a different user ID than the user ID provided to Network SignON Coordinator (from the USERID configuration option, from the command line, from the API, or from the Signon dialog), the USERID parameter may optionally be specified. The user ID on a peer must be the same as the user ID defined locally. Lower case alphabetic characters in the user ID will be converted to upper case. This parameter also allows a user to synchronize passwords for multiple accounts on the same domain controller by including multiple LANSERVER operations for the same domain controller, each with a different USERID parameter.

If the EXIT parameter is provided, Network SignON Coordinator will execute the specified command file or executable program for each request made for this LANSERVER operation. For example, an exit routine could check for a successful domain logon and perform a NET USE for a resource controlled by the domain. A complete path (up to 80 characters) may be specified if the command file or executable program is not in the PATH.

For example, the Network SignON Coordinator OS/2 Client will perform a LAN Server logon for the user on to domain MYDOMAIN at signon and change the password on domain MYDOMAIN when requested with the following operation:

```
LANSERVER , NAME=MYDOMAIN , ON
```

Note: Lower case alphabetic characters in the domain name will be converted to upper case.

Note: Multiple LANSERVER operations can be specified, however they can only be executed from the Client. Since it is only possible to have one active domain logon and one active NetWare login on a workstation, only the primary domain and/or NetWare server should include the ON option. LANSERVER operations can not follow a SERVER definition.

Figure 140 shows the Network SignON Coordinator main folder.

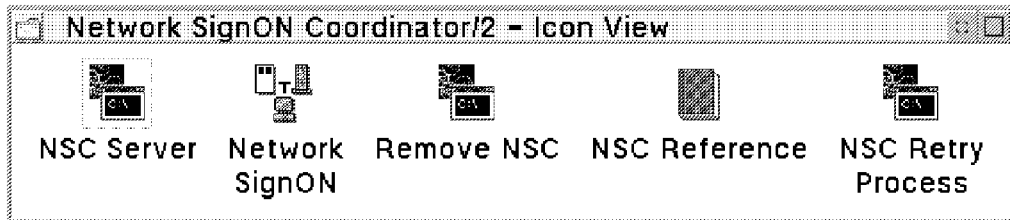


Figure 140. Network SignON Coordinator - Main Folder

For more information open *NSC Reference* and the *LAN Requester User's Guide* online book files.

AskPSP

AskPSP uses CasePoint, which is an intuitive search tool to help you solve OS/2 problems.

The AskPSP databases are built with information developed for solving previously known problems. Although there is extensive information in the AskPSP database, not all problems can be solved in AskPSP.

You can use keywords or full sentences when you describe a problem. CasePoint is not case sensitive, it even recognizes misspellings.

The online help for CasePoint provides basic information on the operation of the interface.

Using AskPSP to Solve Common Problems

Use AskPSP's expert system to obtain answers to problems and questions concerning OS/2 Warp, LAN Requester, LAN Distance, and NetWare Client for OS/2.

After installing AskPSP, you get an AskPSP folder on your Desktop (or in the Technical Connection folder if it is installed) that contains icons for products in OS/2 Warp Connect. Each product icon runs a search tool called

CasePoint* and then opens a database of common problems and questions relating to the product selected.

The search tool screen consists of three basic parts:

1. Description area

Type in the description of the problem or question and press Enter. This initiates a search of the database. After the search, questions appear in the question area.

2. Question area

To answer a question, click on the Not Answered column. A popup box appears with the question and a list of answers. Select the appropriate answer and click on Answer.

An icon to the left of a question indicates that there is additional information about the question. Double-click on the text of the question to see the additional information.

3. Action area

Notice the numbers beside the actions change as you answer questions. The higher the number, the better the match and the more likely the action is the solution to the problem. An action is highlighted when the number is over 80.

Double-click on the top action to see the answer. This brings up a screen with the answer that you can browse and, in some cases, search or print. To exit from the action, double-click in the top left corner of the window.

New Search

To start a new search, select Search from the menu bar and then select New Search. This clears all information from the screen and allows you to type in another problem description.

Hint

We have found it useful to change the preferences for CasePoint so answered questions are retained at the top of the list, rather than the bottom. To do this, select Options from the menu bar and then select Preferences. In the Answered Questions Go To section, select the Top radio button.

AskPSP Example

Try the following example to get a feel for AskPSP:

1. Double-click on the OS/2 Warp Initial Users' Case Base.
2. Type in the following description: PCMCIA support not working with Warp.
3. Press Enter.
4. Double-click on the top of the Not Answered column.
5. Select Problem/Failure and then click on the Answer button.
6. Double-click on the next Not Answered.
7. Select MKBCM (Mouse, Keyboard, Com Ports) and click on Answer.
8. Double-click on the top action (the one that's highlighted).
9. Use scroll bars to browse the answer.

Support and Feedback

A customer forum called ASKPSP CFORUM exists on the OS2BBS. You can submit your comments and questions here, or if you do not have OS2BBS access, mail your comments and questions to:

IBM Corporation
c/o Technical Connection CD-ROM
11400 Burnet Rd. Internal Zip #2901
Austin, Texas 78758

Monthly Updates and Additional Information

Updated AskPSP information is available on the monthly Technical Connection Personal Software CD-ROM. AskPSP is just one of the service and support information features of the Technical Connection. To order the Technical Connection CD-ROM within the U.S. and Canada, call 1-800-992-4777.

Note: If you have already installed a Technical Connection CD-ROM version prior to January, AskPSP installation will overwrite the information in the AskPSP folder of the Technical Connection CD-ROM.

If you have already installed a Technical Connection CD-ROM version after January 1995, there is no need to install this version of AskPSP. Releases of the Technical Connection CD-ROM after January 1995 contain updated versions of the databases included with this product.

As a user, you are only licensed for a *single-use* instance of CasePoint in conjunction with the databases provided with AskPSP.

Also, the material contained in the AskPSP databases is provided *as is*. IBM does not warrant that the functions or data contained in the material will meet your requirements or that the material will be error free.

Running LAN Applications

LAN Server takes advantage of *UNC naming* in defining a network application without assigning a drive. Alias names are used instead. You as a peer user can take advantage of this too. All you need to know is the alias name and the workstation name on which the application resides. Then you can issue the following command assuming Lotus 1-2-3 resides on the workstation ITSCWK_VIVIAN where the alias name LOTUS123 is defined:

```
ITSCWK_VIVIAN LOTUS123 123G.EXE
```

As you can see, there is no drive letter assigned to the application. What happens is, that a connection will be established to the peer server. If you issue a NET USE command from an OS/2 command line you will get a response like this:

Status	Local name	Remote name
OK	F:	\\WFWSERVER\WFW CD ROM
OK	I:	\\ITSCSV00\DISK-COM
OK	M:	\\ITSCWK_JIAYING\MOVIES
OK	P:	\\ITSCSV01\PUBLIC
OK	T:	\\ITSCSV00\DISK-TRN
OK	LPT1	\\ITSCSV01\IBM4019
OK		\\ITSCWK_VIVIAN\LOTUS123

The command completed successfully.

No local name has been assigned to the Lotus 1-2-3 application. Advantage: No waste of drive letters.

Note: Notice the first line with the local name F:. This is a Windows for Workgroup resource which allows having spaces in netnames. OS/2 Peer can handle netnames like this.

See “UNC Naming” on page 37 for information on UNC naming conventions.

Chapter 7. Improved Internet Access and TCP/IP Functions

TCP/IP Version 3.0, which is shipped as a part of Warp Connect, is a complete implementation of the TCP/IP protocols and application suite. Support for TCP/IP communication over token ring, Ethernet connections is included, as well as serial communication support using either the Serial Line Internet Protocol (SLIP) or the Point to Point Protocol (PPP). TCP/IP connections can be made to LAN based TCP/IP server applications, to the Internet or to both at the same time. All of the functions previously provided in the IBM Internet Connection Kit of the Warp BonusPak are included in TCP/IP Version 3, as well as all of the function in the TCP/IP 2.0 base kit and the TCP/IP 2.0 DOS/Windows Access kit. In addition, MPTS as included in Warp Connect provides NetBIOS over TCP/IP support. With TCP/IP Version 3.0,

This chapter will focus on the accessibility to the LAN and the Internet and doesn't cover all of the TCP/IP base functions. For TCP/IP detail, please refer to other book such as *Inside TCP/IP*, ISBN 1-56205-354-X.

Prerequisite of OS/2 Versions

IBM TCP/IP for OS/2 Version 3.0 requires OS/2 Warp or above. It is not supported to install IBM TCP/IP for OS/2 Version 3.0 over an OS/2 V1.x or OS/2 2.x. If you install IBM TCP/IP for OS/2 Version 3.0 on OS/2 Warp at a CSD level less than XR03003, make sure to upgrade the installed MPTS version to a CSD level of WR08000 or higher.

Differences from Warp BonusPak or TCP/IP for OS/2 Version 2

The base kit has been replaced with a new set containing improved functions and fixing some problems, and IBM Internet Connection for OS/2 is renewed. The original IBM Internet Connection for OS/2 in the OS/2 Warp BonusPak included:

- TCP/IP basic applications
- Dial-up support (SLIP and PPP)
- Client support

A full suite of Internet Client applications, including Web Explorer, a Mosaic like Web browser, NewsReader/2, Gopher, Telnet, FTP, and Email are supported.

Now the coexistence with LAN based TCP/IP is supported by TCP/IP Version 3, so you can use both LAN based TCP/IP applications and dial-up based Internet applications together. UltiMedia Mail/2 Lite is now configurable for both LAN and Internet.

Warning

If the Internet Connection kit from the Warp BonusPak has been installed, you can install MPTS and TCP/IP Version 3.0 on top of it to gain TCP/IP LAN function. The Internet Connection installation will not permit you to install it on top of TCP/IP Version 3.0, and as all Internet Connection function is included in TCP/IP Version 3.0, there is no reason to do so.

There is one known problem with MPTS and Internet dial access. You can configure to use TCP/IP only for SLIP/PPP dial access, either by installing only the Internet Connection, or by installing TCP/IP but not using MPTS to bind the TCP/IP protocol to a LAN adapter. If you then run MPTS, it will remove your TCP/IP statements from CONFIG.SYS, disabling dial access. This problem will be fixed soon, but to work around it, you must reinstall TCP/IP Version 3.0 or the Internet Connection to restore dial support. This problem does not occur if you use MPTS to bind TCP/IP to a LAN adapter.

TCP/IP Overview

If you already have enough knowledge about TCP/IP and Internet, you can skip these sections and go to “Configuring Key TCP/IP Parameters” on page 259.

TCP/IP is a set of protocols developed to allow cooperating computers to share resources across a network. It was developed by a community of researchers centered around the ARPANet.

The most accurate name for the set of protocols is the *Internet protocol suite*. Because TCP and IP are the best known of these protocols, it has become common to use the term TCP/IP to refer to the whole family of protocols. Some protocols provide *low-level* functions needed for specific tasks, for instance transferring files between computers, sending mail, or finding out who is logged in on another computer. Thus the most important *traditional* TCP/IP services are:

- **File transfer**

The file transfer protocol (FTP) allows a user on any computer to get files from another computer, or to send files to another computer. You have to pass a a user name and a password to the other computer, to gain access to certain files. FTP is a utility that you run any time you want to access a file on another system. You use it to copy the file to your own system. You then work with the local copy.

- **Remote login**

The network terminal protocol (TELNET) allows a user to log in on any other computer on the network. You start a remote session by specifying a computer to connect to. From that time until you finish the session, anything you type is sent to the other computer. Every character you type is sent directly to the other system. The remote system will ask you to give a user ID and password. When you log off of the other computer, the telnet program exits, and you will find yourself talking to your own computer.

- **Electronic mail**

This allows you to send messages to users on other computers. The computer mail system is simply a way for you to add a message to the mail file of another user. Mail is normally handled by a mail server, running all the time. The mail software of the PC has got a user interface that retrieves mail from the mail server.

- **Remote printing**

This allows you to access printers, attached to other computers.

- **Remote Execution**

This allows you to request that a particular program be run on a different computer. There are a number of different kinds of remote execution, like *remote procedure call*, that allow a program to call a subroutine that will run on another computer.

These traditional services are available in any implementation of TCP/IP. They are also included in the TCP/IP Version 3.0. However, the following TCP/IP functions are not included with TCP/IP 3.0, but they are separately purchasable from IBM.

- Network File System (client and server)
- Domain Name Server
- X Windows Server
- X Windows Client
- MOTIF libraries for the X Windows Client

- Extended Networking Kit for X.25 and SNA support

These kits were created for TCP/IP 2.0, but they are also supported on TCP/IP Version 3.0. In some cases, a recent CSD or APAR fix is needed to make them work with TCP/IP Version 3.0.

Recently the following client/server applications are growing fast in the Internet environment:

- Web Explorer
- NewsReader
- Gopher

SLIP and PPP

Serial Line Internet Protocol (SLIP) and Point-to-Point Protocol (PPP) are TCP/IP protocols that allow a computer to become an independent host on the Internet across a standard telephone line. This gives you the full functionality of such a connection, allowing you to use programs like Gopher, electronic-mail and FTP, as if you were a permanently connected host on the Internet.

Many Internet providers prefer or require that you use PPP, because logon, session establishment, and TCP/IP configuration are designed into the protocol. PPP cannot be used with IBM Internet Connection for OS/2 with Advantis. The Dialer in IBM Internet Connection for OS/2, used to dial Advantis contains many of the functions of PPP, but Advantis uses SLIP. There are no significant differences in performance or reliability between SLIP and PPP, so Advantis users are not missing anything important.

TCP/IP for OS/2 Protocols and Applications

Protocols are a set of rules required to exchange packets of information (or datagrams) on an internet. Applications are the processes running on the hosts, gateways, and routers of an internet that send and receive the datagrams.

In this section we will categorize the TCP/IP protocols and applications by their functional group (network layer, transport layer, and application layer).

Group	Protocols and Functions
Network Layer	Serial Line Internet Protocol (SLIP)
	Point-to-Point Protocol (PPP)
	X.25 Protocol

Internetwork Layer	Internet Protocol (IP) Internet Control Message Protocol (ICMP) Address resolution Protocol (ARP)
Transport Layer	Transmission Control Protocol (TCP) User Datagram Protocol (UDP)
Application Layer	Telnet File Transfer Protocol (FTP) Trivial File Transfer Protocol (TFTP) Simple Mail Transfer Protocol (SMTP) Post Office Protocol (POP) Gopher Hypertext Transfer Protocol (HTTP) Domain Name System (DNS) Simple Network Management Protocol (SNMP) Remote Printing (LPR and LPD) TALK FINGER ROUTED X Window System Remote Procedure Call (RPC) Network File System (NFS) Remote Execution Protocol (REXEC) Socket Interfaces

Internet and TCP/IP

The Internet is a single logical network of computers incorporating many thousands of individual sub-networks called internets, spelled with a small (i) to distinguish it from the main Internet. These networks include ARPANet, NSFnet, regional networks such as NYsernet, local networks at a number of university and research institutions, and a number of military networks. The term Internet applies to this entire set of networks.

It is the largest network of computers in the world and is increasing in size at a remarkable rate as individuals and businesses recognize the advantages of being a part of such a network. As of January 1994 there were an estimated 2.2 million hosts on the Internet representing a year on year growth of 69%.

The Internet started off as a U.S. Defense Department network called ARPANet, which subsequently split into two separate networks, one called MILNET for military use, and the other retained the ARPANet name for further research. The National Science Foundation internet which was part of the ARPANet soon realized it needed to help out in streamlining the network, and created a central backbone connecting six supercomputer centers. The software being used was all freely available from the University of California's Berkeley Software Distribution. This group distributed its operating system, called BSD UNIX, which incorporates the TCP/IP set of protocols and TCP/IP application programs to facilitate networking.

The IBM Internet Connection for OS/2 code that comes as part of the OS/2 Warp BonusPak (or in the IBM TCP/IP for OS/2 Version 3.0) thus uses the TCP/IP standard for its networking capabilities.

For an excellent exposition on aspects of navigating the Internet, see *Ed Krol's The Whole Internet - User's Guide and Catalog*.

Internet Addressing

Addressing within the Internet can be complex and confusing. The following is intended to serve as a basic introduction to the subject of internet addressing. Readers who wish to study the subject in more detail are referred to the book *Internetworking with TCP/IP Volume 1* by Douglas E. Comer.

Two basic types of address are used, the *dotted decimal notation* and the system of *domain names*.

Dotted Decimal Notation

Internet addresses are 32-bit numbers, normally written as four octets. An octet is an 8-bit binary number (for instance 10101010). Internet addresses are normally written not in binary but in decimal, for instance 128.256.121.232. The address indicates both the *network* and the *host*: within the network. There are actually three different types of addresses.

1. Class A address


```

XXX.XXX.XXX.XXX
| | | |
- - - - -
network host
number number

```

Addresses, beginning with 1 to 126, use only the first octet for the network number. Bit 0 of the first byte is 0. The other three octets are available for the host number. Thus 24 (=3x8) bits are available for hosts. These numbers are used for large networks. But there can only be 126 of these very big networks. The ARPANet is one of them, and there are several commercial networks as well.

2. Class B address

```

XXX.XXX.XXX.XXX
| | | |
- - - - -
network host
number number

```

Class B addresses use the first two octets for the network number. However bit 0 of the first byte is 1 and bit 1 should be 0. Thus network numbers range from 128.1.xxx.xxx to 191.254.xxx.xxx. Addresses beginning with 0, 127 and 255 are avoided, because they are used for special purposes. The last two octets are available for host addresses, giving 16 (=2 x 8) bits of host address. This allows for 64516 computers, which should be enough for most organizations.

3. Class C address

```

XXX.XXX.XXX.XXX
| | | |
- - - - -
network host
number number

```

Class C addresses use three octets, in the range form 192.1.1.xxx to 223.254.254.xxx. These allow only 254 hosts on each network, but there can be lots of networks.

For the class A or class B network, **subnet** is used to divide the host portion into the physical network ID and the host ID. With subnetting the network will become more manageable. When you configure TCP/IP Version 3.0, you must enter **subnet mask** in order to distinguish the host ID bits portion from the 32 bits address.

Domain Name System

The system of domain names is much easier to use (though complex to implement), and has a hierarchical format. Every network on the Internet has a unique domain name, for example, my domain name may be:

`sales.comptech.com`

In the hierarchical scheme this reflects a three level domain. The top domain *com* is a standard format to encompass commercial companies, its sub domain *comptech* could be a company network, and *sales* could be a separate logical network for the salesmen of the comptech company.

Individual computers in the Internet also use the domain name system, and

`ps2agnetha.comptech.com`

may be the IBM PS/2 belonging to Agnetha on the Comptech internet.

Individual users also fall into the domain name system, where the user is separated from the network domain name with an @ character. Agnetha may thus be addressed via e-mail as *agnetha@sales.comptech.com*.

An address is unique to its location on the Internet, and is therefore not associated with a single user or a single computer, since either of these can change its position on the Internet.

Users of the Internet ALWAYS use Domain Name resolution. This is configured automatically for users of TCP/IP 3.0 and the Warp Internet Connection kit when a dial connection to the Internet is made.

Common Features of TCP/IP and Internet Folder

After IBM TCP/IP for OS/2 Version 3.0 is installed you will see two new folders on the Desktop:

- TCP/IP folder (see Figure 141 on page 255)
- IBM Internet Connection for OS/2 folder (see Figure 142 on page 256)

However, TCP/IP folder is hidden in the OS/2 System folder.

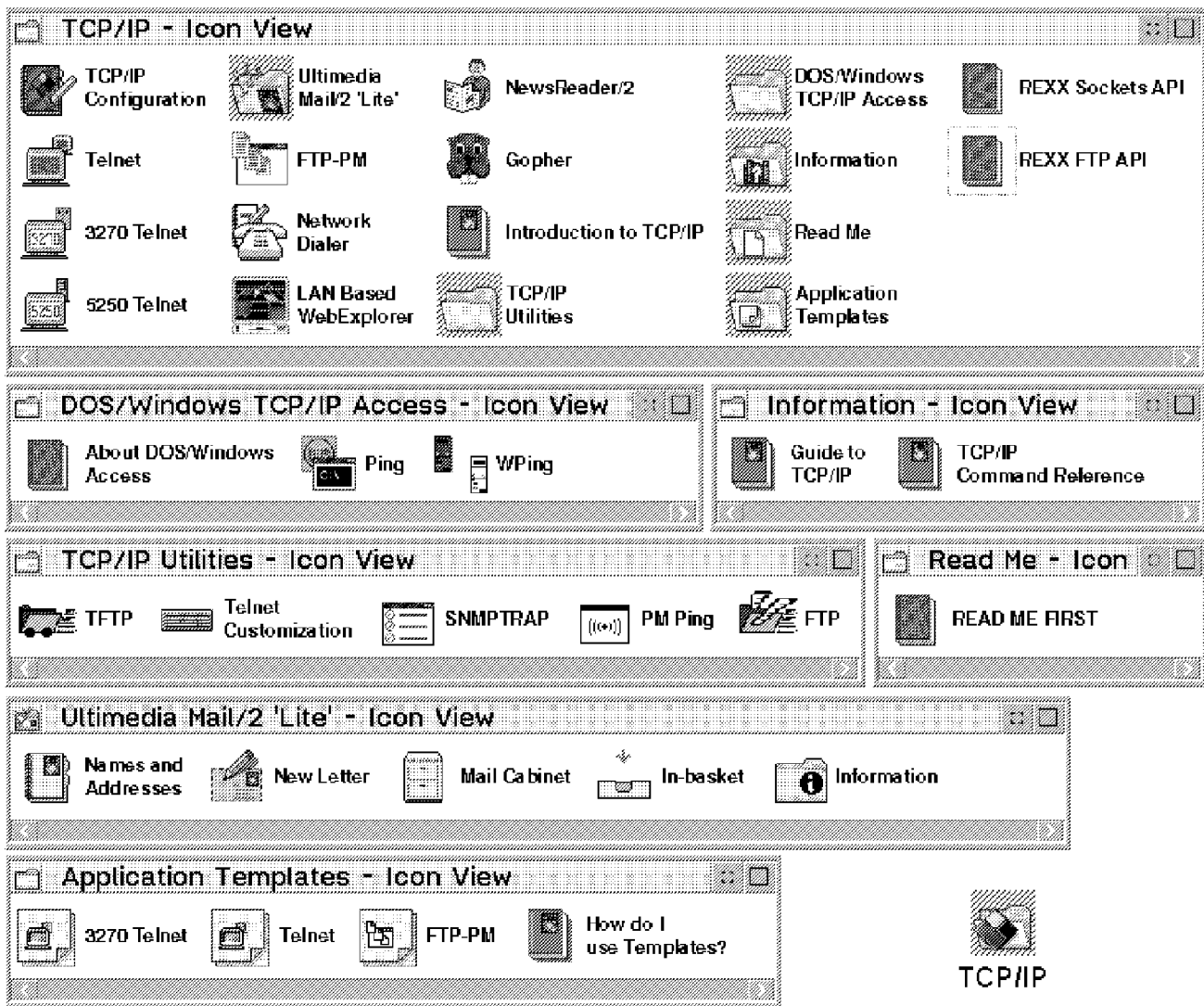


Figure 141. TCP/IP Folder

LAN Based WebExplorer

To avoid confusion it might be a good idea to rename the WebExplorer object which resides in the TCP/IP folder from *WebExplorer* to *LAN Based WebExplorer*.

If you compare both, you'll see some icons are same, for example:

- IBM Web Explorer
- IBM NewsReader/2
- Gopher

- Ultimedia Mail/2 'Lite'
- Application Templates

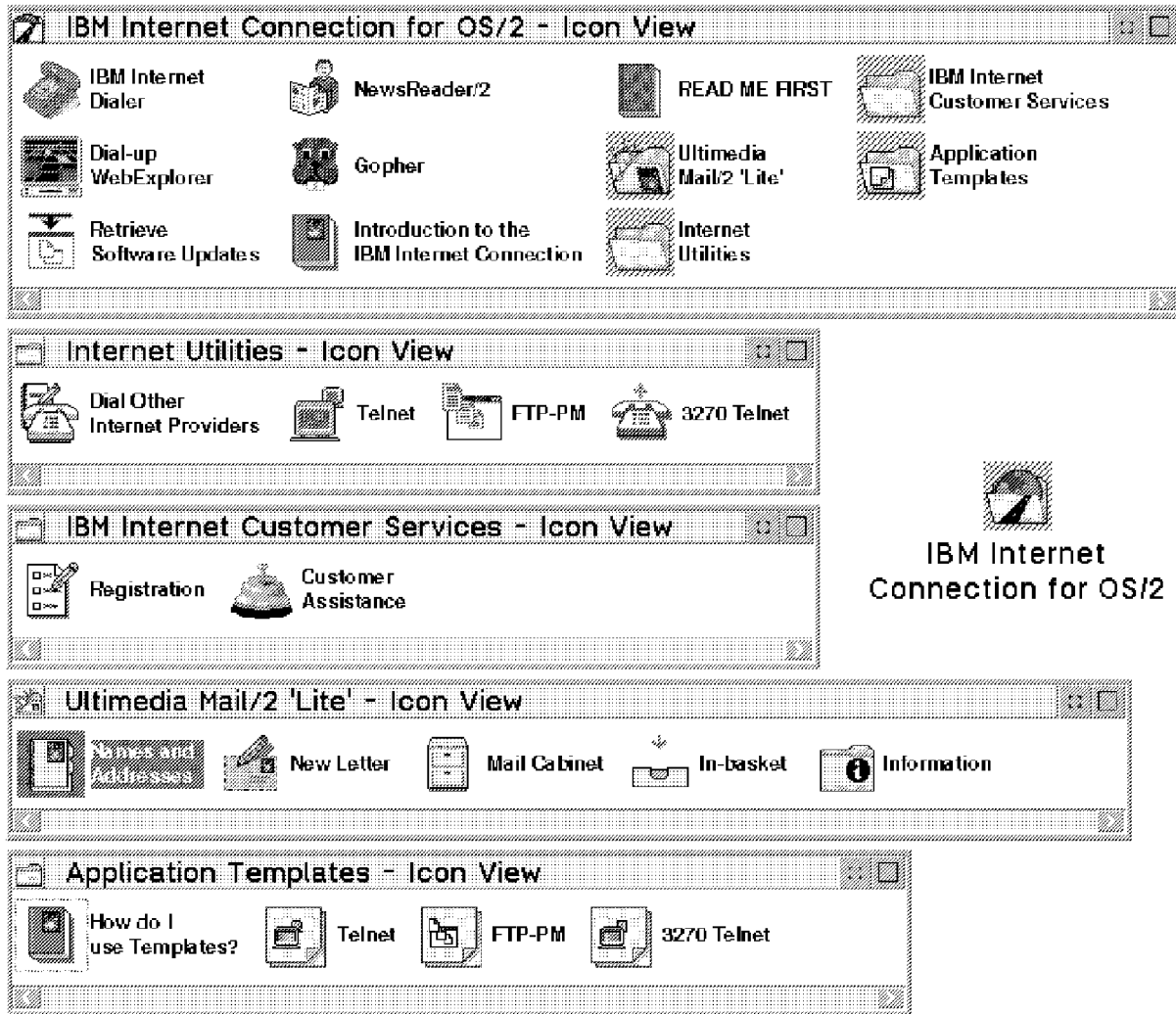


Figure 142. IBM Internet Connection for OS/2 Folder

Dial-up WebExplorer

To avoid confusion it might be a good idea to rename the WebExplorer object which resides in the Internet folder from *WebExplorer* to *Dial-up WebExplorer*.

The IBM Internet Connection for OS/2 folder originally comes as the OS/2 Warp BonusPak and is essentially the same. It assumes you have a serial (SLIP or PPP) connection with your Internet provider. Most of the applications are launched by one utility called LINKUP that accept the name of the

application as one of its parameters (for example: LINKUP GOPHER.EXE). The following shows the pop-up windows by LINKUP.

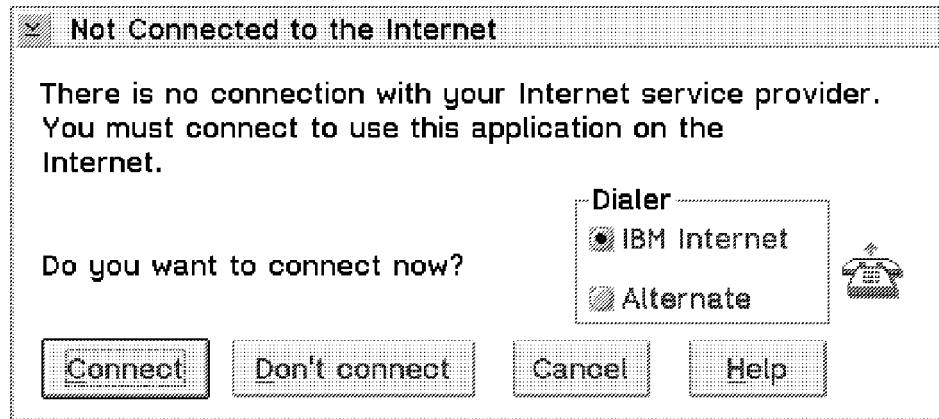


Figure 143. Pop-up Window by LINKUP Program

LINKUP.EXE performs two tasks that are necessary if you have dial access to the Internet network:

- Checks for serial connection and asks you to connect if connection was not activated yet (see Figure 143).
- If you choose to connect to Internet the utility will ask you for extra information required for the service. The very first time you will see the following window (Figure 144 on page 258).

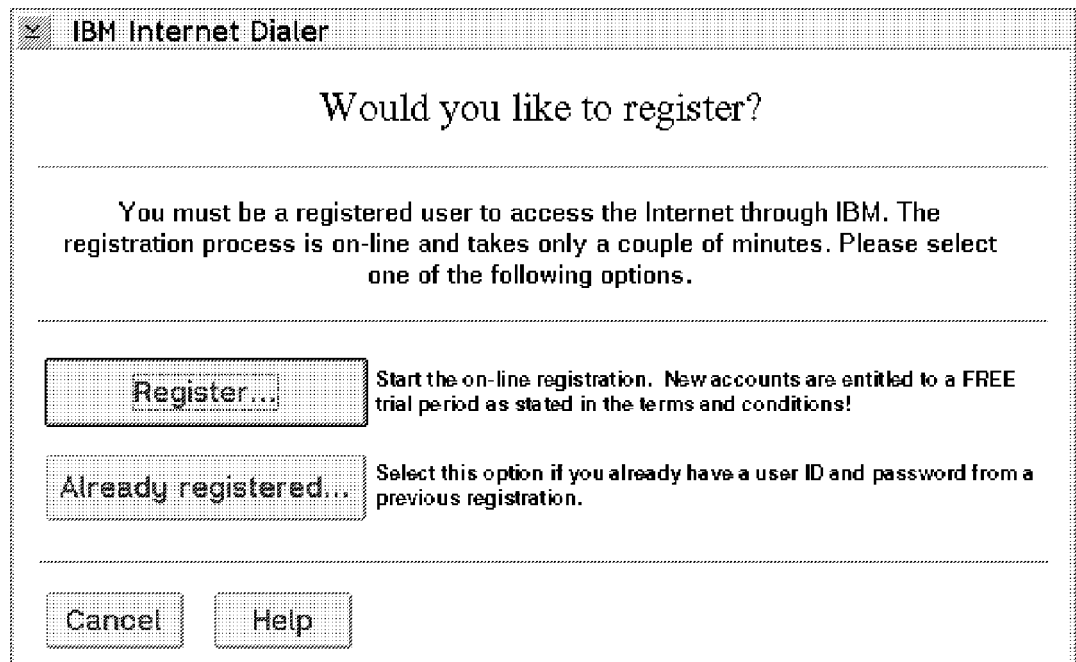


Figure 144. IBM Internet Dialer Window (Registration to the IBM Advantis)

In all cases, one task of the utility will remain waiting for the remote connection, and when the connection is established it will automatically launch the selected application for you (see Figure 145).

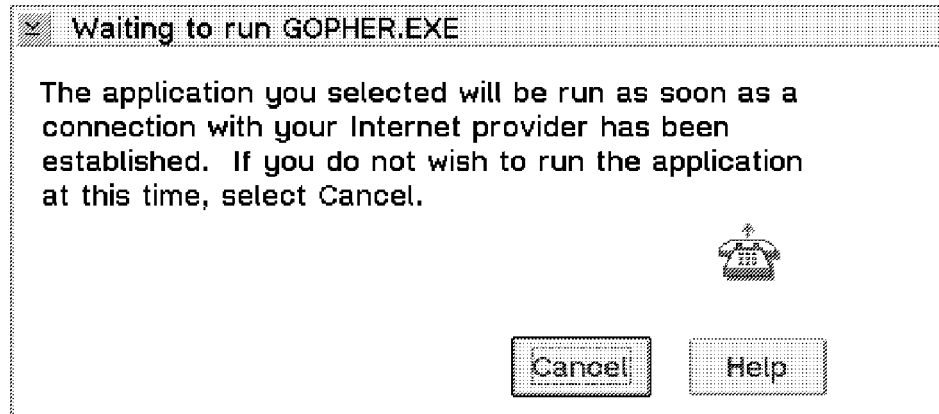


Figure 145. Waiting to Run GOPHER.EXE

On the other hand, the Internet utilities contained in the TCP/IP folder assume that you have a LAN connection with defined Internet IP address, and for that reason you don't need to dial anywhere or do any registration to the Internet. They simply launch the selected application.

Configuring Key TCP/IP Parameters

The TCP/IP Configuration Program was essentially modified to support LAN attachment and Internet dial-up on the same workstation.

In this section we point out how you should configure key TCP/IP parameters such as the IP address, Router and Name server. Before you start the configuration there is some warning for the input characters' case sensitivity.

Case Sensitivity

IBM TCP/IP for OS/2 Version 3.0 configuration is case-sensitive and accepts both upper and lowercase characters. However, only lower case subcommands are accepted by all TCP/IP components in general.

For example, when you exit from an FTP session, you type BYE in uppercase. Then you will get an error message:

```
C: ]FTP
IBM TCP/IP for OS/2 - FTP Client ver 15:51:28 on Nov 19 1994
ftp>BYE
?Invalid command
ftp>
```

In the next example we have to FTP to a host called DANIEL (which was defined in uppercase in the TRUSERS file of the host machine configuration), so we have to use DANIEL instead of daniel:

```
C: ]FTP
IBM TCP/IP for OS/2 - FTP Client ver 15:51:28 on Nov 19 1994
ftp>open DANIEL
```

If both ends are OS/2 TCP/IP, the system can handle a file name or directory name with either lower or upper case. AIX or any UNIX system's file system is case sensitive, so you must use the exact case for the name.

In order to avoid confusion by typing data in different cases, it is recommended to always use lowercase.

Now you start the TCP/IP configuration by double-clicking on the TCP/IP Configuration icon.

Network Interface Parameters

You must select one or more LAN interfaces from 0 to 7. Generally you choose LAN interface 0 for your first LAN adapter.

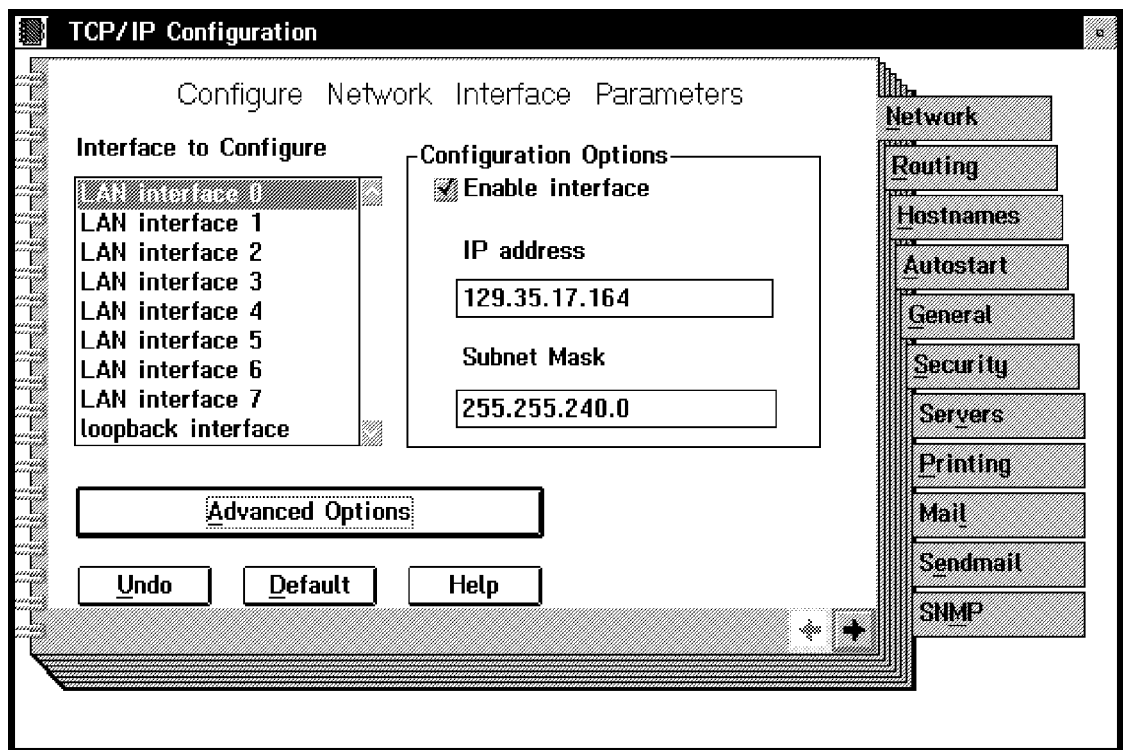


Figure 146. TCP/IP Configuration Program - Basic Options

IBM TCP/IP for OS/2 Version 3.0 introduces changes and improvements in this interface. They are:

- Configuration options have been rearranged with basic and advanced.
- Loopback Interface is added to bypass the network interface driver to provide a direct internal connection back to the protocol driver. In this case the subnet mask and advanced options are not available.

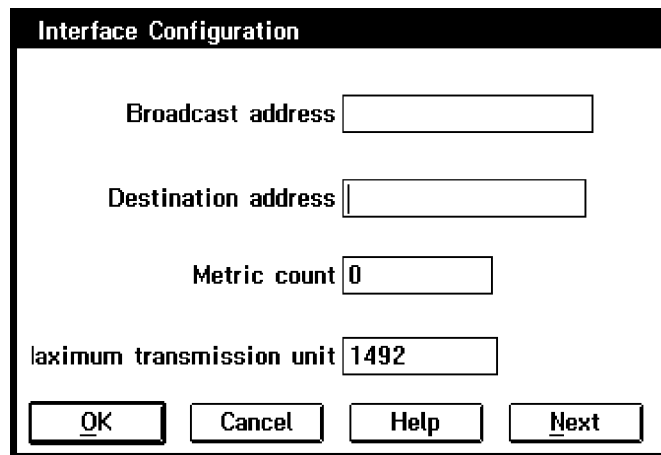
You can configure:

- Basic options:
 - Enable/disable the interface
 - IP address
 - Subnet Mask
- Advanced options:

Use of the advanced options page is rarely necessary, and values in that page should only be modified by users with a full understanding of network configuration, or at the request of your network administrator.

- Broadcast address: Normally not required because TCP/IP automatically calculates the default broadcast address
- Destination address: You don't have to specify this address unless you need to use a point-to-point link to connect to a TCP/IP network. If your machine is attached to the LAN you can leave this field blank.
- Metric count
- Maximum transmission unit

See Figure 146 on page 260 for basic panel and Figure 147 for the advanced options.



The screenshot shows a dialog box titled "Interface Configuration". It contains four input fields: "Broadcast address" (empty), "Destination address" (empty), "Metric count" (containing the number "0"), and "Maximum transmission unit" (containing the number "1492"). At the bottom of the dialog box, there are four buttons: "OK", "Cancel", "Help", and "Next".

Figure 147. TCP/IP Configuration - Advanced Options

Configure Routing Information

In networks that contain more than one segment, routers are used to forward IP packets from one segment to another. In TCP/IP parlance, *router* is synonymous with *gateway*. If you are to communicate with hosts on other segments, you must configure one or more route statements, specifying the routers you will use. Typically, it is sufficient to specify a single route entry for a default router. The router maintains a database of routing tables that it uses to calculate how IP packets to or from your machine should be forwarded. All route statements include a metric, the *hopcount* associated with the route. In almost all cases, you should configure 1 for the metric.

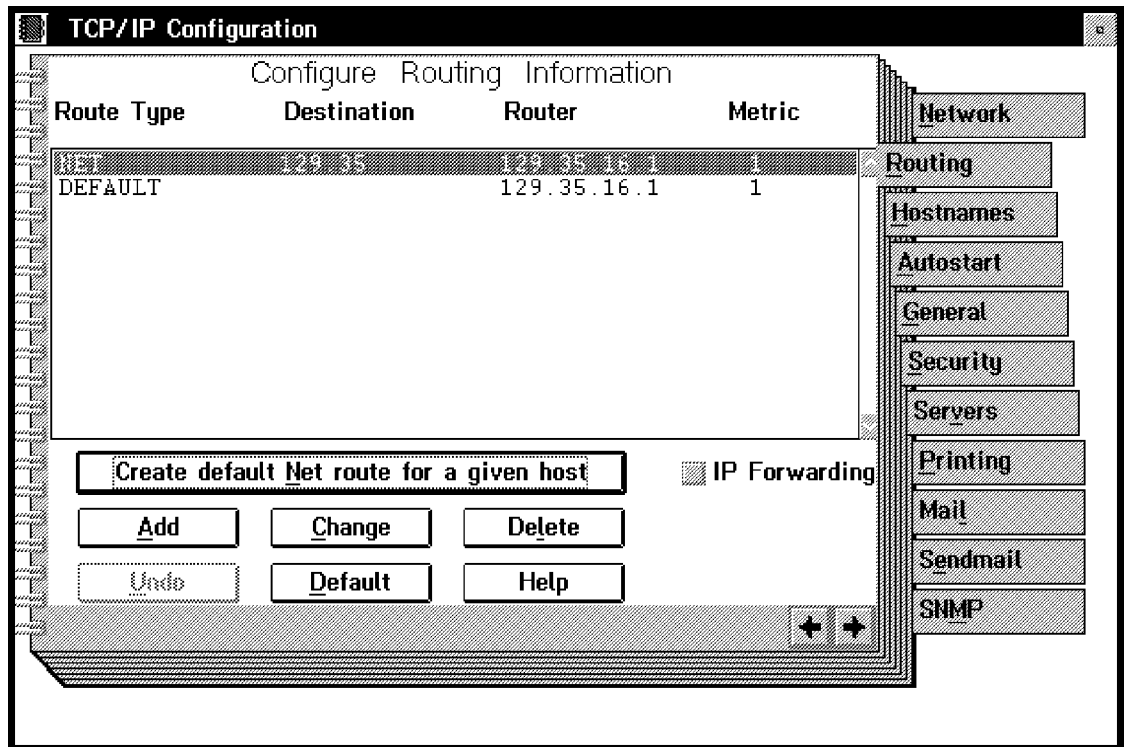


Figure 148. TCP/IP Configuration Program - Configure Routing Information

Routes Types

TCP/IP supports four types of routes: host routes, subnet routes, network routes, and default routes. When you configure a LAN TCP/IP interface with an IP address, a network route statement (or a subnet route statement, if a subnet mask is used) is automatically created. For example, if your host IP address is 196.2.5.20 and you are not subnetting, the following network routing statement is configured:

Destination	Router	Metric
196.2.5.0	196.2.5.20	0

This means that all packets destined for the class C 196.2.5 network are sent directly to the destination host, via the LAN interface for address 196.2.5.20. To communicate with machines not on the 196.2.5 network, you need a router and you must configure at least one routing statement.

Host routes specify the address of a particular host and the router to be used to reach that host. Similarly, network routes specify the address of a network (e.g. 196.2.7) and a router address. If you configure your LAN interface with a subnet mask, you can also specify subnet routes. When

transmitting an IP packet, the TCP/IP protocol stack first searches for a host route to the destination host; then for a subnet route (the destination host must be on the subnet specified in the route statement); then for a network route (the destination host must be on the network specified); and last for a default route. Only one default route can be configured, and it is used for all packets for which there is no host, network, or subnet route. Most users need to configure only one route statement creating a default route. The current routing tables for your host can be displayed using the command:

```
netstat -r
```

from an OS/2 command prompt. The routing table can also be modified from an OS/2 command prompt using the route command, but it is rare that a user would need to do this.

An OS/2 machine can be used as a good inexpensive router. Several network interfaces must be configured. These can be any combination of Ethernet, Token Ring, FDDI, PPP, or SLIP. By installing IBM RouteExpander/2, Frame Relay interfaces can also be used, and with the OS/2 TCP/IP Extended Networking Kit and Communications Manager/2, X.25 or SNA links can also be used to forward TCP/IP packets. When an OS/2 machine is used as a router, it is usually necessary to configure additional network and/or subnet routing statements. Also, you must use the configuration notebook routing page to turn IP forwarding on.

Some TCP/IP implementations include the function to associate different subnet masks with each route. This is rarely important unless the TCP/IP host is configured with several network interfaces, and is being used as a router. OS/2 TCP/IP does not have this function, so there is a workaround that you may need to use. If subnetting is being used on several interfaces, the same subnet mask must be used for each interface. If the machine has two or more interfaces, each directly connected to a subnet, and if the masks for the subnets are of different length, the longer of the two masks should be used, and additional subnet routes may need to be added. For example, suppose the address of one interface is 9.50.40.5, with subnet mask 255.255.255.128, and the address of the other is 9.50.40.129, with subnet mask 255.255.255.192. The longer subnet mask should be used on both interfaces. This creates a problem. If the address of the destination host is in the range from 9.50.40.64 to 9.50.40.191, the packet should be delivered on the 9.50.40.5 interface, because that's where it would go if the 255.255.255.128 subnet mask were used. So an additional subnet route is needed, with destination 9.50.40.64, router 9.67.40.5, and metric 0.

Default routes: where:

- Destination address and subnet mask are all 0s.
- Datagram is routed through the default router with the internet address given by the router address. This is valid only if no host-specific or network-specific routes apply to a datagram's destination host address.

Figure 148 on page 262 shows the **Configure Routing Information** panel where a default and its associated net route has been created.

Dynamic Routing

Routing tables are updated dynamically, based on information contained in packets that pass through the router.

IBM TCP/IP for OS/2 Version 3.0 provides a routing server (RouteD), which uses the Routing Information Protocol (RIP), to dynamically maintain current routing table entries. In RIP, there are two types of participants:

- Passive: They update their routing tables when they receive new information.
- Active: They also advertise their routers to other hosts in addition to updating their routing tables.

When the routing server starts, it transmits a request packet on each interface, using the broadcast packet. Then it receives the response packets from other hosts. In normal operation, the server monitors the UDP socket for the route service to receive routing information packets. When a requested packet is received, the server prepares a reply based on the information maintained in its internal tables. It then send a response packet, which contains a list of known routes and their metrics. A metric of 16 or greater is considered infinite and therefore unreachable.

Response packets received by the server are used to update the routing tables for any of the following conditions:

- No routing table entry exists for the destination network (or LAN segment) or host, and the metric indicates that the destination can be reached (the metric is not greater than 15).
- The existing entry in the routing table has not been updated for a period of 90 seconds and the route is at least as cost effective as the current route.
- The new route describes a shorter route to the destination than the one currently stored in the routing tables.

When an update is applied, the server records the changes in its internal tables and updates the kernel routing table, which resides in the main storage. The change is then reflected in the next response packet sent.

In addition to using incoming packets to update the tables, the server also periodically checks the routing table for inactive entries. If an entry has not been updated for three minutes, the entry's metric is set to infinity and it is marked for deletion. Deletions are delayed for an additional 60 seconds to ensure that the invalidation is propagated throughout the local network.

If the routing server is an active participant, it also supplies copies of its routing tables every 30 seconds to any directly-connected hosts and networks. The response is sent to the broadcast address (on networks capable of that function), to the destination address (on point-to-point links), and to the addresses of routers on the other products.

The `routed` command allows you to participate in RIP. You can participate either in active or passive mode. To participate in active mode, specify the `-s` parameter (to cause `routed` to advertise its routing tables). However, most users don't need to start a `RouteD` server on the Warp Connect workstation. Instead a `RouteD` will cause a lot of broadcast frames on the network.

We don't recommend that you run `RouteD` on your machine, unless you are using the machine as a router connected to other routers also running `RouteD`.

When `RouteD` is started, it reads the `GATEWAYS` file, if one exists, to find gateways that the `RouteD` server cannot find through its queries. IBM TCP/IP for OS/2 Version 3.0 does not provide a `GATEWAYS` file. If you want to use one, you must create it and place it in the `ETC` subdirectory.

IP Router Function

IBM TCP/IP for OS/2 Version 3.0 now allows you to configure the workstation as an IP router. You have to select **IP Forwarding** in the Configure Routing Information. Your workstation must have at least two interfaces enabled. If only one TCP/IP interface is configured, IP forwarding cannot be enabled. You can also use the `ipgate` command to enable or disable IP forwarding. At installation time, IP forwarding is disabled as a default.

Address and Host Resolution

Workstations attached to a LAN use a specific type of address for communication. Hosts attached to an internet use another type of address as well as symbolic names for communication. Since internet communication depends upon LAN communication, processes must be in place to resolve the addresses and symbolic names.

TCP/IP need to perform two kinds of resolution:

Address Resolution

In LAN technology, communication is based on the adapter address; information is sent in units called *frames* that contain the adapter addresses for the source and the destination.

TCP/IP communication is based on internet addresses. Therefore, IBM TCP/IP for OS/2 Version 3.0 uses the Address Resolution Protocol (ARP) to perform a process called *address binding*, which associates internet addresses with adapter addresses. In IBM TCP/IP for OS/2 Version 3.0, address binding with ARP works as follows:

1. Host-A needs to communicate with host-B. So, host-A sends out a broadcast message over the LAN containing its adapter address and internet address and the internet address of host-B, and requesting the physical address of host-B.
2. When host-B recognizes the internet address in the message as its own, it adds the adapter address-to-internet address mapping of host-A to its address resolution table and responds to the request with a message containing its own adapter address.

Note: If the internet address of host-B indicates that it is not on the same LAN network, the router will forward the broadcast message to the appropriate network or subnet.

3. Host-A receives the response to the broadcast message and adds the adapter address-to-internet address mapping of host-B to its address resolution table.

Note: Since the initial request was a broadcast message, one where each adapter on the LAN receives the message, each host can read the information and add the adapter address-to-internet address mapping of host-A to its address resolution table.

You can use `arp` command to maintain the address resolution tables.

Host Name Resolution

When a TCP/IP service or application receives a symbolic host name, it calls a host name resolver routine to resolve the symbolic name into an internet address. The host name resolver routine queries a domain name server or a local HOSTS file, or both, to perform name resolution.

If a RESOLV2 file exists in the ETC subdirectory, the host name resolver routine first tries to resolve the name by querying the name servers specified in that file.

If resolution through a name server fails or if a RESOLV2 file doesn't exist, the host name resolver routine tries to resolve the name locally by searching the HOSTS file in the ETC subdirectory for a match of the symbolic host name.

If a match is found, the routine returns the corresponding internet address. If a match is not found, the routine displays a message stating that the host is unknown.

IBM TCP/IP for OS/2 Version 3.0 provides commands that you can use to:

- Display information about a specific host
- Display information about your own host
- Display additional information about hosts

Configuring LAN Name Resolution Services

Name resolution allows you to communicate with other TCP/IP hosts using symbolic names (in place of IP addresses).

To specify defaults for name resolution, you need to access the Configuration notebook and select the **Hostname** tab. This part is new in the Configuration Notebook of IBM TCP/IP for OS/2 Version 3.0.

The *Domain Name System* or *DNS* uses a hierarchical system for naming hosts. Each host name is composed of domain labels separated by periods. Each label represents an increasingly higher domain level within an internet. The fully-qualified domain name of a host connected to one of the larger internets generally has one or more subdomains, for example:

```
host.subdomain.subdomain.rootdomain
```

or

```
host.subdomain.rootdomain
```

Domain names often reflect the hierarchy level used by network administrators to assign domain names. For example, the domain name eng.mit.edu is the lowest level domain name, which is a subdomain of mit.edu. The subdomain mit.edu is a subdomain of edu.

Local network administrators have the authority to name local domains within a network.

You can refer to hosts in your domain by host name only; however, a name server requires a fully-qualified domain name. The local resolver combines the host name with the domain name before sending the address resolution request to the domain name server.

IBM TCP/IP for OS/2 Version 3.0 uses the RESOLV2 file in the ETC directory to specify the default domain appended to a host name and to specify the addresses of as many as five domain name servers to which address resolution queries can be sent.

Creating a RESOLV2 File

IBM TCP/IP for OS/2 Version 3.0 does not include a default RESOLV2 file. If you want to use this function, you must create it in the ETC directory.

If you use the Configuration notebook to configure name resolution, the Configuration notebook creates a RESOLV2 file for you. Otherwise you can create one manually.

The format of the RESOLV2 file is:

```
domain your_domain_name
search domain_name1 domain_name2 domain_name3
nameserver nameserver1_address
nameserver nameserver2_address
nameserver nameserver3_address
```

The first line specifies the domain name. As an alternative, you can use the search keyword to specify a list of domains to be searched when only the hostname is specified. You can specify up to three domains to be searched. The format is as follows:

```
search tcp.raleigh.com tcp2.raleigh.com
```

You can specify up to three name server addresses. Specify them in the order in which they are to be used for host name resolution. The following is an example of a RESOLV2 file:


```
domain eng.mit.edu
nameserver 129.34.128.245
nameserver 129.34.128.246
```

or using the search keyword:

```
search austin.ibm.com raleigh.ibm.com
nameserver 129.34.128.245
nameserver 129.34.128.246
```

Because the domain name server requires a fully-qualified domain name, the host name resolver routine scans the host name to see if it contains a period. If a period is not present, the routine appends the domain name specified by the domain statement in the RESOLV2 file. Otherwise, the name is assumed to be fully-qualified and is passed verbatim to the name server.

The routine queries the first name server specified in the RESOLV2 file. If the specified name server does not respond in 60 to 80 seconds, the routine queries the next name server specified, until either a response is received or the last name server specified fails to respond.

You can also configure the local domain name and the LAN domain searchlist together but in this case the searchlist information will override the local domain information (see Figure 149).

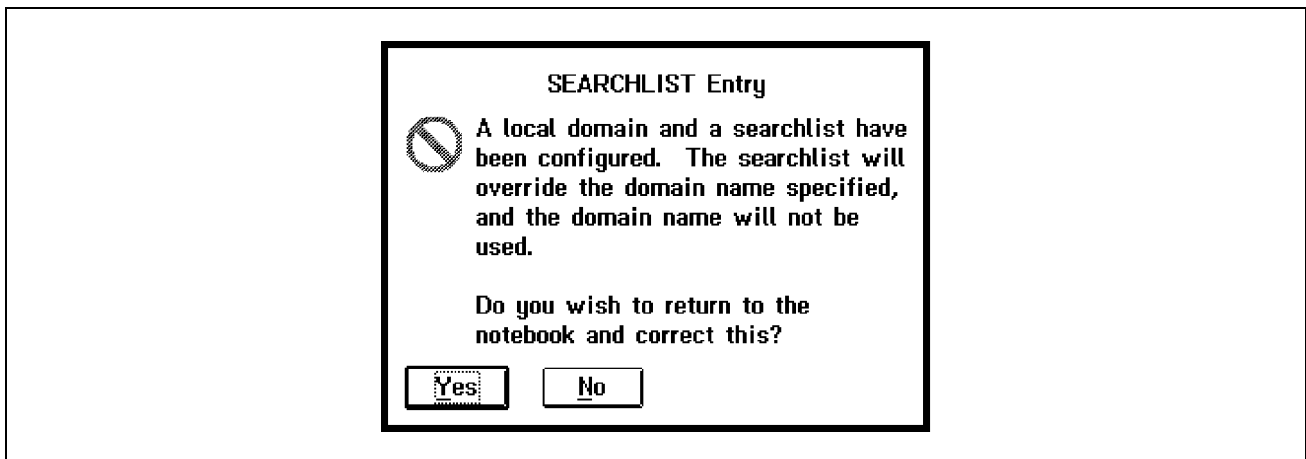


Figure 149. Local Domain Name Overriden by Searchlist

IBM TCP/IP for OS/2 Version 3.0 can also be configured as a Domain Name Server. However You need to install Domain Name Server kit available for IBM TCP/IP for OS/2 Version 2.0.

IBM TCP/IP for OS/2 Version 3.0 can also use the local resolver functions of a local name resolution file. This file, called HOSTS, resides in the ETC

directory and contains entries that allow you to map symbolic names to internet addresses. If both a RESOLV2 file and a HOSTS file exist in the ETC directory, the resolver sends the request to the remote name servers listed in the RESOLV2 file before using the local HOSTS file.

When using the HOSTS file on a small internet, it is not necessary to use the hierarchical naming system used by the larger internets. The following example is a token ring network of three users and their entries in the HOSTS file.

```
129.5.24.1 host1 enriquespc pc1 mathdept
129.5.24.3 pc3 johnspc host3 #This is the John's PC
129.5.24.4 pc4 davespc
```

A carriage return must be entered at the end of each line. In this example, each time the user enters the host-name of host1 or the aliases enriquespc, pc1 or mathdept, the local name resolver translates it to the internet address of 129.5.24.1.

HOSTS file vs. Domain Name System

- HOSTS file or local resolution.
 - Advantages:
 1. Faster than Domain Name System. Resolution response time doesn't depend of the network because is done locally.
 2. No need to maintain a hierarchical naming system.
 3. No need of a name server.
 4. No dependency on another host.
 - Disadvantages:
 1. Any update must be replicated to all hosts in the network.
 2. Inadequate for a large network.
- Domain Name System
 - Advantages:
 1. Easy to maintain.
 2. Good hierarchical naming system for a large number of hosts and networks.
 3. Centralized control.
 - Disadvantages:
 1. Slower than local resolution. Response time of name resolution depends on the network.
 2. Name resolution depends on the active Domain Name Server.

Figure 150 on page 271 shows the first page of the LAN Name Resolution Services configuration notebook.

- LAN Domain Searchlist: This list contains the names of domains to be searched when a request is made using only a host name. You can specify up to three domains to be searched.
- Name Server Addresses: This list contains the internet addresses (IP addresses) of servers that resolve domain names to IP addresses. You can specify up to three domain name servers.
- This Machine's Hostname: It's the name for this host that is to be part of a fully-qualified host name (host name and domain name).
- Local Domain Name: Specify the domain where your host resides, including all subdomains and the root domain, separated by periods.

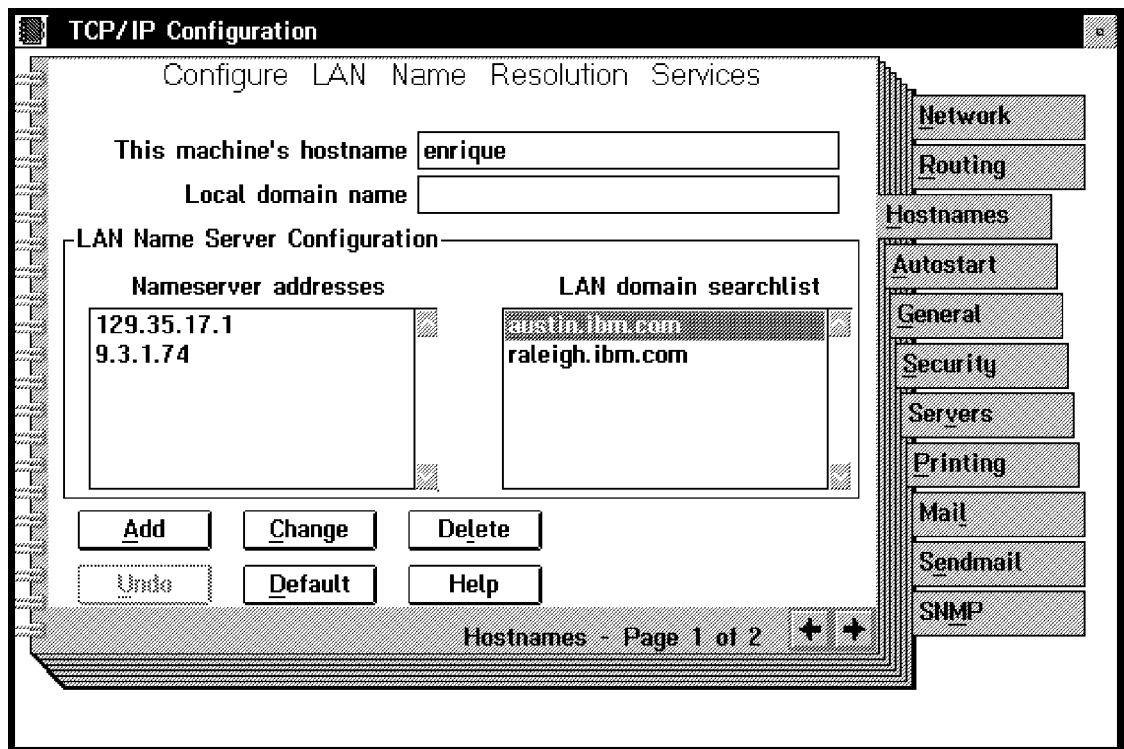


Figure 150. Name Resolution Services - Page 1

Local Domain Name vs. LAN Domain Searchlist

A domain searchlist will override the domain keyword if both are configured, so if you configure a domain searchlist you don't need to configure a local domain name.

The image shows a dialog box titled "HOSTS Entry". It has four text input fields and three buttons at the bottom. The fields are: "IP address" containing "129.35.17.194", "Hostname" containing "enrique", "Aliases" containing "ps77i optical a948r24", and "Comment" containing "Enrique's test machine.". The buttons are "Change", "Cancel", and "Help".

Figure 151. Name Resolution Services - Hosts Entry

Figure 152 on page 273 shows the second page of the LAN Name Resolution Services configuration notebook. Basically this page allows the configuration of the HOSTS file. Figure 151 shows how to configure one entry.

The **Look through HOSTS list before going to nameserver** tag allows you to change the default searching sequence, and then, the HOSTS file will be searched before the name servers are queried to resolve hostnames from the IP addresses or the IP addresses from the hostnames in the RESOLV2 file.

When checked, the following environment variable is added to your CONFIG.SYS file:

```
SET USE_HOSTS_FIRST=1
```

You must reboot your system in order for this change to take effect.

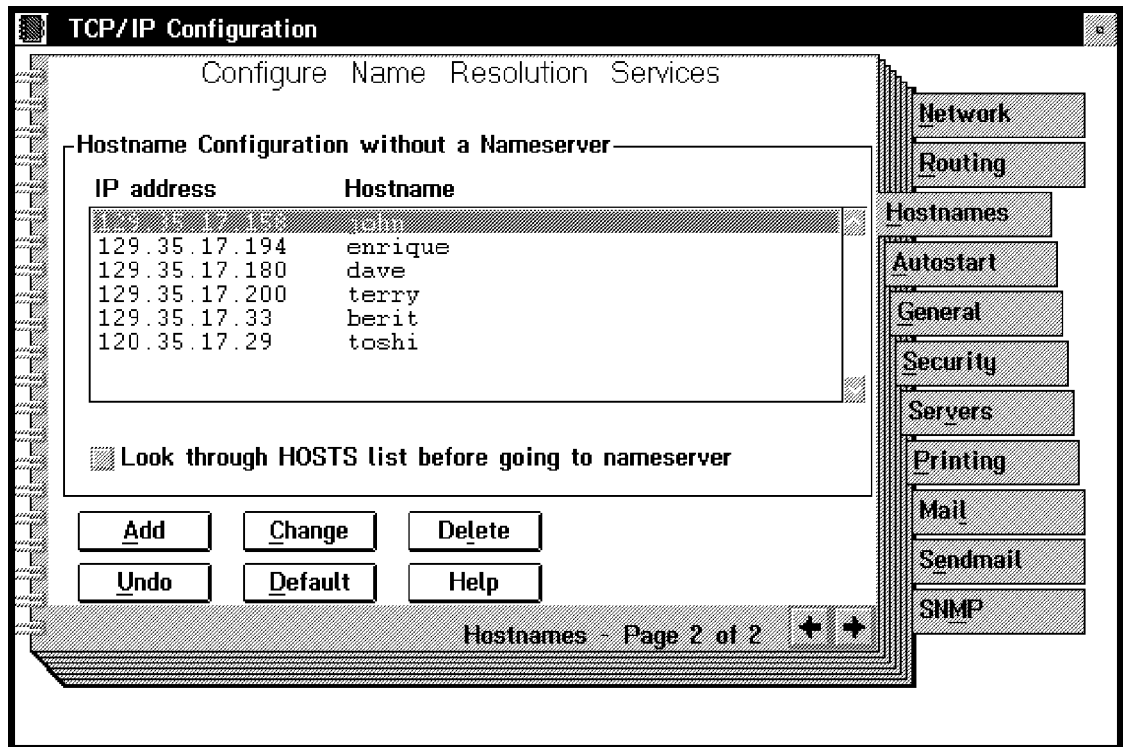


Figure 152. Name Resolution Services - Page 2

Configuring the Auto-Start of Services

IBM TCP/IP for OS/2 Version 3.0 uses three CMD files to set up the protocol and start the configured services. Those are:

- MPTSTART.CMD
- SETUP.CMD
- TCPSTART.CMD

The following explains the detail.

MPTSTART.CMD

This resides in the MPTN BIN directory and it's controlled by the MPTN configuration utility. It is launched from the CONFIG.SYS during the startup. This CMD file has two functions:

1. Waits until the INET protocol is activated.
2. Executes the SETUP.CMD file.

Figure 153 on page 274 shows a part of CONFIG.SYS where MPTSTART.CMD is called, and Figure 154 on page 274 shows a common example of the MPTSTART.CMD file.

```

.
.
CALL=C:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=C:\IBMCOM\LANMSGEX.EXE
SET ETC=C:\MPTN\ETC
DEVICE=C:\MPTN\PROTOCOL\SOCKETS.SYS
DEVICE=C:\MPTN\PROTOCOL\AFOS2.SYS
DEVICE=C:\MPTN\PROTOCOL\AFINET.SYS
DEVICE=C:\MPTN\PROTOCOL\IFNDIS.SYS
RUN=C:\MPTN\BIN\CNTRL.EXE
CALL=C:\OS2\CMD.EXE /Q /C C:\MPTN\BIN\MPTSTART.CMD
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:C:\IBMLAN /N
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
RUN=C:\IBMLAN\NETPROG\LSDAEMON.EXE
DEVICE=C:\IBMLAN\NETPROG\VNETAPI.OS2
RUN=C:\IBMLAN\NETPROG\VNRMINIT.EXE
SET NWDBPATH=C:\IBMLAN\NETPROG
SET HOSTNAME=enrique
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
SET TMP=c:\tcPIP\tmp
DEVICE=c:\tcPIP\bin\vdostcp.vdd
DEVICE=c:\tcPIP\bin\vdostcp.sys
RUN=c:\tcPIP\bin\VDOSCTL.EXE
SET TZ=EST5EDT
.
.

```

Figure 153. Part of CONFIG.SYS Showing the Call to MPTSTART.CMD.

```

@ECHO OFF
echo MPTS initialization is starting.

IF NOT EXIST C:\MPTN\BIN\SETUP.CMD GOTO END
INETWAIT
CALL C:\MPTN\BIN\SETUP.CMD
:END
echo MPTS initialization is complete.

```

Figure 154. MPTSTART.CMD

SETUP.CMD

This file performs several functions such as:

- Set up the internet parameters of the host:
 - Internet address
 - Destination address (for SLIP or PPP)
 - Subnet mask

- mtu
- Set up the different routes

Table 5 shows those differences and Figure 155 shows an example of the STARTUP.CMD file.

	LAPS and IBM TCP/IP for OS/2 Version 2.0 (or below)	MPTN V2.60.2 and IBM TCP/IP for OS/2 Version 2.0 (or below)	MPTN V2.60.5 and IBM TCP/IP for OS/2 Version 3.0
Located in directory	TCPIP BIN	TCPIP BIN	MPTN BIN
Called by	TCPSTART.CMD	MPTSTART.CMD and TCPSTART.CMD	MPTSTART.CMD and TCPSTART.CMD

```

route -fh
arp -f
ifconfig lan0 129.35.17.164 netmask 255.255.240.0 mtu 1492
REM ifconfig lan1
REM ifconfig lan2
REM ifconfig lan3
REM ifconfig lan4
REM ifconfig lan5
REM ifconfig lan6
REM ifconfig lan7
REM ifconfig sl0
route add net 129.35 129.35.16.1 1
route add default 129.35.16.1 1
ipgate off

```

Figure 155. SETUP.CMD - Example

TCPSTART.CMD

This file allows the starting of TCP/IP services (servers and programs) when TCP/IP starts. This file is located in the TCPIP BIN directory.

TCPSTART.CMD is set up by the Configure Automatic Starting of Services page of the TCP/IP Configuration notebook. After the installation of IBM TCP/IP for OS/2 Version 3.0, you will find a TCP/IP Startup Icon in the Startup folder of WARP (see Figure 158 on page 278), so every time the machine is booted, TCPSTART.CMD is called and all the selected TCP/IP services will start.

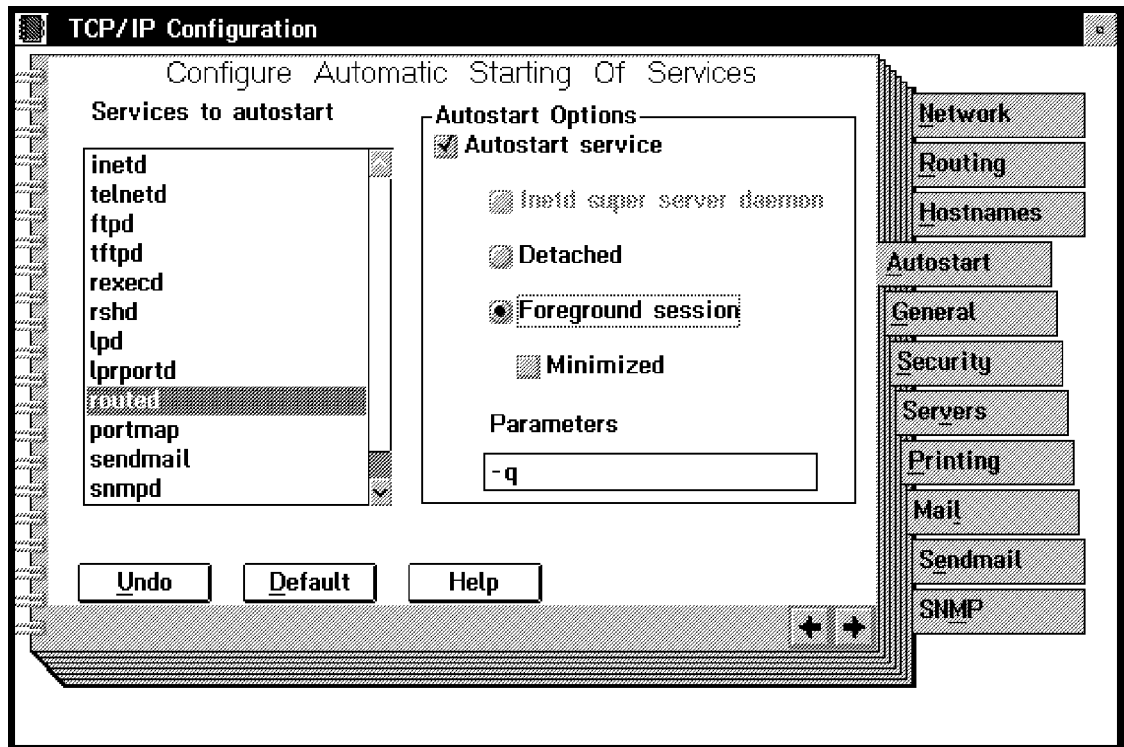


Figure 156. Configure Automatic Starting of Services - Example

Figure 156 shows the Configure Automatic Starting of Services page of the TCP/IP Configuration notebook.

In this notebook page you can:

- Select the service that you want start automatically.
- Select the mode that service has to start. Mode can be:
 1. Detached
 2. In foreground session
 3. Minimized session
 4. The application can be launched when the INET daemon starts

Not all modes can be applied to every service.

- Select the parameters available for that service.

Figure 157 on page 277 shows an example of a configured TCPSTART.CMD file.


```

@echo off

echo CONFIGURING TCP/IP .....

echo See if install cleanup needed.
C:\tcpip\bin\TCPCOEX.EXE

IF EXIST C:\tcpip\bin\B4TCP.CMD CALL C:\tcpip\bin\B4TCP.CMD
IF EXIST C:\MPTN\BIN\SETUP.CMD CALL C:\MPTN\BIN\SETUP.CMD
echo ..... FINISHED CONFIGURING TCP/IP

echo Make current connection LAN only.
IF EXIST C:\tcpip\bin\TOGGLE.EXE C:\tcpip\bin\TOGGLE.EXE
IF ERRORLEVEL 1 GOTO :DONESERVERS

echo STARTING THE TCP/IP PROCESSES .....
REM start inetd
REM echo ..... INET Daemon Started
REM start telnetd
REM echo ..... TELNET Daemon Started
REM start ftpd
REM echo ..... FTP Daemon Started
REM start tftpd
REM echo ..... TFTP Daemon Started
REM start rexecd
REM echo ..... REXEC Daemon Started
REM start rshd
REM echo ..... RSH Daemon Started
REM start lpd
REM echo ..... LP Daemon Started
REM start routed -q
REM echo ..... ROUTED Started
REM start /c xinit.cmd -nocopyright
REM echo ..... X System Server Started
REM start talkd
REM echo ..... TALK Daemon Started
REM start portmap
REM echo ..... Portmapper Started
REM start nfsd
REM echo ..... Network File System Server Started
REM nfsstart.exe
REM echo ..... Network File System Client Started
start /min sendmail -bd -q30m -CC:\MPTN\ETC\sendmail.uml
echo ..... SENDMAIL Started
REM start lprportd
REM echo ..... LPRPORTD Started
REM start snmpd -dpi shm
REM echo ..... SNMP Daemon Started
echo ..... FINISHED STARTING THE TCP/IP PROCESSES

:DONESERVERS

IF EXIST C:\tcpip\bin\TCPEXIT.CMD CALL C:\tcpip\bin\TCPEXIT.CMD
echo ..... EXITING TCPSTART.CMD .....

```

Figure 157. TCPSTART.CMD - Example



Figure 158. OS/2 Warp Startup Folder - TCP/IP Startup Icon

The TCP/IP configuration program in IBM TCP/IP for OS/2 Version 3.0 was improved with several reminding panels that warns you about possible conflicts or gives you some recommendations. In Figure 173 on page 304 you can see an example of that. Another example is shown in Figure 159.

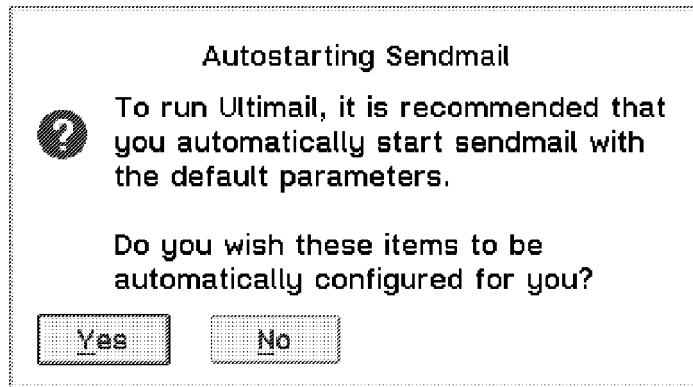


Figure 159. TCP/IP Configuration Panels - Autostart Recommendation

Optional Configuration Files

This topic describes the files that you can create for certain applications in IBM TCP/IP for OS/2 Version 3.0. These files, with the names specified here, must reside in the ETC directory or in the directory specified by the ETC environment variable. If you install OS/2 Warp Connect with the IBM TCP/IP for OS/2 Version 3.0 component, you will find the ETC environment variable set to:

C: MPTN ETC

assuming that C: is the drive where you've installed the MPTS.

You will also find an ETC subdirectory under the TCPIP directory. This directory should be empty. You can change the ETC environment variable putting the ETC subdirectory in another location or even changing the name of this subdirectory. In all cases, remember to create this directory and to move all files in the old ETC directory to the new one, because if you don't

do that, the IBM TCP/IP for OS/2 Version 3.0 will not be able to use the configuration files that you've created before.

If you install only the operating system with the Internet Access Kit (IAK) from the OS/2 Warp BonusPak, the system will define the ETC directory under the TCPIP directory, because you have no LAN configuration.

Table 6 defines the optional files that are available and Table 7 on page 280 shows some examples of those files.

Table 6. Usage of Optional Files for IBM TCP/IP for OS/2 Version 3.0

Name of File	Used by	Purpose of File
GATEWAYS	ROUTED server	Identifies gateways.
HOSTS	Any client and server	Resolves host names if a name server is unavailable.
INETD.LST	Selected servers	Defines servers to be started by the super server INETD.EXE.
MIB2.TBL	Several SNMP commands	Defines the mapping between an object's ASN.1 notation and an object's textual notation.
NETRC	FTP and REXEC clients	Alternative source for user and password.
PINGHOST.LST	PMPING	Specifies a list of hosts to be monitored.
PW.SRC	SNMP Agent	Plain-text list of community names for the SNMP agent.
RESOLV2	Any client or server	Provides domain names and name server addresses.
RHOSTS	RSH server	Specifies the hosts that are authorized to use the RSH server.
SNMP.PW	SNMP Agent	The scrambled version of the PW.SRC file.
SNMPTRAP.DST	SNMP Agent	Specifies destination hosts that receive TRAP messages.
TELNET.RC	LINEMODE	Specifies commands to a Telnet client.
TRUSERS	FTP Server	Verifies user and password.

If you install IBM TCP/IP for OS/2 Version 3.0 on an existing IBM TCP/IP for OS/2 Version 2.0 the install program reads your current CONFIG.SYS file to see if an ETC environment variable has been defined. If it is defined, TCP/IP uses this specified directory path to update new ETC files, even if you installed IBM TCP/IP for OS/2 Version 3.0 in a different directory.

There are some considerations:

- Since existing ETC files are not replaced, you should compare your ETC files with the new files found in the SAMPLES ETC subdirectory and include any modifications.
- New PROTOCOL and SERVICES files may be needed for new applications delivered with IBM TCP/IP for OS/2 Version 3.0. Since these files are installed in the MPTN ETC subdirectory, you may need to move these files to the directory specified by the ETC environment variable.
- If you installed IBM TCP/IP for OS/2 Version 3.0 in a different directory, your SETUP.CMD file must be copied to the MPTN BIN subdirectory and you will also need to update your TCPSTART.CMD file to point to the correct path for SETUP.CMD.

Table 7 (Page 1 of 2). Contents of Optional Files for IBM TCP/IP for OS/2 Version 3.0

Name of File	Sample Contents of File
GATEWAYS	<pre>net net2 gateway host4 metric 4 passive host host3 gateway host4 metric 4 passive host host10 gateway 192.9.201.5 metric 9 active host host10 gateway 192.8.201.5 metric 8 external</pre>
HOSTS	<pre>124.34.216.1 host1 joanspc pc1 educdept 124.34.216.3 pc3 edspc host3 # This is Ed's PC 124.34.216.5 pc5 janetspc</pre>
INETD.LST	<pre>telnet tcp telnetd exec tcp rexecd ftp tcp ftpd printer tcp lpd tftp udp tftpd shell tcp rshd</pre> <p>Where, for example:</p> <ul style="list-style-type: none"> - telnet is the service. - tcp is the protocol. - telnetd is the server to be activated. - exec is the service. - tcp is the protocol. - rexecd is the server to be activated.
MIB2.TBL	<pre>sysDescr 1.3.6.1.2.1.1.1.0 display</pre>
NETRC	<pre>machine raleigh login kent password baseball machine boston login chris password boz macdef mymacro bell hash prompt binary cd c:\mydir get myfile.bin machine phoenix login writer password account payday</pre>
PINGHOST.LST	<pre>9.67.30.100 **Nameserver-Call_Dan 9.67.22.1 RALVMM_via_3172-Call_IS</pre>

Table 7 (Page 2 of 2). Contents of Optional Files for IBM TCP/IP for OS/2 Version 3.0

Name of File	Sample Contents of File
PW.SRC	<pre>passwd1 9.0.0.0 255.0.0.0 passwd2 129.34.81.22 255.255.255.255</pre>
RESOLV2	<pre>domain eng.mit.edu nameserver 129.34.128.245 nameserver 129.34.128.246 or search austin.ibm.com raleigh.ibm.com nameserver 129.34.128.245 nameserver 129.34.128.246</pre>
RHOSTS	<pre>kant.watson.ibm.com Scott Jorge.raleigh.ibm.com Where: - Scott is the only user on kant.watson.ibm.com that is served. - All users on jorge.raleigh.ibm.com are served.</pre>
SNMPTRAP.DST	<pre>124.34.216.1 UDP Manager2 UDP</pre>
TELNET.RC	<pre>Default: send ayt toggle local set escape_char toggle crmode</pre>
TRUSERS	<pre>user: chris boz rd: d:\ c:\ wr: d:\tmp c:\tmp Where: - chris is the user. - boz is the password for chris. - rd: d: c: gives chris read access to drives D: and C: . - wr: d: tmp c: tmp gives chris write access to subdirectories D: TMP and C: TMP.</pre>

Configuring General Parameters

From this window you set up the following parameters:

- Username: the name of the user ID authorized to log on to your workstation using the REXEC server. This username is also used by your line printer (LPR) client. The length can be up to 12 characters and they are case-sensitive. The username will be saved in the USER environment variable.

- Codepage DLL: the file name of the codepage DLL to be used for translation for applications such as FTP. The configuration page allows you to select the codepage from the drop-down list or type the file name of another codepage DLL. Selecting **none** in this field indicates that no translation is needed. The codepage selection will be stored in TCPIP.INI file.
- Time zone: the string of characters that represents the abbreviation for your time zone, the number of hours your time zone differs from Greenwich Mean Time (GMT), and the string of characters that represents the abbreviation for your daylight savings time. The time zone is used to determine the correct date and time for clients located in different time zones.

You can select the time zone from the list or type the time zone in the specified format (for more information see IBM TCP/IP for OS/2 Version 3.0 configuration help panels).

Figure 160 shows an example.

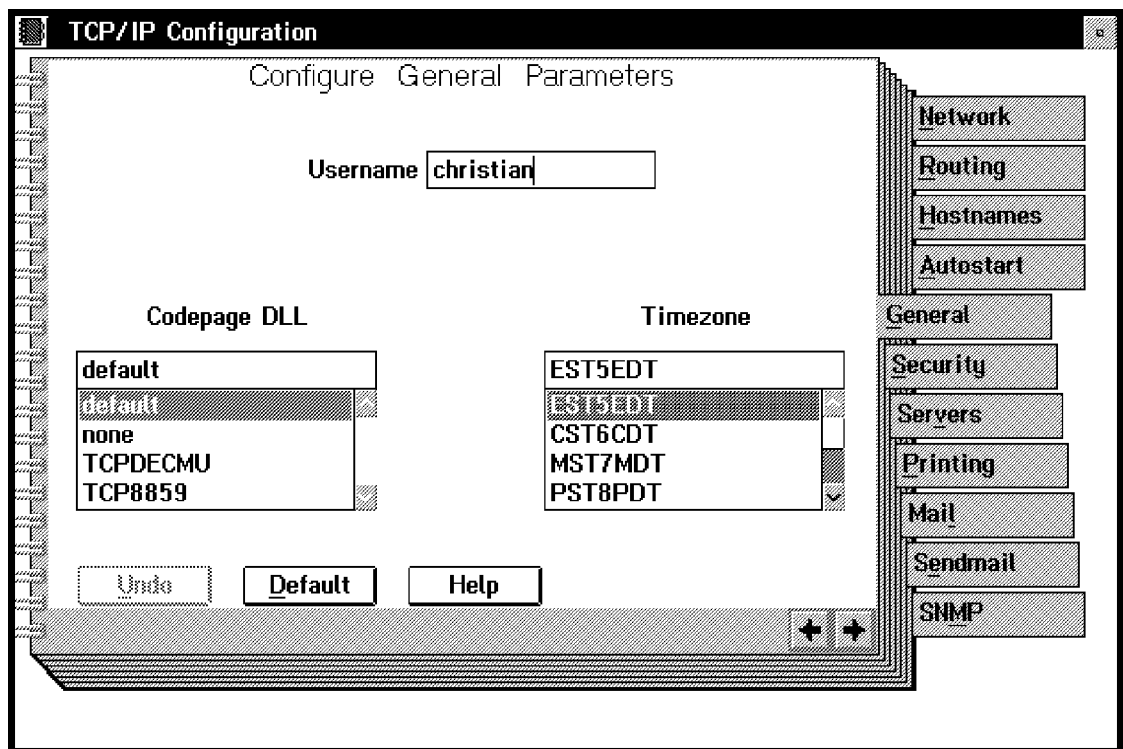


Figure 160. Configure General Parameters - Example

Configuring the Server Security

TCP/IP provides some kind of security services although they are not perfect.

- Telnet

Telnet has security using password protection that can be up to 12 characters and is saved in the TELNET.PASSWORD.ID environment variable.

- FTP

FTP has security using a text file called TRUSERS (see Table 6 on page 279 and Table 7 on page 280 for more information).

- REXEC

Rexec has security using password protection that can be up to 12 characters and is saved in the PASSWD environment variable.

- RSH

RSH has security using a text file called RHOSTS (see Table 6 on page 279 and Table 7 on page 280 for more information).

Figure 161 shows an FTP security configuration entry.

FTP User Entry

Username

Password

Directory access for read—

Deny read access to directories listed.
Note: Checking this box gives read access to ANY drive or directory NOT explicitly listed.

Directory access for write—

Deny write access to directories listed.
Note: Checking this box gives write access to ANY drive or directory NOT explicitly listed.

Figure 161. Configure Server Security - FTP User Entry

Figure 162 on page 284 shows Telnet and FTP security configuration in the configuration notebook.

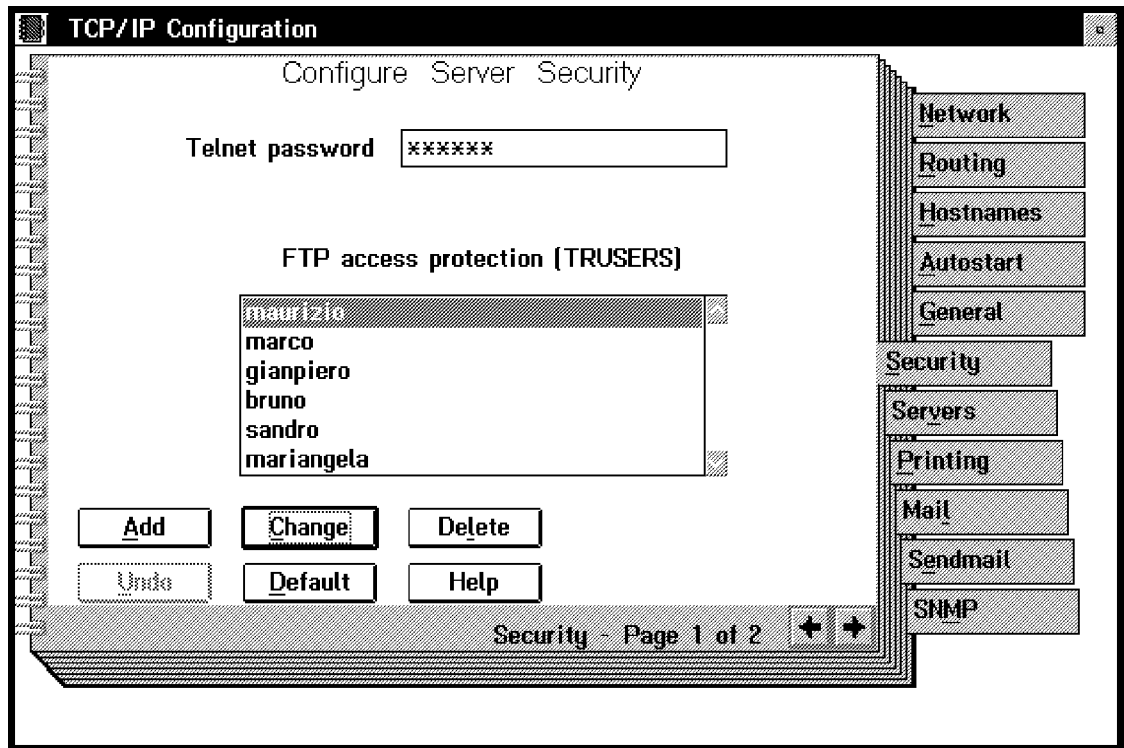


Figure 162. Configure Server Security - Telnet and FTP

Figure 163 shows an RSH security configuration entry.

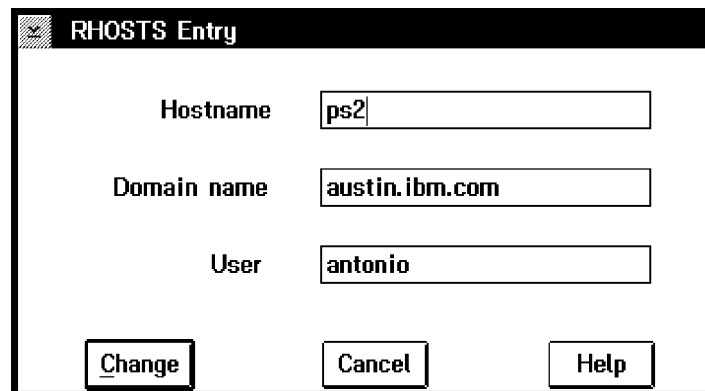


Figure 163. Configure Server Security - RSH

Figure 164 on page 285 shows a Rexec and RSH security configuration in the configuration notebook.

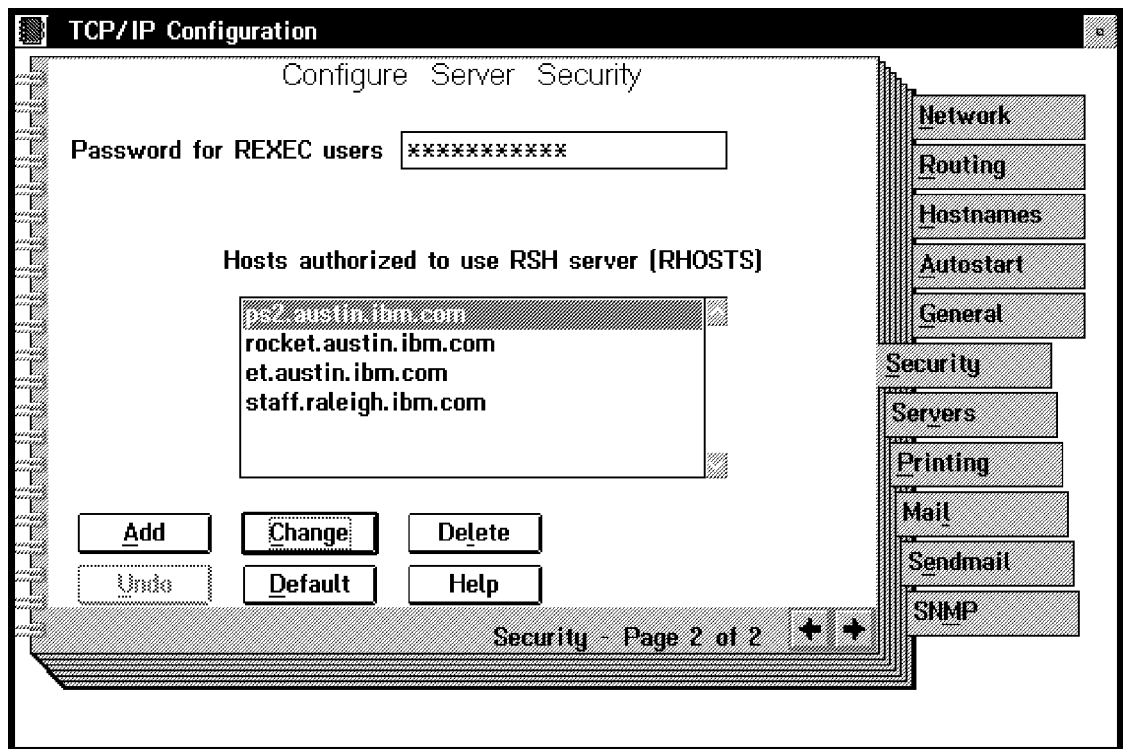


Figure 164. Configure Server Security - REXEC and RSH

Configuring Servers for Applications

From this window you can specify default servers attached to your LAN corresponding to:

- NewsReader/2 servers
- Gopher servers
- World Wide Web servers

However Web Browser will use its own INI file, EXPLORE.INI under MPTN\ETC to reach a default home page.

Figure 165 on page 286 shows the servers configuration in the configuration notebook.

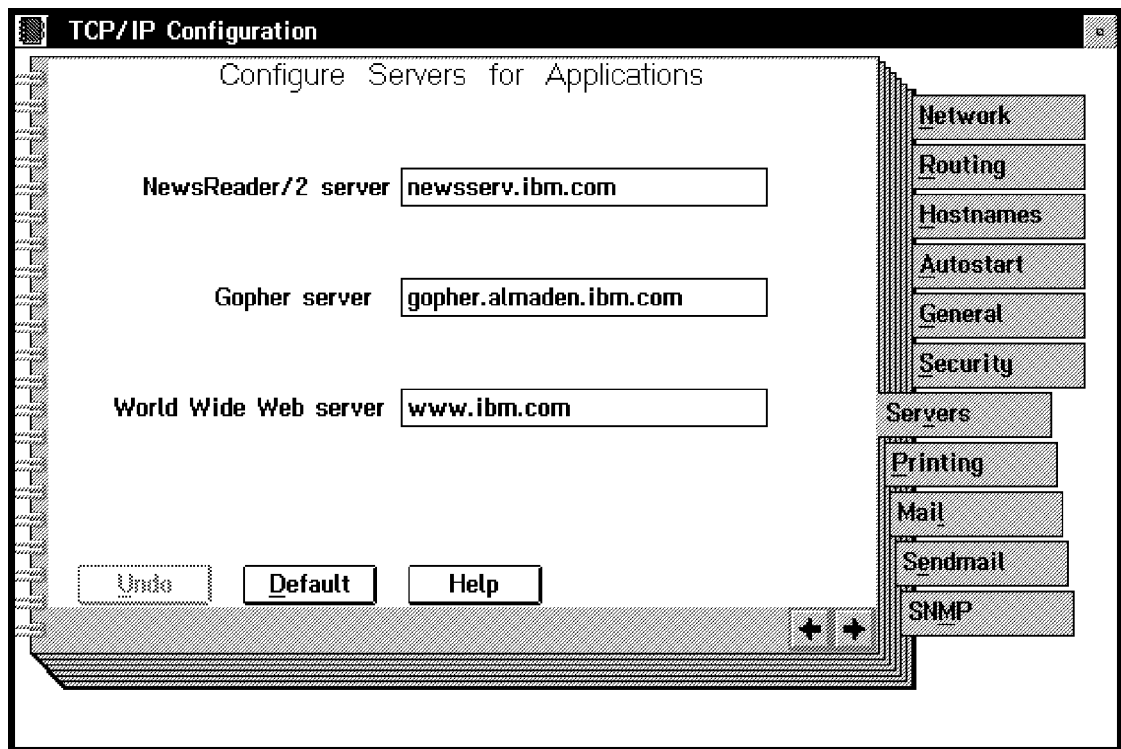


Figure 165. Configure Servers for Applications - Example

The information will be saved in a file called TCPOS2.INI placed in the directory pointed to by the ETC environment variable. This is not a text file and cannot be edited and changed by the user.

Configuring Printing Services

IBM TCP/IP for OS/2 Version 3.0 provides both client and server support for remote printing through the use of the Line Printer Protocol with the following commands:

- lpd
- lpq
- lprm
- lpr
- lprmon
- lprportd

The client commands allow you to send files to remote printer queues, query the status of those jobs and the queues to which the jobs were sent, remove jobs from remote queues, and redirect print objects and parallel devices to

remote queues. With the ability to redirect print objects and parallel devices to remote printers, you can print from any OS/2 application to a remote printer. This includes the ability to drag-and-drop files onto OS/2 printer objects, as well as the ability to print from any OS/2 or Windows application running under OS/2 and have the output sent to a remote host for printing.

The server command, `lpd` enables an OS/2 workstation to act as a remote print server. Clients can then submit, query, and remove print jobs from any OS/2 print queue (printer object) defined at the server workstation.

Table 8. Summary of Line Printer Commands

Print Command	Description
<code>lpd</code>	Starts the print server on your local host. The server spools print jobs for other hosts on the network.
<code>lpr</code>	Submits a file on your workstation to a remote printer attached to a print server.
<code>lpq</code>	Queries print jobs queued at a remote printer attached to a print server.
<code>lprm</code>	Removes jobs that are in a queue on a remote printer attached to a print server.
<code>lprmon</code>	Starts LPRMON, a parallel device monitor that sets up your workstation to automatically send data to a print server. This allows any application that can print to a parallel port to access a print server.
<code>lprportd</code>	Supports OS/2 Workplace Shell (WPS) printer objects which allow you to redirect print jobs.

Print Server Functions

The print server (also known as the LPR server, the LPR daemon and LPD) allows other hosts to use your workstation as a print server to:

- Submit print jobs to an OS/2 print queue associated with a printer object
- Query print jobs
- Remove print jobs from the printer queue

The print server must be running on the workstation providing the print spooling service before you can issue Line Printer commands.

Starting a Print Server

To start the print server on your local host, enter the `lpd` command at an OS/2 command prompt. When you start the LPR server by issuing this command, `LPD.EXE` runs as a task until you shut down the server.

The syntax of the `lpd` command is:

```

--lpd--          - -b--BANNER.LPD-
-----
- -c-  - -b- -  -----  - -s-  - -f-
                -banner-

```

Displaying lpd Help

```
--lpd-- -?-----
```

Parameter	Description
-----------	-------------

-c	Prevents printing of the control file.										
-d banner	<p>Uses the information in the specified file as input for the print job banner (header) page. If this parameter is not specified, LPD uses the default banner page (BANNER.LPD in the TCP/IP BIN directory). If you specify the -b parameter with no filename, a banner is not printed. If you specify a banner file with the -b parameter, you can use the following keywords to customize the banner printed:</p> <table border="1"> <thead> <tr> <th>Keyword</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>%H%</td> <td>Name of the host that originated the print job</td> </tr> <tr> <td>%U%</td> <td>Name of the user that originated the print job</td> </tr> <tr> <td>%J%</td> <td>Name of the print job</td> </tr> <tr> <td>%C%</td> <td>Class of the print job</td> </tr> </tbody> </table>	Keyword	Description	%H%	Name of the host that originated the print job	%U%	Name of the user that originated the print job	%J%	Name of the print job	%C%	Class of the print job
Keyword	Description										
%H%	Name of the host that originated the print job										
%U%	Name of the user that originated the print job										
%J%	Name of the print job										
%C%	Class of the print job										
-s	Validates client requests based on the port addresses. According to RFC 1179, all line printer requests should come from clients on a port within the range of 721 to 731 inclusive. By default, LPD does not verify that the client is connecting from a valid port within this range.										
-f	Changes the file format from binary (the default) to text.										
-?	Displays help information.										

There are some considerations.

1. As an alternative to issuing the lpd command from an OS/2 command prompt, you can start LPD automatically by setting an autostart tab of page 2 in the TCP/IP Configuration notebook.
2. The -f parameter is used to toggle between the following file formats:
 - Binary. The file is sent directly to the specified queue for printing.
 - Text. Each line feed (LF) is converted to a carriage return line feed (CRLF) pair and the file is sent to the specified queue.

If a client does not specify a file format, or if a format other than binary or text is specified, the default is binary.

Terminating a Print Server

To end a print server on your local host, you must:

1. Select the window in which the server is running.
2. Hold down the Ctrl key and press the C key, or close the window.

The LPD.EXE server task will terminate.

Setting up Clients

In order to set up clients you must specify values for the following environment variables prior to issuing the print command as described in this section.

Environment Variable Parameter

LPR_PRINTER	The name of the printer that provides the output. The printer name corresponds to a queue defined at the server. If a device name is specified instead of a queue, that device's first queue is used.
LPR_SERVER	Server name. The IP address or name of the print server.
USER	User name. An identifier of who created the print job. (The default is PC_USER.)

You can set the environment variables by one of the following methods:

- Completing the following fields in the Configuration notebook (Services tab, Page 2 of 3):
 - Remote Print Server
 - Remote Print Server's Printer
- Adding the following statements to your CONFIG.SYS file:

```
SET LPR_PRINTER=printer
SET LPR_SERVER=server
SET USER=username
```

- Entering the following commands at an OS/2 prompt:

```
SET LPR_PRINTER=printer
SET LPR_SERVER=server
SET USER=username
```

Note: Environment variables set at an OS/2 command line are only valid for the current session and any sessions started by the current session.

Sending a Print Job

The `lpr` command transfers the contents of a file from your workstation to a print server. The syntax of the `lpr` command is:

```

--lpr- - -b-          - -r-- 3----- - -q-- 10-----
- -f-  - -n-  - -r-- retries- - -q-- seconds-
- -p-- LPR_PRINTER-- -s-- LPR_SERVER-
----- -filename-----
- -p-- printer----- -s-- server-----

```

Displaying lpr Help

```

--lpr-- -?-----

```

Parameter	Description
<code>-b</code>	Specifies that the data is interpreted as binary (the default).
<code>-f</code>	When the print server is running on a UNIX system, the <code>-f</code> parameter formats the file using the UNIX <code>pr</code> command. When the print server is running under OS/2, no formatting is done.
<code>-n</code>	Displays no messages unless an error occurs.
<code>-r retries</code>	Sets the number of retries (0-5). The default is 3.
<code>-q seconds</code>	Sets the retry delay in seconds. The default is 10.
<code>-p printer</code>	Specifies the name of the printer to which the file is sent. If the <code>-p</code> parameter is omitted, the <code>LPR_PRINTER</code> value used.
<code>-s server</code>	Specifies the name or IP address of a network host with print spooling capabilities. If a print server is not specified on the command line, the <code>LPR_SERVER</code> value is used. If a print server is not specified with the <code>lpr</code> command or defined in the environment variable, the print server displays an error message and ends.
filename	Specifies the name of the file to be sent to the printer. You can specify a wildcard character (*) as part of the filename. For example, to print all of the TXT files in your current directory, you would enter the following command:

```

        lpr *.TXT
-?          Displays help information.

```

Querying a Print Queue

You can query the status of jobs queued for remote printing by issuing the `lpq` command. The syntax of the `lpq` command is:

```

        - -p-- LPR_PRINTER-- -s-- LPR_SERVER-
--lpq-----
- -l-   - -p-- printer----- -s-- server-----
- all jobs-
-----
- joblist--

```

Displaying `lpq` Help

```

--lpq-- -?-----

```

Parameter	Description
<code>-l</code>	Requests long output from the server. (The output depends on the operating system under which the server is running.) Generally, short output (the default) provides printer status and the number of print jobs in the printer queue. Long output includes additional information about the printer queues and the print jobs in each queue, such as: <pre> Job identifier User identification Filename </pre>
<code>-p printer</code>	Specifies the name of the printer to query. If the <code>-p</code> parameter is omitted, the <code>LPR_PRINTER</code> value is used.
<code>-s server</code>	Specifies the name or IP address of the print server. If a print server is not specified on the command line, the <code>LPR_SERVER</code> value is used. If a print server is not specified with the <code>lpq</code> command or defined in the environment variable <code>LPR_SERVER</code> , <code>LPQ</code> displays an error message and ends.
<code>joblist</code>	Specifies a list of job identifiers for the information to be displayed. Each operating system's server uses its own form of job identifier. The joblist consists of one or more of their identifier numbers separated by a single space.

The default is to return information about all jobs queued on the specified printer.

-? Displays help information.

Removing a Job from a Print Queue

You can use the `lprm` command to delete jobs from a print queue. To use this command, you must first obtain the print job identifier from the printer queue (see "Querying the Print Queue" in topic 9.5 for more information). Because each operating system implements printer queues differently, you may need to refer to the system documentation for your remote print server to determine how to specify a job identifier.

The syntax of the `lprm` command is:

```
    - -a-- PC_USER@hostname- -p-- LPR_PRINTER-  
--lprm-----  
    - -a-- agent----- -p-- printer-----  
  
    - -s-- LPR_SERVER-- current job-  
-----  
    - -s-- server----- joblist-----
```

Displaying lprm Help

```
--lprm-- -?-----
```

Parameter	Description
-a agent	Specifies the agent name (user name) to send to the server. If an agent is not specified, LPRM will send the value of the <code>USER</code> environment variable followed by <code>@hostname</code> (where <code>hostname</code> is the symbolic name or IP address of your host). For example, <code>pc_user@zena.raleigh.ibm.com</code> .
-p printer	Specifies the name of the printer from which you are trying to delete a job. If the <code>-p</code> parameter is omitted, the <code>LPR_PRINTER</code> value is used.
-s server	Specifies the name or IP address of the print server. If a print server is not specified on the command line, the <code>LPR_SERVER</code> value is used. If a print server is neither specified with the <code>lprm</code> command nor defined in the environment variable, LPRM displays an error message and terminates.

- `joblist` Specifies a list of job identifiers for the jobs to be removed from the queue. The default is to remove the current job in the queue.
- `-?` Displays help information.

If the server from which you are trying to remove a job does not accept the default agent name, you can override the value using the `-a` parameter. When you issue the `lpq` command with the `-l` parameter, the `USER` field indicates what the server expects as the agent information.

Redirecting a Print Job

IBM TCP/IP for OS/2 Version 3.0 provides support for redirecting local OS/2 printers to any printer attached to an LPD server. This enables you to print from an application to a network printer without specifying any special application support. From the application perspective, it is actually printing to a local printer, but the output is then sent to a printer attached to an LPD server on your network.

You can redirect the output of a local printer object to a remote printer using either of the following methods:

- Using a parallel device monitor (LPRMON)
- Using the LPR port driver (LPRPORTD)

LPRMON is a parallel device monitor that redirects output from a specific parallel device to a remote printer. OS/2 currently supports three parallel devices: LPT1, LPT2, and LPT3. You can use LPRMON to redirect any of these parallel devices, as well as any OS/2 device that conforms to the Parallel Port Device Driver's Monitor interface.

The LPR port driver enables you to redirect any local printer object instance to a remote printer. Unlike LPRMON, you can create up to 64 LPD printer ports to support up to 64 remote printer destinations.

In addition to a remote server and a remote printer, printer objects enable you to configure many of the parameters that are passed to the LPD server. You can also pass free-form, server-specific parameters to the LPD server.

There are many advantages in using the LPR port driver instead of LPRMON, including:

- Support of up to 64 remote printers
- User configuration options
- Does not prevent the use of parallel ports for local printers

Using a Parallel Device Monitor

The `lprmon` command starts LPRMON, a Parallel Device Monitor, which is a program to intercept data sent to a parallel device (such as LPT1, LPT2, and so on). It enables you to set up your workstation to automatically send data to a remote LPR server. This allows you to print to an LPR server without an application using the Line Printer protocol directly.

Note: Use the `-b` option unless the remote LPD printer is strictly a text printer (the printer does not support embedded binary control characters).

```

--lprmon--
          - -r-- 3-----
--lprq--
  - -b-   - -n-   - -l-   - -r-- retries-
  - -f-
          - -q-- 10----- - -p-- LPR-PRINTER-- -s-- LPR-SERVER-
-----
  - -q-- seconds- - -p-- printer----- -s-- server-----
-- devicename-----
```

Displaying `lprmon` Help

```
--lprmon-- -?-----
```

Parameter	Description
<code>-b</code>	Specifies that the data is interpreted as binary by the server, LPD.
<code>-f</code>	When the print server is running on a UNIX system, the <code>-f</code> parameter formats the file using the UNIX <code>pr</code> command. When the print server is running under OS/2, LPD passes the file unchanged.
<code>-n</code>	Disables the beep that occurs when there is an error.
<code>-r retries</code>	Sets the number of retries (0-5). The default is 3.
<code>-q seconds</code>	Sets retry delay in seconds. The default is 10.
<code>-p printer</code>	Specifies the name of the printer to which the file is sent. If the <code>-p</code> parameter is omitted, LPRMON looks at environment variable <code>LPR_PRINTER</code> for the corresponding value.
<code>-s server</code>	Specifies the name or internet address of a network host with print spooling capabilities. If a print server is not specified on the command line, LPRMON looks at environment variable <code>LPR_SERVER</code> for the corresponding

value and uses that value as the print server. If a print server is not specified with the lprmon command or defined in the environment variable, LPRMON displays an error message and ends.

- devicename Specifies the parallel port for LPRMON to monitor. Data sent to this port is then redirected to a remote LPR server. This must be specified as lptn, where n is a number (1-3).
- ? Displays help information.

To redirect a local printer to a remote printer using LPRMON:

1. Create a printer that supports output to one of the parallel printer objects (LPT1, LPT2, or LPT3)
2. Run LPRMON to redirect the corresponding device to a remote printer.

Note: LPRMON support is provided because you cannot use printer objects to redirect printer output from a Windows application running under OS/2. This can be accomplished only by creating a Windows printer attached to LPT1.OS2, LPT2.OS2, or LPT3.OS2. Then run LPRMON to redirect the corresponding device to a remote printer.

Using an LPR Port Driver

IBM TCP/IP for OS/2 Version 3.0 provides LPR printing capabilities which are fully integrated with the Workplace Shell. After installing the LPR port driver, you can transmit your jobs to the server for printing by:

1. Creating a printer object (if one does not already exist)
2. Specifying a printer object as the output for the printer
3. Configuring the corresponding printer object to send output to a specific printer on a specific server
4. Printing to the printer object

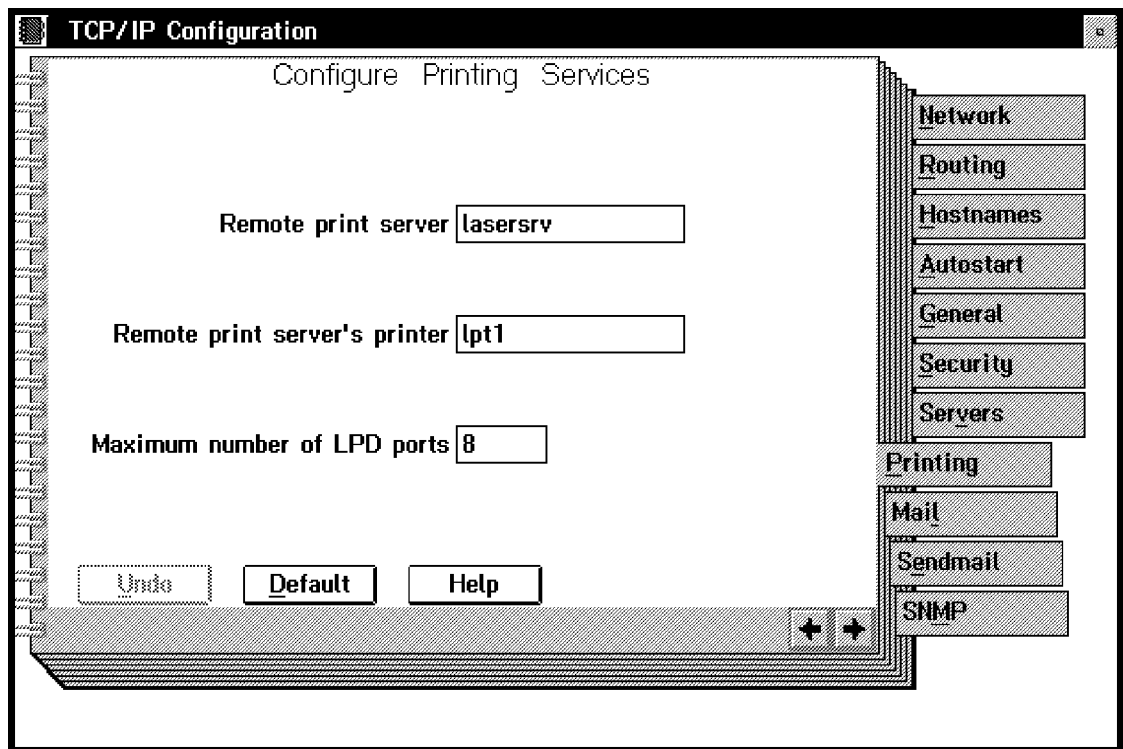


Figure 166. Configure Printing Services

Figure 166 shows the configuration panel corresponding to the printing services in TCP/IP. The fields are defined as follows:

1. Remote print server is the host name of the print server where you want your line printer (LPR) requests to be sent. This information is saved as the LPR_SERVER environment variable in your CONFIG.SYS file.
2. Remote print server's printer is the name of the printer queue on the remote print server or a device name where you want your line printer (LPR) request to be sent. If you specify a device name, the LPD server determines the associated queue. For example, lpt1 is the name of an OS/2 printer and lp0 is the name of a UNIX printer. This information is saved as the LPR_PRINTER environment variable in your CONFIG.SYS file.
3. Maximum number of LPD ports is a maximum number of ports installed on the print server corresponding to a printer that is driven by an LDP print server. This value is between 2 and 64.

How to Access the Internet

With Warp Connect you have two options to access the Internet and to use Web Explorer or Gopher or UltiMail. They are:

- Dial-up connection through the dedicated or shared modem
- LAN connection through the gateway to the Internet

Shared Modem Support

It is quite convenient to share (a) modem(s) connected to a workstation either through peer services or LAN Server. The Internet dialer on your peer or requester workstation can use a network COM port. You need to apply APAR PJ18597.

- DIALER.EXE must have a file date of May 11th or later (At least version 1.43d)
- SLIPPM.EXE must have a file date of May 18th or later (At least version 1.11)

The above mentioned files provided by OS/2 Warp Connect are older and therefore do not support a network COM port.

You will see two options in dial-up access to the Internet. One as an IBM Internet Dialer icon which resides in the IBM Internet Connection for OS/2 folder, and one as the Dial Other Internet Providers icon which resides in the IBM Internet Connection for OS/2 folder or Network Dialer icon which resides in the TCP/IP folder. The latter two are identical. You need to register with the service provider.

Assuming you have a Warp Connect PC which should connect to the another Internet service provider other than IBM Advantis, you will have a configuration such as Figure 167 on page 298.

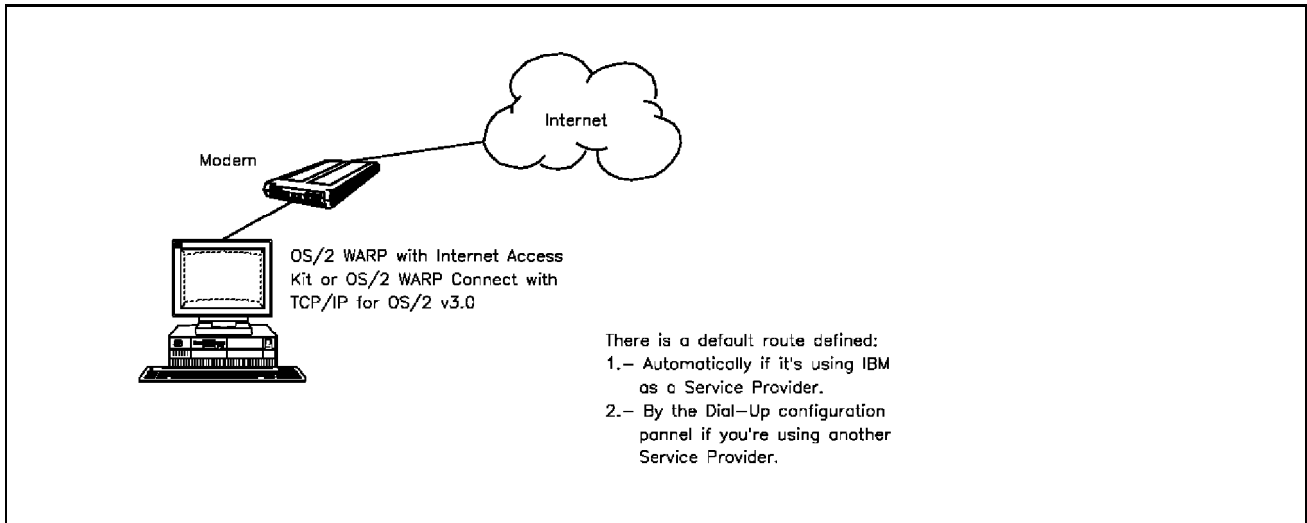


Figure 167. Scenario-1, Dial-up Connection

You need to configure the required parameters of IBM Dial-Up for TCP/IP which will be shown by double-clicking the Network Dialer icon in the TCP/IP folder. (see Figure 168) Here we assume you need to connect to a service provider other than IBM Advantis.

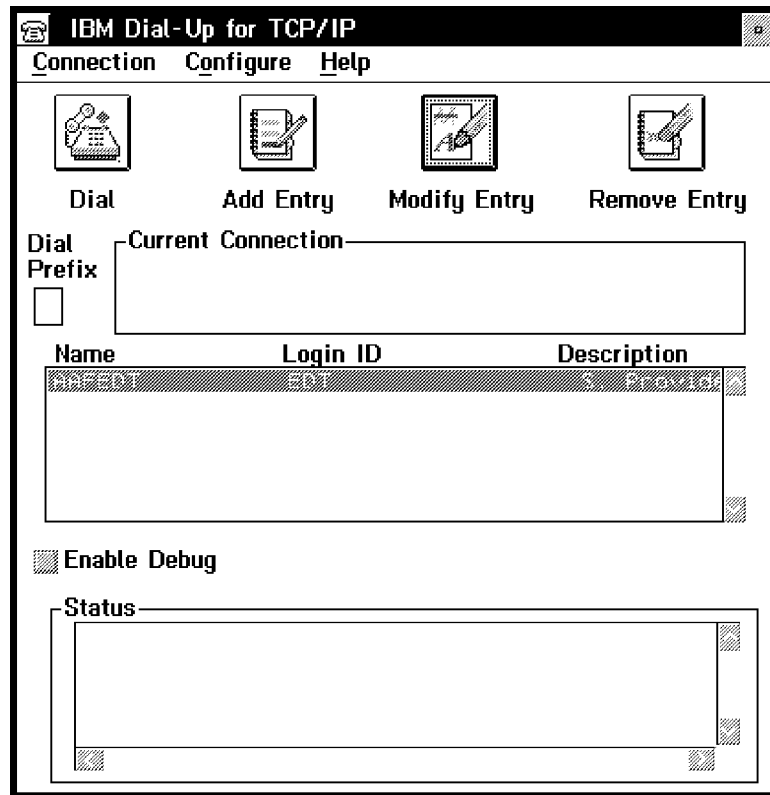


Figure 168. Configuring IBM Dial-Up for TCP/IP - Main Window

You need to specify how you can reach the Internet service provider through the serial link. The most basic parameters are two IP addresses:

- Your machine's IP address
- Service provider's IP address

You also need to specify your account information which you must get from your service provider.

Add Entries

*Name: AAFEDT

Description: S. Provider

Login ID: EDT

Password: xxxxxxxx Required

Phone Number: 578398276

Login Sequence: NONE

Connection Type

SLIP PPP

Inactivity Timeout Option

Minutes to Wait Before Automatic Hangup: 15

[Help](#) (* = required field)

Page 1 of 4

Login Info
Connect Info
Server Info
Modem Info

Figure 169. Configuring IBM Dial-Up for TCP/IP - Account Information

From this setup window you can select either SLIP or PPP protocol to connect to your service provider. In general PPP is a better protocol than SLIP. Most of the service providers support PPP connection. You must get all the information from the service provider in order to complete the fields on Figure 170 on page 300.

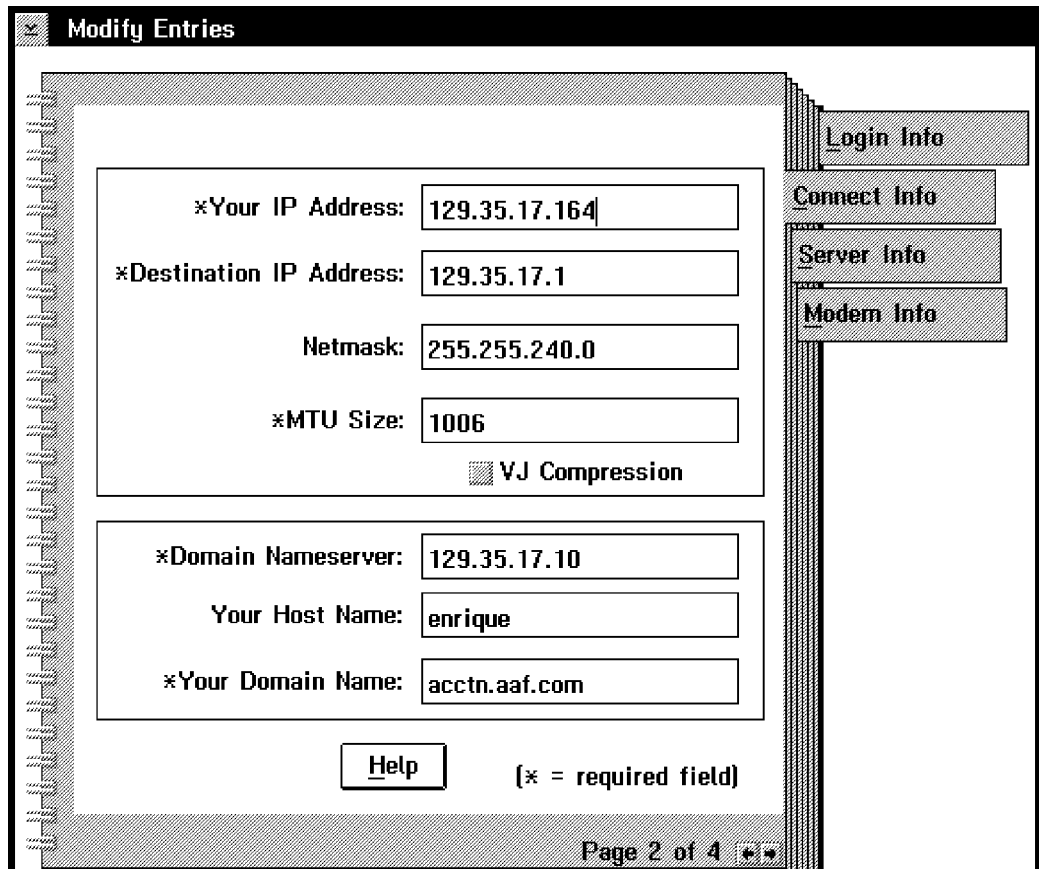


Figure 170. Configuring IBM Dial-Up for TCP/IP - More Parameters

Now we assume you have a machine in a LAN environment which TCP/IP installed and configured (see Figure 171 on page 301). You should have some routers and/or gateways and then net routes will be configured in your routing information of TCP/IP.

It makes sense to have a default route configured, because if the target network is not defined in all preceding net routes, then the configured default router can be used.

In this case, you have to use the TCP/IP Configuration Notebook and set up your routes.

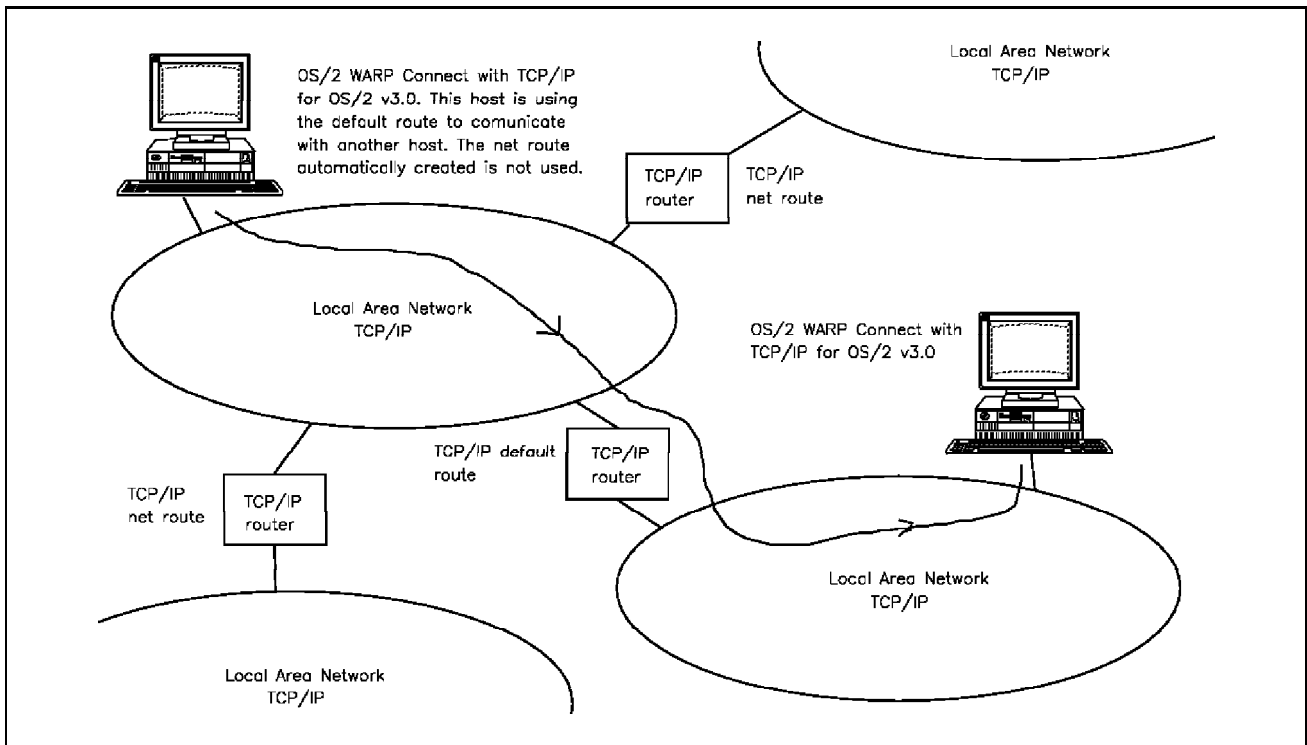


Figure 171. Scenario-2, LAN Connection

Your company's LAN may have a special Router or Gateway connecting to the Internet, so there is no special need for the Internet connection. Your Web Browser needs to be configured but that is an easy task. You only need to get the Web server's name from your administrator.

Now suppose that you have both environments together (see Figure 172 on page 302). You are in a LAN environment and are also attached to Internet through a SLIP connection.

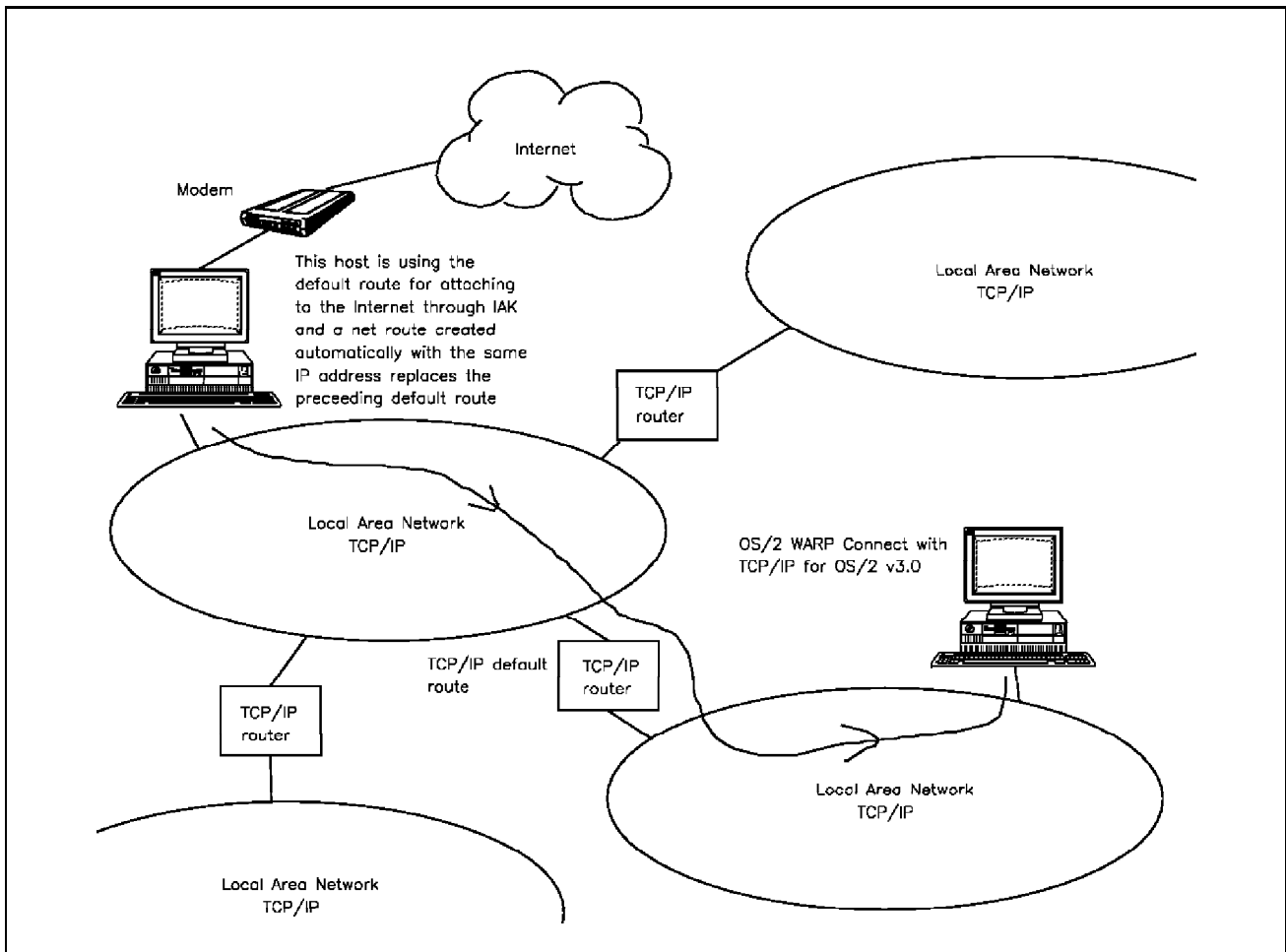


Figure 172. Scenario-3, Dial-up and LAN Concurrent Connection

You have your default route defined for your LAN, and you are using its route. So you are attached to another TCP/IP host and your datagrams are passing through its router.

When you activate your SLIP connection and dial to Internet, your default router information will be replaced by the service provider's IP address. So you lose your default router configuration and you might end up with no connection through the LAN.

In order to avoid this, IBM TCP/IP for OS/2 Version 3.0 has been improved and each time you define a default router for your LAN attachment, the IBM TCP/IP for OS/2 Version 3.0 defines a net router automatically. This means:

- If you have only the LAN attachment, both routers, the default and the net are exactly the same and there is redundancy, but the system works.

- If you only have the SLIP attachment, your default route information will be created dynamically.
- If you have both SLIP and LAN attachments, your default route information will be replaced dynamically at the SLIP activation time. However there will be a net route definition for the LAN connection, so there will be no connection loss.

Consideration for Concurrent Access of SLIP/PPP and LAN

If you plan to simultaneously use IBM TCP/IP for OS/2 Version 3.0 through a LAN connection and the Internet Access Kit (IAK) through a Service Provider, you must configure your net routes, at least the net route corresponding to your LAN segment. However, this is automatically done when you configure the default route for the LAN interface.

When connected to the Internet through SLIP or PPP, the default router for the serial line interface is added. After the serial line is activated you will have two default route at same time. The following paragraphs explain how routing is done after the second default route is added.

```
[C:\]netstat -r
```

destination	router	refcnt	use	flags	snmp	intrf
			metric			
129.37.32.20	129.37.37.19	0	3	U	-1	sl0
default	129.37.32.20	0	180	U	-1	sl0
default	129.35.16.1	0	2485	U	-1	lan0
129.35.0.0	129.35.16.1	0	5	U	-1	lan0
129.35.16.0	129.35.25.166	0	281	U	-1	lan0

However, only the first default route (which is the newer one) is active. The second default route has no effect. When you disconnect from your serial line connection to the Internet, the corresponding default route statement is removed, and the old one becomes active again.

While your SLIP or PPP connection is active, you may still need to communicate with other hosts via the old default router. If you have an active TCP connection, a host route for that connection is cached, so it won't be affected, but making new connections through the old router could be a problem. As your old default route is inactive, you need additional routing statements for each network that you access through that router. Suppose, in this example, you access the class A network with address 9, and the class B network with address 129.35, via the 129.35.16.1 router. You need two network route statements

Type	Destination	Router	Metric
NET	129.35	129.35.16.1	1
NET	9	129.35.16.1	1

As we will see, the first of these statements is created for you automatically by the configuration notebook, to facilitate simultaneous Internet and LAN access. You must add the second one yourself. To make it easier, you can use the **Create default Net route for given host** button. Then you can specify a host by address or by domain name, and the configuration notebook figures out the network route you need to get to that host and adds it for you. This should be done before you connect to the Internet.

If you've created a default route and then you quit from the TCP/IP configuration utility, the program will remind you that a net route with the same address of the default route has been created for you (see Figure 158 on page 278).

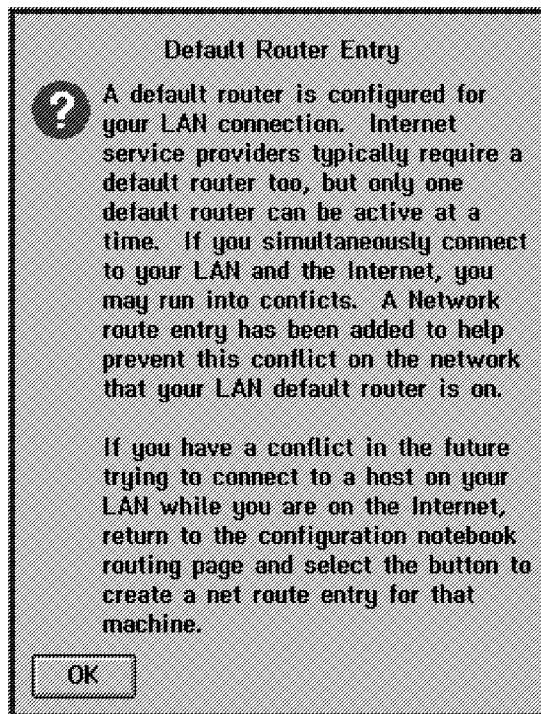


Figure 173. Default Router Entry - Notification Message

Security Warning to Concurrent Access

If you do have a dial connection to the Internet and a LAN TCP/IP interface active simultaneously, be aware of security risks. If you are running the FTP server, for example, and you are permitting anonymous FTP access, FTP access to your machine is available to all the hackers and rogues on the Internet via your SLIP or PPP link, as well to by your friends on the LAN. You may choose to end your FTP Telnet, or other server processes when you connect to the Internet. Even more important, be sure IP Forwarding is OFF in the routing page of the configuration notebook. Otherwise, these same rogues may figure out a way to use your machine as a router to gain access to other TCP/IP hosts on your LAN.

Name Resolution Considerations

Domain name servers on your LAN may be unable to resolve host names on the Internet. Therefore, when an Internet connection is made using the IBM Internet Dialer or the Network Dialer, a RESOLV file is created in the ETC directory, containing the name of an Internet name server. If you have a LAN connection as well, and if you have used TCP/IP Configuration to specify a name server for your LAN, then you also have a RESOLV2 file in your ETC directory. If you are connected to the Internet and the LAN simultaneously, the nameservers in the RESOLV and RESOLV2 files are queried simultaneously for each name resolution request. The LAN name server returns answers for LAN based hosts, and the Internet name server returns answers for Internet hosts, so you don't need to know which hosts are on the LAN, and which are on the Internet. In very rare cases, the same host name may exist on both the LAN and the Internet. The first host address returned is used, and usually this is an address on the LAN. The RESOLV file is deleted when you disconnect from the Internet.

Configuring UltiMail or Mailing from NewsReader/2

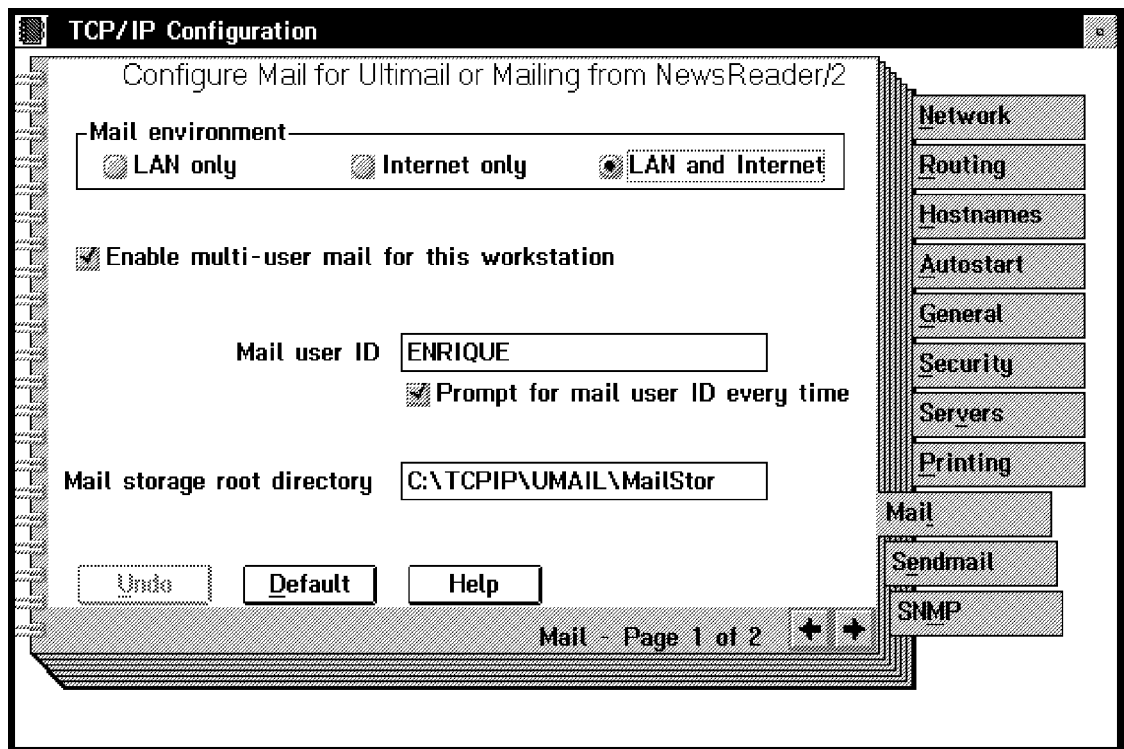


Figure 174. Configure UtiMail or Mailing from NewsReader/2

Figure 174 shows the configuration panel corresponding to the Mail settings for UtiMail or Mailing from NewsReader/2.

In this panel you can set up the mail environment between:

- LAN only
- Internet only
- LAN and Internet

If you choose Internet Only

If the Internet only is chosen and if this has been a change from the previous mail environment, a warning message says that the UltiMail settings in the configuration notebook will be ignored by UltiMail and the configuration from their service provider will be used instead.

Use SLIPPM or the Advantis dialer to supply your Internet mail information.

For the Internet only mail environment, the SENDMAIL.UML file is used. This file has a mail queue stored in it.

Click on the **Enable multi-user mail for this workstation** button if you want multiple users on the workstation. You can also specify whether you want UltiMail to prompt you for the mail user ID each time it is started. If a mail user ID is specified, it will be used as the default. The default Mail user ID is the host name.

Specify a Mail storage root directory. You provide a directory structure where your incoming and outgoing mail are to be stored. A directory will be created below the root directory name you specify.

The UltiMail configuration information is saved in the TCPOS2.INI files and information for other mail packages is stored in the SENDMAIL.CF file.

Configuring POP for UltiMail or Mailing from NewsReader/2

In this configuration you specify the defaults for your post office protocol (POP) UltiMail or Mailing from NewsReader/2:

- POP mail server. The host name of the mail server assigned to you on your LAN. This information should be provided by your network administrator.

By default, the entry for the POP mail server field is used as the entry for the SNMP mail gateway field. The SNMP mail gateway field cannot use a 32-dotted decimal notation Internet Protocol (IP) address, so it's recommended that you use a host name for the POP mail server field.

- POP ID. The identifier assigned to you for access to the mail server on your LAN. This information should be provided by your network administrator.

If the POP ID field is blank, the mail user ID is used as the default.

- POP Password. The password assigned to you for access to the mail server on your LAN. This information should be provided by your administrator.

If you want UltiMail to prompt you for your POP information each time you start UltiMail, you have to select the button **Prompt for POP information every time** (see Figure 175).

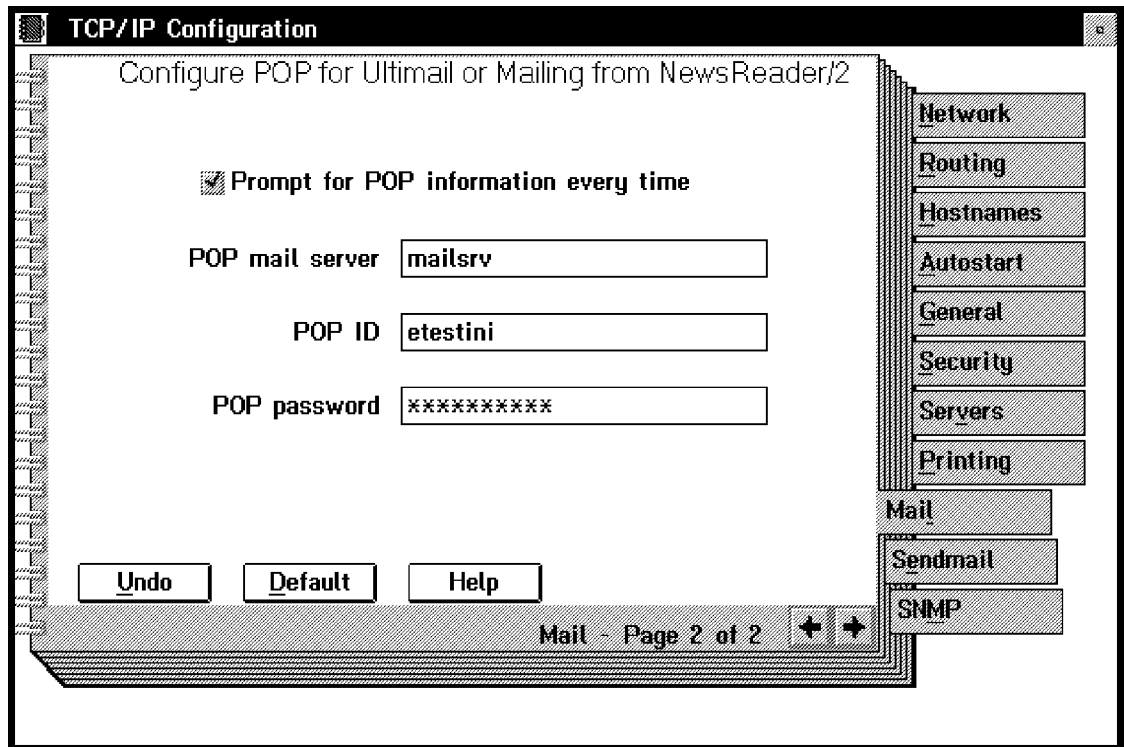


Figure 175. Configure POP for UltiMail or Mailing from NewsReader/2

Configuring Sendmail Parameters

Configuration of Sendmail parameters is a complex task. You need to open a Sendmail page (page 1 and 2) and input required parameters. The first page of the TCP/IP configuration notebook (see Figure 176 on page 310 and Figure 177 on page 311) allows configuration of defaults for mail services used by sendmail.

You will need to:

- Identify which mail package to configure:
 - When using UltiMail or Mailing from NewsReader/2 package.
 - When using another mail package.

- Specify:
 - Mail queue. Drive and path of the subdirectory in which you want to store undelivered outgoing mail and temporary e-mail files, for example: C: MPTN ETC mqueue).
 - Mail directory. Drive and path of the subdirectory in which you want to store incoming e-mail, for example: C: TCPIP UMAIL server inbox).
 - Mail program. Name of the program that you want to use to send and receive e-mail, for example: C: TCPIP UMAIL umailer.exe)
 - Reply domain. Specify the name of the domain in which your mail server resides. The domain name includes all subdomains and the root domain separated by periods.

An example of a domain name is:

`eng.mit.edu`

This is not a required field, and if the Reply Domain field is left blank, no default will be provided.

- SMTP mail gateway. The SMTP (Simple Message Transfer Protocol) Mail Gateway routes the mail to the recipients. The SMTP mail gateway is analogous to a POP server.

If your connection is through a LAN, the SMTP mail gateway is optional. If your notebook uses an SMTP mail gateway, enter its host name.

If your connection is through a service provider, the SMTP mail gateway host name is assigned by your provider.

By default, the entry for the POP mail server is used as the entry for the SMTP mail gateway field. The SMTP mail gateway field cannot use a 32-bit dotted decimal notation Internet Protocol (IP) address, so it is recommended that you use a host name for the POP mail server field.

Note: RFC 822 is a standard for a mail format for use with the Simple Mail Transfer Protocol (SMTP). All systems that use SMTP can exchange mail, but each must understand certain information, such as the sending and the receiving addresses, in order to handle the mail successfully. RFC 822, which is used by virtually all SMTP handlers, specifies the format of the mail headers so that they may all handle each other's mail. UltiMail uses the RFC 822 standard, and is compatible with other such systems.

The UltiMail configuration information is saved in the SENDMAIL.UML file and information for other mail packages is stored in the SENDMAIL.CF file.

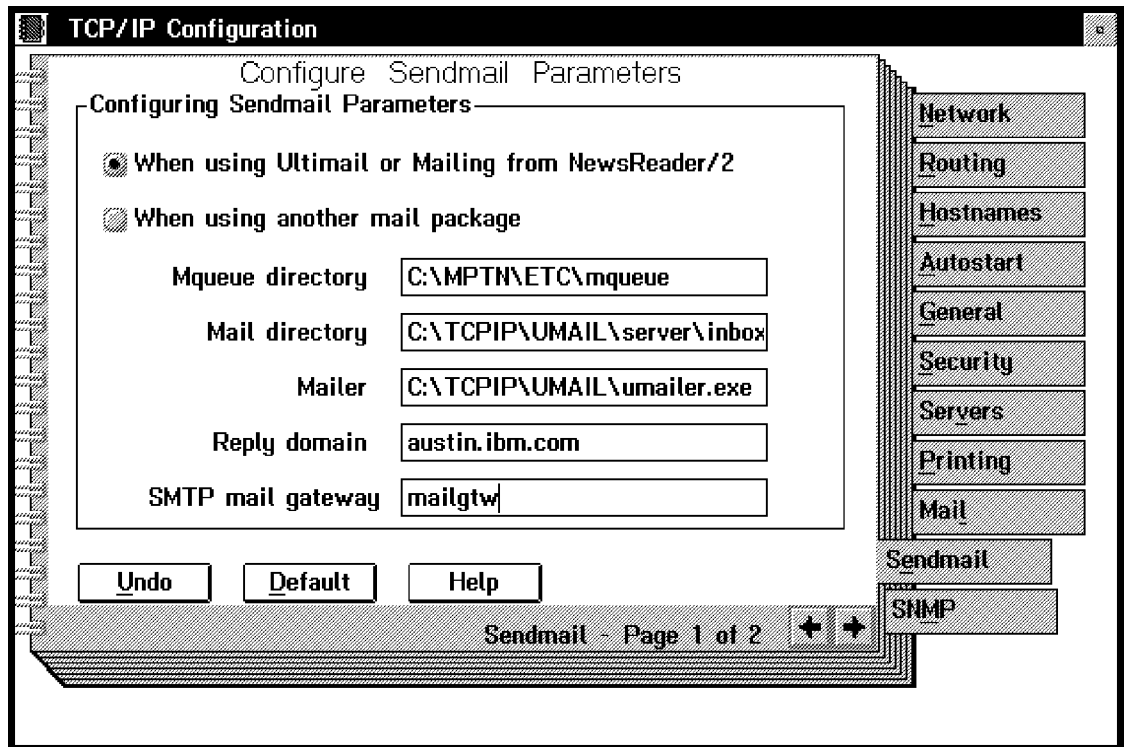


Figure 176. Configure Sendmail Parameters - Page 1

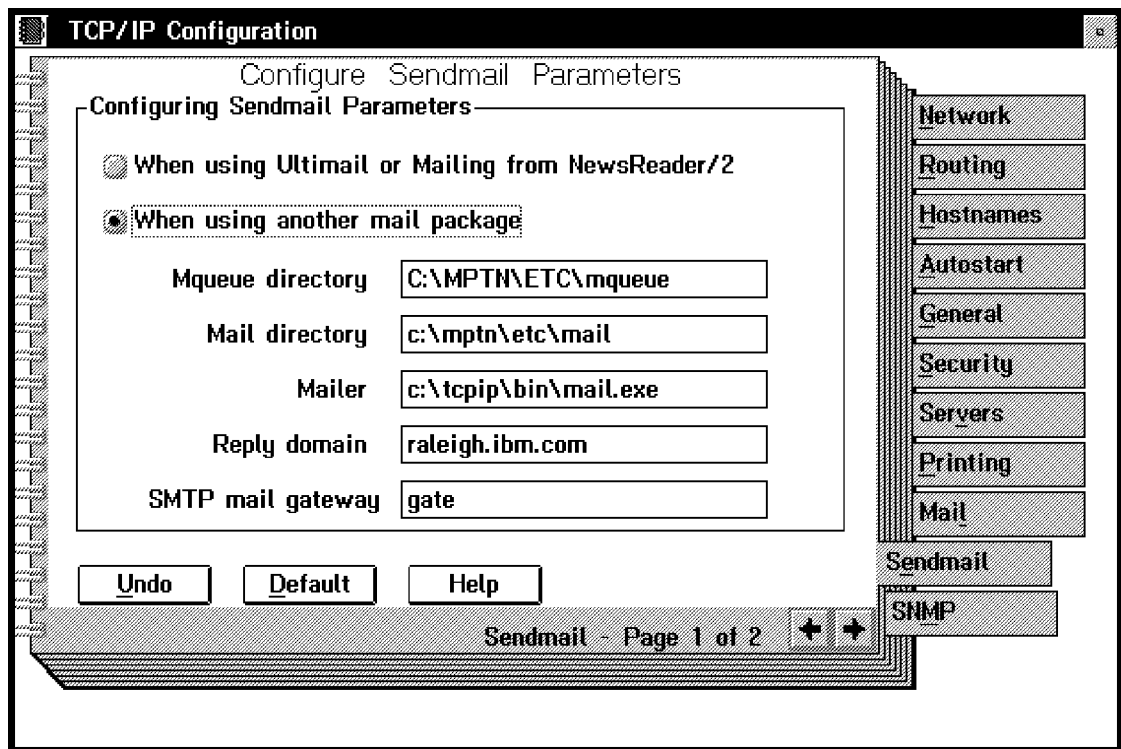


Figure 177. Configure Sendmail Parameters - Using Another Mail Package

The second page of the TCP/IP configuration notebook (see Figure 178 on page 312 and Figure 179 on page 313) allows configuration of additional Sendmail domains. LAN mail environments users may specify up to three additional domains. The question is: Why do I want to specify additional sendmail domains?

If you selected **LAN and Internet** as your mail environment, specifying additional sendmail domain names ensures that outgoing, LAN-based mail can be delivered.

For example, your local domain is `raleigh.ibm.com`, and you want to send mail to the following destinations:

```
hostname.raleigh.ibm.com
  local domain address
```

```
hostname.atl.ibm.com
  internal network address
```

```
hostname.eos.ncsu.edu
  Internet address
```

```
hostname.eng.mit.edu
```

Internet address

If no additional sendmail domains are specified, all of the mail would be delivered successfully *except* that addressed to `hostname.atl.ibm.com` because it is not part of the local domain or the Internet.

To ensure that the internal network address mail (for example, `ibm.com`) would be delivered to any addressee outside of your local domain, you should add `ibm.com` to the Additional Sendmail Domains.

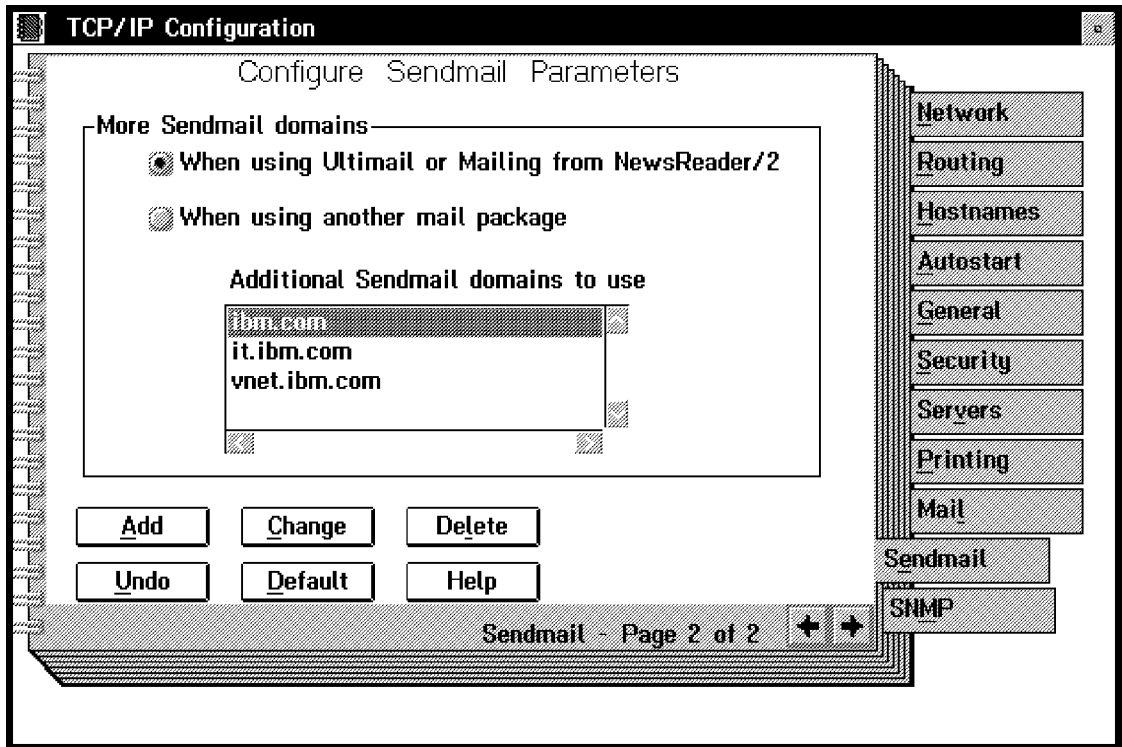


Figure 178. Configure Sendmail Parameters - More Sendmail Domains

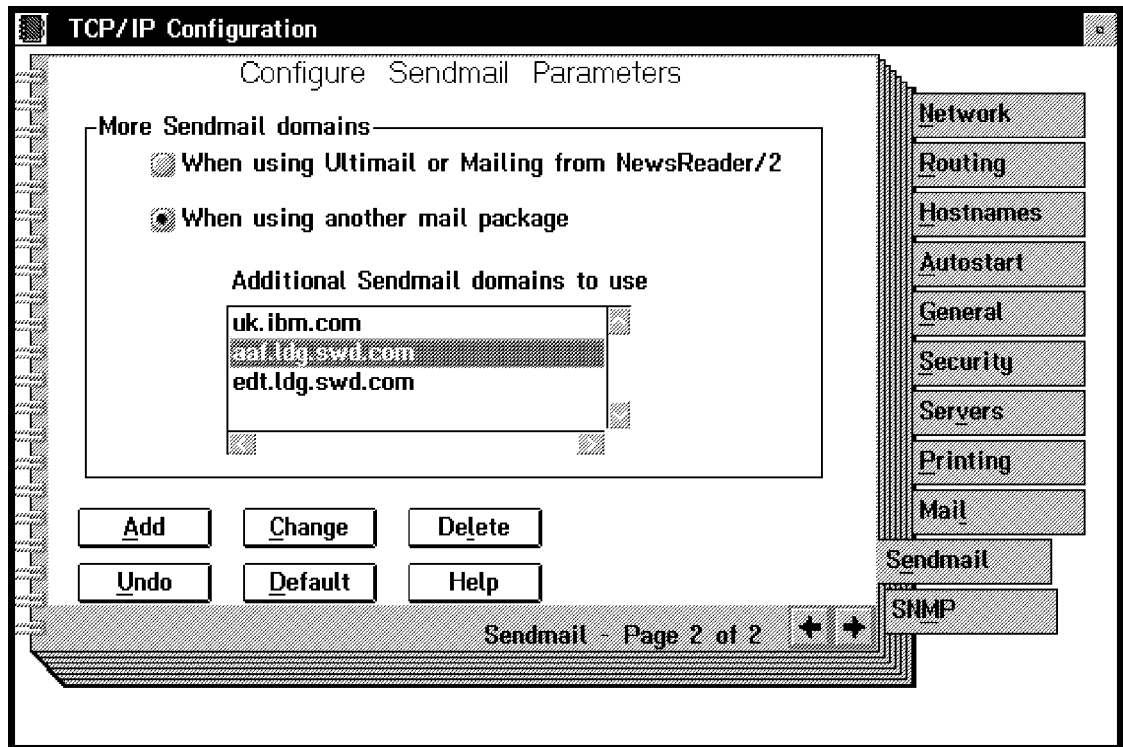


Figure 179. Configure Sendmail Parameters - More Sendmail for Another

Configuring SNMP (Simple Network Management Protocol)

Simple Network Management Protocol (SNMP) defines an architecture that consists of network management stations (SNMP monitors or clients) and network elements (SNMP agents or servers).

SNMP monitors, collects and analyzes data sent by SNMP agents residing on nodes in the network. This data can specifically be requested by an SNMP monitor by querying an SNMP agent for desired information (sending a GET or GET_NEXT command). The agent responds with the requested data (GET_RESPONSE).

The collection of all the data that can be obtained from an SNMP agent is called the Management Information Base (MIB). The MIB defines objects that are relevant to a TCP/IP environment, such as packet counts and routing tables, and divides them into the following groups:

- System
- System Interfaces
- Address Translation
- IP

- ICMP
- TCP
- UDP
- EGP
- Transmission
- SNMP

An SNMP agent can also send an unsolicited message (called a trap) containing information about, for example, the failure of a network resource.

GET, GET_NEXT, GET_RESPONSE and TRAP are called protocol data units (PDUs). SNMP also defines a fifth PDU called SET, that is issued from an SNMP monitor to update data at an SNMP agent.

SNMP also has a concept of subagents. A subagent is a separate program that communicates with an agent via a Distributed Program Interface (DPI) over a TCP connection. A subagent can REGISTER its own MIB objects and groups with an agent. The agent will then GET the information from the subagent, when an SNMP monitor requests it from the agent. A subagent can also generate traps, which the agent will forward to the SNMP monitor. This makes it possible to generate your own TRAPs by developing your own subagents with the SNMP DPI.

Configuring SNMP

Figure 180 on page 315 shows the first page of the configuration notebook. We need to define the following parameters:

Contact Name: The name of the contact person for this node and information on how to contact this person. The contact person is usually the system or network administrator.

The information in this field is saved in your SNMP.INI file.

System Location: The physical location of this node, such as building, floor, and room.

The information in this field is saved in your SNMP.INI file.

Issue SNMP trap message for any invalid manager access: You have to select this box if you want to send an SNMP trap message if an invalid manager attempts to access this agent. The default is OFF (no trap message is sent).

The information in this field is saved in your SNMP.INI file.

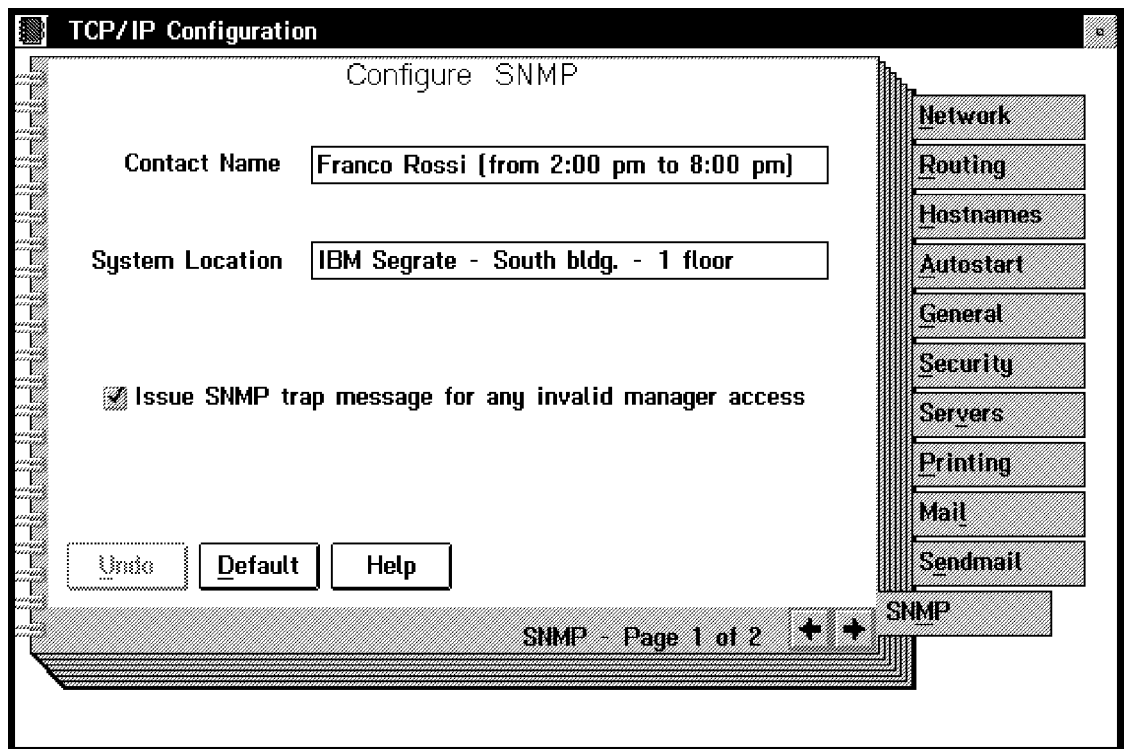


Figure 180. Configure SNMP - Page 1

Figure 181 on page 316 shows the second page of the configuration notebook.

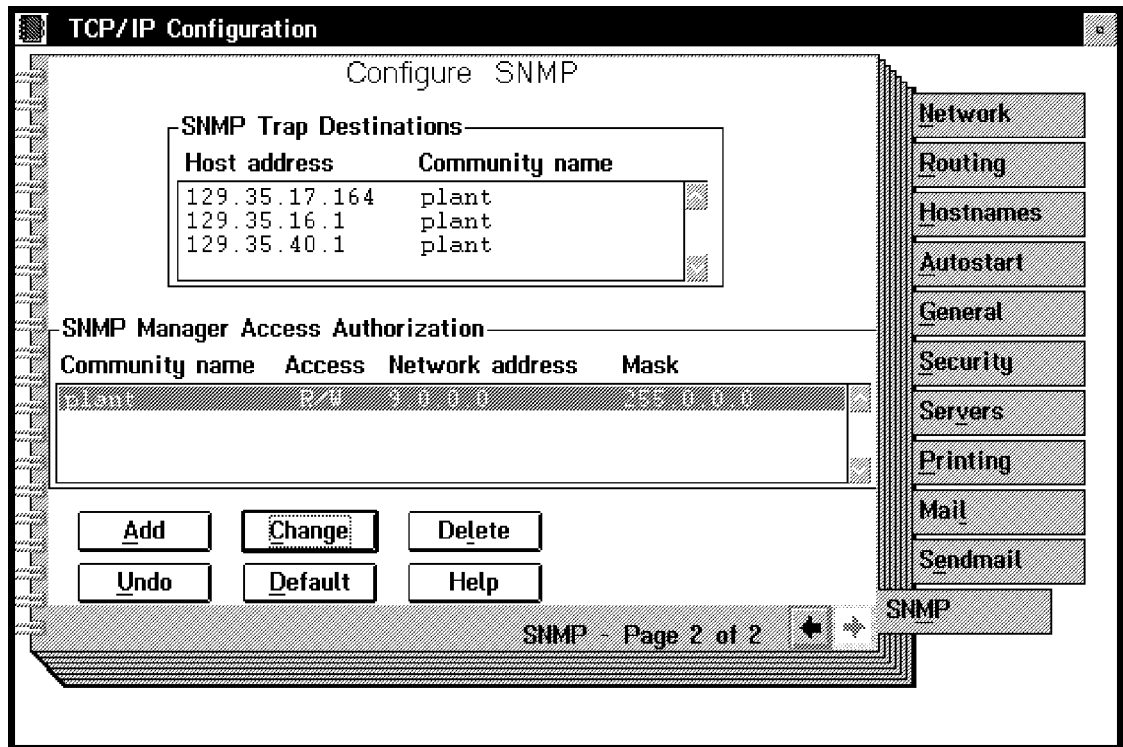


Figure 181. Configure SNMP - Page 2

We need to define the following parameters:

SNMP Trap destinations: Is a list that defines host addresses and community names of SNMP clients who are sent information about TRAPs occurring on this SNMP agent.

- Trap destination host
It's a 32-bit dotted decimal notation internet protocol (IP) address or the host name of a host to receive TRAP messages. For example, 9.67.43.126 is an IP address and manager2 is a host name.
- Community name
It's a unique string of characters used by the manager to recognize and validate the source of the TRAP information.

See Figure 182 on page 317 as an example.

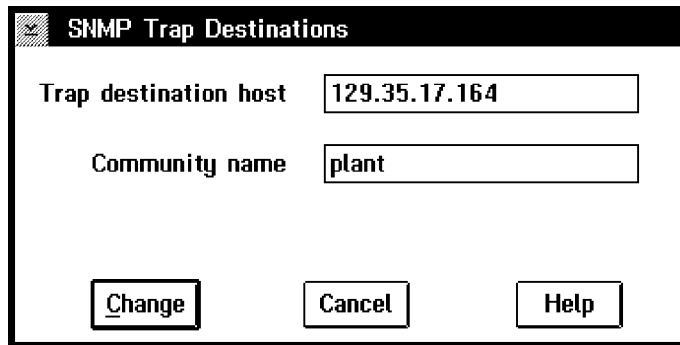


Figure 182. Configure SNMP - SNMP Trap Destinations

SNMP Manager Access Authorization: This is a list that contains information that is used to verify that a host is authorized to request SNMP information from the SNMP agent.

The SNMP Manager Access Authorization File consist of the following information:

- Community name
A unique string of characters used to verify that a request for SNMP information is valid. The community name is similar to a password.
- Network address
The network address to be used to validate access authorization for the requesting manager.
- Network mask
The network mask to be used to validate access authorization for the requesting manager.
- Read or read/write access
Allow authorized managers to read or read and write to the management information base on this workstation.

Validate Access Authorization

Access is provided to an SNMP manager based on the following authorization scheme:

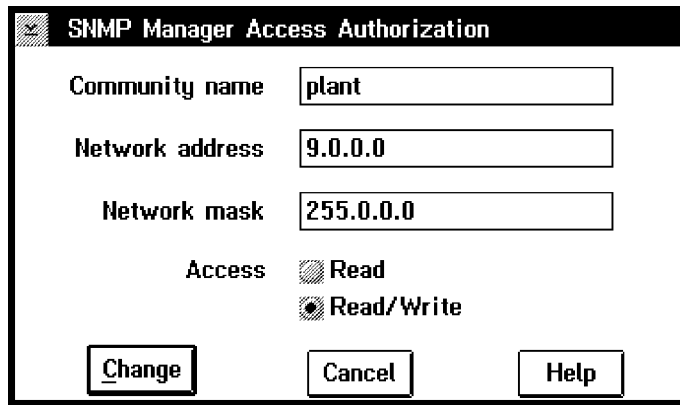
- The community name provided by the SNMP manager is checked against the Community name specified at the SNMP agent.
- The Network mask is applied to the IP address to the SNMP manager and the result is checked against the Network address.
- If the result of the network mask and the IP address matches the network address, and the community name provided matches the name assigned by the agent, the manager is allowed to access the agent's management information base (MIB). Access can be either Read or Read/write.

To allow requests only from a specific host using the correct community name, specify the IP address of the host in the Network address of the host in the Network address field and 255.255.255.255 in the Network mask field.

To allow requests from a group of hosts using the correct community name, specify the mask to be used in the Network mask field and the desired resulting address in the Network address field.

For example, if your company was allocated the class A address of 9.0.0.0 and you wanted to allow access to anyone in your company, you would specify a network address of 9.0.0.0 and a subnet mask of 255.0.0.0. This subnet mask, when applied to an IP address, preserves the first decimal position and converts the rest to 0s.

See the Figure 183 on page 319 as an example.



The image shows a dialog box titled "SNMP Manager Access Authorization". It contains the following fields and options:

- Community name:** A text box containing the value "plant".
- Network address:** A text box containing the value "9.0.0.0".
- Network mask:** A text box containing the value "255.0.0.0".
- Access:** Two radio button options: "Read" (which is unselected) and "Read/Write" (which is selected).
- Buttons:** Three buttons at the bottom: "Change", "Cancel", and "Help".

Figure 183. Configure SNMP - SNMP Manager Access Authorization

Add-on Kits Compatibility with IBM TCP/IP for OS/2 Version 2.0

IBM TCP/IP for OS/2 Version 3.0 contained in the OS/2 Warp Connect has compatibility with some of the add-on kits of IBM TCP/IP for OS/2 Version 2.0. They can be installed on top of the IBM TCP/IP for OS/2 Version 3.0 with no modification.

- **Network File System (NFS):** Enables you to share drive resources across networks as if the resources were local. It uses the User Datagram Protocol (UDP) for communication between clients and servers.

Note: If you use the Network File System kit from IBM TCP/IP for OS/2 Version 2.0 with IBM TCP/IP for OS/2 Version 3.0 to set up a NFS server, you must apply an APAR PN69745. To request this fix, contact IBM Service at 1-800-237-5511 in U.S. or your local IBM representative.

- **Domain Name Server:** Provides support for a hierarchical naming system for naming hosts, allowing system administrators to name local domains within an internet.

Note: To use the Domain Name Server (DNS) kit from IBM TCP/IP for OS/2 Version 2.0 with IBM TCP/IP for OS/2 Version 3.0, you must apply an APAR PN69747. To request this fix, contact IBM Service at 1-800-237-5511 in U.S. or your local IBM representative.

You also need to copy the ETC NAMEDB subdirectory to your MPTN ETC subdirectory. ETC NAMEDB is a subdirectory of the directory in which you installed TCP/IP, usually TCPIP ETC NAMEDB, and contains the NAMED.BT, NAMED.CA, NAMED.DOM, and NAMED.REV files. To start a name server using IBM TCP/IP for OS/2 Version 3.0, these files must reside in the MPTN ETC subdirectory.

- **Extended Networking:** Enables you to install and configure an X.25 or SNALINK interface.
- **Programmer's Toolkit:** Provides routines for application programming in TCP/IP for OS/2. These routines include sockets, RPCs, the File Transfer Protocol (FTP) application programming interface (API), and the Simple Network Management Protocol (SNMP) distributed programming interface. These routines use the 32-bit compiler, IBM C Set/2, Version 1.0.
- **X Window System Server:** Enables you to display and control X Window System client applications in an OS/2 Presentation Manager windowed session. Because the X Window System server uses OS/2 Presentation Manager as the window manager, it supports all of the keyboard, display, and pointer devices that are supported by OS/2 Presentation Manager.

Note: To CID install the X Window System Server kit for IBM TCP/IP for OS/2 Version 2.0 with CSD UN68122 loaded on the same CID server, you must:

1. Select the X Window System Server for installation. (You will receive a return code of 2 from the installation.)
2. Delete X11 MISC
3. Rename X11 MISCPCF to X11 MISC
4. Install CSD UN68122

Alternatively, you can apply an APAR PN70086. To request this fix, contact IBM Service at 1-800-237-5511 in U.S. or your local IBM representative.

- **X Window System Client:** Consists of two components; the X Window System Client Runtime Services and the X Window System Client Programmer's Toolkit. These components provide the standard X Window System APIs from the MIT Consortium, enabling users to write X Window applications for OS/2 or to port X Window applications from other platforms. The kit also enables the running of such applications by providing DLLs for the APIs and some utilities to support the X Window applications.
- **OSF/Motif:** Consists of two components; the OSF/Motif Runtime Services and the OSF/Motif Programmer's Toolkit. These components provide the standard OSF/Motif widgets and header files, enabling users to write and run Motif applications on OS/2. The OSF/Motif Kit requires the X Window Client Kit and the Programmer's Toolkit.
- **Asia/Pacific Kit**

The following kits will be discontinued:

- DOS/Windows Access Kit, because it's included in IBM TCP/IP for OS/2 Version 3.0.
- NetBIOS Kit, because it is now a part of MPTS.
- Ultimedia Kit, because it is included in the IBM Internet Connection for OS/2.

Table 9 shows the functions contained in the IBM TCP/IP for OS/2 Version 2.0 add-on kits.

<i>Table 9. IBM TCP/IP for OS/2 Version 2.0 Add-on Kits Function</i>	
Package	Functions
Network File System Kit	NFS Server NFS Client Redirected Installation Method (C.I.D.) Configuration Notebook Online Publications IBM Library Reader/2
Extended Networking Kit	X.25 SNALINK Redirected Installation Method (C.I.D.) Configuration Notebook Online Publications IBM Library Reader/2
Domain Name Server Kit	Domain Name Server Utilities Redirected Installation Method (C.I.D.) Configuration Notebook Online Publications IBM Library Reader/2
Programming Kit	32-bit APIs Samples Redirected Installation Method (C.I.D.) Configuration Notebook Online Publications IBM Library Reader/2
X Window System Server Kit	X Server Version 11 Release 5 Utilities Configuration Notebook Redirected Installation Method (C.I.D.) Configuration Notebook Online Publications IBM Library Reader/2
X Window System Client Kit	X Client APIs Samples Redirected Installation Method (C.I.D.) Configuration Notebook Online Publications IBM Library Reader/2
OSF/Motif Kit	OSF/Motif V1.2 Client APIs Samples
Asia/Pacific Kit	Base Kit plus DBCS Support

TCP/IP Client and Server Functions

The following are the brief summary of the client and server functions for IBM TCP/IP system.

Client Functions

IBM TCP/IP systems have the following clients functions:

- **Telnet:** Telnet in IBM TCP/IP for OS/2 Version 3.0 supports ASCII (ANSI, VT100, VT220, HFT, and NVT) and EBCDIC (3270, 5250) terminals for logging on to other TCP/IP hosts.
- **TN3270:** It's an OS/2 full-screen or window application for 3270 emulation.
- **TN5250:** It's an OS/2 full-screen or window application for 5250 emulation.
- **Telnet3270:** Telnet3270 is a 3270 terminal emulator that supports all 3270 terminal types, extended colors, and a copy to PM clipboard function. A number of different fonts can be selected to control the size of the window. It runs as a Presentation Manager task and is integrated in the OS/2 Workplace Shell.
- **Telnet5250:** Simmilar to Telnet3270 but for 5250 emulation.
- **FTP:** File Transfer Protocol supports file transfer to/from other TCP/IP hosts.
- **FTPPM:** FTPPM is the Presentation Manager version of the FTP client and is integrated in the OS/2 Workplace Shell. The application is based on selection lists.
- **TFTP:** Trivial File Transfer Protocol is an alternative to transferring files with FTP. It does not provide all the features available in FTP.
- **REXEC:** REXEC enables remote command execution on other TCP/IP hosts.
- **RSH:** RSH enables remote command execution on other TCP/IP hosts.
- **LPR:** Remote Printing Protocol allows remote printing on other TCP/IP hosts. The line printer client (LPR) sends the file to be printed to a specified print server host and to a specific printer.
- **LPRMON:** LPRMON is a Parallel Device Monitor that allows you to set up your PC to automatically send data to a remote LPR server.
- **LPR Ports:** LPR ports provide output to a remote TCP/IP printer from within a printer object of the OS/2 Workplace Shell.
- **NFS:** The NFS client enables you to mount remote file systems and access them like local disk drives.

- **Portmapper:** When a client wishes to access an RPC service, like NFS, it first send an enquiry including the program, procedure and version numbers together with the type of the desired protocol to the port mapper of the target computer. It receives the port number of the service by return and can then send the request directly to the server.
- **SENDMAIL:** The OS/2 mail server that uses SMTP to route mail from one host to another host on the network. A file can be piped to the SENDMAIL server by invoking SENDMAIL in foreground mode.
- **UltiMedia Mail/2 Client:** UltiMedia Mail/2 is an electronic mail system used to exchange mail with different environments based on the Simple Mail Transfer Protocol (SMTP) and the MIME extension of RFC 822, which allows you to send multimedia mail using the TCP/IP network.
- **TALK:** TALK together with the TALKD server enables interactive conversations with a user at another TCP/IP host.
- **NewsReader/2:** NewsReader/2 (NR/2) is a Presentation Manager application which allows you to access USENET news servers on an Internet. News servers contain a broad range of news groups that can be viewed, subscribed, and appended to by NR/2.
- **BOOTP:** BOOTP is used to obtain a hosts internet address, subnet mask, default IP router address, host name, and domain name from a BOOTPD server on the local LAN by broadcasting its network adapter address using the BOOTP protocol.
- **X Window System Clients:** The X Window System Client Kit provides a few X Client sample programs that are ready to use if the OS/2 X Server is installed.
- **DOS/Windows Clients:** The DOS/Windows TCP/IP access included in TCP/IP Version 3.0 enables most Windows TCP/IP applications to run under OS/2. A WinSOCK DLL, conformant with the current WinSock standard, is included in TCP/IP Version 3.0. Do not install other WinSock DLLs if you are running OS/2 TCP/IP Version 3.0; they are not needed and they won't work. DOS applications can also be used, if they use the same sockets libraries as are provided with IBM TCP/IP Version 2.1 for DOS.

Server Functions

IBM TCP/IP systems have the following servers:

- **TELNETD:** TELNETD supports ANSI, VT100, and VT220 terminals in OS/2 full-screen mode.

- **FTPD:** FTPD supports file exchange using the File Transfer Protocol with other TCP/IP hosts.
- **TFTPD:** TFTPD supports file exchange using the Trivial File Transfer Protocol with other TCP/IP hosts. You can restrict access for remote clients to files in a single directory.
- **REXECD:** REXECD executes OS/2 commands issued from other TCP/IP hosts.
- **RSHD:** RSHD executes OS/2 commands issued from other TCP/IP hosts.
- **LPD:** LPD interfaces to the OS/2 print spooler and makes it possible to share an OS/2 printer with other TCP/IP workstations.
- **INETD:** This server incorporates all servers mentioned so far by starting them within a single task. This reduces system overhead, but you cannot specify parameters to a server if it is started by INETD.
- **LPRPORTD:** This server provides the capability to print using LPR port icons.
- **SENDMAIL:** SENDMAIL implements SMTP to transmit mail to and receive mail from other TCP/IP hosts.
- **UtiMedia Mail/2:** UtiMedia Mail/2 implements SMTP and the MIME extension of 822 RFC to exchange multimedia mail between TCP/IP hosts.
- **TALKD:** TALKD together with the TALK client supports interactive conversation with a user at another TCP/IP host.
- **ROUTED:** An OS/2 workstation connected to two LANs works as an Internet gateway. ROUTED expands the basic routing capabilities of the Internet Protocol (IP) by using the Routing Information Protocol (RIP) to maintain its routing table.
- **SNMPD:** The Simple Network Management Protocol agent (SNMPD) can communicate with an SNMP network management host (an SNMP Monitor) and with SNMP subagents to provide network management support in a TCP/IP environment.
- **NFSD:** The NFS server enables you to export directories of an OS/2 system so that users running an NFS client can mount them and access them like local disk drives. You can restrict access to certain directories to selected systems, and you can export directories read-only.
- **Portmapper:** The port mapper program maps RPC program and version numbers to transport-specific port numbers. This program makes dynamic binding of remote programs possible. This is desirable because

the range of reserved port numbers are very small and the potential remote programs is very large.

- **PMX:** PMX is the Presentation Manager X Window System Server. It allows the user to run remote X client applications and display them locally.
- **NAMED:** The name server does the Internet-to-name translation on one centralized system. Remote systems can ask to get the internet address for a certain name.
- **BOOTPD:** BOOTPD sends an internet address, subnet mask, default IP router address, host name, and domain name to a BOOTP client on the local LAN that broadcasts its network adapter address using the BOOTP protocol.
- **DOS/Windows Servers:** The DOS/Windows Access Kit enables DOS and Windows applications that were originally written using the APIs provided by IBM TCP/IP V2.1 for DOS, to run as a server in an OS/2 Virtual DOS Machine or WIN-OS/2 session, using the TCP/IP protocol stack provided by IBM TCP/IP for OS/2 Version 3.0.

For Warp Connect supported functions please see Table 10.

<i>Table 10 (Page 1 of 2). Warp Conenct TCP/IP Functions</i>					
TCP/IP Function	Client	Server	Required Package	Can be Started from TCPSTART.CMD ?	
				Client	Server
Telnet	Yes	Yes	None	No (telnet)	Yes (telnetd)
PM Telnet	Yes	-	None	No (TCP/IP folder)	No
Telnet 3270	Yes	-	None	Yes (TCP/IP folder)	No
Telnet 5250	Yes	-	None	Yes (TCP/IP folder)	No
FTP	Yes	Yes	None	No (ftp)	Yes (ftpd)
TFTP	Yes	Yes	None	No (tftp)	Yes (tftpd)
FTP-PM	Yes	-	None	No (TCP/IP folder)	No
REXEC	Yes	Yes	None	No (rexec)	Yes (rexecd)
RSH	Yes	Yes	None	No (rsh)	Yes (rshd)
LPR	Yes	-	None	No (lpr)	No
LPRMON	Yes	-	None	No (lprmon)	No
LPR ports	Yes	-	None	No (lprportd)	No
NFS	No	No	IBM TCP/IP for OS/2 Version 2.0 Add-on Kit	Yes (nfsstart)	Yes (nfsd)

Table 10 (Page 2 of 2). Warp Conenct TCP/IP Functions

TCP/IP Function	Client	Server	Required Package	Can be Started from TCPSTART.COMD ?	
				Client	Server
Portmapper	Yes	Yes	None	Yes (portmap)	Yes (portmap)
SENDMAIL	Yes	Yes	None	Yes (sendmail)	Yes (sendmail)
Ultimedia Mail/2 Lite	Yes	Yes	None	No (folder on the desktop)	No (folder on the desktop)
TALK	Yes	Yes	None	No (talk)	Yes (talkd)
NewsReader/2	Yes	-	None	No (folder on the desktop)	-
BOOTP	Yes	Yes	None	No (bootp)	No (bootpd)
X System	No	No	IBM TCP/IP for OS/2 Version 2.0 Add-on Kit	No	Yes (xinit)
DOS/Windows access	Yes	Yes	None	No	No
LPD	-	Yes	None	No	Yes (lpd)
INETD	-	Yes	None	No	Yes (inetd)
LPRPORTD	-	Yes	None	No	Yes (lprportd)
ROUTED	-	Yes	None	No	Yes (routed)
SNMPD	-	Yes	None	No	Yes (snmpd)
NAMED	-	Yes	IBM TCP/IP for OS/2 Version 2.0 Add-on Kit	No	No (named)
Gopher	Yes	No	None	No	No
WebExplorer	Yes	No	None	No	No

Reference Information.

If you would like to learn more about the Internet, we suggest the following publications:

- Paul Gilster, The Internet Navigator (New York: John Wiley and Sons, Inc., 1993)
- Paul Gilster, Finding It On The Internet (New York: John Wiley and Sons, Inc., 1994)
- Peter Kent, 10 Minute Guide to the Internet (Indianapolis: Alpha Books, 1994)

- Ed Krol, *The Whole Internet User's Guide and Catalog* (Sebastopol, California: O'Reilly and Associates, Inc., 1992)
- John R. Levine and Carol Baroudi, *The Internet for Dummies* (San Mateo, California: IDG Books Worldwide, Inc., 1993)
- Deborah Morrison, *Your OS/2 Warp Internet Connection* (Foster City, California: IDG Books Worldwide, Inc., 1995)

Chapter 8. IBM LAN Distance

The IBM LAN Distance remote client is one of the optional components of OS/2 Warp Connect. This chapter introduces IBM LAN Distance 1.1 with a discussion of its components, the functions provided, and some examples of how it may be used.

IBM LAN Distance Overview

IBM LAN Distance 1.1 allows a remote OS/2 workstation to connect into a LAN. When connected, the remote workstation has the same abilities and functions as if it were directly connected to the LAN. Probably the most frequent use of IBM LAN Distance is to provide the ability for remote workstations to dial into the LAN via standard ASCII or asynchronous modems. Once connected, the remote workstation can directly address any device on the LAN.

Note: The IBM LAN Distance Remote Client, when purchased as a separate product, provides code to allow both OS/2 and Microsoft Windows workstations with remote LAN access capabilities. The Windows IBM LAN Distance code is not provided as part of OS/2 Warp Connect.

IBM LAN Distance provides remote LAN access capability for remote workstations to run LAN-based applications transparently over switched and non-switched wide area network (WAN) connections. The connection can be initiated either by a remote workstation to a LAN-attached workstation, or by a LAN-attached workstation to a remote workstation through a IBM LAN Distance Connection Server. For the remote workstation to be able to connect to resources on the LAN, an IBM LAN Distance Connection Server is required on the LAN. The Connection Server code is not provided as part of OS/2 Warp Connect. However, IBM LAN Distance also enables connections between remote workstations - OS/2 Warp Connect provides all the code necessary for peer connections between remote OS/2 Warp Connect workstations. See "Using the IBM Peer for OS/2 Version 1.0 over IBM LAN Distance" on page 340 for further details.

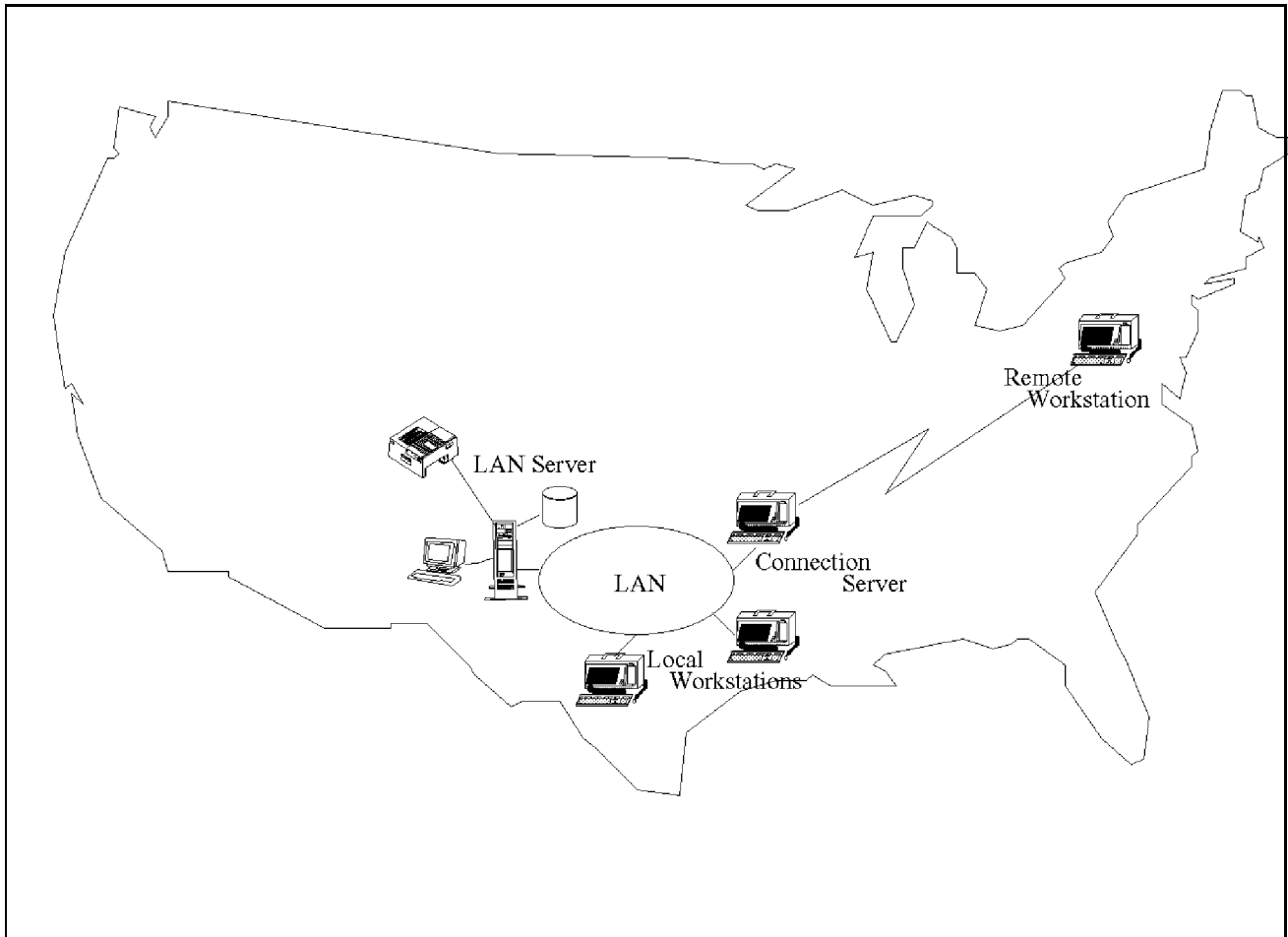


Figure 184. IBM LAN Distance Overview

A simplified view of the capabilities of IBM LAN Distance is shown in Figure 184. In this diagram an IBM LAN Distance remote workstation is connecting into a LAN via the IBM LAN Distance Connection Server. The remote workstation requires no LAN-specific hardware to be connected to the LAN in this way. The remote workstation does, however, require communications hardware such as an asynchronous COM port and modem. The Connection Server must be connected to both the LAN via a LAN adapter and the remote workstation via the communications link. The Connection Server provides the security and routing capabilities that allow remote workstations to access LAN resources. The Connection Server functions as a bridge or gateway from the wide area network (WAN) to the LAN.

Remote workstations can access the LAN via a number of communications methods including asynchronous and synchronous over switched and non-switched telephone lines, and ISDN Basic Rate switched connections.

Remote workstations can connect to token-ring LANs or Ethernet LANs. IBM LAN Distance also supports access to X.25 networks through asynchronous modems with X.25 Packet Assembler Disassembler (PAD) capabilities. Native X.25 support is provided by third parties, such as WAN Services for OS/2, announced by Eicon Technology.

For further information on installing and configuring the IBM LAN Distance Connection Server please refer to the *IBM LAN Distance 1.1 Advanced Guide* (supplied with the Connection Server product) or the *IBM LAN Distance Version 1.1 Configuration and Customization* redbook.

Supported LAN Protocols and Applications

IBM LAN Distance supports LAN applications that work with NDIS directly or use a LAN protocol that is NDIS-compliant. NDIS is a network driver architecture that allows a workstation to support multiple network adapters and protocols. This means that you can run your LAN applications, unchanged, over IBM LAN Distance wide area connections if the applications are written to a supported LAN protocol.

NetBIOS, IEEE 802.2 and TCP/IP are NDIS-compliant LAN protocols; these LAN protocols are included with MPTS, which is installed as part of the OS/2 Warp Connect. An ODI-to-NDIS mapper, also included with MPTS, enables support for the IPX LAN protocol, which is used by NetWare.

All of the LAN applications which are supplied with the OS/2 Warp Connect use one or other of these LAN protocols, and may be used with IBM LAN Distance

Many other LAN-based applications use LAN protocols supported by IBM LAN Distance. Client-server types of applications are particularly well-suited to a remote LAN access environment. Some compatible LAN applications and communications products are:

- IBM Database 2 OS/2
- Lotus Notes
- cc:Mail
- Artisoft LANtastic 5.0
- IBM Time and Place/2
- IBM Person-to-Person/2
- IBM OS/2 Communications Manager/2 features:
 - 3270 Emulation
 - 5520 Emulation
 - APPC/APPN

- AS/400 PC Support
- PC/3270

There are many other client/server applications that work over normal LAN systems and also work with IBM LAN Distance.

Note: The TCPBEUI protocol is *not* supported over a IBM LAN Distance connection.

LAN Distance Environments

There are several remote LAN access environments in which the OS/2 Warp Connect workstation, running IBM LAN Distance can be used:

- Remote-to-LAN
- Remote-to-Remote
- LAN-to-Remote
- Remote-to-Central (Stand-alone) Server (no LAN)

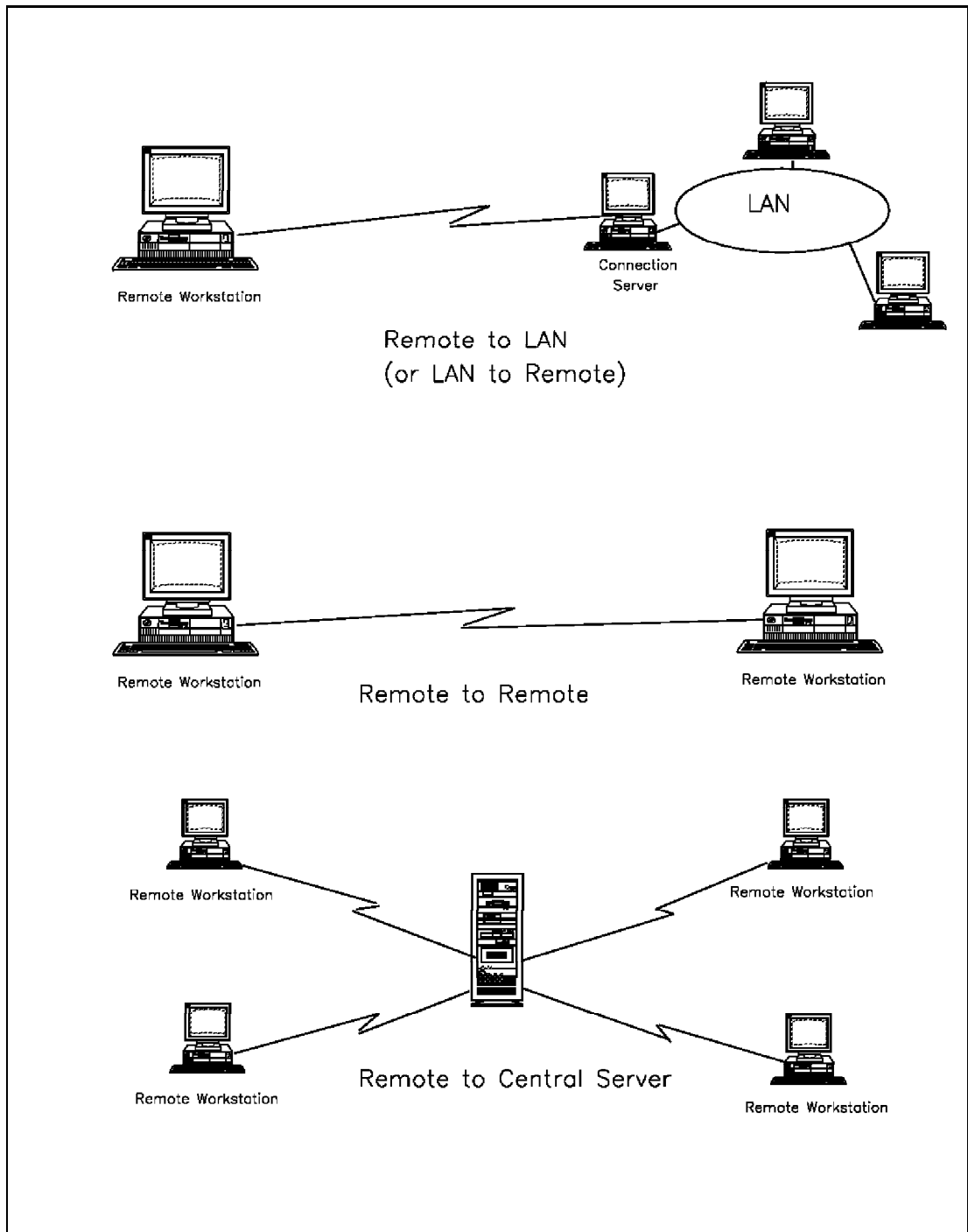


Figure 185. IBM LAN Distance Configurations

Remote-to-LAN

A remote workstation establishes a connection to a Connection Server on a LAN and becomes a member of the LAN. The single connection provides access to all of the workstations and resources attached to the LAN, allowing the remote workstation to behave as if it is also physically attached to the LAN.

This environment is a flexible solution for users requiring access to LAN resources from remote locations, such as home or while traveling. Users call into their office LANs and run the same applications that they use in their offices.

LAN-to-Remote

It is also possible for a LAN-attached workstation to request from the Connection Server that a connection be established with a remote OS/2 Warp Connect workstation. This configuration could, perhaps, be used in a situation where someone in a central office needs to send an updated file to a number of remote workstations. They could dial out through the Connection Server and copy the update to each remote workstation in turn.

Remote-to-Remote

Two remote workstations can connect over an existing telephone line to form a virtual LAN. In this environment the two workstations are connected together as if they were both connected to the same physical LAN. Using the IBM Peer for OS/2 Version 1.0, two remote workstations will be able access file and printer resources on each other. Other applications which use one of the supported LAN protocols would also be able to communicate between two remote workstations.

The remote-to-remote environment is a simple, solution for workstations requiring direct access to resources located on other workstations. It can be used in a number of situations: in a local office environment in lieu of more expensive LAN cabling, by traveling employees needing access to information on their office workstations, and by employees working between home and office.

For further information on using the IBM Peer for OS/2 Version 1.0 over IBM LAN Distance, refer to "Using the IBM Peer for OS/2 Version 1.0 over IBM LAN Distance" on page 340.

Remote-to-Central Server (No LAN)

The IBM LAN Distance Connection Server can be installed as a stand-alone workstation to support upto 32 remote workstations. You can install on the Connection Server any other server program, such as:

- IBM Peer for OS/2 Version 1.0
- OS/2 LAN Server
- TCP/IP for OS/2 2.0
- CM/2 1.1 as a network node for APPC client/server applications

No LAN hardware is necessary on the Connection Server, and the remote workstations can all access the resources at the Connection Server.

Note: There is a fifth possible configuration option for IBM LAN Distance - This is a LAN to LAN connection, where a Connection Server attached to one LAN segment is able to connect to another Connection Server on a different LAN segment, forming a remote bridge. This type of configuration is outside the scope of this redbook. For further details, please refer to the IBM LAN Distance Version 1.1 Installation and Customization Guide (red book).

IBM LAN Distance Installation Considerations

This section discusses installation considerations from both the advanced path and the individual product install menu.

Installation Procedure - Advanced Installation Path

IBM LAN Distance is an option when installing the OS/2 Warp Connect by the Advanced Installation path. Having selected the check box to install **IBM LAN Distance Remote** on the OS/2 Warp Connect Install panel, you will be presented with the configuration panel shown in Figure 186 on page 336.

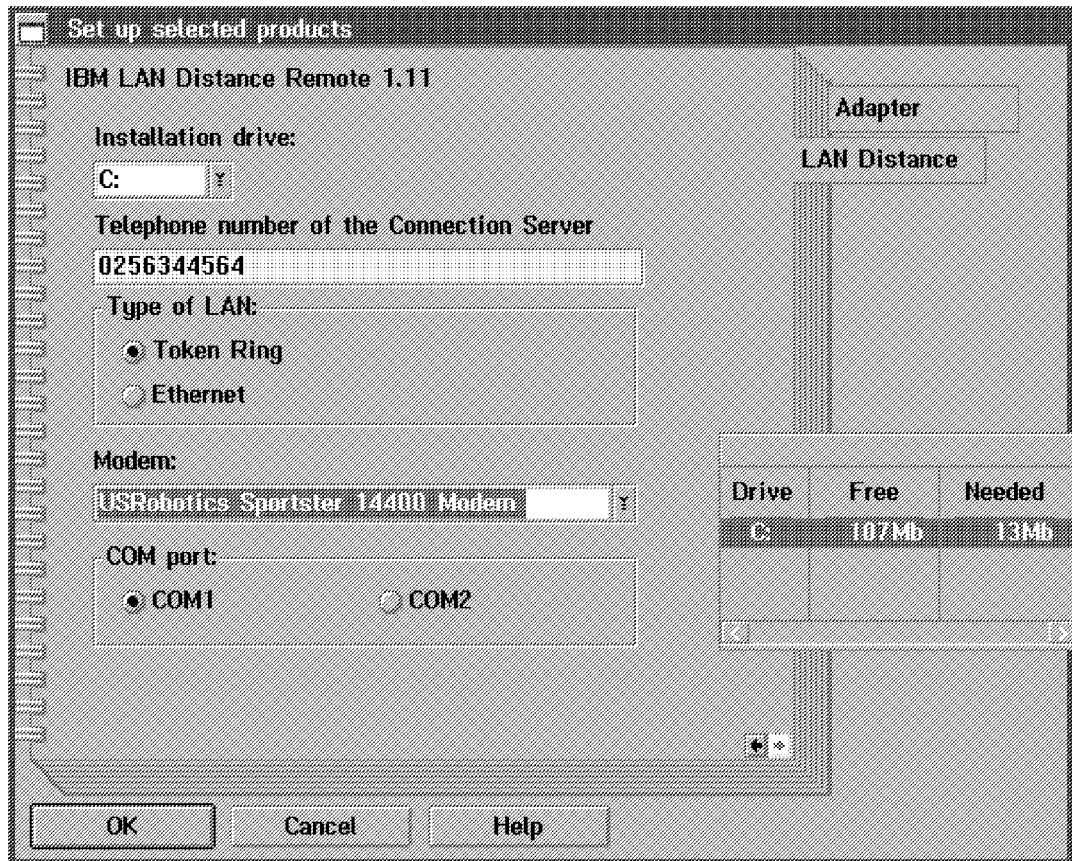


Figure 186. Set Up Panel - LAN Distance Remote

There are a number of points which should be considered when completing this panel:

- **Telephone number of the Connection Server**

This field is optional. The telephone number entered here will appear as the default entry when you first open your Phone Book in order to make a connection. However, additional entries can be made in the Phone Book, at the workstation, after the installation has completed. It is possible that you will not be making a connection to a connection server at all, but to one or more other IBM LAN Distance remote workstations. In this case, enter the telephone number of the connection you will be making most frequently.

- **Type of LAN**

If you are making a connection to a LAN by way of a IBM LAN Distance Connection Server, it will be obvious to you which type of LAN to select here. However if you are connecting to one or more IBM LAN Distance remote workstations, which are not attached to a real LAN, it is important

that each workstation is configured the same - that is all token-ring or all Ethernet. A workstation that is configured with a LAN type of token-ring will not be able to make a connection with one configured for Ethernet.

- **Modem**

If you are going to be making an asynchronous or synchronous, switched or leased connection, choose the appropriate modem from this list. If the modem that you wish to use does not appear on the list, it is possible that selecting one of the other modems (a similar type or generic Asynchronous Switched Modem) will work. Alternatively, you will need to install a modem PIF (Product Information File) file at the workstation, after the OS/2 Warp Connect installation has completed. A modem PIF file is simply installed by copying the file into the x:\WAL directory on the workstation. IBM LAN Distance will then need to be configured at the workstation using the IBM LAN Distance Settings Notebook. PIF files can often be obtained from your modem manufacturer, but it is also possible to create your own using CFMODEM, a utility that is supplied on diskette 3 of the LAN Distance code (also on the OS/2 Warp Connect CDROM 1). For further details on using CFMODEM, please refer to "Creating/Modifying a LAN Distance PIF File for an Uncertified Modem" on page 375. For more information on configuring LAN Distance from the Settings Notebook, please refer to the online IBM LAN Distance Remote Help.

- **Other Connection Types**

The OS/2 Warp Connect installation procedure only allows for asynchronous or synchronous switched or leased connection types. If you wish to use another connection type, such as ISDN, you will need to configure this at the workstation from the IBM LAN Distance Settings Notebook after the OS/2 Warp Connect installation has completed. For further information on configuring an ISDN connection, please refer to the online IBM LAN Distance Remote Guide.

There is a file giving further detail on configuring and using IBM LAN Distance over an X.25 PAD connection supplied with the IBM LAN Distance code. This file, X25RME.ZIP, is in compressed format on CDROM1 and should be expanded, using the PKUNZIP2 utility, onto your hard disk with the following command:

```
x: \IBMCOM\PKUNZIP2 y: \CID\IMG\LDR\LO265R3\WAL\X25RME.ZIP z: \TE
```

Where x: is the drive containing your IBMCOM subdirectory, y: is your CDROM drive (which may be a redirected drive across the LAN) and z: TEMP is the directory in which you wish to place the uncompressed readme file.

Installing IBM LAN Distance from the Individual Product Install Menu

IBM LAN Distance can also be installed from the CDROM by means of the Individual Product Install Menu, either locally (on the machine with the CDROM drive attached) or from a redirected drive. The considerations in "Installation Procedure - Advanced Installation Path" on page 335 also apply to this installation procedure. Installation in this case is very similar to when installing IBM LAN Distance from diskette. Please refer to the *IBM LAN Distance Version 1.1 Installation and Customization Guide* redbook if you need further information.

Shuttling between LAN-Attached and Remote Workstation Configurations

The Shuttle option allows you to use your workstation and its applications in either the LAN-attached or the IBM LAN Distance Remote Version 1.11 environment. To use this option, you must have a LAN adapter installed in your workstation and a working LAN-attached configuration.

Shuttling between the LAN-attached and remote environments can be accomplished by:

- Typing `LDSHUTTL` at an OS/2 command prompt and pressing Enter
- Starting IBM LAN Distance when the machine is configured as a LAN workstation
- Closing the IBM LAN Distance container on a workstation that is set up to operate as a remote workstation

Figure 187 on page 339 shows the Shuttle Option window.

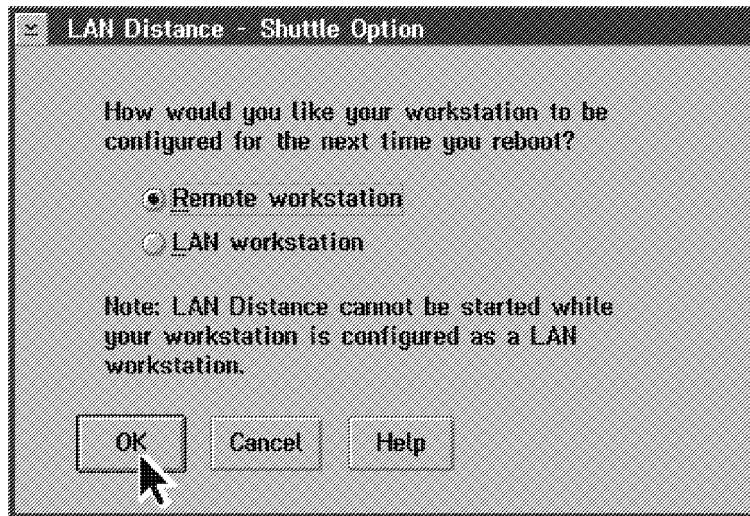


Figure 187. Shuttle Option Window

1. Select how you want the workstation to be configured after the next reboot, **Remote workstation** or **LAN workstation**.
2. Select **OK**.
3. Shut down and restart (Ctrl-Alt-Del) your workstation to activate the new configuration.

The Shuttle feature provides an easy mechanism for switching the machine between the two types of workstation configuration at any time. When you have just completed IBM LAN Distance installation from the OS/2 Warp Connect CDRom, your workstation will be in LAN mode. You must run the shuttle function if you wish to use the workstation as an IBM LAN Distance Remote.

Note: The Shuttle feature changes both your CONFIG.SYS and PROTOCOL.INI files. IBM LAN Distance handles two different PROTOCOL.INI files. One for LAN connection and one for remote connection. One of these files is in active use, and the other one is backed up. Shuttle switches between these two files. After Shuttle changes the PROTOCOL.INI file, the CONFIG.SYS file is edited to support the device driver statements required for the current PROTOCOL.INI. This means that any changes in the MPTS configuration (stored in PROTOCOL.INI) only affect the currently active configuration.

For example, if you install an application that changes PROTOCOL.INI while your workstation is attached to the LAN, that change is not automatically made in the other PROTOCOL.INI used when the workstation is a IBM LAN Distance remote workstation. To run that application on the remote

workstation, you would need to use MPTS to update the PROTOCOL.INI with the appropriate changes.

Order of Installation

Because of this potential problem of having one or other of your PROTOCOL.INI files not being properly updated, it is recommended that IBM LAN Distance is always installed *after* all other network applications on your workstation. Install the network applications and verify that they are working correctly on the real LAN before installing IBM LAN Distance

If you already have installed IBM LAN Distance, and you require to install another network application (one which will make changes to your PROTOCOL.INI file), the safest way to do this is to remove IBM LAN Distance, using the LDREMOVE command, install the network application, then reinstall IBM LAN Distance. See "Removing and Reinstalling an Existing IBM LAN Distance Configuration" on page 373 for further details.

Using the IBM Peer for OS/2 Version 1.0 over IBM LAN Distance

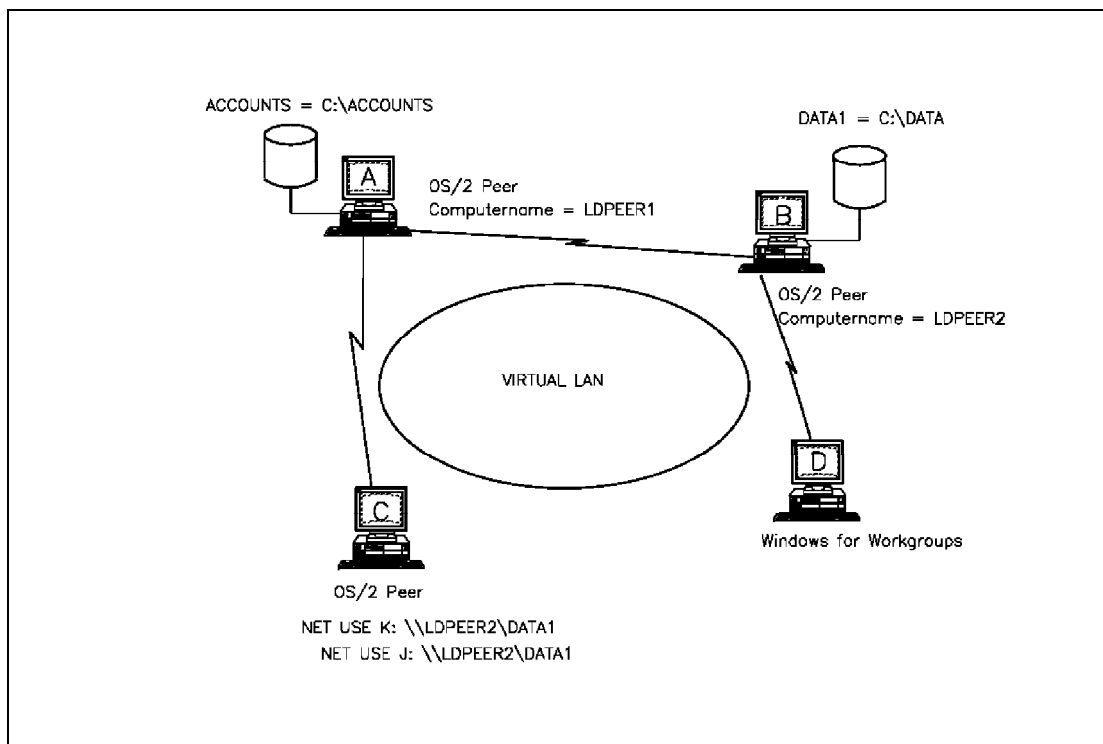


Figure 188. IBM Peer for OS/2 Version 1.0 Workstations on a IBM LAN Distance Network

Figure 188 shows a number of OS/2 Warp Connect workstations configured with both the IBM Peer for OS/2 Version 1.0 and IBM LAN Distance. Each IBM LAN Distance Remote workstation supports up to two connections. When a number of IBM LAN Distance workstations are connected by remote links in this manner, then logically they are all connected on a single *Virtual LAN*. It is important, therefore, when configuring the remote workstations, to ensure that in the LAN Distance configuration panel, each is configured for the same LAN type - either Token-Ring or Ethernet.

In this environment, it is possible for each of the OS/2 Warp Connect remote workstations to make a connection to another remote workstation and start accessing resources on that machine (provided, of course, that the appropriate shares and access rights have been created on the workstation being accessed). In order for a IBM LAN Distance remote workstation to be able to answer an incoming call however, the *Answer Mode* must be enabled on the workstation. For further details on configuring Answer Mode, please refer to the *online IBM LAN Distance Remote Help* or the *IBM LAN Distance Version 1.1 Installation and Customization Guide* redbook.

In Figure 188 on page 340, remote workstations A,B and C are all shown as OS/2 Warp Connect machines, each running IBM Peer for OS/2 Version 1.0 and IBM LAN Distance. Workstations A and B each have two modems attached. Workstations C and B have both made a connection to workstation A. Now, workstation C is able to connect to shared resources on both A and B, even though there is no direct connection between C and B. This is because all the workstations, once connected are on the same Virtual LAN segment, which behaves just as if it was a real LAN segment (although performance is, of course, considerably slower, because of the limited bandwidth of the remote connections).

Workstation D, a Windows for Workgroups workstation, running the Windows IBM LAN Distance remote client, is also able to connect to, and participate in this virtual LAN. The IBM LAN Distance Windows remote client supports only a single connection.

Performance Considerations

When using IBM LAN Distance remote workstations connected together to form a Virtual LAN, or connected to a real LAN through a Connection Server, the limited bandwidth that is available to the LAN applications must always be considered. Performance will always be less than can be expected on a real LAN segment. Because of this, it is recommended that applications are, wherever possible, loaded locally at the remote workstation, rather than from a workstation across the remote link, and only data files should be copied

across the LAN. Client-server applications, which generally produce a fairly limited amount of network traffic, will normally give acceptable performance in this environment, as will character-based applications such as 3270 or 5250 emulation.

Copying Files

When manipulating files across the virtual LAN, consideration should be given to using the `NET COPY` or `NET MOVE` command in place of the `COPY` command wherever appropriate. For example, consider Figure 188 on page 340. Let us suppose remote workstation C is accessing remote workstation A and wants to make a copy of a file in the `c:\accounts` directory to a backup file on the same workstation.

If the following command is issued:

```
COPY J:\FILE1.DAT J:\FILE1.BKP
```

Then the file `FILE1.DAT` is first copied across the remote link into the memory of remote workstation C, then is copied from memory, back across the link and stored on the hard disk of remote workstation A.

If, however, the `NET COPY` command is used, as follows:

```
NET COPY J:\FILE1.DAT J:\FILE1.BKP
```

Then only the `NET COPY` command is sent across the remote link from remote workstation C to remote workstation A, and the file is then copied locally using the memory of workstation A. The amount of data which is actually being copied across the slow remote link is, in this case, relatively small.

Errors When Copying Files

When IBM LAN Distance is installed on an OS/2 workstation, adjustments are made to the NetBIOS Timer values T1, T2, and T3 to make allowances for the fact that the workstation will be operating on such a low bandwidth network. However, no such parameter changes are made to any LAN applications installed on the workstation.

If you find, when copying large files from one remote workstation to another using the IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester, that you experience timeout or disconnection errors, the following parameter changes are recommended:

Edit the file:

```
x: IBMLAN IBMLAN.INI
```

and:

- Change the SESSTIMEOUT value from 45 to **300**.
- Change the WRKHEURISTICS digits 11, 12 and 13 to 0

```

; The next lines help you to locate bits in the wrkheuristics entry.
;
;           1       2       3       4
;           01234567890123456789012345678901234567890
wrkheuristics = 11111111213000111100010111201112210011111

```

- On a IBM Peer for OS/2 Version 1.0 workstation that is sharing resources, change the SRVHEURISTICS digit 15 to 2

```

; The next lines help you to locate bits in the srvheuristics entry.
;
;           1       2
;           012345678901234567890
srvheuristics = 111101411113110213311

```

For further details on tuning a IBM LAN Distance workstation, please refer to the IBM LAN Distance Version 1.1 Installation and Customization Guide (red book) or the IBM LAN Distance Advanced Guide.

Virtual LAN Considerations

Here we discuss briefly how NetBIOS names and adapter addresses are handled in the LAN Distance virtual LAN environment.

NetBIOS Names

When a NetBIOS LAN application is started on a workstation, it registers its NetBIOS name to the LAN. If for some reason the NetBIOS name already exists on the LAN, it is unable to add the name and the application cannot operate. In effect, the LAN and NetBIOS architecture operates in such a way as to only permit unique NetBIOS names on the network. *NetBIOS names must be unique within a LAN.*

When IBM LAN Distance is introduced into a network, it is possible to start NetBIOS applications before the remote workstation has made a connection to a Connection Server, or to another remote workstation. When a IBM LAN Distance workstation has no connection to another remote workstation or Connection Server it is effectively on its own isolated LAN. Although NetBIOS and other LAN applications can be started, they cannot communicate with other LAN applications on remote LAN-attached devices.

If a NetBIOS application is started on the remote workstation before a connection is made, it is able to add its NetBIOS name without other devices

on the LAN to be connected to, having a chance to verify that the name is unique. The application's NetBIOS name is added locally at the remote workstation without being verified. If the NetBIOS name is not unique, there is no way it can be verified as there is no connection available to the rest of the LAN.

When the remote workstation establishes a connection and becomes a member of the LAN, there is no further checking of NetBIOS names. It is thus possible to now have a duplicate NetBIOS name on the network.

Duplicate NetBIOS names should be avoided as problems could arise. In order to prevent the potential for duplicate NetBIOS names, all NetBIOS names used within your LAN must be managed. That is, a central administrator should be responsible for providing a NetBIOS naming convention and administering NetBIOS names within the organization.

Adapter Addresses

In much the same way that NetBIOS applications verify that their NetBIOS names are unique within the entire LAN, workstation adapter addresses must also be unique. In the case of token-ring, an adapter address must be unique within a single segment. Although a IBM LAN Distance remote workstation is not using a real LAN adapter, it does have a logical adapter, with a logical adapter address. All IBM LAN Distance remote workstations connecting to the same virtual LAN segment must have a unique logical adapter address. In an Ethernet LAN, adapter addresses must be unique within the entire network (similar to NetBIOS names).

Because adapter addresses must be unique, and for similar reasons as described for NetBIOS names, an administrator should be appointed to administer the adapter addresses assigned to all IBM LAN Distance remote workstations.

When installing IBM LAN Distance from the Advanced installation path, the Universal Adapter Address (UAA) of the real LAN adapter present in the workstation at installation time will automatically be used as the logical adapter address for LAN Distance. This may be changed if necessary by means of the IBM LAN Distance Settings notebook.

Using the NetWare Client for OS/2 Version 2.11 on IBM LAN Distance

When a IBM LAN Distance workstation, configured with the NetWare Client for OS/2 Version 2.11, starts, it will try to make a connection to a NetWare server at CONFIG.SYS time. Because the workstation has not made a connection to a real LAN at this time, the following error will appear:

```
Error!  
REQ0815: The program cannot get the connection ID
```

Select **OK** to clear this message. The workstation will continue to start up as usual. The connection to the NetWare server will be made automatically as soon as the remote workstation connects to the LAN through a connection server.

Security Considerations

In the most common IBM LAN Distance configurations - that is, remote workstations dialling to a IBM LAN Distance Connection Server 1.1 to gain access to a LAN, Security is all controlled at the connection server. As soon as a remote workstation is configured to answer incoming calls, however, there is a potential security exposure. The use of the IBM LAN Distance security functions should therefore be considered for each and every remote workstation which is configured to be able to accept incoming calls. See "IBM LAN Distance Security Features" on page 346 for further information on security on the IBM LAN Distance remote workstation.

Administering a Remote Workstation

When a IBM LAN Distance workstation connects to a IBM LAN Distance Connection Server 1.1, an icon for that Connection Server will appear in the LAN Distance - Workstations window. (An icon will also appear for every Connection Server which is on the same LAN segment to which you are connecting, even though you do not have a direct connection to them). It is possible, by selecting one of these icons, to logon to, and administer, one of the remote connection servers.

When you make a connection to another IBM LAN Distance remote workstation, the other workstation also appears as an icon in your LAN Distance - Workstations window, but only if security is enabled on that remote workstation. However, when connected to a remote workstation, it is only possible to make changes to the logged-on user's personal account information. It is not possible to access, for example, the Settings notebook

and remotely administer that workstation, even if you are logged on with a Security Administrator's user ID.

IBM LAN Distance Security Features

The security feature of IBM LAN Distance is a configuration option that can be enabled on a IBM LAN Distance remote workstation as well on the IBM LAN Distance Connection Server 1.1. Once security has been enabled at a workstation, then any user who tries to connect to that workstation from another IBM LAN Distance workstation will be required to enter a valid user ID and passphrase before the connection will be established. In addition, if that user ID has been set up as a callback ID, then the called workstation, once it has validated the calling user's ID, will drop the incoming connection and make an outgoing return call to a specified telephone number, thus adding an additional layer of security. If security is disabled, any person can access the configuration interface at the IBM LAN Distance workstation and enable its security option. However, once security is enabled, only a user designated as a IBM LAN Distance security administrator can log on to the secured IBM LAN Distance workstation and disable the security subsystem.

Enabling or disabling security at a IBM LAN Distance workstation is a local operation only and cannot be performed remotely. That is, a IBM LAN Distance security administrator must be physically located at the machine when operating the IBM LAN Distance configuration user interface that toggles the state of the security subsystem.

Password Phrases

To minimize the possibility of offline dictionary attacks to discover user passwords, the IBM LAN Distance security supports *passphrases*. Up to 32 case sensitive characters can be used to build individual tokens that comprise a password phrase. The passphrase is one-way encrypted using a *hash* algorithm. The resulting *password key* is 8 bytes in length.

Note: A hash algorithm is a method of transforming a *source key* to an *object key*. It is computationally difficult to derive the source key from the object key. The probability of two different source keys resulting in the same object key is extremely low.

Security Policy Options

Several user authentication *security policy* options can be configured by a IBM LAN Distance security administrator when setting up security, such as the following:

- Maximum Age

Users with passphrases are required to change their passphrase when the age of their current passphrase exceeds this time period.

The user is not permitted to log on until a valid new passphrase has been submitted. The new passphrase does not take effect until the next logon (that is the current passphrase is used for the passphrase change session). The user is permitted to change their own passphrase prior to the passphrase's expiration time using a separate user account management interface. The default is 30 days and a no maximum selection is supported.

- Minimum Age

A security administrator can specify a time period during which a user is unable to change a recently established passphrase.

The default time period is 0 days, which means that there is no restriction on when a user can change a newly assigned passphrase.

- Minimum Length

A IBM LAN Distance security administrator can establish the minimum passphrase length that is required for each user account. The minimum passphrase length can be from 4 to 32 characters.

The default is 8 characters.

- Duplicates Checked

A IBM LAN Distance security administrator can specify that a history of from 0 to 8 prior passphrases be saved in the user's account. Whenever the user changes his/her passphrase, the new passphrase is checked against these passphrase history values to ensure the new passphrase is not a duplicate of a recent passphrase. If a duplicate is found, the new passphrase submitted is reported to be invalid and the user is asked to submit another new passphrase.

The default is 8 prior passphrases.

- Maximum Logon

A IBM LAN Distance security administrator is able to specify the number of unsuccessful logon attempts that are permitted. A logon attempt can fail because:

- Unknown user ID is submitted.
- Inactive account is being accessed.
- Passphrase is incorrect.
- User is calling from a workstation with a LAN adapter address that is invalid for the account.
- User is calling during a day of the week or a time of the day that is invalid for the account.

The maximum number of allowed logon attempts defaults to 4.

If the maximum number of logon attempts is exceeded, the user's account is automatically marked as inactive. In this situation, in order to log on in the future, a user is required to contact the IBM LAN Distance security administrator to have the account reactivated.

Callback

The IBM LAN Distance security supports an optional *Callback* feature for IBM LAN Distance remote workstations. The Callback option configured within the caller's account is not checked unless the call is placed from a remote workstation. (That is, not from a Connection Server)

Figure 189 on page 349 shows you the general Callback procedure.

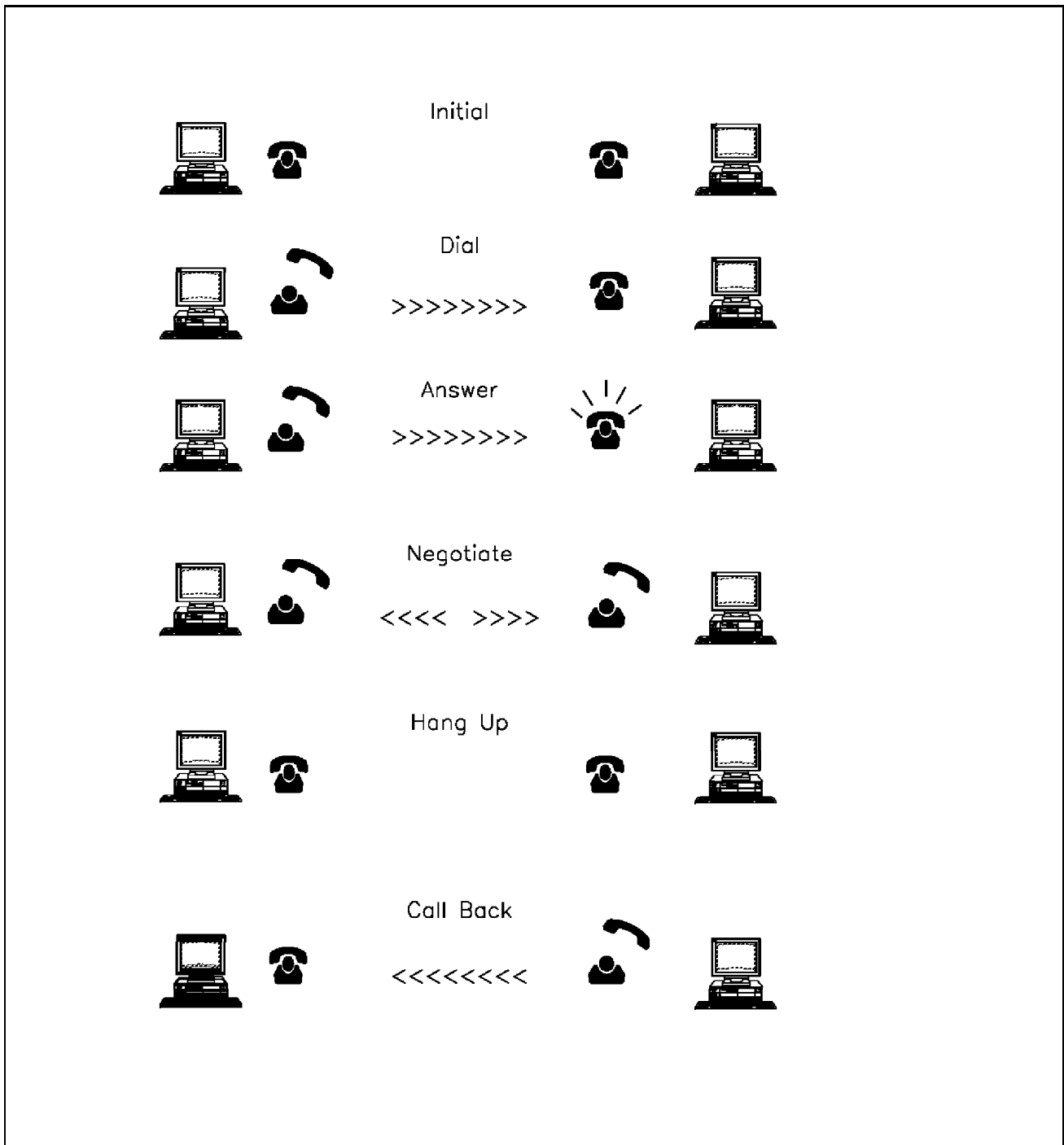


Figure 189. Callback

Callback can be configured in a user account as follows:

- Callback not required

These users are never called back by the called workstation

- Fixed callback

These users are called back at a fixed configured telephone number.

- Variable callback

The user is asked to enter a telephone number as part of the logon procedure. The called workstation can then use the telephone number submitted to it for the callback.

The caller is authenticated both:

- Prior to the callback (this prevents harassment calls)
- And also after the callback is complete (this guards against known hacker techniques that can normally only be avoided using special telephone equipment or service options)

Callback can be useful if reversal of telephone charges is needed. For example the majority of the charges for a call from a hotel room can be charged to the central site instead of the traveller at the hotel.

Workstation Address Identification

A IBM LAN Distance security administrator can configure up to eight workstation LAN addresses within a user account. The caller must call from a workstation that has been configured with a IBM LAN Distance logical adapter network address (see “ Adapter Addresses” on page 344) that matches one of the MAC addresses stored in the caller's account; otherwise, the logon attempt fails. The default allows the user to call from any adapter address.

Valid Logon Time Intervals

A IBM LAN Distance security administrator can configure the days of the week and the time of the day during these weekdays that a user is allowed to log on to his account at the workstation.

A logon attempt at a time that is not within the specified time intervals specified in the user's account, fails.

Setup of the IBM LAN Distance Security Option

This section covers the steps required to enable and configure the security on an OS/2 IBM LAN Distance machine (This process is the same whether you are setting up a Connection Server or remote workstation). The following major steps are required:

1. Enable the security option on the IBM LAN Distance machine.
2. Customize the different security options.

Enable the Security Option

Before the optional security can be used, it must first be enabled. The IBM LAN Distance Settings notebook is used to enable the security option. Follow these steps to enable the security option:

1. From the Settings notebook, select the **Security** tab.

The following window is displayed.

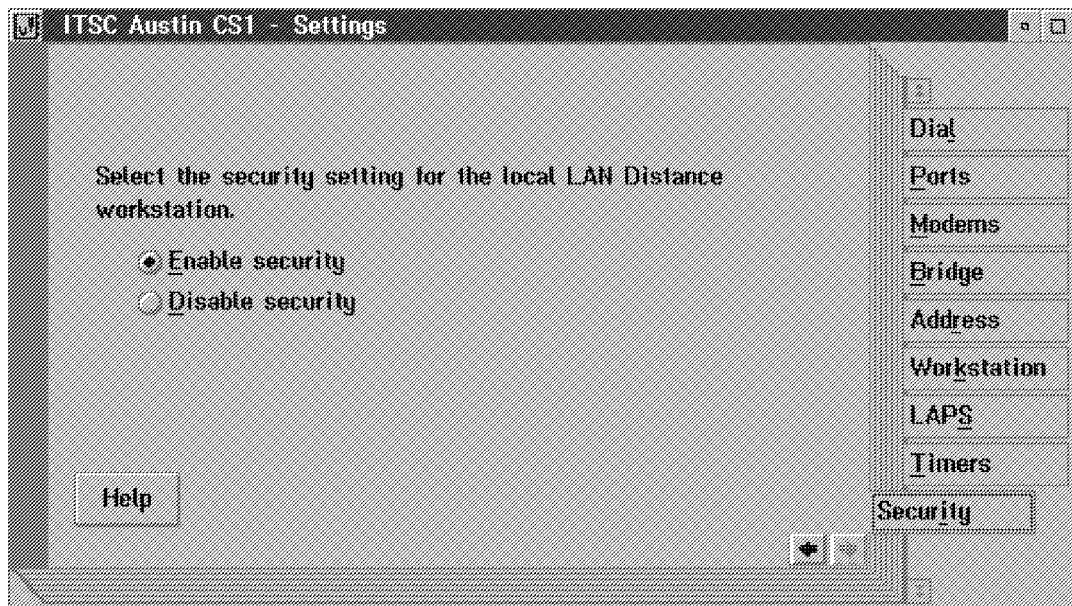


Figure 190. Settings Window (Security Section)

2. Select, in Figure 190, the **Enable security** option.
3. Close the Settings notebook window.

You receive a message asking you if you want to save the Settings notebook values.

4. Select the **Yes** button.

You receive a message telling you that some changes to the Settings notebook require you to stop and restart IBM LAN Distance. Other changes require you to shut down and restart the workstation.

You can select the **Help** button to find which configuration changes require you to simply stop and restart IBM LAN Distance, and what configuration changes require the workstation to be restarted (Ctrl-Alt-Del). Enabling Security requires you only to stop and restart LAN Distance.

5. Select the **OK** button.
6. Close the IBM LAN Distance application.
7. Restart the IBM LAN Distance application.

Customize the Security Option

Now you have successfully enabled the security option. The following sections show you how to customize the different security options. These tasks are presented in more detail in the following sections:

- Logging on for the first time
- Setting up Personal Account Information
- Adding a new user:
 - Specifying the user type
 - Specifying the user's passphrase
 - Specifying the user's logon interval
 - Specifying the user's addresses
 - Specifying the user's callback feature
- Defining the policy options

Logging On for the First Time

After starting the IBM LAN Distance program you have to perform a first logon as a security administrator to configure all the security options.

1. Select **Selected** from the menu bar.
2. Select **Logon**.

The LAN Distance Logon window is displayed as follows:

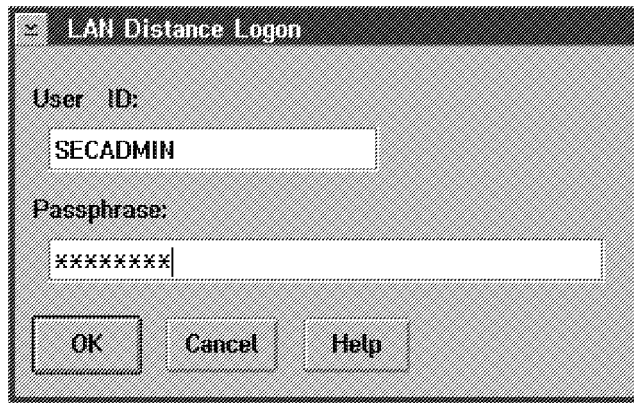


Figure 191. LAN Distance Logon

In Figure 191 you have to enter the default user ID and the default passphrase.

3. Enter the default user ID, SECADMIN.
4. Enter the default passphrase, SECADMIN.

Be careful! The passphrase is case sensitive. You have to enter the passphrase SECADMIN in uppercase letters.

5. Select the **OK** button.

The following message window is displayed:

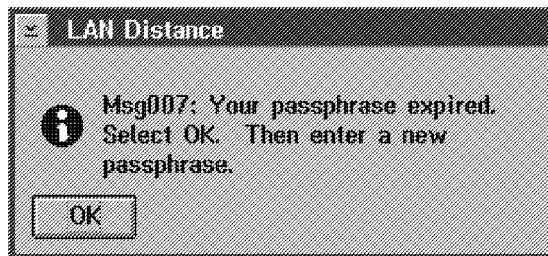


Figure 192. Passphrase Expired

This message tells you that the passphrase is expired and forces you to enter a new passphrase to replace the default passphrase.

6. Select the **OK** button.

The following Change Passphrase window is presented:

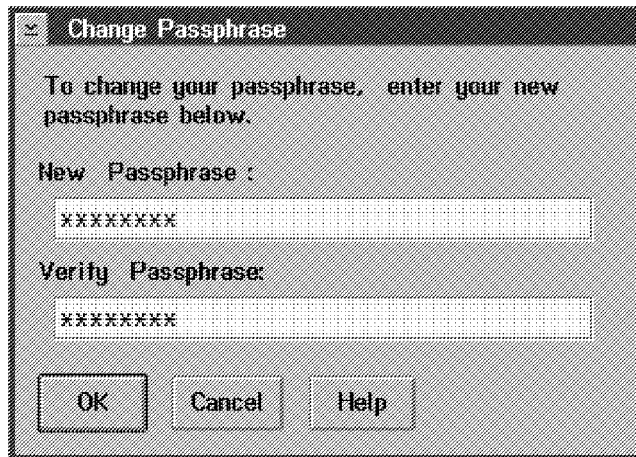


Figure 193. Change Passphrase

7. In the Change Passphrase window, enter:
 - In the **New Passphrase** field, a new passphrase
 - In the **Verify Passphrase** field, the same new passphrase for the verification
8. Select the **OK** button.

If you enter a valid new passphrase, you are logged on as a security administrator. You are now able to configure all the security options.

Note: The new passphrase length must be greater than the default policy for minimum password length, which is 8 characters.

Setting Up Personal Account Information

This section shows you what you can see and what you can change in the **Personal Account Information** section.

Perform the following steps as shown in Figure 194 on page 355:

1. Select **Selected** from the menu bar.
2. Select **Open as** →.
3. Select **Personal Account Information**.

You now see the Personal Account Information window as shown in Figure 194 on page 355.

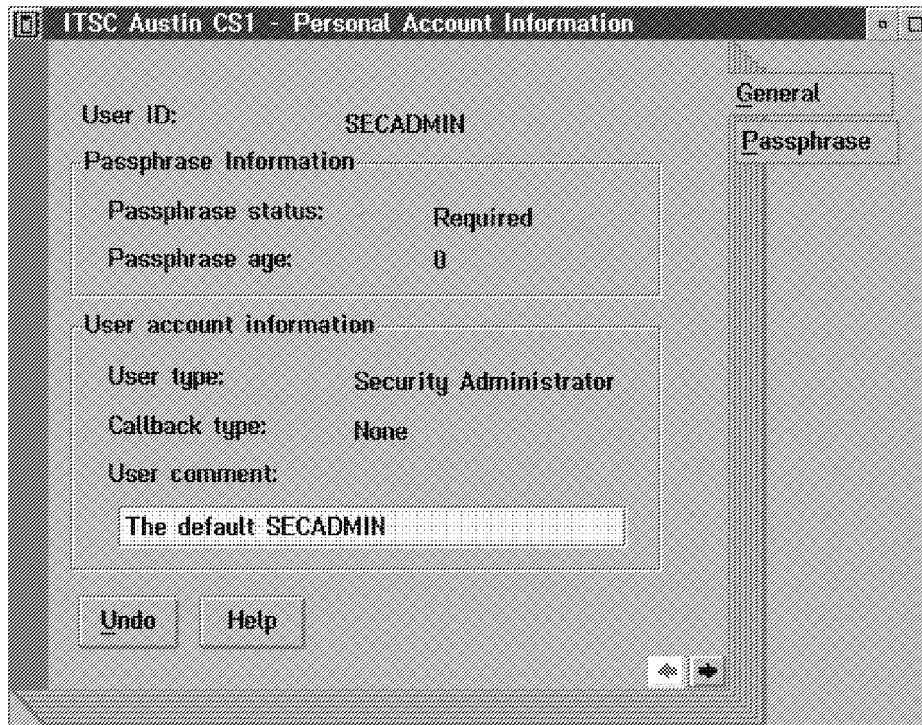


Figure 194. Personal Account Information (General Section)

Note: The following two information sections are presented:

- **Passphrase Information**

This section gives you information about the passphrase status and the passphrase age.

- **Passphrase status**

This field specifies whether a passphrase is required for logon.

- **Passphrase age**

This field specifies the age of your passphrase in terms of number of days.

- **User account information**

This section gives you information about your user type, type of callback and a description of your user account.

The **User type** field displays the privilege level of your user account (that is, user, LAN Distance administrator or LAN Distance security administrator).

The **CallBack type** field displays the type of callback to be performed for your user account.

- **Fixed Callback** restricts your dialing location to a fixed location that does not change.
- **Variable Callback** allows your dialing location to change. For example, if you are traveling, you can dial in from a customer location or a hotel.

Select the **Passphrase** tab from the Personal Account Information notebook and the following window is displayed:

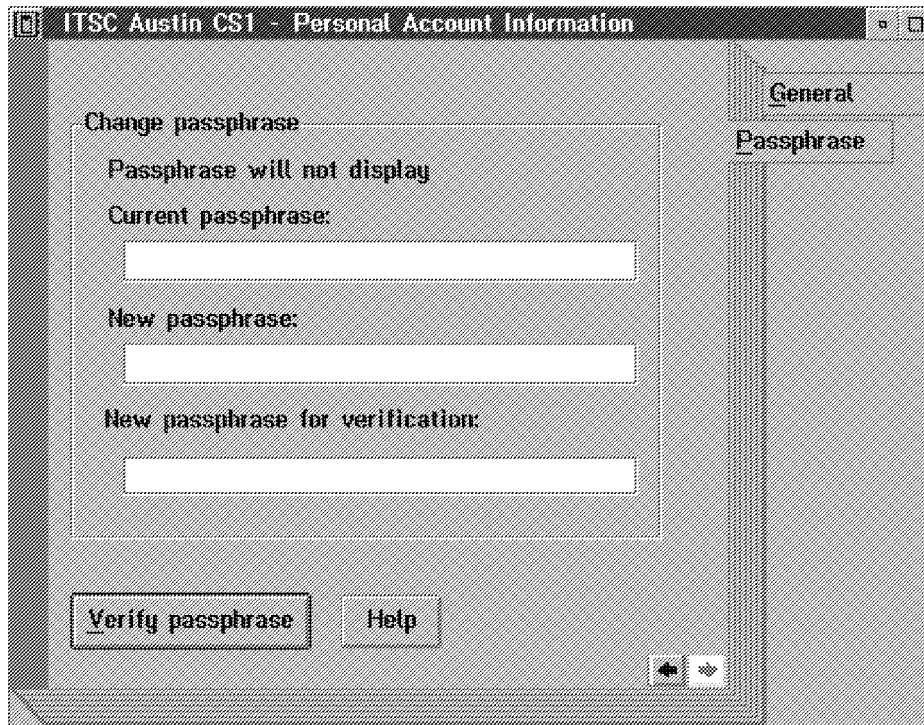


Figure 195. Personal Account Information (Passphrase Section)

Note: In this section you can change the passphrase for your personal user account.

Adding a New User

This section describes how to add a new user. First, you need to:

1. Select **Selected** from the menu bar.
2. Select **Open as** →.
3. Select **User Account Management**.

The User Account Management window **Account** section, as shown in Figure 196 on page 357, is presented.

A user account must exist for every user that is authorized to remotely access this secure LAN Distance workstation.

A LAN Distance security administrator can manage the user accounts of all other users with the User Account Management functions. Each user and LAN Distance administrator is limited to changing only the passphrase and description for their own personal user account.

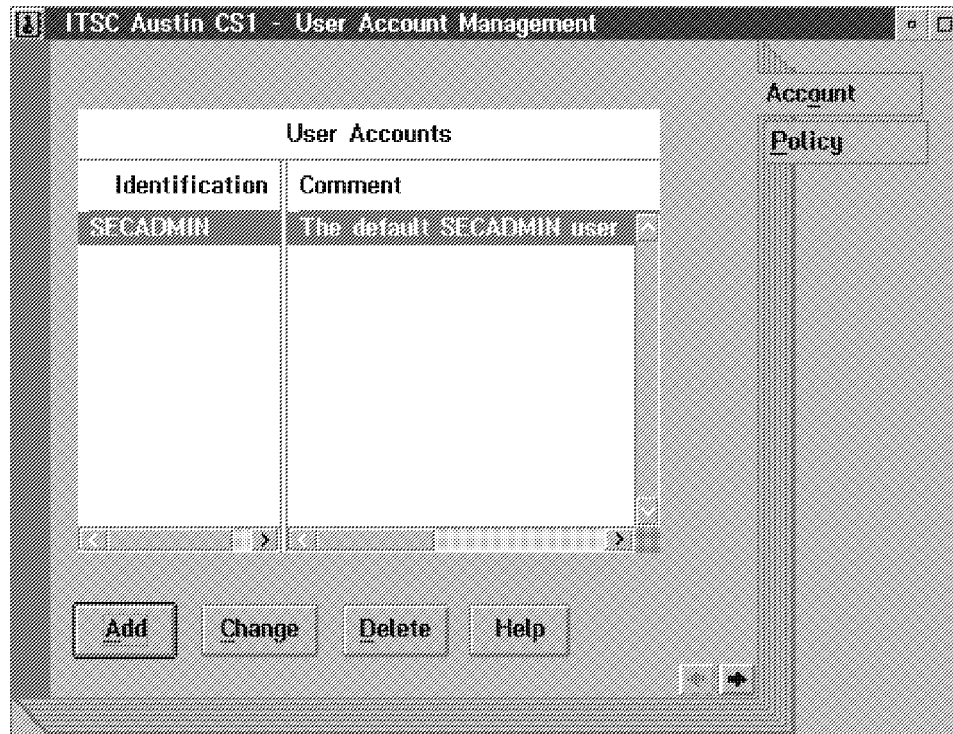


Figure 196. User Account Management Window (Account Section)

The following steps show you how to set up a new user account:

1. In Figure 196, select the **Add** button.

The **Type** tab of the user account notebook that is now presented displays information about the user account, including:

- User ID
- Comment
- User type (user, LAN Distance administrator, or LAN Distance security administrator)
- Account Status (inactive or active)

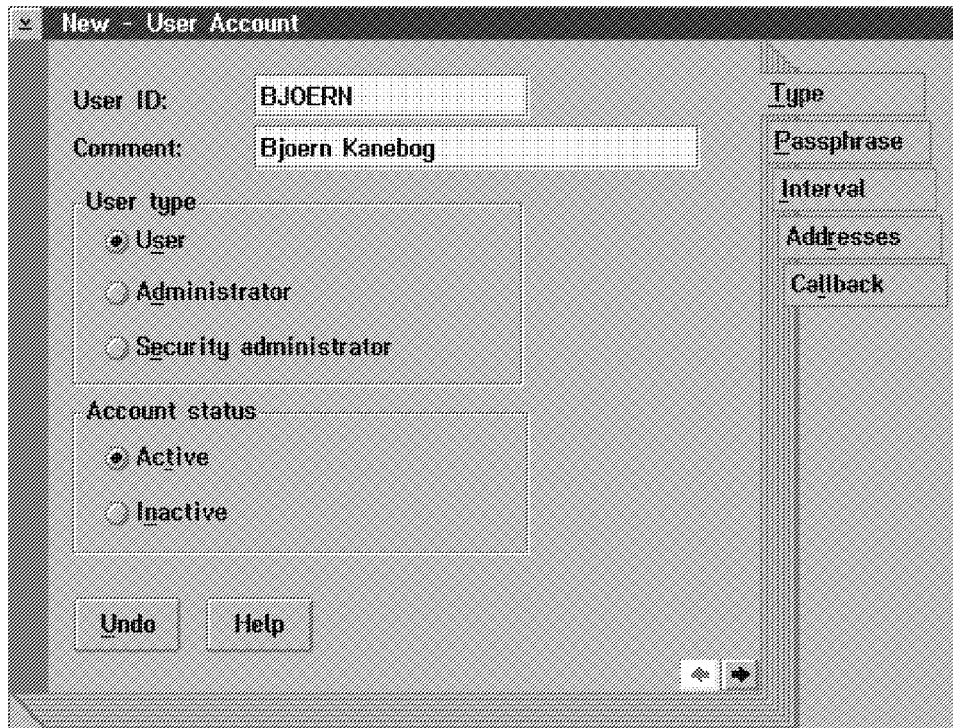


Figure 197. New - User Account Window (Type Section)

2. In the **User ID** field, enter the new user ID.
3. In the **Comment** field, enter the user's name.
4. In the **User type** section, select **User**.
5. In the **Account status** section, select **Active**.

Note: The **Account status** indicates whether or not LAN Distance security can access this user account for user authentication.

A user account can be either Active or Inactive. Making a user account Inactive is a method of denying remote access by a particular user, without deleting the information in that user account.

A user account can be made Inactive, restricting that user from accessing the secure workstation. The benefit of deactivating a user account, versus deleting it, is that the information in the user account is preserved.

Note: A user account is automatically deactivated when a user exceeds the limit for unsuccessful logon attempts.

To reactivate a user account that has become inactive, change the **Account status** field to Active.

6. Select the **Passphrase** tab from the New - User Account notebook.

The **Passphrase** tab of the User Account notebook that is now presented is used to manage the passphrases for this user account, including:

- Specifying if a passphrase is required to log on to this secure LAN Distance workstation
- Specifying a passphrase if adding a user account
- Changing a passphrase if changing a user account

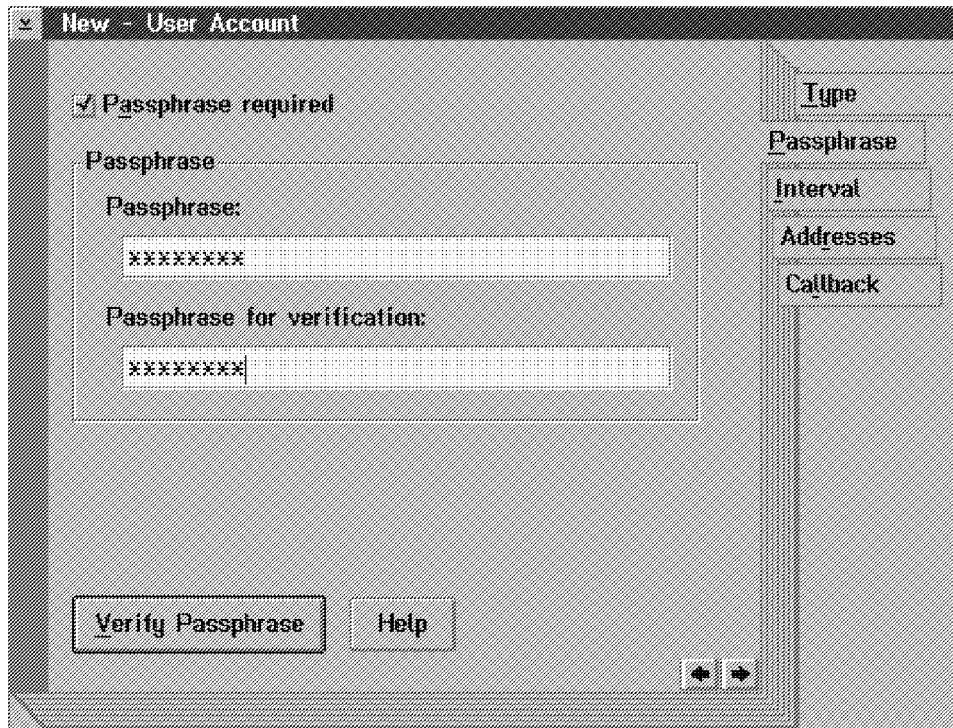


Figure 198. New - User Account Window (Passphrase Section)

7. Set the **Passphrase required** checkbox to .
8. In the **Passphrase** field, enter a passphrase.
9. In the **Passphrase for verification** field, enter the same passphrase for verification.
10. Select the **Verify Passphrase** button.
11. Select the **Interval** tab from the New - User Account notebook.

The **Interval** tab of the User Account notebook that is now presented is used to manage the logon time intervals for this user account.

Note: Multiple logon time intervals can be specified for a user account. If logon time intervals overlap, the earliest time is used as the starting point and the latest time is used as the stopping point.

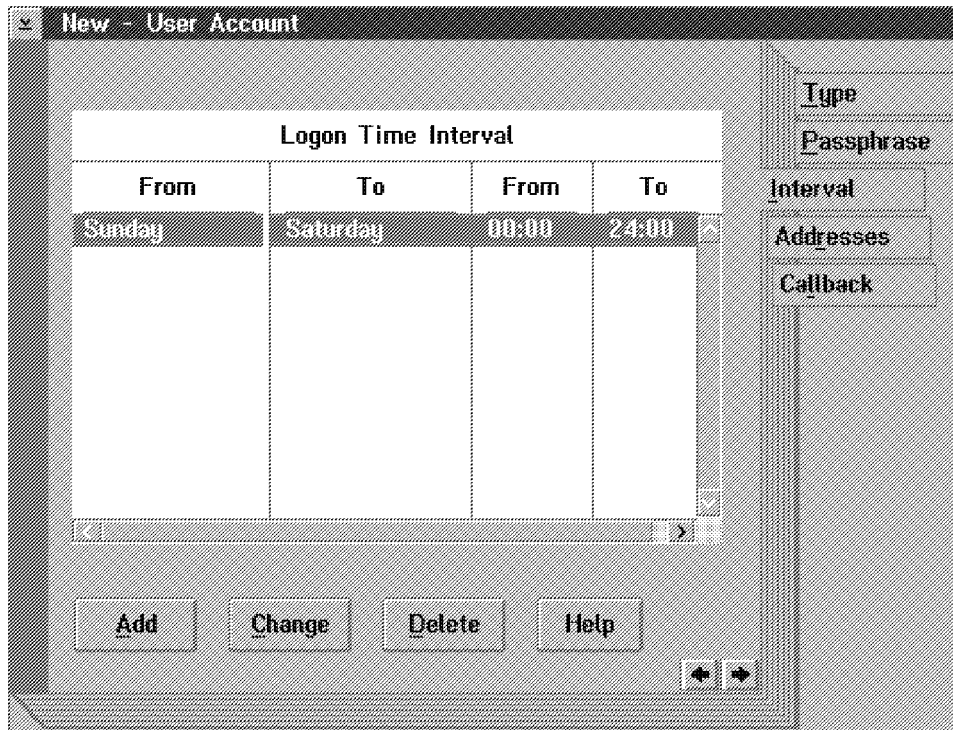


Figure 199. New - User Account Window (Interval Section)

Figure 199 shows you that the default logon time interval is from Sunday to Saturday and from 00:00 to 24:00. That means that the default has no limitations. A user with the default can log on any time.

In our example, we give some limitations because in our company we would like to save energy on the weekends, and in the time between 22:00 and 05:00 we have to run some special procedures, such as a backup program.

12. Select the **Change** button.

The following window is presented.

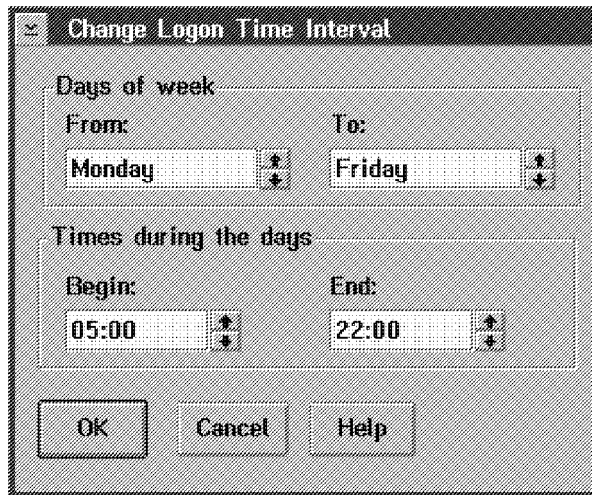


Figure 200. Change Logon Time Interval Window

Figure 200 shows you that in the **Days of week** section we selected:

- From **Monday** to **Friday**.

In the **Times during the days** section we selected:

- Begin: 05:00 and End: 22:00

13. Enter your own values.

14. Select the **OK** button.

The result of this change is shown in Figure 201 on page 362.

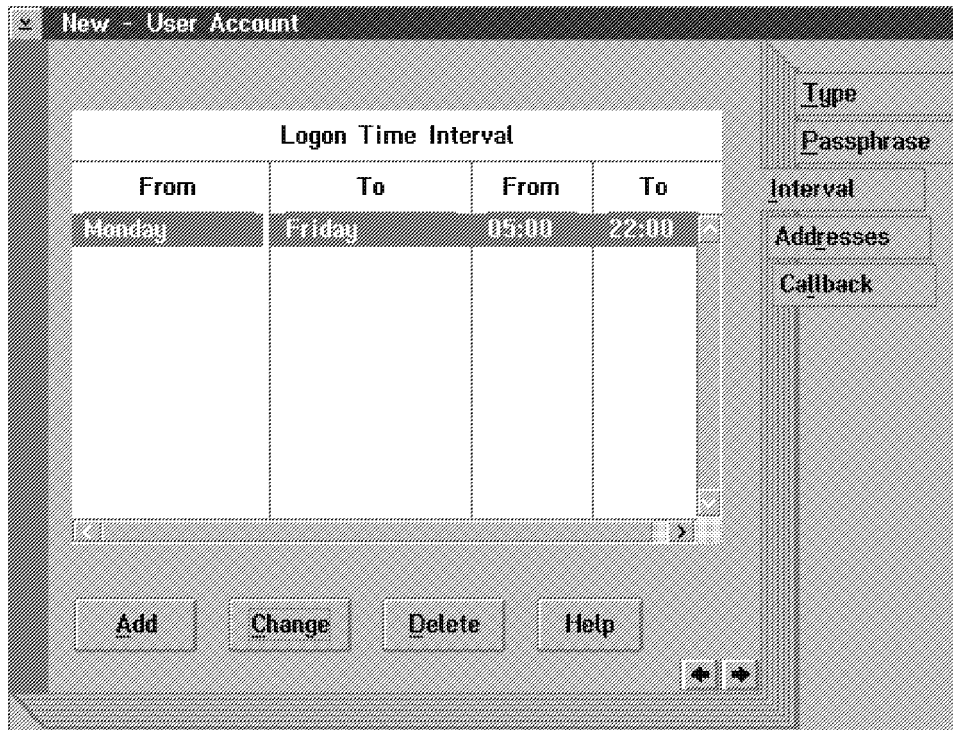


Figure 201. New - User Account Window (Interval Section)

15. Select the **Addresses** tab from the New - User Account notebook.

The **Addresses** tab of the User Account notebook that is now presented is used to manage the **LAN Distance logical adapter network addresses**.

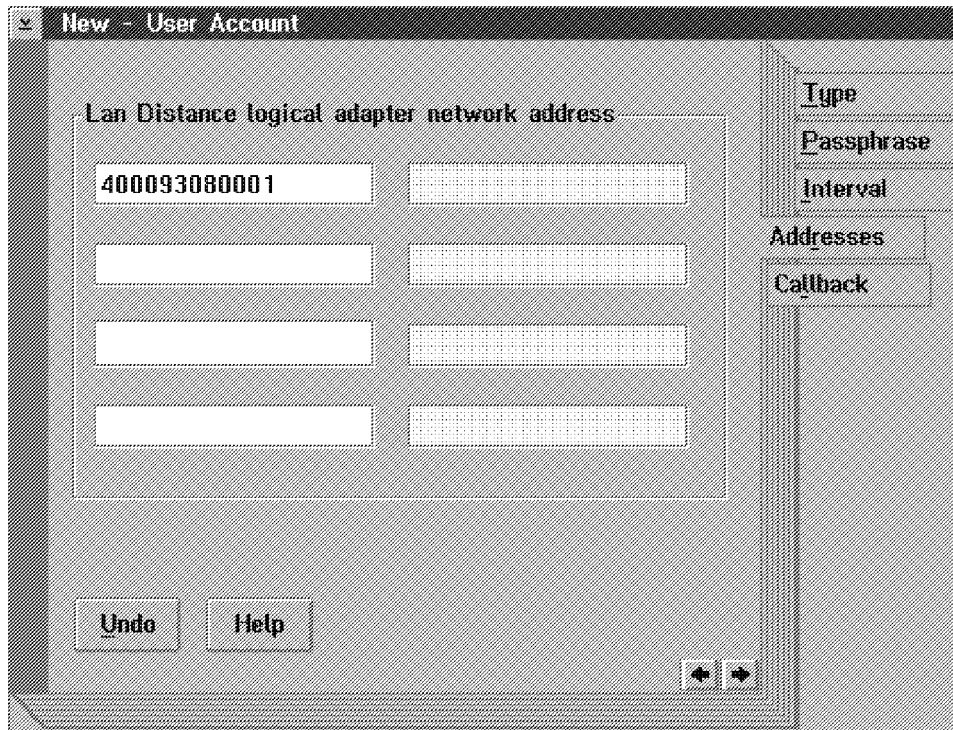


Figure 202. New - User Account Window (Addresses Section)

Figure 202 displays the logical adapter network addresses of the valid workstations for this user account. Use this tab to view or update these logical adapter network addresses.

If no logical adapter network addresses are displayed, the user can access the secure IBM LAN Distance workstation from any address.

We specified the adapter number 400093080001. That means the user can only log on from a workstation with that adapter number. If the user needs to be able to log on from different workstations, you can specify up to eight adapter numbers.

Note: The user must use one of the specified workstations to access this secure IBM LAN Distance workstation. When the user attempts to log on to this workstation, his actual logical adapter network address is verified against this list.

16. Specify your adapter numbers here if your user should be able to log on from one to eight different workstations.
17. Select the **Callback** tab from the New - User Account notebook.

The **Callback** tab of the User Account notebook that is now presented is used to manage callback options for this user ID.

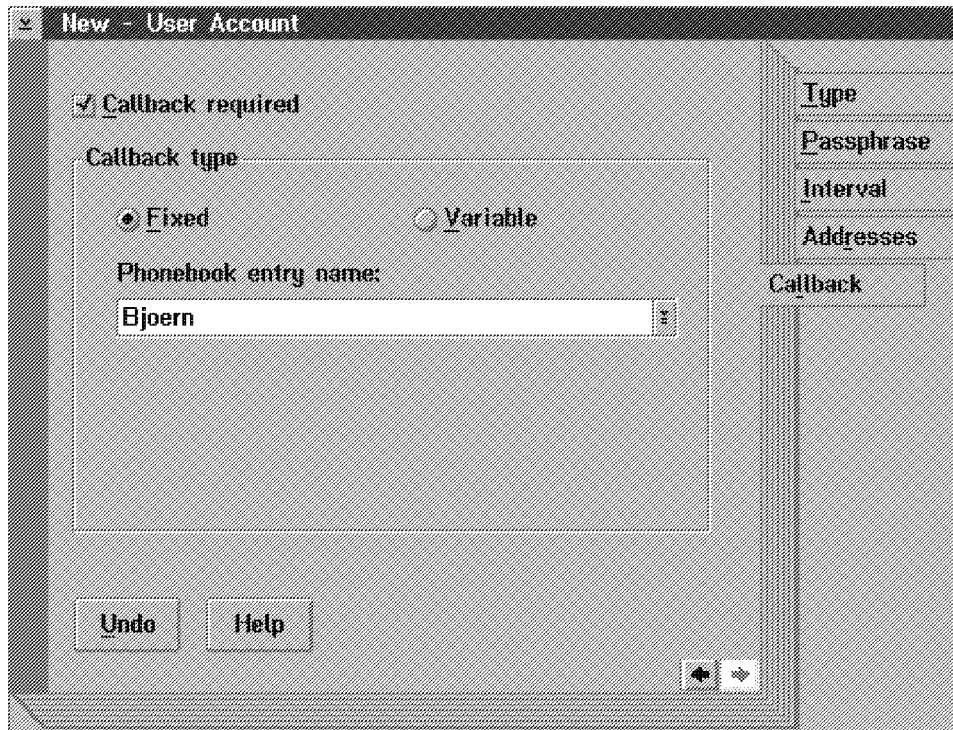


Figure 203. New - User Account window (Callback Section)

Figure 203 shows you the group of fields which display the type of callback that is performed for this user account.

18. Set the **Callback required** field to **On**.
19. Set the callback type to **Fixed**.

Fixed or Variable is used to specify the type of callback for this user account. Callback can be performed to either a fixed or variable location. If the dialing user's location does not change, then Fixed Callback should be selected. If the dialing user's location is subject to change, as is the case for a traveling employee dialing in from a customer location or a hotel, then Variable Callback should be selected.

Note: Fixed and Variable are available only if **Callback required** is selected.

20. Type in a **Phonebook entry name** in the **Callback type** section.

Note: If callback is required, you must specify a Phonebook entry name that corresponds to the dialing user. The Phonebook entry name must be the same as the User ID that you are currently creating. A Phonebook entry contains connectivity information that is needed in addition to a phone number. A Phonebook entry name for Fixed Callback must have a phone number, but a Phonebook entry name for Variable Callback does

not require a phone number. If a Phonebook entry for this User ID does not already exist, then you will need to go into the IBM LAN Distance Settings notebook and create one before this User ID will be useable. If you need further information on creating Phonebook entries, please refer to the IBM LAN Distance on-line Remote Guide.

21. Close the New - User Account window.

Defining the Policy Options

1. Select the **Policy** tab from the User Account Management notebook.

In Figure 204, the values shown in the window are the defaults.

For more information about these options refer to section “Security Policy Options” on page 347.



Figure 204. User Account Management Window (Policy Section)

2. Enter your own values.
3. Close the User Account Management window.

The User ID will be available immediately. It is not necessary to stop and restart IBM LAN Distance for the User ID to take effect.

Synchronizing Security on Multiple Workstations

In an environment where you have multiple OS/2 Warp Connect workstations configured with IBM LAN Distance security, it may be a requirement to have identical User ID's and passphrases defined at each. Synchronization of the user accounts can be achieved by copying the user account database from one of the remote workstations to all of the other workstations.

The user account database is contained in the single file:

`x:\WAL\WCBUSRF.ISF`

Note: This file is open when LAN Distance is started, so it can not be copied across a IBM LAN Distance connection unless you make a renamed copy at the workstation before LAN Distance is started. For example:

At Workstation A

Make sure IBM LAN Distance is not started.

Copy `x:\WAL\WCBUSRF.ISF` to `x:\WAL\WCBUSRF.TMP`

Start IBM LAN Distance

Make IBM LAN Distance connection to Workstation B

Using IBM Peer for OS/2 Version 1.0, copy `WCBUSRF.TMP` to Workstation B

At Workstation B

Stop IBM LAN Distance

Copy `WCBUSRF.TMP` to `x:\WAL\WCBUSRF.ISF`

Restart IBM LAN Distance

Workstation B will now have the same User ID's and passphrases defined as Workstation A.

Sharing a Modem with LAN Distance

Whenever IBM LAN Distance is loaded, even if the modem is not actually in use, (that is, there is no active connection to another workstation) then the COM port assigned to the modem is unavailable to other communication applications, such as the Internet Access Kit. However, if you close LAN Distance, then the COM port will be released and the Modem can then be used by other applications.

PCMCIA - Considerations when using IBM LAN Distance on PCMCIA Workstations.

Both the online IBM LAN Distance Remote Help and the *IBM LAN Distance Version 1.1 Configuration and Customization Guide* redbook refer to special configuration changes necessary to IBM LAN Distance to ensure that the Shuttle function will work properly. The changes include editing the PDFH.NIF file to ensure that the PCMCIA drivers (\$ICPMOS2.SYS, IBM2SS01.SYS and ICRMU02.SYS) maintain their order of loading.

Note

It is not necessary to make special configuration changes for PCMCIA workstations when installing OS/2 Warp Connect

This is because OS/2 Warp Version 3.0 has new PCMCIA support using Base device drivers (BASEDEV=) which are always loaded before normal device drivers.

IBM LAN Distance and MPTS

IBM LAN Distance Remote Version 1.11 does not support configuration of MPTS through the IBM LAN Distance Settings notebook. If you attempt to configure MPTS by selecting LAPS from the LAPS page of the Settings notebook the session will hang. The only way to exit from this is to close the Settings task from the Window List (Ctrl-Esc). MPTS can be configured from the MPTS icon on the Desktop.

Note

If you have closed the Settings from the Window list there will still be some IBM LAN Distance configuration files in the \WAL\TEMP directory. This may cause an error message when you start your system. Erase the files in the \WAL\TEMP directory.

Sample Configuration Files

The following configuration files are taken from a IBM LAN Distance remote workstation configured with NetBIOS, TCP/IP, IEEE 802.2 and IPX protocols.

```

:
LIBPATH=C:\MPTN\DLL;C:\IBMCOM\DLL;C:\MUGLIB\DLL;C:\IBMLAN\NETLIB;. . . .C:\TCPIP\DLL;C:\TCPIP\UM
C:\WAL\DLL;C:\NETWARE;C:\NETWARE\NLS\ENGLISH;L:\OS2;
SET PATH=C:\MPTN\BIN;C:\IBMCOM;C:\IBMLAN\NETPROG;C:\MUGLIB;C:\OS2;. . . .C:\TCPIP\BIN;C:\TCPIP\UM
C:\WAL;C:\NETWARE;L:\OS2;
SET DPATH=C:\IBMCOM;C:\IBMLAN\NETPROG;C:\IBMLAN;C:\MUGLIB;. . . .C:\WAL;C:\NETWARE;C:\NETWARE\NLS
C:\NETWARE\NLS\ENGLISH;L:\NLS;
:
:
:
DEVICE=C:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:C:\IBMCOM
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:C:\IBMCOM
:
:
:
DEVICE=C:\NETWARE\VIPX.SYS
DEVICE=C:\NETWARE\VSHELL.SYS GLOBAL
:
:
DEVICE=C:\OS2\BOOT\COM.SYS
DEVICE=C:\OS2\MDOS\VCOM.SYS
:
:
:
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NETWARE\LSL.SYS
RUN=C:\NETWARE\DDAEMON.EXE
DEVICE=C:\IBMCOM\PROTOCOL\ODI2NDI.OS2
REM -- ODI-Driver Files BEGIN --
REM -- ODI-Driver Files END --
DEVICE=C:\NETWARE\ROUTE.SYS
DEVICE=C:\NETWARE\IPX.SYS
rem DEVICE=C:\NETWARE\SPX.SYS
rem RUN=C:\NETWARE\SPDAEMON.EXE
rem DEVICE=C:\NETWARE\NMPIPE.SYS
rem DEVICE=C:\NETWARE\NPSEVER.SYS
rem RUN=C:\NETWARE\NPDAEMON.EXE
DEVICE=C:\NETWARE\NWREQ.SYS
IFS=C:\NETWARE\NWIFS.IFS
RUN=C:\NETWARE\NWDAEMON.EXE
DEVICE=C:\NETWARE\NETBIOS.SYS
RUN=C:\NETWARE\NBDAEMON.EXE
DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
CALL=C:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=C:\IBMCOM\LANMSGEX.EXE
SET ETC=C:\MPTN\ETC
DEVICE=C:\MPTN\PROTOCOL\SOCKETS.SYS
DEVICE=C:\MPTN\PROTOCOL\AFOS2.SYS
DEVICE=C:\MPTN\PROTOCOL\AFINET.SYS
DEVICE=C:\MPTN\PROTOCOL\IFNDIS.SYS
RUN=C:\MPTN\BIN\CNTRL.EXE

```

Figure 205 (Part 1 of 2). CONFIG.SYS from IBM LAN Distance Remote Workstation

```

CALL=C:\OS2\CMD.EXE /Q /C C:\MPTN\BIN\MPTSTART.CMD
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:C:\IBMLAN /N
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
RUN=C:\IBMLAN\NETPROG\LSDAEMON.EXE
DEVICE=C:\IBMLAN\NETPROG\VNETAPI.OS2
RUN=C:\IBMLAN\NETPROG\VNRMINIT.EXE
SET NWDBPATH=C:\IBMLAN\NETPROG
SET TMP=c:\tcpip\tmp
DEVICE=c:\tcpip\bin\vdostcp.vdd
DEVICE=c:\tcpip\bin\vdostcp.sys
RUN=c:\tcpip\bin\VDOSCTL.EXE
SET HOSTNAME=itso4
RUN=C:\IBMCOM\PROTOCOL\NETBIND.EXE
DEVICE=C:\OS2\LOG.SYS
RUN=C:\OS2\EPW.EXE
RUN=C:\OS2\SYSTEM\LOGDAEM.EXE
DEVICE=C:\IBMCOM\PROTOCOL\LANDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANDLLDD.OS2
RUN=C:\IBMCOM\PROTOCOL\LANDLL.EXE
DEVICE=C:\WAL\WCLVPCM.OS2
DEVICE=C:\IBMCOM\MEMMAN.OS2
DEVICE=C:\IBMCOM\VLAN.OS2
RUN=C:\IBMCOM\VLANINIT.EXE
DEVICE=C:\IBMCOM\MACS\MACFH.OS2
DEVICE=C:\IBMCOM\MACS\WCLCPMAC.OS2
DEVICE=C:\IBMCOM\MACS\PDFH.OS2

```

Figure 205 (Part 2 of 2). CONFIG.SYS from IBM LAN Distance Remote Workstation

```

[PROT_MAN]

    DRIVERNAME = PROTMAN$

[VLAN_KERNEL]

    DRIVERNAME = VLANKNL$
    CFGTYPE = "Locked"
    MODE = "LEARN_WFLOWS"
    LANTYPE = "802.5"
    MAXADDRESSES = 512

[COM1]

    DRIVERNAME = WCLCPMC$
    CFGTYPE = "LOCKED"
    PCMSUPPORT = "YES"
    MACTYPE = "802.5"
    CONN_TYPE = "SWITCHED"
    PORTNAME = "COM1"

[COM2]

    DriverName = WCLCPMC$
    CFGTYPE = "LOCKED"
    PCMSUPPORT = "yes"
    MACTYPE = "802.5"
    CONN_TYPE = "Switched"
    PCMCIA = "no"
    PORTNAME = "COM2"

[IBMLXCFG]

    landd_nif = landd.nif
    netbeui_nif = netbeui.nif
    odi2ndi_nif = odi2ndi.nif
    tcpip_nif = tcpip.nif
    PDFH_nif = PDFH.NIF

[NETBIOS]

    DriverName = netbios$
    ADAPTER0 = netbeui$,0

```

Figure 206 (Part 1 of 3). PROTOCOL.INI from IBM LAN Distance Remote Workstation

```
[landd_nif]

DriverName = LANDD$
Bindings = PDFH_nif
ETHERAND_TYPE = "I"
SYSTEM_KEY = 0x0
OPEN_OPTIONS = 0x2000
TRACE = 0x0
LINKS = 8
MAX_SAPS = 3
MAX_G_SAPS = 0
USERS = 3
TI_TICK_G1 = 255
T1_TICK_G1 = 15
T2_TICK_G1 = 3
TI_TICK_G2 = 255
T1_TICK_G2 = 25
T2_TICK_G2 = 10
IPACKETS = 250
UIPACKETS = 100
MAXTRANSMITS = 6
MINTRANSMITS = 2
TCBS = 64
GDTS = 30
ELEMENTS = 800
```

```
[netbeui_nif]

DriverName = netbeui$
Bindings = PDFH_nif
ETHERAND_TYPE = "I"
USEADDRREV = "YES"
OS2TRACEMASK = 0x0
SESSIONS = 48
NCBS = 125
NAMES = 27
SELECTORS = 10
USEMAXDATAGRAM = "NO"
ADAPTRATE = 1000
WINDOWERRORS = 0
MAXDATARCV = 4168
TI = 60000
T1 = 10000
T2 = 2000
MAXIN = 1
MAXOUT = 1
NETBIOSTIMEOUT = 500
NETBIOSRETRIES = 2
NAMECACHE = 1000
RNDOPTION = 0
PIGGYBACKACKS = 1
DATAGRAMPACKETS = 10
PACKETS = 350
```

Figure 206 (Part 2 of 3). PROTOCOL.INI from IBM LAN Distance Remote Workstation


```

LOOPPACKETS = 8
PIPELINE = 5
MAXTRANSMITS = 6
MINTRANSMITS = 2
DLCRETRIES = 10
FCPRIORITY = 5
NETFLAGS = 0x1000

[odi2ndi_nif]

DriverName = odi2ndi$
Bindings = PDFH_nif
NETADDRESS = "T10005A88B1C9"
TOKEN-RING = "yes"
TOKEN-RING_SNAP = "no"
ETHERNET_802.3 = "no"
ETHERNET_802.2 = "no"
ETHERNET_II = "no"
ETHERNET_SNAP = "no"
TRACE = 0x0

[tcpip_nif]

DriverName = TCPIP$
Bindings = PDFH_nif

[PDFH_nif]

DriverName = PDFH$
NETADDRESS = "t10005A88B1C9"

```

Figure 206 (Part 3 of 3). PROTOCOL.INI from IBM LAN Distance Remote Workstation

Removing and Reinstalling an Existing IBM LAN Distance Configuration

A utility is provided with the IBM LAN Distance code, LDREMOVE.EXE, which will remove all IBM LAN Distance files from your workstation, remove the IBM LAN Distance icon from your Desktop and, optionally, backup all necessary IBM LAN Distance configuration files to allow you to easily reinstall IBM LAN Distance and recreate your original configuration.

To remove IBM LAN Distance from your workstation, backing up your configuration files, use the following procedure:

- Make sure that your Workstation is in LAN configuration - use the shuttle facility if necessary.
- From an OS/2 command prompt, type LDREMOVE

- On the Remove LAN Distance panel, select **Archive Configuration files**, then select **Remove**

All the IBM LAN Distance code will now be removed from workstation, with the exception of the following files, which are stored in the WAL BACKUP subdirectory.

CONFIG.WAL	Copy of last Remote CONFIG.SYS
PROTOCOL.XXX	PROTOCOL.INI files used for switching LAN to Remote configurations
WCBUSRF.ISF	Security account database
WCLDIAL.CXD	Phonebook entries
WCLLOCAL.INI	Workstation-specific configuration file
WCLNET.INI	Modem configuration file

To restore the backed-up files:

- Reinstall IBM LAN Distance
- Without restarting IBM LAN Distance, and with the workstation in LAN mode, copy the contents of the WAL BACKUP directory into the WAL directory.
- Shuttle your workstation to remote mode, and reboot your workstation. When you now start LAN Distance it will have the same configuration as before it was removed from the workstation.

FFST/2 Device Driver Error

When you reboot your workstation after installing LAN Distance, the following warning message will be displayed:

```
The IBM OS/2 Virtual LAN Kernel could not attach to the FFST/2 device  
EPWDD.SYS.
```

The error is occurring because the EPWDD.SYS driver has not been installed but there is no need to be worried, as LAN Distance will function correctly anyway. The message can be removed by placing this device driver in your CONFIG.SYS file, as follows:

```
DEVICE=x:\OS2\EPWDD.SYS
```

Creating/Modifying a LAN Distance PIF File for an Uncertified Modem

A Product Information File (PIF) is used to initialize a modem. The PIF file contains all needed string information and configuration values for your modem.

To set up a modem, initialization strings are needed. A modem initialization string is an AT command string passed to the modem when IBM LAN Distance is first started. The initialization string is used to configure and optimize the modem for use with IBM LAN Distance. The PIF file has two parameters that are used to initialize the modem, `Initialization1` and `Initialization2`.

If you have a modem that is not supported, and you cannot get it to work using another supported modem type, it is usually because the initialization string is incompatible. There are a number of parameters that may need to be modified in a new modem PIF file. To help you, the CFMODEM utility is shipped with IBM LAN Distance.

The CFMODEM utility is a small application to modify and create PIF files. This graphical utility should help you to create the needed PIF files for unlisted modems.

To create and modify modem strings and IBM LAN Distance PIF files, you need technical knowledge of modems. Also you need to refer to your modem manual to find the correct commands.

The CFMODEM utility is normally installed from diskette 3 of the IBM LAN Distance diskettes. To install from the OS/2 Warp Connect CDROM 1, type the following command:

```
x:\cid\img\ldr\lo265r3\INSTAPPL x:\cid\img\ldr\lo265r3\  
y:
```

Where

`x:` is your CDROM drive (which may be a redirected drive across a LAN)

`y:` is the drive which contains the LAN Distance (WAL) directory.

The CFMODEM files are unpacked and copied to your WAL directory.

To develop a PIF file, start the CFMODEM utility from your desktop or, if you haven't added it to your desktop, from the command prompt. The utility will lead you through a series of panels, asking questions about the commands used by your modem. For further, more detailed information on using the CFMODEM utility, please refer to the *IBM LAN Distance Version 1.1*

Installation and Customization Guide or the IBM LAN Distance Advanced Guide.

Chapter 9. Multi-Protocol Transport Services (MPTS)

OS/2 Warp Connect contains a number of networking applications which can be used together in a variety of combinations to allow a workstation access to a wide range of network-based facilities. Typically these different network applications use different communication protocols (NetBIOS, TCP/IP and IPX). Multi-Protocol Transport Services / AnyNet (MPTS) is, perhaps, the key component of OS/2 Warp Connect, in that it makes possible the coexistence of these multiple protocols on the same workstation, and allows them to share one or more network adapters.

This chapter describes MPTS and its component parts, new features in this release of the product and some configuration examples.

Multi-Protocol Transport Services / AnyNet provides a comprehensive solution to interconnecting LANs. It supports LAN Adapters, protocols, and programming interfaces. It also provides a transport framework for accessing various protocols using the Socket API.

MPTS actually consists of two main components - LAN Adapter and Protocol Support (LAPS - version 2.60.5) and Socket/MPTS (version 2.0)

The LAPS component of MPTS provides adapter, protocol, and LAN Virtual Device Driver (VDD) support. The Socket/MPTS component provides a transport framework that lets applications written to the Socket interface communicate using any of the underlying protocols (TCP/IP, NetBIOS, or Local IPC). Figure Figure 207 on page 378 shows the main components of MPTS. The area bounded by the heavy broken line is the Sockets/MPTS component.

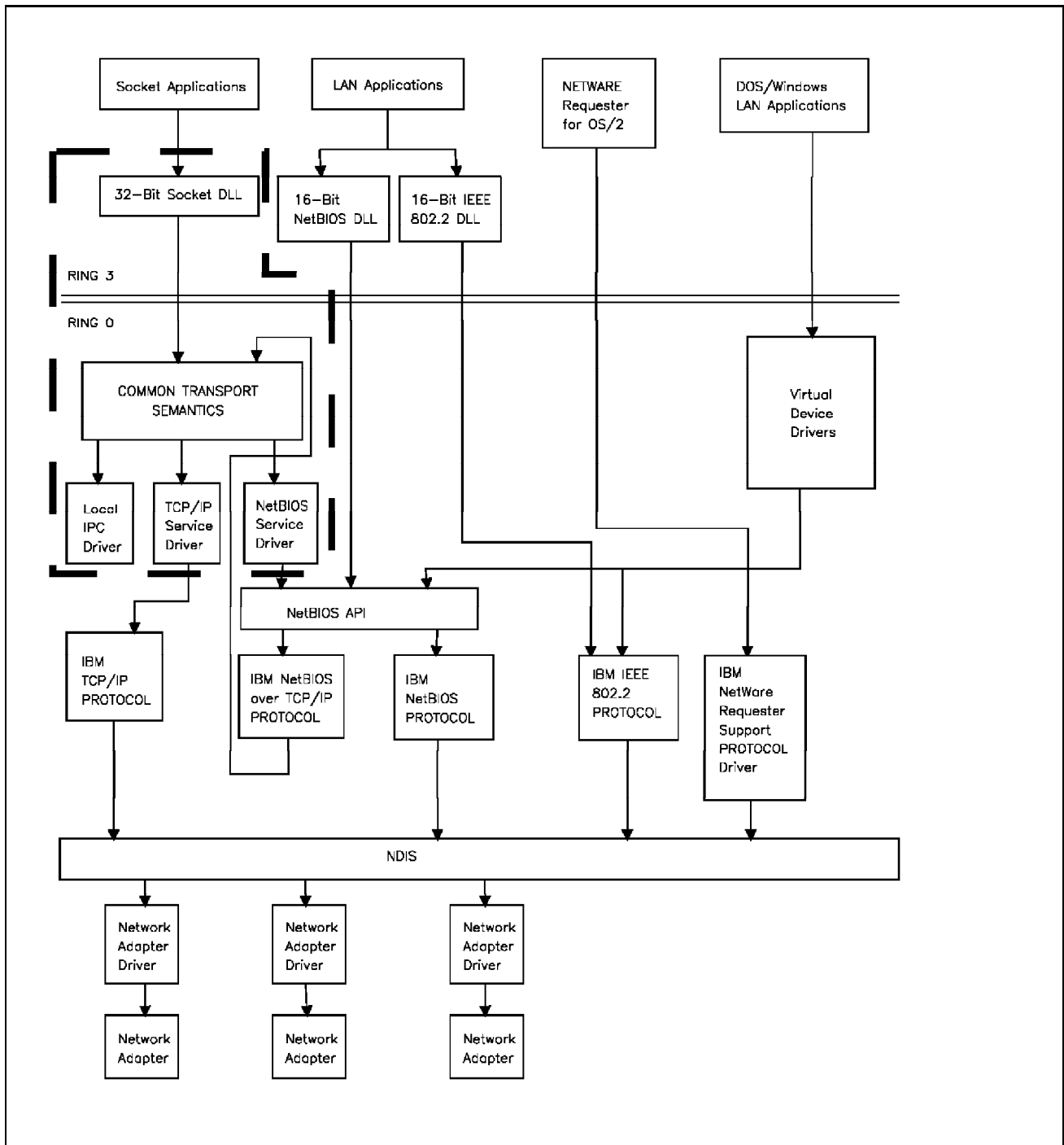


Figure 207. MPTS Components

MPTS - Enhancements and New Features

The version of MPTS supplied as part of OS/2 Warp Connect has enhancements over previous releases. The Sockets/MPTS part of the product has internal structural changes which mean that the product is now compatible with AnyNet/2. AnyNet/2 is an alternative implementation of the Sockets interface which enables further flexibility of Network applications and protocols - for example it allows you to run NetBIOS or TCP/IP applications over SNA. Use of AnyNet/2 in conjunction with the OS/2 Warp Connect would therefore allow you, for example, to have IBM Peer for OS/2 Version 1.0 workstations communicating with each other across an SNA network.

A number of new protocol and MAC drivers are now included with the product. These include a NetBIOS for IPX protocol, PRNANDIS.MAC, an NDIS driver that allows the parallel port of your workstation to function like a LAN adapter (see "Parallel Port ANDIS MAC driver" on page 426 for further details) and an NDIS driver for the IBM Wireless LAN Adapter.

LAN Adapter and Protocol Support

IBM's transport strategy is based on the Network Driver Interface Specification (NDIS) - a standard jointly developed by 3COM and Microsoft Corporation. NDIS allows different network protocols to operate over the same LAN interface at the same time.

NDIS is a standardized Medium Access Control (MAC) interface for network adapter drivers and protocol drivers. It has become a de facto industry standard, providing a common, open interface that enables different manufacturers of network adapters and LAN software developers to produce products which communicate with each other.

NDIS separates protocol handling from hardware manipulation by defining functions that protocol drivers and network adapter drivers must provide to each other.

NDIS defines:

- Specifications for network protocol drivers
- Specifications for network adapter drivers
- The interface between the above two layers
- A binding process to link these protocol and adapter drivers

A *network protocol driver* provides the communication between an application and a network adapter driver.

A *network adapter driver*, or MAC driver, provides the communication between a network adapter and a protocol. The main function of the network adapter driver is to support network packet reception and transmission.

Each driver has an upper and a lower boundary. The drivers are linked together to form a stack by binding the lower boundary of one driver to the upper boundary of another driver. The MAC driver at the bottom of the stack always has its lower boundary connected to the physical layer - the network adapter hardware.

The NDIS specification defines the binding process of the drivers. Three components are used to form and manage the protocol stack from individual drivers. These are:

PROTOCOL.INI

An ASCII file that defines the protocol drivers and adapter drivers in use and their binding information

PROTMAN.OS2

A Protocol Manager

NETBIND.EXE

Initiates the final binding process

The LAN Adapter and Protocol Support component of MPTS contains the above three files, the protocol and adapter drivers, and a utility for easy installation and configuration of the required drivers. LAPS also contains *Virtual Device Drivers* which make the installed protocols available to DOS and Windows sessions under OS/2, without the need for specific DOS protocol drivers.

Figure 208 on page 381 provides an illustration of an NDIS protocol stack in comparison to both the OSI reference model and the IEEE model.

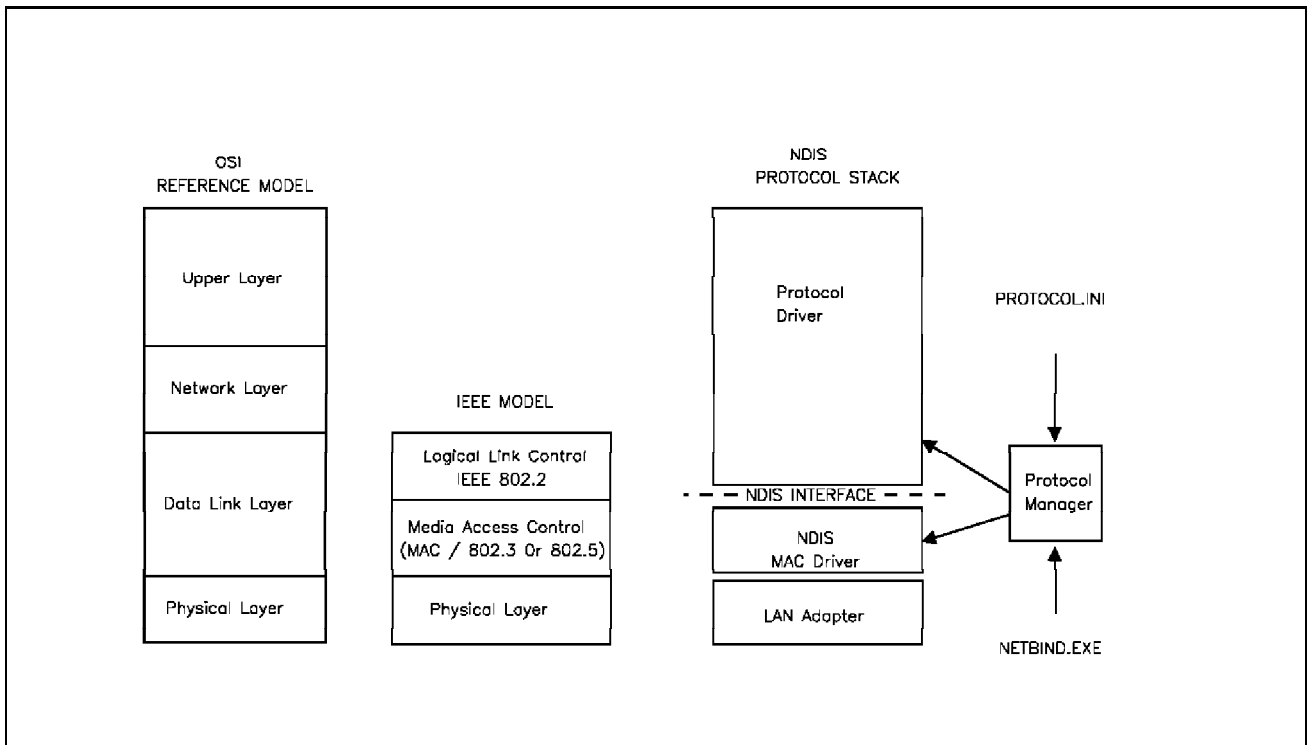


Figure 208. NDIS and OSI Comparison

Multiple Protocol Support

NDIS allows multiple protocols to be bound to a single MAC driver - that is, to share a network adapter. Figure 209 on page 382 shows the NDIS protocol stacks when NetBIOS (Peer or LAN Requester), IEEE 802.2 and TCP/IP are loaded together. In this example, two LAN adapters are in use - NetBIOS and IEEE802.2 are bound to one of the adapters and the other adapter is dedicated to the TCP/IP protocol (although there is no reason why all three protocols could not have been bound to both adapters). The configuration information defining which protocol(s) is bound to which adapter(s) is contained in the PROTOCOL.INI file.

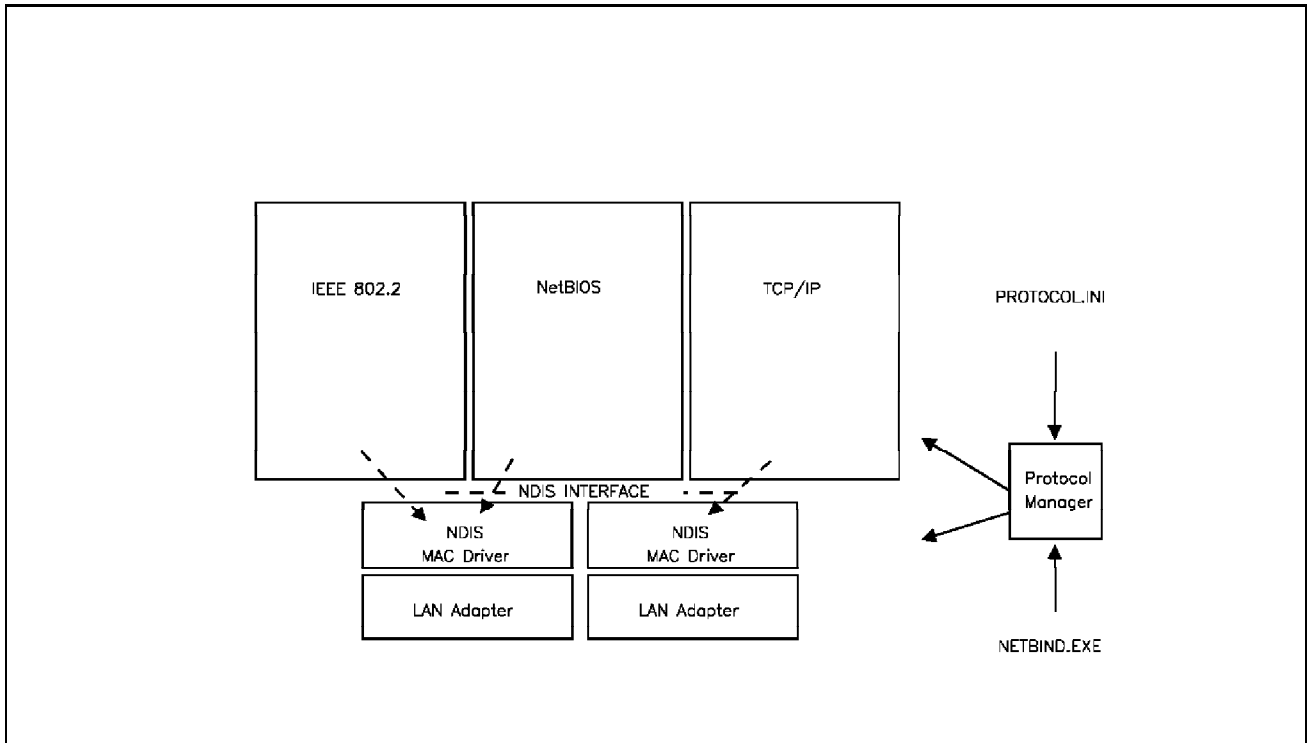


Figure 209. NDIS - Multiple Protocols

PROTOCOL.INI

PROTOCOL.INI contains the NDIS configuration information for network adapter drivers and protocol drivers for a workstation. PROTOCOL.INI is an ASCII file that can be edited manually, but this is generally not recommended. We recommend that you always use the LAPS configuration utility to ensure the creation of valid PROTOCOL.INI and CONFIG.SYS files. To use the LAN adapters and protocols configuration utility, either, click on the MPTS icon on the Desktop, or type the following command at the command prompt, assuming c: is the drive where MPTS is installed:

```
c:\ibmcom\mpts
```

Then select Configure, so it will bring up the panel shown in Figure 210 on page 383.

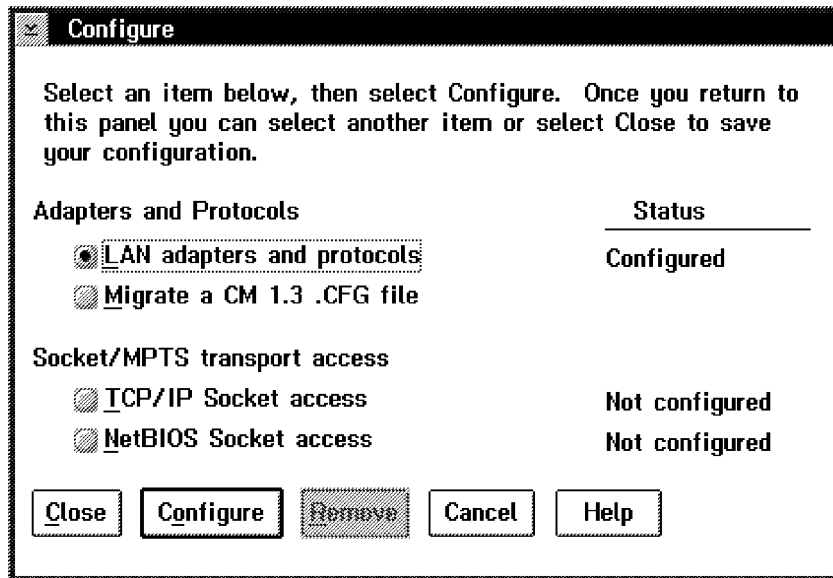


Figure 210. MPTS - Configure Options

Select LAN adapters and protocols and choose Configure to bring up the LAPS Configuration window. Use this configuration panel to select the LAN adapter(s) installed on the workstation and the protocols installed on them. Figure 211 on page 384 shows a Token-Ring and an Ethernet adapter installed, each configured with the NetBIOS protocol.

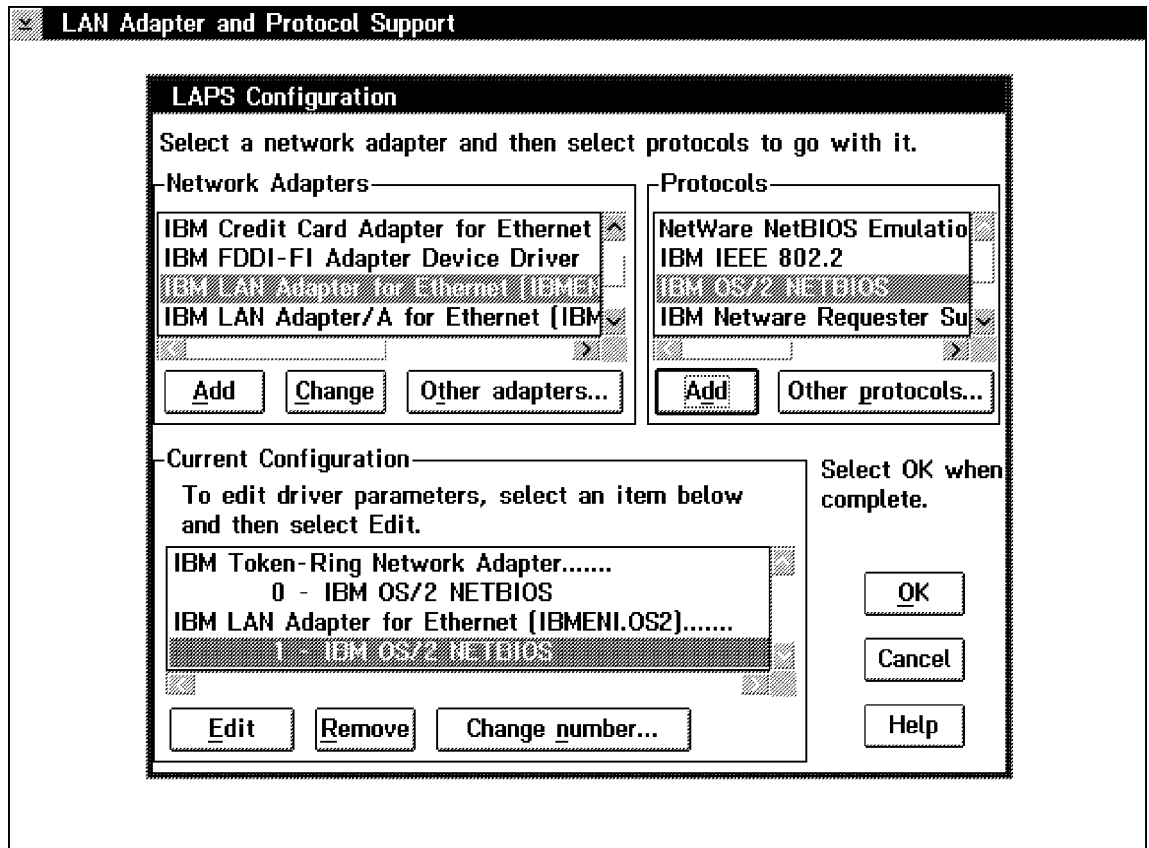


Figure 211. LAPS Configuration

PROTOCOL.INI consists of four sections:

- Protocol Manager
- Configuration Section
- Protocol Drivers
- MAC (network adapter) drivers

All these sections have the structure:

```
[module name]
  parameter=value
```

The following is an example of a PROTOCOL.INI file, configured with both NetBEUI and TCP/IP protocol stacks (as for Figure 209 on page 382). The first entry is the protocol manager, which is the driver that controls the binding process.

```
[PROT_MAN]
```

```
DRIVERNAME = PROTMAN$
```

The configuration section defines which protocols are used, and which type of adapters are configured. In the following example, `netbeui_nif` and `tcpip_nif` are the protocol drivers, and `IBMTOK_nif` is the adapter configuration (in this case an IBM Token-Ring adapter).

```
[IBMLXCFG]
```

```
netbeui_nif = netbeui.nif
tcpip_nif = tcpip.nif
IBMTOK_nif = IBMTOK.NIF
```

The `Bindings=` parameter under the various protocol drivers specifies the module name of the MAC driver with which the protocol driver will bind to form a protocol stack or stacks. In this example, NetBIOS, the NetBIOS API is using the NetBEUI protocol driver, which itself is bound to the token-ring MAC driver. TCP/IP is also bound to the Token-Ring card driver.

```
[NETBIOS]
```

```
DriverName = netbios$
ADAPTER0 = netbeui$,0
```

```
[netbeui_nif]
```

```
DriverName = netbeui$
Bindings = IBMTOK_nif
ETHERAND_TYPE = "I"
USEADDRREV = "YES"
OS2TRACEMASK = 0x0
SESSIONS = 130
NCBS = 225
NAMES = 21
SELECTORS = 15
USEMAXDATAGRAM = "NO"
ADAPTRATE = 1000
WINDOWERRORS = 0
MAXDATARCV = 4168
TI = 30000
T1 = 1000
T2 = 200
MAXIN = 1
MAXOUT = 1
NETBIOSTIMEOUT = 500
```

```
NETBIOSRETRIES = 2
NAMECACHE = 1000
RNDOPTION = 0
PIGGYBACKACKS = 1
DATAGRAMPACKETS = 10
PACKETS = 350
LOOPACKETS = 8
PIPELINE = 5
MAXTRANSMITS = 6
MINTRANSMITS = 2
DLCRETRIES = 10
FCPRIORITY = 5
NETFLAGS = 0x0
```

```
[tcpip_nif]
```

```
DriverName = TCPIP$
Bindings = IBMTOK_nif
```

```
[IBMTOK_nif]
```

```
DriverName = IBMTOK$
MAXTRANSMITS = 6
RECVBUFS = 2
RECVBUFSIZE = 256
XMITBUFS = 1
```

NDIS NETBIND Process

When a workstation is initialized, the following process takes place:

1. The Protocol Manager is the first NDIS related driver to be initialized during the CONFIG.SYS process. During initialization, the Protocol Manager reads the PROTOCOL.INI file.
2. The information in the PROTOCOL.INI is parsed into an image table that is accessible to other NDIS drivers.
3. As CONFIG.SYS processing continues, other drivers are loaded. As each is initialized, the related information in the image table is read. The NDIS driver then registers with the Protocol Manager.

After all drivers and protocols are processed, the Protocol Manager has a list of active NDIS drivers and their desired bindings.

4. A NETBIND is issued, and the desired bindings take place.

NetWare Client for OS/2 Version 2.11

Novell and Apple have jointly developed their own solution for multi-protocol networked environments - The Open Data-Link Interface (ODI). The ODI may be loosely equated to the function provide by the NDIS specification.

Figure 212 illustrates ODI in relation to the OSI Model, and the four main components of ODI. These are:

- Network Protocol Drivers - (similar to NDIS protocol drivers)
- Link Support Layer (LSL) - (similar in some respects to the NDIS interface)
- Multiple Link Interface Driver (MLID) - (similar to NDIS MAC driver)
- Control File - NET.CFG

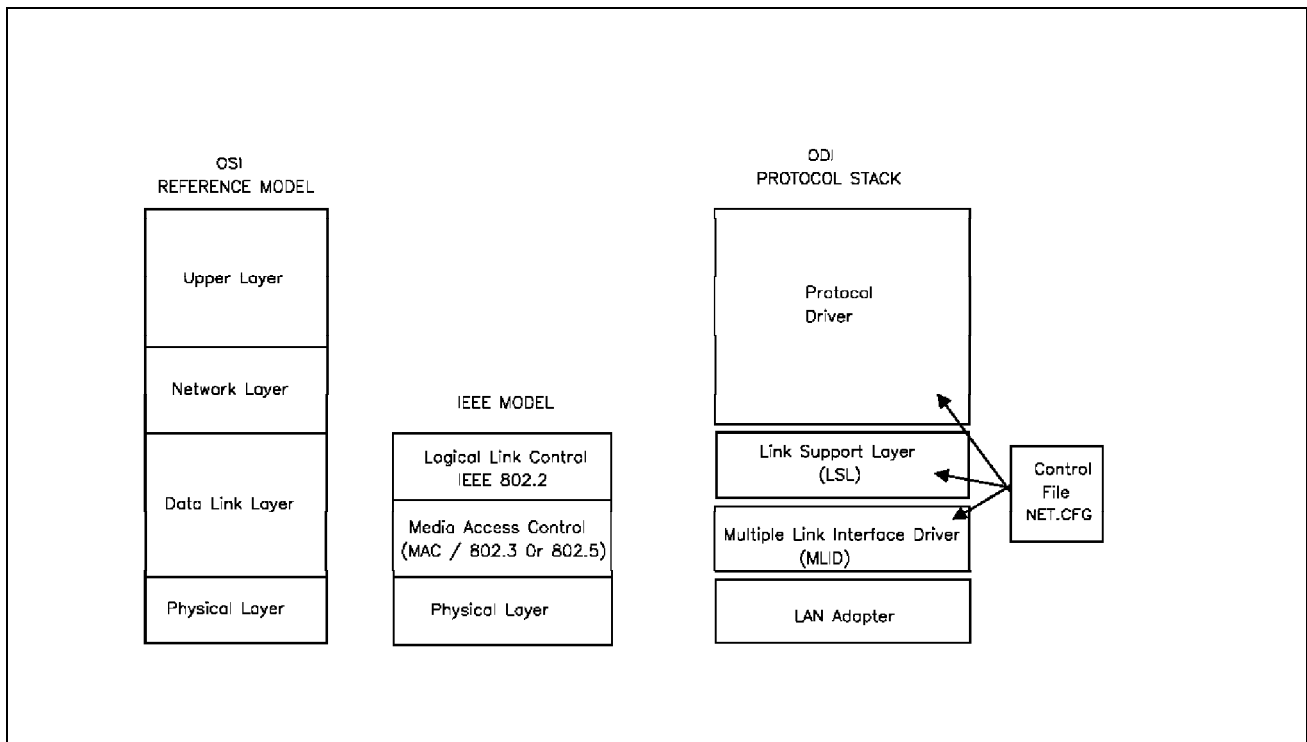


Figure 212. ODI Stack

By default, the NetWare Client for OS/2 Version 2.11 would normally run on an ODI stack. The normal NetWare protocol driver is IPX, for which there is no NDIS protocol driver available. However, it is not possible to have both an NDIS MAC driver and an ODI MLID loaded simultaneously for the same adapter. So, it is not possible, for example, to run the NetWare Client for

OS/2 Version 2.11 on a full ODI stack and the IBM Peer for OS/2 Version 1.0, on an NDIS stack at the same time.

IPX over NDIS

To run the NetWare Client for OS/2 Version 2.11 over the NDIS interface, IBM has developed a special driver: ODI2NDI (or ODI to NDIS). The ODI2NDI driver may be loaded from the LAPS configuration panel like any protocol driver. ODI2NDI provides an interface to the ODI stack, so that the NetWare protocol drivers are able to use the NDIS interface and to coexist with NDIS protocol drivers. Figure 213 shows the protocol stacks in use when the NetWare Client for OS/2 Version 2.11 is coexisting with the IBM LAN requester. Note that the ODI2NDI driver, which appears to the NDIS interface as a protocol driver, appears to the ODI stack as an adapter driver (MLID).

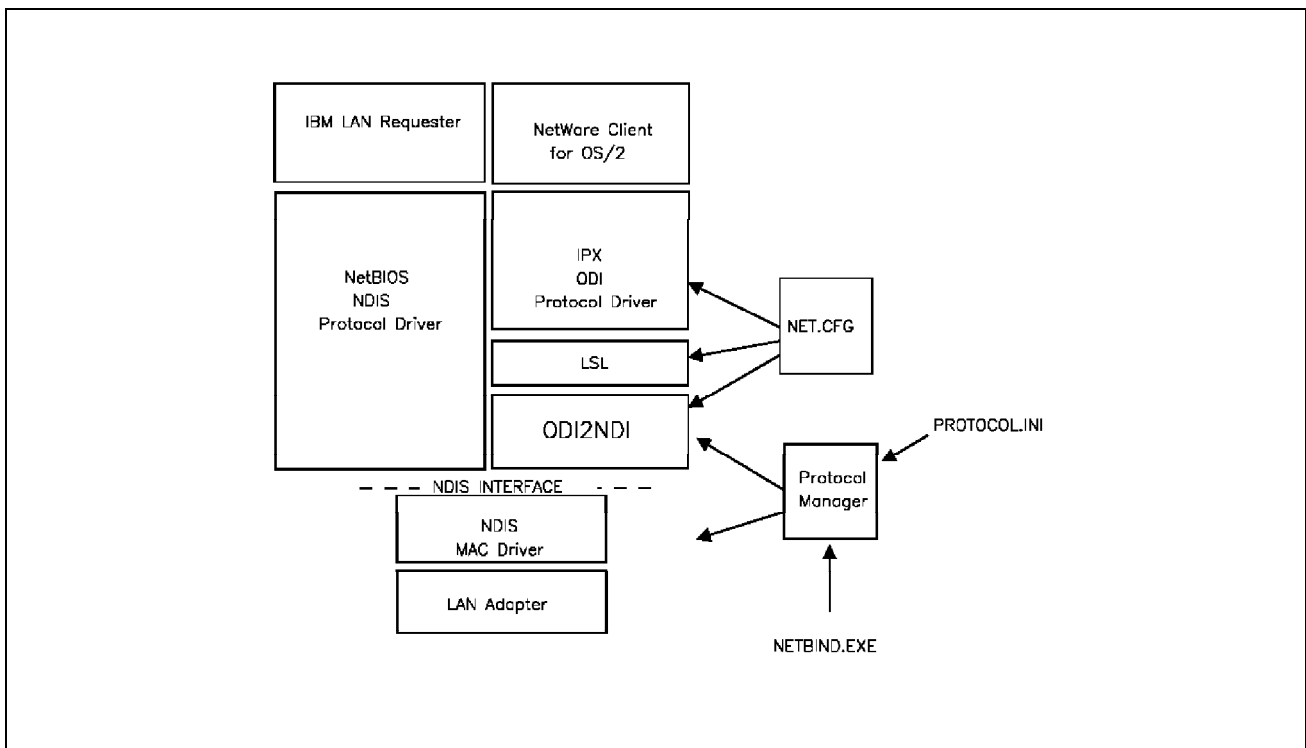


Figure 213. NetWare Client for OS/2 Version 2.11 in a Multiprotocol environment

Installing the NetWare Client for OS/2 Version 2.11

When installing the NetWare Client for OS/2 Version 2.11 as part of the OS/2 Warp Connect installation, the NetWare Client for OS/2 Version 2.11 will always need to coexist with an application which uses an NDIS protocol stack. (Unless you are doing an Easy Install and the NetWare Client for OS/2 Version 2.11 is the ONLY LAN application that you are installing). Because of this, the OS/2 Warp Connect installation will automatically install and configure the ODI2NDI driver for you. Figure 214 on page 390 and Figure 215 on page 391 show configuration files from a workstation with both the OS/2 LAN Requester and NetWare Client for OS/2 Version 2.11 installed.

```

:
:
LIBPATH=C:\...C:\IBMCOM\DLL;C:\IBMLAN\NETLIB;C:\MUGLIB\DLL;...C:\NETWARE;
C:\NETWARE\NLS\ENGLISH;L:\OS2;
SET PATH=C:\IBMCOM;C:\IBMLAN\NETPROG;C:\MUGLIB;.....;C:\NETWARE;L:\OS2;
SET DPATH=C:\IBMCOM;C:\IBMLAN\NETPROG;C:\IBMLAN;C:\MUGLIB;...;C:\NETWARE;
C:\NETWARE\NLS\ENGLISH;L:\NLS;
:
DEVICE=C:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:c:\IBMCOM
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:c:\IBMCOM
:
DEVICE=C:\NETWARE\VIPX.SYS
DEVICE=C:\NETWARE\VSHELL.SYS GLOBAL
:
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NETWARE\LSL.SYS
RUN=C:\NETWARE\DDAEMON.EXE
DEVICE=C:\IBMCOM\PROTOCOL\ODI2NDI.OS2
REM -- ODI-Driver Files BEGIN --
REM DEVICE=C:\NETWARE\TOKEN.SYS
REM -- ODI-Driver Files END --
DEVICE=C:\NETWARE\ROUTE.SYS
DEVICE=C:\NETWARE\IPX.SYS
DEVICE=C:\NETWARE\SPX.SYS
RUN=C:\NETWARE\SPDAEMON.EXE
rem DEVICE=C:\NETWARE\NMPIPE.SYS
rem DEVICE=C:\NETWARE\NPSEVER.SYS
rem RUN=C:\NETWARE\NPDAEMON.EXE
DEVICE=C:\NETWARE\NWREQ.SYS
IFS=C:\NETWARE\NWIFS.IFS
RUN=C:\NETWARE\NWDAEMON.EXE
rem DEVICE=C:\NETWARE\NETBIOS.SYS
rem RUN=C:\NETWARE\NBDAEMON.EXE
DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
CALL=C:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=C:\IBMCOM\LANMSGEX.EXE
:
:
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:c:\IBMLAN /N
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
RUN=C:\IBMLAN\NETPROG\LSDAEMON.EXE
DEVICE=C:\IBMLAN\NETPROG\VNETAPI.OS2
RUN=C:\IBMLAN\NETPROG\VNRMINIT.EXE
SET NWDBPATH=C:\IBMLAN\NETPROG
:
:
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2

```

Figure 214. ODI2NDI Configuration - CONFIG.SYS (Extract)

```

[PROT_MAN]

    DRIVERNAME = PROTMAN$

[IBMLXCFG]

    NETBEUI_NIF = NETBEUI.NIF
    IBMTOK_NIF = IBMTOK.NIF
    ODI2NDI_NIF = ODI2NDI.NIF

[NETBIOS]

    DriverName = netbios$
    ADAPTER0 = netbeui$,0

[NETBEUI_NIF]

    BINDINGS = IBMTOK_NIF
    DriverName = netbeui$

[ODI2NDI_NIF]

    NETADDRESS = "10005A88B1C9"
    BINDINGS = IBMTOK_NIF
    DriverName = odi2ndi$

[IBMTOK_NIF]

    DriverName = IBMTOK$

```

Figure 215. ODI2NDI Configuration - PROTOCOL.INI

Note: Generally, when configuring the ODI2NDI driver (from diskettes) you must explicitly enter the adapter address as a parameter, or the driver will fail at boot up time. When installing the NetWare Client for OS/2 Version 2.11 from the OS/2 Warp Connect CD-ROM, the adapter address is entered automatically.

Using the OS/2 Warp Connect with Multiple Protocols

Both the IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server 4.0 Requester are NetBIOS applications which would normally be configured, using MPTS, to use the NetBIOS protocol stack. Native NetBIOS, however, has certain characteristics which limit its use in certain communications environments:

- The NetBIOS protocol can only be used on a LAN.
- The NetBIOS protocol cannot be routed.

- The NetBIOS protocol uses single route broadcasts to establish connections.

One solution to overcome these limitations can be found in RFC 1001 and RFC 1002. They describe the standard to implement the IBM NetBIOS services on top of the TCP and UDP protocol layers. The LAN Adapter Protocol Support of MPTS provides a TCP/IP protocol stack as well as the new TCPBEUI protocol, which is a unique implementation of NetBIOS over TCP/IP. These two components were not provided with previous versions of LAPS. So, even if you have not installed TCP/IP on the OS/2 Warp Connect, it is still possible to run NetBIOS over TCP/IP

Another solution is to use the NetBIOS over IPX protocol driver.

The capability of running these NetBIOS applications over routable protocols offers new flexibility when designing IBM Peer for OS/2 Version 1.0 and OS/2 LAN Server 4.0 Requester networks. Peer workstations, LAN requesters and Servers can be on remote LAN segments connected by routers such as the IBM6611 router. This also means that IBM Peer for OS/2 Version 1.0 workstations can be introduced into existing TCP/IP or IPX networks, without introducing an additional network protocol (NetBIOS)

NetBIOS over TCP/IP

Here we describe NetBIOS over TCP/IP with the introduction and the implementation on the OS/2 Warp Connect.

TCP/IP Protocol and RFC 1001/1002

TCP/IP was developed under sponsorship of the Defense Advanced Research Projects Agency (DARPA). It is widely used and its specification is in the public domain. TCP/IP is a general networking protocol, and may be used in any kind of network (for example, Ethernet, token-ring, broadcast networks and dedicated serial lines).

While TCP/IP is generally considered to be a transport layer protocol, it is composed of several other protocol layers.

- The Internet Protocol (IP) is a general protocol which corresponds roughly to the network layer of the ISO reference model. The IP defines the way nodes are addressed. All nodes in the network have an IP address, which consists of a network number and a station number.

- TCP is a transport layer, containing several modes of service (for example, connection-based virtual circuits and connectionless datagrams). A general view can be found in Figure 216 on page 393.

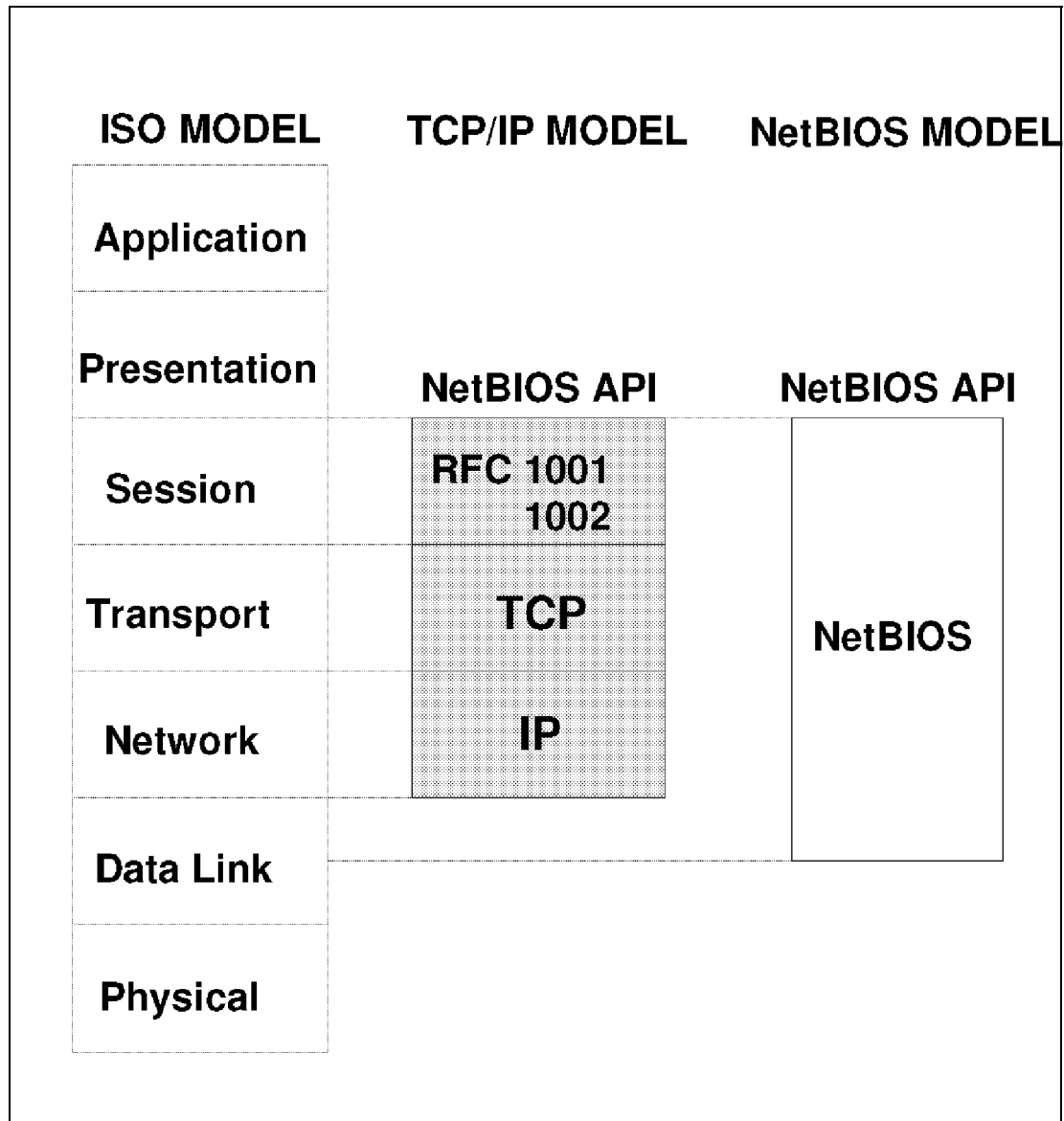


Figure 216. Network Protocol Layers Diagram

The TCP/IP development community designs and publishes new protocol specifications by means of a multi-step process. Part of the process is the preliminary publication of the proposed standard in a form called *Request for Comment*. Once the standard has been accepted, it is still known by its RFC number.

The RFCs number 1001 and 1002 are specifications which define the relationship between TCP/IP and NetBIOS. They defined a protocol for use by TCP/IP clients wanting to support a NetBIOS communication layer.

There are several defined classes of NetBIOS over TCP/IP implementations specified by the RFCs. The simplest, and the one most widely implemented, is the Broadcast Node (B-node) implementation. This covers TCP/IP implemented environments which support broadcast and Ethernet in particular. The point-to-point node (P-node) implementation operates in environments where there are only point-to-point connections. The mixed node (M-node) implementations operates in a mixed environment.

NetBIOS over TCP/IP (TCPBEUI)

NetBIOS over TCP/IP (TCPBEUI) provides a valuable functional enhancement to the OS/2 Warp Connect product by enabling a IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester workstation to be geographically isolated from other IBM Peer for OS/2 Version 1.0 workstations or OS/2 LAN Servers and yet still communicate with them transparently.

Note

Before the release of MPTS., it was possible to implement a NetBIOS application, such as OS/2 LAN Server 3.0 over TCP/IP by installing IBM TCP/IP for OS/2 Version 2.0, and an additional product, IBM NetBIOS 2.0 for TCP/IP, (also an implementation of RFC 1001/1002 NetBIOS). However, this older implementation was inefficient because of transitions through the code paths between the adapter drivers at kernel level (ring 0) and the application level (ring 3) IBM NetBIOS 2.0 for TCP/IP implementation.

TCPBEUI is a high performance, ring 0, implementation of NetBIOS for TCP/IP. MPTS also provides the TCP/IP protocol stack and the sockets interface necessary to configure NetBIOS over TCP/IP so there is no need to install the IBM TCP/IP for OS/2 Version 2.0 component of OS/2 Warp Connect, (unless you wish to use the TCP/IP applications which are provided with this product).

TCPBEUI provides the LM10 protocol driver interface. It is the same LM10 interface also provided by NetBEUI. Figure 218 on page 397 shows this interface. TCPBEUI maps NetBIOS API calls into the TCP/IP protocol. NetBIOS over TCP/IP contains enhancements over the RFC 1001/1002 standards which improve system performance by decreasing broadcast storms, and expanding communications over routers and bridges. These

enhancements, described in “How to Reduce Broadcast Frames using TCPBEUI” on page 404, are transparent to NetBIOS applications and do not interfere with other B-node implementations that lack similar functions.

TCPBEUI does *not* use encapsulation, but rather builds RFC 1001/1002 packets and sends them out via UDP and TCP. For example, once a NetBIOS session has been established, TCPBEUI will use sockets send commands over a TCP connection to send NetBIOS session data. TCPBEUI builds a 4-byte session header that precedes the actual user data. Thus, a NetBIOS Chain Send of 128KB would have an overhead of only 4 bytes.

TCPBEUI allows peer-to-peer communication over the TCP/IP network with other computers which have compatible services. Figure 217 on page 396 gives an overview of the relationship between the NetBIOS, NetBIOS over TCP/IP and TCP/IP protocol stacks.

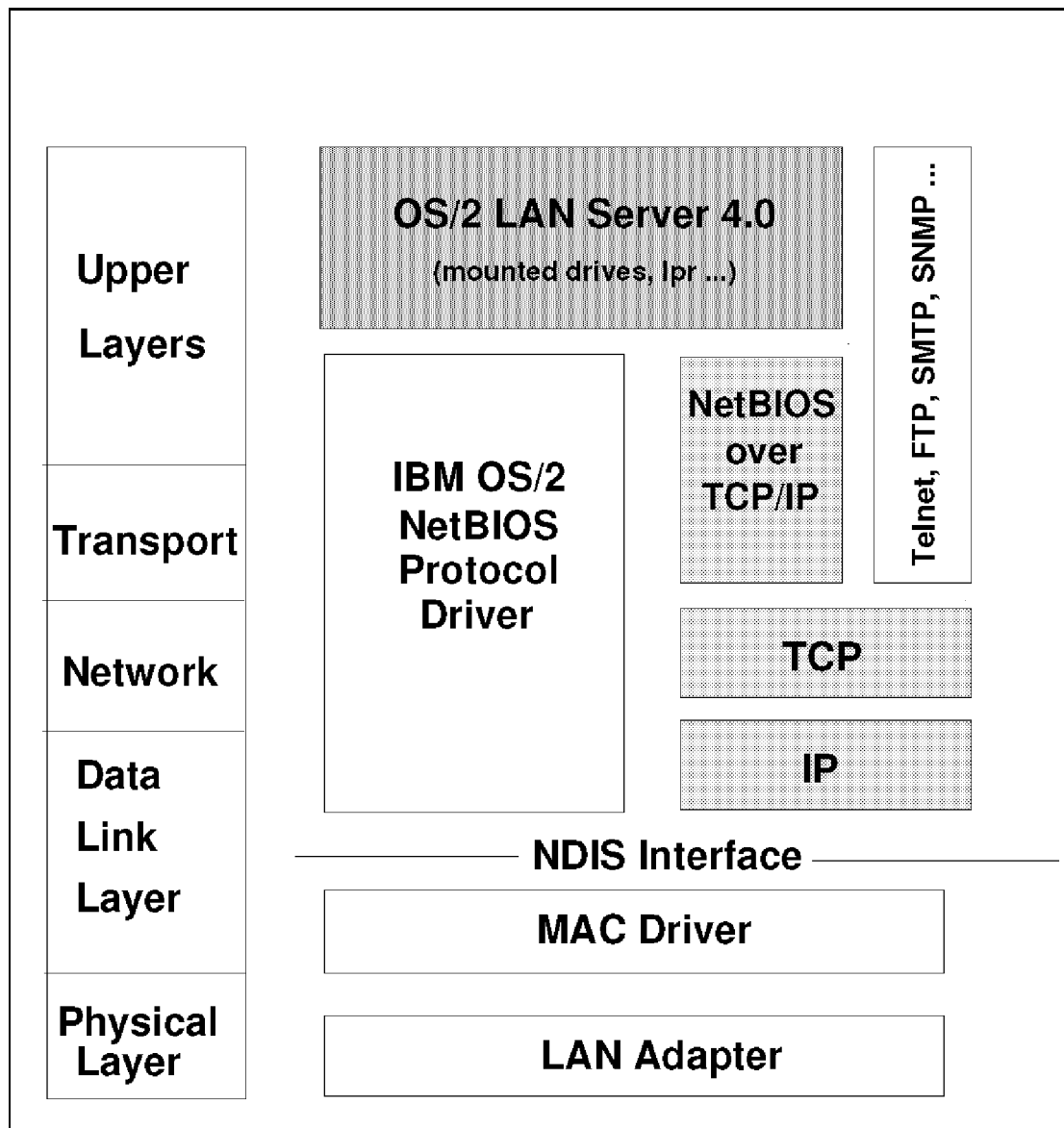


Figure 217. NetBIOS over TCP/IP General View

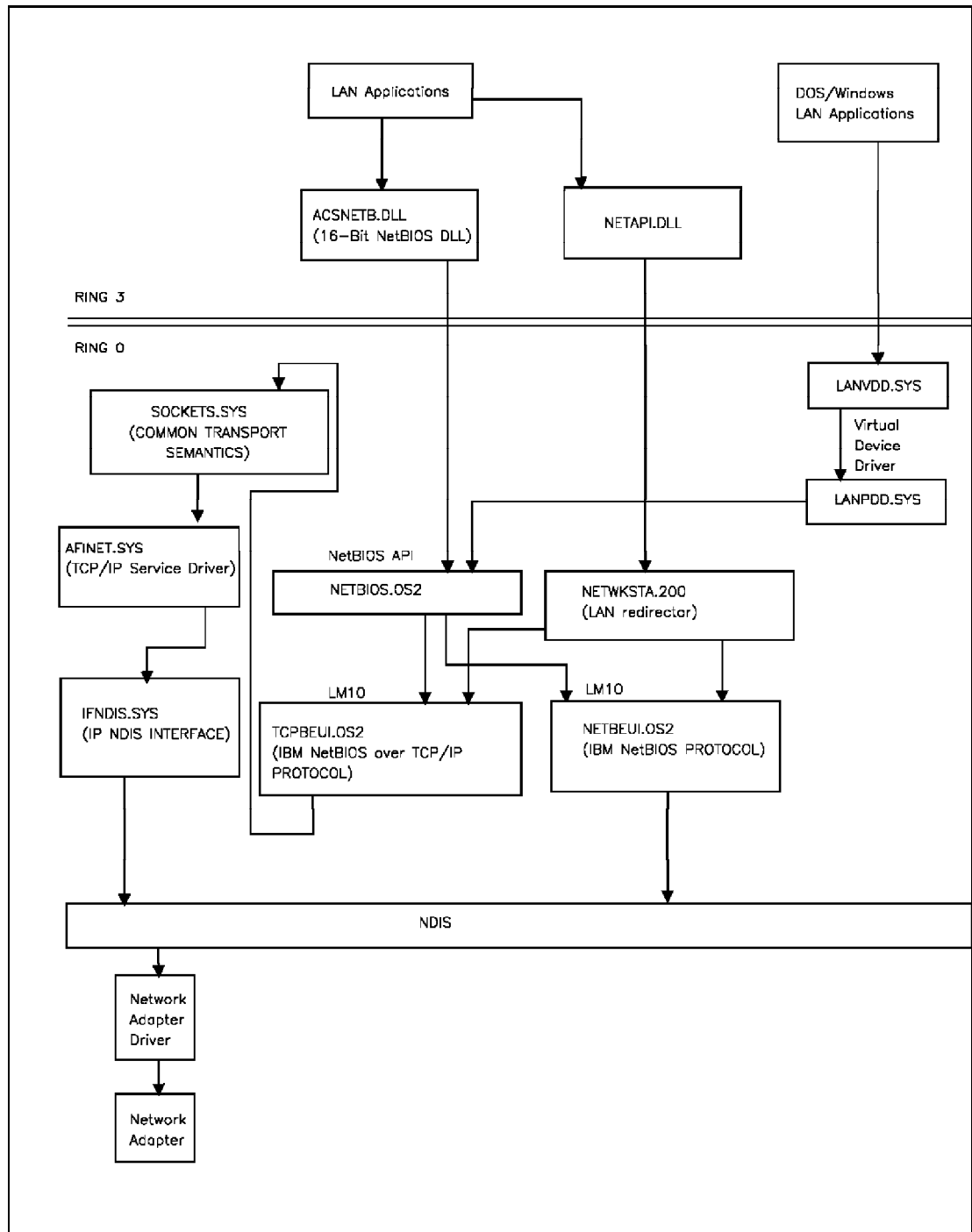


Figure 218. NetBIOS over TCP/IP Structure

Figure 218 gives a more detailed view of NetBIOS configured to use both NetBEUI and TCPBEUI protocol stacks. ACSNETB.DLL provides a ring 3 NetBIOS API for application programs. Ring 3 NetBIOS commands are sent to NETBIOS.OS2 for processing. NETBIOS.OS2 provides a ring 0 NetBIOS

API for other device drivers to use and also binds to one or more LM10 (LAN Manager 1.0) protocol drivers.

NETWKSTA.200, the LAN redirector component both IBM Peer for OS/2 Version 1.0 and OS/2 LAN Requester also uses the LM10 interface directly and in this example is using both TCPBEUI and NetBEUI.

Support for NetBIOS over TCP/IP can easily be added to the existing NetBIOS structure since NETBIOS.OS2 supports one or more LM10 protocol drivers. It is provided by having NETBIOS.OS2 bind to TCPBEUI.OS2. To enable NETWKSTA.200 to use TCPBEUI, there must be a NETx line in the IBMLAN.INI file configured appropriately (see Figure 223 on page 404)

Finally, data transfer is handled by a MAC device driver, for example the IBMTOK.OS2 device driver.

The Multi-Protocol Transport Services / AnyNet (MPTS) shipped with OS/2 Warp Connect provides the capability of configuring LAN Requester (or IBM Peer for OS/2 Version 1.0) workstations with both NetBEUI and TCPBEUI on the same network interface card. This dual protocol stack configuration will allow local sessions to continue running with NetBEUI performance while also providing Wide Area Network connectivity with NetBIOS over TCP/IP.

TCPBEUI and IBM TCP/IP for OS/2 Version 3.0 Coexistence

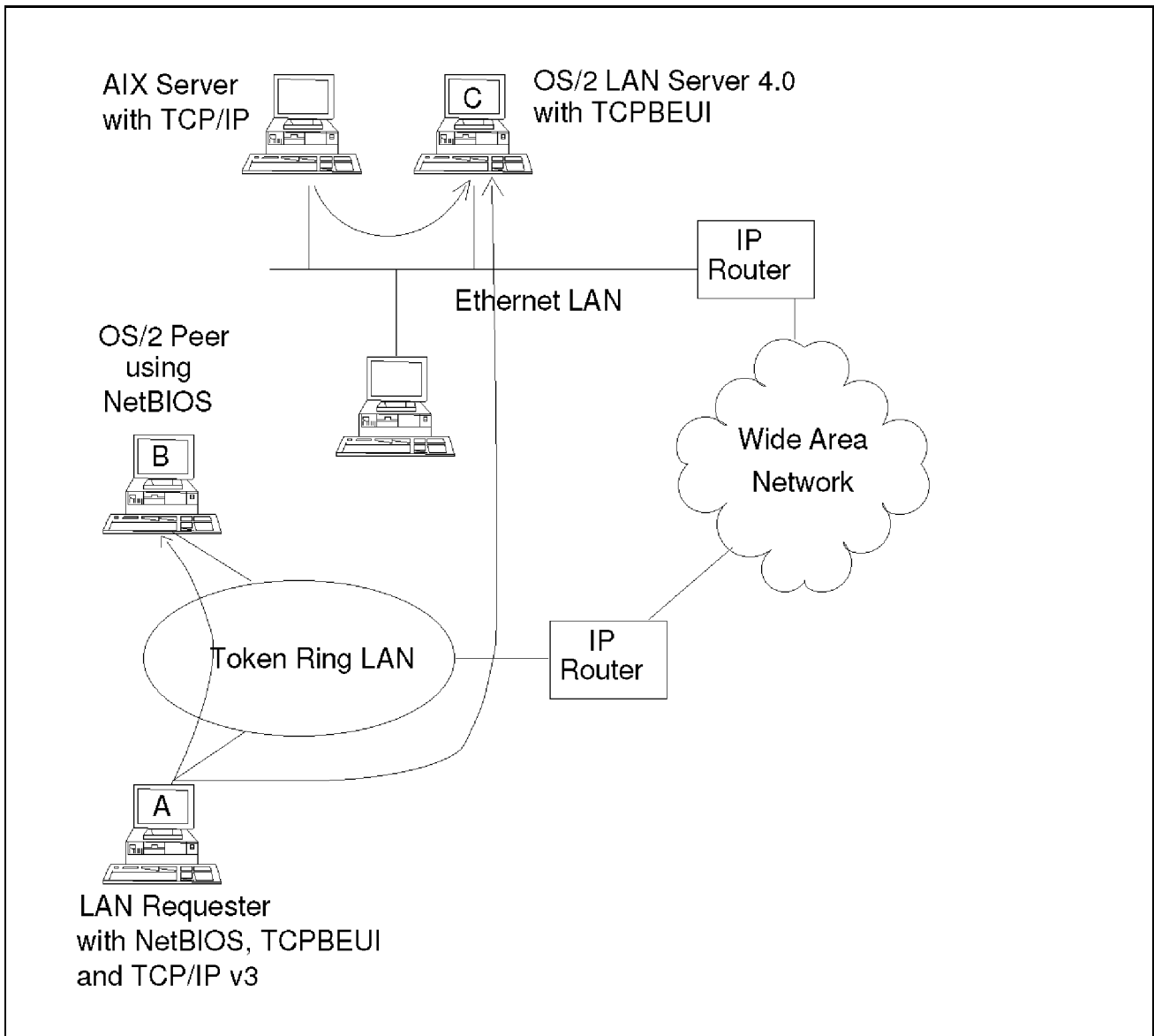


Figure 219. OS/2 Warp Connect Using Multiple Protocols

Figure 219 shows an example scenario with both TCP/IP and NetBIOS protocols being used, and IBM TCP/IP for OS/2 Version 3.0 installed on a workstation. In this example, workstation A is able to access the IBM Peer for OS/2 Version 1.0 resources on workstation B on the local LAN segment via NetBIOS, the OS/2 LAN Server (C) on the remote LAN segment across the IP network via TCPBEUI and, in addition, is able to use the TCP/IP applications provided by IBM TCP/IP for OS/2 Version 3.0 to access other TCP/IP resources via the native TCP/IP protocol.

MPTS provides the TCP/IP protocol capability with or without IBM TCP/IP for OS/2 Version 3.0 installed, but provides only a limited set of TCP/IP applications. These are:

- IFCONFIG
- ROUTE
- ARP
- PING
- NETSTAT
- HOST
- HOSTNAME

When configuring MPTS for both NetBEUI and TCPBEUI, even though a single LAN adapter is present in the workstation, the two protocols need to be configured on different logical adapters. The Current Configuration window on the LAPS Configuration panel should be adapted as follows:

```
IBM Token-Ring Network Adapter ...
  0 - IBM OS/2 NETBIOS
  0 - IBM IEEE 802.2
  0 - IBM TCP/IP
  1 - IBM OS/2 NETBIOS OVER TCP/IP
```

Figure 220. LAPS Configuration Panel. Single Token-Ring Adapter bound to NetBIOS, IBM IEEE 802.2, and TCPBEUI

Note that the numbers of the protocol drivers have to be set differently although only one physical LAN adapter is present.

The following changes were made to the CONFIG.SYS and PROTOCOL.INI files by MPTS:

```

:
:
CALL=C:\ibmcom\PROTOCOL\NETBIND.EXE
RUN=C:\ibmcom\LANMSGEX.EXE
DEVICE=C:\MPTN\PROTOCOL\SOCKETS.SYS
DEVICE=C:\MPTN\PROTOCOL\AFOS2.SYS
DEVICE=C:\MPTN\PROTOCOL\AFINET.SYS
DEVICE=C:\MPTN\PROTOCOL\IFNDIS.SYS
RUN=C:\MPTN\BIN\CNTRL.EXE
CALL=C:\OS2\CMD.EXE /Q /C C:\MPTN\BIN\MPTSTART.CMD
RUN=C:\ibmcom\PROTOCOL\NBTCP.EXE
DEVICE=C:\IBMCOM\PROTOCOL\TCPBEUI.OS2
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:C:\IBMLAN /N
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
RUN=C:\IBMLAN\NETPROG\LSDAEMON.EXE
:
RUN=C:\IBMCOM\PROTOCOL\NETBIND.EXE
SET ETC=C:\MPTN\ETC
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
RUN=C:\ibmcom\PROTOCOL\LANDLL.EXE
DEVICE=C:\IBMCOM\PROTOCOL\LANDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANDLLDD.OS2
SET HOSTNAME=ITSCWK3.AUSTIN.IBM.COM

```

Figure 221. CONFIG.SYS. Single Token-Ring Adapter bound to NetBIOS, IBM IEEE 802.2, and TCPBEUI (Extract)

```

[PROT_MAN]

    DRIVERNAME = PROTMAN$

[IBMLXCFG]

    landd_nif = landd.nif
    netbeui_nif = netbeui.nif
    tcpbeui_nif = tcpbeui.nif
    tcpip_nif = tcpip.nif
    IBMTOK_nif = IBMTOK.NIF

[NETBIOS]

    DriverName = netbios$
    ADAPTER0 = netbeui$,0
    ADAPTER1 = tcpbeui$,1

[landd_nif]

    DriverName = LANDD$
    Bindings = IBMTOK_nif
    ETHERAND_TYPE = "I"
    SYSTEM_KEY = 0x0
    OPEN_OPTIONS = 0x2000
    TRACE = 0x0
    LINKS = 8
    MAX_SAPS = 3
    MAX_G_SAPS = 0
    USERS = 3
    T1_TICK_G1 = 255
    T1_TICK_G1 = 15
    T2_TICK_G1 = 3
    T1_TICK_G2 = 255
    T1_TICK_G2 = 25
    T2_TICK_G2 = 10
    IPACKETS = 250
    UIPACKETS = 100
    MAXTRANSMITS = 6
    MINTRANSMITS = 2
    TCBS = 64
    GDTS = 30
    ELEMENTS = 800

[netbeui_nif]

    DriverName = netbeui$
    Bindings = IBMTOK_nif
    ETHERAND_TYPE = "I"
    USEADDRREV = "YES"
    OS2TRACEMASK = 0x0
    SESSIONS = 130
    NCBS = 225
    NAMES = 21
    SELECTORS = 15

```

Figure 222 (Part 1 of 3). PROTOCOL.INI - NetBIOS, IBM IEEE 802.2 and TCPBEUI

```
USEMAXDATAGRAM = "NO"  
ADAPTRATE = 1000  
WINDOWERRORS = 0  
MAXDATARCV = 4168  
TI = 30000  
T1 = 1000  
T2 = 200  
MAXIN = 1  
MAXOUT = 1  
NETBIOSTIMEOUT = 500  
NETBIOSRETRIES = 2  
NAMECACHE = 1000  
RNDOPTION = 0  
PIGGYBACKACKS = 1  
DATAGRAMPACKETS = 10  
PACKETS = 350  
LOPPACKETS = 8  
PIPELINE = 5  
MAXTRANSMITS = 6  
MINTRANSMITS = 2  
DLCRETRIES = 10  
FCPRIORITY = 5  
NETFLAGS = 0x0
```

```
[tcpbeui_nif]
```

```
DriverName = tcpbeui$  
Bindings = ,IBMTOK_nif  
OS2TRACEMASK = 0x0  
SESSIONS = 130  
NCBS = 225  
NAMES = 21  
SELECTORS = 15  
USEMAXDATAGRAM = "NO"  
NETBIOSTIMEOUT = 500  
NETBIOSRETRIES = 2  
NAMECACHE = 0  
PRELOADCACHE = "NO"  
NAMESFILE = 0  
DATAGRAMPACKETS = 20  
PACKETS = 50
```

Figure 222 (Part 2 of 3). PROTOCOL.INI - NetBIOS, IBM IEEE 802.2 and TCPBEUI

```

[tcPIP_nif]

  DriverName = TCPIP$
  Bindings = IBMTOK_nif

[IBMTOK_nif]

  DriverName = IBMTOK$
  ADAPTER = "PRIMARY"
  MAXTRANSMITS = 6
  RECVBUFS = 2
  RECVBUFSIZE = 256
  XMITBUFS = 1

```

Figure 222 (Part 3 of 3). PROTOCOL.INI - NetBIOS, IBM IEEE 802.2 and TCPBEUI

OS/2 LAN Server handles this configuration as if there were 2 adapters present. Therefore two NET entries will be made in IBMLAN.INI:

```

[networks]

net1 = NETBEUI$,0,LM10,102,175,14
net2 = tcpbeui$,1,LM10,102,175,14

[requester]

wrknets = NET1,NET2

[server] srvnets = NET1,NET2

```

Figure 223. IBMLAN.INI. NetBIOS and TCPBEUI bound to a single LAN adapter (Extract)

How to Reduce Broadcast Frames using TCPBEUI

NetBIOS over TCP/IP, or TCPBEUI, supports the use of routing extensions and a name cache. This section discusses these topics and also gives you information on how to use an existing Domain Name Server (DNS) in a TCPBEUI environment. With all these settings you can reduce TCP/IP broadcast frames on the network.

TCPBEUI Fixes

To take full advantage of these enhancements, get the latest TCPBEUI fixes from your IBM customer service representative.

Routing Extensions

Three of the enhancements to TCPBEUI are in the form of *routing extensions*. These extensions allow communication between networks and over IP routers and bridges. The routing extensions are:

1. Names file. A names file consists of NetBIOS name and IP address pairs. NetBIOS over TCP/IP will conduct a prefix search of the names file before broadcasting on the network. The prefix match succeeds if the entry in the names file matches the given name, up to the length of the entry. The first match is used, therefore, the order in which NetBIOS names are listed in the names file is important.

To enable this routing extension, set the `NAMESFILE` parameter in the `TCPBEUI` section of the `PROTOCOL.INI` to a nonzero integer that represents the number of names file entries.

2. Domain Name Server (DNS). A network administrator can maintain NetBIOS name and IP address pairs in a DNS. If a name query fails, NetBIOS over TCP/IP can append the NetBIOS Domain Scope String to the encoded NetBIOS name and issue a request to the DNS to look up an IP address for that NetBIOS name. The Domain Scope String is defined by the `PROTOCOL.INI` parameter `DOMAINSCOPE`.

For more information on how to set up the DNS with the NetBIOS names, see “Storing NetBIOS Names on the Domain Name Server” on page 407.

3. Broadcast file. A broadcast file contains a list of host names, host addresses, or directed broadcast addresses. It is read at startup and each valid address is added to the set of destination addresses for broadcast packets. Remote nodes included in the broadcast file are then treated as if they were on the local network. Use of a broadcast file has the effect of extending a node's broadcast domain to its own subnet plus any other subnets listed in the broadcast file. A maximum of 32 broadcast file entries are supported, each of which could include additional subnets, thus extending the node's broadcast domain.

If your routers support directed broadcasts (that is, you can ping the broadcast address of a distant IP subnet, and get back a response from all the stations on that subnet), then you can place the broadcast address for each subnet in the server's broadcast file. Also enable the TCPBEUI name cache described in “Name Cache and Name Discovery Algorithm” on page 406. This greatly reduces broadcast traffic and eases administration. (The clients still need to know the IP address and NetBIOS name of each server and peer server.)

Name Cache and Name Discovery Algorithm

Another enhancement NetBIOS over TCP/IP provides is a *name cache* for storing remote names that have been discovered. Since TCPBEUI uses broadcasting as a mechanism for name discovery, by checking the cache first, broadcast traffic can be reduced. This cache is enabled by setting the NAMECACHE parameter in the TCPBEUI section of the PROTOCOL.INI to a nonzero integer that represents the number of names stored in the directory (NAMECACHE=xx).

The information in the remote name cache (or directory) is also stored on disk and periodically updated. When the system is restarted, this information can be preloaded into the cache at bootup time. Preloading can reduce the amount of broadcast frames on the network since NetBIOS will not have to rediscover names for remote workstations. To preload the remote names cache, set PRELOADCACHE=YES in the TCPBEUI section of the PROTOCOL.INI.

When NetBIOS over TCP/IP is searching for a name, the following name discovery algorithm is used:

1. Check the local name cache first.
2. If not found, check the local names file.
3. Next, issue `GetHostByName()` to the Domain Name Server. The `tcPIP` etc hosts file is checked if the `GetHostByName` to the DNS fails.
4. Finally, issue a broadcast using the broadcast file's entries.

It is recommended that when running NetBIOS over TCP/IP in a wide area network (WAN), you should turn name caching on at the server (`NAMECACHE=100`).

Storing NetBIOS Names on the Domain Name Server

In a larger network where a DNS already exists, you can use the DNS database to store NetBIOS name and IP address pairs, thereby eliminating the need for maintaining a broadcast file or names file on each client. In each client `PROTOCOL.INI` file, you must only ensure that the `DOMAINSCOPE` parameter is set to the TCP/IP domain name. `TCPBEUI` will then know to search that domain's DNS for the IP address of the requested server.

Notes:

1. The solution described in this section assumes that the Warp Connect or LAN Server is already set up as a TCP/IP machine with a host name/IP address pair that is registered in the DNS database.
2. If you do not have a DNS, you can set up the local node's hosts file (`tcPIP` etc hosts) in the same way we describe here. That is, the NetBIOS names must be encoded in the hosts file just as they must be in the DNS. `TCPBEUI` will first look for the requested server IP address in the DNS; if one does not exist or the address is not specified in the DNS, `TCPBEUI` checks for the local hosts file.

The Warp Connect or LAN Servers' NetBIOS names must be added to the DNS database in an *encoded* format. The encoding is necessary because NetBIOS names are 16 bytes of *any* bit pattern and a TCP/IP DNS only accepts host names in the character set *A to Z* and *0 to 9*.

For example, if you have specified `DOMAINSCOPE=austin.ibm.com` in the `PROTOCOL.INI` file and the NetBIOS name you have requested is not found in the local names cache or the local names file, then a `sockets` `GetHostByName(netbios_name.austin.ibm.com)` call will be made. `TCPBEUI` translates the 16-byte NetBIOS name into a 32-byte reversible, half-ASCII biased encoded format, such as:

```
GetHostByName(GCHCGJGDGFCACACACACACACACACACACA.austin.ibm.com)
```

and sends it to the DNS. If the DNS knows this name, it sends back the IP address to TCPBEUI. For this to work, the administrator must store the NetBIOS names in the DNS in the encoded format.

How do you encode NetBIOS names and store them in the DNS database? You must encode the 16 byte name into a 32-byte string using the MAPNAME utility, which is located in the APPLETS directory of MPTS diskette 3 (MPTSAPLT.ZIP). Then, you store the names in the DNS database so that they point back to the original host name, where the TCP/IP address is already listed. We will take you through an example on how to do this.

For each server, there will be at least three entries in the DNS database in addition to the initial host name entry. (Remember, we are assuming that the LAN Server is already set up as a TCP/IP host, with a host name/IP address pair that is registered in the DNS database.) The three entries are necessary because LAN Server issues a NetBIOS NCB.AddName call three times, using the `computername` specified in the IBMLAN.INI file and ending each with a unique hex value as the sixteenth byte. The hex values used as the sixteenth byte are 0x20 (blank or null), 0x00, and 0x03. If the server is a domain controller, there must be a fourth entry, the encoded domain name with the sixteenth byte of 0x00.

Let's say that we have a DNS already set up on our network. We have installed LAN Server 4.0 on the domain controller and one additional server. Both machines also have TCP/IP for OS/2 installed, and their host names are registered in the DNS database. We want to configure for TCPBEUI so that clients can access servers across our IP router without requiring a broadcast file or names file at each client. To do this, we will take advantage of the DNS, and add the appropriate `DOMAINSCOPE` entry to each client's `PROTOCOL.INI` file.

In this example, our domain name is ITSCAUS, and our two servers are configured as follows:

Domain controller	Computername: ITSCSV00 TCP/IP host name: ITSCWK00
Additional server	Computername: ITSCSV01 TCP/IP host name: ITSCWK01

Note: The `computername` refers to the IBMLAN.INI parameter. This is also referred to as the server name or machine ID.

Here's an extract from our DNS database *before* we add the encoded NetBIOS names:

```

ITSCWK00          86400 IN A      129.35.144.210
                  IN HINFO DC HOST NAME
;
ITSCWK01          86400 IN A      129.35.144.211
                  IN HINFO AS HOST NAME
;

```

Figure 224. Sample DNS Database File Before Adding Encoded NetBIOS Names. The TCP/IP host names are listed with the workstation IP addresses.

The HINFO keyword specifies comment information. In this case, we have indicated that ITSCWK00 is the TCP/IP host name for the domain controller, and ITSCWK01 is the host name for the additional server. TCP/IP looks up the host name in the DNS database and finds the actual IP address.

Now we want to use TCPBEUI and take advantage of the DNS database. To do this, we must encode the server NetBIOS names using the MAPNAME utility. Typing MAPNAME by itself will give you help on how to use the command. The utility converts NetBIOS names to RFC-encoded names and vice versa. Using our example, the following steps show you how to encode your server NetBIOS names.

MAPNAME Requires Uppercase NetBIOS Name

When using MAPNAME, be sure to type the NetBIOS computername in *uppercase* letters, as this is a case sensitive utility. If you type the computername in lowercase, the output will be incorrect.

1. Use MAPNAME with the /RB parameters to specify that you want the output to be in RFC format and padded with blanks for up to 16 characters.

```
MAPNAME ITSCSV00 /RB
```

The following 32-byte encoded name is displayed:

```
RFC name: EJFEFDEDFDFGDADACACACACACACACACA
```

This is the first of the four encoded names you need for the domain controller. Here, the sixteenth byte, CA, is null (0x20). The following command would have given us the same result, but since null characters are the default, the L20 is unnecessary.

```
MAPNAME ITSCSV00 /RBL20
```

2. This time, also use the L parameter to specify that you want the last character of the output to be 0x00, as follows:

```
MAPNAME ITSCSV00 /RBL00
```

The result is:

```
RFC name: EJFEFDEDFDFGDADACACACACACACACAAA
```

AA is hex 0x00.

3. Again, use the L parameter to specify the last character of the output to be 0x03, as follows:

```
MAPNAME ITSCSV00 /RBL03
```

You receive this output:

```
RFC name: EJFEFDEDFDFGDADACACACACACACACAAD
```

AD is hex 0x03.

4. Because this is the domain controller, you must also specify the encoded domain name with the sixteenth byte of 0x00, as follows:

```
MAPNAME ITSCAUS /RBL00
```

The encoded name is:

```
RFC name: EJFEFDEDFDFGDADACACACACACACACAAA
```

5. Now we go through the first three steps for the additional server, ITSCSV01, to get the following output. (Do not encode the domain name for additional servers.)

```
MAPNAME ITSCSV01 /RB
```

```
RFC name: EJFEFDEDFDFGDADBCACACACACACACACA
```

```
MAPNAME ITSCSV01 /RBL00
```

```
RFC name: EJFEFDEDFDFGDADBCACACACACACACAAA
```

```
MAPNAME ITSCSV01 /RBL03
```

```
RFC name: EJFEFDEDFDFGDADBCACACACACACACAAD
```

6. Edit the DNS database to add the entries for the domain controller and additional server. Use the DNS CNAME keyword to point back to the host name entry for the machine where the actual IP address is already specified. In other words, the encoded names we have generated are *aliases* for the host names ITSCWK00 and ITSCWK01. You cannot have two entries pointing to the same IP address, so you must use the CNAME keyword to create aliases.

The following example shows how our DNS database file looks *after* adding the NetBIOS encoded names. Again, we use HINFO to designate comments.

```

ITSCWK00                86400 IN A      129.35.144.210
                        IN HINFO  DC HOST NAME
;
EJFJFDEDFDFGDADACACACACACACACA 86400 IN CNAME ITSCWK00
                        IN HINFO  ITSCSV00 (0x20 in byte 16)
;
EJFJFDEDFDFGDADACACACACACACAAAA 86400 IN CNAME ITSCWK00
                        IN HINFO  ITSCSV00 (0x00 in byte 16)
;
EJFJFDEDFDFGDADACACACACACACAAD 86400 IN CNAME ITSCWK00
                        IN HINFO  ITSCSV00 (0x03 in byte 16)
;
EJFJFDEDFDFGDADACACACACACACAAAA 86400 IN CNAME ITSCWK00
                        IN HINFO  ITSCAUS (0x00 in byte 16)
;
ITSCWK01                86400 IN A      129.35.144.211
                        IN HINFO  AS HOST NAME
;
EJFJFDEDFDFGDADBCACACACACACACA 86400 IN CNAME ITSCWK01
                        IN HINFO  ITSCSV01 (0x20 in byte 16)
;
EJFJFDEDFDFGDADBCACACACACACAAAA 86400 IN CNAME ITSCWK01
                        IN HINFO  ITSCSV01 (0x00 in byte 16)
;
EJFJFDEDFDFGDADBCACACACACACAAD 86400 IN CNAME ITSCWK01
                        IN HINFO  ITSCSV01 (0x03 in byte 16)
;

```

Figure 225. Sample DNS Database File After Adding Encoded NetBIOS Names. The encoded NetBIOS names point back to the TCP/IP host names (using CNAME), where the workstation IP addresses are specified.

For the domain controller (ITSCSV00), there are four encoded entries, three for the server name (computername) and one for the domain name (ITSCAUS). For the additional server (ITSCSV01), there are three encoded entries for the server name. The encoded entries are all aliases that point back to the host names.

7. On your clients, be sure that you set the DOMAINSCOPE parameter to point to the correct TCP/IP domain, for example, DOMAINSCOPE=austin.ibm.com. This enables TCPBEUI to use the DNS to find the NetBIOS name/IP address pairs, eliminating the need for a broadcast file or names file at each client.

For further information on the Domain Name Server, please refer to the *IBM TCP/IP Version 2.0 for OS/2 Domain Name Server Guide*.

Performance Considerations

The performance when using TCPBEUI is generally slower than using native NetBIOS due to the additional overhead of mapping NetBIOS API calls to TCP/IP (However, using OS/2 LAN Server over TCPBEUI is significantly faster than using OS/2 LAN Server 3.0 with IBM NetBIOS 2.0 for TCP/IP, because there is no longer a transition overhead from Ring 3 to Ring 0). The performance difference can range widely depending on the environment. Some environmental factors that can affect performance are the type of client (OS/2 or DOS), the server CPU workload, the type of network operations being performed, the network media, network congestion, and communication line speeds. We've observed the performance of NetBIOS over TCP/IP being anywhere from 10% slower to as much as 4 times slower than NetBEUI.

One of the environments in which performance tests were conducted was a medium-sized LAN on 16Mbps Token Ring with no WAN connections. We ran a set of industry standard business applications on TCPBEUI clients and again on OS/2 NetBEUI clients. In this environment, NetBIOS over TCP/IP was 20% slower than NetBEUI. The performance of DOS NetBIOS over TCP/IP clients was significantly less than that of the OS/2 clients.

Database applications generally use small records when accessing shared databases residing on the server. Often these small records are retrieved from the file system cache with no physical disk access being required. The performance of this type of application on NetBIOS over TCP/IP may be noticeably slower than if the application were run using NetBEUI. However, if the number of database accesses of this type in performing a typical operation is in the order of hundreds, not thousands, the user may not notice a difference in performance in the two protocols.

It may be necessary to periodically update client applications or other files by copying them from the server disk. DCDB replication from a domain controller to a remote additional server also generates I/O operations sometimes known as file transfers. This type of file I/O activity over a network will show little or no performance difference between NetBEUI and NetBIOS over TCP/IP due to protocol characteristics. One should be aware, however, that most WAN connections today are made over relatively low-speed communication lines when compared with a LAN speed of 4 to 16 Mbps. File transfer operations over WAN communication lines will probably be slower than over LANs but most likely not due to the network protocol.

Tuning Considerations for TCPBEUI

If you're using NetBIOS over TCP/IP in a token-ring environment, file transfer performance might be improved by increasing the maximum transmissible unit (MTU) size. We have seen up to a 20 percent increase in performance of large file transfers by using an 8 KB packet instead of the default 1500 bytes. The default of 1500 was chosen because of Ethernet's packet size limitation and prevalence in TCP/IP environments. The MTU size can be changed with the IFCONFIG command in TCP/IP's SETUP.CMD. Set the MTU size to the desired packet size plus 40 bytes, the maximum TCP/IP header size. The desired packet size should be a multiple of 2048. Your network adapter must be configured to support transmission of buffers that are at least the size specified for the MTU. On an IBM 16/4 Token-Ring Adapter, this would be accomplished by setting the XMITBUFSIZE parameter in the token-ring section of the PROTOCOL.INI file. Check your network interface card documentation for information on configuring your adapter.

It is also recommended that you use the INETCFG command to change the default *keepalive* value from the default of 120 minutes to a lower value, for example:

```
inetcfg keepalive=10
```

The reason for this is that a TCPBEUI server is *not* informed of a TCP/IP connection breaking for a period of two hours. Thus, a TCPBEUI server could accumulate a large number of *ghost* sessions. By issuing the `inetcfg keepalive=10` command, TCP/IP will inform TCPBEUI after 10 minutes that a TCP/IP connection is broken (that is, a remote client has gone down).

If you are experiencing difficulties accessing a remote server over a slow WAN connection, try gradually increasing the NETBIOSTIMEOUT parameter in PROTOCOL.INI.

When using both NetBEUI (for LAN access) and TCPBEUI (for WAN access), it is best to have `net1=netbeui` and `net2=tcpeui`, as shown in Figure 223 on page 404. In this dual protocol environment, it is recommended that you decrease NETBIOSRETRIES to 2 or 3 (from the current default of 8). Also, be aware that if the NETBIOSTIMEOUT parameter is set too high, some local LAN functions, such as logon and NET USE, may take significantly longer.

Recommendation - Dual Protocol Stack

Because there may be a performance difference in a particular environment, it is recommended to configure and use NetBEUI in the Local Area Network (LAN) environment, and NetBIOS over TCP/IP in the Wide Area Network (WAN) environment. The Multi-Protocol Transport Services (MPTS) shipped with OS/2 Warp Connect provides the capability of configuring your LAN workstation or server with both NetBEUI and NetBIOS over TCP/IP on the same network interface card.

The dual protocol stack can be configured through the installation/configuration program. When selecting protocols, install logical adapter 0 with NetBEUI and logical adapter 1 with TCP/IP and NetBIOS over TCP/IP (on the same physical adapter). This dual protocol stack configuration allows local sessions to continue running with NetBEUI performance while also providing WAN connectivity with NetBIOS for TCP/IP.

Removing TCPBEUI Configuration

When removing the TCPBEUI configuration from MPTS, you must first remove TCP/IP Socket Access at the Configure panel (see Figure 210 on page 383), before proceeding to the LAPS Configuration panel and removing the TCP/IP protocol and the NetBIOS over TCP/IP protocol.

If the removal is not performed in this manner, the protocols will be removed from the PROTOCOL.INI file but the MPTCONFIG.INI file will not be updated properly. This will result in invalid device drivers being added to the CONFIG.SYS file.

NetWare NetBIOS Emulation over IPX

MPTS allows the configuration of Novell's NetBIOS emulator program (IPXNB) that is provided with the NetWare Client for OS/2 Version 2.11. IPXNB provides an LM10 NetBIOS interface that may be used by workstations running NetBIOS applications that support this interface, such as IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester. This capability is extremely useful for customers who have multi-segment networks connected by IPX routers, or who already use IPX as the standard protocol on their networks and do not wish to introduce additional protocols. Figure 226 on page 415 shows an example scenario of IBM Peer for OS/2 Version 1.0 workstations on a routed Novell NetWare network. In this example, each OS/2 peer

workstation is able to access resources on each other, as well as being able to access resources on the NetWare server using the NetWare Client for OS/2 Version 2.11

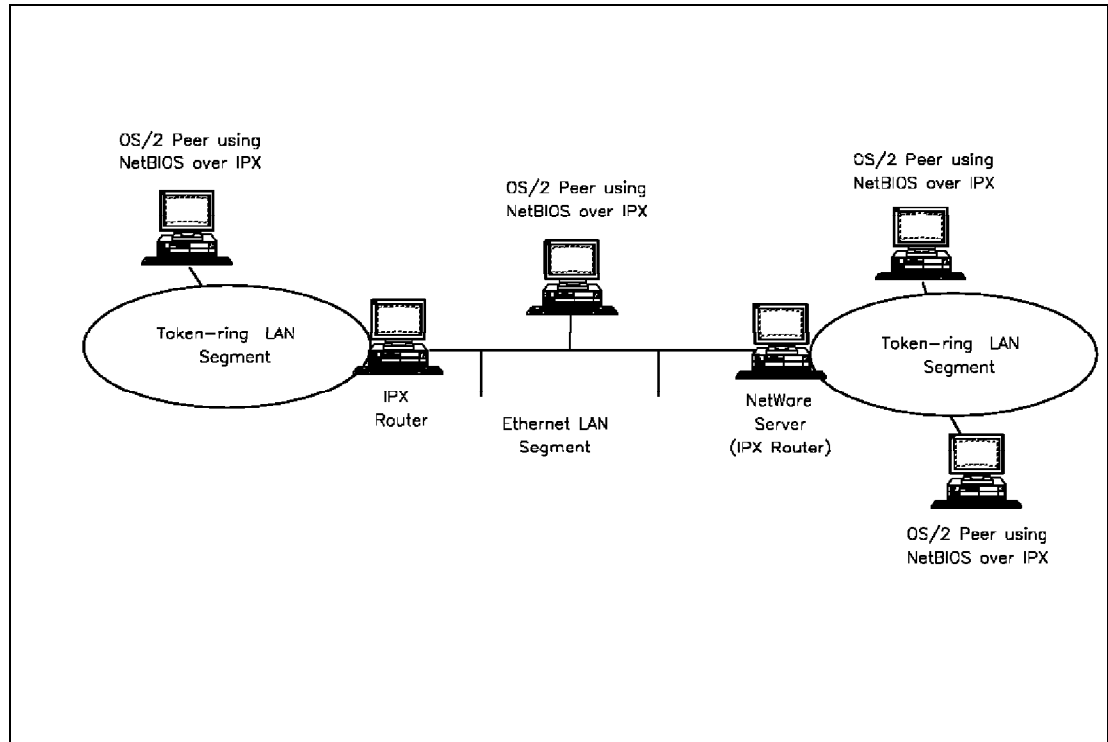


Figure 226. IBM Peer for OS/2 Version 1.0 Workstations on an IPX Network

Figure 227 on page 416 shows the active protocol stacks with the NetWare NetBIOS emulator loaded.

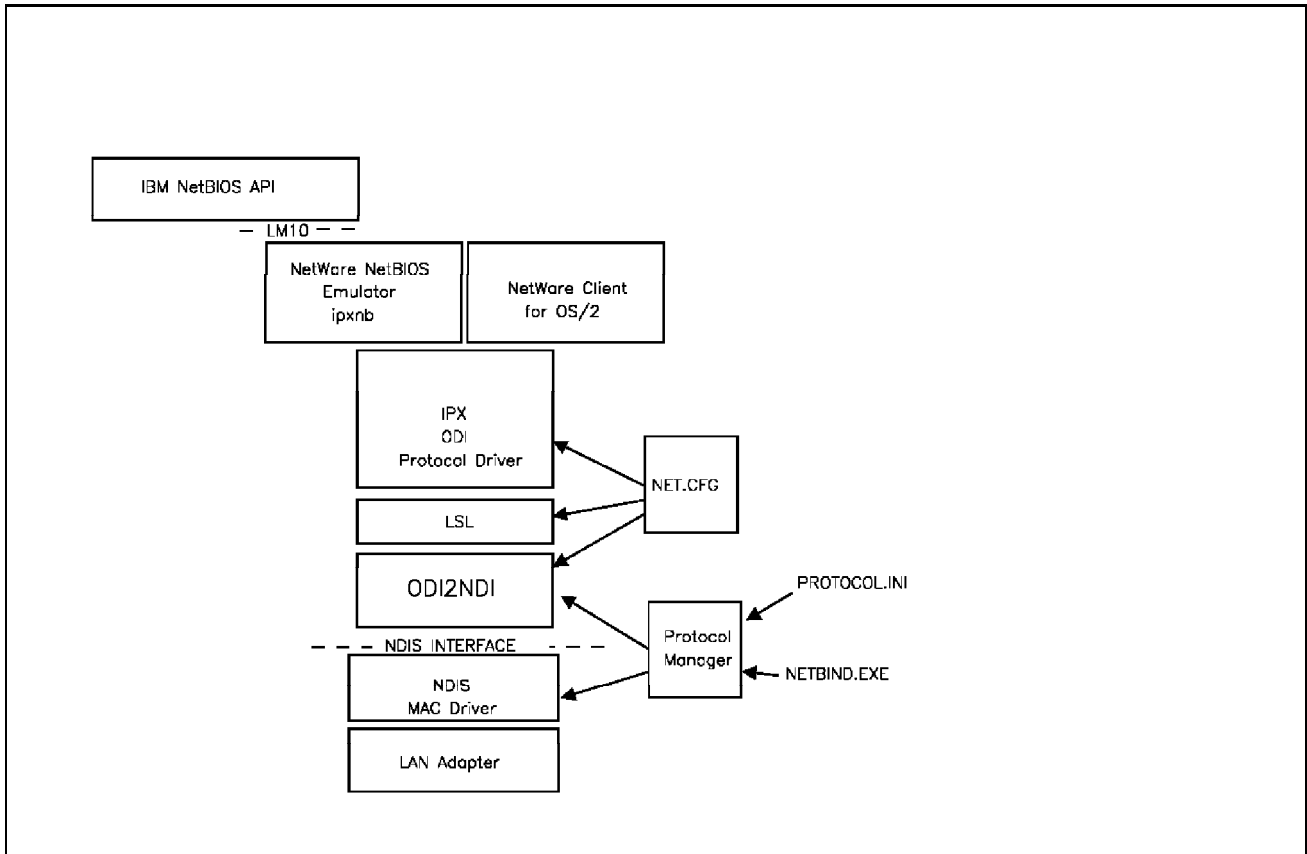


Figure 227. IPXNB Protocol Stack

Configuring the NetWare NetBIOS Emulation

The following steps are a guideline for configuring NetWare's NetBIOS emulation program:

1. Install the NetWare Client for OS/2 Version 2.11 prior to installing MPTS.
2. During the NetWare installation process, select **Optional Protocols**. Select to install NetWare NetBIOS emulation, (default installation does not install NetWare NetBIOS emulation).
3. To configure NetWare's NetBIOS Emulation, start the Install program from the Novell folder.
 - Select **Configuration** and **This Workstation** (accept the default path for the NET.CFG file)
 - Select **Edit**. Figure 228 on page 417 shows the panel for configuring the NET.CFG file
 - Select **NetWare NetBIOS**

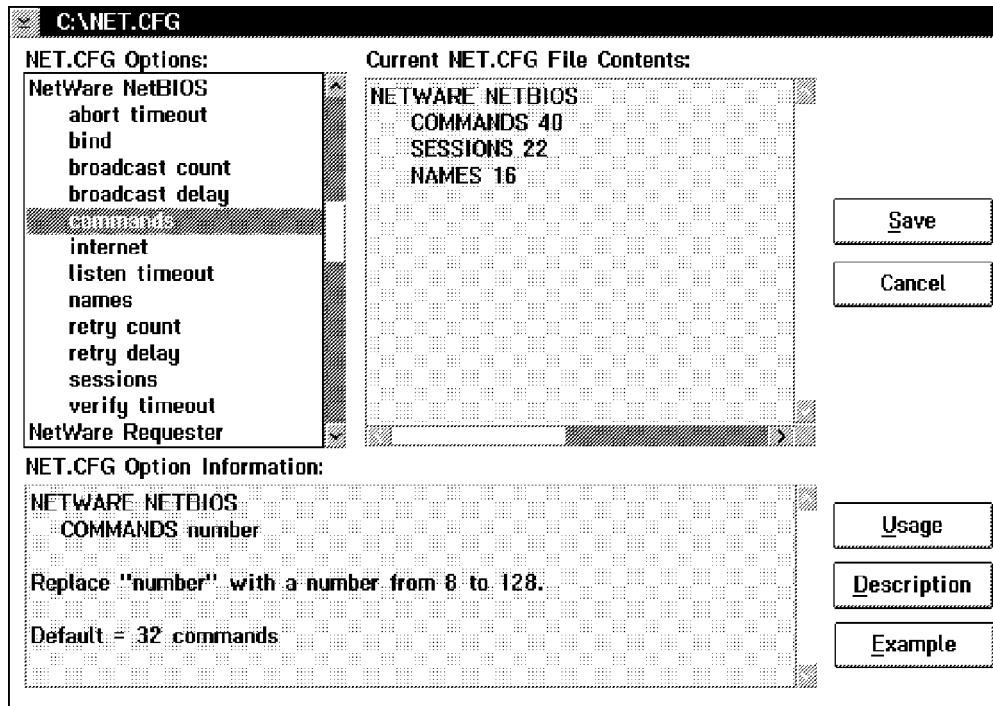


Figure 228. NetWare Client for OS/2 Version 2.11 Configuration Panel

The following NetWare NetBIOS emulation parameters determine the NetBIOS resources that are available for NetBIOS applications running over NetWare NetBIOS emulation:

- COMMANDS
(this corresponds with the NCBS parameter in the NETBEUI_NIF section of the x:\IBMCOM\PROTOCOL.INI file - default value is 32)
- NAMES
(this corresponds with NAMES parameter in the NETBEUI_NIF section of the x:\IBMCOM\PROTOCOL.INI file - default value is 24)
- SESSIONS
(this corresponds with SESSIONS parameter in the NETBEUI_NIF section of the x:\IBMCOM\PROTOCOL.INI file - default value is 16)

4. Make the appropriate changes to the NetBIOS resource parameters according to the amount of NetBIOS resources needed to run the NetBIOS applications.
5. Save the configuration and close the NetWare Workstation for OS/2 Installation Utility.

Note: If the default values for COMMANDS, NAMES and SESSIONS are adequate, you do not need to carry out this configuration of the NET.CFG file.

6. Install MPTS.
7. After installation, select **Configure**.
8. Select **Configure LAN Adapters and Protocols**.
9. After selecting the appropriate Network Adapter, the following protocols need to be configured in order to properly run NetWare's NetBIOS emulation over IPX.

- IBM Netware Requester Support (ODI2NDI.OS2)
- Netware NetBIOS Emulation over IPX - IBM Netware Requester

The IBM Netware Requester Support enables protocol stacks that comply with the Novell Open Data Link Interface (ODI) specification to operate with network adapter drivers that comply with NDIS, up to NDIS Version 2.01. (see "IPX over NDIS" on page 388 for further details)

The Netware NetBIOS Emulation over IPX, modifies the PROTOCOL.INI file with the proper NetBIOS Emulation over IPX sections in order to run NetBIOS applications over this NetBIOS Emulation.

10. After LAPS configuration is complete, select OK to save the configuration.

NetBIOS Emulation over IPX as the Default Protocol

When you carry out an installation of OS/2 Warp Connect, you do not get an option to configure NetBIOS Emulation over IPX at installation time.

Assuming that you have chosen to install the NetWare Client for OS/2 Version 2.11 and either OS/2 LAN Requester or IBM Peer for OS/2 Version 1.0, and the installation has completed successfully, your IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester will be configured to use the NetBIOS protocol. To change this configuration to use the NetBIOS emulation over IPX, you need to do the following:

1. Start the Install program from the Novell folder.
2. Select **Installation** and **Requester on Workstation**.
3. Leave the Target Directory and Source drive at the defaults.
4. Select only **Edit CONFIG.SYS** on the Requester Installation panel.
5. Accept the default values on the next few panels until you get to the Optional Protocols panel.
6. Select **NetBIOS Emulation** for OS/2 Sessions.

7. Having chosen to save CONFIG.SYS, you will return to the NetWare Workstation for OS/2 Installation Utility.
8. If you need to change the values of NAMES, SESSIONS and COMMANDS from the defaults, create and configure your NET.CFG file as in the previous example (see 416).
9. Choose the MPTS icon from the Desktop. Select LAN Adapter and Protocol Support and Configure.
10. Remove the IBM OS/2 NetBIOS driver from the PROTOCOLS Window and add the NetWare NetBIOS over IPX protocol.
11. Close and save your MPTS configuration.

The workstation is now configured to use the NetWare NetBIOS over IPX protocol. However, we still have to tell the IBM Peer for OS/2 Version 1.0 or the OS/2 LAN Requester to use the IPXNB interface instead of the NetBEUI interface. To do this:

1. Select the **IBM Peer for OS/2 Version 1.0** or **IBM LAN Services** on the Desktop.
2. Select Installation.
3. On the Installation Tasks Panel select **Configure this workstation**.
4. Go through all the following panels without making any changes - this will change the NetBIOS interface used by the IBM Peer for OS/2 Version 1.0 or the OS/2 LAN Requester
5. Finally shut down and reboot the workstation. You will then be able to start the IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester using the NetBIOS over IPX protocol.

NetBIOS over IPX consideration

If you install IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester using NetBIOS over IPX then copy the file NETBIOS.SYS dated 1/09/95 or later (check Novell's R211FT.EXE on NetWire) to the \NETWARE directory. NETBIOS.SYS can be found in the \CID\IMG\NWREQ directory on the OS/2 Warp Connect CD-ROM. This corrects errors in the allocation of resources (Commands, Sessions, and Names).

Sample Configuration Files

The following changes to the CONFIG.SYS file will have been made by the configuration of the NetWare NetBIOS emulator. Note that no changes to CONFIG.SYS are made by the MPTS configuration changes.

```

:
:
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NETWARE\LSL.SYS
RUN=C:\NETWARE\DDAEMON.EXE
DEVICE=C:\IBMCOM\PROTOCOL\ODI2NDI.OS2
REM -- ODI-Driver Files BEGIN --
REM -- ODI-Driver Files END --
DEVICE=C:\NETWARE\ROUTE.SYS
DEVICE=C:\NETWARE\IPX.SYS
DEVICE=C:\NETWARE\SPX.SYS
RUN=C:\NETWARE\SPDAEMON.EXE
rem DEVICE=C:\NETWARE\NMPIPE.SYS
rem DEVICE=C:\NETWARE\NPSEVER.SYS
rem RUN=C:\NETWARE\NPDAEMON.EXE
DEVICE=C:\NETWARE\NWREQ.SYS
IFS=C:\NETWARE\NWIFS.IFS
RUN=C:\NETWARE\NWDAEMON.EXE
DEVICE=C:\NETWARE\NETBIOS.SYS
RUN=C:\NETWARE\NBDAEMON.EXE
DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
:

```

Figure 229. CONFIG.SYS with IPXNB Configured (Extract)

Figure 230 on page 421 shows a PROTOCOL.INI file from a workstation with IPXNB configured.


```

[PROT_MAN]

    DRIVERNAME = PROTMAN$

[IBMLXCFG]

    ipxnb_nif = ipxnb.nif
    odi2ndi_nif = odi2ndi.nif
    IBMTOK_nif = IBMTOK.NIF

[NETBIOS]

    DriverName = netbios$
    ADAPTER0 = ipxnb$,0

[ipxnb_nif]

    DriverName = ipxnb$
    Bindings = IBMTOK_nif

[odi2ndi_nif]

    DriverName = odi2ndi$
    Bindings = IBMTOK_nif
    NETADDRESS = "10005A88B1C9"
    TOKEN-RING = "yes"
    TOKEN-RING_SNAP = "yes"
    ETHERNET_802.3 = "no"
    ETHERNET_802.2 = "no"
    ETHERNET_II = "no"
    ETHERNET_SNAP = "no"
    TRACE = 0x0

[IBMTOK_nif]

    DriverName = IBMTOK$
    MAXTRANSMITS = 6
    RECVBUFS = 2
    RECVBUFSIZE = 256
    XMITBUFS = 1

```

Figure 230. PROTOCOL.INI with IPXNB Configured

Figure 231 shows an extract from the IBMLAN.INI for a IBM Peer for OS/2 Version 1.0 workstation using IPXNB.

```

; OS/2 Peer initialization file

[networks]

    net1 = ipxnb$,0,LM10,34,50,14
; This information is read by the redirector at device initialization time.

```

Figure 231. IBMLAN.INI Configured for IPXNB

```
NETWARE NETBIOS
SESSIONS=50
COMMANDS=40
NAMES=15
```

Figure 232. NET.CFG File for NetWare NetBIOS Emulator

NetBIOS Considerations

Using IPXNB, the following has to be considered.

An application using IPXNB cannot communicate with another application using native NetBIOS. Even if applications are written to the NetBIOS programming interface, IPX protocol stacks cannot talk with NetBIOS protocol stacks. A partner must use the same communication protocol stack.

Performance Considerations

The NetBIOS emulation in the NetWare Client for OS/2 Version 2.11 is provided by the NETBIOS.SYS driver. The NetBIOS provided by Novell is called an emulator because it does not transmit NetBIOS packets on the network. Instead, NetBIOS packets are encapsulated in IPX packets, and the IPX packets are transmitted. The encapsulation process will impact performance of the IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester. Also, bear in mind that the NetBIOS over IPX protocol does not have the same enhancements that have been specifically designed for routed networks as are available in the NetBIOS over TCP/IP protocol. (see "How to Reduce Broadcast Frames using TCPBEUI" on page 404).

Native NetBIOS should always be considered as the protocol of choice whenever the network configuration allows.

Socket/MPTS

With the growth of networking in general and local area networks in particular, it is not uncommon to see customer configurations with many different networks using four or five different protocols, such as TCP/IP, NetBIOS, SNA, or AppleTalk. One of the problems in these environments is interoperability, since applications that run on one network often do not run with applications on other networks.

The Multi-Protocol Transport Network (MPTN) addresses these problems. MPTN (see Figure 233 on page 423) defines an architecture which allows a network application on one device to communicate with other devices across a network, or networks, without concern for the underlying protocols in use. This protocol independence for applications is provided by two aspects of MPTN: the Common Transport Semantics (CTS) and MPTN gateways.

The MPTN gateway connects two different single-protocol transport networks and provides cross-network directory and routing services between them.

The CTS provides the capability to write an application once and have it run on different network protocols. The Socket/MPTS component of MPTS provides Common Transport Semantics for the Multi-Protocol Transport Network.

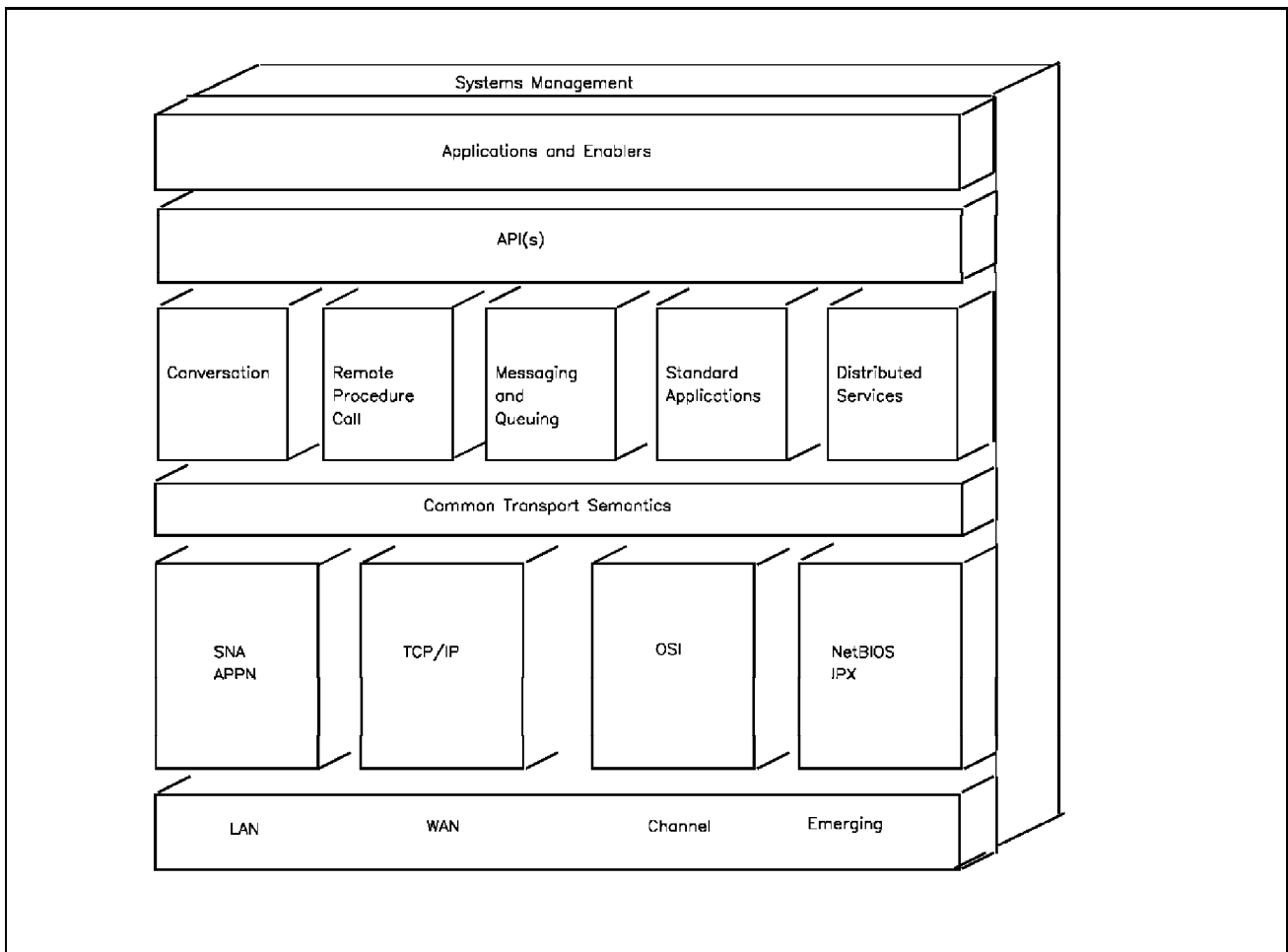


Figure 233. Networking Blueprint - Multiprotocol Networking

The CTS provides a semantic interface so that higher-level protocols or application interfaces written for a particular transport protocol can be transported over another protocol with no apparent change. The Socket/MPTS version of MPTN supports TCP/IP and NetBIOS protocols. (It does not include the MPTN gateway function). The OS/2 transport-independent interface is known as the socket programming interface.

When an application creates a socket end point of a certain address family and the protocol chosen to provide the transport matches the address family, this is known as *native networking* - for example, if the INET (TCP/IP) protocol is used to support the INET address family or NetBIOS is used to support the NetBIOS address family. On the other hand, when an unmatching transport protocol is used, it is termed non-native.

When TCP/IP applications, which are written to the Sockets interface, run, they normally do so natively (that is, using the TCP/IP protocol). However it is possible to run them using the NetBIOS protocol. A workstation on a LAN configured in this way could, for example, use FTP to transfer a file to another workstation similarly configured, and the traffic flow between them would be NetBIOS. This is non-native networking. The application, (in this case FTP), is unaware of the fact that an unmatching transport protocol is being used to provide the service. Other applications written for the INET (TCP/IP) family, can also run unaltered over NetBIOS in the MPTN environment. Figure 234 on page 425 shows the data path when a TCP/IP application is using an underlying NetBIOS protocol.

Note: The data path has changed in this release of MPTS - The decision to use a non-native underlying protocol is now made at the service driver level, not at the sockets level.

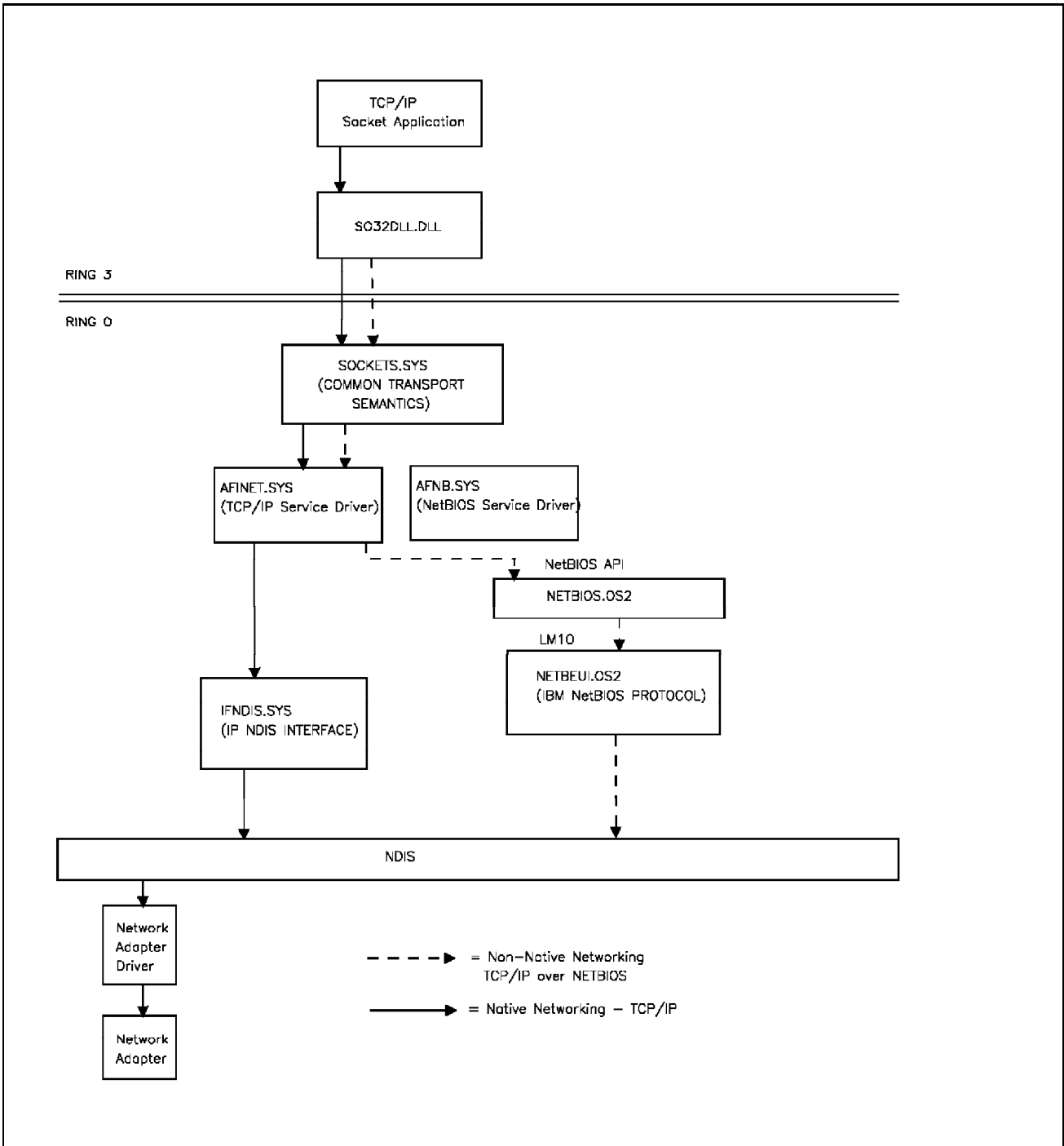


Figure 234. TCP/IP Sockets Application - Native and Non-native Networking

Using Socket/MPTS on its own allows ONLY native networking of sockets applications. However, this release of MPTS (sometimes known as *Converged MPTS*) allows coexistence with the IBM AnyNet/2 product. AnyNet/2 introduces the capability to run non-native networking and also

introduces an SNA services driver, which means that running TCP/IP applications over SNA or NetBIOS applications over SNA is also made possible. Co-existence with AnyNet/2 was not possible with previous releases of MPTS.

Socket interfaces allow you to write distributed or client/server applications using local IPC, TCP/IP, or NetBIOS protocols. The application can select the transport protocol or request that the Socket/MPTS layer determine the protocol. Most socket applications available today communicate with either TCP or UDP. However, with the non-native networking feature of TCP/IP over NetBIOS, these applications can communicate with one another using NetBIOS. Therefore, the application can choose the transport option for its environment. Some applications are written to communicate directly with TCP/IP - these would need to be rewritten to the sockets interface before they could run over NetBIOS.

Sockets are duplex, which means that data can be transmitted and received simultaneously. Sockets allow you to send to, and receive from, the socket as if you are writing to and reading from any other network device.

Configuring Socket/MPTS

Socket/MPTS is configured from the Configure panel when loading MPTS. (see Figure 210 on page 383). Use this panel to select the protocols that you may use. These selections notify Socket/MPTS to initialize the protocol services required. The selectable protocols are TCP/IP and NetBIOS. To select TCP/IP access, you must have the TCP/IP protocol configured (within LAPS). To select NetBIOS access, you must have the NetBIOS protocol configured. You must select at least one protocol for your Socket/MPTS environment. However, you can select more than one protocol.

MPTS - New Driver Support

A number of new MAC and Protocol drivers are included with this release of MPTS. Table 13 on page 439 lists all the drivers that are shipped with OS/2 Warp Connect.

Parallel Port ANDIS MAC driver

The PRNANDIS MAC driver, when configured on two workstations which are connected together via their printer ports, enables those two workstations to communicate as if they were connected via a LAN. Two workstations could, for example, use the IBM Peer for OS/2 Version 1.0 to share resources across this connection.

The PRNANDIS driver is written to run in IBM PC/AT, IBM PS/2 and compatible machines.

PRNANDIS supports the following cables to connect two machines.

- PPLINK fullduplex cable
- LAPLINK/INTERLNK cable
- JFACOMM halfduplex cable

Note: The PPLINK full duplex cable only works in a machine which has a PS/2 style bidirectional parallel port. You may change the capability of the parallel port of your machines by changing DIP switch, jumper, or machine setup programs.

Cable Wiring Diagrams

The following cable wiring diagrams show the supported connections. (N.C. means no connection)

-STROBE	1	----->	13	SLCT
DATA 0	2	<----->	2	DATA 0
DATA 1	3	<----->	3	DATA 1
DATA 2	4	<----->	4	DATA 2
DATA 3	5	<----->	5	DATA 3
DATA 4	6	<----->	6	DATA 4
DATA 5	7	<----->	7	DATA 5
DATA 6	8	<----->	8	DATA 6
DATA 7	9	<----->	9	DATA 7
-ACK	10	<----->	16	-INIT
BUSY	11	N.C.	11	BUSY
PE	12	<----->	14	-AUTO FD XT
SLCT	13	<----->	1	-STROBE
-AUTO FD XT	14	----->	12	PE
-ERROR	15	<----->	17	-SLCT IN
-INIT	16	----->	10	-ACK
-SLCT IN	17	----->	15	-ERROR
GROUND	18	----->	18	GROUND
:	:	:	:	:
GROUND	25	----->	25	GROUND

Figure 235. PPLINK Full Duplex Cable

-STROBE	1	N.C.	1	
DATA 0	2	----->	15	-ERROR
DATA 1	3	----->	13	SLCT
DATA 2	4	----->	12	PE
DATA 3	5	----->	10	-ACK
DATA 4	6	----->	11	BUSY
DATA 5	7	N.C.	7	
DATA 6	8	N.C.	8	
DATA 7	9	N.C.	9	
-ACK	10	<-----	5	DATA 3
BUSY	11	<-----	6	DATA 4
PE	12	<-----	4	DATA 2
SLCT	13	<-----	3	DATA 1
-AUTO FD XT	14	N.C.	14	
-ERROR	15	<-----	2	DATA 0
-INIT	16	N.C.	16	
-SLCT IN	17	N.C.	17	
GROUND	18	-----	18	GROUND
:	:	:	:	:
GROUND	25	-----	25	GROUND

Figure 236. LAPLINK/INTERLNK Cable

-STROBE	1	N.C	1	-STROBE
DATA 0	2	N.C	2	DATA 0
DATA 1	3	N.C	3	DATA 1
DATA 2	4	N.C	4	DATA 2
DATA 3	5	----->	15	-ERROR
DATA 4	6	----->	13	SLCT
DATA 5	7	----->	12	PE
DATA 6	8	----->	10	-ACK
DATA 7	9	----->	11	BUSY
-ACK	10	<-----	8	DATA 6
BUSY	11	<-----	9	DATA 7
PE	12	<-----	7	DATA 5
SLCT	13	<-----	6	DATA 4
-AUTO FD XT	14	N.C	14	-AUTO FD XT
-ERROR	15	<-----	5	DATA 3
-INIT	16	N.C	16	-INIT
-SLCT IN	17	N.C	17	-SLCT IN
GROUND	18	-----	18	GROUND
:	:	:	:	:
GROUND	25	-----	25	GROUND

Figure 237. JFACOMM Half Duplex Cable

Chapter 10. Interoperability

This chapter gives an overview of the interoperability of the LAN components of OS/2 Warp Connect with other LAN products, both from IBM and from other vendors.

Test Environment

Figure 238 shows the configuration used for carrying out the testing. Tests were carried out from the OS/2 LAN Requester, the IBM Peer for OS/2 Version 1.0 and the NetWare Client for OS/2 Version 2.11 accessing the other LAN products, and from the other products accessing the IBM Peer for OS/2 Version 1.0

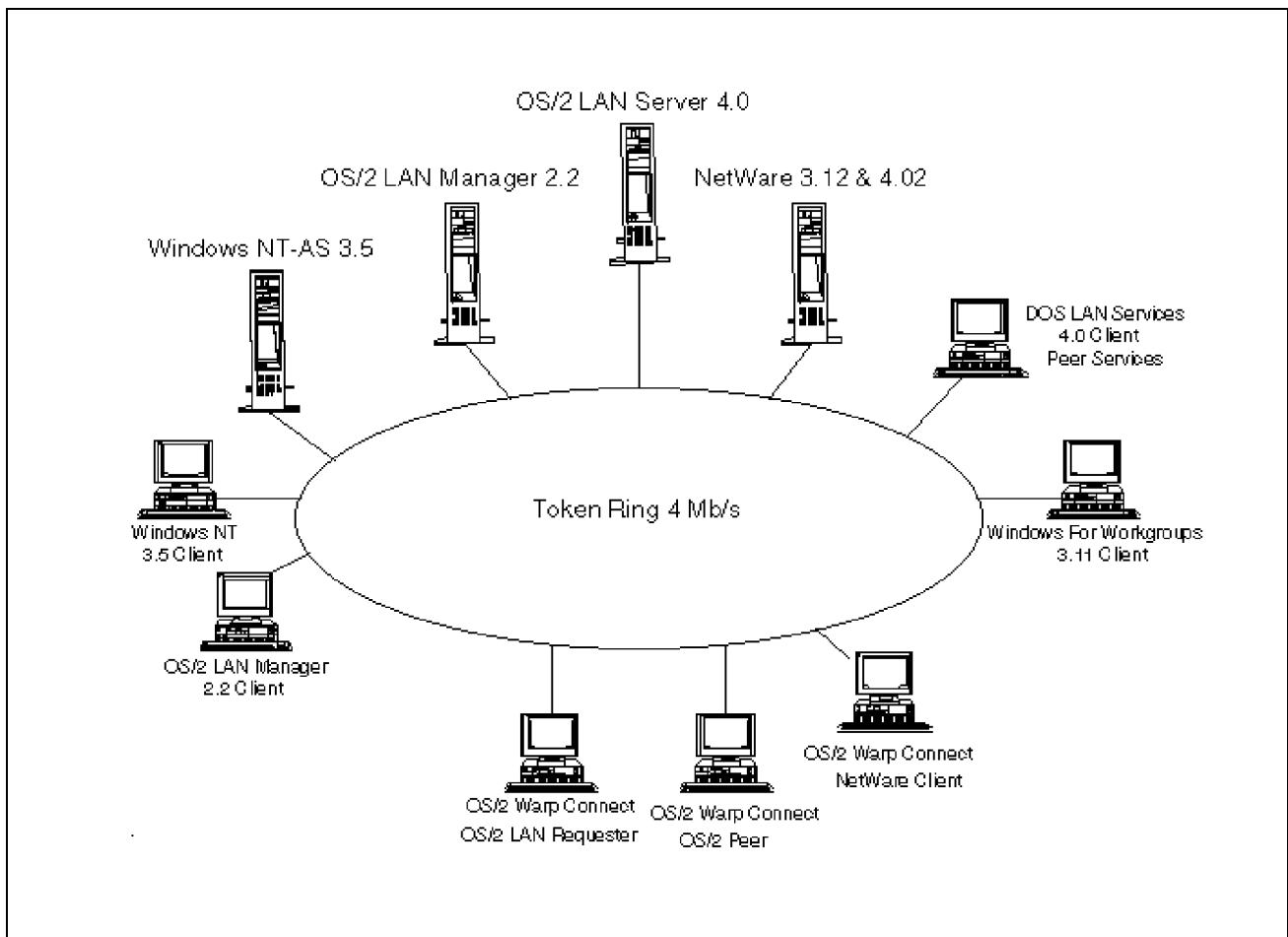


Figure 238. Interoperability - Test Environment

Specifically, the tests were carried out to see if and how users are able to:

- Log on to the servers
- Access the servers' resources, including network applications
- Get home directory assignments (if logon is allowed)
- Get logon scripts (if logon is allowed)
- Manage the server

Table 11 and Table 12 on page 432 show our general test results.

<i>Table 11 (Page 1 of 2). Interoperability - OS/2 Warp Connect Accessing Servers</i>							
Warp Connect Client	Server						
	LAN Server 4.0	LAN Manager 2.2	Windows NT Advanced 3.5	Windows for Workgroups 3.11	NetWare 3.12	NetWare 4.x	DOS LAN Services Peer
OS/2 Peer	All functions ¹	L,U,M ¹ ,G,S	L,U,G,A,B	U,B	No access	No access	U
OS/2 LAN Requester	All functions	L,U,G,S,M ²	L,U,G,A,M ³	U	No access	No access	U
NetWare Requester	No access	No access	No access	No access	All functions	All functions	No access
OS/2 Peer and NetWare Requester	All functions ¹	L,U,M ¹ ,G,S	L,U,G,A,B	U,B	All functions	All functions	U

Table 11 (Page 2 of 2). Interoperability - OS/2 Warp Connect Accessing Servers

Warp Connect Client	Server						
	LAN Server 4.0	LAN Manager 2.2	Windows NT Advanced 3.5	Windows for Workgroups 3.11	NetWare 3.12	NetWare 4.x	DOS LAN Services Peer
OS/2 LAN Requester and NetWare Requester	All functions	L,U,G,S,M ²	L,U,G,A,M ³	U	All functions	All functions	U
Legend: L Logon to the server U Use the server's resource H Home directory assigned N Network application G Guest account access accepted A Logon assignments M Manage server resources S Logon scripts B Browse and Connect to resources							
Notes: 1 - You can manage servers by using the NET ADMIN command 2 - Group definitions can be managed; other administrative functions allow for displaying only. 3 - User and group definitions can be managed only from the GUI (NET ADMIN not supported)							

Table 12. Interoperability - OS/2 Warp Connect OS/2 Peer - Accessed by Clients

	Client						
	OS/2 Peer (client)	OS/2 LAN Requester	LAN Manager 2.2	Windows NT 3.5	Windows for Workgroups 3.11	OS/2 NetWare Requester	DOS LAN Services
OS/2 Peer (server)	U,G,M1,B	U,G,M1,2,B	U,G,M1	G,U,B	G,U,B	No access	U,G,M1,B
Legend: L Logon to the server U Use the server's resource H Home directory assigned N Network application G Guest account access accepted A Logon assignments M Manage server resources S Logon scripts B Browse and Connect to resources							
Notes: 1 - You can manage servers by using the NET ADMIN command 2 - Although IBM Peer for OS/2 can be accessed using the LAN Server 4.0 graphical user interface, administration of the peer through this interface is not supported. Attempts to do so will have unpredictable results.							

The following gives more explanation on the preceding tables:

- **L - Logon to the server**
This means that you can log on to the server and be validated.
- **U - Use resource**
This indicates that you can use the server's resource. However, if L is not also specified, this means that you are not validated for logon but you can use the resource with the NET USE command.
- **H - Home directory assigned**
This indicates that during the logon process, you can receive a home directory when there is one assigned for your ID at the server.
- **N - Network Application**
This indicates that you can access Public or Private network applications set up on LAN Server, if any application is defined. This is a LAN Server-specific function, and is available to LAN Server or OS/2 Peer requesters only.
- **G - Guest Access**

This indicates that you can access the server's resource using a guest account, that is, without logging on to that specific domain or server.

- **A - Logon Assignments**

This indicates that you have all LAN Server logon assignments added to the user ID during logon time. Logon assignments are automatically made to connect the logged-on user to network resources.

- **M - Manager**

This indicates that you can do some management of your server. In some cases, this is allowed only via the NET ADMIN command.

- **S - Logon Scripts**

This indicates that the workstation can interpret the logon scripts, if there are any defined on the server. LAN Manager uses this mechanism to assign resources to users every time they logon to the server. Depending on the number of users, you may have many different logon scripts.

LAN Server 4.0 supports logon scripts in addition to the Logon Assignments function and logon profiles (PROFILE.CMD and PROFILE.BAT).

- **B - Browse**

This indicates that the workstation is able to Browse available resources on the server and select to make a connection. This can be achieved through the Network icon for OS/2 workstations, the OS/2 Peer Sharing and Connecting Notebook, or the Windows File and Print Managers.

IBM Peer for OS/2 Version 1.0 Interoperability

Note: For the level of interoperability between the IBM Peer for OS/2 Version 1.0, Windows for Workgroups and Windows NT described in this section, the operating system in use must be base operating system OS/2 Warp Version 3.0, Type 0C with CSD XR03003 or Type WC. Prior levels of OS/2 are restricted to interoperability at the command line interface.

Connecting from IBM Peer for OS/2 Version 1.0 to Microsoft Windows for Workgroups and NT Workstations

p.The IBM Peer for OS/2 Version 1.0 can access shared files and printers on Microsoft Windows for Workgroups workstations across the LAN. Connections to Microsoft Windows for Workgroups resources are supported through the Sharing and Connecting Notebook or from the OS/2 command line.

Although user IDs and passwords are required for local network access in Windows for Workgroups, share-level security has been implemented for shared resources. That is, resources are shared simply with an optional password. If a shared Windows for Workgroups resource is password-protected and the OS/2 Peer user's logon password does not match the resource password, you can specify the correct resource password at the time of connection.

In the OS/2 network browser, shared Windows for Workgroups drives and printers with no password or with a previously established connection are visible and fully accessible. The OS/2 network browser does not see a resource that is password-protected. Therefore, you should connect to password-protected resources before accessing the OS/2 network browser.

OS/2 Peer workstations can browse the shared resources on Microsoft Windows for Workgroups workstations if the workgroup names of the Microsoft Windows for Workgroups workstations are within the browse scope of the OS/2 Peer workstations. The browse scope of an OS/2 Peer workstation consists of the logon domain, the default domain, and any other domains specified to OS/2 Peer. Two methods for specifying other domains are:

- Issue the command `NET CONFIG REQ /OTH:domains` to specify up to four other domains for the current session of the Requester service.
- Add up to four domain names to the `othdomains` statement in the requester section of the `IBMLAN.INI` file on the OS/2 Peer workstation. The statement is processed when the Requester service is started.

OS/2 Peer can access drives and directories shared by Windows for Workgroups workstations. Directory and file settings pages for Windows for Workgroups files and directories are limited to the File page. File attributes of archive, hidden, and readonly are not settable.

To use a shared Microsoft Windows for Workgroups printer, you must install an OS/2 printer driver on the peer workstation and associate it with the remote Windows for Workgroups printer. This can be done through the network browser or the Network Printer template. The remote Windows for Workgroups printer queue is visible. Each user can manage his jobs in the remote queue with the options release, hold, and delete. Jobs cannot be copied or moved within the queue. The jobs settings page is not accessible.

If you are connecting from OS/2 Peer to a Windows for Workgroups resource that contains a blank as a character in a share name, put the share name

containing the blank in a string delimited with double quotation marks on the command line. For example:

```
NET USE d: "\\wfw lan\Ron 4019"
```

Connecting from Windows for Workgroups to OS/2 Peer

The Windows for Workgroups user ID and password is used to access the OS/2 Peer resources. It is the responsibility of the user to synchronize his password and the OS/2 Peer remote password. Type NET HELP PASSWORD on the DOS Windows for Workgroup command line to see the command syntax.

OS/2 Peer has implemented user-level security for access to both local network access and shared resources. Peer workstation administration defines user IDs, access permissions for those users, and shared resources to be used by the specified user IDs.

Windows for Workgroups workstations can access resources shared by OS/2 Peer workstations, except for serial devices. Windows for Workgroups workstations can browse the resources in a LAN Server or OS/2 Peer domain provided at least one Windows for Workgroups or Windows NT workstation is in the same domain, or has a Workgroup name which matches the IBM Peer for OS/2 Version 1.0 domain name. OS/2 Peer shared drives are visible in and accessible through the Windows for Workgroups File Manager network browser; OS/2 Peer shared printers are visible in and accessible through the Print Manager network browser.

The user must install a matching printer driver on the Windows for Workgroups workstation and associate it with the remote OS/2 printer. The remote OS/2 printer is visible. Each user can manage his jobs in the remote queue with the options pause, resume, and delete. The user cannot change the position of the jobs in the queue.

Files and directories can be moved between OS/2 and Windows for Workgroups systems by diskette, by command line moves or copies, by drag and drop on the Desktop, or in an application. This movement can be initiated by the user on either system.

Windows for Workgroups does not support OS/2 file or directory extended attributes. This typically includes creation date, last revision date, author, file description, and icon associations. Extended attributes can contain other application-specific data. Because many public applications have both Windows and OS/2 versions of their applications, the extended attribute can be stored within the file itself. This makes it easier to move the data

between systems whether by diskette or by LAN. OS/2 and many of its applications warn the user whether data is being stored on a drive that does not support extended attributes. Once the user is aware of the significance of moving data between drive types, the Workplace Shell warning messages can be suppressed by inserting SET CONFIRMLOSTEAS=NO in the CONFIG.SYS file. Most other application-specific warning messages can be suppressed in digit position 41 of the wrkheuristics parameter in the IBMLAN.INI file.

Microsoft Windows for Workgroups 3.11 includes a messaging utility called WinPopup, which is interoperable with the OS/2 Peer Network Messaging utility. However, the Microsoft Windows for Workgroups ClipBook Viewer is not interoperable with the OS/2 Peer Network DDE and Clipboard utility.

It is not possible to remotely administer a Windows for Workgroups workstation from an OS/2 Peer workstation, or vice versa.

Interoperability with Windows NT Workstation and Advanced Server

OS/2 Peer workstations can access resources shared by Microsoft Windows NT Advanced Servers. Connections to NT resources can be made through the OS/2 network browser, the Sharing and Connecting GUI on the Desktop or from the OS/2 command line with the NET USE command. An active user ID and password authorizes the user to browse and use shared drives and printers.

Both Microsoft Windows NT Workstation and Advanced Servers and OS/2 Peer implement user-level security through user IDs and passwords. Each user manages his password on remote systems to maintain security. OS/2 Peer users can manage their user password on the remote NT system through OS/2 Peer User Profile Management or the command line.

Windows NT and OS/2 Peer do not recognize each others' printer drivers. It is the responsibility of the user to install an OS/2 printer driver on the peer workstation and associate it with the remote NT printer. This can be done through the network browser or the Network Printer template. The remote NT printer queue is visible. The OS/2 Peer or Windows for Workgroups print jobs are marked *remote down level documents* by the NT system.

Windows NT users can browse the shared resources on a LAN Server domain, including OS/2 Peer workstations, if the workgroup name of at least one Windows NT workstation or NT Advanced Server matches the domain name. Windows NT servers or workstations can access resources shared by peer workstations except for serial devices. OS/2 Peer shared drives will be visible in the NT File Manager network browser. However, the OS/2 Peer

workstation name and share name (workstation sharename) must be entered on the NT Print Manager command line before its printer resources will be visible to the NT workstation. The user must install an NT printer driver on the NT system and associate it with the remote OS/2 printer. Windows NT can use long file names and extended attributes.

It is not possible to remotely administer an NT Advanced Server workstation from a peer workstation or vice versa.

Sharing NetWare Resources using IBM Peer for OS/2 Version 1.0

When a OS/2 Warp Connect workstation has both the NetWare Client for OS/2 Version 2.11 and the IBM Peer for OS/2 Version 1.0 installed, it is possible for the NetWare Client for OS/2 Version 2.11 to map a drive to a NetWare server resource over the IPX protocol, then subsequently share that mapped drive (which appears to the IBM Peer for OS/2 Version 1.0 as a local drive) to other IBM Peer for OS/2 Version 1.0 or OS/2 LAN Requester workstations across the LAN over NetBIOS. Figure 239 shows this configuration.

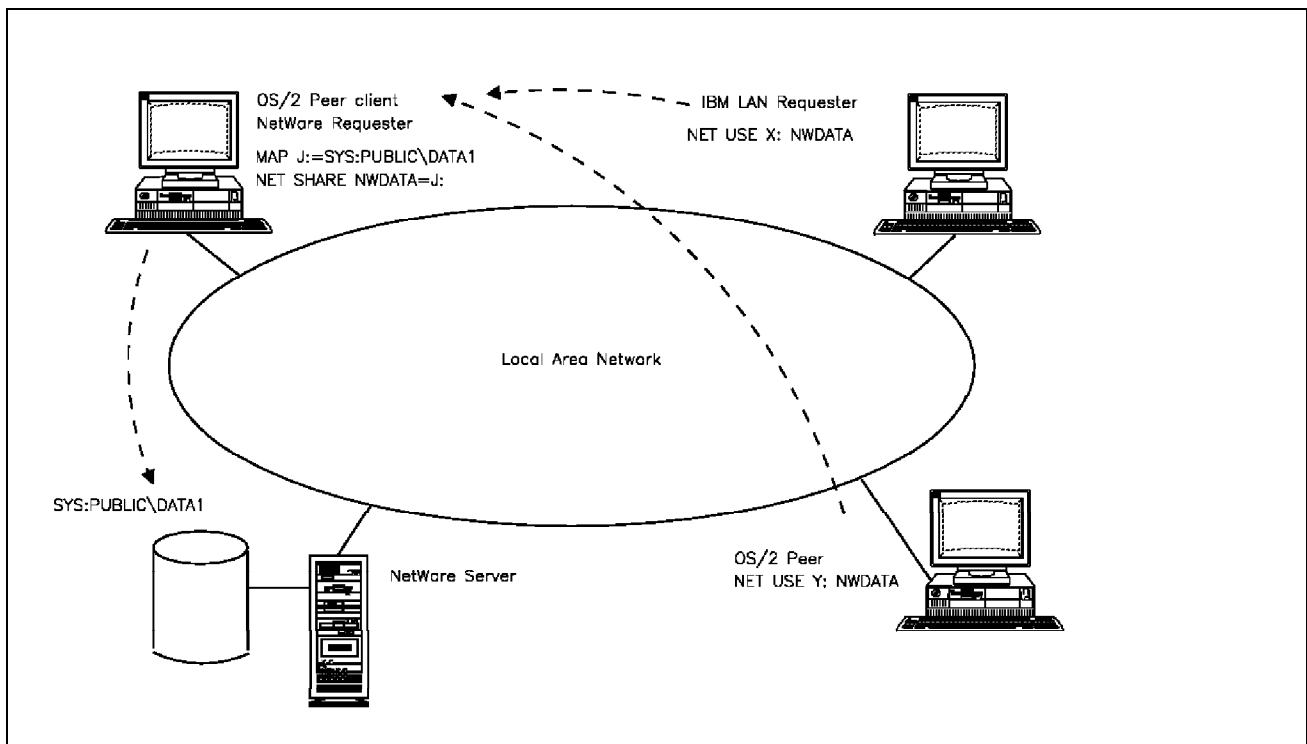


Figure 239. IBM Peer for OS/2 Version 1.0 Sharing NetWare Resources to other Workstations

This facility can be extremely useful in an environment which is mainly OS/2 LAN Server based, but has a requirement for occasional access to file resources or a printer on a NetWare server. All the workstations can access the NetWare resource, without having to install the NetWare Client for OS/2 Version 2.11 on each workstation.

Note

You can start sharing the NetWare drive only from the OS/2 command line or the IBM Peer for OS/2 Version 1.0 Sharing and Connecting notebook.

Appendix A. Supported Hardware List

This section lists the hardware such as LAN adapters, modem or communication adapters and CD-ROM drives supported by OS/2 Warp Connect Version 3.

Supported Network Adapter Card Drivers

OS/2 Warp Connect provides network adapter card drivers that are shipped with OS/2 Warp Connect but it also supports several drivers that are not shipped with OS/2 Warp Connect. They are available from the adapter card manufacturers.

Drivers Shipped with OS/2 Warp Connect

<i>Table 13 (Page 1 of 7). Network Adapter Card Drivers Shipped with OS/2 Warp Connect</i>		
Network Adapter Card	Driver Name	Associated Files
3Com EtherLink II (3C503)	ELNKII.OS2	ELNKII.NIF
3Com EtherLink II-16 (3C503-16)	ELNKII.OS2	ELNKII.NIF
3Com EtherLink II-16-TP (3C503-16-TP)	ELNKII.OS2	ELNKII.NIF
3Com EtherLink/MC (3C523B)	ELNKMC.OS2	ELNKMC.NIF
3Com EtherLink/MC-TP (3C523B-TP)	ELNKMC.OS2	ELNKMC.NIF
3Com EtherLink III (3C509)	ELNK3.OS2	EL3IBMO2.NIF
3Com EtherLink III-Combo (3C509-COMBO)	ELNK3.OS2	EL3IBMO2.NIF
3Com EtherLink III-TP (3C509-TP)	ELNK3.OS2	EL3IBMO2.NIF
3Com EtherLink III-TPO (3C509-TPO)	ELNK3.OS2	EL3IBMO2.NIF
3Com EtherLink III-EISA (3C579)	ELNK3.OS2	EL3IBMO2.NIF
3Com EtherLink III-EISA-TP (3C579-TP)	ELNK3.OS2	EL3IBMO2.NIF
3Com EtherLink III-MCA (3C529)	ELNK3.OS2	EL3IBMO2.NIF
3Com EtherLink III-MCA-TP (3C529-TP)	ELNK3.OS2	EL3IBMO2.NIF
3Com TokenLink III (3C619)	IBMTOK.OS2	TLNKIII.NIF LT2.MSG LT2H.MSG
3Com TokenLink III EISA (3C679)	IBMTOK.OS2	TLNKIII.NIF LT2.MSG LT2H.MSG
3Com TokenLink III MCA (3C629)	IBMTOK.OS2	TLNKIII.NIF LT2.MSG LT2H.MSG
Artisoft NodeRunner/SI 2000/C	AEXNDIS.OS2	AEXNDIS.NIF
Artisoft NodeRunner/SI 2000/T	AEXNDIS.OS2	AEXNDIS.NIF

Table 13 (Page 2 of 7). Network Adapter Card Drivers Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
Artisoft NodeRunner/SI 2000/A	AEXNDIS.OS2	AEXNDIS.NIF
Artisoft NodeRunner/SI 2000M/TC	AEXNDIS.OS2	AEXNDIS.NIF
Artisoft LANTastic NodeRunner 2000/C	AEXNDIS.OS2	AEXNDIS.NIF
Artisoft LANTastic NodeRunner 2000/T	AEXNDIS.OS2	AEXNDIS.NIF
Artisoft LANTastic NodeRunner 2000/A	AEXNDIS.OS2	AEXNDIS.NIF
Artisoft LANTastic NodeRunner 2000M/TC	AEXNDIS.OS2	AEXNDIS.NIF
Cabletron Ethernet DNI Adapter (E1112)	E11ND.OS2	E11.NIF
Cabletron Ethernet DNI Adapter (E1119)	E11ND.OS2	E11.NIF
Cabletron Ethernet DNI Adapter (E2112)	E21ND.OS2	E21.NIF
Cabletron Ethernet DNI Adapter (E2119)	E21ND.OS2	E21.NIF
Cabletron Ethernet DNI Adapter (E3112)	E31ND.OS2	E31.NIF
Cabletron Ethernet DNI Adapter (E3119)	E31ND.OS2	E31.NIF
Cabletron Token-Ring DNI Adapter (T2015)	T20ND.OS2	T20.NIF
Cabletron Token-Ring DNI Adapter (T3015)	T30ND.OS2	T30.NIF
Cray Communications ScaNet Network Interface Adapter-MCA	PC04.OS2	PC04.NIF
Cray Communications ScaNet Network Interface Adapter-ISA	PC04.OS2	PC04.NIF
DCA ClassicBlue MC 4/16 Token-Ring Adapter	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
Eagle Novell NE2000	NE2000.OS2	IBMNE200.NIF
Eagle Novell NE2000T	NE2000.OS2	IBMNE200.NIF
Eagle Novell NE2000plus	NE2000.OS2	IBMNE200.NIF
Eagle Novell NE2000Tplus	NE2000.OS2	IBMNE200.NIF
Eagle Novell NE2000plus-3	NE2000.OS2	IBMNE200.NIF
Eagle EtherXpert EP2000plus	EP2000.OS2	IBMEP200.NIF
Eagle EtherXpert EP2000Tplus	EP2000.OS2	IBMEP200.NIF
Eagle Novell NE3210	NE3210.OS2	IBMNE321.NIF
Eagle EtherXpert EP3210	EP3210.OS2	IBMEP321.NIF
IBM Adapter/A for Ethernet Networks	MACETH.OS2 MACETH2.OS2	MACETH.NIF ETH.MSG ETHH.MSG
IBM FDDI Copper Base ISA Adapter	IBMFDX.OS2	IBMFDX.NIF LTE.MSG LTEH.MSG IBMFDX.TXT
IBM FDDI Copper Extender ISA Adapter	IBMFDX.OS2	IBMFDX.NIF LTE.MSG LTEH.MSG IBMFDX.TXT

Table 13 (Page 3 of 7). Network Adapter Card Drivers Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
IBM FDDI Fiber Base ISA Adapter	IBMFDX.OS2	IBMFDX.NIF LTE.MSG LTEH.MSG IBMFDX.TXT
IBM FDDI Fiber Extender ISA Adapter	IBMFDX.OS2	IBMFDX.NIF LTE.MSG LTEH.MSG IBMFDX.TXT
IBM Adapter/A for Ethernet Networks	MACETH.OS2	MACETH.NIF MACETH2.OS2 ETH.MSG ETHH.MSG
IBM Adapter/A for Ethernet Twisted-Pair Networks	MACETH.OS2 MACETH2.OS2	MACETH.NIF ETH.MSG ETHH.MSG
IBM LAN Adapter for Ethernet	IBMENI.OS2	IBMENI.NIF IBMENI.TXT
IBM LAN Adapter for Ethernet CX	IBMENI.OS2	IBMENI.NIF IBMENI.TXT
IBM LAN Adapter for Ethernet TP	IBMENI.OS2	IBMENI.NIF IBMENI.TXT
IBM LAN Adapter/A for Ethernet	IBMENII.OS2	IBMENII.NIF IBMENII.TXT
IBM EtherStreamer MC 32 Adapter	IBMMPC.OS2 V 1.3 or higher	IBMMPC.NIF LTC.MSG LTCH.MSG IBMMPC.TXT
IBM Dual EtherStreamer MC 32 Adapter	IBMMPC.OS2 V3.0 or higher DUALSTRM.OS2	IBMMPC.NIF LTC.MSG LTCH.MSG IBMMPC.TXT
IBM Credit Card Adapter for Ethernet	PCMNICCS.OS2	PCMNICCS.NIF PCMNICCS.TXT
IBM Credit Card Adapter II for Ethernet	PCMNICCS.OS2	PCMNICCS.NIF PCMNICCS.TXT
IBM Parallel Port	PRNANDIS.OS2	PRNANDIS.NIF PRANDISC.EXE PRN.MSG PRNH.MSG PRNANDIS.TXT
IBM Token-Ring Network Adapter	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
IBM Token-Ring Network Adapter II	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG

Table 13 (Page 4 of 7). Network Adapter Card Drivers Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
IBM Token-Ring Network 16/4 Adapter	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
IBM Token-Ring Network 16/4 ISA-16 Adapter	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
IBM Token-Ring Network 16/4 Adapter II	IBM16TR.OS2	IBM16OS2.NIF BRZ.MSG BRZH.MSG IBM16TR.TXT
IBM 16/4 Busmaster EISA Adapter	IBMEITR.OS2	IBMEIOS2.NIF LT9.MSG LT9H.MSG
IBM Token-Ring 16/4 Credit Card Adapter	IBMTOKCS.OS2	IBMTOKCS.NIF LTG.MSG LTGH.MSG IBMTOKCS.TXT
IBM Token-Ring 16/4 Credit Card Adapter II	IBMTOKCS.OS2	IBMTOKCS.NIF LTG.MSG LTGH.MSG IBMTOKCS.TXT
IBM Token-Ring Network Adapter/A (69X8138)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
IBM Token-Ring Network 16/4 Adapter/A (16F1163)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
IBM Token-Ring Network 16/4 Adapter/A (75F9410)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
IBM 16/4 Busmaster Server Adapter/A	IBMTRBM.OS2	IBMTRBM.NIF MONT400.BIN WRTRAM.BIN LT4.MSG LT4H.MSG
IBM LANStreammer MC 16 Adapter	IBMTRDB.OS2	IBMTRDB.NIF LT6.MSG LT6H.MSG IBMTRDB.TXT
IBM LANStreammer MC 32 Adapter	IBMTRDB.OS2	IBMTRDB.NIF LT6.MSG LT6H.MSG IBMTRDB.TXT
IBM Auto LANStreammer MC 32 Adapter	IBMMPC.OS2 V 2.0 or higher	IBMMPC.NIF LTC.MSG LTCH.MSG IBMMPC.TXT

Table 13 (Page 5 of 7). Network Adapter Card Drivers Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
IBM Dual LANStreamer MC 32 Adapter	IBMMPC.OS2 V3.0 or higher DUALSTRM.OS2	IBMMPC.NIF LTC.MSG LTCH.MSG IBMMPC.TXT
IBM PC Network Adapter II-Frequency 2	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM PC Network Adapter II-Frequency 3	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM PC Network Baseband Adapter	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM PC Network Broadband Adapter II	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM PC Network Adapter II/A-Frequency 2	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM PC Network Adapter II/A-Frequency 3	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM PC Network Baseband Adapter/A	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM PC Network Broadband Adapter II/A	IBMNET.OS2	IBMNET.NIF LT1.MSG LT1H.MSG
IBM wIReless LAN ISA Adapter (Infrared)	IRMAC.OS2	IRMACISA.NIF IRMAC.OS2 IR0.MSG IR0H.MSG IRMAC.TXT
IBM wIReless LAN MCA Adapter (Infrared)	IRMAC.OS2	IRMACMCA.NIF IRMAC.OS2 IR0.MSG IR0H.MSG IRMAC.TXT
IBM wIReless LAN PCMCIA Adapter (Infrared)	IRMAC.OS2	IRMACPCM.NIF IRMAC.OS2 IR0.MSG IR0H.MSG IRMAC.TXT
IBM Wireless ISA/MCA LAN Adapter	IBMWLO.OS2	IBMWLO.NIF LTH.MSG LTHH.MSG
IBM Wireless PCMCIA LAN Adapter	IBMWLO.OS2	IBMWLO.NIF LTH.MSG LTHH.MSG

Table 13 (Page 6 of 7). Network Adapter Card Drivers Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
IBM Advanced 3278/79 Emulation Adapter	IBMXLN.OS2	IBMXLN.NIF LT3.MSG LT3H.MSG
IBM 3270 Connection DFT	IBMXLN.OS2	IBMXLN.NIF LT3.MSG LT3H.MSG
Intel EtherExpress 16C (PCLA8100)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel EtherExpress FlashC (PCLA8105)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel EtherExpress 16 (PCLA8110)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel EtherExpress Flash (PCLA8115)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel EtherExpress 16TP (PCLA8120)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel EtherExpress FlashTP (PCLA8125)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel EtherExpress MCA (MCLA8110)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel EtherExpress MCATP (MCLA8120)	EXP16.OS2	EXP16.NIF EXP16.TXT
Intel TokenExpress ISA/16S (PCLA8130A)	INTEL16.OS2 (OLITOK16.OS2)	INTEL16.NIF (OLITOK16.NIF) INTEL.TXT
Intel TokenExpress 16/4 LAN Adapter for EISA (EILA8235)	INTEL16.OS2 (OLITOK16.OS2)	INTEL16.NIF (OLITOK16.NIF) INTEL.TXT
Intel TokenExpress EISA/32 LAN Adapter (EILA8245)	INTEL16.OS2 (OLITOK16.OS2)	INTEL16.NIF (OLITOK16.NIF) INTEL.TXT
Madge Straight Blue 16/4 ISA (62-01)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
Madge Straight Blue ISA Plus Blue Box (62-02)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
Madge Straight Blue MC Blue Box (64-01)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
Madge Smart 16/4 AT PLUS Ringnode (52-03)	SMARTND.OS2	SMARTND.NIF MDGND.OS2 MDGND.NIF
Madge Smart 16/4 EISA Ringnode (52-08)	SMARTND.OS2	SMARTND.NIF
Madge Smart 16/4 MC Ringnode (54-08)	SMARTND.OS2	SMARTND.NIF
Madge Smart 16/4 MC32 Ringnode (54-09)	SMARTND.OS2	SMARTND.NIF

Table 13 (Page 7 of 7). Network Adapter Card Drivers Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
Madge Smart 100 EISA Ringnode	MDGND.OS2	MDGND.NIF
Madge Smart 100 16/4 AT Ringnode	MDGND.OS2	MDGND.NIF
Madge Smart 100 Ringnodes FDDI	MDGFND.OS2	MDGFND.NIF MDGFNODE.BIN
Madge Straight Blue MC Blue Box (64-01)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
Olicom USA Inc. ISA 16/4 Adapter (OC-3117)	OLITOK16.OS2	OLITOK.NIF
Olicom USA Inc. MCA 16/4 Adapter (OC-3129)	OLITOK16.OS2	OLITOK.NIF
Olicom USA Inc. EISA 16/4 Adapter (OC-3133)	OLITOK16.OS2	OLITOK.NIF
Racore Computer Products Inc. Token-Ring ISA	RTR16NDS.OS2	RTR16NDS.NIF RTR16NDS.MSG RTR16NDS.TXT
Racore Computer Products Inc. Token-Ring MC	RTR16NDS.OS2	RTR16NDS.NIF RTR16NDS.MSG RTR16NDS.TXT
SMC EtherCard PLUS (8003EB)	MACWD.OS2 MACWD2.OS2	MACWDAT.NIF MAC.MSG MACH.MSG
SMC EtherCard PLUS/A (8003E/A)	MACWD.OS2 MACWD2.OS2	MACWDMC.NIF MAC.MSG MACH.MSG
Texas Instruments Inc. TokenLite Token-Ring Adapter	TR2KNDIS.OS2	TR2KNDIS.NIF TR2KNDIS.MSG TR2KNDIS.TXT
Thomas-Conrad Tropic 16/4 Token-Ring Adapter/AT (TC4043)	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
Thomas-Conrad 16/4 Token-Ring Adapter/AT (TC4045)	TCCTOK.OS2	TCCTOK.NIF EAGLEMAC.BIN
Thomas-Conrad 16/4 Token-Ring Adapter/MC (TC4046)	TCCTOK.OS2	TCCTOK.NIF EAGLEMAC.BIN
Ungermann-Bass NIUpc Adapter	UBNEI.OS2	UBNEIPC.NIF LT2.MSG LT2H.MSG
Ungermann-Bass NIUps Adapter	UBNEI.OS2	UBNEIPS.NIF LT2.MSG LT2H.MSG

Drivers Not Shipped with OS/2 Warp Connect

<i>Table 14 (Page 1 of 3). Network Adapter Card Drivers not Shipped with OS/2 Warp Connect</i>		
Network Adapter Card	Driver Name	Associated Files
3Com EtherLink 16 (3C507)	ELNK16.OS2	LS507OS2.NIF
3Com EtherLink 16-TP (3C507-TP)	ELNK16.OS2	LS507OS2.NIF
3Com EtherLink MC-32 (3C527B)	ELMC32.OS2	LS527OS2.NIF
Accton EtherCombo-16 (EN1650)	ETHNE.OS2	EN165X0.NIF
Accton EtherPair-16 (EN1651)	ETHNE.OS2	EN165X0.NIF
Accton EtherCoax-16 (EN1652)	ETHNE.OS2	EN165X0.NIF
Accton EtherCombo-32 (EN1200)	ACC1200.OS2	ACC1200E.NIF
Allied Telesis AT1500 Plus ISA	AT1500.OS2	
Allied Telesis AT1700 Plus ISA	AT1700.OS2	
Allied Telesis AT1720 Plus MCA	AT1700.OS2	
Asante EtherPaC 2000+3	EP2000.OS2	EP2000.NIF
Asante EtherPaC 2000+N	EP2000.OS2	EP2000.NIF
Asante EtherPaC 2000+T	EP2000.OS2	EP2000.NIF
Compaq Netflex-2 ENET-TR Controller	NETFLX.OS2 V1.11	NETFLX.NIF
DCA IRMAtrac EISA	OLITOK32.OS2	OLITOK32.NIF
DCA IRMAtrac Token-Ring Adapter/Convertible-MCA	IRMATR.OS2	IRMATR.NIF
IRMATR.TXT		
DEC EtherWorks Turbo 435 PCI	DC21040.OS2	
D-Link Ethernet Interface Card for the PC XT/AT (DE-220C)	DE200.OS2	DE200IBM.NIF
D-Link Ethernet Interface Card for the PC XT/AT (DE-220CAT)	DE200.OS2	DE200IBM.NIF
D-Link Ethernet Interface Card for the PC XT/AT (DE-220CT)	DE200.OS2	DE200IBM.NIF
D-Link Ethernet Interface Card for the PC XT/AT (DE-220T)	DE200.OS2	DE200IBM.NIF
D-Link Ethernet Card for EISA bus PC (DE-400)	DE400.OS2	DE400.NIF
D-Link Ethernet VESA Combo Card (DE-500CAT)	DE500.OS2	DE500.NIF
Hewlett-Packard 27247	HPLANP.OS2	HPLANP.NIF
IBM Ethernet Quad-BT and Quad-B2 PeerMaster Server Adapters	MXMCA4BT.OS2 MXMCA4BN.OS2 VNET.OS2	MXMCA4BT.NIF MXMCA4BN.NIF VNET.NIF MXMCA4BT.BIN MXMCA4TN.BIN
IBM Auto 16/4 Token-Ring ISA Adapter	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG

Table 14 (Page 2 of 3). Network Adapter Card Drivers not Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
IBM Auto LANStreamer PCI Adapter	IBMMPC.OS2 V4.01.00 or higher	IBMMPC.NIF LTC.MSG LTCH.MSG IBMMPC.TXT
IBM FDDI Copper Base MCA Adapter	IBMFDX.OS2	IBMFDX.NIF
IBM FDDI Copper Extender MCA Adapter	IBMFDX.OS2	IBMFDX.NIF
IBM FDDI Fiber Base MCA Adapter	IBMFDX.OS2	IBMFDX.NIF
IBM FDDI Fiber Extender MCA Adapter	IBMFDX.OS2	IBMFDX.NIF
IBM Wireless ISA/MCA LAN Adapter	IBMWLO.OS2 IBMWLB.OS2	IBMWLO.NIF IBMWLB.NIF
IBM Wireless PCMCIA LAN Adapter	IBMWLO.OS2	IBMWLO.NIF
Intel EtherExpress PRO with Flash	EPRO.OS2	
Kingston TokenRx MC 16/4 Token-Ring Adapter	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
Kingston TokenRx ISA 16/4 Token-Ring Adapter	IBMTOK.OS2	IBMTOK.NIF LT2.MSG LT2H.MSG
NCR Corporation StarLAN Token-Ring ISA	STRN.OS2	
NCR Corporation StarLAN Token-Ring MCA	STRN.OS2	
NCR Corporation WaveLAN Adapter	ONCRWL02.OS2	ONCRWL02.NIF
Olicom USA Inc. EISA/32 Adapter (OC-3135)	OLITOK32.OS2	OLITOK32.NIF
Olicom USA Inc. Pocket Token-Ring Adapter (OC-3210)	OLITOKP.OS2	OLITOKP.NIF
Olicom USA Inc. Token-Ring PCMCIA Card (OC-3220)	OLITOK16.OS2 OCTENABL.OS2	OLITOKCE.NIF
Proteon p1892plus ProNET - 4/16 Plus	NDIS89XR.OS2	LS189XR.NIF
Proteon p1392plus ProNET - 4/16 Plus	NDIS39XR.OS2	LS129XR.NIF
Proteon p1990plus ProNET - 4/16 Plus	NDIS99XR.OS2	LS199XR.NIF
Racal InterLan InterLan EtherBlaster TP-8INT (163-3184)	NI6510.OS2	NI6510.NIF
Racal InterLan InterLan AT-TP (163-3118)	ILANAT.OS2	ILANAT.NIF
Racal InterLan NI5210-16 (163-0610)	NI5210.OS2	NI5210.NIF
Racal InterLan ES3210	ES3210.OS2	ES3210.NIF
Racal InterLan ES3210-TP (163-3160)	ES3210.OS2	ES3210.NIF
Racal InterLan InterLan MCA (163-3142)	NI9210.OS2	NI9210.NIF
Racal InterLan InterLan MCA-TP (163-3143)	NI9210.OS2	NI9210.NIF
Racal InterLan InterLan T/R 16/4 ISA (163-3193)	RIC16NDS.OS2	RIC16NDS.NIF
Racal InterLan InterLan T/R 16/4 MCA (163-3137)	RDC16NDS.OS2	RDC16NDS.NIF
SMC EtherCard PLUS Elite (8003EP)	SMCMAC.OS2	SMCOS2AT.NIF SMC.MSG
SMC EtherCard PLUS Elite 10T (8003WC)	SMCMAC.OS2	SMCOS2AT.NIF SMC.MSG

Table 14 (Page 3 of 3). Network Adapter Card Drivers not Shipped with OS/2 Warp Connect

Network Adapter Card	Driver Name	Associated Files
SMC EtherCard PLUS Elite 16T (8013WC)	SMCMAC.OS2	SMCOS2AT.NIF SMC.MSG
SMC EtherCard PLUS Elite 16 (8013EPC)	SMCMAC.OS2	SMCOS2AT.NIF SMC.MSG
SMC EtherCard PLUS Elite 16 Combo (8013EWC)	SMCMAC.OS2	SMCOS2AT.NIF SMC.MSG
SMC EtherCard PLUS Elite/A (8013EP/A)	SMCMAC.OS2	SMCOS2AT.NIF SMC.MSG
SMC EtherCard PLUS Elite 10 T/A (8013WP/A)	SMCMAC.OS2	SMCOS2AT.NIF SMC.MSG
SMC EtherCard Elite 16 Ultra (8216)	SMC8000.OS2	SMCOS2AT.NIF
SMC EtherCard Elite 16C Ultra (8216C)	SMC8000.OS2	SMCOS2AT.NIF
SMC EtherCard Elite 16T Ultra (8216T)	SMC8000.OS2	SMCOS2AT.NIF
SMC EtherCard Elite32C Ultra (82M32C)	SMC8232.OS2	SMCOS2E.NIF
SMC TokenCard Elite (8115T)	SMC8100.OS2	SMCOS2AT.NIF
SMC TokenCard Elite/A (8115T/A)	SMC8100.OS2	SMCOS2MC.NIF
SMC TokenCard Elite Master 32 (83M32)	SMC8332.OS2	SMCOS2ET.NIF
Xircom External Token-Ring Adapter (ET16BU)	SMARTND.OS2 TRSETUP.OS2	XIRTOK.NIF
Xircom Pocket Token Ring Adapter III (PT3-16CTP)	SMARTND.OS2	XIRTOK.NIF
Xircom CreditCard Token Ring Adapter (CT-16CTP)	CTND.OS2	CTOS2V2.NIF
Xircom Pocket Ethernet Adapter III (PE3-10BT)	PE3NDIS.OS2	PE3OS2V2.NIF
Xircom Pocket Ethernet Adapter III (PE3-10BC)	PE3NDIS.OS2	PE3OS2V2.NIF
Xircom Pocket Ethernet Adapter III (PE3-10BX)	PE3NDIS.OS2	PE3OS2V2.NIF
Xircom CreditCard Ethernet Adapter (CE-10BC)	CENDIS.OS2	CEOS2V2.NIF
Xircom PS-CreditCard Ethernet Adapter (PS-CE2-10BT)	CE2NDIS.OS2	CE2OS2.NIF

Modems Supported by IBM LAN Distance

IBM LAN Distance requires specific support for modems and communications adapters. The IBM LAN Distance Connection Server 1.1 requires specific network adapters to support bridging. The following tables list the support included in IBM LAN Distance.

List of Modems and PIF File Name

The following table provides a list of the modems listed in release 1.1 of IBM LAN Distance and the corresponding PIF file name. Identify the listed modem's PIF and select this in the CFMODEM utility as a template.

<i>Table 15 (Page 1 of 3). PIF File Names for Modem Types Shipped with Product</i>	
Modem Types	PIF File Names
IBM LAN Distance Generic Modem Types	
Null Modem	NULMODEM.PIF
Asynchronous Switched Connection Modem	ASYNCSW.PIF
Asynchronous Leased Line Modem	ASYNCLL.PIF
Synchronous Switched Connection Modem	SYNCSW.PIF
Synchronous Leased Line Modem	SYNCLL.PIF
** Any Modem Not in This List **	NOTLIST.PIF
Asynchronous/Synchronous Modems	
Apex Freedom 14/96 Data/Fax Laptop Modem	APEX1496.PIF
Apex PCMCIA Fax/Modem IBP-1414	APEXPCM.PIF
AT&T Comsphere 3820	ATT3820.PIF
AT&T DataPort	ATTD.PIF
BocaModem 14.4 V.32bis External Modem	BOCA144E.PIF
BocaModem 14.4 V.32bis Internal Modem	BOCA144I.PIF
Complete PC 14400 TurboModem	COMPLETE.PIF
Data Race RediCard Internal Modem	DRREDIMI.PIF
Data Race Thinkpad Internal Modem	DRTURBO.PIF
Digicom Eagle Plus V.32 Modem	EAGLEP.PIF
GVC FM-144V External Fax Modem	GVCFM144.PIF
GVC SM-96 External Modem	GVC96.PIF
Hayes ACCURA 144 + FAX144 Modem	ACCURA14.PIF
Hayes ACCURA 96 + FAX96 Modem	ACCURA96.PIF
Hayes Optima 28800 Modem	OPTIMA28.PIF
Hayes Optima 9600 Modem	OPTIMA96.PIF
Hayes Optima 14400 Modem	OPTIMA14.PIF
Hayes Ultra 9600 Modem	ULTRA96.PIF
Hayes Ultra 14400 Modem	ULTRA144.PIF
IBM 7851 14.4kbps Data/Fax Modem	IBM7851.PIF
IBM 7855 Modem (stand-alone and rack-mount models)	IBM7855.PIF
IBM ASYNC/SDLC V.32 Modem/A	IBMV32A.PIF
IBM High Speed Internal Data/Fax Modem	IBMHSINT.PIF
IBM MWave Waverunner Digital Modem (ISDN)	WAVERUNR.PIF
IBM MWave Windsurfer 14400 Modem	WINDSURF.PIF

Table 15 (Page 2 of 3). PIF File Names for Modem Types Shipped with Product

Modem Types	PIF File Names
IBM Microelectronics 14.4/14.4 Data/Fax Modem (PCMCIA)	IBMTORON.PIF
IBM PCMCIA Data/Fax Modem	IBMPCMC1.PIF
Intel 14.4EX Modem	INT144EX.PIF
Intel PCFM7600 14.4/14.4 External Modem	INPCFM76.PIF
Intel SatisFAXtion Modem/400	INTFAX4.PIF
Intel SatisFAXtion Modem/400e	INTFAX4E.PIF
Macronix Fax/Modem	MACRONIX.PIF
Megahertz XJ1144FM PCMCIA Data/Fax Modem	MH144PCM.PIF
Megahertz XJ196FM PCMCIA Data/Fax Modem	MH96PCM.PIF
Microcom DeskPorte FAST Modem	MICVFAST.PIF
Microcom MicroPorte 4232bis Portable Modem	MICROPRT.PIF
Microcom QX/4232bis Modem	MICROCOM.PIF
Motorola Codex 3220 Plus	CODX3220.PIF
Motorola Codex 3260 Modem	CODX3260.PIF
Motorola Codex 3261 Fast	CODX326X.PIF
Motorola UDS FasTalk 32bx Modem	FASTALK.PIF
Motorola UDS DSU170 V.35 Synchronous Modem	UDSDU170.PIF
Motorola UDS V.3229 Modem	UDSV3229.PIF
MultiTech 1432 Modem	MT1432.PIF
MultiTech 1432MU Modem	MT1432MU.PIF
MultiTech 932 Modem	MT932.PIF
NEC 19632E Intelligent Modem	NEC19632.PIF
Northern Telecom Meridian Datapath V.35 Modem	MERIDIAN.PIF
Practical Peripherals FX PS/2 Internal Modem	PPFXPS2.PIF
Practical Peripherals FXMT Modem	PPFXMT.PIF
Practical Peripherals FXSA Modem	PPFXSA.PIF
Practical Peripherals PM 14400FX Internal Modem	PPPM144.PIF
Racal-Datacom ALM3223 Modem	ALM3223.PIF
Racal-Datacom ALM3226 V.32bis Modem	ALM3226.PIF
RoIm 244PC Telephone	ROLM244.PIF
SupraFAX V.32bis Modem	SUPRAFAX.PIF
Switched 56 V.35 Modem	SWITCH56.PIF
Telebit T1600 Modem	TBT1600.PIF
Telebit T2500 Modem	TBT2500.PIF
Telebit T3000 Modem	TBT3000.PIF
Telebit Trailblazer Plus Modem	TELEBIT.PIF
Telebit WorldBlazer Modem	WLDBLAZE.PIF
USRobotics Courier HST DS	USRHSTDS.PIF

<i>Table 15 (Page 3 of 3). PIF File Names for Modem Types Shipped with Product</i>	
Modem Types	PIF File Names
USRobotics Sportster 14400 Modem	USRSPORT.PIF
USRobotics WorldPort Modem	USRWPORT.PIF
USRobotics WorldPort 9600 Modem	USRWPRT9.PIF
ViVa 14.4/FAX Modem	VIVA144.PIF
Zenith Data Systems 2000 Laptop Modem	ZEN2000.PIF
ZOOM EVFXV32 Modem	ZMFXV32.PIF
ZOOM EVFPV32bis Modem	ZMFPV32B.PIF
ZOOM EVFXV32 Internal Modem	ZMFXV32I.PIF
ZOOM EVFPV32bis Internal Modem	ZMPV32BI.PIF
ZOOM V.32bis High Speed External Modem	ZOOMV32B.PIF
ZOOM V.32bis High Speed External Modem	ZOOMV32B.PIF

COM-Port Recommendation

For the IBM LAN Distance Connection Server 1.1, we recommend a COM port with the UART chipset 16550A (FIFO) that enables buffering. Without this, your IBM LAN Distance Connection Server 1.1 may not be able to transmit data faster than 9600bps.

WAN Adapter Cards Supported by IBM LAN Distance

The following table reflects the adapters supported when IBM LAN Distance 1.1 was announced in the US, and may vary in different countries. Also, the list is likely to change as additional adapters are tested and certified.

For the latest list of supported adapters, see the ADAPTERS.TXT file available on:

- CompuServe PSPAPROD forum, in the library section of IBM LAN Distance
- OS2BBS to access IBMLink, the REMOTE section:
 - OS/2 Software Library (select option 3)
 - OS/2 Selective Fixes (select option 1)

Table 16. IBM LAN Distance 1.1 Supported Adapters (for US)

Adapter	MC	ISA	EISA	Supported On			Considerations
				Conn Svr	OS/2 Rem	Win Rem	
IBM Realtime Interface Co-Processor	X	X		X	X		- Device driver included with IBM LAN Distance - Async line speed limit of 38.4kbps
IBM Wide Area Connector	X	X		X	X		- Requires WAC device driver 2.1 or higher - Supports switched 56 or nonswitched up to 2mbps
IBM ISDN Co-processor	X	X		X	X		Requires ISDN Coprocessor Support Program 1.2
IBM WaveRunner Digital Modem	X	X		X	X	X	- Uses COM port device driver provided with IBM LAN Distance - Limited to single adapter
IBM Primary Rate ISDN Adapter	X			X	X		
IBM Dual Async Adapter/A	X			X	X	X	- Device driver provided with IBM LAN Distance - Number of adapters supported dependent on operating environment and processor speed
Star Gate Avenstar Multiport (8 or 16 ports)		X		X	X		- Device driver provided with adapter - Transfer rates limited to 115kbps, up to 4 adapters per PC
Various vendors serial ports (single/multiple)	X	X	X	X	X	X	- Uses COM port device driver provided with IBM LAN Distance - Number of adapters supported dependent on operating environment and processor speed; be sure you have 16550A UART

The abbreviation in the table are:

- **Conn Svr** as IBM LAN Distance Connection Server 1.1
- **OS/2 Rem** as IBM LAN Distance Remote Version 1.11
- **Win Rem** as IBM LAN Distance Remote for Windows Version 1.11

ISDN Adapter Cards Supported by IBM LAN Distance

Table 17 (Page 1 of 2). Supported ISDN Adapters with IBM LAN Distance	
Adapter	Part Number
IBM LAN Distance Micro Channel Adapters	
IBM ISDN Co-processor/2 (see note 1)	44F47228
IBM WaveRunner Digital Modem (see note 2)	60G0736
IBM Primary Rate ISDN Adapter	06H2153
IBM LAN Distance Non-Micro Channel Adapters	

<i>Table 17 (Page 2 of 2). Supported ISDN Adapters with IBM LAN Distance</i>	
Adapter	Part Number
IBM ISDN Co-processor/2 (see note 1)	94F4311
IBM WaveRunner Digital Modem (see note 2)	73G1393
Note:	
1. Works on a IBM LAN Distance Connection Server 1.1 and IBM LAN Distance Remote Version 1.11. ISDN Coprocessor Support Program Version 1.2 is required. 2. Works on a IBM LAN Distance Connection Server 1.1, IBM LAN Distance Remote Version 1.11 and IBM LAN Distance Remote for Windows Version 1.11.	

What is Generally Needed to Support ISDN?

ISDN adapters that work under IBM LAN Distance fall into the following two categories:

1. Adapters conforming to the IBM GCCI and NDIS interface (like ISDN Co-Processor Adapter/2)
 - GCCI stands for Generalized Call Control Interface. GCCI is for setting up and clearing the call. This is a published interface, but it is not designed for applications to use. The main design point you should realize is that there is only one user of GCCI, the IBM LAN Distance Connection Manager.
 - NDIS stands for Network Driver Interface Specification. The NDIS interface for the data link controls are used to send data over the ISDN B channels.
2. ISDN adapters that have the capability to be driven by AT commands (like the IBM WaveRunner Digital modem that maps AT commands into ISDN messages).

LAN Adapter Cards Supported by IBM LAN Distance Connection Server 1.1

<i>Table 18 (Page 1 of 2). IBM LAN Distance Connection Server 1.1 1.1 Supported Adapters (for US)</i>						
Adapter	MC	ISA	EISA	Supported On		
				Conn Svr	OS/2 Rem	Win Rem
IBM Token-Ring Network 16/4 Adapter	X	X		X	X	X
IBM Token-Ring Network Adapter/A	X			X	X	X
3COM TokenLink III	X	X		X	X	X
Madge Straight Blue	X			X	X	X

Table 18 (Page 2 of 2). IBM LAN Distance Connection Server 1.1 1.1 Supported Adapters (for US)

Adapter	MC	ISA	EISA	Supported On		
				Conn Svr	OS/2 Rem	Win Rem
IBM LAN Adapter for Ethernet		X		X	X	X
IBM LAN Adapter for Ethernet TP	X	X		X		
IBM LAN Adapter for Ethernet CX		X		X	X	X
Standard Microsystems for Ethercard PLUS		X		X	X	X
IBM PS/2 Adapter/A for Ethernet	X			X	X	X

CD-ROM Drives Supported by OS/2 Warp Connect Installation Program

Table 19 (Page 1 of 2). CD-ROM Drives Supported by OS/2 Warp Connect Installation Program

CD-ROM Drive	CD-ROM Drive
Aztech CDA-268-031-SE	Panasonic CF-41
CD Technology T3301,T3401	Panasonic 501,LK-MC501S
Chinon 5251	Panasonic 521,522,523
Chinon 431,435	Panasonic 571
Chinon 535	Philips LMS CM-205,CM-225
Compaq Tray Load	Philips LMS CM-205MS,206,225MS,226
Compaq Dual Speed	Philips LMS CM-215
Creative Labs OmniCD	Philips LMS CM-207
Goldstar GCD-R520B	Pioneer DRM-600
Hitachi 1650S,1750S,3650	Pioneer DRM-604X
Hitachi 1950S,3750,6750	Plextor DM-3028,DM-5028,4APLEX
IBM CD-ROM I	Sanyo CDR-450P
IBM CD-ROM I rev 242	Sony CDU-31A,33A,7305,7405
IBM CD-ROM II, Enhanced CD-ROM II	Sony CDU-531,535,6150,6201,6205,6251,7201,7205
IBM ISA, Panasonic 562,563	Sony CDU-55D,55E,76E
Lion Optics XC-200AI,200EI	Sony 541,561,6211,7211,7811
Mitsumi CRMC-LU002S, Tandy CDR-1000	Sony 6111
Mitsumi CRMC-LU005S	Texel 3021,5021
Mitsumi CRMC-FX001	Texel 3024,3028,5024,5028
Mitsumi CRMC-FX001D	Think Pad 755CD, Teac CD-40E
Mitsumi CRMC-FX001DE,FX300,FX400	Toshiba 3201
NEC Intersect 25,36,37,72,73,74,82,83,84	Toshiba 3301,3401,4101,3501,5201
NEC MultiSpin 4Xe,4xi,3Xi,3Xe,3Xp,38,74-1,84-1	Toshiba 5302B

<i>Table 19 (Page 2 of 2). CD-ROM Drives Supported by OS/2 Warp Connect Installation Program</i>	
CD-ROM Drive	CD-ROM Drive
NEC 2vi,260	Wearnes CDD-120
Optics Storage 8001 IDE	

PCMCIA Machines Supported by OS/2 Warp Connect

<i>Table 20. PCMCIA Support in OS/2 Warp</i>		
Machine Type	Machine Type	Machine Type
Ambra 486 SN425C	IBM Thinkpad 360	NCR Safari
AST Ascentia 800N	IBM Thinkpad 500	NEC Versa
AST Bravo	IBM Thinkpad 510	Panasonic
AST PowerExec	IBM Thinkpad 701	Toshiba T3600
Austin DSTN	IBM Thinkpad 720	Toshiba T4500
Compaq Concerto	IBM Thinkpad 750	Toshiba T4600
Compuadd 425TX	IBM Thinkpad 755 C/CS	Toshiba T4700
Dell Latitude	IBM Thinkpad 755 CE/CSE	Toshiba T4800
Dell Latitude XP	IBM Thinkpad 755 CD	Zeos
IBM Thinkpad 230	IBM PS/2 E	Zenith Z-lite 425L
IBM Thinkpad 350	Matushita	

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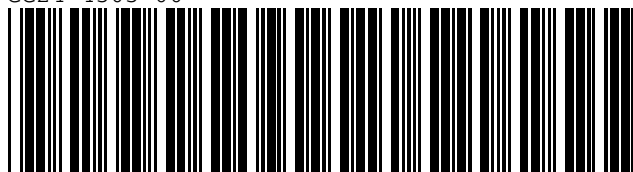
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SES10	4505LDR			
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