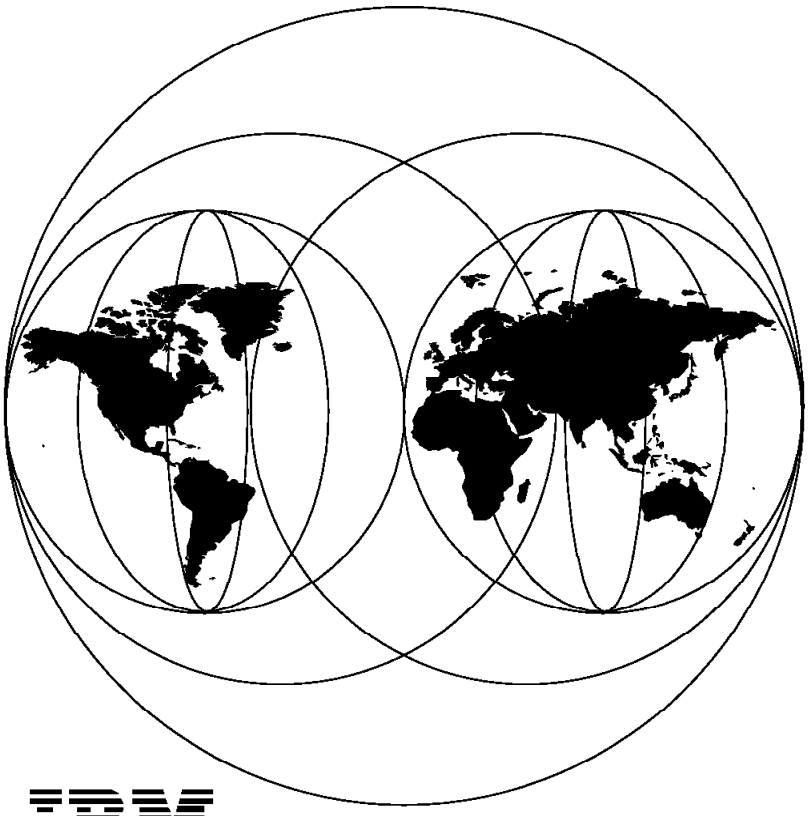
SG24-4588-01

AIX Connections for Beginners

December 1996



IBM

International Technical Support Organization

Austin Center

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Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix G, “Special Notices” on page 209.

Second Edition (December 1996)

This edition applies to Version 4.1.5 of AIX Connections for use with the AIX Operating System Version 4.1.5.

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Preface

This redbook describes AIX Connections for AIX Version 4.1.5. AIX Connections allows an RS/6000 to provide file and print server functions to PC operation systems using traditional PC requesters and protocols. This is a new version of AIX Connections that includes many enhancements. This book includes an overview of AIX Connections functions and implementation examples. An example of using AIX Connections as a gateway to DCE is included.

This redbook was written for implementers and maintainers of PC LANs. Several practical examples are presented to demonstrate the use of this product in various PC LANs.

Some knowledge of AIX and PC networks is assumed.

How This Redbook Is Organized

This redbook contains 223 pages. It is organized as follows:

- Chapter 1, “What is AIX Connections?”

  This provides an introduction to AIX Connections.

- Chapter 2, “What You Can Do With AIX Connections”

  This chapter describes the functions implemented in AIX Connections.

- Chapter 3, “AIX Connections 4.1.5.”

  The enhancements of the new version are discussed in this chapter.

- Chapter 4, “AIX Connections Common Installation and Configuration”

  This chapters covers the installation of the common functions of AIX Connections.

- Chapter 5, “Using AIX Connections in the NW Realm”

  This chapter describes the installation and configuration of the NW realm of AIX Connections.

- Chapter 6, “Using AIX Connections in the NB Realm of AIX Connections”

  This chapter describes the installation and configuration of the NB realm of AIX Connections.

- Chapter 7, “Using AIX Connections in the AT Realm”

  This chapter describes the installation and configuration of the AT realm of AIX Connections.

- Chapter 8, “What You Can Do With AIX Connections Client”

  In this chapter what and how AIX Connections can function as a client to PC servers is discussed.

- Chapter 9, “AIX Connections DCE Integration” .

  This provides an explanation of AIX Connections as a gateway to Distributed Computing Environment, DCE, for PC clients.

- Chapter 10, “Special Setups”

This provides information on how to configure AIX Connections in special environments.

- Chapter 11, “Migration from AIX Connections 4.1.4”

  This chapter discusses migration from the previous version of AIX Connections.

- Chapter 12, “Considerations When Using AIX Connections Servers”

  In this sections some of the differences between AIX Connections and traditional PC servers are discussed.

- Chapter 13, “Why Use an AIX-Based Server?”

  In this chapter we discuss environments where AIX Connections can provide a solution.

- Chapter 14, “Problem Determination”

  This provides information on problem determination.

- Chapter 15, “Terminal Emulation Using AIX Connections”

  Examples of PCs using the terminal emulators provided with AIX Connections are described.

- Chapter 16, “Web Based HTML Administration Tool”

  This chapter describes the TotalAdmin tool provided.

- Appendix A, “Scenario”

  This chapter describes the environment used during the writing of this book.

- Appendix B, “Capacity and Throughput”

  This section describes the system resources used by AIX Connections.

- Appendix C, “NWserver SYSTEM.INI”

  This section gives an example of the SYSTEM.INI file for an NW realm client.

- Appendix D, “NB Realm of AIX Connections CONFIG.SYS”

  This is the CONFIG.SYS file for an NB realm client

- Appendix E, “NB Realm of AIX Connections SYSTEM.INI”

  This section gives an example of the SYSTEM.INI file for an NB realm client.

- Appendix F, “NB Realm of AIX Connections WIN.INI”

  This section gives an example of the WIN.INI file for an NB realm client.

The Team That Wrote This Redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization Austin Center.

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Comments Welcome

We want our redbooks to be as helpful as possible. Should you have any comments about this or other redbooks, please send us a note at the following address:

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Your comments are important to us!

Chapter 1. What is AIX Connections?

AIX Connections is a network operating software solution. Installing AIX Connections allows any network client running popular operating systems, like OS/2, Windows 95, Windows NT, or Macintosh, to share resources, such as files and printers, on an IBM RISC System/6000 as *one* server for the different environments and protocols.

AIX Connections incorporates IBM′s LSserver (Server Message Block-compatible connectivity software for LAN Manager, LAN Server, Windows NT, and other peer-to-peer networks), NWserver (NetWare-compatible server), and MACserver (AppleTalk-compatible server) into a single product set.

AIX Connections allows the different clients to share RS/6000 data or printers and allows different clients to integrate. As an example, Macintosh files stored on the server can be directly accessed from a Windows 95 client, or a postscript printer attached to a Novell NetWare server can be used from an OS/2, Windows 95 or Macintosh client.

In addition to the above server functions, AIX Connections also enables the AIX-based computer to act as a network client to Novell NetWare-compatible servers and to SMB-compatible servers, like OS/2 LAN server, Windows NT or any SMB-compatible operating system that allows resource sharing. .

The AIX-based computer can participate in a LAN while concurrently being a client in the LAN. TNclient also provides mounting of LAN file systems for access from AIX applications.

AIX Connections 4.1.5 is the second version of the product. This does not mean the concept is new. The base of the product has been in the market for years now as TotalNET Advanced Server from Syntax, Inc.

For people familiar with AIX Connections 4.1.4, much has changed in this version. The old server concepts, LSserver, NWserver, and MACserver, are replaced by a set of ″realms″.

Most of the specific server commands have changed, so we now have one command-set to configure and control the AIX Connections software for all three PC-client environments.

A lot of new functions have been added, including an HTML-based management tool. This tool makes it possible to manage AIX Connections from any client in the network that is running a Web browser.

The administration of AIX Connections can still be done by using SMIT or from the command line.

Below, you will find a list of the significant enhancements in AIX Connections 4.1.5:

- Forward authentication
- New Web-based administration tool
- TotalPrint enhancement

- Improved browsing support
- Token-ring support for Mac clients
- OS/2 Extended Attributes support
- DCE integration
- HACMP support enhancement

Minor enhancements added to AIX Connections 4.1.5 are:

- Automatic configuration of services during install
- Quick Start configuration tool
- NetBIOS configuration using SMIT

For more information about the new functions added to AIX Connections, please refer to 3.2, “ New Functions in Version 4.1.5” on page 21.

AIX Connections fully utilizes the AIX operating system functions, such as locking of files and security. Using AIX Connections not only gives you a PC-client server but also enables you to use a platform famous for its networking capabilities. An example of this is the DCE integration implemented in AIX Connections 4.1.5.

Using AIX Connections and the IBM RISC System/6000, you are provided access to the benefits of the AIX operating system′s capabilities and the scalability of the RS/6000 as a file and print server.

For a quick introduction to some of the functions, let′s take a look at Figure 1 on page 3.

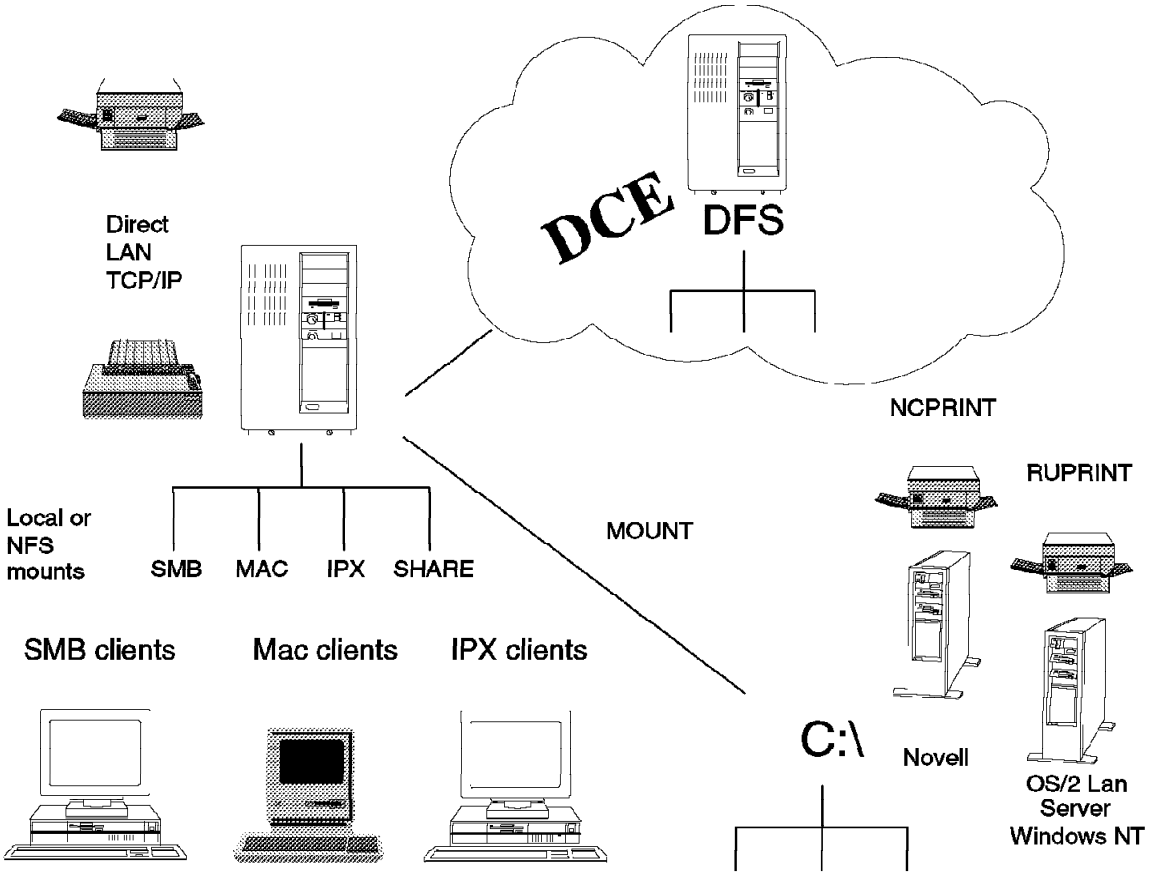

Figure 1. AIX Connections Functions.

- Each client with a suitable requester can store and retrieve files from the server. These files can be in dedicated directories for each client environment, but the clients can also share files using AIX Connections as their server. Access to the files (rights, locking, and so forth) is controlled by the AIX operating system.

  The directories used – in AIX Connections known as Volumes – can be NFS-mounted filesystems and CD-ROM filesystems. AIX Connections Volumes can even be directories mounted in the AIX filesystem using AIX Connections Client or DCE/DFS filesystems.

- The client can access printers known by the AIX server. All files defined in the /etc/qconfig file can be used.

- SMB and IPX clients can run a VT100 terminal emulation based on either NetBIOS, IPX, or SPX II. This is done without TCP/IP on the client side.

- Using the AIX Connections Client function, the AIX Connections server can be a client to real PC server. The command `mount -V` creates an ″NFS-like″ access to servers such as Novell NetWare servers, OS/2 LAN Server, Microsoft NT servers, and any client able to share its resources. This could be a Windows 95 or OS/2 Peer client.

- By using the AIX Connections Client printer functions `ncprint` and `ruprint`, we enable the AIX Connections server to print to Novell NetWare servers,

OS/2 LAN Server, Microsoft NT servers and any client able to share a printer. This could be a Windows 95 or OS/2 Peer client.

These print jobs can either be from the clients or from AIX applications.

As an example, we can set up a Macintosh client to print to a Postscript printer attached to a Novell NetWare server.

- Last but not least, AIX Connections gives clients from the SMB environment access to the DCE world without any change to the client. To leave the client unchanged is key for use of an AIX Connections server in general.

Useful information

In Appendix A, “Scenario” on page 177, all functions of AIX Connections described above are documented using the configuration files for the AIX Connections server used to create this document.

1.1 AIX Connections Highlights

Today, most businesses are using computers for many different tasks while trying to optimize the work done in the local departments.

Different parts of a company use different types of computers. These differ not only by brand name but also by the operating system, network protocol, architecture, and mail system. In addition, the management of the local network often uses different addresses and naming conventions.

The user′s task has dictated what type of computer the user has on his/her desk. A typical example of this is the use of Macintosh computers to work with desktop publishing and graphic manipulation.

The result is that departments form small islands that are not, or cannot be, usefully connected. More significantly, data access is awkward among these disparate servers and other enterprise applications, if it is done at all.

It is important to understand that the client or desktop choice is based on the task the user is doing. This means that the client or desktop cannot be changed. The goal is to integrate with minimum impact on the end users.

Businesses try to solve integration problems in different ways. One way of integrating their networks is to build each client with many different communication software packages so they are able to talk with relevant networks. This is called the Fat Client approach. This approach requires some amount of user training.

This normally requires faster clients with more RAM and bigger hard disks. The different types of clients, combined with the use of many different communication packages, makes this a hard environment to administrate and a very expensive solution.

Another way of solving the problem is by using *one* protocol in the network, like TCP/IP.

This may result in the need for a lot of user education. It also may affect the way the work is done, but first of all, it requires that clients not using the chosen protocol will have to be moved to it. This is an expensive solution, and in some

cases, the number of clients will require more than one server if the hardware is not scalable.

Another solution could be to try to integrate the network by using bridges, routers, protocol converters, and other kinds of ′black boxes′. This might easily turn out to be very hard to administer and control.

The best way of solving the lack of integration is by choosing a server that will serve all clients without having to change the clients, a server that is able to grow with the company and able to protect the investment, and a server easy to manage and able to communicate with current and future clients and servers. A server based on AIX Connections and the IBM RISC System/6000 is such a server.

In addition to this, all clients attached to the AIX Connections server can continue using their favorite GUI or commands to access the server.

A Macintosh user will find the AIX Connections server in his ′chooser′(the Macintosh requester), and a Windows 95 or OS/2 client will find his server in the File Manager or equivalent.

By using AIX Connections as one focal point of your LAN, you will benefit from the following advantages:

Multiple LAN Server

An IBM RISC System/6000 running AIX Connections allows PC clients that are compatible with SMB, NetWare or AppleTalk servers to share data and resources under the control, security, and system management of one sever. i1.NetWare

Multiple Protocol Support

The PC-client is the most popular terminal used on UNIX-based systems. The reason for this is probably not that it is the best or the cheapest solution. A more reliable explanation is that the user *also* needs access to a word processor, a spreadsheet, or a mail system.

With AIX Connections, the clients can speak the language of the server, or the server can speak the language of the clients. Both PC and AIX protocols are supported.

This solution optimizes reliability and ease of use. It also means that AIX Connections users are allowed to connect to and use server functions and applications based on existing protocols, such as NetBEUI or IPX.

AIX Server Compatibility

AIX Connections enables clients to share resources by using AIX Connections and the IBM RISC System/6000 to coexist with traditional PC servers.

Minimum End-User Disruption

Once AIX Connections is configured on the client PCs as another server, the user′s GUI, applications, and server access methods are unchanged.

Lowest Cost PC Server	Any AIX system currently in a network with PC servers can become an additional server to the PC clients by adding AIX Connections software.
Scalable Server Environment	AIX Connections will run on every AIX-based computer. This gives the customer the possibility to grow from inexpensive computers to high-performance SMP machines while using the same AIX Connections software. AIX Connections will run on any AIX-based IBM RISC System/6000, from a ThinkPad to an SP/2.
Global Administration	Administration of the server can be done from SMIT or a Web-based tool from any client. Daily tasks, such as adding users and managing printers, can be done via VSM and require no special AIX knowledge.
Terminal Emulation	AIX Connections gives clients access to AIX applications on the server. Using the built-in terminal emulators of AIX Connections (VT102) enables AIX Connections users to connect to the AIX Connections server without use of TCP/IP on the client side.
Remote Printing	AIX Connections allows PC clients to share printers in the network, regardless of whether they reside on an AIX Connections server or are defined as remote printers on the AIX Connections server or a PC server.
Industry Standard API Support	The AIX operating system supports many industry standard APIs, such as TCP/IP sockets, NetBIOS, DCE, and others, which provide the best platform for development of client/server applications.
Routeable NetBIOS	AIX Connections provides NetBIOS routing over routers, bridges, and gateways. This function allows users to access data across the network segments transparently.

For more information, please refer to:

AIX Connections Up and Running! SC23-1758-02

AIX Connections, Reference Guide SC23-1829-00

AIX Connections, Administrators Guide SC23-1828-00

AIX Connections, Client Guide SC23-1762-01

1.2 Clients and Users

AIX Connections is shipped without any client requester code. This means that the clients need to be preinstalled with a suitable requester, or the requester code must be available.

The table below shows the relationship between AIX Connections realms and client requesters.

Table 1. AIX Connections Clients.

Realm	DOS or Win 3.1	Win 3.11 (WFW)	Win'95 or Win'NT	OS/2	OS/2 WARP	MacOS
NB	S	C,S	C	S	C	
NW	S	S	C,S	S	C	
AT						C

Note: **C** means that the necessary software to connect to the AIX Connections realm is shipped with the operating system.

S means that the user needs a license to the client software to connect to the AIX Connections server.

In Chapter 5, “Using AIX Connections in the NW Realm” on page 37, Chapter 6, “Using AIX Connections in the NB Realm of AIX Connections” on page 77, and Chapter 7, “Using AIX Connections in the AT Realm” on page 123. we will provide a detailed look into the configurations of the clients.

An AIX Connections user must be defined as an AIX user. AIX users are not automatically authorized to access AIX Connections server.

Each user needs an AIX Connections password, created by the `tnpasswd` command. This command allows you to set up different passwords for the three realms and a separate AIX or use the same password in all cases.

In the situation where another server is used to authorize the user (proxy authentication) the user does not need an AIX Connections password, but he/she still needs to be defined as an AIX user.

AIX Connections users do not utilize an AIX user license unless they access AIX via a terminal emulation session.

Chapter 2. What You Can Do With AIX Connections

In this chapter, we focus on the functions implemented in AIX Connections.

We go through the functionality, the prerequisites, the services that AIX Connections provides to PC clients and some of the key concepts in AIX Connections.

2.1 What is AIX Connections?

AIX Connections is software that is installed on an AIX-based computer to provide file, print and terminal emulation services to PC clients that are running operating systems such as OS/2, DOS, Windows 95, and MacOS.

Clients running OS/2, DOS, Windows 95 or Windows NT can be divided by network protocol.

One group will have its network functions implemented based on the SMB protocol. These are typically Windows for Workgroups, Windows 95, or LAN Server LAN Manager clients.

The second group is clients using the IPX protocol to get to the server (often referred to as Novell clients).

In addition to these clients, we must not forget the Macintosh. These clients use the AppleTalk protocol to get to the server.

All access to services on the server is controlled by the AIX operating system. Files and printers can be shared with clients from the three different environments. Everything is managed and controlled by the AIX operating system.

An AIX Connections user is also an AIX user belonging to one or more AIX groups, with access and existence rights to AIX resources. These rights are enforced by AIX.

2.2 Prerequisites

To use AIX Connections 4.1.5 on your IBM RISC System/6000, you must have the following software installed:

- AIX 4.1.5 or higher.
- NetBIOS 2.1.4 or higher. This is only needed if you are going to support SMB clients. The NetBIOS is a part of the AIX Connections feature; so you do not need to order this separately.

  The IPX protocol used by AIX Connections is **not** the IPX protocol from the LPP 5765-550, NetBIOS, and IPX/SPX Support V2.1.

  This IPX/SPX protocol may not be compatible with all software that uses the LPP 5765-550 stack.
- Token-ring network adapter or Ethernet adapter.

On the client side every client must have this hardware installed:

- Token-ring network adapter or Ethernet adapter.

For NetBIOS/SMB clients, each client that will connect to the server must have a LAN requester, such as:

- IBM OS/2 LAN Server Version 3.0 or higher
  - DOS requester
  - OS/2 requester
- OS/2 Peer services

  Note: The above is a part of OS/2 Warp Connect.
- Microsoft Windows for Workgroups
- Microsoft Windows 95 client to Microsoft Network
- Microsoft LAN Manager
- Microsoft NT server or workstation

For NetWare clients, each client that will connect to the server must have a LAN requester, such as:

- Novell NetWare Client 2.11 for OS/2

  Note: The above is a part of OS/2 Warp Connect.
- Microsoft Windows 95 client to NetWare Network
- Microsoft NT server or workstation
- Novell′s NetWare (NetX or VLM 1.2 or higher)

For Macintosh clients, each client that will connect to the server must have:

- MacOS 6.03 or higher
- AppleTalk

Note: The requester, also called the ′Chooser′, is a part of MacOS.

The NetBIOS support in AIX Connections, can be configured for NetBEUI or TCP/IP (RCF 1001/1002) protocols.

The users in the network can connect to the IBM RISC System/6000 with AIX Connections in the same way they connect to other servers and use AIX filesystems as virtual drives and the AIX spool system like standard DOS printers.

The services provided by AIX Connections can be accessed using the preferred GUI of the users.

All files stored on the server are protected by AIX security features, such as file and record locking.

Users with a valid AIX username and password, if forward authentication is not used, can access the server.

2.3 AIX Connections Services

As mentioned earlier, AIX Connections is divided into *realms* based on what kind of clients are using the services.

The services provided by AIX Connections are:

- File service
- Print service
- Messaging service
- Terminal emulation

2.3.1 File Service

This function enables PC users to access the AIX Connections server and use files and applications in the AIX filesystem. Files and directories in an NFS-mounted filesystem can also be configured to be available for the clients.

For NetBIOS, the file service and other services must be known on the network with a unique NetBIOS name. These names will be broadcast over the network. AIX Connections lets the IBM RISC System/6000 running the server software recognize and claim NetBIOS names on the network and relate to the names of network services.

On the Novell NetWare side, the IPXd (the IPX daemon making the network communication possible between client and server) provides the capability for AIX Connections to claim and recognize names in the network and relate these names to specific services.

A name may be one with which a PC can share files and printers or one with which AIX Connections can have communication with another server.

Administrators can limit the access to a directory (virtual drive) by using AIX security functions, and they can limit the number of users accessing a certain directory at the same time. This functionality can be useful with network licenses for applications.

2.3.2 Print Service

The print service lets a client submit print jobs to the AIX spool system for printing on a printer known by the AIX spool system. These printers can be local or remote printers.

Printing to nonAIX or UNIX servers – such as OS/2 LAN server or Microsoft NT servers and Novell NetWare servers – is supported.

Printing to other clients based on a workgroup concept can also be implemented.

2.3.3 Messaging Service

Messages can be sent from the AIX Connections host to connected SMB or Novell clients.

2.3.4 Terminal Emulation Service

AIX Connections provides DOS executables for terminal emulation.

This function of AIX Connections enables an SMB or Novell PC user running a NetBIOS or IPX connection to the server to operate as an AIX terminal, without TCP/IP.

The terminal is a VT102 terminal, and 10 different sessions can be defined from one NBterm. This function enables AIX Connections users to do personal administration of their setup, such as changing the password or profile. The user appears as a tty to AIX. This means interactive AIX applications that support a VT102 terminal can be invoked by this user.

2.4 AIX Connections Concepts

In this chapter, we will introduce some concepts used in AIX Connections.

The material here is mostly for people who are not familiar with earlier versions of AIX Connections. Some of these concepts have changed since AIX Connections V4.1.4.

The concepts discussed in this chapter are:

1. What is an AIX Connections service?
2. What is an AIX Connections volume?
3. What is an AIX Connections attach point?
4. What is an AIX Connections printer?

2.4.1 What is an AIX Connections Service?

A service is the concept that makes the connection between the client and the server available. A service name consists of the name of the service and a type.

Service types are:

- file

  This service allows a client to access file on the server. It is valid in all realms.

- term

  This service allows a client to enable a terminal emulation session with the server. It is valid in the NB and NW realms of AIX Connections.

- nvt

  This service allows a client to enable a NetWare Virtual Terminal session with the NW Realm of AIX Connections server. It is valid in the NW Realm of AIX Connections.

- atlw

  This service allows a client to enable an Apple Laserwriter print session with the server. It is valid in the AT Realm of AIX Connections.

The service type used most often is the *file* service. This service enables the client to access, save or restore files from the server. This service is valid for all realms, NB, NW, and AT.

An example of a service valid only for the AT realm is the *atlw* service. This service enables Postscript printers known by the AIX Connections server to show up as Apple Laserwriters for Macintosh clients.

A service is described in a services.realms file in the home directory of AIX Connections.

In Figure 2, you will see a stanza of the /usr/tn/services.NB file that describes the services available for NB realm clients.

A service definition appears as a resource to the PC clients.

```
[ service lsconnect:file ]
command /usr/tn/NB/LMfile
transport altnb
persistent off
description NB server on connect
plex unique
user root
```

Figure 2. The /usr/tn/services.NB File

This file describes:

- The command to execute when a client requests this service.
- How to get to the client and what protocol stack to use.
- If the service is persistent, the service is started when it is enabled and runs automatically thereafter. Nonpersistent services are started for each incoming request.
- A description of the service that will show up in the network as a server.
- Whether this service must have a unique NetBIOS name in the network.
- What userid should be assumed when the command described above is executed.

Many other parameters can be configured using this file. For more detailed information, please refer to *AIX Connections, Reference Guide, SC23-1829-00*.

Within a service, resources are referenced and configuration is completed. This includes:

- Volumes
- Printers
- Browsers
- Proxies

Now we have a service in the network we can use. This brings us to the Volume.

2.4.2 What is an AIX Connections Volume?

A volume is defined as a directory in the AIX filesystem that is capable of being exported using file services. Volumes are defined at a system level, so the same volume can be exported to one or more realms.

In this way, the volume will show up as being the root file system of a drive when clients connect to AIX Connections.

One or many volumes can be exported using the same file service. The reference between the volume and the service name is described in the profile.file file in the home directory of AIX Connections.

Volumes are also described in the profile.file file in the home directory of AIX Connections.

2.4.3 What is an AIX Connections Attach Point?

An attach point is similar to a volume, a directory of the AIX filesystem that is being made available for an AIX Connections client. The attach point is an alias for an internal directory within a volume.

Attach points are defined on a realm and service level.

2.4.4 What is an AIX Connections Printer?

A printer in AIX Connections is like a print queue in the AIX spool system. Print queues can be either local or remote.

Queues have the capability of being exported through file and/or print services, and may export one queue to many printers.

Printers are defined on a system level for the NB Realm of AIX Connections and the NW Realm of AIX Connections, so the same printer can be exported to one or more realms.

2.5 Getting File and Print Services to the Client

Finally, let′s see how all these components fit together and result in file and print services to the clients.

From the profile.file general part, we get the definitions of the printers and volumes, as shown in Figure 3 on page 15.

Let′s assume that we started the service called lsconnect:file as configured in Figure 2 on page 13.

```
[ general ]

[ printer ps3825 ]
template-only off

[ printer ps ]
template-only off


[ volume home ]
template-only off
atalk-map defatmap
path %HOME%

[ volume sys ]
template-only off
path /usr/tn/NW/sys

[ volume pccode ]
template-only off
path /usr/tn/smb/pccode


[ service NB lsconnect:file ]
printer ps3825
volume home
volume pccode
printer ps
attach crop home:crop
```

Figure 3. The /usr/tn/profile.file File

Using the profile.file in Figure 3, PC clients would have access to two volumes (home and pccode), one attach point (crop) and two printers (ps and ps3925).

Starting the NB realm with this configuration will give an NB realm client access to the AIX Connections server resources as shown below.

```
[C:\] net view \\lsconnect
Shared resources at \\lsconnect
 NB server on connect

Netname      Type         Used as  Comment
-------------------------------------------------------------------
CROP         Disk         U:       crop
HOME         Disk                  home
PCCODE       Disk                  pccode
PS           Print
PS3825       Print
The command completed successfully.

[C:\]
```

Figure 4. Net View Command

Chapter 3. AIX Connections 4.1.5.

In this chapter, we will focus on the new version of AIX Connections, Version 4.1.5. The chapter is divided into two parts.

Initially, we go through the new structure of the product. This part also covers the new way AIX Connections can be administered and configured.

Secondly, all of the new functions of AIX Connections are described.

3.1 New Structure in Version 4.1.5

AIX Connections 4.1.5 has been restructured since the first version was announced with AIX 4.1.4 in 1995.

AIX Connections 4.1.5 consists of a set of functions that implement LAN Manager/LAN server, NetWare and AppleTalk server functionality on an AIX-based server.

These services consist of different processes and protocols and are mainly file and print services.

These can be divided into three groups – in AIX Connections known as ″realms′ – based on the type of client requesting the service:

- **NB realm for NetBIOS clients**

  The NB realm for NetBIOS clients provides services like file, print, and terminal emulation. These services are implemented based on either the NetBIOS/NetBEUI or NetBIOS over TCP/IP protocol.

  Clients in this environment are PC clients running DOS, OS/2, Microsoft Windows 95, or Microsoft Windows NT.

  The NB realm for NetBIOS clients correspond to the **LSserver** of AIX Connections Version 4.1.4.

- **NW realm for Novell NetWare clients**

  The NW realm for Novell NetWare clients provide services like file, print, and terminal emulation. These services are implemented based on the IPX/SPX protocol. Clients in this environment are referred to as Novell NetWare-compatible clients.

  The NW realm for Novell NetWare clients corresponds to the NWserver of AIX Connections Version 4.1.4.

- **AT realm for AppleTalk clients**

  The AT realm for AppleTalk clients provides file and print services to Macintosh clients. These services are implemented based on the AppleTalk protocol, and they enable an AIX server to act as a Macintosh AppleShare server.

  The AT realm for AppleTalk clients corresponds to the MACserver component in AIX Connections Version 4.1.4.

3.1.1 Other Functions

In addition to these server functions, AIX Connections also enables our AIX system to act as a client to real SMB or Novell NetWare servers. This function is called AIX Connections client.

The AIX Connections client corresponds to the TNclient component of AIX Connections version 4.1.4.

3.1.2 Configuration and Administration

In Version 4.1.5 of AIX Connections, administration and configuration can be done by using three interface tools.

- Command line interface
- SMIT interface
- Web-based tool

A major advantage of AIX Connections over other connectivity software products is its ability to reduce network administration tasks by providing efficient configuration and administration tools.

To configure and administer the three realms of AIX Connections, we have one set of commands. This also means that many of the realm-specific commands from Version 4.1.4 have been replaced with one set of commands for all AIX Connections realms.

Some of the V4.1.4 commands are no longer used. These commands are included with the new version, but return an exit code of 0 without executing.

Let's spend some time on the command line interpreter and the commands used in all three realms.

In general, each command can be executed based on:

- A realm
- A service type
- A service
- A combination of a service type and a realm

To control the commands, we use options or 'flags'.

- The realm, applies the command to all services in the realm. The **-r** `realm` flag is used for this option.
- The service type, applies the command to all services of a specific service type. **-t** `service type` flag is used for this option.
- The Service, applies the command only to the service with this specific name. **-s** `service` flag is used for this option.
- The realm and the type, applies the command to services of this type in the realm. **-r** `realm` and **-t** `type` flag is used for this option.

Let's look at a simple example, and let's use the `tnstart` command. The `tnstart` is used to start services.

To start **all** services in **all** realms use:

```
tnstart
```

To start **all** services in **the AT realms** use:

```
tnstart -r AT
```

To start **all** services of **type file** in **all** realms use:

```
tnstart -t file
```

To start **a service with a specific name** use:

```
tnstart -s servicename
```

To start **all services of a specific type** in **the NW realm** use:

```
tnstart -r NW -t servicetype
```

For more detailed information about the commands, please refer to AIX Connections, Reference Guide SC23-1829-00.

Table 2 (Page 1 of 2). AIX Connections Administration Command Set

Command	Function	Example
tnaccept	Accept services	`tnaccept -r AT` Start accepting AppleTalk clients for service.
tnck	Check AIX Connections Runtime database	`tnck` Check the database and repair it if any errors for al realms. The database holds information about running AIX Connections processes and attached clients.

tninfo	List information about AIX Connections clients	`Username  Realm  Startup  Requests  Server name`
		`ausres4  NW  Fri Sep 27 13:11:04 CDT 1996  74 nwconnect:file`
		`root  AT  Fri Sep 27 12:41:43 CDT 1996  1 atconnect:file`
		`ausres4  NB  Fri Sep 27 12:52:49 CDT 1996  267 lsconnect:file`

tnkill	Kill service client	`tnkill -r NB -u ausres4` Kills the NB user ausres4.
tnpasswd	Add/change/delete AIX Connections password	`tnpasswd -u ausres4`
tnreject	Reject AIX Connections services	`tnreject -r NW` Reject new connections from the NW realm.
tnshut	Shut down one or more services or realms	`tnshut -r NB` Shuts down the NB realms services.
tnstart	Start one or more services or realms	`tnstart -r AT` Starts all defined AT realms services.

Table 2 (Page 2 of 2). AIX Connections Administration Command Set

Command	Function	Example
tnstat	Show the AIX Connections status of one or more realms or services	TotalNET system is enabled. Transports: tnipx tnatk altnb NWservices are up. Transports used: tnipx nwconnect:file is accepting new connects. 1 client(s) connected. nwconnect:term is accepting new connects. 0 client(s) connected. nwconnect:nvt is accepting new connects. 0 client(s) connected. ATservices are up. Transports used: tnatk atconnect:file accepting new connects. 1 client(s) connected. atconnect:atlw is accepting new connects. 0 client(s) connected. NBservices are up. Transports used: altnb lsconnect:file is accepting new connects. 0 client(s) connected. lsconnect:term is accepting new connects. 0 client(s) connected.
tnwho	List currently connected clients	ausres4 NW :10005a6f6b11 Fri Sep 27 13:11:04 CDT 1996 root AT A(65496.1.252) Fri Sep 27 12:41:43 CDT 1996

Configuration of AIX Connections can be done through the command line. But we recommend you use either the Web-based tool or SMIT. One reason to use a command line interface could be that you wanted to set up AIX Connections on one or more IBM RISC System/6000s using AIX scripts. In Table 4 on page 21, you will find the most-used commands.

For more detailed information about the commands, please refer to *SC23-1829-00 AIX Connections, Reference Guide* and *AIX Connections, Administrators Guide SC23-1828-00*.

Configuration commands are like the administration commands, *one* set of commands for all three realms. The command can be executed on different parts of our configuration. To separate it, we use the notation for the administration commands:

-r realm for the realms

-t service type for the services.

Most of the configuration commands use the option shown in Table 3.

Table 3 (Page 1 of 2). AIX Connections Configuration Commands Options

Option	Function
-L	List
-R	Read
-A	Add
-M	Modify

Table 3 (Page 2 of 2). AIX Connections Configuration Commands Options	
Option	**Function**
-D	Delete

The default option is **-L**; the **-R** without any other options will return all attributes for all applicable sections.

Table 4. AIX Connections Configuration Command Set	
Command	**Function**
tnattach	This command reads, lists, adds, modifies, or deletes attach points made for a file service.
tniface	This command reads, lists, adds, modifies, or deletes interfaces used by AIX Connections
tnpref	This command reads, lists, adds, or deletes printer references defined for each file service.
tnprinter	This command reads, lists, adds, modifies, or deletes printer configuration options. These options can be the queue name or special spooler options.
tnrealm	This command reads, lists, adds, modifies, or deletes the realm configuration options.
tnservice	This command reads, lists, adds, modifies, or deletes AIX Connections file and non-file services. Here, you can set up options like proxies, umask, or spooldir for the service.
tnstype	This command reads, lists, adds, modifies, or deletes service types.
tntransport	This command reads, lists, adds, modifies, or deletes AIX Connections transport configuration options.
tnvolume	This command reads, lists, adds, modifies, or deletes AIX Connections volumes. Options set up here are typical the path on the AIX directory that will be root of the volume we define.
tnvref	This command reads, lists, adds, modifies, or deletes volume references defined for file services.

For more detailed information about the commands, please refer to *SC23-1829-00 AIX Connections, Reference Guide* and *AIX Connections, Administrators Guide SC23-1828-00*.

3.2 New Functions in Version 4.1.5

This sections covers the new functions implemented in AIX Connections Version 4.1.5. The new functions described here are:

- Forward authentication
- New Web-based administration tool
- TotalPrint enhancement
- Improved browsing support

- Token-ring support for Mac clients
- OS/2 Extended Attributes support - NB realm only
- OS/2 PM Browser support - NB realm only
- DCE integration - NB realm only
- HACMP support enhancement
- Automatic configuration of services during install
- Quick-Start tool configuration
- NetBIOS configuration using SMIT

We will describe situations in which these functions can be related to the scenario used to produce this document. The scenario is described in Appendix A, “Scenario” on page 177.

3.2.1 Forward Authentication

AIX Connections 4.1.5 allows you to use a proxy server to authenticate AIX Connections user passwords.

A proxy server is used on a service level; this means that you can use different proxies for different services, groups of users and so on. One or more proxies may be defined per service.

By default, services do not use a proxy server, so the password is authenticated by the server running the AIX Connections software.

A proxy sever does not need to be a service on the server – nor does it have to be an AIX Connections service. The only requirement to the proxy is that it is native to the realm of our AIX Connections server. In other words, the NB Realm of AIX Connections clients must be authenticated by an SMB server like OS/2 LAN server or a Microsoft Windows NT server; while, a Novell NetWare server must be used for the NW Realm of AIX Connections client password authentication.

This function helps us to administer users more easily than in Version 4.1.4.

Users still have to be defined as AIX users because they will start processes and own files on the AIX workstation. But as an example, we have a set of users defined on a Microsoft Windows NT server. They have login scripts, user profiles, rules about passwords etc.defined. We want to give these users access to services on the AIX workstation. The only thing we need to do is to create the AIX users and then ′point′ to the NT server for authentication of the user.

Services on the AIX workstation can now be accessed from these clients.

To add a proxy server to a service, you can go through the following steps:

1. Use the SMIT fastpath ″manage_services″
2. Select the realm of the service
3. Select the service name
4. Select **modify**
5. Add the authentication proxy

The authentication proxy is a name of the service or the name of a server followed by the keyword `file`.

Naturally, this also can be done through the command line or using the Web based tool.

As an example, let's set up the Windows NT server WIN_NT from the scenario described in Appendix A, "Scenario" on page 177 as a proxy for a service in the NB Realm of AIX Connections.

To add the server as a proxy to the service jens:file, we will simply add WIN_NT:file as the authentication proxy as shown in Figure 5.

This means that every user defined on our WIN_NT server that also has a valid userid with or without an AIX Connections password will be authorized by the NT server. If the userid and password are OK, the user will be granted access to the service-related resources.

Security and ownership rights are still controlled by the AIX operating system. The proxy's only function is validation of the user. The above is also valid for the NW realm. The only limitation is that the proxy for a service must have the same realm as the service. In other words, you can only use a Novell NetWare server as a proxy for the NW realm

Figure 5. SMIT Panel. Adding a proxy server to your AIX Connections service.

```
                                AIX Connections

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]                                        [Entry Fieldsrbrk.
  Action                          +           modify
  Realm                                       NB
  Service                                     jens:file
* Command                                    [/usr/tn/NB/LMfile]
  Service Description                        [Test]
  Home Directory                             []
  Write Activity Record                       off
  Default Attach Point                       []
  Authentication Proxy                       [win_nt:file]
  Cache Size                                 []
  Allow users to change their passwords?     []
  Use client file modification timestamp values?  [off]
  Encrypted Client Passowrd                   off
  Remote Control Command Path                []
[MORE...32]

F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

The changes which have been made will only become effective after the server has been shut down and restarted.

The steps described above will add the following to our `/usr/tn/profile.file`.

Figure 6. /usr/tn/profile.file Using Proxy Server. Adding a proxy server to your AIX Connections service add the authent-proxy stanza to your /usr/tn/profile *file.*

```
[ service NB jensl:file ]
activity off
browse-election-bias 0
browse-election-version 0
browse-master on
client-encryption off
clienttime off
db-update-interval 120
dfreport all
keepalive 1
nice -5
null-passwd-login off
passwdage off
restrictdcm off
searchcount 100
share-mode off
spooldir /tmp
authent-proxy win_nt:file
volume home
```

3.2.2 New Web-Based Administration Tool

In AIX Connections 4.1.5, a new Web-based administration tool is implemented.

This allows AIX Connections to be managed from any client or server, AIX or nonAIX, that is able to run a frame-supported Web-browser as well as the server.

The tool provides a uniform interface, regardless of the AIX operating system employed. One can change server names, service names and passwords, share new resources and modify security parameters. The tool contains Java applet extensions using the browser software while updating network activity automatically.

The Web tool features include:

- Menu options - which assemble configuration and administration tasks into logical segments.
- Dialog screens - where a selected option to add or create within a segment has field values. Options which are displayed in bold are required, and the rest are optional.
- Wizards - which help the administrator follow a sequence of steps in configuration of AIX Connections.
- Templates - that can be used to add new services, volumes and printers.
- Navigation and Help buttons displayed at the bottom of the window can be used for the following:
  - **Back** button is used to go back to the previous screen
  - **Help** button is used to access the help menu for the AIX Connections system
  - **Key** button is used to log off from the tool
  - **Home** button is used to go back to the tool main menu

– **Telnet** button is used to open a Telnet session to the host system where AIX Connections was installed.

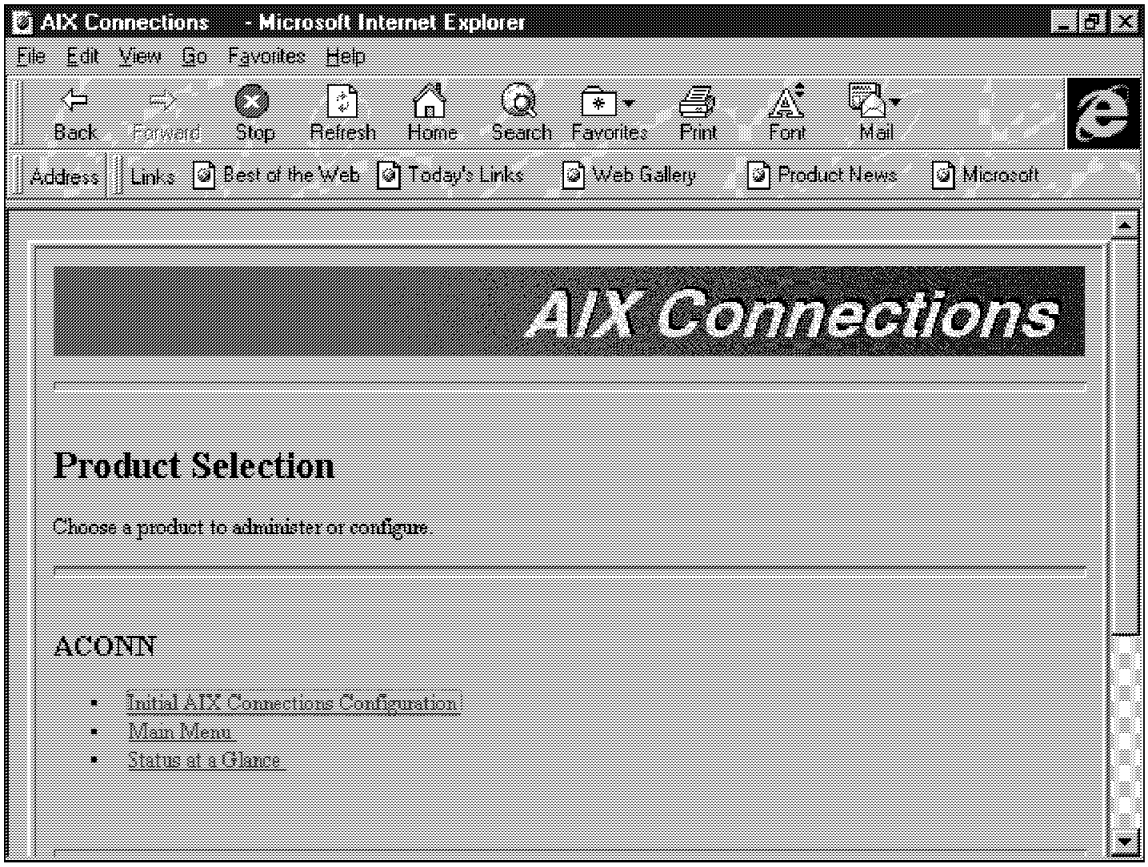

Figure 7. Web Tool Running Microsoft Windows 95 Internet Explorer

For a detailed discussion on the functionality of the Web tool, please refer to Chapter 16, “Web Based HTML Administration Tool” on page 171.

Let’s go through the Main menu.

The tool is divided into these main groups:

- Initial AIX Connections configuration
- General AIX Connections management
- System
- Alternate NetBIOS/NetBEUI realm
- NetWare-compatible realm
- AppleTalk-compatible realm
- Transports
- Online AIX Connections documentation

The Web tool includes an authorization tool to log you onto the ’URL’ as any valid AIX user.

If logged on as an AIX Connections administrator, one will be authorized to perform all of the administrative functions provided in the tool interface.

3.2.3 Improved Browsing Support

In this version of AIX Connections, the AIX Connections server can act as a browse master. The browse master is the server that collects information about available shares in the network. The browse master concept is only supported by Microsoft clients.

To have your AIX Connections server show up in its own domain (defined by the ls-domain keyword in the `/usr/tn/config.tn` file) be sure to set up the server as a browse master.

3.2.4 Token-Ring Support for Mac Clients

Version 4.1.5 of AIX Connections supports attachment of Macintosh clients using a token ring. This means that Macintosh clients can connect to AIX Connections over both token ring and Ethernet.

3.2.5 OS/2 Extended Attributes Support

The NB Realm of AIX Connections supports the use of OS/2 extended attributes and long filenames from OS/2, Windows 95 and Windows NT.

The NW Realm of AIX Connections supports long filenames from Windows 95 and Windows NT.

3.2.6 DCE Integration

AIX Connections 4.1.5 can integrate to AIX DCE and DFS, enabling you to use the well-known and highly regarded security and directory services for AIX Client. In this version of AIX Connections, DCE integration is enabled for the NB realm.

For more details on AIX Connections DCE integration and configuration, please refer to Chapter 9, “AIX Connections DCE Integration” on page 141.

3.2.7 HACMP Support Enhancement

Due to the fact that the loss of a PC server can be fatal, AIX Connections servers are HACMP enabled. This means that you will have a fault-tolerant server environment.

The HACMP implementation is based on the AIX Connections service concept. A service definition will show up as a server or, in other words, as a piece of hardware in the network. AIX Connections allow you to define more the one server in each realm. This feature facilitates HACMP in mode 1 (hot standby) and mode 2 (mutual takeover).

To set up HACMP from the AIX Connections point of view, you define two equivalent services on both servers.

3.2.8 TotalPrint Enhancement

In AIX Connections Version 4.1.5, a new printing tool called TotalPrint is available. You can use the spooler of TotalPrint (/usr/tn/tp/tpr) as a substitute for the AIX spool system.

TotalPrint can be controlled and configured using the Web tool. TotalPrint cannot be controlled using SMIT.

An AIX Connections client running a Web browser can execute different print control jobs like:

- Aligning pages
- Restarting jobs
- Prioritizing jobs
- Controlling job queues

TotalPrint will not be discussed in detail in this book. For more information please refer to *AIX Connections, Reference Guide SC23-1829-00*.

3.2.9 Automatic Configuration of Services During Install

During installation of AIX Connections 4.1.5, some startup configuration of your AIX Connections server is done automatically.

- In the NB realm:
  - A file service is defined
  - A terminal service is defined
  - A volume reference to the home and pccode volumes is specified
- In the NW realm:
  - A file service is defined
  - A terminal service is defined
  - A service to support nvt is defined
  - A volume reference to home and sys is specified
- In the AT realm:
  - A file service is defined
  - A volume reference to home is specified

All realms are set up during installation to start automatically on reboot by adding stanzas to the /etc/inittab file.

A set of rc-files is created for this in the /etc directory. These files are:

- /etc/rc.lsserver
- /etc/rc.nwserver
- /etc/rc.macserver

The htmld daemon is also configured to start on reboot. This will allow you to access the HTML-based administration tool.

As a small, but very nice feature in the new version of AIX Connections, you can use system environments as references to volumes. During installation, a reference to $HOME is created. This means that every user accessing the AIX Connections server will have a reference to his home directory on the server.

All printers defined in /etc/qconfig, local or remote, will be set up to be available for AIX Connections.

3.2.10 Quick-Start Tool Configuration

As mentioned, a lot of your configuration is done during installation. The SMIT quick start tool allows you to set up communication between the clients of each realm and the server in an easy and consistent way.

3.2.11 NetBIOS Configuration Using SMIT

In Version 4.1.5 of AIX Connections, all configuration can be done using SMIT. Configuration of NetBIOS in this version also can be done using SMIT.

Chapter 4. AIX Connections Common Installation and Configuration

In this chapter, we will look at how the AIX Connections product is structured. We will also look at installation tasks that are common to all three realms.

Note: AIX Connections uses the hostname of your workstation to set up service names for you. If the hostname is not set, maybe because you are installing your workstation for the first time (hostname = localhost or blank), the installation program will create a name for your services from the letters ′ibm′ followed by your workstation′s machine ID number from the `uname` command.

This might not be the way you want to recognize your service names – and service names cannot be renamed – so it might be a good idea to set up TCP/IP before installing AIX Connections.

4.1 AIX Connections Components

The AIX Connections product is split into installable groups:

1. Server – the Server package is split into five packages:
   - connect.server.admin
   - connect.server.com
   - connect.server.lsserve
   - connect.server.macserve
   - connect.server.nwserve

   The connect.server.com package contains files common to all the servers. The others are the servers themselves, NB Realm of AIX Connections, NW Realm of AIX Connections and Macintosh and a package containing the new Web-based administration tool is included.
2. Protocols

   connect.protocols
3. Client

   connect.client
4. Manuals

   connect.ps.en_US

   connect.ps.en_US.lsserve 4.1.5.0.all
   connect.ps.en_US.macserve 4.1.5.0.all
   connect.ps.en_US.nwserve 4.1.5.0.all
   connect.ps.en_US.client 4.1.5.0.all
   connect.ps.en_US.up_n_running 4.1.5.0.all
5. Documentation

   connect.info.en_US

   This is the Version 4.1.4 documentation.
6. man pages

   connect.man.en_US.data
7. Online Documentation

connect.hsml.en_US.data

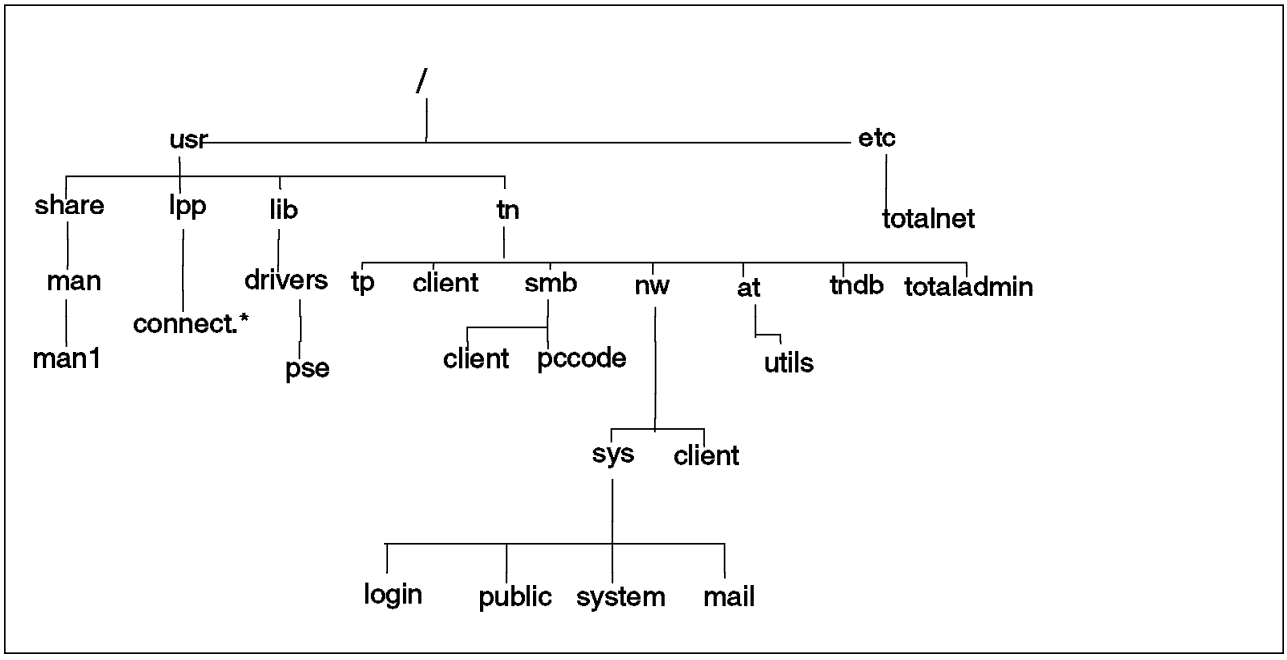

Figure 8. AIX Connections Fileset Installation

AIX Connections is also available as an installation bundle. To install it, you can simply select the bundle, connect.Bnd. This will install:

Version 4.1.5.0 connect.client
  4.1.5.0 Connections Client Software

Version 4.1.5.0 connect.protocols
  4.1.5.0 NW LS MAC and Client Protocols

Version 4.1.5.0 connect.server
  4.1.5.0 Connections Common Server Files
  4.1.5.0 Connections HTML administration
  4.1.5.0 LS_Server Software
  4.1.5.0 MAC_Server Software
  4.1.5.0 NW_Server Software

Version 2.1.4.0 netbios
  2.1.4.0 NetBIOS Application Programming Interface
  2.1.4.0 NetBIOS Protocol Stack

4.1.1 Installation Disk Requirements

Installing AIX Connections without the Postscript documentation will take up about 25 MB of disk space.

Figure 8 shows the filesets and where their contents are installed.

4.1.2 Initial Configuration

During installation some default services and shared disk areas (volumes) are created for you as described in 3.2.9, “Automatic Configuration of Services During Install” on page 27.

Once the product is installed, you can use the new SMIT Quick Start tool. This tool sets up basic configurations for any or all three realms and starts the configured services on your system.

Attention

Use this tool only when no configuration has been done before; using the tool at any other time may produce unwanted results.

Do not use the Quick Start tool if you are upgrading from AIX Connections 4.1.4.

Configuration can now be performed by using SMIT or using the Web-based administration tool. To run the Quick Start tool using SMIT, follow the steps below:

- Start SMIT
- Select **Applications**
- Select **AIX Connections**

You will now see the SMIT panel as in Figure 9.

```
                                AIX Connections

Move cursor to desired item and press Enter.

  Configuration
  Administration
  Client
  Quick Start









F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 9. AIX Connections SMIT Panel

From here, you can launch the Quick Start tool.

To set up NB realm services:

1. Select **Quick Start** from the AIX Connections SMIT panel.
2. Select **NB** from the pop-up window.
3. Select the **service** to start from the pop-up window.
4. Select the **protocol** to use from the pop-up window.
5. Select the **interface** you want to use from the pop-up window.

   Note: If you want your services to run on more than one interface, you might configure this later using SMIT or the Web tool.
6. Press the **Enter** key, and the NB realm Quick Start is complete.

To set up NW realm services:

1. Select **Quick Start** from the AIX Connections SMIT panel.
2. Select **NW** from the pop-up window.
3. Select the **service** to start from the pop-up window.
4. Select the **interface** you want to use from the pop-up window.

   Note: If you want your services to run on more than one interface, you might configure this later using SMIT or the Web tool.
5. Select the **network number** and **frame type** you want to use for your configuration.
6. Press the **Enter** key, and the AT realm Quick Start is complete.

To set up AT realm services:

1. Select **Quick start** from the AIX Connections SMIT panel.
2. Select **AT** from the pop-up window.
3. Select the **service** to start from the pop-up window.
4. Select the **interface** you want to use from the pop-up window.

   Note: If you want your services to run on more than one interface, you might configure this later using SMIT or the Web tool.
5. Press the **Enter** key, and the AT realm Quick Start is complete.

Now let's see how to set up AIX Connections using the Web-based administration tool.

Note: The Web-based administration tool uses the httpd daemon. You need to start the daemon on you server. To do this, enter the following command:

```
/usr/tn/totaladmin/W3/bin/tnadmin.sh start
```

Once the daemon is running, bring up your Web browser and open the following URL `http://hostname:nnnn`, where `hostname` is the TCP/IP hostname of the AIX Connections server and `nnnn` is the assigned port number of AIX Connections Admin, 7777.

In our scenario, we will open the URL: `http://connect:7777.`

This will bring up the product selection screen below.

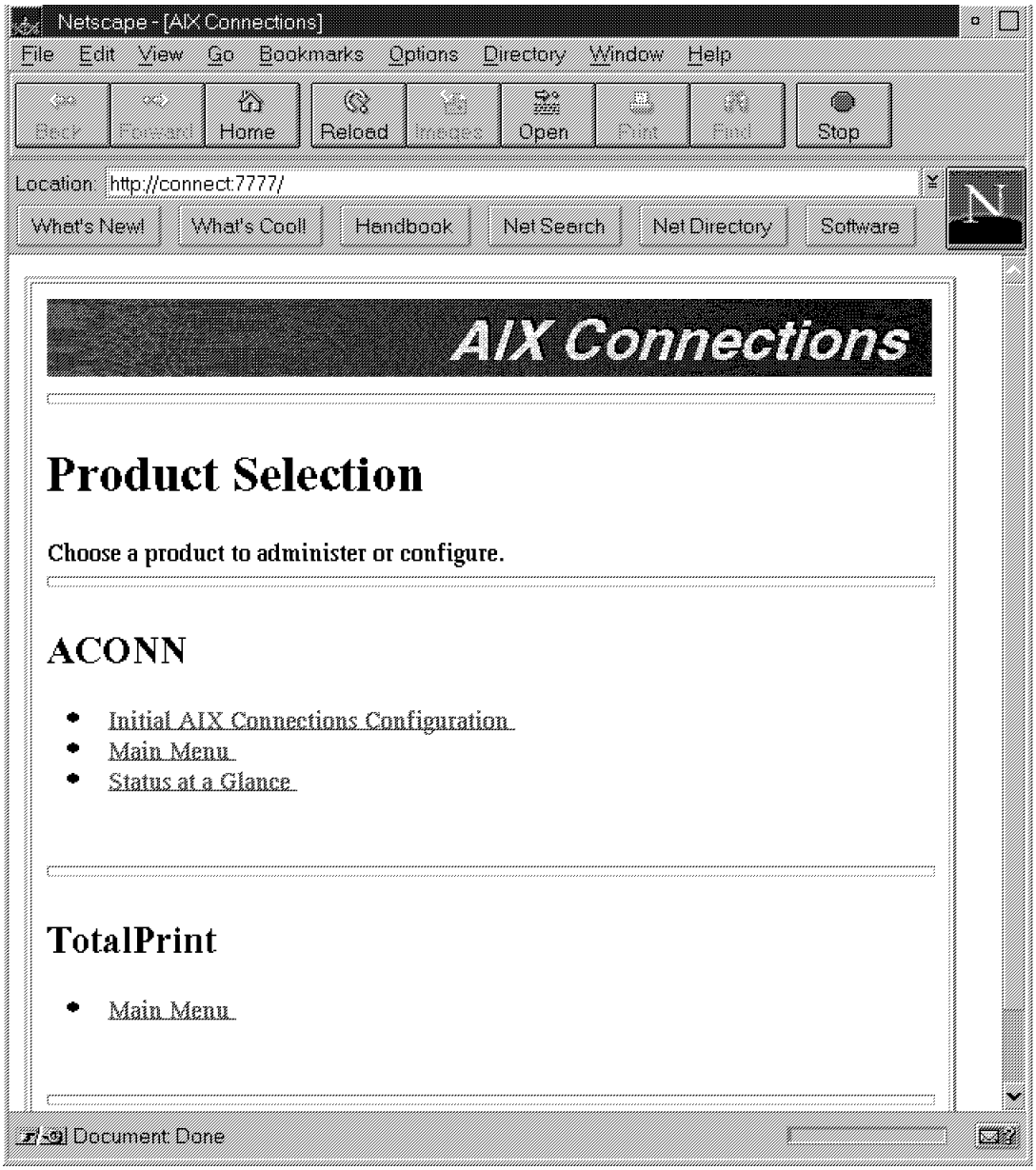

Figure 10. Web Tool

1. From the product selection screen, select **Initial AIX Connections Configuration**.
2. Log in using your AIX userid and password. To configure, you must have superuser privileges.
3. Select **AIX Connections Initial Configuration**. This will bring you to this screen:

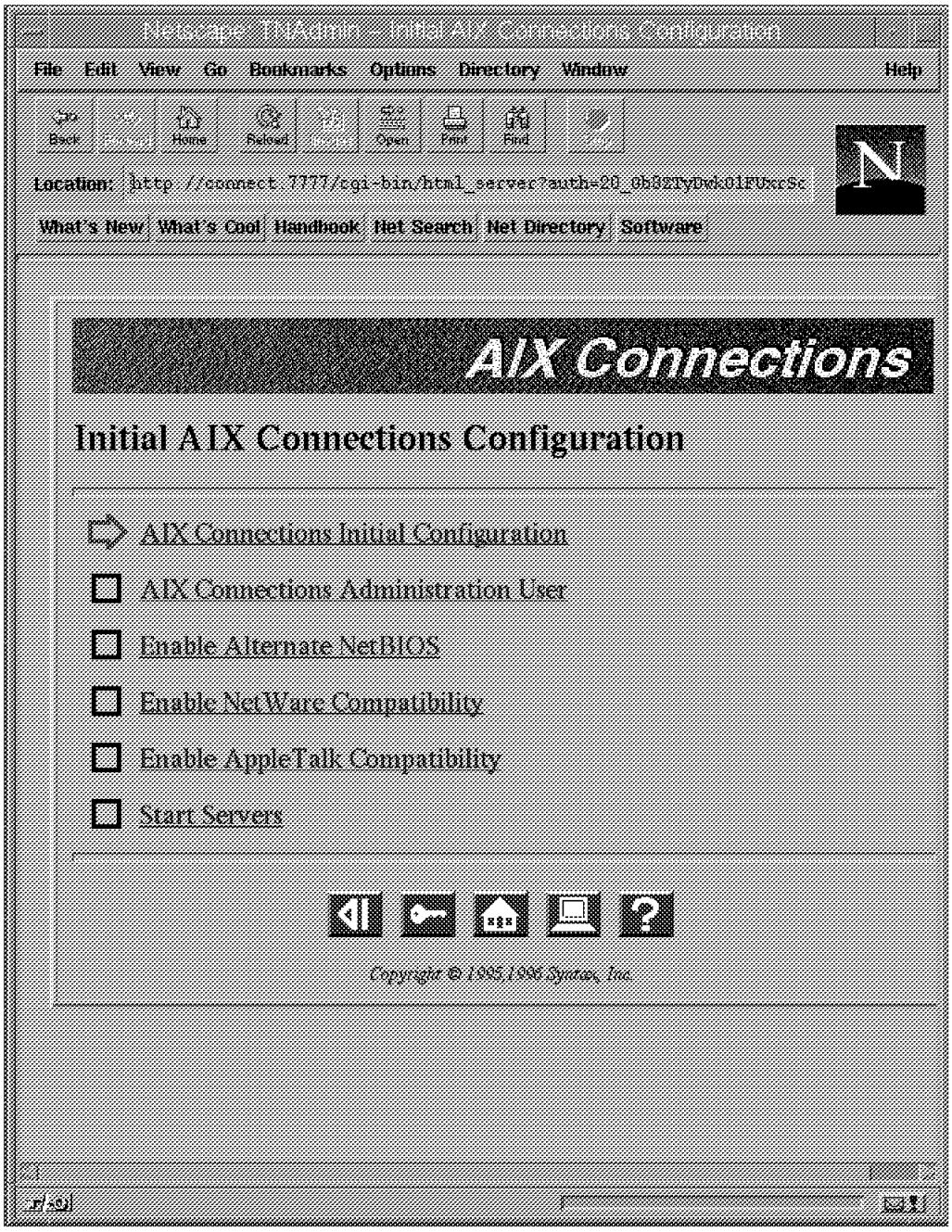

Figure 11. Web-Based Administration Tool

4. Select **Check For Superuser**. Then select **OK**.
5. Fill in username and group of the AIX Connections administrator. Select **Configure Administrative User Info**. Then select **OK**.
6. If you want to use the NB realm, be sure that **Enable Alternate NetBIOS** is checked, and then select the **Update Enable Alternate NetBIOS** button. Then select **OK**.

   Note: Before this step, NetBIOS LANAs must be configured. See *Up and Running!*, SC23-1758-02 for information on configuring LANAs.

7. Fill in your server name, interface and domain name, and then select **Update NetBIOS Configuration**. Then select **OK**.
8. If you want to use the NW realm, be sure that **Update NetWare Compatibility** is checked, and then select the **Update Enable NetWare Compatibility** button. Then select **OK**.
9. Fill in your server name, device name, frame type and network number. Select the **Update NetWare Compatibility Configuration**. Then select **OK**.
10. If you want to use the AT realm, be sure that **Enable AppleTalk Compatibility** is checked, and then select the **Update Enable AppleTalk Compatibility** button. Then select **OK**.
11. Fill in your server name, Appletalk zone and interface, and then select **Update Appletalk Compatibility Configuration**. Then select **OK**.
12. If you want all three realms to start, be sure **Start Servers** is checked, and then select **Update Start Configured Server**. Then select **OK**.
13. To log out of your session, select the **Key** button.
14. To go to the AIX Connections Main menu, select the **Arrow** button.

Chapter 5. Using AIX Connections in the NW Realm

In this section, we will look at installing and configuring the NW Realm of AIX Connections and the clients that connect to it.

We will go through the installation of the fileset necessary to set up the NW Realm of AIX Connections, and we will then look at the configuration of:

1. The protocol stack, in this case, IPX
2. The file service and the setup of volumes and printers
3. Configuration of clients
   - DOS/Windows, Windows for Workgroups client
   - OS/2 client
   - Windows 95 client

   Note: Other client types, such as Windows NT and others, can also use NW Realm of AIX Connections as a server. Examples of their configuration is not included.

This section covers a non-Quick Start configuration. The Quick Start configuration is covered in Chapter 4, “AIX Connections Common Installation and Configuration” on page 29.

For complete information on installing any or all AIX Connections components, please see *Up and Running!, SC23-1758-02*.

5.1 NW Realm of AIX Connections Package Installation

The installation for NW Realm of AIX Connections requires only some of the filesets. The following list shows all the filesets. Those marked with an * are necessary; those marked with an > are optional.

```
 4.1.5.0  connect.Bnd
   @ 4.1.5.0  Connections Bundle

>4.1.5.0  connect.client
   @ 4.1.5.0  Connections Client Software

>4.1.5.0  connect.html.en_US
   + 4.1.5.0  Connections Server Guides - U.S. English

>4.1.5.0  connect.man.en_US
   @ 4.1.5.0  Connections Server and Client Man pages - U.S. English

*4.1.5.0  connect.protocols
   @ 4.1.5.0  NW LS MAC and Client Protocols

 4.1.4.0  connect.ps.en_US
   @ 4.1.4.0  Connections - LS_Server Documentation - U.S. English
   @ 4.1.4.0  Connections - MAC_Server Documentation - U.S. English
 > @ 4.1.4.0  Connections - NW_Server Documentation - U.S. English
   @ 4.1.4.0  Connections Client Documentation - U.S. English
   @ 4.1.5.0  Connections - Up and Running Documentation - U.S. English
```

```
 4.1.5.0  connect.server
*  @ 4.1.5.0  Connections Common Server Files
   @ 4.1.5.0  Connections HTML administration
   @ 4.1.5.0  LS_Server Software
   @ 4.1.5.0  MAC_Server Software
*  @ 4.1.5.0  NW_Server Software
```

5.2 NW Realm of AIX Connections Configuration

Before we configure the NW Realm of AIX Connections, there are a few basic configuration decisions to be made and a few basic operating system configurations to check.

If there are already Novell servers in the network to be integrated with the NW Realm of AIX Connections, you will need to get some information from the network administrator. You will need to know what frame type(s) the servers are configured to use, the network number, what your NW Realm of AIX Connections service name should be and what the NW Realm of AIX Connections internal network number should be.

Note: The name and *internal* network numbers must be unique in the network. The output of the `hostid` command will provide a unique network number.

Note: It is possible that the native NetWare servers are configured to use more than one frame type. The NW Realm of AIX Connections will also support this.

Table 5 lists the frame types the NW Realm of AIX Connections supports and their corresponding interfaces in AIX.

Table 5. Packet Frame Types and Interfaces.

Frame Type	**Interface**
ETHERNET_II	en
ETHERNET_802.2	et
ETHERNET_802.3	et
ETHERNET_SNAP	et
TOKEN-RING	tr
TOKEN-RING_SNAP	tr

We are now ready to configure the NW Realm of AIX Connections.

5.2.1 NW Realm Configuration

Configuration of the NW Realm of AIX Connections can be done through SMIT or the Web-based tool. In this part, we will use the Web tool and a new feature in this version of AIX Connections called the Wizard.

The Wizard will guide you through the steps necessary to do a specific task.

Note: The ? button may be pressed to obtain field help.

See *Up and Running!*, SC23-1758-02 for more information on configuration.

To configure the NW Realm of AIX Connections using the Web tool, you will have to go through the following steps:

1. Bring up your favorite Web browser and connect to the URL `http://connect:7777`, where `connect` is the hostname of our AIX Connections server and 7777 is the port used by the Web tool.
2. From the Product Selection menu, select the **Main menu**.
3. Enter your **userid** and **password**. You need superuser privileges to set up the NW Realm of AIX Connections.
4. From the Main menu, select **NetWare Compatible Service Wizard** (Figure 12 on page 40). You need to go through the following steps:

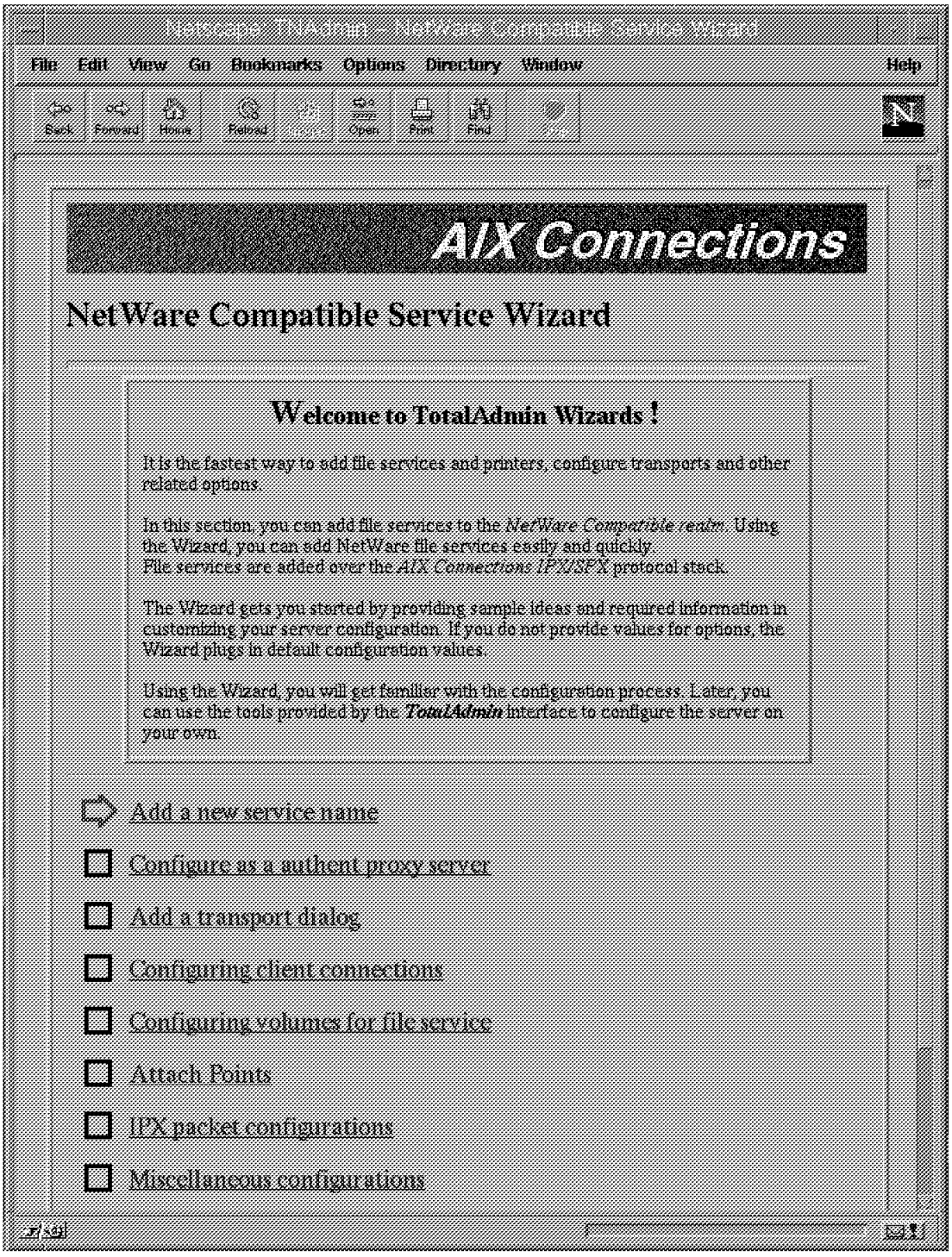

Figure 12. Web Tool NetWare-Compatible Service Wizard

a. Add a new service name

b. Configure a proxy server

c. Add a transport dialog

d. Configure client connections

e. Configure volumes for file service

f. Attach points

g. Set IPX packet configurations

h. Complete miscellaneous configurations

5. To start up your service configuration, select **Add a new service name** from the wizard.
6. Fill in your service name, and select **Update File Service Name**.

   The service name consists of the service name and type.

Figure 13. NetWare-Compatible Service Wizard: File Service Name

7. Select **OK**. This brings you to Figure 14 on page 42.

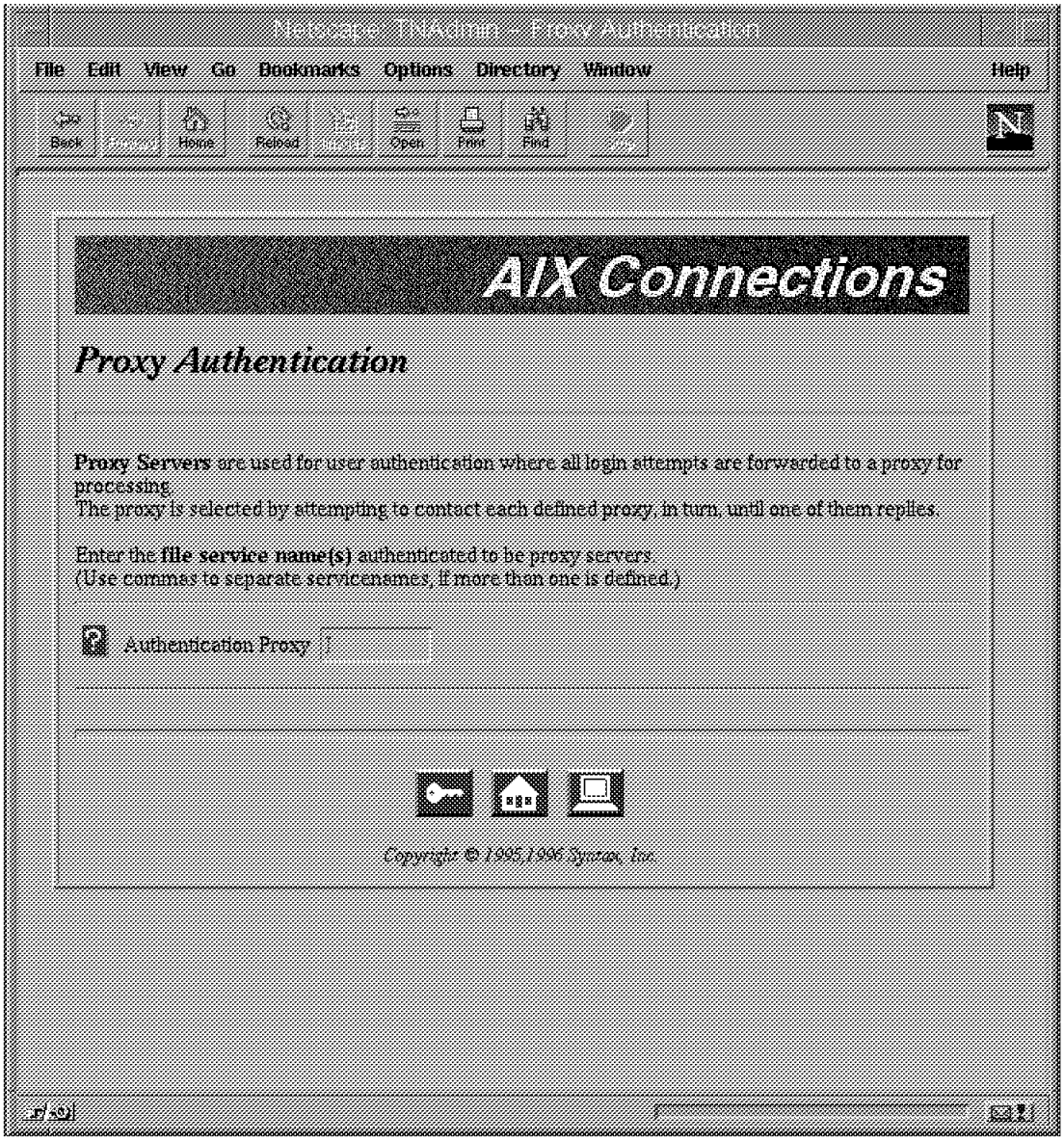

Figure 14. NetWare-Compatible Service Wizard:Proxy Authentication

8. Fill in the name of your proxy(s), if any. Proxy servers must be separated using a comma. Select **Update Proxy Authentication**.
9. Select **OK**. This brings you to Figure 15 on page 43.

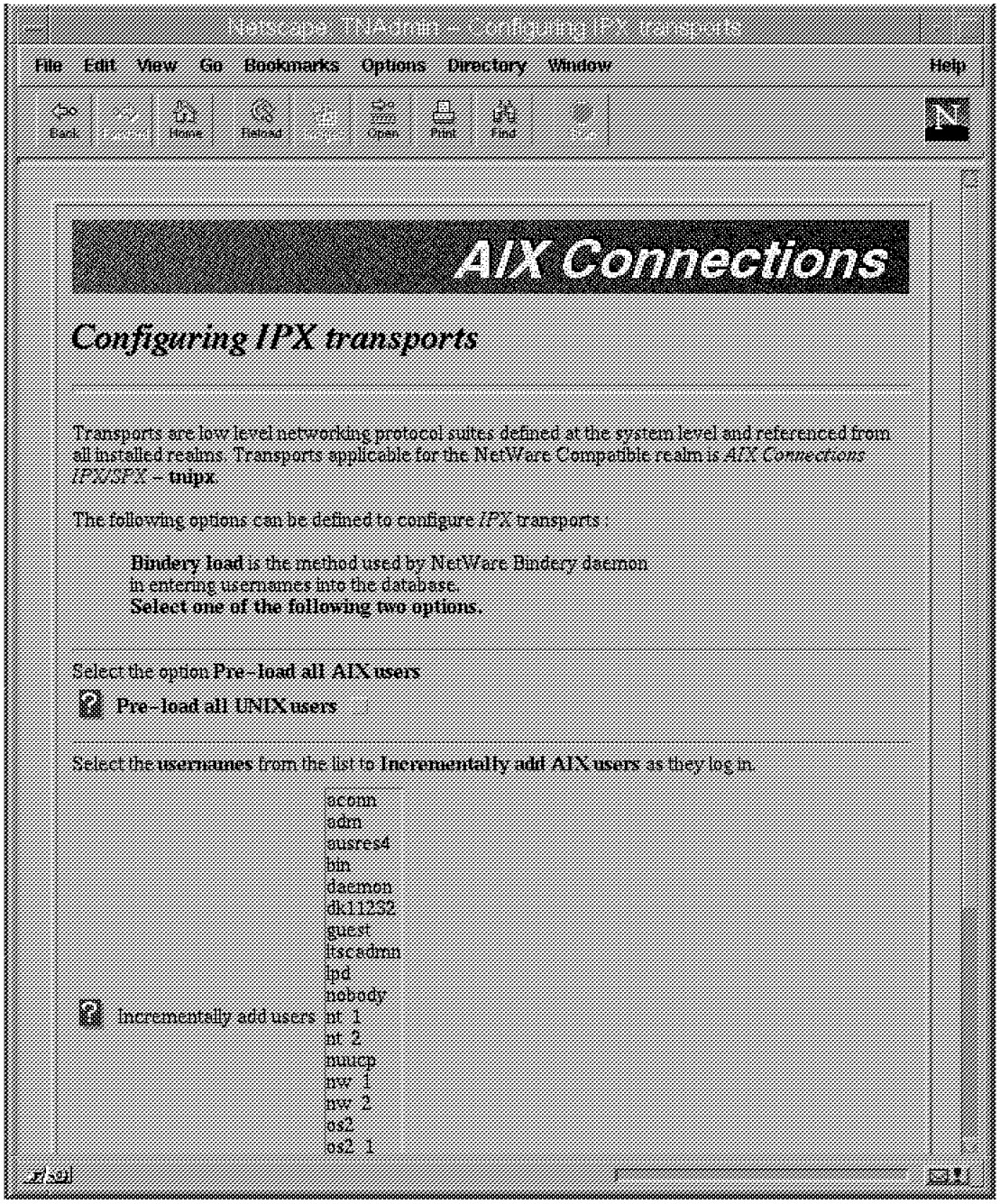

Figure 15. NetWare-Compatible Service Wizard: Configuring IPX Transports

10. You need to set up your IPX configuration as either **Bindery load** or **Incrementally add users**. Select **Update Configuring IPX Transport**.
11. Select **OK**. This brings you to Figure 16 on page 44.

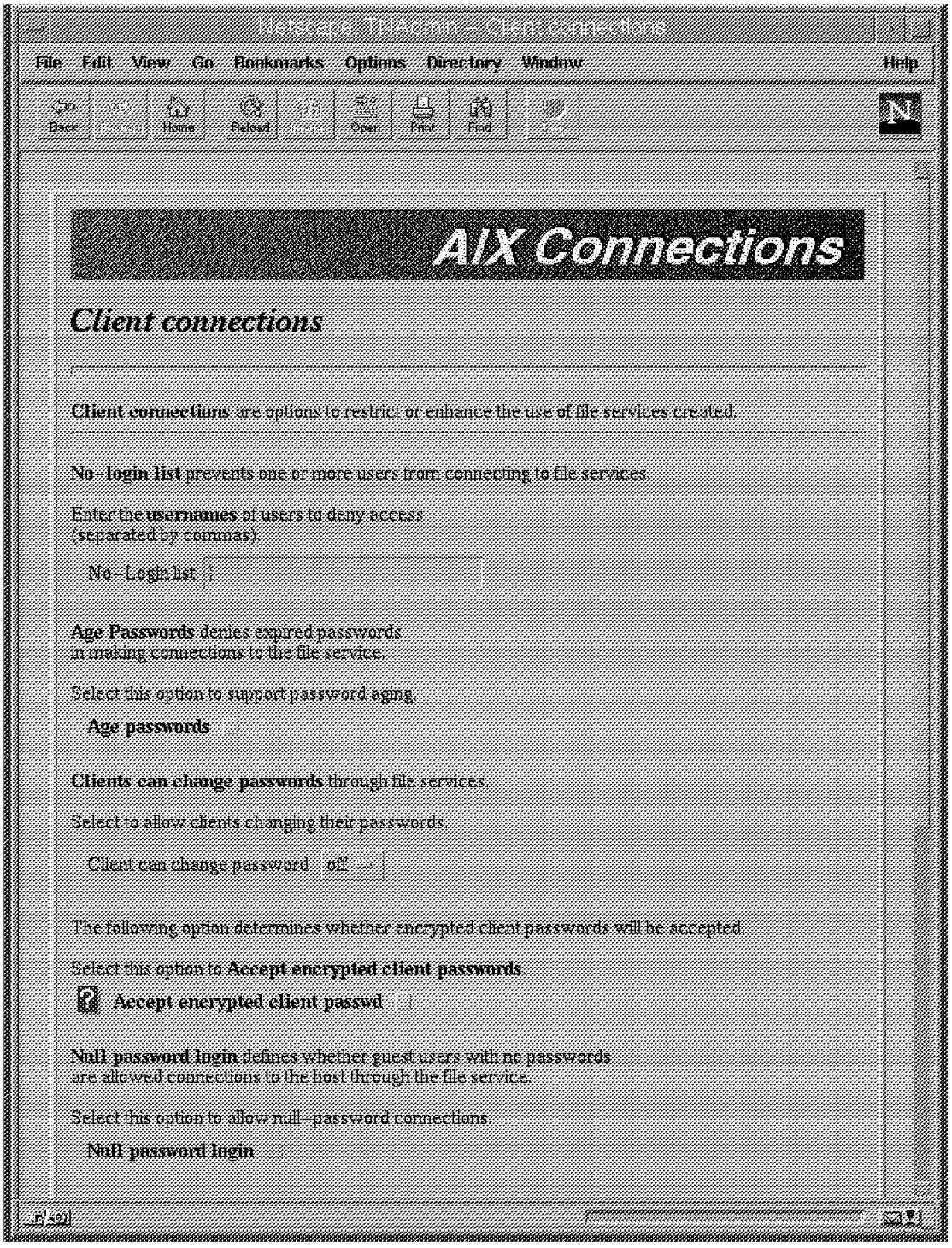

Figure 16. NetWare-Compatible Service Wizard: Client Connections

12. You can use this panel to define user privileges. You also can exclude users. Select **Update client connections**.
13. Select **OK**. This brings you to Figure 17 on page 45.

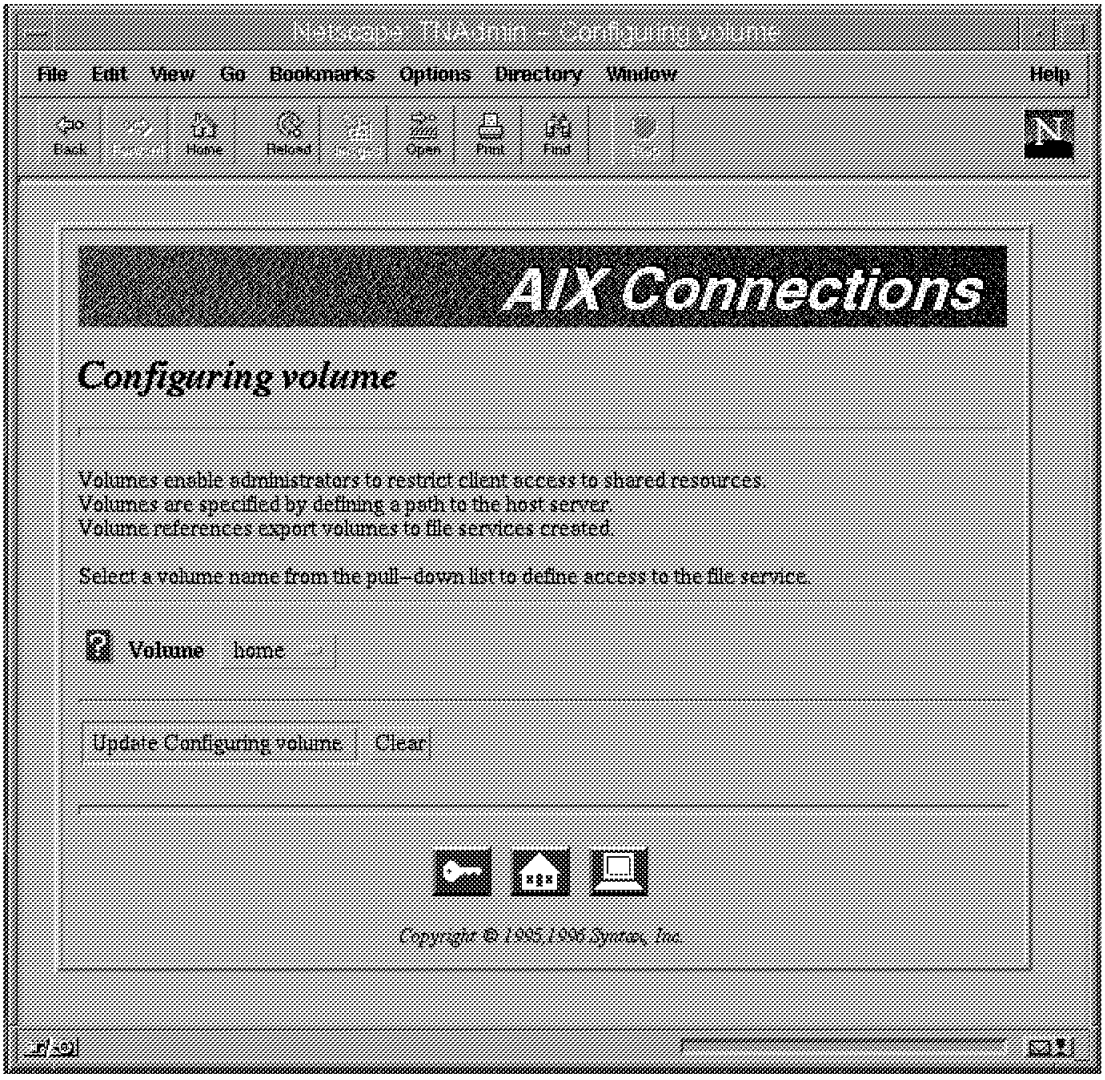

Figure 17. NetWare-Compatible Service Wizard: Configuring Volume

14. Select the volumes you want to set up for this service. Select **Update Configuring volume**.
15. Select **OK**. This brings you to Figure 18 on page 46.

Figure 18. NetWare-Compatible Service Wizard: Configuring Attach Points

16. Add the attach points you want to define for your service. Select **Update Configuring attach points**.
17. Select **OK**. This brings you to Figure 19 on page 47.

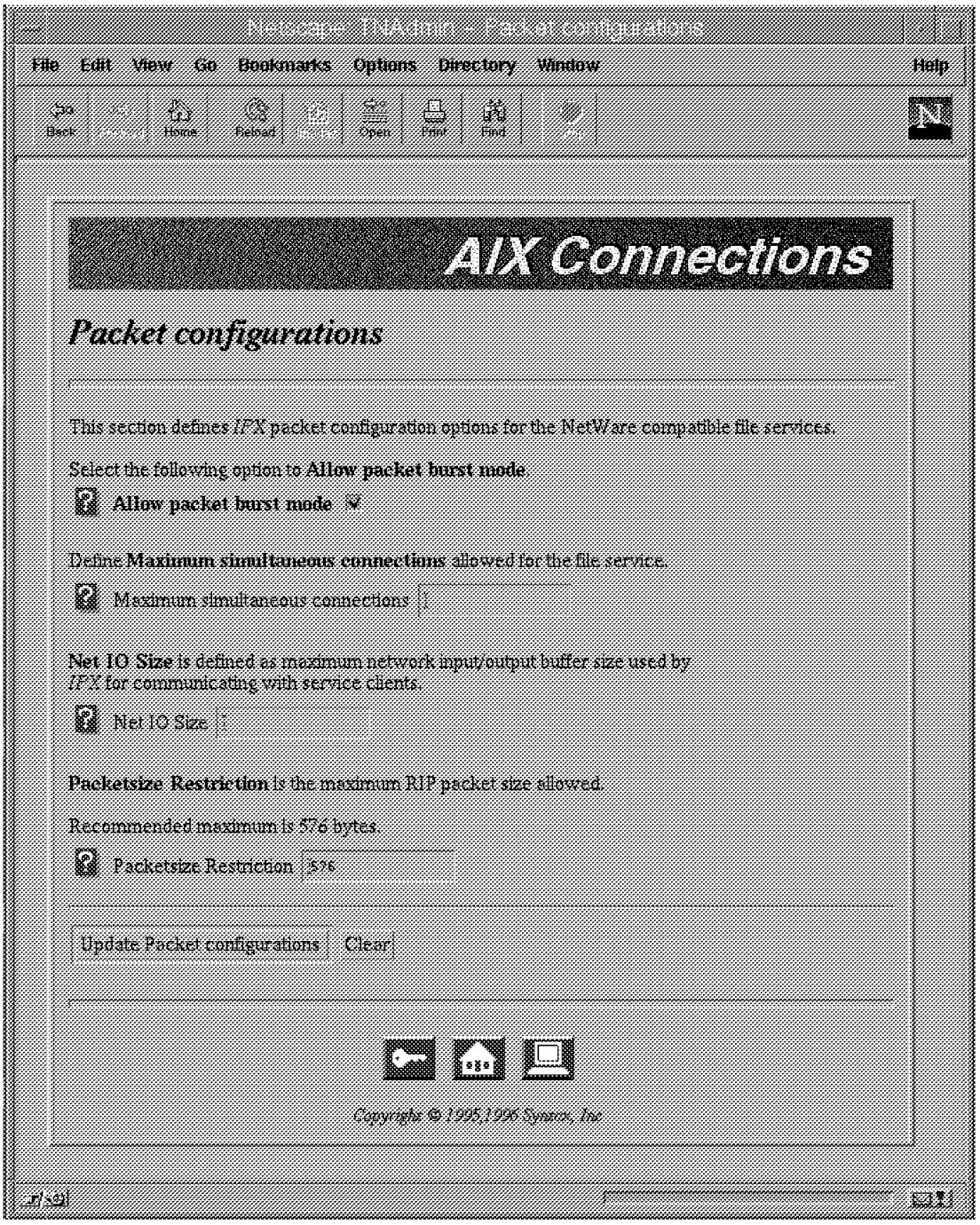

Figure 19. NetWare-Compatible Service Wizard: Packet Configurations

18. Configure your IPX communication between the client and the server. You might not wish to change these options, but you should consider things like the number of connected clients and net IO size. Select **Update Packet configurations**.
19. Select **OK**. This brings you to Figure 20 on page 48.

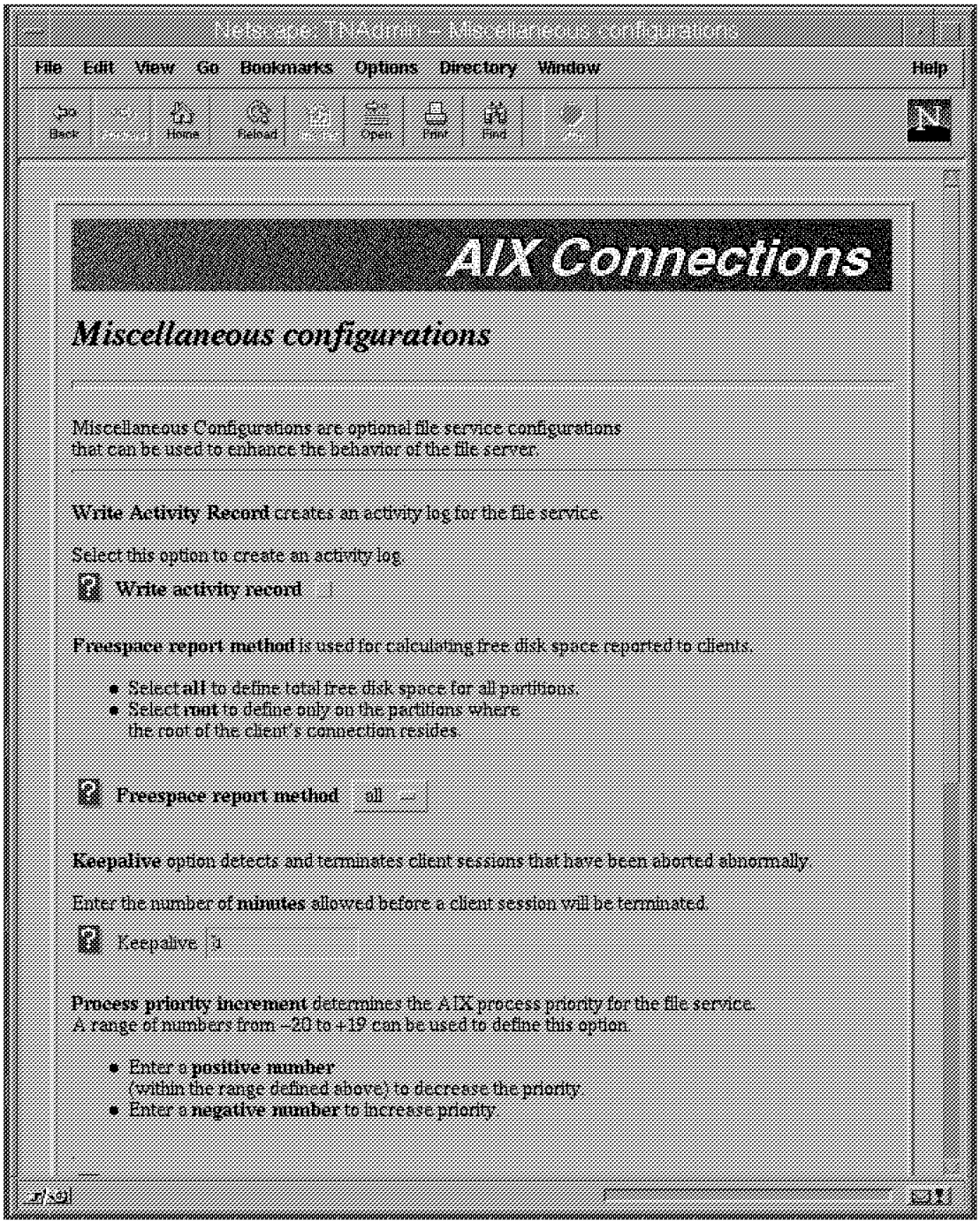

Figure 20. NetWare-Compatible Service Wizard: Miscellaneous Configurations

20. Finally, you may configure options such as the default printer for the service. Pay careful attention to the number of open files and process priorities you define. Select **Update Miscellaneous configurations**.
21. Select **OK** to finish configuration of your new service. This will bring you back to the **NetWare-Compatible Service Wizard**.
22. Select **Apply** and then the **HOME** button to go back to the Main menu.
23. You can now start your new service.

Finally, check your NW Realm of AIX Connections status. To check the status of the NW Realm of AIX Connections, you can use the command `/usr/tn/tnstat -r NW` or the SMIT fastpath aconn_stat. The latter will show you the status of all realms.

The output should look similar to Figure 21.

```
                                COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

[TOP]
TotalNET system is enabled.
Transports: tnipx tnatk altnb
NWservices are up.
        Transports used: tnipx
        nwconnect:file is accepting new connects.
        3 client(s) connected.
        nwconnect:term is accepting new connects.
        0 client(s) connected.
        nwconnect:nvt is down
ATservices are up.
        Transports used: tnatk
        atconnect:file is accepting new connects.
        0 client(s) connected.
[MORE...11]

F1=Help             F2=Refresh          F3=Cancel           F6=Command
F8=Image            F9=Shell            F10=Exit            /=Find
n=Find Next
```

Figure 21. Output From the NW Realm of AIX Connections Status SMIT Option

To add a new IPX interface on another adapter using the Web tool, you need to go through the following steps:

1. From the Main menu, find the Transport section and select the **Configure IPX/SPX Transports Wizard**. This will give you a screen like Figure 22 on page 50.

Figure 22. Configure IPX/SPX Transports Wizard.

From here, you can configure your new interface. You will need to go through:

a. Interfaces

b. Routes

c. Service advertisements

d. Miscellaneous configurations

From the AIX Connections IPX/SPX Configuration panel (Figure 22 on page 50), you need to go through the following steps to complete your network configuration:

a. Select **Interfaces**, and Figure 23 on page 52 screen will appear.

b. You need to add the following information to Figure 23 on page 52:

   Add the interface you want to use – like en0, et0 or tr0

   Add the internal network number – must be unique in the network

   Add the device name to use – like /dev/dlpi/en:0

   Add the IPX network number and frametype

c. Select **Update IPX/SPX Network Interface**, and then select **OK**.

d. If you are planning to use routing in your configuration, add information about **router name** and **gateway** to the Static Route panel.

e. Select **Update Static Route** and select **OK**.

f. Add the **service advertisement protocol name** to the Service Advertisement Protocol panel. Select **Update Service Advertisement Protocol** and select **OK**.

g. This brings you to the Miscellaneus Configuration Panel. Normally, there is no need to change the defaults. One option, **SAP Answer Nearest**, might interest you. This option specifies whether NWfile will respond to client SAP GetNearestServer queries. By default, this option is not selected.

   Typically, AIX Connections will respond faster than a Novell NetWare server. If clients need to be attached to a Novell server first for some reason, select this option.

h. Select **Update Miscellaneus Configuration**, and then select **OK**.

i. This finishes the IPX/SPX configuration.

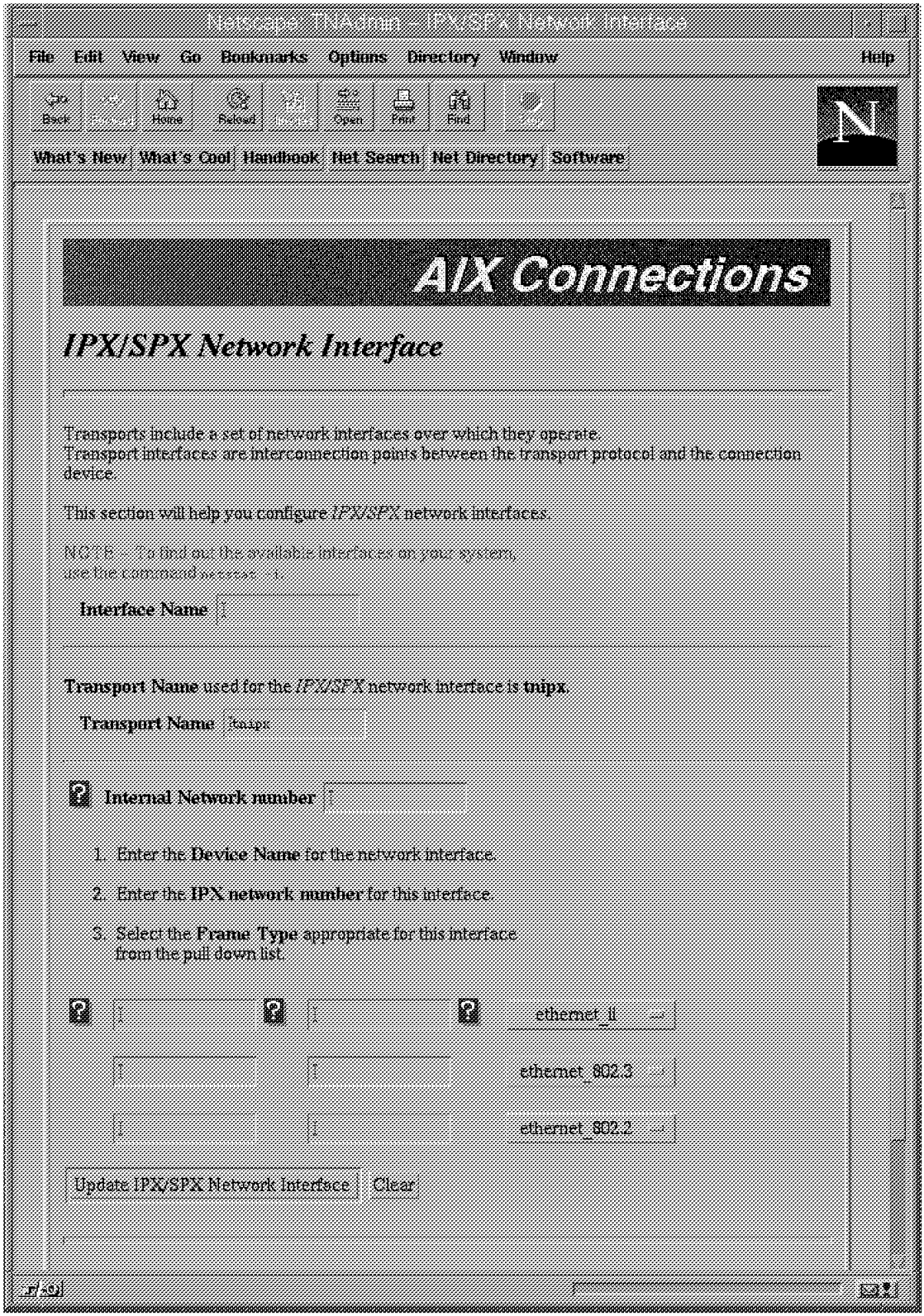

Figure 23. IPX/SPX Network Interface Panel

You are now ready to connect PC clients to the NW Realm of AIX Connections.

5.3 NW Realm of AIX Connections Clients

In this section, we will look at the configuration of various clients connecting to NW Realm of AIX Connections.

The clients used in this section are:

- DOS/Windows, Windows for Workgroups client
- OS/2 Warp Connect client
- Windows 95 client

Note: Other clients, such as Windows NT etc., are supported.

This chapter also covers how to use login scripts with AIX Connections. You will find this section at the end of this chapter.

Before going into details about the different clients, let's do a brief introduction to the Novell NetWare environment, including the ODI stack.

IBM does not provide the IPX/SPX drivers for the PC clients with AIX Connections. You must obtain these from Novell or another source. If you already have NetWare servers in your network, you will already have a license to use these drivers. Depending on which version of Novell NetWare you are running, you will either have the VLM (Virtual Loadable Module) kit or the earlier ODI (Open Data-Link Interface) stack with NETX.EXE. It is recommended that you obtain the latest version of the drivers from Novell. Drivers are available via the Internet on the Novell node, `http://www.novell.com`.

See Table 1 on page 7 for more information on requestors.

For the examples in this book, the NetWare Client Kit for DOS and MS Windows 1.20a, otherwise known as VLMs, was used.

If the client PCs are connected to another server using AIX Connections supported protocols and requesters, AIX Connections will provide file and print services with no additional client software. The PC users will also be able to use the same interface used with the existing server. AIX Connections will appear as an additional server, and once selected, the volumes and printers configured will be available. Essentially, in an existing PC network environment, you do nothing to the clients. AIX Connections can coexist with the existing servers or provide file and print services as a stand-alone server. This allows AIX Connections to be installed with minimal disruption to the users.

5.4 The ODI Stack

Novell's ODI standard provides the function of the OSI (Open Systems Interconnection) data-link layer. The purpose of ODI is to allow single or multiple network protocol drivers to use single or multiple adapters. Network protocol drivers written to the ODI standard – such as IPX/SPX – are physical-media and media-protocol independent. ODI and OSI related to NetWare are discussed in greater detail in the redbook *NetWare from IBM: Network Protocols and Standards, GG24-3890-01*.

Figure 24 on page 54 shows how the ODI stack fits into the OSI 7-layer model.

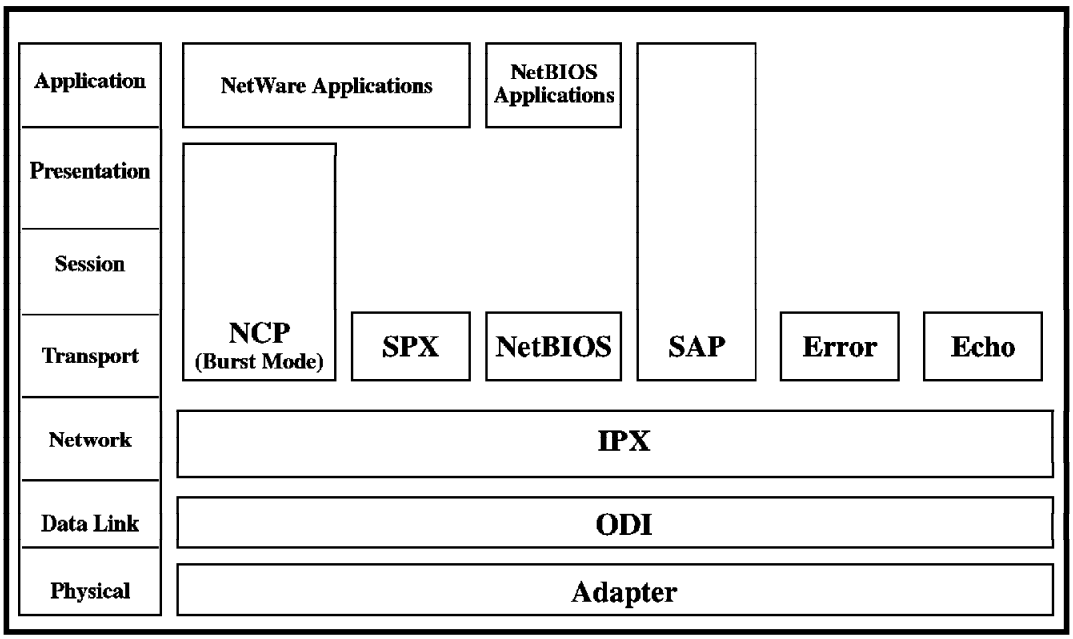

Figure 24. ODI Stack and the OSI 7-Layer Model

5.5 DOS-Only Client

The simplest client to install is a PC running only DOS. Before installing the client software, you must know the model of the network card you are using. For example, NE2000, IBM Token-Ring Adapter A, Etherlink and so on.

If you are using the NetWare Client Kit for DOS and Windows (VLMs), you can use the following instructions. If you are using an earlier version of the NetWare client code, the options may not be exactly the same but should be similar. We recommend upgrading to the latest code available from Novell. (See page 53 for details about obtaining the code from the Internet.)

Connections to an existing configuration will be discussed later in this chapter.

Installation of the client software is easy with the NetWare Client Kit. It is menu-driven from the diskettes. Boot the PC to a DOS prompt; insert diskette 1 of the NetWare Client Kit; and type: A: <enter> INSTALL <enter> . You will now see a screen with several options.

```
NetWare Client Install  v1.21

1. Enter the destination directory:
   C:\NWCLINET

2. Install will modify your AUTOEXEC.BAT and CONFIG.SYS files and make
   backups.  Allow changes? (Y/N): Yes

3. Install support for MS Windows? (Y/N):  Yes
   Enter MS Windows directory:  C:\WINDOWS
   Highlight here and Press <Enter> to customize.

4. Configure your workstation for back up by a NetWare server running
   software such as SBACKUP? (Y/N):  No

5. Select the driver for your network board.
   Highlight here and press <Enter> to see list.

6. Highlight here and press <Enter> to install.
```

Figure 25. NetWare Client Installation Screen

Most options can be left as the default. Now, continue with the following steps:

1. If you have Windows installed, check that Option 3 is set to **Yes** and see that your Windows directory is set correctly.
2. Move down to Option 5, and select your **network board driver**. The list provided in the kit is quite comprehensive. If the driver you require does not appear, select the last option from the list, other drivers. You will be prompted to insert a diskette containing the third-party driver. This diskette is provided with your network card.
3. After selecting the driver, you will be asked for the network and card settings. Normally, you can leave these as default. The frame type must match one of the frame types specified when setting up the NW Realm of AIX Connections (see Table 5 on page 38). If you do not know these values, accept the defaults since they can be altered later if necessary.

4. Press **F10** to save the network driver values.
5. Finally, select **Option 6** to continue.

The installation process will now make the necessary changes to your autoexec.bat and config.sys files and copy the client software to the PC's hard disk.

Your config.sys and autoexec.bat files should now look similar to the examples below. The lines in boldface are those added by the installation.

Config.sys

```
DEVICE=C:\WINDOWS\HIMEM.SYS
DOS=HIGH
DEVICE=C:\DOS\SETVER.EXE
DEVICE=C:\WINDOWS\EMM386.EXE NOEMS
FILES=40
BUFFERS=10
DEVICE=C:\WINDOWS\SMARTDRV.EXE /DOUBLE_BUFFER
STACKS=9,256
LASTDRIVE=Z
```

Autoexec.bat

```
@CALL C:\NWCLIENT\STARTNET
C:\WINDOWS\SMARTDRV.EXE
@ECHO OFF
PROMPT $P$G
PATH=C:\WINDOWS;C:\DOS
PATH C:\NWCLIENT\;%PATH%
SET TEMP=C:\DOS
C:\DOS\MOUSE.COM
```

Now reboot the machine. It should now be able to connect to the nearest Novell NetWare or NW Realm of AIX Connections server in your network.

5.5.1 Configuration Files

In this section, we will look at the configuration of the NetWare client and how to resolve any problems you may have in getting a connection to the NW Realm of AIX Connections.

The startnet.bat file called in autoexec.bat executes the various commands that make up the NetWare client software. The contents of the startnet.bat file, when first installed, should look similar to the following:

```
SET NWLANGUAGE=ENGLISH
C:\NWCLIENT\LSL
C:\NWCLIENT\NTR2000.COM
C:\NWCLIENT\IPXODI.COM
C:\NWCLIENT\VLM.EXE
```

Each line loads part of the ODI stack sequentially. (See Figure 24 on page 54). Each line does the following:

1. Sets the language to English.
2. Loads the LAN support layer.
3. Loads the network card driver (in this case, the token-ring driver).

4. Loads the IPX/SPX protocols.
5. Loads the NetWare shell.

Each part of the NetWare shell reads part of the configuration file, NET.CFG, which is also located in the NWCLIENT directory. After a clean installation, the file should look similar to the following:

```
Link Driver NTR2000
        PORT A20
        FRAME TOKEN-RING MSB
        MAX FRAME SIZE 4222

NetWare DOS Requester
        FIRST NETWORK DRIVE = F
        NETWARE PROTOCOL = NDS BIND
```

The `Link Driver` section is read by the network card driver, in this case, the NTR2000.COM. The `NetWare DOS Requester` section is read by the VLM.EXE. There can also be other sections in this file for other parts of the ODI stack and for other protocol drivers. For more information, see the NetWare Workstation for DOS and MS Windows manual from Novell. This can also be accessed from Novell's Internet Web site `http://www.novell.com`.

Items you may need to change or add are:

- Link driver settings for the network card. Some card drivers will autodetect the network card and its settings, such as interrupt and Direct Memory Access (DMA). However, in some cases, these need to be specified in the Link Driver settings. Values that may need to be set are:
  1. DMA - DMA Channel
  2. INT - Interrupt request number
  3. Port - Specifies on which port the network card is installed
- NetWare DOS Requester settings for the NetWare shell
  1. First network drive - Drive letter to be used for the first network drive.
  2. NetWare Protocol - Sets the NetWare protocols to be loaded (Domain Name Server is for NetWare 4.x, and BIND is for the NW Realm of AIX Connections and NetWare 3.x).
  3. Preferred server - Sets which server you want to attach to when the NetWare shell is loaded. You may wish to set this so you know what server you will connect to. If no value is specified, you will connect to the first server to respond. Set this to the name of the NW Realm of AIX Connections if this is to be your primary server.
  4. Show dots = on - Makes the NW Realm of AIX Connections and NetWare servers show the directory dots for the current directory and parent directory. By default, the NW Realm of AIX Connections does not show these; this can cause problems when changing directories in programs, such as Windows, where you click on the double dots to move to the parent directory.

5.5.2 Logging In and Your Environment

Assuming that we now have set up a connection to our server, we can log into it or any other server on the network.

A set of tools to do this is shipped with AIX Connections. The files are stored in the /usr/tn/nw/sys/login directory on the server.

The tools shipped with the NW Realm of AIX Connections are:

- ATTACH.EXE - Allows you to attach to another NW Realm of AIX Connections server or native NetWare server.
- CAPTURE.EXE - Allows you to redirect printing from a local printer to a network printer defined on an NW Realm of AIX Connections or on a native NetWare server.
- LOGIN.EXE - Allows you to log in and out of the NW Realm of AIX Connections and native NetWare servers.
- LOGOUT.EXE - Allows you to log out of the NW Realm of AIX Connections and native NetWare servers.
- MAP.EXE - Allows you to map drive letters to volumes on the NW Realm of AIX Connections or on native NetWare servers.
- SLIST.EXE - Lists all of the NW Realm of AIX Connections and native NetWare servers on your network.
- VERSION.EXE - Allows you to check the version of the tools shipped with the NW Realm of AIX Connections.

5.5.2.1 Manual Configuration

Any of these tasks can be run manually from a DOS command line, or they can be automatically run when a user logs into the NW Realm of AIX Connections. Here's an example scenario:

The NW Realm of AIX Connections is the user's local server. The server's name is NWCONNECT. Through the configuration files discussed in 5.5.1, "Configuration Files" on page 56, the user's PC has been configured so that it attaches to NWCONNECT at boot and assigns drive F: as the first network drive. When users log in, they wish to direct their first parallel port to a network printer on NWCONNECT called OFFICE and their second parallel port to a printer called POST on a native NetWare server called RHINO. They also need to access files in the SYS:\SHARED directory on another NW Realm of AIX Connections server called TURKEY.

To accomplish this manually, users would have to do the following:

1. Change to the network drive - `F:<enter>`.
2. Log in to NWCONNECT -`LOGIN <username> <enter>`, then enter the password at the prompt.
3. Redirect LPT1: to the OFFICE queue: `CAPTURE Q=OFFICE LPT=1.`
4. Attach to RHINO - `ATTACH RHINO`, then enter usernames and passwords.
5. Redirect LPT2: to the POST queue on RHINO - `CAPTURE Q=POST S=RHINO LPT=2`.
6. Attach to TURKEY - `ATTACH TURKEY`, and map the drive - `MAP Z:=TURKEY\SYS:\SHARED`.

They would now have LPT1 going to the OFFICE print queue and LPT2 going to the POST print queue on RHINO. Their Z: drive would be the shared directory on TURKEY.

5.6 Windows 3.1 and 3.11 Client

In this section we will cover the configuration of Windows and Windows for Workgroups as NW Realm of AIX Connections clients.

Using the VLMs, it is very easy to set up Windows to use a network. If Windows is already installed, you need to install the NetWare Client Kit as detailed in 5.5, “DOS-Only Client” on page 55, making sure that the Windows option is set to Yes. This will automatically modify your Windows or Windows for Workgroups installation to start up with the network drivers loaded.

If Windows is not installed, install it with no network selected. Then, install the NetWare Client Kit as above to update the setup. Doing the installation this way will ensure you have the latest Windows NetWare drivers installed.

If you have any problems, see Appendix C, “NWserver SYSTEM.INI” on page 193 for a list of the SYSTEM.INI from a cleanly installed Windows for Workgroups configuration. The lines that are relevant to the network are highlighted in boldface type.

Note: If you also have the Microsoft Network installed, your SYSTEM.INI file may look a little different from the one above.

5.6.1 Windows Environment

Windows for Workgroups and Windows will allow you to use a GUI tool for tasks such as logging in, attaching, mapping drives and capturing to printers. This tool, called NWUSER.EXE, is supplied with the VLMs and is located in the NetWare Tools folder. Figure 26 on page 60 shows the NWUSER screen.

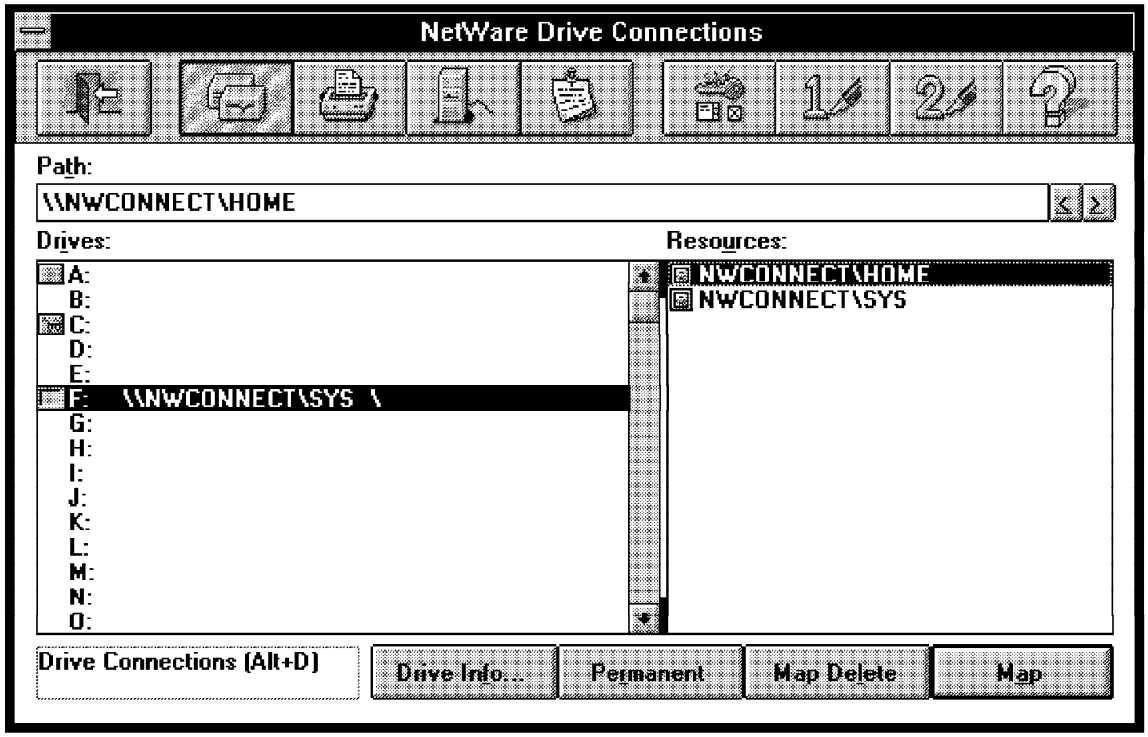

Figure 26. NetWare User Tools

The buttons across the top of the window, from left to right, allow you to do the following:

1. Map drives
2. Capture to printers
3. Attach to and log into servers
4. Send messages to other users
5. Change the NetWare driver settings
6. User-Defined 1
7. User-Defined 2
8. Help

The buttons across the bottom change, depending on which one of the top buttons is selected. In the case of drive mappings and printers, there is a button to make the connection permanent. This means that every time you start Windows, these connections will be made. If this means you must be logged onto a server when Windows is started, you will be prompted for your username and ID on startup. See Figure 27 on page 61

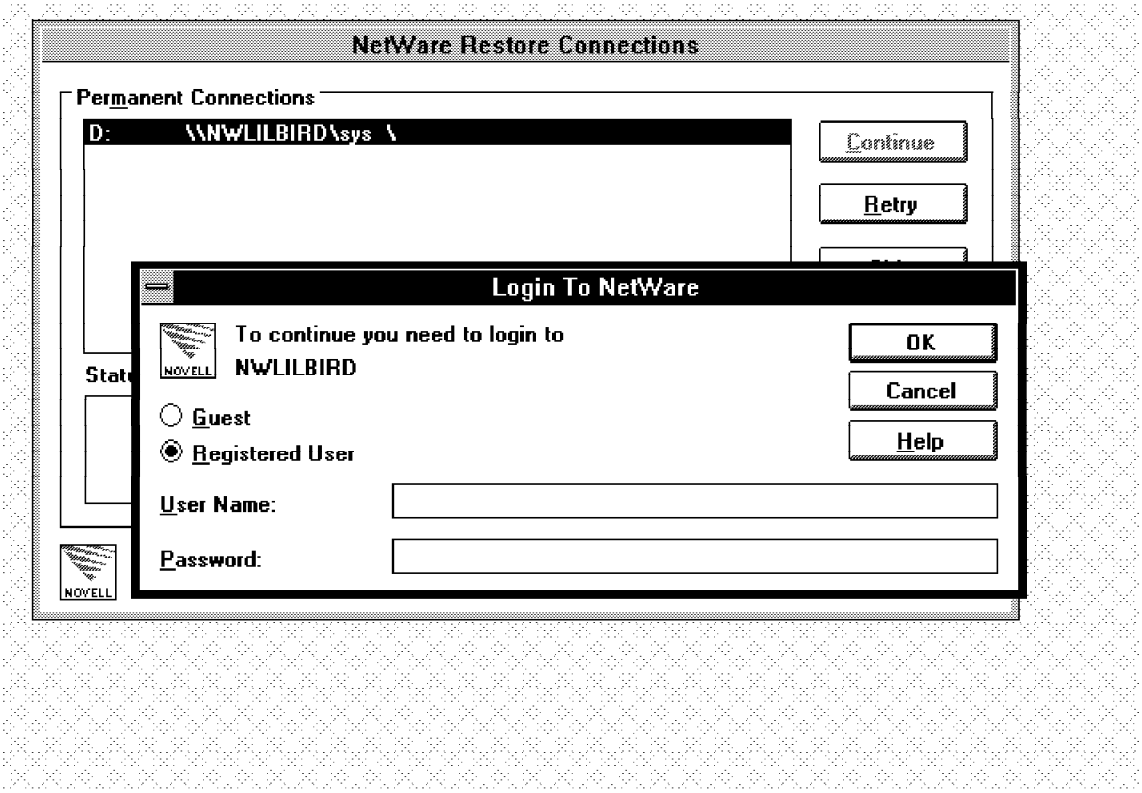

Figure 27. Windows for Workgroups Prompting for Login

The button for NetWare driver settings allows you to change settings, for example, if the reception of broadcast messages is on or off. The panel this option brings up is shown in Figure 28 on page 62.

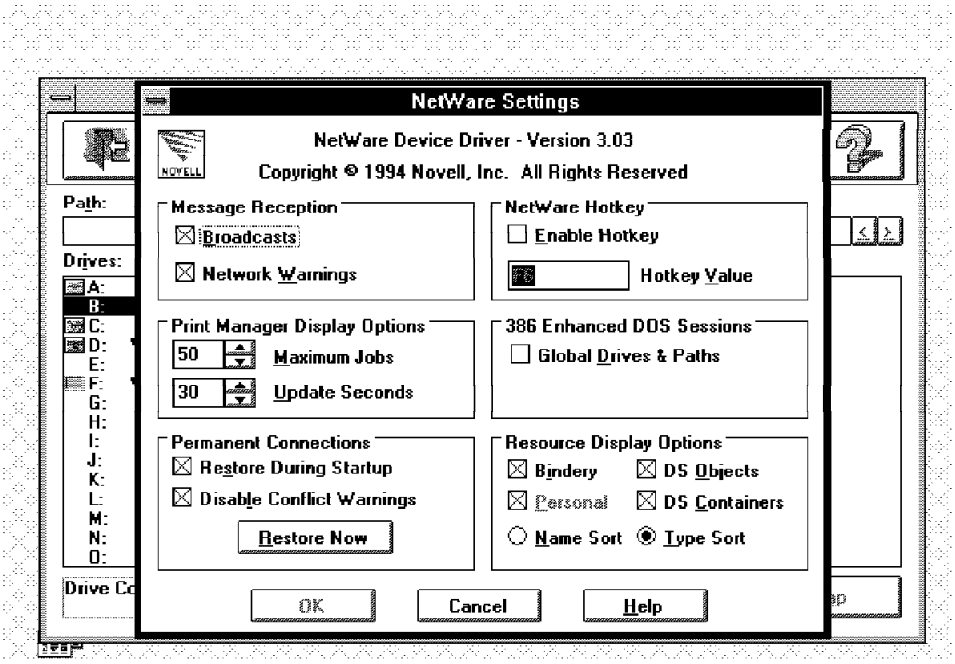

Figure 28. NetWare Settings

You should now be able to connect to the NW Realm of AIX Connections and other NetWare servers from Windows, capture to printers and so on.

5.7 OS/2 Warp Novell Netware Client 2.11

In this section, we will assume that you already have OS/2 Warp Connect installed without any network options. This section will not cover the installation of OS/2 Warp but will focus on the network installation and on configuration.

The description of installation and configuration is based on a CD version of OS/2 Warp Connect.

A Novell NetWare client is shipped with OS/2 Warp Connect. To install and configure this client, you need to go through the following steps:

1. From the OS/2 desktop, open the **OS/2 System** icon.
2. From the OS/2 system, open **OS/2 Warp Connect Install/Remove**.
3. From OS/2 Warp Connect Install/Remove, open the **Warp Connect Selective Install for Networking** icon.

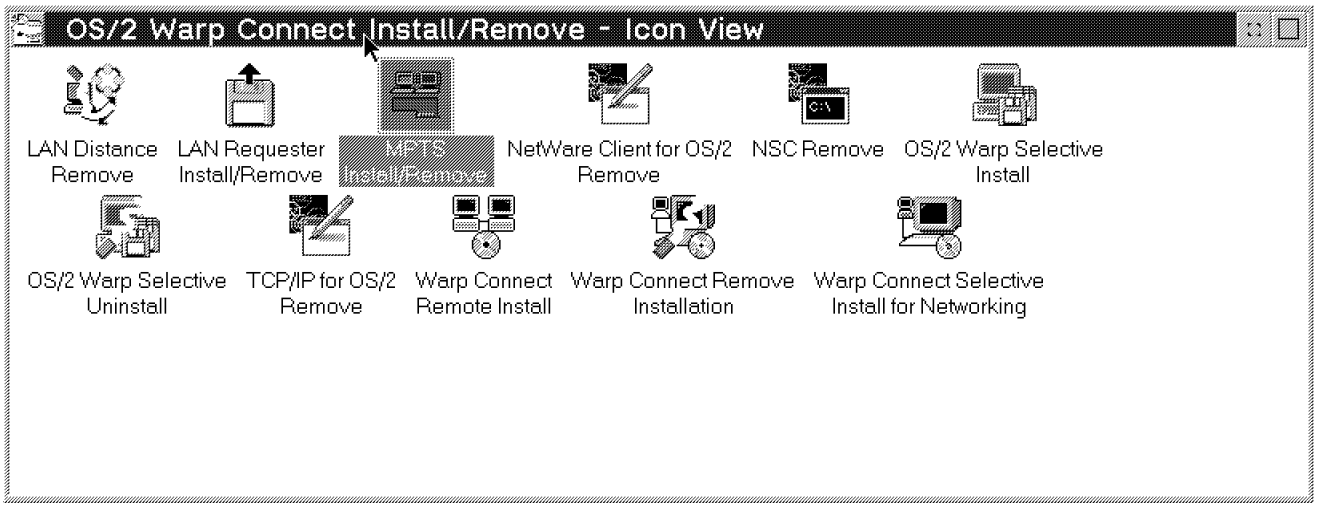

Figure 29. OS/2 Warp Connect Intall/Remove

The OS/2 Warp Connect Install window is displayed.

4. Select **Local Install** and verify that **This workstation** is checked. Then select **OK**.
5. From Installing OS/2 Warp Connect check the **Advanced Installation**. Then select **OK**.
6. From Product Selection, check the **Novell NetWare Client 2.11 for OS/2**. Then select **OK**.

   Note: More products can be installed at the same time.

   Note: There is no automatic way to remove the Novell NetWare Client 2.11 for OS/2, but the removal steps are described in a read-me file available from the OS/2 Warp Connect Install/Remove folder.
7. From the notebook NAME, select your network card.
8. Select the **NetWare** tab of the notebook.
9. Select your install drive and select **Install**.

10. After a few minutes, the install program will ask you to shut down your machine. Select **OK** after having closed other running programs.
11. After shutdown has finished, restart your machine.
12. On bootup, the OS/2 desktop displays the Novell NetWare Client installation screen and begins installation of related drivers from MPTS.
13. After installation has finished, you need to shut down and reboot.

Note: No further configuration should be necessary, but if you have problems connecting to the server, please see below.

If you are running other network programs – like OS/2 Communication Manager or OS/2 LAN Requester – and are using an alias for your network adapter address, you will have to change the address for your Novell NetWare client. The install program′s default address is the hardware address of your network card. To change it you need to go through the following steps:

1. Open the MPTS folder and select **Configure** in the Multi-Protocol Transport Services window.
2. Select **LAN adapters and protocols**.
3. Select **Configure**.

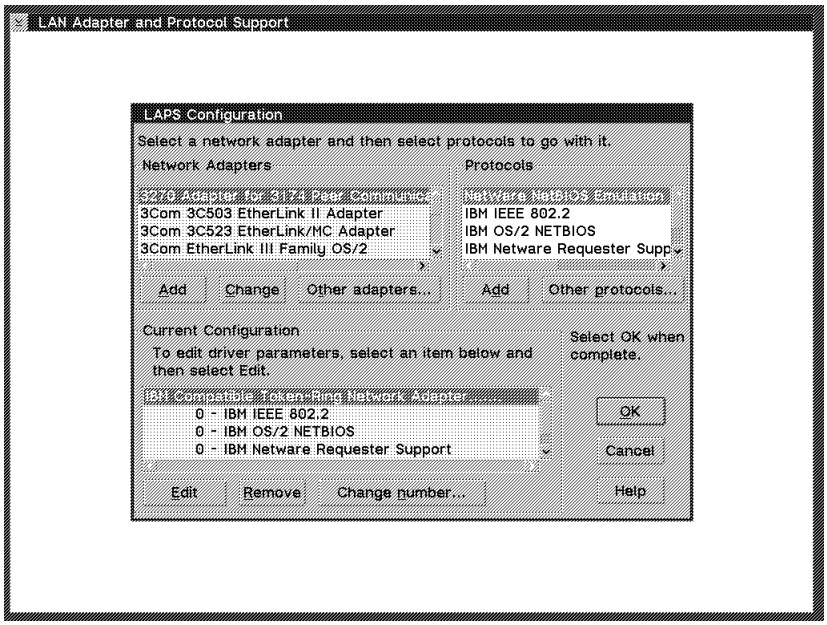

Figure 30. MPTS Configuration

4. In the LAPS Configuration window, select **IBM NetWare Requester Support** from the Current Configuration list to highlight it.
5. Select **edit**.
6. From the Parameters for IBM Netware Requester Support window, type in the network address used by the adapter.

   You should also verify that the requester is supporting the correct frametypes for your configuration.

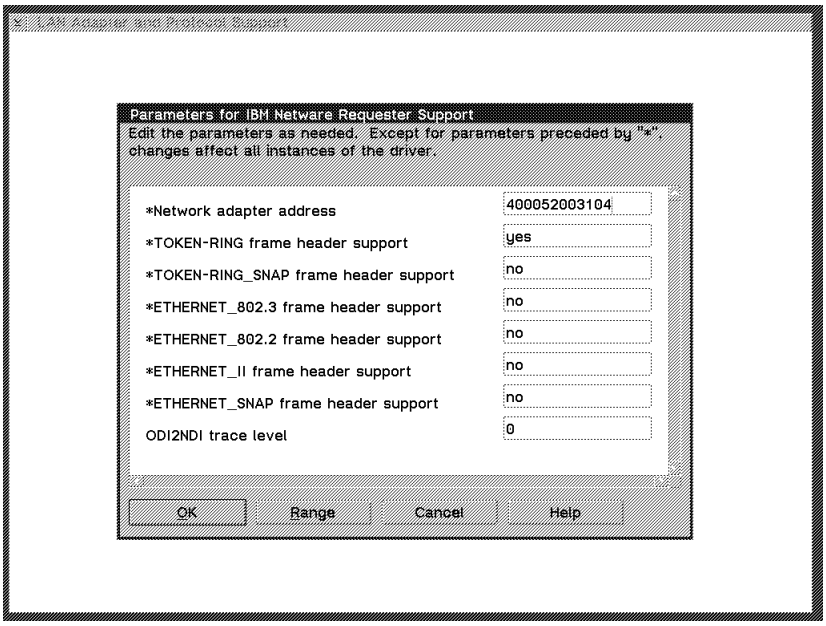

Figure 31. NetWare Client Network Adapter Address Configuration

7. Select **OK** to return to the LAPS Configuration window.
8. Select **OK** to return to the Configuration window.
9. Select **Close** to return to the Multi-Protocol Transport Services window.
10. Select **Exit**. The Update CONFIG.SYS window is displayed.
11. Select **Exit**. The CONFIG.SYS Updated window is displayed.
12. Select **OK**. The Exiting MPTS window is displayed.
13. Select **Exit**.
14. Shut down and reboot your workstation.

You can now log in to your server by going through the following steps

1. From the OS/2 desktop open the **Network folder**.
2. Open the **NetWare folder**. Your server should now show up in the NetWare Window. To log in to the server double-click on the icon.
3. Type in your userid and password. Then select **OK**.
   A window will now display the shared disk and printers available on the server.
4. To attach a printer select the icon, press the right mouse button and select **Assign port**.
   Your printer is now attached to your workstation.

A set of NetWare tools is also available from the OS/2 Desktop for you to configure your connection to the server, map drives and capture printers.

To access these tools open the **Novell folder** from the OS/2 Desktop.

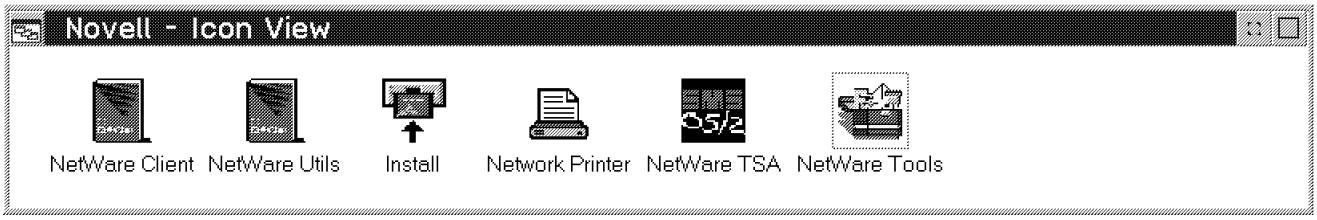

Figure 32. Novell Tools

To change the configuration of your connection to the server, open the **Install** icon from the Novell tools window. This will help you edit your NET.CFG file and specify:

- Preferred server
- Directory services
- Link Driver
- Frame type

To edit the NET.CFG file, select **Configuration** and then **This workstation** from the NetWare Workstation for OS/2 Installation Utility window.

To access disks or printers using the Novell tools, select the **Novell Tools** icon from the Novell window.

To map a drive on the server, go through the following steps:

1. Select **Drivers** from the NetWare Tools window.
2. Select **Map** - the Map window will be displayed.
3. If you are not already logged on to the server, you can do this by selecting **Attach** from the Map window.
4. From the Attach to Server Window, select the **small arrow** to see a list of servers available.
5. Select the **server** you want to attach and type in your userid and password.
6. From the Map window, select the **volume(s)** you want to map and select **Map**.

To capture a printer on the server, go through the following steps:

1. Select **Tools** from the NetWare Tools Window.
2. Select **Printer ports** - the Printer ports window will display.
3. Select the port you want to use by double-clicking it – a list of available printers will be displayed.
4. Select the **printer** you want and select **Capture**.
   If the printer is on another server, you can attach the server by selecting the **Attach** button.

5.8 Windows 95 NW Realm of AIX Connections Clients

For Windows 95 clients with an NW Realm of AIX Connections you do not need to do any DOS configuration. All the drivers you require are shipped with Windows 95. The drivers shipped with Windows 95 are 32-bit drivers.

A Novell 32-bit client is available on the Web (`http://www.novell.com`). This client will not be discussed in this book. We will only cover the functions built into Windows 95 IPX/SPX-compatible drivers and clients.

5.8.1 Installing Windows 95

If Windows 95 is not already installed on the workstation, go through the Windows 95 installation process. The installation should detect the network card in your machine. If this does not occur, it can be added later.

The installation process will also ask you if you want the drivers for the Microsoft Network loaded for this adapter. Unless you want to also run a Microsoft Network, deselect this option.

You should now have Windows 95 installed with no network identified or with only Microsoft Network support.

5.8.2 Configuring Windows 95

To configure Windows 95 to use the IPX/SPX protocol to access an NW Realm of AIX Connections, you need to access the Control Panel. The Control Panel icon can be found in the My Computer folder. From the Control Panel, select the **Network** icon. You should now see a window that looks like Figure 33 on page 68.

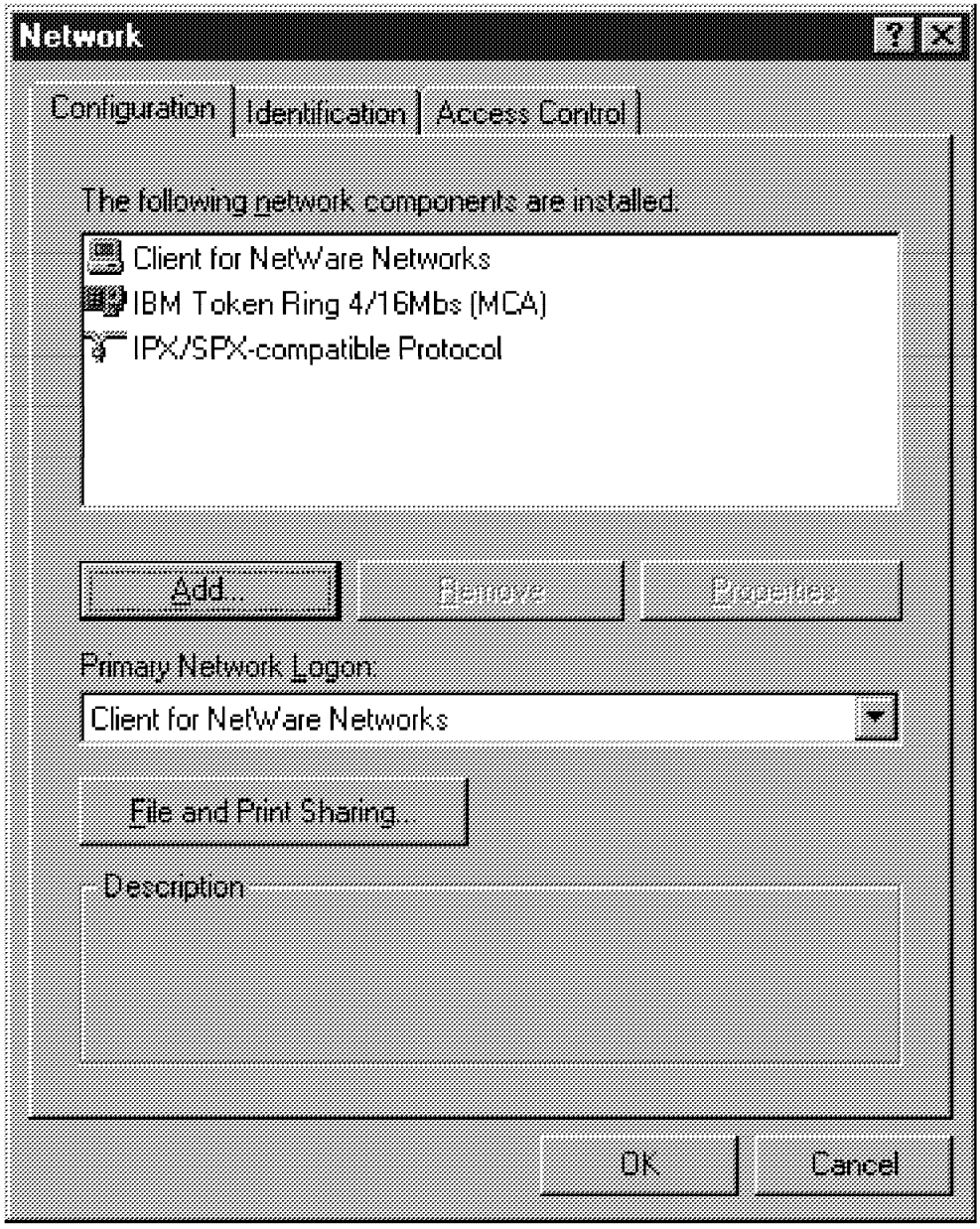

Figure 33. Control Panel Network Settings

You may have different network components in the box displayed in this figure, depending on what Windows 95 detected on installation. If Windows 95 detected your network card, you should at least have that entry. If not, click on the **Add** button; you will be prompted to select a network component type. Select **adapter** from the box, and click **Add**. Now, you will be prompted to select the manufacturer of the adapter and the actual name of the adapter. Figure 34 on page 69 shows this screen. This screen looks similar for each network component we will be adding.

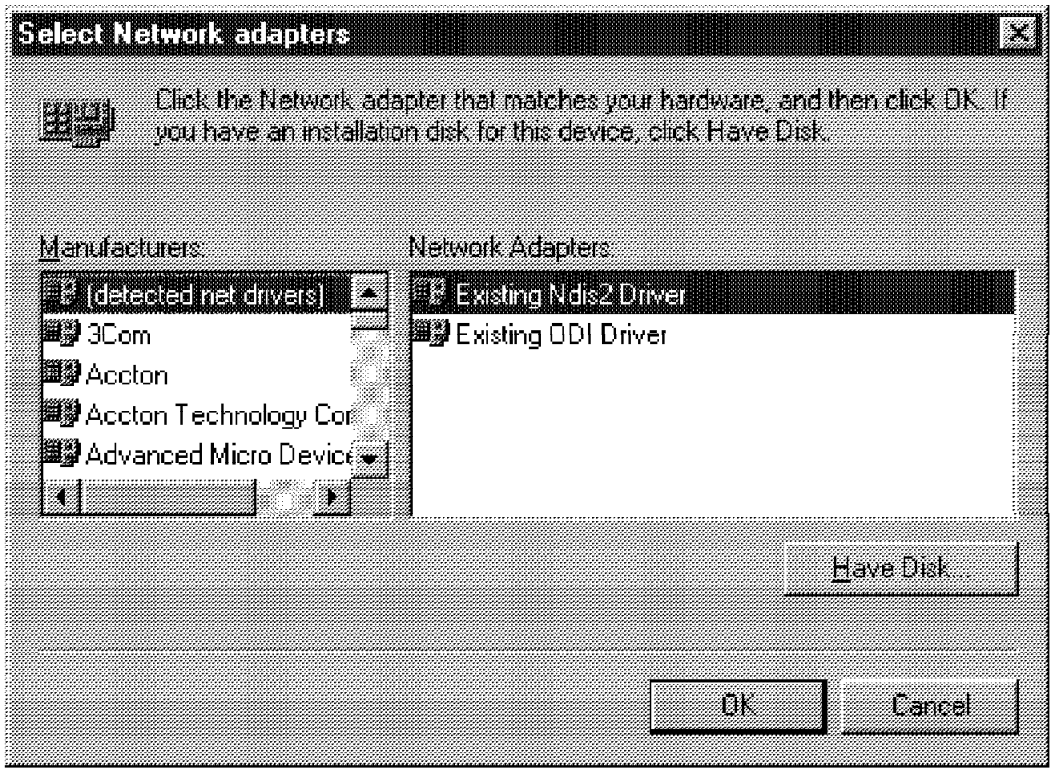

Figure 34. Adding a Network Adapter

Select the manufacturer in the left-hand box; then select the adapter type from the right hand box, and click on **OK**. You should now have an adapter in the network components list.

We now need to add the rest of the components.

Protocol: Click on the **Add** button again, but this time, select **protocol** from the list box, and click on **Add**. You will now be prompted to select the manufacturer of the protocol and the protocol itself. For the manufacturer, select **Microsoft**, and for the protocol, select **IPX/SPX-compatible protocol**. Now click on **OK**.

Client: Again, click on **Add**, and select **Client** from the list box. For the manufacturer, select **Microsoft**, and for the client, select **Client for NetWare Networks**. Again, click on **OK**. You should now have a screen that looks like Figure 33 on page 68.

You may have noticed that there is also one other network component you can add, called Service. This will allow your Windows 95 PC to act like a NetWare server so that other NetWare or NW Realm of AIX Connections clients can share files or resources on your PC.

We now need to check the properties of each of the network components added. From the list box in Figure 33 on page 68, select the network adapter; then click on the **Properties** button. This will open the Properties window shown in Figure 35 on page 70. Again, this window looks similar for each network component.

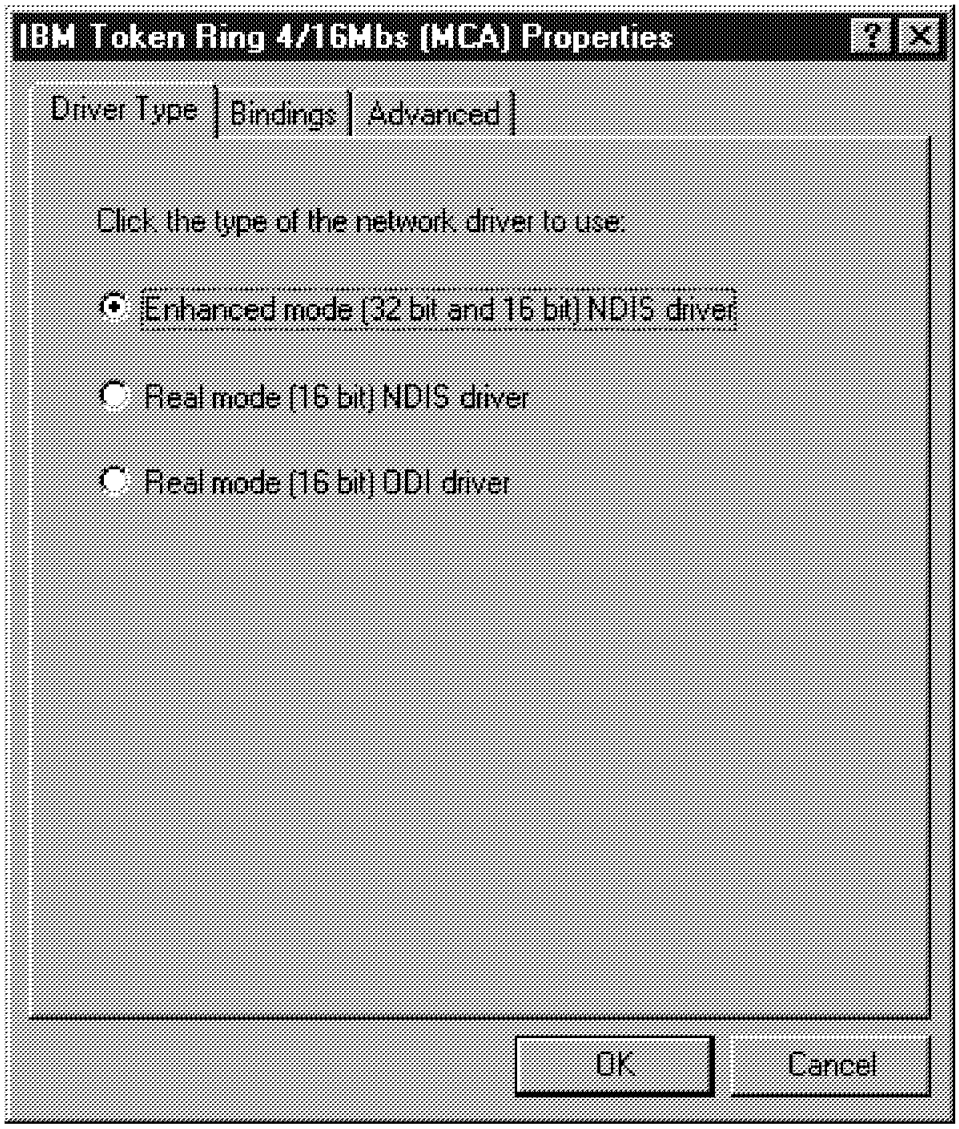

Figure 35. Properties Window

To check each property, select the tabs at the top of the window. The properties should be set as follows:

- The Driver Type should be set to Enhanced Mode.
- In the Bindings section, a tick should be in the box next to IPX/SPX-compatible protocol.
- Finally, the Advanced settings should be left at their default, unless you need to change such things as maximum packet size.

Click on the **OK** button to return.

Next, select the IPX/SPX-compatible protocol and properties. The properties should be configured as follows:

- In the Bindings section, check that there is a tick in the box next to Client for NetWare networks.
- In the Advanced section, you can probably leave the values at their default. You can select such settings as frame type if you wish to force Windows to

use a particular frame type. If your network uses source routing, you may need to enable it here.

- Finally, the NetBIOS section is only needed if you want to run NetBIOS over IPX/SPX. In normal circumstances, the check box in this section should be empty.

Click **OK** to return.

Finally, select the **Client for NetWare Networks** and select **Properties**. You can set up the properties as follows:

- In the general section, you can enter the preferred server. This is the server you will be connected to when Windows 95 starts up. If the NW Realm of AIX Connections server is your primary server, type the name in the box. (The name will not appear in the list box, as the network is not yet up.) You can also select your first network drive. The default, F:, is usually fine for most configurations. Finally, select the check box for enabling logon script processing if you wish this to happen. See 5.9, “Login Scripts” on page 75 for more information about login scripts.

Click on **OK** to return to the Network window of Control Panel.

Finally, set the Primary Network Logon in the Network Control Panel to **Client for NetWare Networks**. This can be left as Windows Logon, but you will not automatically be logged into an NW Realm of AIX Connections at startup.

Once you are happy with all the settings, click on **OK**, and Windows 95 will install and configure the necessary drivers from your installation media. When prompted to restart your computer, click on the **restart** button. Windows 95 should now restart and come up with a login box for the NW Realm of AIX Connections server or for your preferred server as shown in Figure 36.

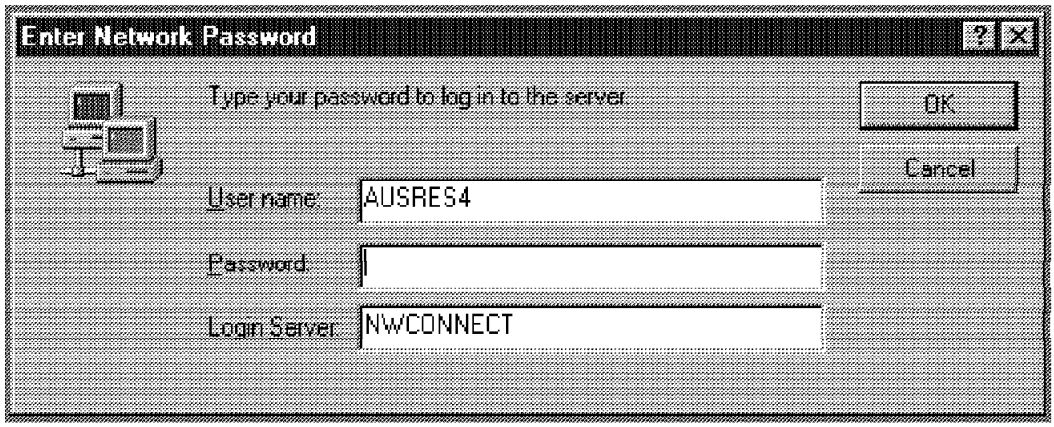

Figure 36. Windows 95 Login

If this login screen does not display, you will probably have a Windows login screen, and this means that your client was not able to find your preferred server or any other server to log into.

When you have the login box, type in your login name and password, and click on **OK**. Windows should now bring up the desktop.

5.8.3 Windows 95 Environment

Now that you are logged into an NW Realm of AIX Connections, you can use the Windows 95 utilities to access resources on the server. As mentioned earlier, at the time of writing this book, there is no client shipped by Novell for Windows 95. This means that the utilities for using the network resources are somewhat different from those in Windows 3.1 and 3.11.

The main utility for Windows 95 networking is the Network Neighborhood program.

5.8.3.1 Network Neighborhood

When you start Network Neighborhood, you will see a window similar to the one in Figure 37.

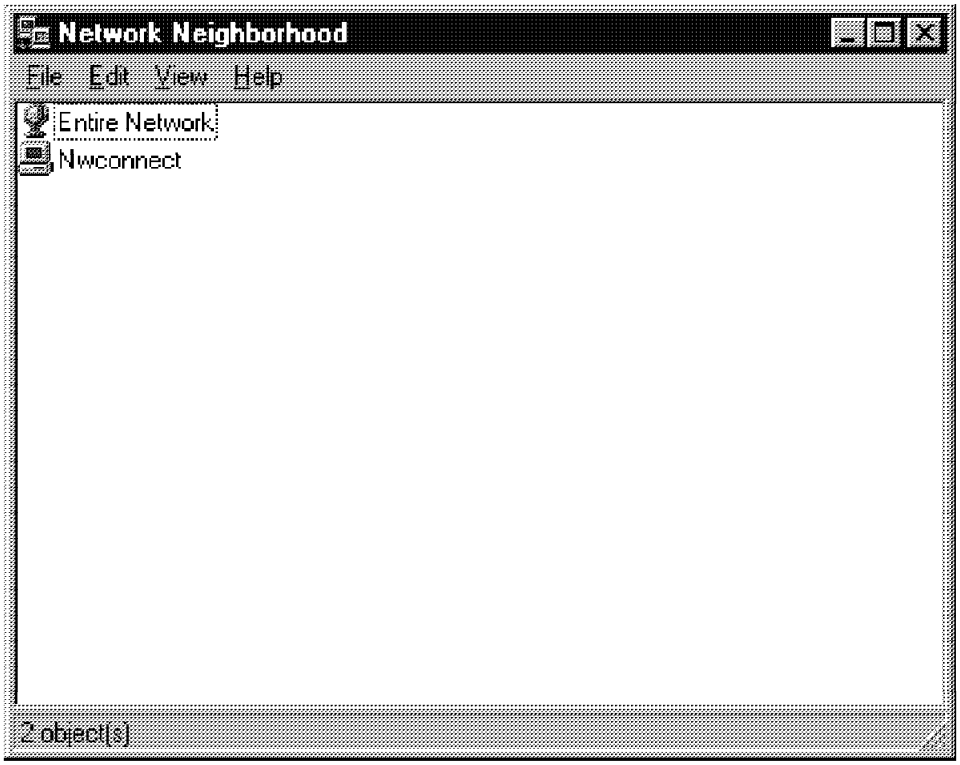

Figure 37. Windows 95 Network Neighborhood

The two icons in the window represent the server you logged into when Windows started and the rest of the network. Double-click on the server you are logged into; in this example, it is an NW Realm of AIX Connections called NWCONNECT. You will now see the volumes in that server to which you have access.

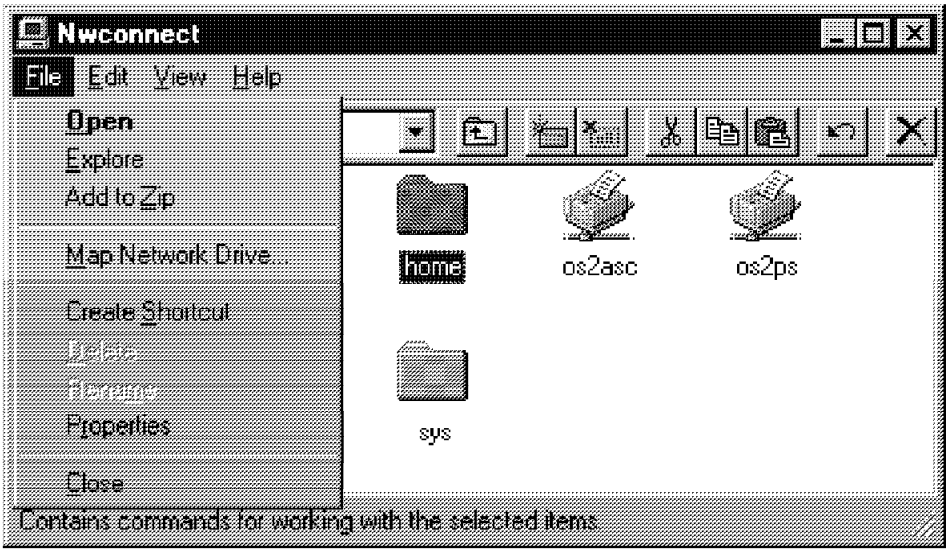

Figure 38. Windows 95 Server Volumes

5.8.3.2 Mapping Drives with Network Neighborhood

To map a drive within Network Neighborhood, you need to follow the steps below.

- First, highlight the folder that represents the directory on the server that you wish to map, for example, the PUBLIC directory.
- Next, click on the **File** pull-down menu, and select the **Map Network Drive** option. This will bring up a window where you can select the drive letter, choose to have the drive reconnected each time you log in to Windows 95 and decide if you want this to be a root map. A root map means that you will not be able to move back down the directory tree from the map point. An example of root mapping would be if you mapped NWCONNECT/SYS:PUBLIC to drive E: as a root map. If you then selected drive E: in an application, you would not be able to see the whole path or change to just NWCONNECT/SYS:. All you would see is E:\.

Once you have made your selections, click on **OK**.

The advantage of mapping network paths to drive letters is that the directory now becomes available as another drive in the My Computer window and in any applications you run.

Network Neighborhood is listed as an option when you are accessing files from an application. This means that you can access network drives even if you are not yet logged into that server.

Useful Hint!

There are some useful utilities if you right-click on the Network Neighborhood icon. This will allow you to map drives, check who you are logged on as, find a computer name in the network and call up the Network Settings (properties from the menu).

5.8.3.3 Capturing to Printers

Network printers are not set up via Network Neighborhood. To set up Windows 95 to capture to a print queue on an NW Realm of AIX Connections, you need to follow the steps below:

- Go into the Control Panel, and select the **Printers** icon.
- Next, select the **Add Printer** icon. This will bring up the Add Printer Wizard. When prompted, select **Network Printer** for the printer type.
- Next, you will be prompted for the **Network Path** or **Queue Name**. If you select the **Browse** button, you will get a window with a tree of your network. Find the NW Realm of AIX Connections that the print queue is on, double-click on the server's icon, and you will get a list of available queues. Figure 39 shows an example of this window. The NW Realm of AIX Connections is NWCONNECT, and the print queue is ASC3825.

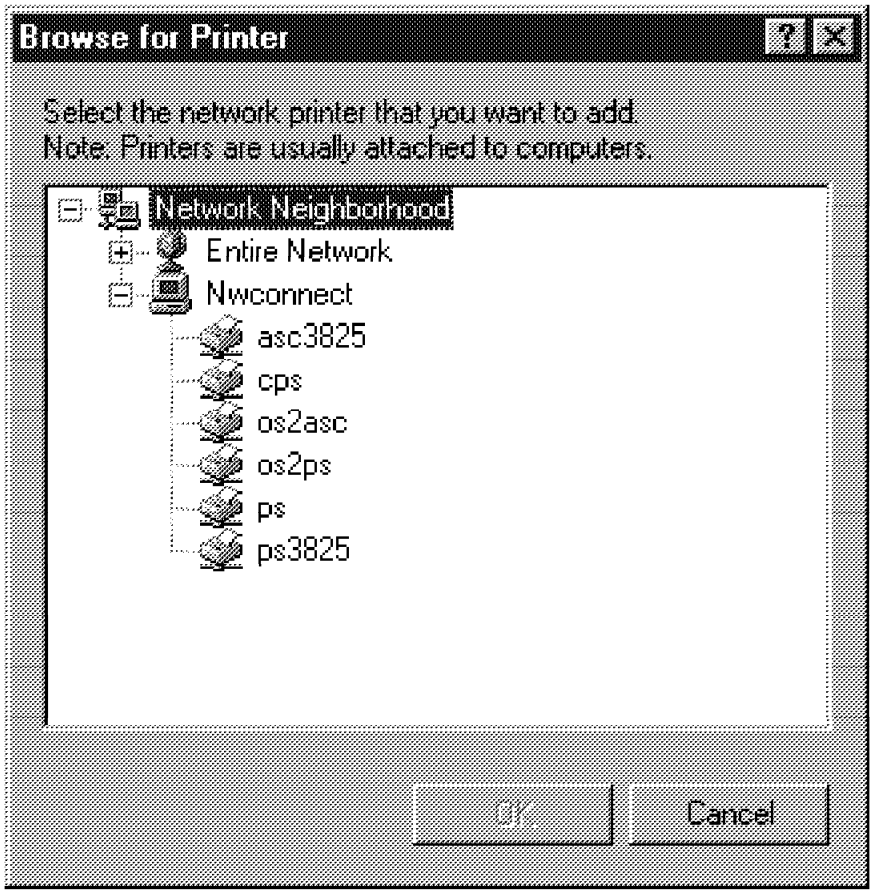

Figure 39. Capturing to a Network Printer in Windows 95

In the window where you input the queue, there is also a selection for printing in DOS. If you are going to run any DOS-based programs, this must be set to Yes.

- If you set printing in DOS to Yes, you will be prompted for the port you wish to capture. If not, this screen will be skipped.
- Next, you need to select the **printer manufacturer** and **model**. If you wish to print only text, the Generic option can be used. If you wish, you are given the option to print a test page.

The drivers to support the printer will now be loaded and the printer configured. This printer will now be available in subsequent Windows sessions.

This completes the configuration of a Windows 95 client.

5.9 Login Scripts

As you may well be aware, NetWare has the facility to run login scripts when the user logs into the server. These can be likened to profiles in AIX. There is a systemwide login script (like /etc/profile) and a user login script (like the user's .profile). NW Realm of AIX Connections provides login scripts for NW realm clients.

These scripts can be edited from the client PC using Novell's syscon utility if you have NetWare servers in your network or by using the NW Realm of AIX Connections edscript utility. To edit the systemwide login script, log into the NW Realm of AIX Connections as the system administrator (usually aconn), and start the edscript program, which is in \PUBLIC, with the option /SYSTEM. If you are running IBM DOS, you may need to use the /EDITOR:E option to specify E as the editor to use. To edit a specific user's login script, you need to log in as the system administrator and use the /USER:USERNAME option to invoke edscript. You also may log in as the user and use edscript without any options.

To achieve the same results we did manually, users can create their own login scripts as follows:

1. Start the editor, edscript, with no options to edit a personal login script.
2. Add the following lines to the file:
   - #CAPTURE Q=OFFICE LPT=1
   - #ATTACH RHINO
   - #CAPTURE Q=POST S=RHINO LPT=2
   - #ATTACH TURKEY
   - #MAP Z:=TURKEY/SYS:\SHARED
3. Log out and log back in. Answer the password prompts for each server. The rest will be done automatically.

Note: An NW Realm of AIX Connections does some default mapping when there is no system or user login script. If either is created, this default mapping will not occur.

Chapter 6. Using AIX Connections in the NB Realm of AIX Connections

In this section, we will look at installing and configuring the NB Realm of AIX Connections and some clients that connect to it.

We will install the fileset necessary to set up the NB Realm of AIX Connections, and we will then look at the configuration of:

1. The protocol stack, NetBIOS.
2. The file service and the setup of volumes and printers.
3. Configuration of clients.
   - DOS/Windows client based on DOS LAN Requester 5.0
   - Windows for Workgroups client
   - OS/2 LAN Requester 4.0 client
   - OS/2 Peer Services client
   - Windows 95 client

   Note: Other clients are supported.

This section covers a non-Quick Start configuration. The Quick start configuration is covered in Chapter 4, “AIX Connections Common Installation and Configuration” on page 29.

For complete information on installing any or all AIX Connections components, please see *Up and Running! SC23-1758-02*.

6.1 NB Realm of AIX Connections Package Installation

The installation for NB Realm of AIX Connections requires only some of the filesets. The following list shows all the filesets of AIX Connections.

The filesets marked with an * are necessary; those marked with an > are optional.

```
4.1.5.0  connect.Bnd
  @ 4.1.5.0  Connections Bundle

4.1.5.0  connect.client
> @ 4.1.5.0  Connections Client Software

>4.1.5.0  connect.html.en_US
   + 4.1.5.0  Connections Server Guides - U.S. English

4.2.0.0  connect.info.en_US
> @ 4.2.0.0  Connectivity Server Guides - U.S. English

4.1.5.0  connect.man.en_US
> @ 4.1.5.0  Connections Server and Client Man pages - U.S. English

4.1.5.0  connect.protocols
* @ 4.1.5.0  NW LS MAC and Client Protocols

4.1.4.0  connect.ps.en_US
> @ 4.1.4.0  Connections - LS_Server Documentation - U.S. English
  @ 4.1.4.0  Connections - MAC_Server Documentation - U.S. English
  @ 4.1.4.0  Connections - NW_Server Documentation - U.S. English
  @ 4.1.4.0  Connections Client Documentation - U.S. English
  @ 4.1.5.0  Connections - Up and Running Documentation - U.S. English

4.1.5.0  connect.server
* @ 4.1.5.0  Connections Common Server Files
> @ 4.1.5.0  Connections HTML administration
* @ 4.1.5.0  LS_Server Software
  @ 4.1.5.0  MAC_Server Software
  @ 4.1.5.0  NW_Server Software


2.1.4.0  netbios
* @ 2.1.4.0  NetBIOS Application Programming Interface
* @ 2.1.4.0  NetBIOS Protocol Stack
```

Figure 40. Installation of the NB Realm of AIX Connections

All of the configuration of an NB Realm of AIX Connections can be done through SMIT or the Web-based tool. In this example, we will use the Web tool.

An NB Realm of AIX Connections supports the NetBIOS protocol running on NetBEUI or TCP/IP (RFC1001/1002). Using the latter lets you route your NetBIOS traffic. Both NetBIOS protocols can be active on the same adapter card using different NetBIOS LANAs.

The SMIT quick tool configuration will set up NetBIOS on the first available NetBIOS LANA for you.

6.1.1.1 Configuration of NetBIOS Using SMIT

As a new function in AIX Connections 4.1.5, configuration of NetBIOS can be done using SMIT. To configure your NetBIOS connection using SMIT, you have to go through the following steps. In this example, we will add an RFC 1001/1002 on the Ethernet adapter on our workstation.

1. Start up SMIT, select **Communications Applications and Services**, and select **NetBIOS** or use the fastpath SMIT netbios.

   This will render the following screen:

```
                                    NetBIOS

Move cursor to desired item and press Enter.

  Start all LANAs
  Stop all LANAs
  Status
  LANAs
  Trace

F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 41. SMIT NetBIOS Panel

2. Select **LANAs** and select **Add LANA Configuration**.
3. From the pop-up window, select the RFC1001/1002 protocol.

   This will bring you to the following screen:

```
                                 RFC 1001/1002

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
  LANA number                                         1
* NetBIOS sessions                                   [254]
* NetBIOS commands                                   [254]
* TCP/IP interface                                   [en0]
* Sessions keep alive (minutes)                      [1]
* NetBIOS node type                                  [Broadcast]
  NetBIOS Name Server (NBNS) address                 []

F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 42. SMIT Protocol Settings

4. Select the **TCP/IP Interface** you want to use, or press F4 to get a list. Press **Enter** to add your LANA definition.
5. For the LANA to be available for applications (servers), it must be started.
6. To start the LANA, go back to the LANA screen and select **Start all LANAs**.
7. All the applications/servers need to be stopped and restarted. To restart your AIX Connections servers, execute /usr/tn/tnshut followed by /usr/tn/tnstart.
8. To verify that your LANA definition is running, from the SMIT NetBIOS panel, select **Status** from the status window and select **LANA**.
9. To verify that our NB Realm of AIX Connections is running on the LANA, you need to select **Status** from the SMIT NetBIOS panel. From the status window, select **Adapter**, and from the Adapter window, select the corresponding LANA.

   This should bring you to a screen like the one below:

```
                                COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

[TOP]
LANA
  1
Adapter address . . . . . 000080010101  Names in name table . . . . .
Reporting period in minutes . 10        Pending sessions. . . . . .
Free commands . . . . . 244             Configured sessions . . . . .
Configured commands . . . . . 254

 Hexadecimal Format                              ASCII Format         No
 ----------------------------------------------  -------------------  --
 4C 53 43 4F 4E 4E 45 43 54 20 20 20 20 20 20 20  LSCONNECT      (20)   0
 4C 41 4E 47 52 4F 55 50 20 20 20 20 20 20 20 00  LANGROUP       (00)   0
 4C 41 4E 47 52 4F 55 50 20 20 20 20 20 20 20 1E  LANGROUP       (1E)   0
 01 02 5F 5F 4D 53 42 52 4F 57 53 45 5F 5F 02 01  .._MSBROWSE__.(01)   0
[MORE...4]

F1=Help             F2=Refresh          F3=Cancel           F6=Command
F8=Image            F9=Shell            F10=Exit            /=Find
n=Find Next
```

Figure 43. Verifying the NB Realm

This tells you that your adapter is broadcasting the service name in the network and that clients are able to connect to the server.

If the lower part of your screen is empty, the NB Realm of AIX Connections is not active on your LANA.

6.1.1.2 Configuration of NetBIOS Using mcsadm

Configuration of NetBIOS can still be done by using the **NetBIOS for AIX** configuration utility, `mcsadm`.

6.1.2 mcsadm

There is another AIX administration utility to configure NetBIOS. This procedure describes how to use it.

1. Enter `mcsadm` from the AIX command line to access the NetBIOS for AIX Main Menu (Figure 44).

```
NetBIOS for AIX Administration Utility                    Version 2.01

=========================================================================
                          NetBIOS for AIX Main Menu
=========================================================================

                          1. Start NetBIOS for AIX
                          2. Stop NetBIOS for AIX
                          3. Administer Protocols
                          4. Configure Protocols
                          5. Display Protocol Status
                          6. Display Software Versions
                          7. Maintain RC Scripts
                          8. Maintain Language Files



<?> Help  <Q> Quit

Please enter option number>
```

Figure 44. NetBIOS for AIX Main Menu

2. From the Main Menu, select Option 4, **Configure Protocols**.
3. Select **NetBIOS/ix**.
4. Select **Configure NetBIOS LANAs**.
5. Select **Add LANA Configuration**.
6. Select the **protocol** you want to use.
7. Assuming you selected NetBEUI, select the **Network adapter** you will enable your NetBIOS LANA on. In Figure 45 on page 82, the token-ring network was chosen. To change this, simply select Option 4, **LLC Type II device**. This will show you a list of available networks.

```
================================================================================
                                  NetBIOS/ix
                           Add NetBEUI Configuration
================================================================================

                  Option                                Current Value
                  ----------------------------------    -------------
              1. LANA number                            0
              2. NetBIOS sessions                       255
              3. NetBIOS commands                       512
              4. LLC Type II device                     /dev/dlpi/tr
              5. Physical Point of Attachment (PPA)     0


<?> Help  <Esc> Previous

Please enter option number>
```

Figure 45. NetBIOS LANA Configuration

Note: If you cannot see any adapters, one possibility is that you have not loaded your AIX streams drivers correctly.

8. Press **S** to save the configuration. The previous screen is displayed again.
9. Press **Esc** to go back until you are at the NetBIOS/ix Configuration Main Menu, and select Option 2, **Configure Transport Provider Interface (TPI)**.
10. Select **Add TPI Configuration**, and select Option 3, **Naming convention**.
11. Select **X/Open (XTI)**, and **S** to save.

    Note: If your NetBIOS configuration is based on NetBEUI, you're done.
12. If you are using TCP/IP, you need to configure the **Internet Name (NIP) Cache**. To do this, select Option 3 from the NetBIOS/ix Configuration Main Menu.
13. Select **Add NIP Cache Configuration**.

```
================================================================================
                                   NetBIOS/ix
                          Add NIP Cache File Configuration
================================================================================

                      Option                       Default Value
                      -------------------------    -------------
                  1. NIP cache filename            /etc/inethosts
                  2. NIP cache names per line      1
                  3. Uppercase NIP cache names     NO









<?> Help  <Esc> Cancel  <S> Save

Please enter option number>
```

Figure 46. mcsadm NIP Cache Configuration

The NIP cache stores a static list of NetBIOS names and corresponding IP addresses. NetBIOS/ix uses the NIP cache to communicate with other NetBIOS nodes via TCP/IP routers.

This filename specifies the file loaded into the NIP cache. Each line in the file should contain a network address followed by one or more NetBIOS names. The format of the file is similar to /etc/hosts.

14. Press **S** to save the configuration. The previous screen is displayed again.
15. Press **Esc** three times to go back the NetBIOS for AIX Menu.

You have now configured NetBIOS. Select Option 1, **Start NetBIOS** from the Main Menu to start your NetBIOS stack.

NetBIOS can also be configured using the Web tool. To do this:

- Start the tool, see 6.1.2.1, “Service Definition in the NB Realm of AIX Connections” on page 84
- Select Main Menu
- Select Transports
- Select Alternate NetBIOS/NetBEUI Interfaces
- Select Create a NetBIOS LANA Interface

Enter the NetBIOS interface name and device.

Now that NetBIOS is configured, we need to set up a new service.

6.1.2.1 Service Definition in the NB Realm of AIX Connections

Complete the following steps to define service in the NB Realm using the Web tool:

1. Bring up the Web tool by launching your Web browser, and connect to the URL http://connect:7777, where connect is the TCP/IP hostname of our AIX Connections server and 7777 is the IP port used by the htmld daemon.

   This will bring you to the AIX Connections Product Selection Screen, Figure 47 on page 85.

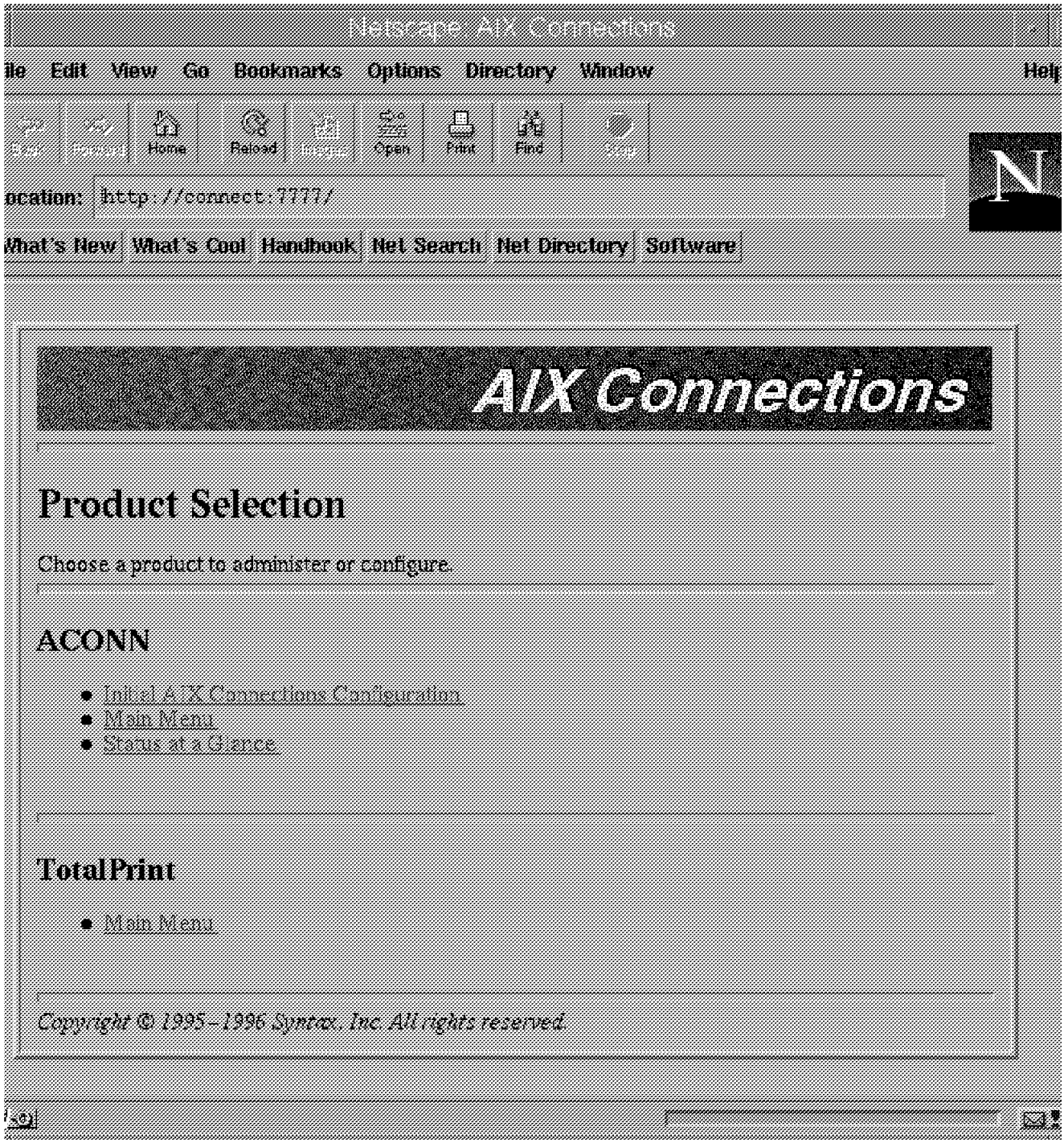

Figure 47. Web Tool Product-Selection Screen

2. From the AIX Connections Product Selection screen, select **Main Menu**.
3. Log in using your AIX userid and password and select **OK**. You will need superuser rights to do the configuration.

   Before you create the NB Realm, you should configure the NetBIOS LANA.
4. Select the **Alternate NetBIOS/NetBEUI Realm** section, and then select **File Services**.
5. From the **Select a File Service** window, select **Create an Alternate NetBEUI/NetBIOS File Service**.

   On the screen in Figure 48, fill in at least the following:

   - Name of the service, in our example, jens.

     Note: Do not add the keyword **:file**
   - The command line must be /usr/tn/NB/LMfile.
   - A description of your service.

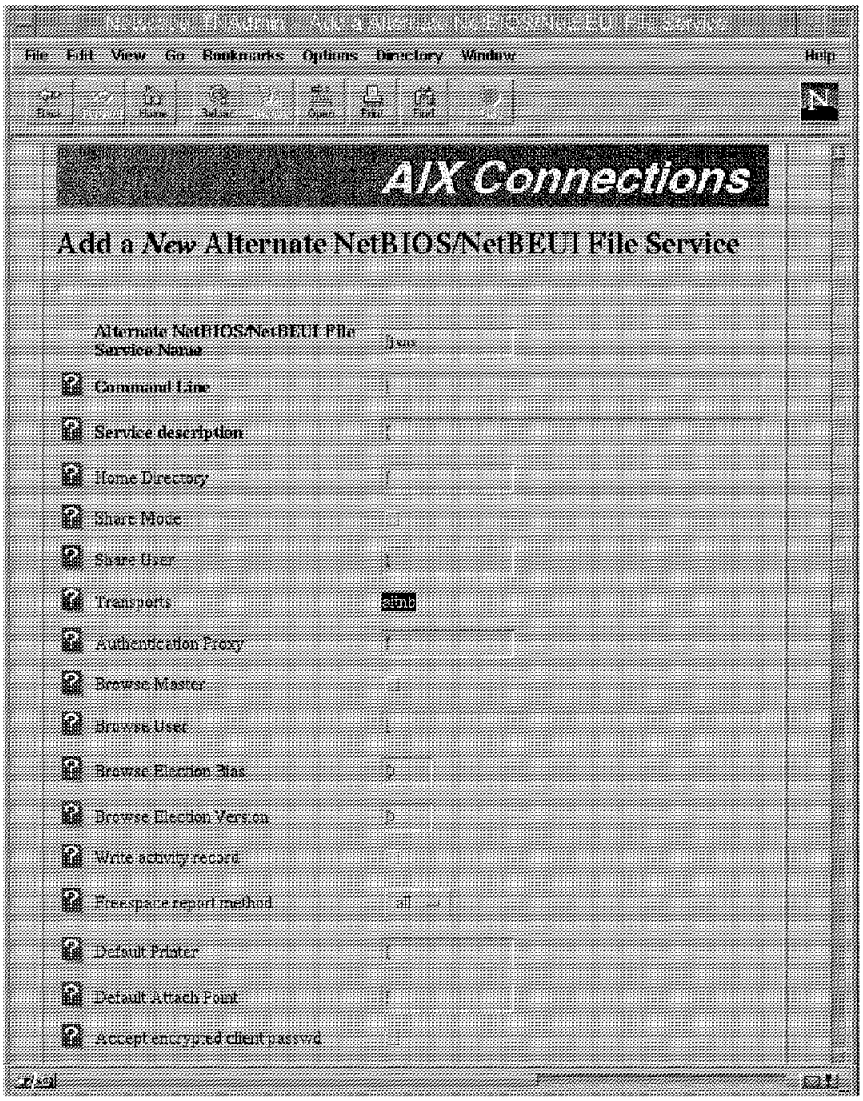

Figure 48. Creating an Alternate NetBEUI/NetBIOS File Service

The rest of the selections are optional. For more information about these please refer to *AIX Connections, Reference Guide SC23-1829-00* and *AIX Connections, Administrators Guide SC23-1828-00*.

Be sure to set *client-encryption* to enforce password encryption by PC clients, if desired.

6. Select **OK** from the Create an Alternate NetBEUI/NetBIOS File Service screen.

To go back to the Main Menu, select the **Home** button.

To start the service just created, go to the AIX command line and execute `/usr/tn/tnstart -F`. This will restart all your realms.

Next, we need to add some volumes and printers to our new service.

To modify the service, go to the **Alternate NetBIOS/NetBEUI Service** screen.

To add a new systemwide volume definition, we need to go through the following steps:

1. From the Main Menu **System** section, select **Manage Volumes**.
2. Select **Create a Volume**.
3. Fill in at least the **Volume name** and **Path**. Other fields are optional.
4. Select **Submit new Volume data**.
5. Select **OK** to return to the Select Volume Menu.
6. Select the **Home** button to return to the Main Menu.

To add an existing volume or printer to a service, go through the following steps:

1. From the Main Menu, select **Configuration for Alternate NetBIOS/NetBEUI**.
2. Select **File Services**.
3. Select the service you want to add volumes to by selecting the name of the service (in our example, jensl). This will bring you to the Alternate NetBIOS/NetBEUI service panel for this particular service (Figure 49 on page 88).

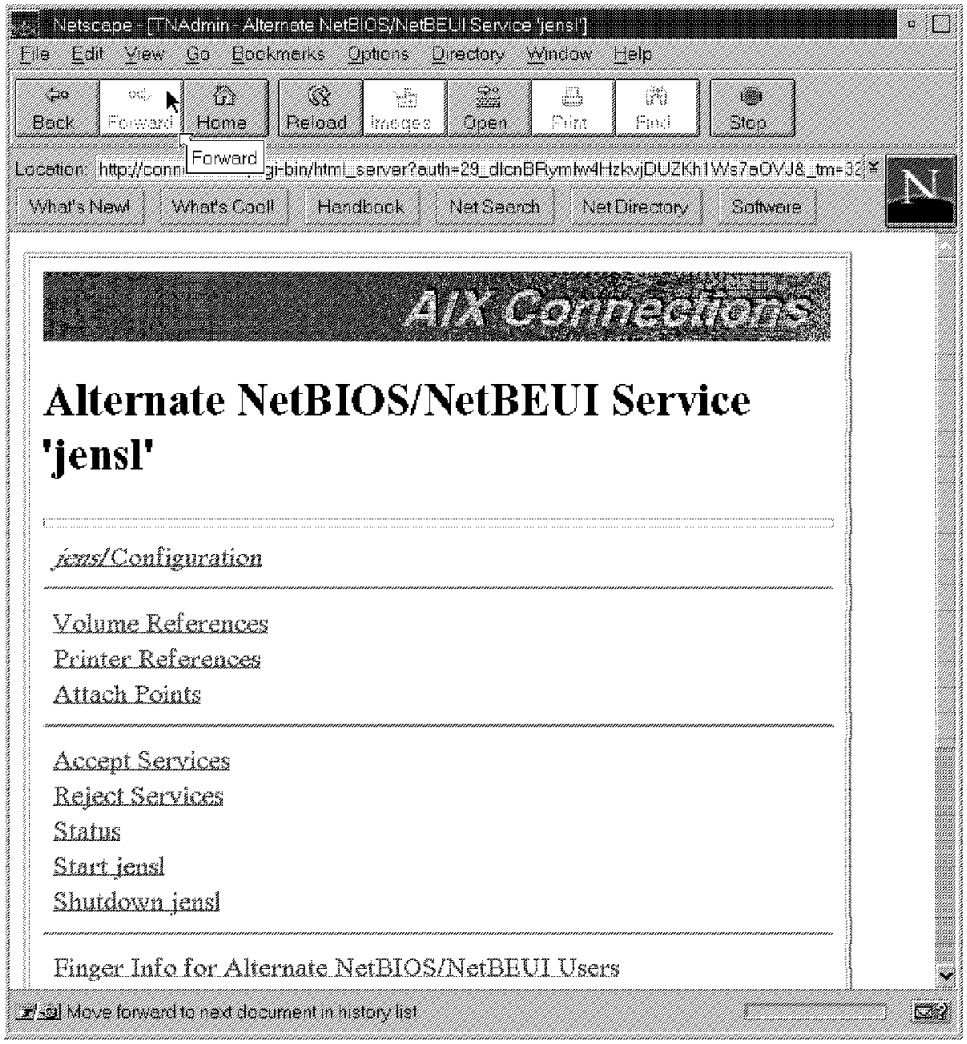

Figure 49. File Service Configuration

4. Select **Volume References** to add a volume or **Printer References** to add a printer. Both options bring up a list of already defined resources if you have any.

   Select **Create** to add a new definition among the systemwide-defined volumes and printers.

We have now defined a new service and are able to connect from a client to this service.

The screen in Figure 49 also allows you to modify your service configuration in general, as in the tasks below.

- Change the service configuration.
- Change volume references.
- Change printer references.
- Add or delete attach points.

- Accept services.
- Reject services.
- Look at the status of the service.
- Start the service.
- Shut down the service.
- Get finger info for alternate NetBIOS/NetBEUI users.
- Get print queue information on alternate NetBIOS/NetBEUI users.
- Get connection information on alternate NetBIOS/NetBEUI users.
- Send a message to an alternate NetBIOS/NetBEUI user.
- Disconnect an alternate NetBIOS/NetBEUI user.

6.2 Clients

In this section, we will focus on the configuration of clients for connection to an NB Realm of AIX Connections.

The clients discussed here are:

- DOS/Windows clients based on DOS LAN Requester 5.0
- Windows for Workgroups clients
- OS/2 LAN Requester 4.0 clients
- OS/2 Peer Services clients
- Windows 95 clients

  Note: Other clients that support SMB requesters, such as Windows NT, are supported.

If the client PCs are connected to another server using AIX Connections supported protocols and requesters, AIX Connections will provide file and print services with no additional client software. The PC users will also be able to use the same interface used with the existing server. AIX Connections will appear as an additional server, and once selected, the volumes and printers configured will be available. Effectively, in an existing PC network environment, you do nothing to the clients. AIX Connections can coexist with the existing servers or provide file and print services as a standalone server. This allows AIX Connections to be installed with minimal disruption to the users.

6.2.1 DOS/Windows Client Based on DOS LAN Requester 5.0

A DOS client with no Windows environment or a Windows 3.1 client can use DOS LAN Requester 5.0 (Version 3.0 and 4.0 are also supported) to connect to an NB Realm of AIX Connections.

DOS LAN Requester comes with its own graphical user interface, independent of Windows and a Windows interface.

In addition, the more experienced user or LAN administrator may perform network tasks from the DOS command line. To install the requester on your client, you need to go through the following steps:

1. Insert the first diskette into your diskette drive and type **A:\install**.

2. From the welcome screen, simply press **Enter**.
3. Select a directory in which to store your requester.
4. The installation program will determine your network card.
5. Type in your client name.
6. Type in the userid you will use on the network.
7. Type in the name of your domain, if any.
8. Verify your installation options as in Figure 50.

   Note: To change any of the options, select the option, press **Enter** and select the suitable alternative.

   Note: DOS LAN requester also supports RFC 1001/1002 access to the server. To change to RFC 1001/1002, you need to change the Protocol Driver option as shown in Figure 50

```
Install for DOS LAN Services
----------------------------

          If all the options are correct, select 'The listed options
          are correct,' and then press Enter. If you want to change
          an option, use the Up Arrow or Down Arrow key to select it. Then
          press Enter to see alternatives for that option.

 Graphical User Interface : Install GUI.
 Peer Services            : Install Peer Services.
 Windows Support          : Install Windows support.
 Protocol Driver          : IBM NetBEUI

 The listed options are correct.




Enter=Continue  F1=Help  F3=Exit
```

Figure 50. DOS LAN Requester Installation

9. When the options are correct, select **The listed options are correct** and press **Enter**.

   This will bring up a window allowing you to change your configuration, as in Figure 51 on page 91.

```
Install for DOS LAN Services
----------------------------

          If all the options are correct, select 'The listed options
          are correct,' and then press Enter. If you want to change
          an option, use the Up Arrow or Down Arrow key to select it.
          Then press Enter to see alternatives for that option.

 Machine ID      : win31
 User name       : ausres4
 Domain name     : itscaus
 Redirector      : Use the full redirector.
 Startup option  : Run DOS LAN Services and log on.
 Path            : C:\net
 Network card    : IBM Token Ring (All Types)

 The listed options are correct.


Enter=Continue  F1=Help  F3=Exit
```

Figure 51. Installation of DOS LAN Requester

10. Verify your configuration; to change an option, select the option and choose an alternative.
    When the options are correct, select **The listed options are correct** and press **Enter**.
11. When installation has finished, you must reboot your client.

The installation program will change your config.sys and autoexec.bat files. In our example, you will see the modified files in Figure 52 and in Figure 53 on page 92

Note: The lines bold-faced reflect the installation of the DOS LAN Requester.

```
@ECHO OFF
C:\WINDOWS\SMARTDRV.EXE
SET PATH=C:\WINDOWS;C:\DOS;%PATH%;
PATH C:\NET;;%PATH%
SET TEMP=C:\DOS
C:\DOS\DOSKEY.COM
SHARE
C:\NET\NET START
```

Figure 52. Autoexec.bat File for DOS Client

```
DEVICE=C:\POINTTR.EXE SA RS=16 MMIO=D000 IRQ=9 SRAM=D800,16
FILES=40
BUFFERS=10
DOS=HIGH
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\SETVER.EXE
DEVICE=C:\DOS\POWER.EXE
DEVICE=C:\WINDOWS\SMARTDRV.EXE /DOUBLE_BUFFER
STACKS=9,256
LASTDRIVE=Z
DEVICE=C:\NET\PROTMAN.DOS /i:C:\NET
DEVICE=C:\NET\IBMTOKCS.DOS
DEVICE=C:\NET\DLSHELP.SYS
```

Figure 53. Config.sys File for DOS Client

Three .ini files are created in the installation directory. These files determine the configuration and setup of your requester. The files that might interest you are:

- network.ini
- protocol.ini
- ncdinfo.ini

You may modify these files to reconfigure your requester, but you need to know what you are doing. We recommend that you either reinstall the requester or use the built-in tools if you want to change your setup. See Figure 54 on page 93, Figure 55 on page 94 and Figure 56 on page 94.

```
[network]
computername=WIN31
lanroot=C:\NET
autostart=netbeui predir
username=AUSRES4
domain=ITSCAUS
lslogon=yes
autologon=no
reconnect=yes
passwordcaching=yes
timesync=no

[install]
peer=yes
gui=yes
windows=yes
protocol=netbeui
minidls=no                **for minidls only
installed=no              **for minidls only
target=c:\WSRCLNT\  **for minidls only

[Domain List]
ITSCAUS=

[Password Lists]
AUSRES4=C:\NET\AUSRE000.PWL
```

Figure 54. Network.ini File Created During Installation

```
[network.setup]
version=0x3100
netcard=IBM_TRCC,1,IBM_TRCC
transport=ibm$netbeui,IBM$NETBEUI
lana0=IBM_TRCC,1,ibm$netbeui

[protman]
DriverName=PROTMAN$
PRIORITY=ibm$NETBEUI

[IBM$NETBEUI]
DriverName=netbeui$
SESSIONS=20
NCBS=20
BINDINGS=IBM_TRCC
LANABASE=0

[IBM_TRCC]
DriverName=IBMTOK$
MAXTRANSMITS=6
RECVBUFS=2
RECVBUFSIZE=256
XMITBUFS=1
XMITBUFSIZE=2040
RINGSPEED=16
```

Figure 55. Protocol.ini File Created During Installation

```
[LarstdetectedFromSetup]
NETCARD1=807,2,0xa20,4,0xffff,-1,0xffff,-1,-1,0,-1,0xffffffff,-1,0xfd00
```

Figure 56. Ncdinfo.ini File Created During Installation

You can start up your DOS GUI by executing the C:\net\netgui command. This GUI has the same functionality as the Windows GUI that will be described in the following paragraphs.

If your client has Windows installed, start Windows to finish your configuration. When Windows starts, you will be prompted to accept a change in the Windows network setup. Select **OK**.

You will need to restart Windows to use your requester.

After restarting Windows, you will be prompted to log in to the network. This can be done locally or by a domain.

After you have logged in using the userid created during installation and the password you want to use in the future, you will find a set of Window tools in the DOS LAN Services group, as shown in Figure 57 on page 95.

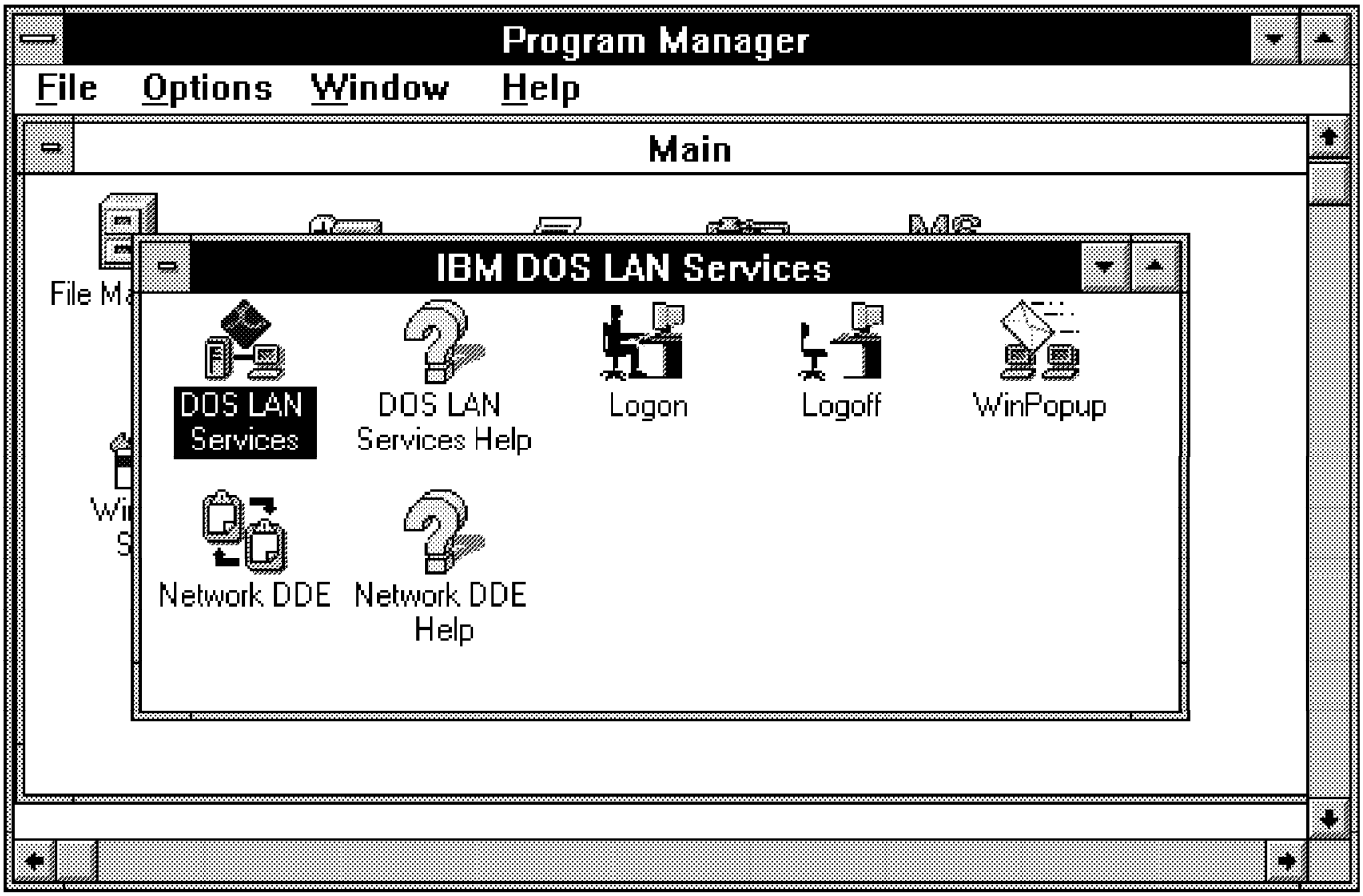

Figure 57. IBM DOS LAN Services

The DOS LAN Services group contains program icons to enable you to log on, log off, start the Network DDE and Clipboard features, and access the DOS LAN Services main window.

As mentioned earlier, DOS LAN Services provides three kinds of interfaces, one that is a Windows interface, one that runs from the DOS command prompt and a DOS LAN Services graphical user interface which can be run without Windows.

Any of these interfaces will enable you to perform the following tasks:

- Log on and log off to/from a LAN Server domain including LSserver, modify logon assignments and re-establish persistent connections.
- List users logged onto the domain.
- Modify the appearance of the graphical user interface.
- Share directories and printers with other users on the network.
- View directory-limit information for a shared directory (Windows only).
- Send and receive network messages.
- Define private and public applications.

With IBM DOS LAN Services, you have a nice GUI to access resources on the AIX Connections server, as shown in Figure 58 on page 96.

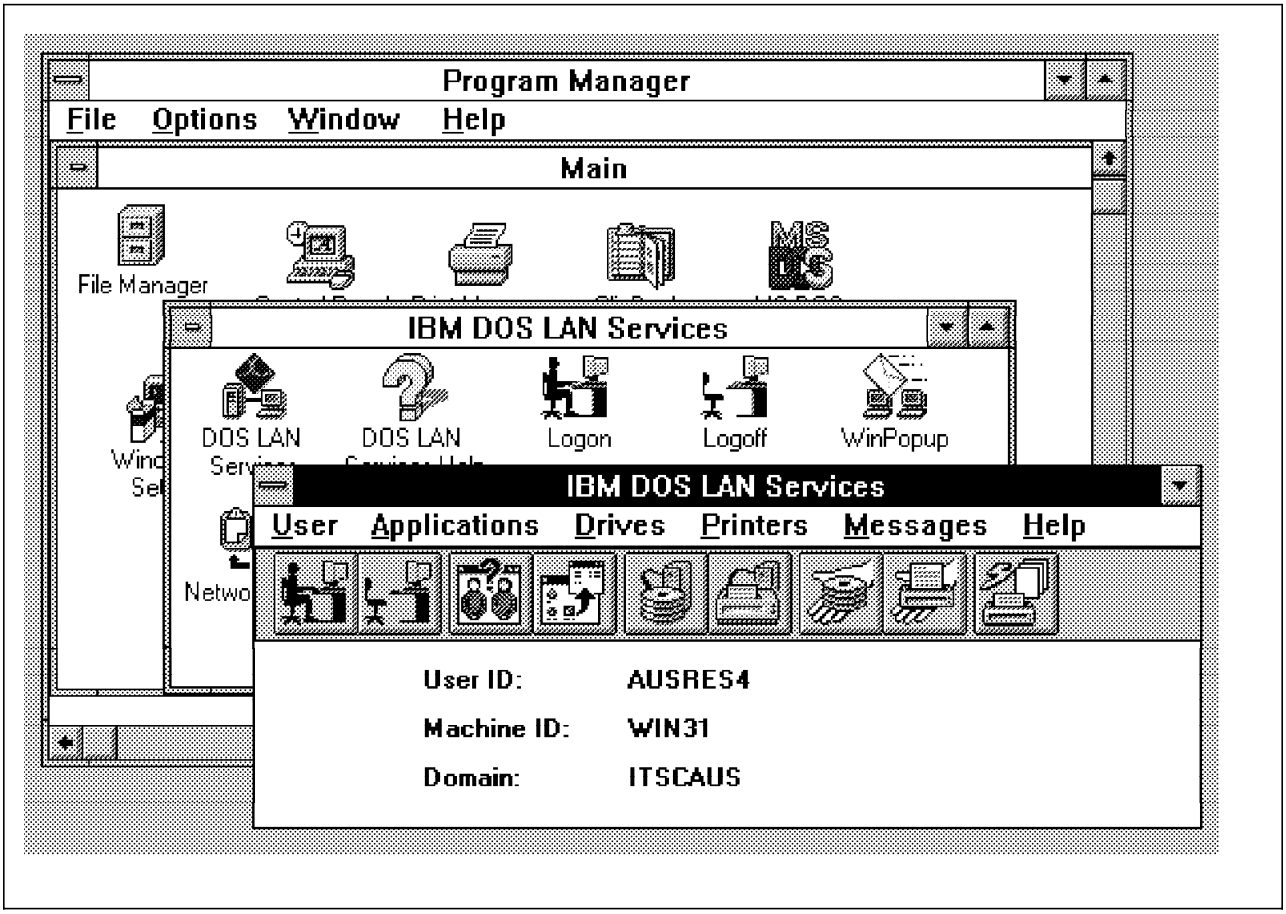

Figure 58. IBM DOS LAN Services GUI

To connect an AIX Connections volume or attach point, select **Drives** from the IBM LAN Services GUI.

To connect an AIX Connections Printer, select **Printers** from the IBM LAN Services GUI.

In this version of AIX Connections, the server will not show up when browsing the network. You will have to type in the server name and resource name in the dialog box.

This ends the configuration of the DOS client.

6.2.2 Windows for Workgroups Client

The network functionality built into Windows for Workgroups can be used to connect to the NB Realm of AIX Connections.

You may also choose to use the DOS LAN requester described in the last section to connect to the NB Realm of AIX Connections with a Windows for Workgroup client, but in this section, we will focus on the built-in network functions of Windows for Workgroups.

During installation of Windows for Workgroups, you have to make sure that you install **Support for Microsoft Networks**.

You will be prompted to create a userid on your client, set up a name for your client and select a workgroup for your client.

After this, the installation program will install the necessary drivers for you. After installation, you will need to restart your client.

You might need to know what kind of Network card you have in your client to set up the network components, but in most cases, the installation program will auto-detect your network card.

After a restart of your client, you will be prompted to log in and set up a password for your user.

The installation will change your autoexec.bat file. In our example, you will see the file modified in Figure 59.

Note: The lines bold-faced reflect the installation of network support to Windows for Workgroups.

```
C:\WINDOWS\SMARTDRV.EXE
C:\WINDOWS\net start
SET PATH=C:\WINDOWS;C:\DOS;%PATH%
SET TEMP=C:\DOS
C:\DOS\MOUSE.COM
C::\DOS\DOSKEY.COM
```

Figure 59. Autoexec.bat File for Windows for Workgroups Clients

Your Windows configuration system.ini file will also be changed. In Figure 60 on page 98, you will find an example of the actual file. The file is not complete; only parts related to NB Realm of AIX Connections are included.

Note: The lines bold-faced reflect the installation of network support to Windows for Workgroups.

```
Workgroups Clients Modified by Network Installation

[boot]
network.drv=wfwnet.drv

[keyboard]

[boot.description]
network.drv=Microsoft Windows Network (version 3.11)
secondnet.drv=No Additional Network Installed

[386Enh]

network=*vnetbios,*vwc,vnetsup.386,vredir.386,vserver.386

netheapsize=20
MaxPagingFileSize=35832
netmisc=ndis.386,ndis2sup.386
netcard=ibmtok.386
transport=netbeui.386

[NonWindowsApp]

[vcache]

[mci]

[drivers]

[DDEShares]

[Network]

winnet=wfwnet/00025100
multinet=nonet
FileSharing=Yes
PrintSharing=Yes
LogonDisconnected=yes
EnableSharing=Yes
UserName=AUSRES4
Workgroup=RSCONNECT
ComputerName=W4W
Comment=ITSO
logonvalidated=no
reconnect=yes
LogonDomain=CONNECT

[network drivers]
netcard=ibmtok.dos
transport=ndishlp.sys,*netbeui
devdir=C:\WINDOWS
LoadRMDrivers=No

[Password Lists]
*Shares=C:\WINDOWS\Share000.PWL
AUSRES4=C:\WINDOWS\AUSRES4.PWL
```

Figure 60. Windows Configuration File System.ini for Windows for

You will find a group of Network Tools in the Network folder on your Windows desktop.

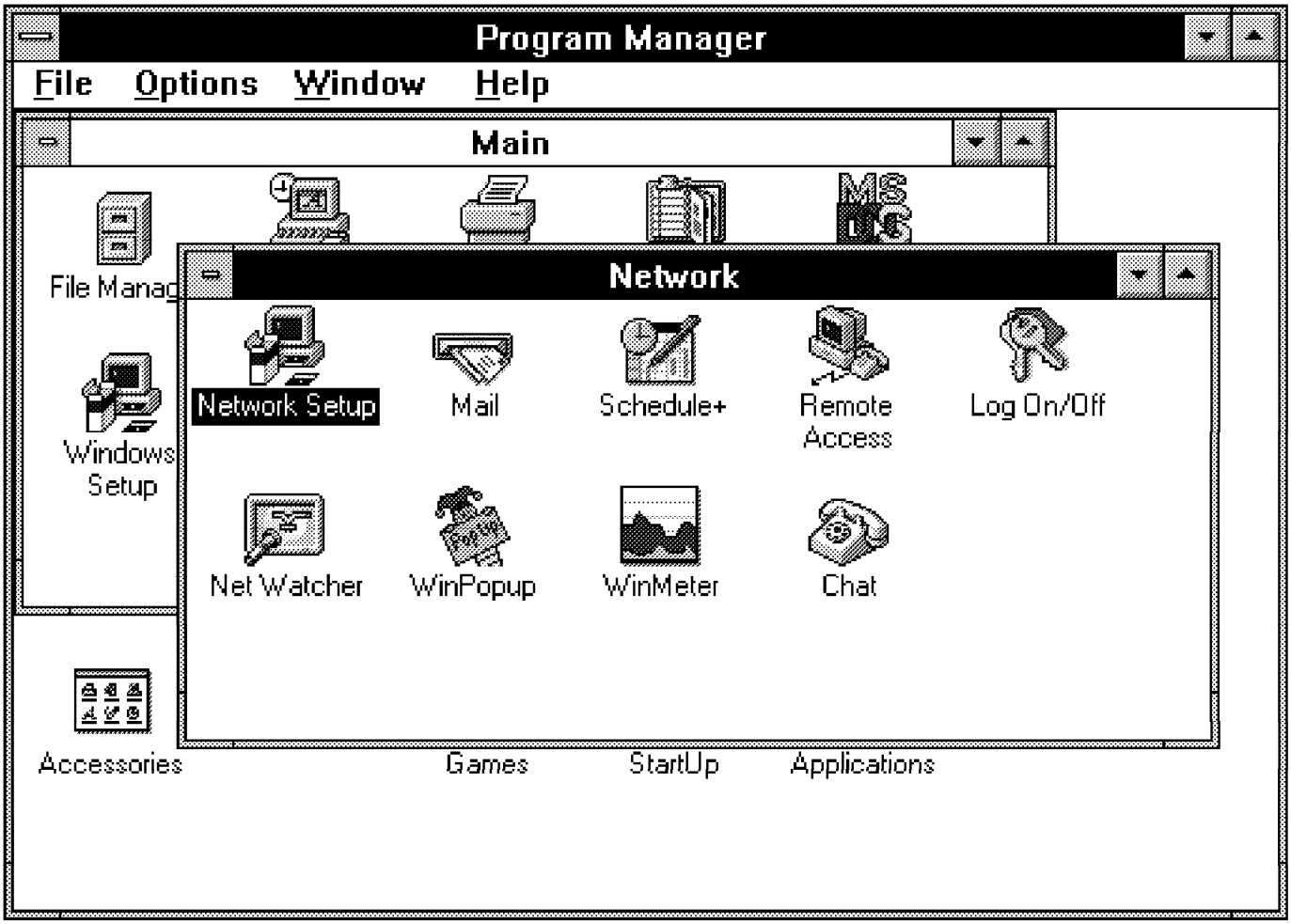

Figure 61. Windows for Workgroups Network Group

To verify that you have the necessary components installed, open the Network Setup folder. Be sure that your network card is correct and that you have installed support for Microsoft Networks based on the NetBEUI protocol, as in Figure 62 on page 100.

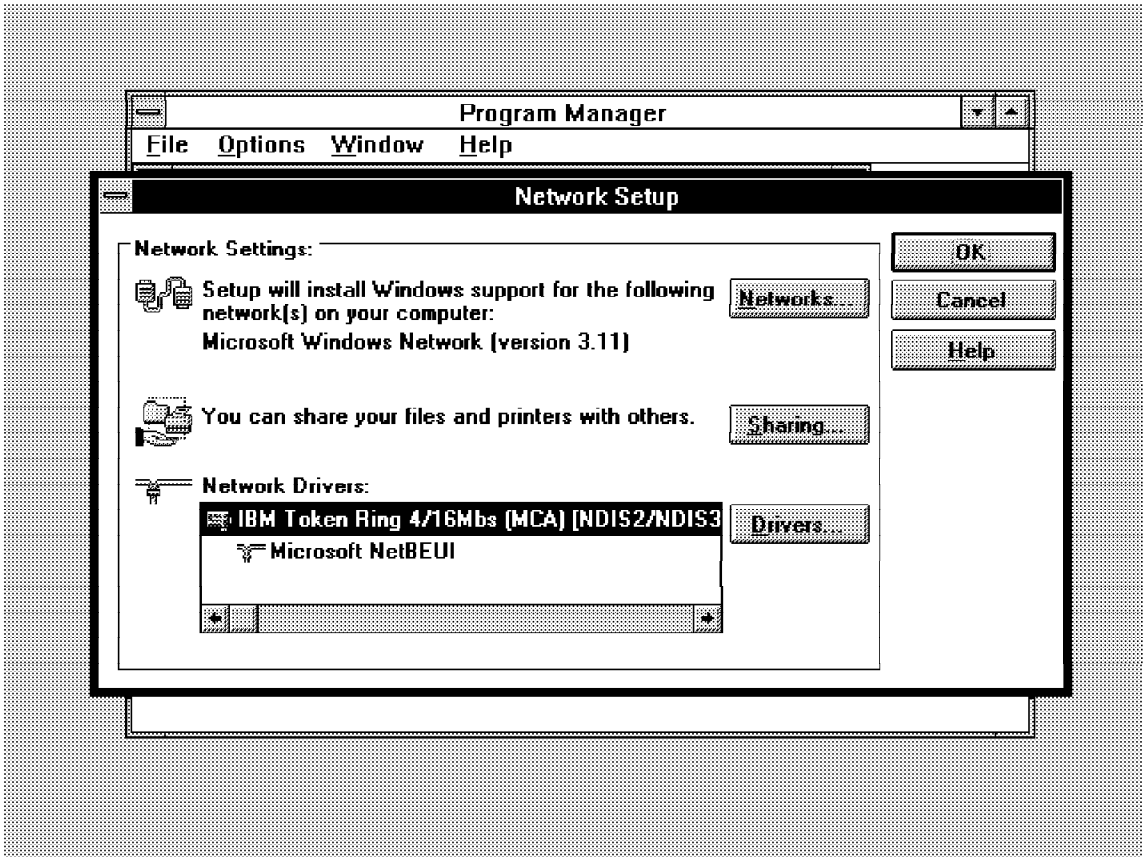

Figure 62. Windows for Workgroups

To change Network options other than network card and protocols, you can use the Windows Control Panel. Select the Network icon, and this will bring you to a panel like that shown in Figure 63 on page 101.

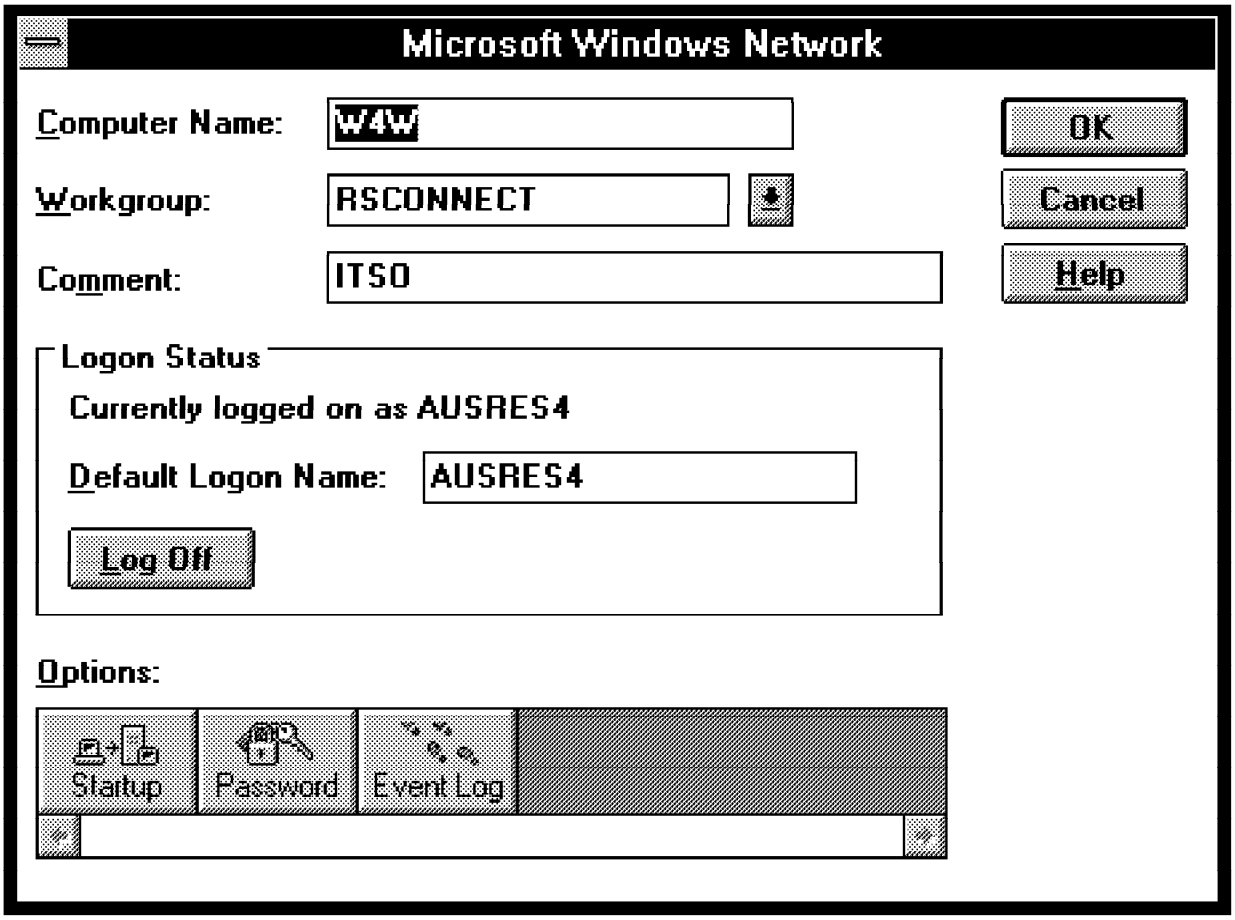

Figure 63. Windows for Workgroups Network Setup

From this panel, you can change your computer name, workgroup name and default logon name. To change your password, select the Password button on the panel.

You might also want to change the startup options of Windows for Workgroups. By default, you will be prompted to log on at Windows startup. To change this, select the Startup icon in Figure 63.

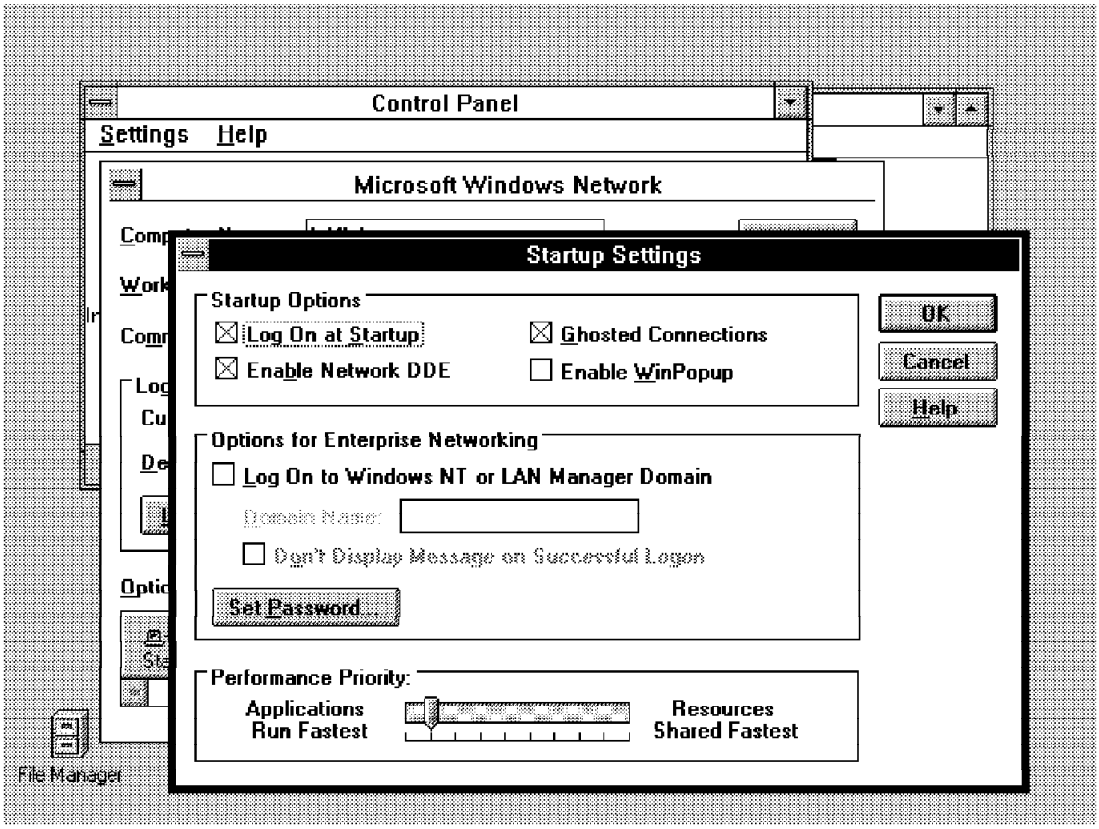

Figure 64. Windows for Workgroup Network Startup Options

The window shown in Figure 63 on page 101 will also allow you to change your logon from a local logon (userid and password verified by the client itself) to a domain logon.

To access network drives from a Windows for Workgroups client, you have to use the Windows File Manager. From the Main group of Windows, select the File Manager icon to bring you to the File Manager.

From the File Manager, select **Disk** followed by **Connect Network Drive**. This will bring you to a window like that in Figure 65 on page 103.

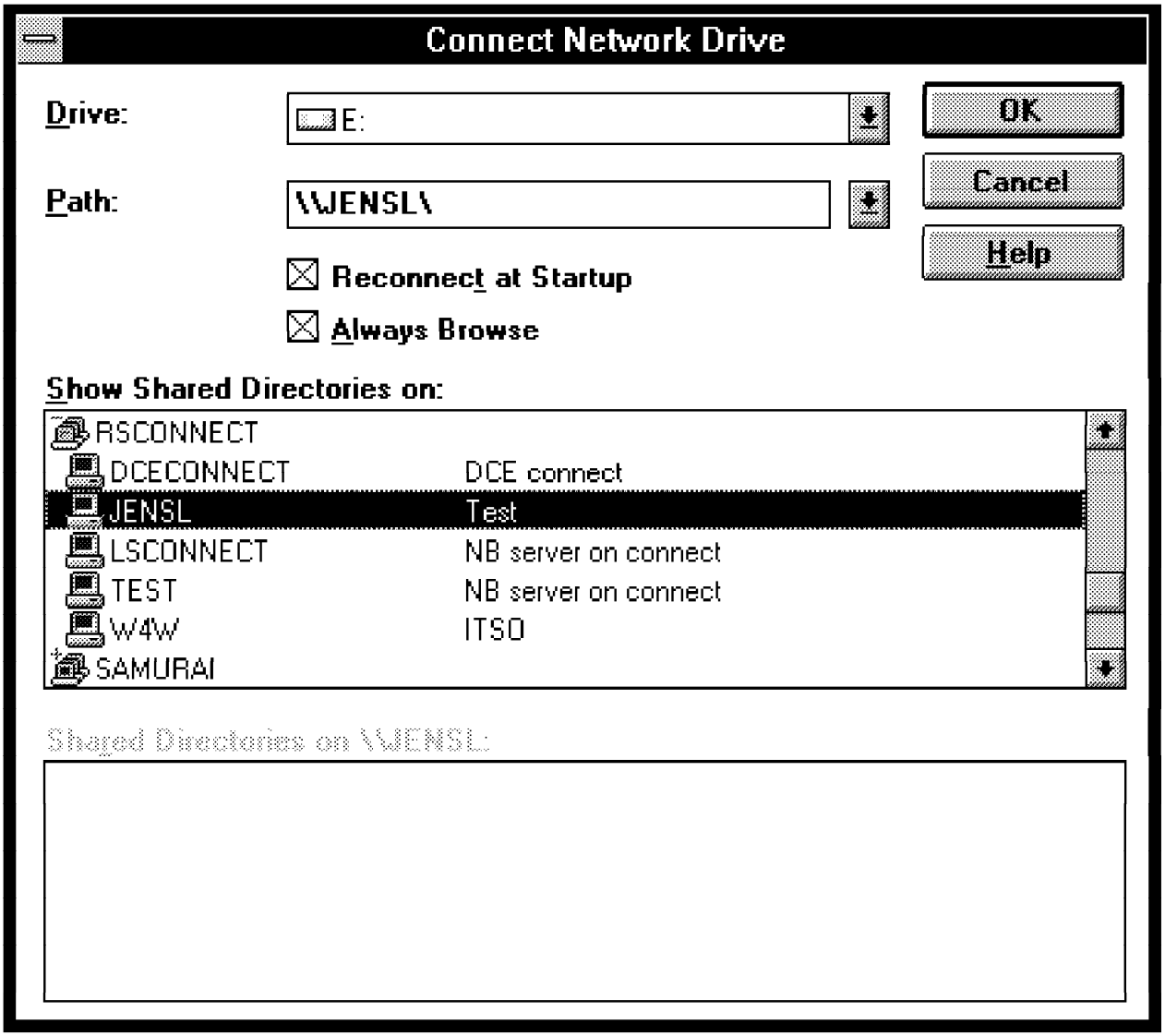

Figure 65. Connecting Network Drives from a Windows for Workgroups Client

Select the server you want to attach to. From the **Shared Directories** section, select the directory you want. Select **OK** to finish your connection.

To attach a printer, you need to start the **Control Panel** from the Main group. Select the **Printer** icon to bring up the Printers window.

Select the **printer type** you want to use, select **Connect** and select **Network**. (This will bring you to a screen like Figure 66 on page 104.)

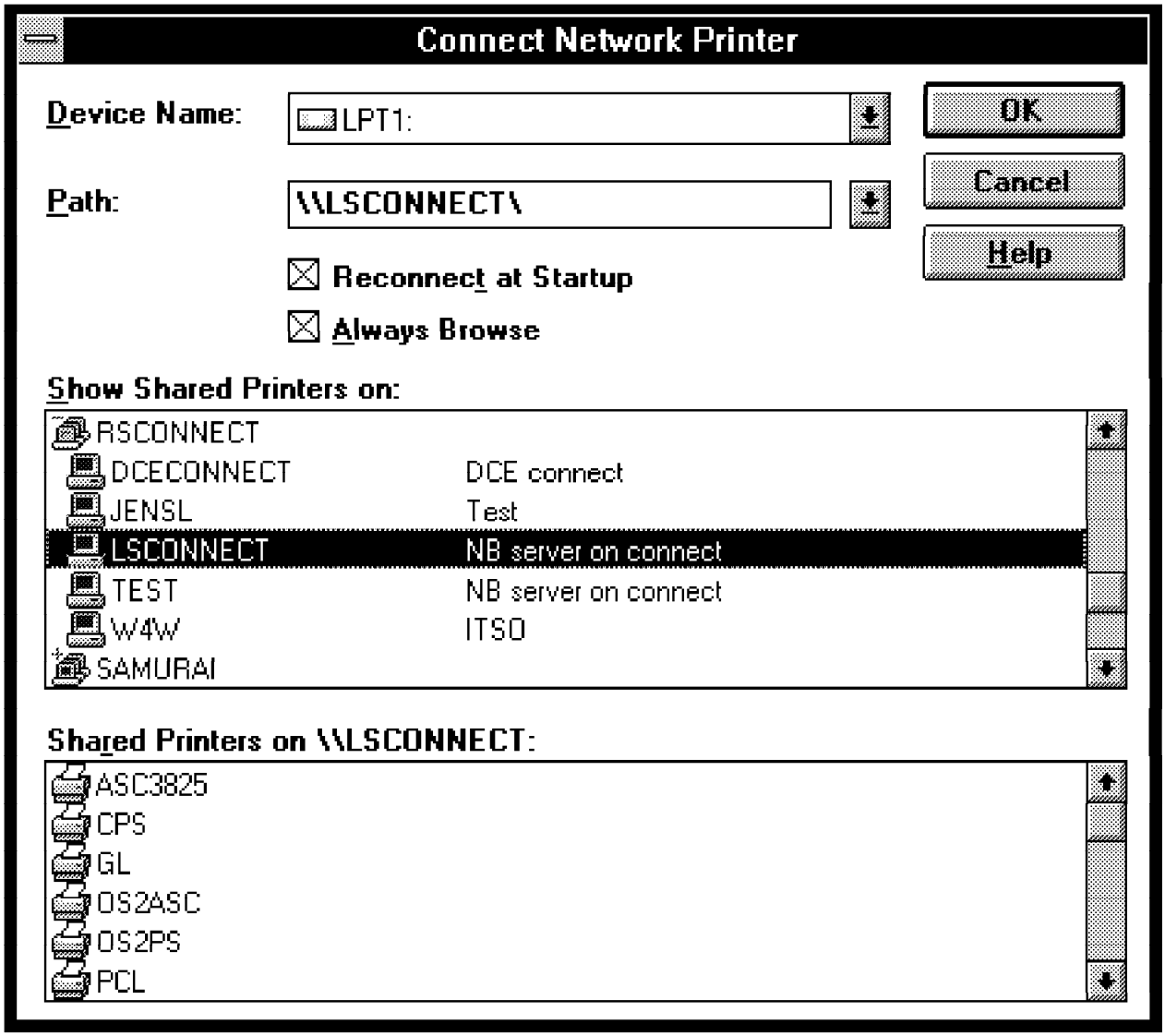

Figure 66. Connecting Network Printers from a Windows for Workgroups Client

Select the **server** you want to use, and from **Shared Printers**, select the **printer** you want to connect to. Select **OK** to finish your connection.

This ends the configuration of the Windows for Workgroups client.

6.2.3 OS/2 LAN Requester 4.0 Client

In this section, we will assume that you already have OS/2 Warp Connect installed without any network options. This section will not cover the installation of OS/2 Warp, but it will focus on the network installation and configuration.

The description of installation and configuration is based on a CD version of OS/2 Warp Connect.

OS/2 requesters can operate with NetBIOS, NetBIOS over TCP/IP or both.

Both are installed as part of Multiple Protocol Transport Services (MPTS). These will install automatically as part of the LAN Requester installation process and with the OS/2 Peer as well.

MPTS helps you configure the protocols and network adapters you need.

Note: You do not need to install TCP/IP for OS/2 to use a NetBIOS over TCP/IP client.

To install OS/2 LAN Requester on your client, you will have to go through the following steps:

1. From the OS/2 desktop, select the **OS/2 System** icon.
2. From OS/2 System, select **OS/2 Warp Connect Install/Remove**.
3. From OS/2 Warp Connect Intall/Remove, select **Warp Connect Selective Install for Networking**. The OS/2 Warp Connect Install windows displays.
4. Select **Local Install** and verify that **This workstation** is checked. Then select **OK**.
5. From Installing OS/2 Warp Connect, check **Advanced Installation**. Then select **OK**.
6. From the Product Selection screen, Figure 67, check **IBM client products** and select **IBM LAN Requester 4.0**. Then select **OK**.

   Note: More products can be installed at the same time by checking them in the Product Selection window.

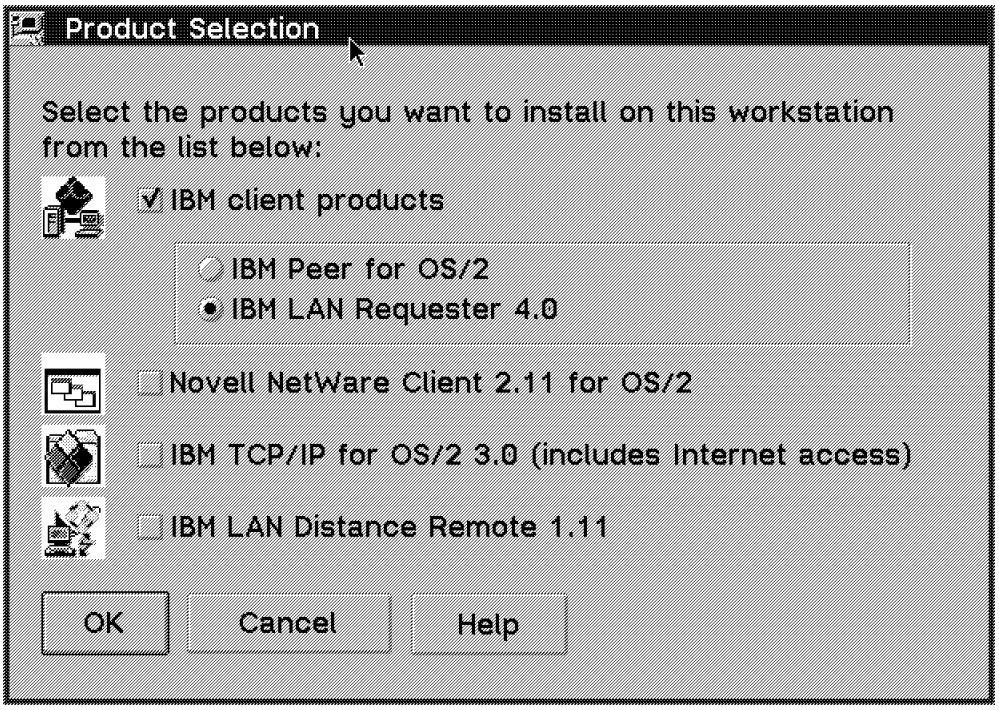

Figure 67. OS/2 Warp Network Installation Product Selection Screen

7. Select your **network card** and **installation drive** from the notebook displayed.
8. Select the **LAN Requester** tab of the notebook.
9. Specify your **Requester name** and **Domain name**.

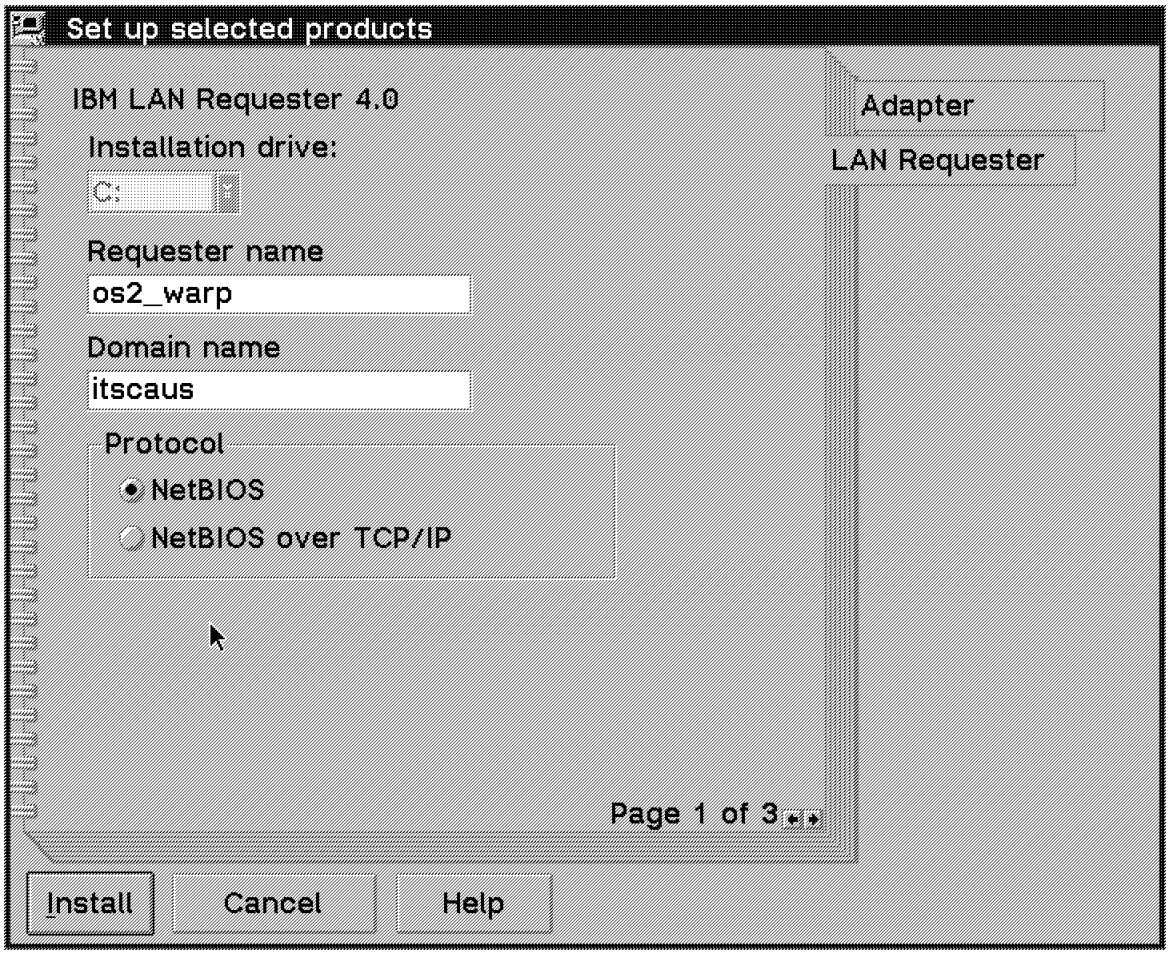

Figure 68. OS/2 LAN Requester 4.0 Client Configuration, Screen 1

Your requester can access the AIX Connections server based on either NetBIOS or NetBIOS over TCP/IP. Select one of the protocol options.

Note: If you select NetBIOS, your configuration is done. Skip the TCP/IP configuration and select **Install**.

To finish your configuration using NetBIOS over TCP/IP, please go through the following:

10. Select the **arrow** on your notebook to bring up page 2 of 3 of the TCP/IP configuration.

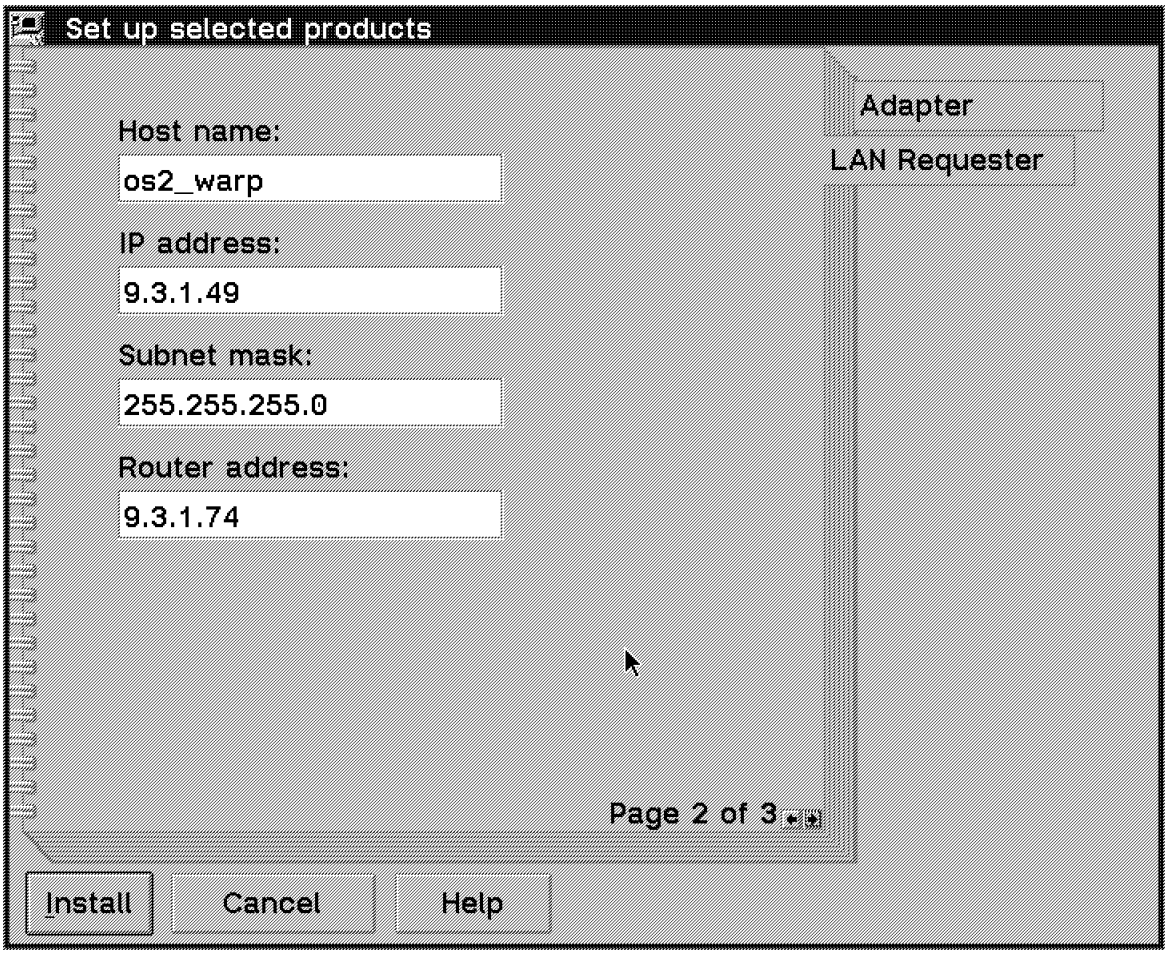

Figure 69. OS/2 LAN Requester 4.0 Client Configuration, Screen 2

11. Type your
    - Host name
    - IP address
    - Subnet mask
    - Router, if present

    in the window. Then press the **arrow** to go to page 3 of 3 of the TCP/IP configuration.

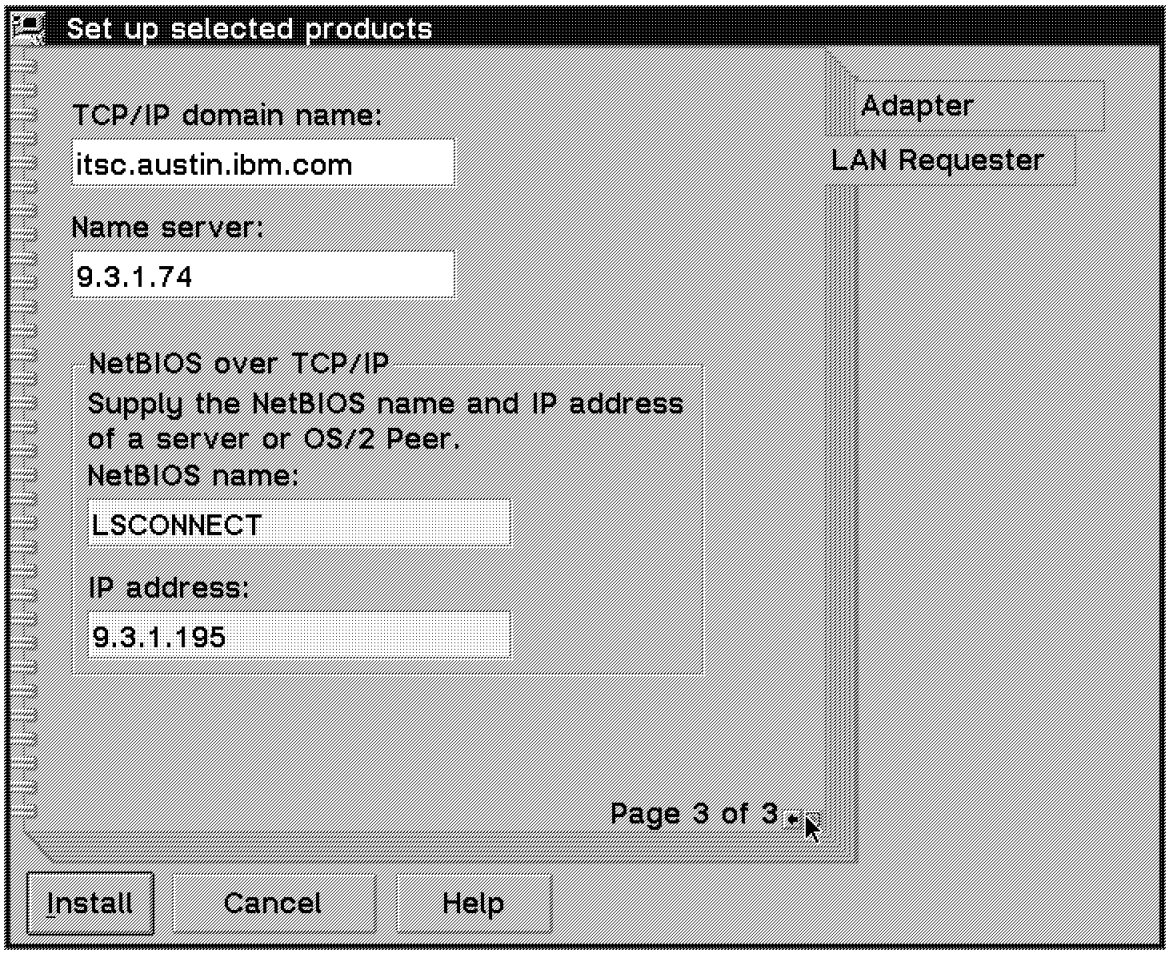

Figure 70. OS/2 LAN Requester 4.0 Client Configuration, Screen 3

Type your

- TCP/IP domain name
- IP address of the nameserver
- NetBIOS name of your server
- IP address of your server

12. Select **Install** to finish your configuration.
13. Select **Install** from the Setup window.
14. After a few minutes, the install program will ask you to shut down your machine. Select **OK** after having closed other running programs.
15. After shutdown has finished, restart your machine.
16. Shortly after, the OS/2 desktop displays installation of OS/2 LAN Requester and related MPTS drivers.

AIX Connections and OS/2 LAN Requester are not using the same SMB Dialog. Unfortunately, this means that you are not able to browse the network and find the AIX Connections server.

You will need to use *net use* commands to access volumes and printers from the AIX Connections server.

6.2.4 OS/2 Peer Services 1.0

In this section, we will assume that you already have OS/2 Warp Connect installed without any network options. This section will not cover the installation of OS/2 Warp, but it will focus on the network installation and configuration.

The description of installation and configuration is based on a CD version of OS/2 Warp Connect.

The installation of the peer requester is very common to the OS/2 LAN Requester. The functionality of the peer is, from a client point of view, not unlike that of the LAN requester. The difference is that by using the peer, you can grant other clients access to resources like disks and printers.

To install the peer, go through the same steps as described in 6.2.3, “OS/2 LAN Requester 4.0 Client” on page 104, but from the Product Selection screen, Figure 67 on page 105, check the **IBM client products** and select **IBM Peer for OS/2** . Then select **OK**.
This will bring you to the OS/2 Peer notebook.

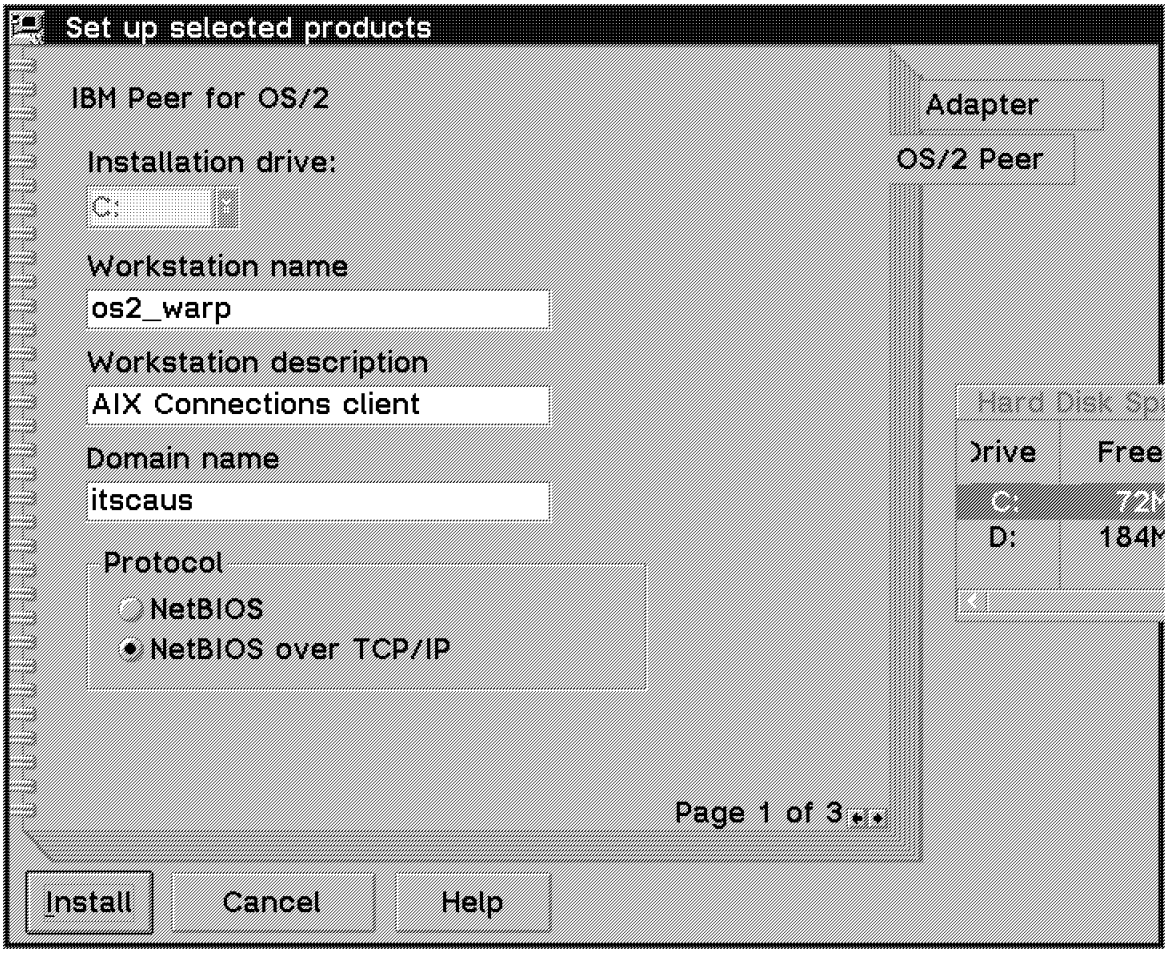

Figure 71. OS/2 Peer Configuration, Screen 1

As shown in Figure 71, fill out:

- Your client’s name
- A description of your client

- The domain name
- The protocol you want to use, NetBIOS or NetBIOS over TCP/IP

If you are using native NetBIOS, click the **Install** button.

If you are using NetBIOS over TCP/IP, click the small arrow to bring you to the TCP/IP part of the configuration, as in Figure 72.

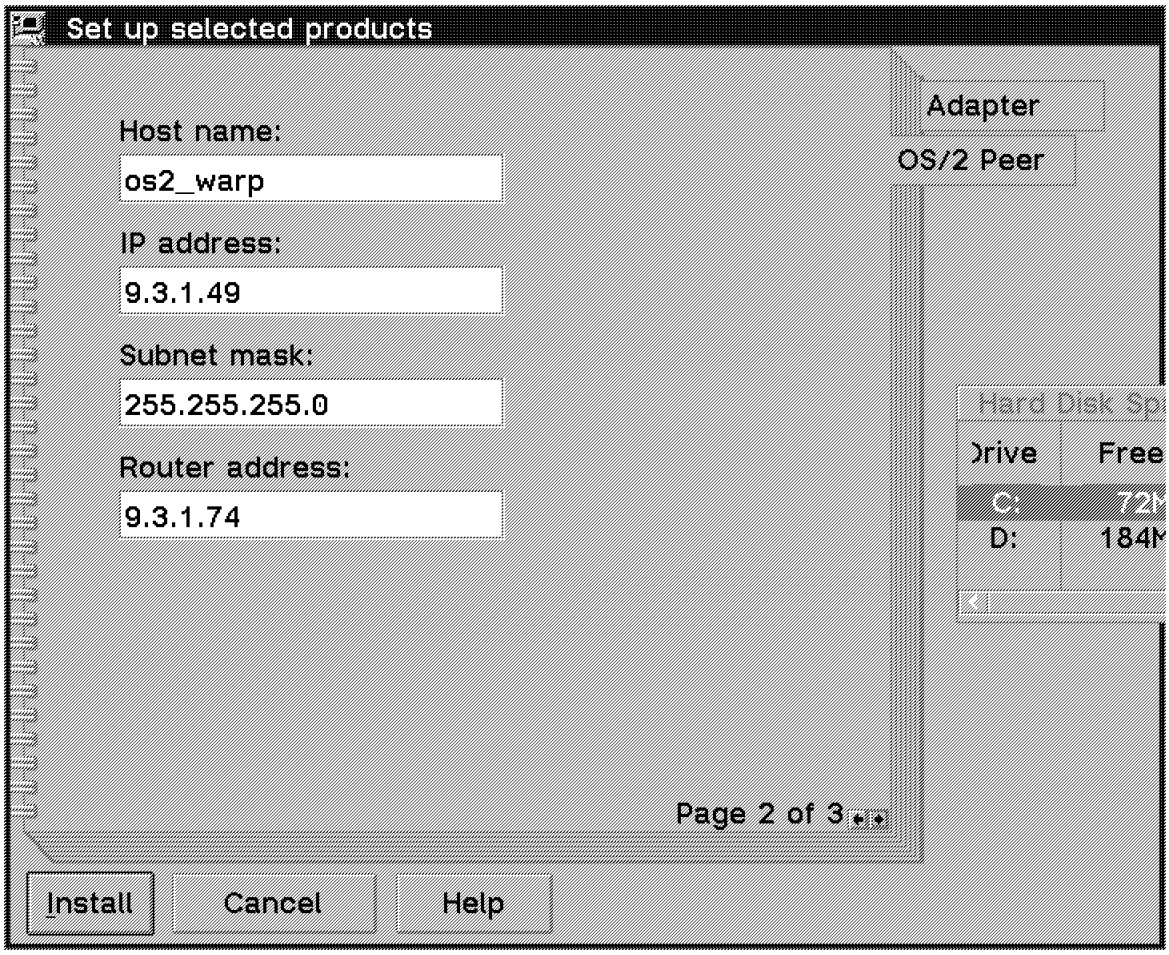

Figure 72. OS/2 Peer Configuration, Screen 2

Fill in:

- Your TCP/IP host name
- Your IP address
- Your subnet mask
- The address of your router, if available

Click the small arrow to finish the configuration. This will bring you to a screen like Figure 73 on page 111.

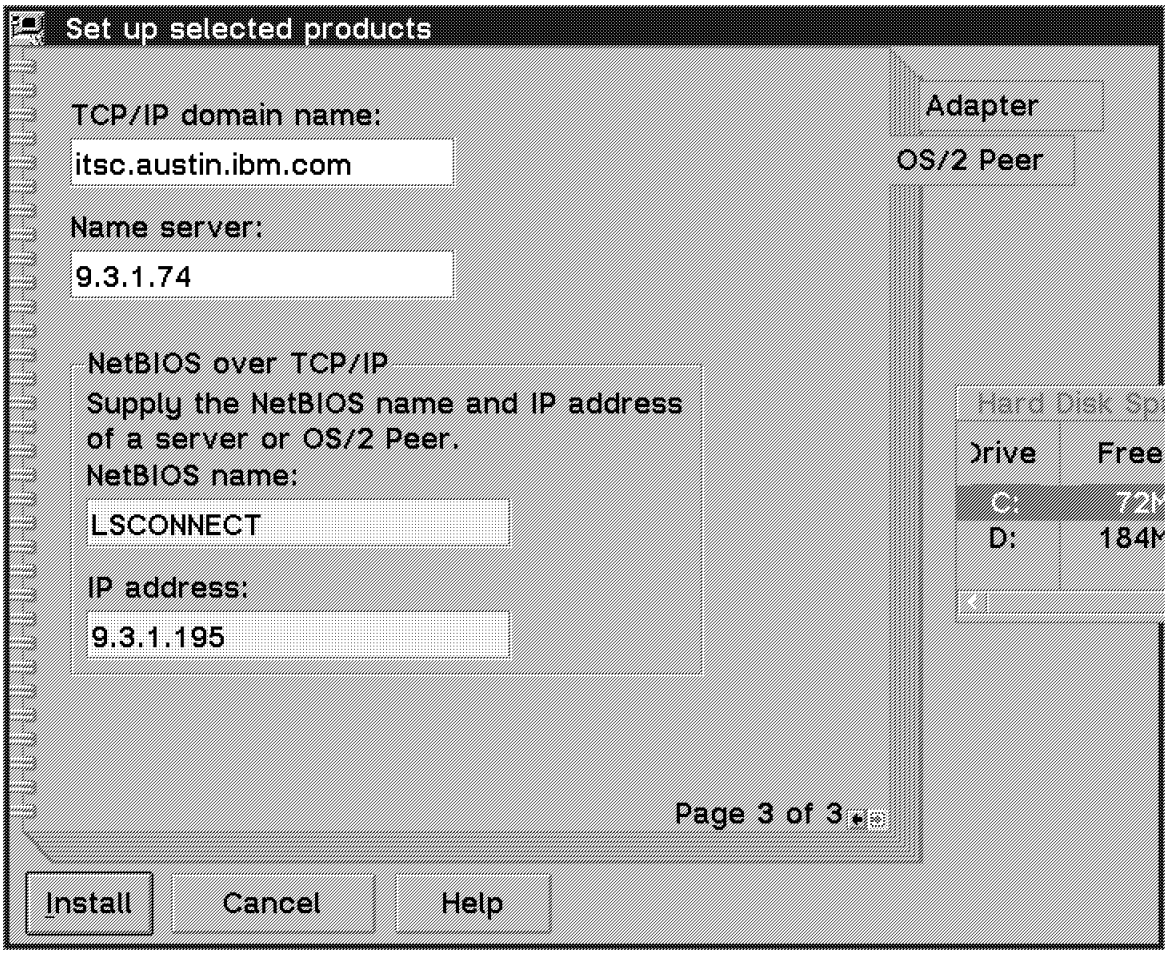

Figure 73. OS/2 Peer Configuration, Screen 3

Fill in:

- Your TCP/IP domain
- The IP address of your nameserver
- The NetBIOS name of your server
- The IP address of your server

Select **Install** to finish your configuration.

Select **Install** from the Setup window.

After a few minutes, the install program will ask you to shut down your machine. Select **OK** after having closed other running programs.

After shutdown has finished, restart your machine.

Shortly after, the OS/2 desktop displays installation of OS/2 Peer-related MPTS drivers.

When installation has finished, you will have to shut down and reboot your workstation.

On the OS/2 desktop, you will now find an OS/2 Peer folder. Open the folder and you will see a screen like Figure 74 on page 112.

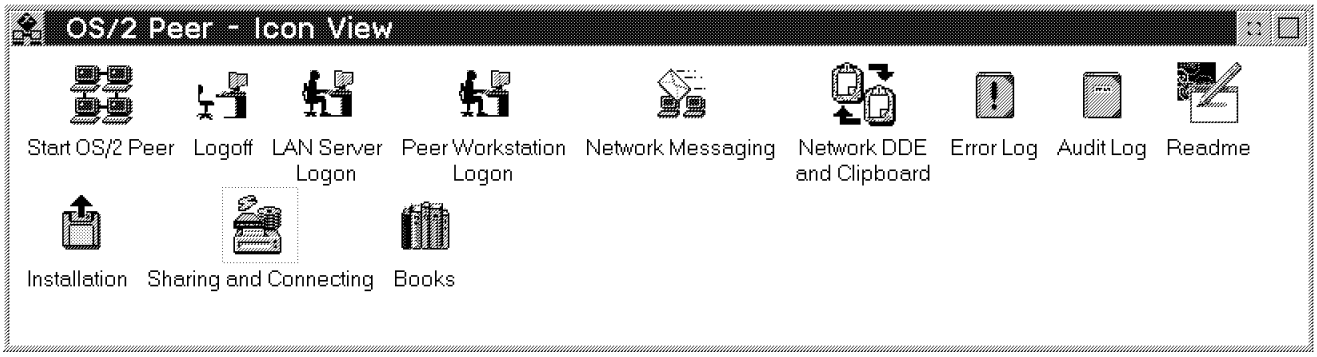

Figure 74. OS/2 Peer Tools

From this folder, you can control such functions as:

- Starting the peer
- Logging onto the peer
- Logging off of the peer
- Logging onto an OS/2 LAN server
- Sending and receiving messages
- Accessing and sharing resources

To access resources from the AIX Connections server, select **Sharing and Connecting**. This will bring up a screen like Figure 75 on page 113.

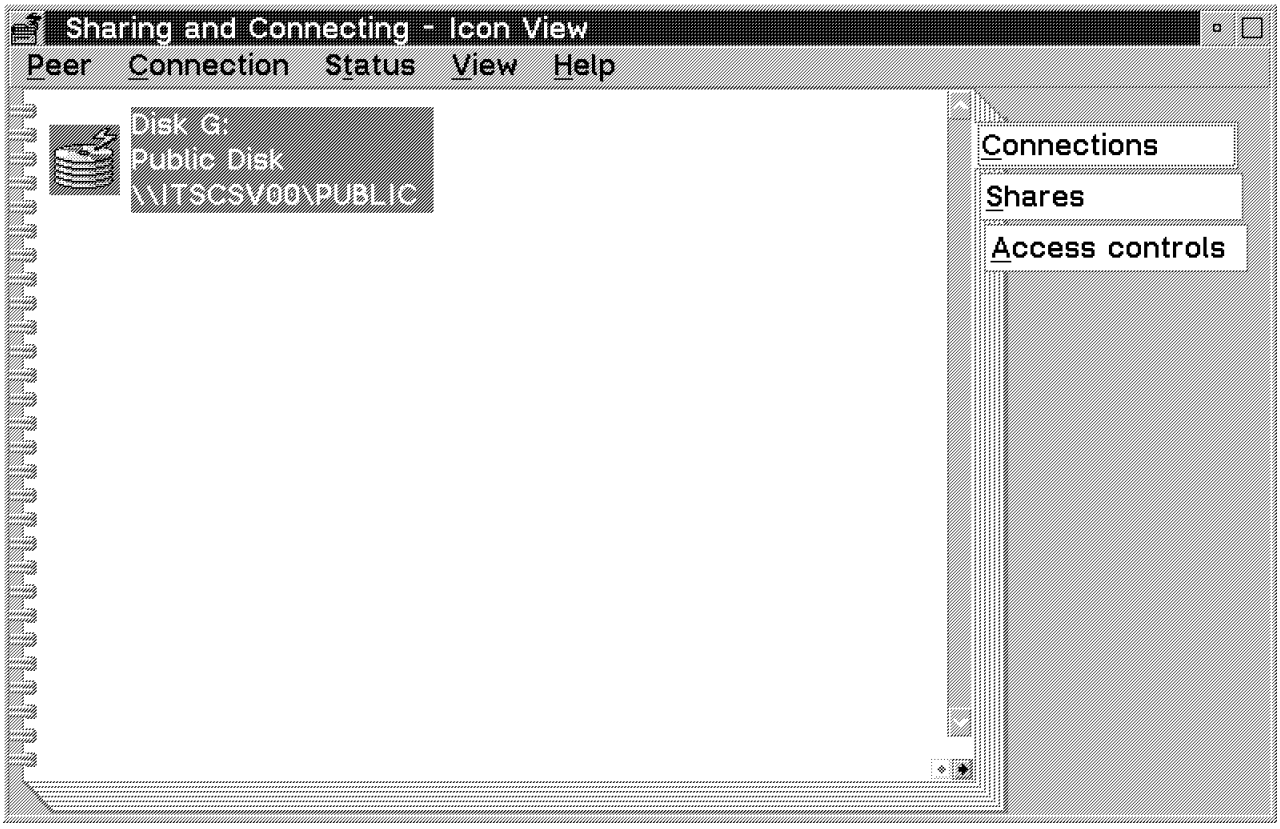

Figure 75. OS/2 Peer Network Connections

To access resources, select the **Connections** tab, and to grant other clients access to your services, select the **Shares** tab.

In this version of AIX Connections, the server will not show up using the browse function.

This ends the configuration of OS/2 Peer Services 1.0.

6.2.5 Windows 95 Client

Windows 95 includes the software necessary to connect to the NB Realm of AIX Connections.

If Windows 95 is not already installed on the workstation, go through the Windows 95 installation process. The installation should detect the network card in your machine. If this does not occur, it can be added later.

The installation process will also ask you if you want the drivers for Microsoft networks loaded for this adapter. You need this to connect to the NB Realm of AIX Connections.

All configuration of the Windows 95 client is done using the Network folder from the Control Panel, as shown in Figure 76.

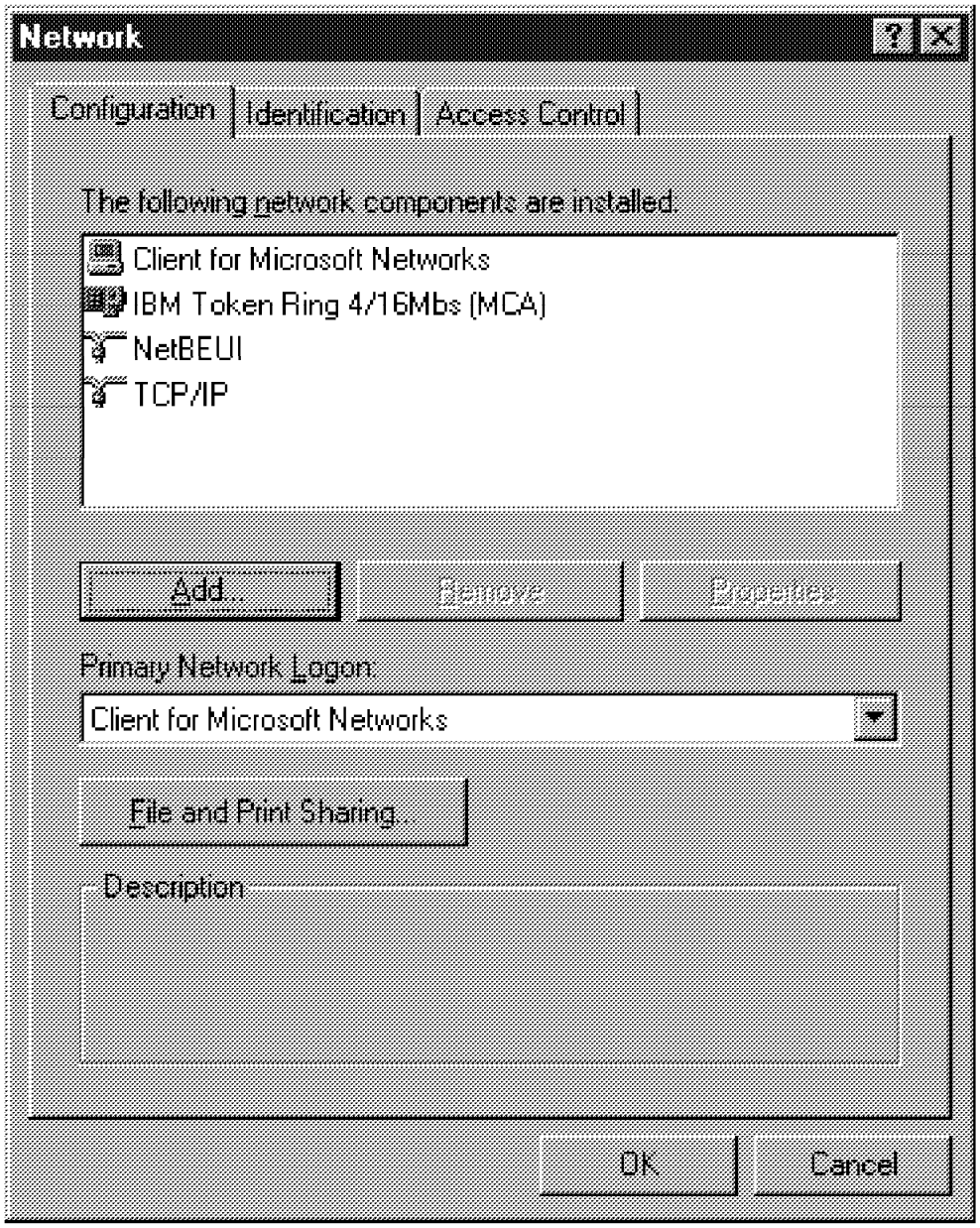

Figure 76. Windows 95 Network Options

If you have Windows 95 installed with Microsoft network support, you are ready to begin configuration.

Access the Control Panel from your My Computer folder or from the Start menu.

From the Control Panel, select the **Network** icon. This will bring you to a screen like Figure 76 on page 114.

Be sure that your network card is correct and that you have at least Client for Microsoft Networks and the NetBIOS protocol present. If you need to access the NB Realm of AIX Connections running RFC 1001/1002, you also need to add and configure the TCP/IP protocol.

If one or more of the features above is not available on your client, click on the **Add** button; you will be prompted to select a network component type **adapter/client/protocol** or **service**.

You can now add the components you need.

Adapter: If you do not have your adapter in the list, select **adapter** from the box, and click **Add**. Now, you will be prompted to select the manufacturer of the adapter and the actual name of the adapter. To add the adapter to your configuration, click on **OK**.

Client: If you do not have the Client for Microsoft Networks installed, click on **Add**, and select **Client** from the list box. For the manufacturer, select **Microsoft**, and for the client, select **Client for Microsoft Networks**. Again, click on **OK**.

Protocol: Click on the **Add** button again, but this time, select **protocol** from the list box, and click on **Add**. You will now be prompted to select the manufacturer of the protocol and the protocol itself.

Service: The last network component you can add is called Service. This will allow your Windows 95 PC to act like a server so that other clients and servers can share files or resources on your PC. This component is not necessary for our client to access the AIX Connections server.

Now that we have all components available, we can configure the client. You will have to go through the properties of the different components as described in the following:

Adapter Properties:

Be sure you are using Enhanced Mode drivers on your network adapter. To verify this, select the **adapter** and select **properties**.

Click the **Driver type** tab to verify that Enhanced Mode drivers are checked. Next, click the **Bindings** tab to verify that your selected protocol is checked on your network adapter. To use RFC 1001/1002, be sure both NetBEUI and TCP/IP are checked.

You can normally leave settings from the Advanced tab unchanged.

Client Properties:

Select **Client for Microsoft Networks**, and select **properties**. You will see a screen like Figure 77 on page 116.

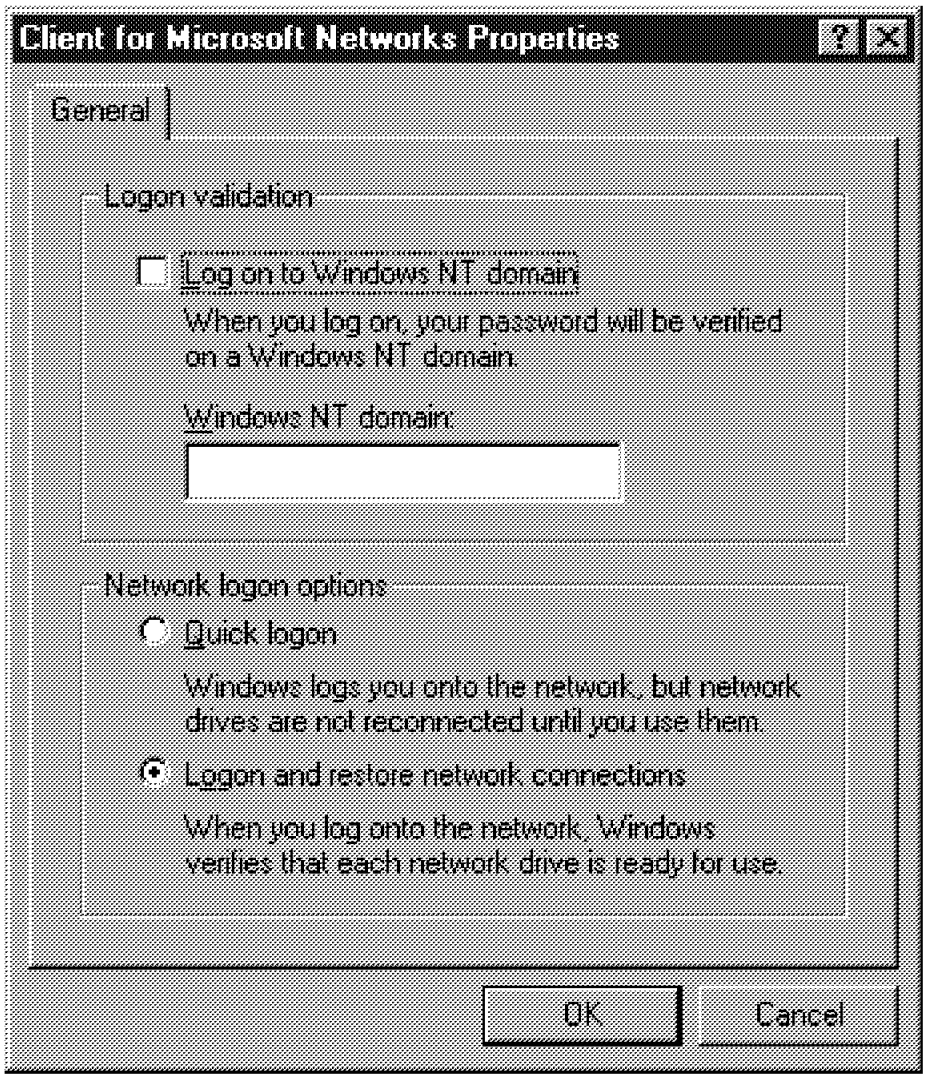

Figure 77. Windows 95 Client for Microsoft Networks Properties

You can set up your client either to log on to an NT domain by checking this option and specifying the domain name, or to log on locally by unchecking this option. By selecting local logon, the userid and password are verified by the client.

You might also verify your logon option. You can choose to have your earlier network connections restore on time of logon or by the time you need to access them.

Protocol Properties:

Select the properties of your NetBEUI protocol to verify that the Client for Microsoft Networks is checked, as in Figure 78 on page 117.

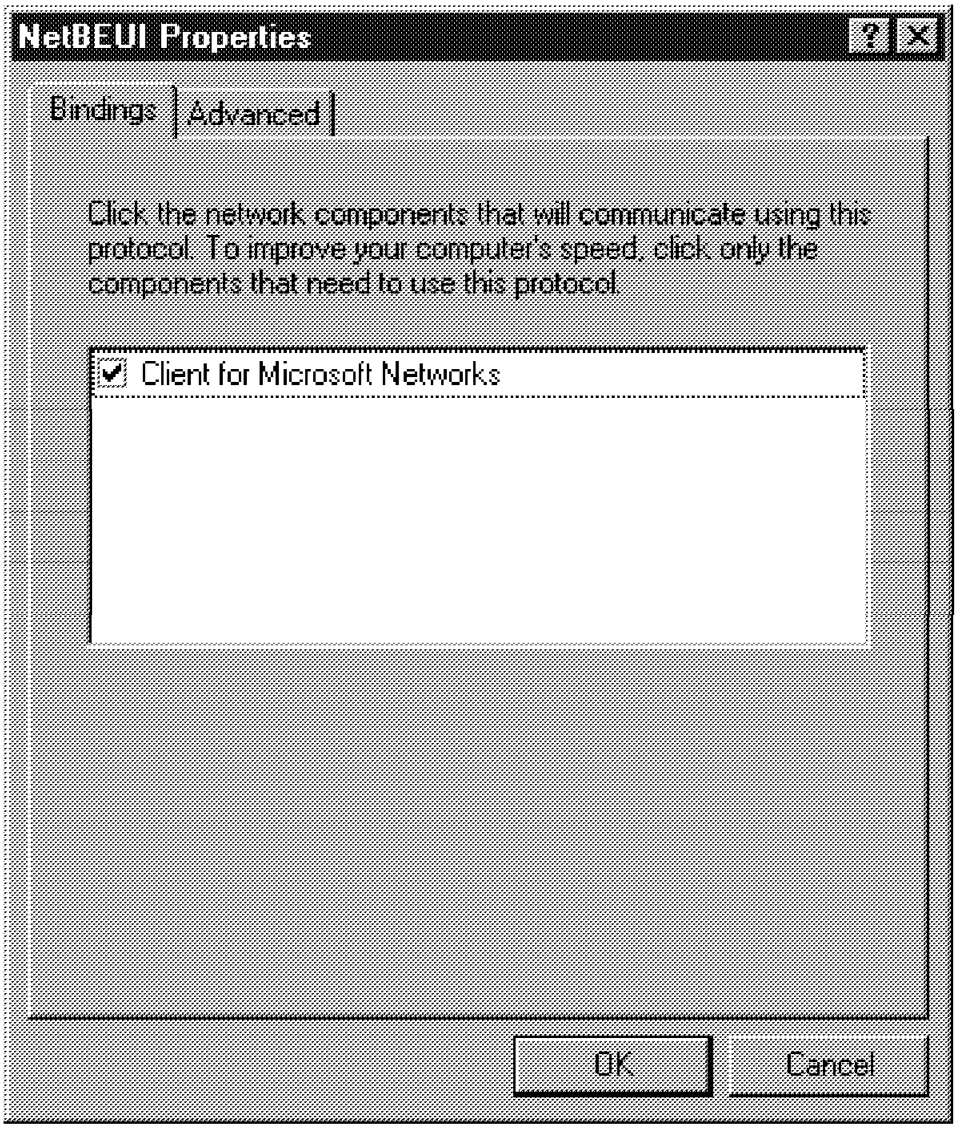

Figure 78. Windows 95 NetBEUI Properties

If you are using TCP/IP, select the properties to set up at least your hostname and IP address, like in Figure 79 on page 118.

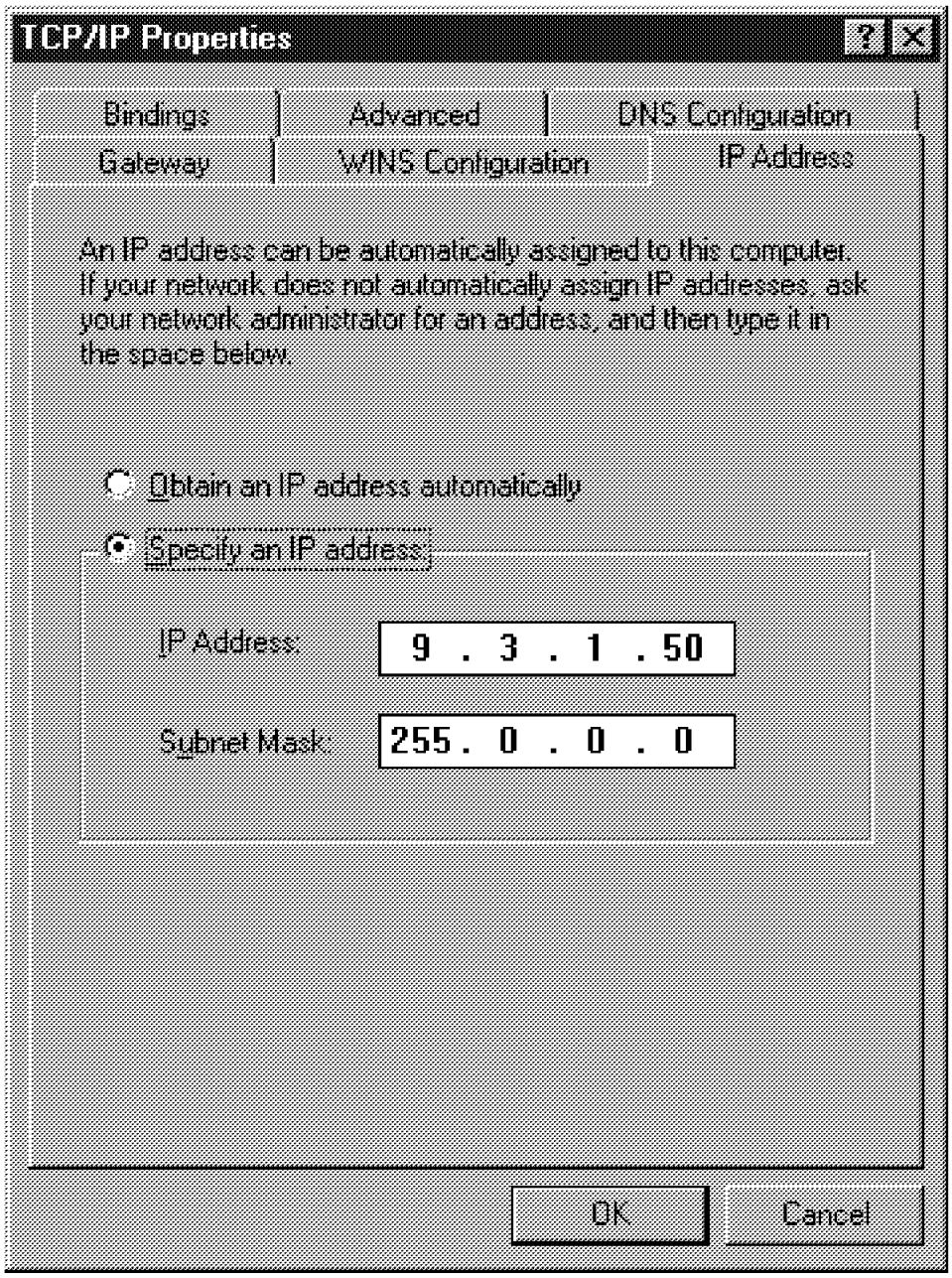

Figure 79. Windows 95 TCP/IP Properties

You also need to click the **Bindings** tab to verify that the Client for Microsoft Networks is checked. For more detailed information about configuration of TCP/IP, please refer to your Windows 95 documentation.

Now, we need to identify your client in the network. Select the **Identification** tab to display a screen like Figure 80 on page 119.

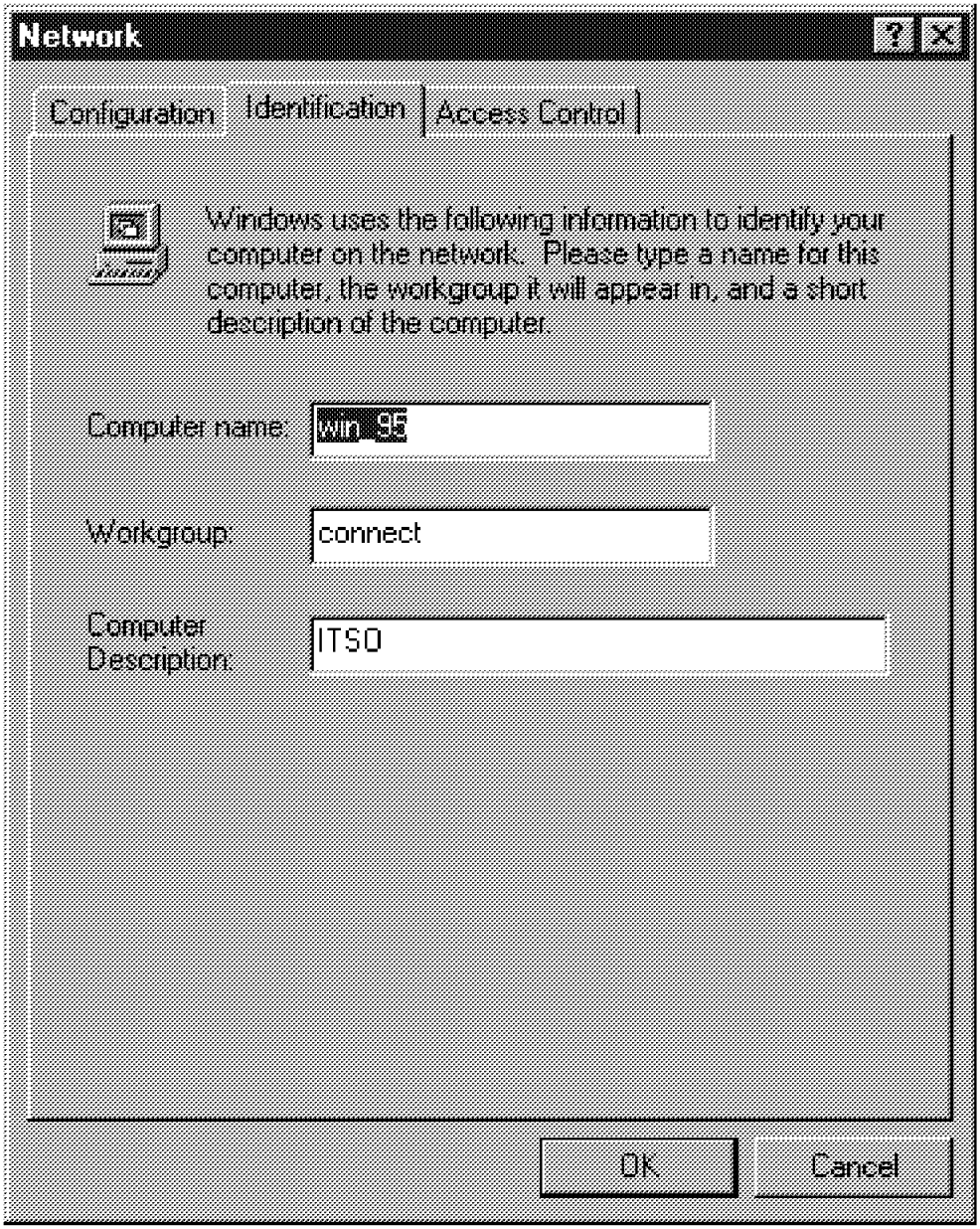

Figure 80. Windows 95 Client Identification

In Figure 80, fill in:

- The name of your computer
- The name of your workgroup
- A description of your client

When these steps are done, select the **OK** button.

If you want to share your disks or printers with other clients, select the File and Print Sharing button and check the options you want to enable.

Lastly, verify that your primary Network logon is set to Client for Microsoft Networks.

Once you are happy with all the settings, click on **OK**, and Windows 95 will install and configure the necessary drivers from your installation media. When prompted to restart your computer, click on the **restart** button. Windows 95 should now restart and come up with a login box for the Microsoft networks. The first time you log on, you will have to use a userid and password that you have on the AIX machine. If it doesn't exist in Windows, it will be created for you. This is only in the situation where the NT domain login is *not* used.

When you have the login box, type in your login name and password, and click on **OK**. Windows should now bring up the desktop.

6.2.6 Windows 95 Environment

Now that you are logged in, you can use the Windows 95 utilities to access resources on the server.

The main utility for Windows 95 networking is the Network Neighborhood program.

Open the **Network Neighborhood** by clicking the icon from the Windows 95 desktop.

From this window, click the **Entire Network** icon.

You should now find your domain as defined on the AIX Connections server and open it by clicking the icon.

The services defined on the server will now show up as servers in the corresponding domain window. To show shared resources on the AIX Connections server, double-click the server (service) you want.

You will now see a screen similar to the one in Figure 81 on page 121.

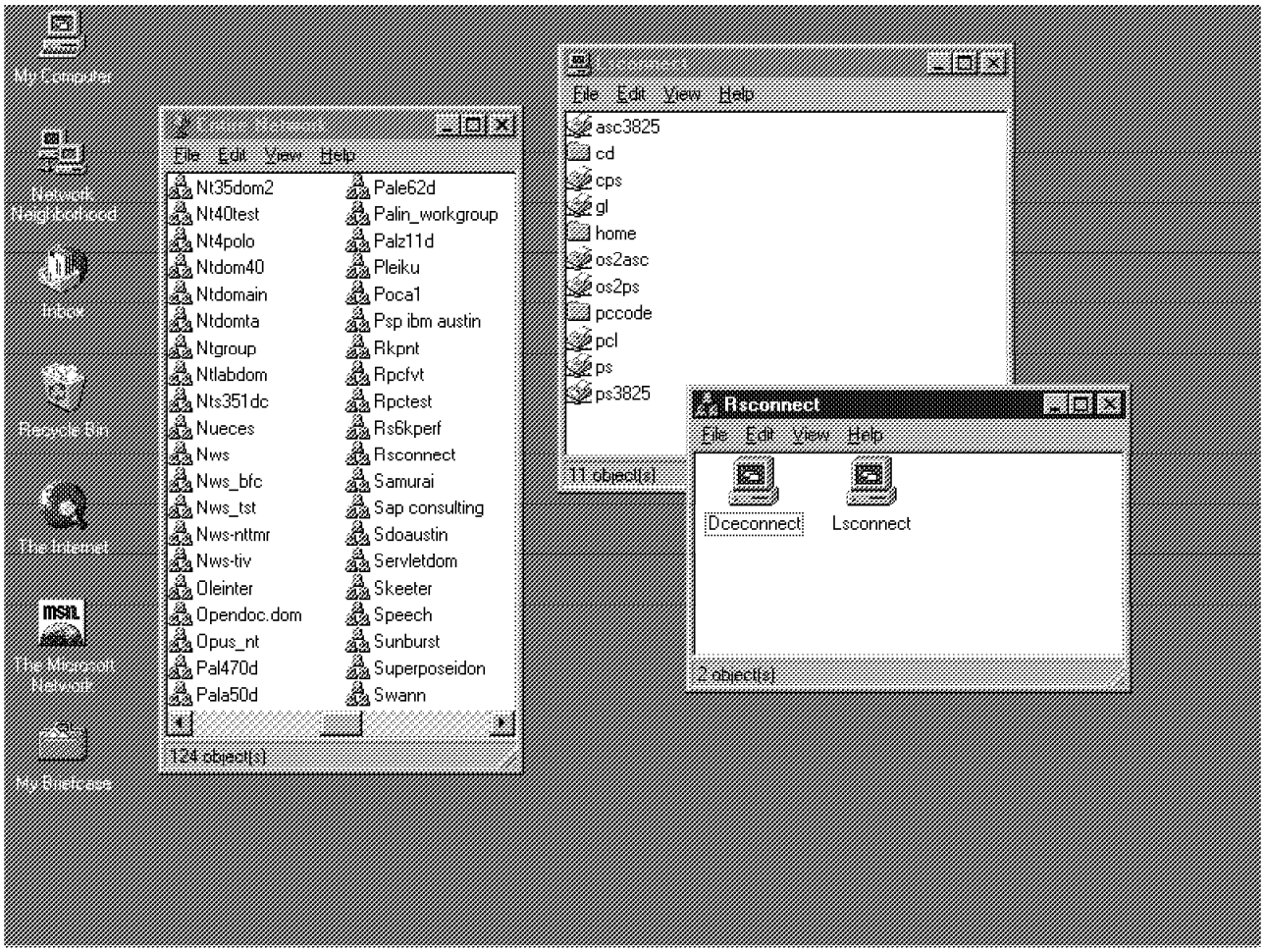

Figure 81. Windows 95 Network Neighborhood

Accessing files and printers from an NB Realm of AIX Connections client is similar to accessing an NW Realm of AIX Connections client, so please refer to Chapter 5, “Using AIX Connections in the NW Realm” on page 37 for information on this topic.

This completes the configuration of a Windows 95 client.

Chapter 7. Using AIX Connections in the AT Realm

In this section, we will look at installing and configuring the AT Realm of AIX Connections and the clients able to connect to it.

We will go through the following steps:

1. The installation of the fileset necessary to set up the AT Realm of AIX Connections.
2. The print service for the AT Realm of AIX Connections and the setup of printers.
3. Configuration of clients.

For complete information on installing any or all AIX Connections components, please see *Up and Running! SC23-1758-02*.

As a new function of Version 4.1.5 of AIX Connections, Macintosh clients running token rings also can connect to AIX Connections servers. Unfortunately, there were no clients with token rings available at the time this was written, so this section only covers Ethernet clients.

7.1 AT Realm of AIX Connections Package Installation

The minimum installation for AT Realm of AIX Connections requires only some of the filesets. The following list shows all the filesets. Those marked with an * are necessary; those marked with an > are recommended.

```
4.1.5.0  connect.Bnd
  @ 4.1.5.0  Connections Bundle

4.1.5.0  connect.client
  @ 4.1.5.0  Connections Client Software

4.2.0.0  connect.info.en_US
> @ 4.2.0.0  Connectivity Server Guides - U.S. English

4.1.5.0  connect.man.en_US
> @ 4.1.5.0  Connections Server and Client Man pages - U.S. English

4.1.5.0  connect.protocols
* @ 4.1.5.0  NW LS MAC and Client Protocols

4.1.4.0  connect.ps.en_US
  @ 4.1.4.0  Connections - LS_Server Documentation - U.S. English
> @ 4.1.4.0  Connections - MAC_Server Documentation - U.S. English
  @ 4.1.4.0  Connections - NW_Server Documentation - U.S. English
  @ 4.1.4.0  Connections Client Documentation - U.S. English
  @ 4.1.5.0  Connections - Up and Running Documentation - U.S. English

4.1.5.0  connect.server
* @ 4.1.5.0  Connections Common Server Files
> @ 4.1.5.0  Connections HTML administration
  @ 4.1.5.0  LS_Server Software
* @ 4.1.5.0  MAC_Server Software
  @ 4.1.5.0  NW_Server Software
```

Figure 82. Installation of the AT Realm of AIX Connections

7.2 Print Service for the AT Realm of AIX Connections

AIX Connections printers are defined on a systemwide basis for the NB Realm of AIX Connections and the NW Realm of AIX Connections. This is not the case for the AT Realm of AIX Connections. The reason for this is that the AT Realm of AIX Connections has a special print service called **ATlwprint**, AppleTalk Laserwriter print.

You will have to set up a service definition in the /usr/tn/services.AT file for each printer you want to use. Figure 83 shows an example of a printer definition.

```
[ service ps:atlw ]
command /usr/tn/AT/ATlwprint -d ps3825 -f /usr/tn/AT/LWFonts
```

Figure 83. AT Realm of AIX Connections Print Service Stanza

This service definition defines the AIX printer ps3825 to be accessible for the AT Realm of AIX Connections clients.

Only Postscript printers can be set up for AT Realm of AIX Connections clients.

To add an AIX printer to be accessed from the AT Realm of AIX Connections, you can use SMIT or the Web tool. In this example, we will use SMIT.

Start SMIT with the fastpath aconn_printer (Figure 84) and select **Configure AT Printer Service**

```
                              AIX Connections Printers

Move cursor to desired item and press Enter.

  Configure AIX Connections Printer
  Configure AT Printer Service
  Enable AIX Connections Printers
  List AIX Connections Printers
  List Enabled AIX Connections Printers

F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 84. Printer Definition in the AT Realm of AIX Connections

You will be prompted to give your service a name. If the name does not exist entering the name will bring you to a screen like Figure 85 on page 126.

Note: If you choose a name that already exists you will be able to modify or delete this service.

In the **AIX Printer Queue**, press **F4** to get a list of printers defined in the /etc/qconfig on the server. Select the one you want to enable, and you′re done.

```
                        Configure AIX Connections Printer

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* AIX Connections Printer                                ps4039:atlw
* Action                                                 create
* AIX Printer Queue
  Spooler Options                                       []
  Spooler (Full Path)                                   []
  Font File                                             [LWFonts]









F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 85. Printer Service Definition in the AT Realm of AIX Connections

7.3 Macintosh Client

In this section, we will look at the configuration of an Apple Macintosh client running AppleTalk. Since AppleTalk is only used by Apple, there is only one client configuration.

If the client is connected to another server using AIX Connections-supported protocols and requesters, AIX Connections will provide file and print services with no additional client software. PC users will also be able to use the same interface used with the existing server. AIX Connections will appear as an additional server, and once selected, the volumes and printers configured will be available. Effectively, in an existing network environment, you do nothing to the clients. AIX Connections can coexist with the existing servers or provide file and print services as a standalone server. This allows AIX Connections to be installed with minimal disruption to the users.

Macintosh clients do not need any requester software to connect to AIX Connections servers. The Chooser (requester) is built into the Mac operating system.

You just need to verify that your client has installed support for your network adapter (Ethertalk or Tokentalk).

This will allow your Macintosh to use the AppleTalk protocol over the Ethernet or token-ring networks.

To enable the AppleTalk protocol on your client's network adapter, open the System/Control Panels/Network folder to verify that you are using the right adapter (Figure 86 on page 127).

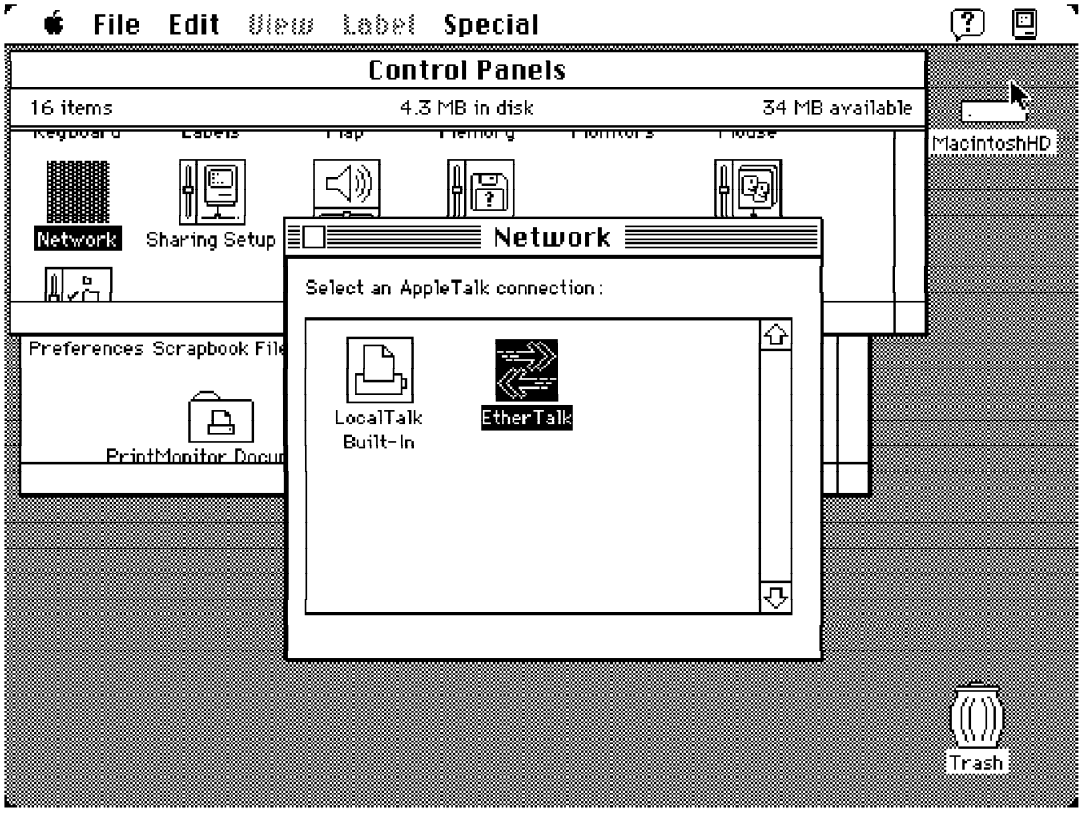

Figure 86. Macintosh Network Setup

Note: In newer versions of the Mac operating system, select the AppleTalk menu from the Apple menu.

To configure AppleTalk, simply double-click on the **EtherTalk** icon in the System/Control Panels/Network window. You will most likely receive a warning message; click on **OK** to clear this message.

Now, start the Chooser application from the Apple menu or from a folder. A window that looks similar to the one in Figure 87 on page 128 will be displayed.

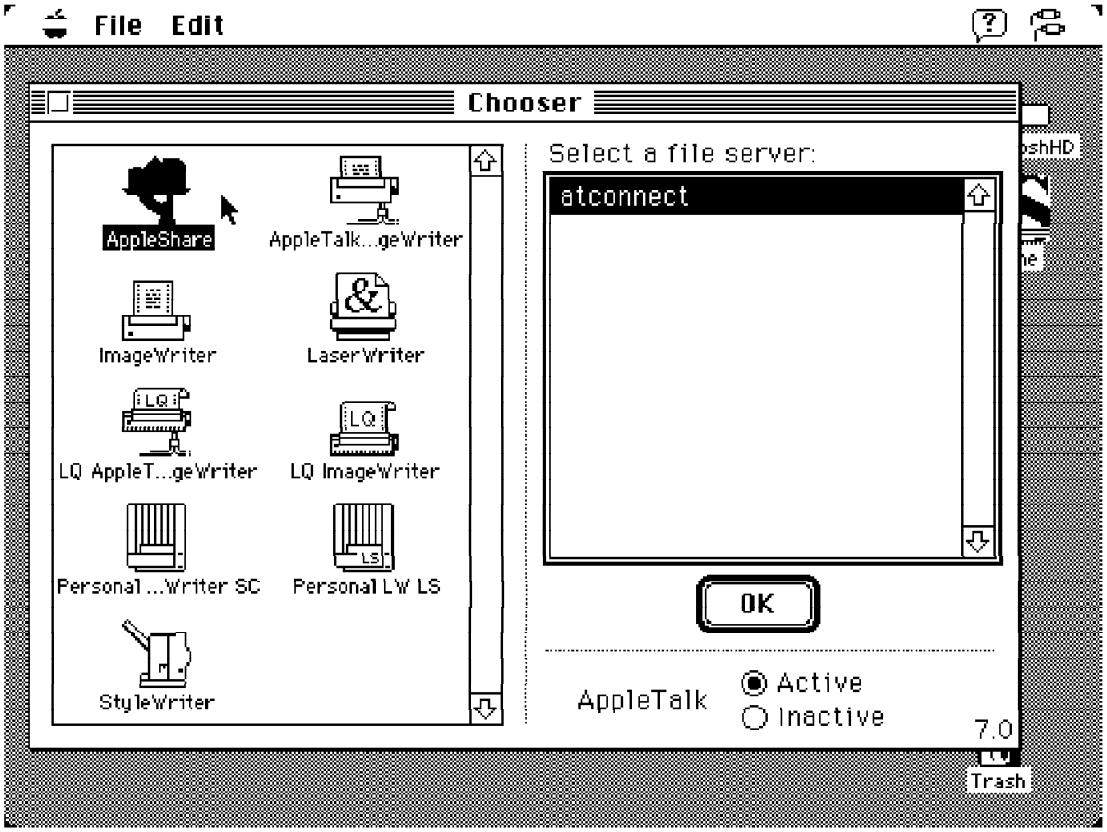

Figure 87. Macintosh Chooser

Single-click on the **AppleShare** icon. You should see the name of the AT Realm of AIX Connections service in the list box on the right, as shown in Figure 87. Click on the server name to highlight it; then click on **OK**. You will now be prompted for a username and password, like in Figure 88 on page 129.

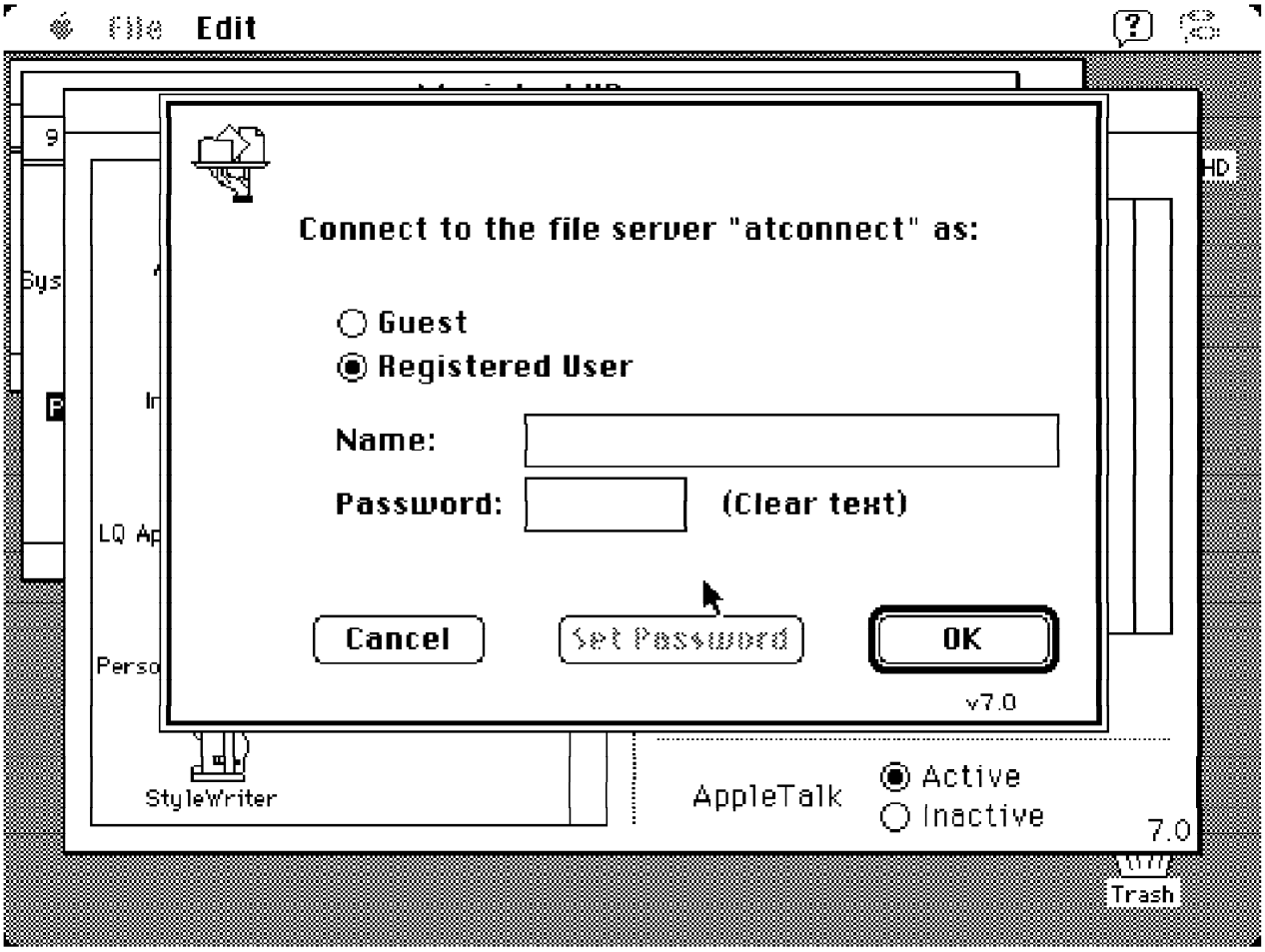

Figure 88. Logging in from a Macintosh Client

Enter your username and password; then click on **OK**, which brings you to Figure 89 on page 130.

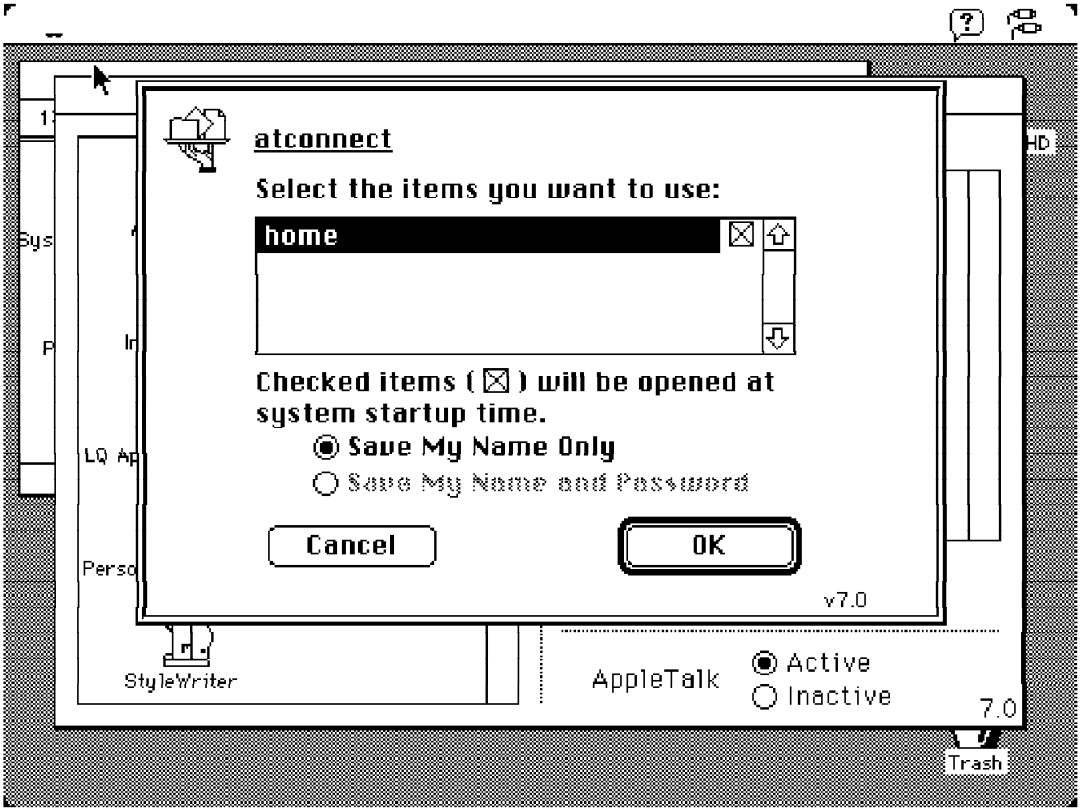

Figure 89. Choosing Your Macintosh Resources

You will be prompted for the items you wish to use. This list of volumes on the AIX Connections server to which you have access will be shown as in Figure 89.

Once you have selected your resources, click on **OK** to return to the Chooser.

The resources you chose will now appear on your desktop. To open the volume, simply click the icon. You will see all files and directories from the server, as shown in Figure 90 on page 131.

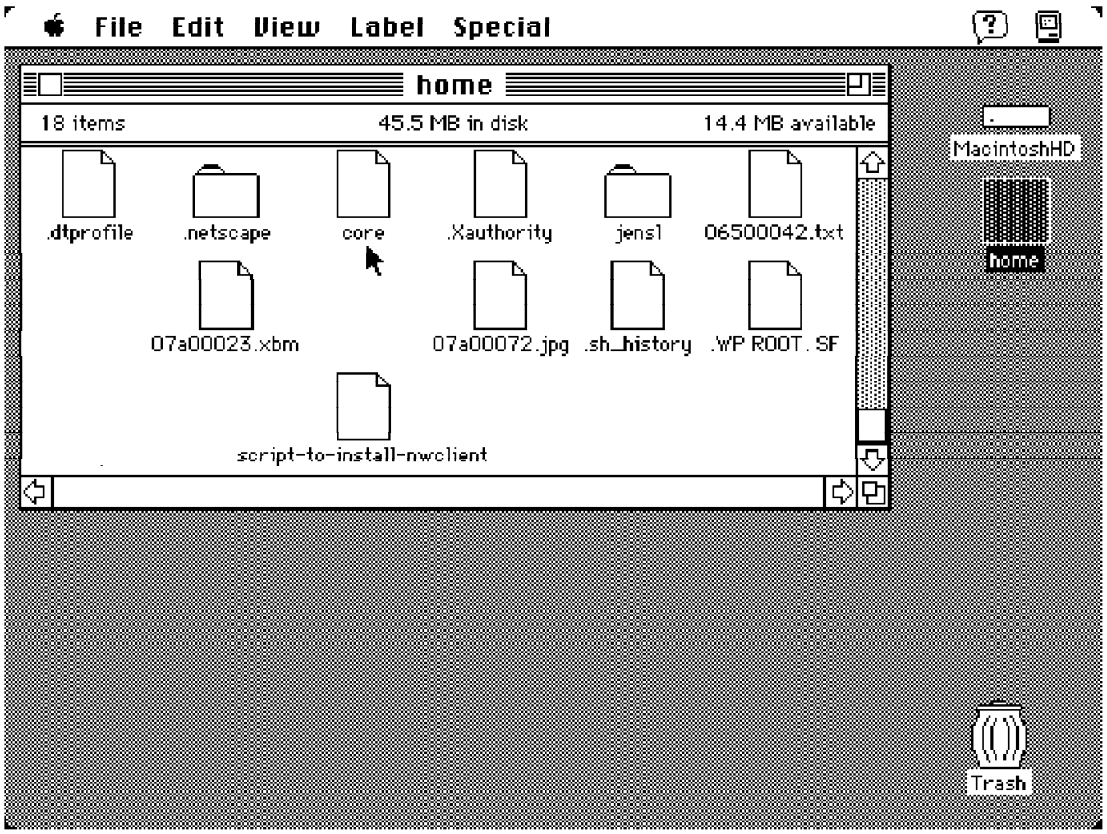

Figure 90. AT Realm of AIX Connections Volume

To disconnect the volume, drag it to the wastebasket.

To use a printer, simply select **Apple Laserwriter** instead of AppleShare in Figure 87 on page 128.

Since the Apple Macintosh is driven completely from a graphical interface, the Mac user is insulated from the file structure.

Mac files are quite different than files stored under the NB Realm of AIX Connections and the NW Realm of AIX Connections. All files have more than one component; so they cannot be manipulated by simply using the AIX `cp` and `rm` commands and so on.

There are several special utilities shipped with Macintosh to help you manipulate Macintosh files under AIX. Please refer to Chapter 12, “Considerations When Using AIX Connections Servers” on page 155 for a discussion of this topic.

Chapter 8. What You Can Do With AIX Connections Client

In this chapter, we will focus on the AIX Connections client.

We will go through the concept, the prerequisites and the use of the AIX Connections client.

For complete information on installing and configuring the AIX Connections client, please see *AIX Connections, Client Guide SC23-1762-01*.

8.1 AIX Connections Client Package Installation

The minimum installation for the AIX Connections client requires only some of the filesets. The following list shows all the filesets. Those marked with an * are necessary; those marked with an > are recommended.

```
 4.1.5.0  connect.Bnd
   @ 4.1.5.0  Connections Bundle

*4.1.5.0  connect.client
   @ 4.1.5.0  Connections Client Software

>4.2.0.0  connect.info.en_US
   @ 4.2.0.0  Connectivity Server Guides - U.S. English

>4.1.5.0  connect.man.en_US
   @ 4.1.5.0  Connections Server and Client Man pages - U.S. English

*4.1.5.0  connect.protocols
   @ 4.1.5.0  NW LS MAC and Client Protocols

 4.1.4.0  connect.ps.en_US
   @ 4.1.4.0  Connections - LS_Server Documentation - U.S. English
   @ 4.1.4.0  Connections - MAC_Server Documentation - U.S. English
   @ 4.1.4.0  Connections - NW_Server Documentation - U.S. English
 > @ 4.1.4.0  Connections Client Documentation - U.S. English
   @ 4.1.5.0  Connections - Up and Running Documentation - U.S. English

 4.1.5.0  connect.server
*  @ 4.1.5.0  Connections Common Server Files
   @ 4.1.5.0  Connections HTML administration
*  @ 4.1.5.0  LS_Server Software
   @ 4.1.5.0  MAC_Server Software
*  @ 4.1.5.0  NW_Server Software
```

8.2 What is the AIX Connections Client?

The AIX Connections client enables an AIX-based server running AIX Connections to act as a client to another AIX Connections server, to a Novell NetWare server or to an SMB server, such as OS/2 LAN Server or Microsoft Windows NT server.

These functions enable the AIX users to access files, printers and applications on remote servers. Using the AIX Connections client, the AIX-based computer can be a part of an existing LAN and can act as a client to other servers.

The AIX Connections client enables the AIX-based server to mount remote volumes on PC-based servers in an NFS-like way.

8.3 Using the AIX Connections Client

The AIX Connections client lets a user log into a server by using the `tnclogin` command.

The user is now able to mount remote volumes from an AIX Connections-, NetWare- or SMB-compatible server by using the `mount` command.

When mounting a NetWare or another NW Realm of AIX Connections, a volume is the same as a NetWare volume. For an NB Realm of AIX Connections, a volume is the server's attach point.

Files accessed on a mounted volume will reflect the permissions of the remote user specified in the `tnclogin` command. This means that the user has to log in before being able to mount the volume.

The AIX Connections client enables the AIX-based server to connect to an Intel-based server and use programs or data from this server.

Two sets of file utilities are shipped with the AIX Connections client: *SMB remote utilities* for the SMB environment and *Novell NetWare remote utilities* for the Novell NetWare environment.

8.4 SMB Remote Utilities

SMB Remote Utilities is a set of programs that can be used from an IBM RISC System/6000 running the NB Realm of AIX Connections to control other SMB servers. The functions available are shown in Table 6.

The functions are DOS-like commands that allow basic file and print access to a remote server.

Special functions are allowed when using the `rush` command (the SMB remote utility shell).

For more detailed information on this topic, please refer to *AIX Connections, Client Guide: SC23-1762-01*.

These utilities are in the */usr/tn/NB/client* directory.

Table 6 (Page 1 of 2). SMB Remote Utilities. This table shows available functions for modifying files and directories and for control of printing and messages on a remote SMB server.

Command	Purpose
ruattr	List or modify DOS attributes of remote files
rucopy	Copy files to or from a remote server
rudel	Delete files on a remote server
rudir	List directory on a remote server
rumd	Create directory on a remote server

Table 6 (Page 2 of 2). SMB Remote Utilities. This table shows available functions for modifying files and directories and for control of printing and messages on a remote SMB server.

Command	Purpose
rumessage	Send a message to a remote server
ruprint	Print files on a remote server
rurd	Remove a directory on a remote server
ruren	Rename files on a remote server
rush	Start remote utilities shell to enter multiple commands
rutime	Synchronize with or display remote system time

8.5 Novell NetWare Remote Utilities

NetWare Remote Utilities is a set of programs that can be used from an IBM RISC System/6000 running the NW Realm of AIX Connections to access Novell NetWare compatible servers.

These utilities are in the */usr/tn/NW/client* directory.

Table 7. Remote Utilities - NW Realm of AIX Connections. This table shows available functions for access from an AIX-based computer to an NW Realm of AIX Connections or to a Novell NetWare server.

Command	Purpose
ncget	Copy files from a remote server
ncprint	Print to a remote printer
ncput	Copy files to a remote server
nctime	Get the system time at a remote server

The functions allow a server to work with files and print files on the remote server. For more detailed information on the use of these commands, please refer to *.AIX Connections, Client Guide: SC23-1762-01*.

8.6 Starting the AIX Connections Client Server

Before attempting to use AIX Connections Client, you need to load the necessary drivers. To do this:

- Log in as the AIX Connections administrator or root.
- Start the streams driver: `strload -f /usr/tn/client/tncdv.conf`.
- Load the filesystem: `/usr/tn/client/tncfs_conf -c`.
- Start the NW Realm of AIX Connections or NB Realm of AIX Connections.

This completes the necessary configuration.

It is recommended that you use SMIT or that the `strload -f /usr/tn/client/tncdv.conf` and `/usr/tn/client/tncfs_conf -c` commands be put in a shell script and started from a command line.

8.7 Connecting to Other Servers

Before connecting to another server and mounting a volume, you must know the following:

- The user name and password to use on the remote server
- The name of the volume(s) you want to mount.

The access rights you will inherit for the mounted filesystem will be those of the user you connect as. There are two methods of accessing drives. In one case, you can have the root user set up a default user that will be used for whomever changes into that filesystem. For example, if the root user sets up the default user as fred for a server called cookie, anyone who logs into the AIX system will be able to change into the filesystem and have the access rights of fred.

The second way is to require all users to first log into the remote server before they can access the filesystem. If they do not log in, they will get a message denying access.

Since the volumes are mounted to directories in the AIX filesystem, AIX controls the user access rights to those directories.

Below are methods and examples of setting up both environments.

8.7.1 AIX Connections Client with a Default User

- Log into the RS/6000 as root.
- Execute the following command that resides in /usr/tn/client:

  `tnclogin -d -s <server> -r <realm> -u <user> -p <password>`

  Where:

  – <server> is the remote server you wish to access.

  – <realm> is either nw for NetWare or nb for SMB-compatible servers.

  – <user> is the remote user name you wish to use. (This will be prompted for if you do not place it on the command line.)

  – <password> is the password of the user. (This will be prompted for if you do not place it on the command line.)

  – The -d specifies this as a default user.
- Enter the remote user's name and password, if prompted.
- Before 30 seconds elapses, you must mount the directory! To achieve this, type:

  `mount -V tncfs -o <realm> <server>:<vol>`
  `<mountpoint>`

  where realm and server are as above and vol is the remote volume you wish to mount.

  Example

  ```
  mount -V tncfs -o nb win_nt:C$ /mnt
  ```

  This command will mount the C drive (shared as C$) on the SMB (NetBIOS) server win_nt on the the /mnt AIX directory.

You should now be able to change into the mounted directory and see the files on the remote server. If you wish, you could place the above in a script to automatically mount the directory.

In this configuration, any AIX user who now logs into the RS/6000 will be able to see these files and have the same access rights. This option must be used with caution, as it would compromise the security of the remote system. For this reason, the superuser login with the -d option is not treated as an active connection if there are no active mounts.

8.7.2 AIX Connections Client with No Default User

Each AIX user must manually log into the remote server to use the remote filesystem. To set up this configuration, follow the steps below:

- Log into the RS/6000 as root.
- Execute the following command that resides in /usr/tn/client:

  ```
  tnclogin -s <server> -r <realm> -u <user>
  ```

  Where:

  - <server> is the remote server you wish to access.
  - <realm> is either nw for NetWare or nb for SMB-compatible servers.
  - <user> is the remote user name you wish to use. (This will be prompted for if you do not place it on the command line.)
  - <password> is the password of the user. (This will be prompted for if you do not place it on the command line.)
- Enter the remote user's name and password, if prompted.
- Now mount the directory:

  ```
  mount -V tncfs -o <realm> <server>&colon<vol>
  <mountpoint>
  ```

  where realm and server are as above, and vol is the remote volume you wish to mount.

As the root user, you will now be able to access this filesystem. If you now log in as another user, you will have no access to the filesystem unless you run the tnclogin command and log in with a username and password valid on the remote server. With this configuration, different users can have different access rights to the directory.

8.7.3 Logging Out

To log out of a server, you need to use the tnclogout command, located in the /usr/tn/client directory:

```
tnclogout [-d] -s <servername> -r <realm>
```

Where servername and realm are the servername and realm of the server you wish to disconnect from. The -d option is used by the root user to remove the default user.

A server for the AIX Connections client can be a client using any kind of share or workgroup. As an example, Windows for Workgroups, Windows 95 and OS/2 Peer clients can act as servers for an AIX Connections client.

A drive mounted using an AIX Connections client can be shared with other clients as a normal volume, but be aware of permissions.

To access and use printers on these types of servers and real servers, please refer to Chapter 10, “Special Setups” on page 149.

8.7.4 AIX Connections Client and SMIT

As a new function in Version 4.1.5 of AIX Connections, the login of the remote server and the mounting of the drive can be done by using SMIT. For detailed information on the syntax, please refer to *AIX Connections, Client Guide SC23-1762-01*.

The following figures show examples of accessing an NetWare compatible server via SMIT.

```
                          AIX Connections Login / Logout

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
  Login or Logout                                        Login
* Server Name                                           []
* User name                                             [root]
  AIX Connections Server Realm                           NW

F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 91. AIX Connections Login SMIT Panel

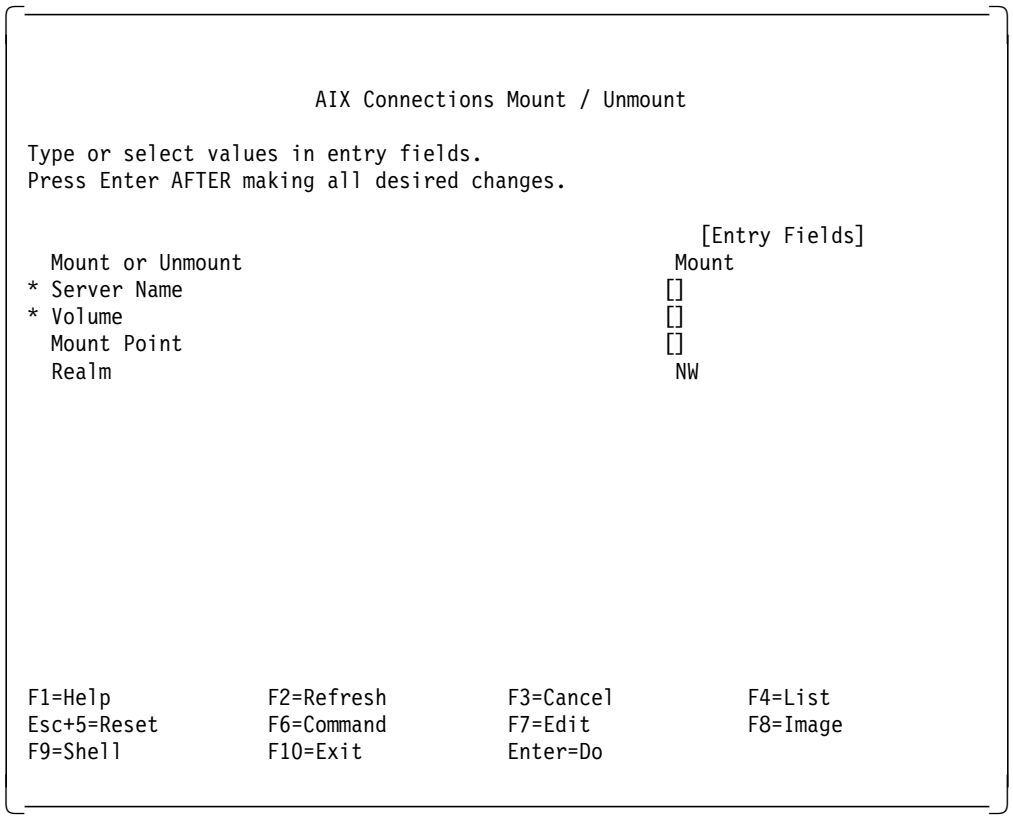

Figure 92. AIX Connections Mount SMIT Panel

Chapter 9. AIX Connections DCE Integration

In this chapter, we will describe AIX Connections integration to DCE (Distributed Computing Environments). To understand why this makes AIX Connections an outstanding PC connectivity solution, we will start this chapter with a short introduction to the DCE concept.

In this chapter, we will look at how to set up your AIX Connections server as a client in the DCE environment.

Lastly, we will go through the configuration of the AIX Connections server to enable its integration into DCE. This integration is based on standard AIX Connections functions like establishing services and volumes. In this version of AIX Connections, only the NB Realm of AIX Connections is able to integrate with DCE.

Your client will be able to access DCE files without any changes or additional software.

9.1 The DCE Concept

DCE is an integrated set of distributed computing technologies provided by Open Software Foundation (OSF). The components of DCE form a layer that is between the distributed application and the operating system and network.

The components of DCE are:

- Remote Procedure Call

  DCE RPC extends the typical procedure call model by supporting direct calls to procedures on remote systems.

- Directory Service

  The DCE Directory Service provides a naming model throughout the distributed environment. This model allows users to identify by name such resources as servers, files, disks or print queues, and to gain access to them without needing to know their locations on a network.

- Time Service

  The DCE Time Service provides precise, fault-tolerant clock synchronization for systems in local- and wide-area networks.

- Security Service

  The DCE Security Service provides secure communications and controlled access to resources in a distributed system. There are three areas of DCE security: authentication, secure communication, and authorization. These are implemented by several services and facilities that together comprise the DCE Security Service: the Registry Service, the Authentication Service, the Privilege Service, the Access Control List (ACL) Facility, and the Login Facility.

- Threads Service

  The OSF Threads Service provides portable facilities that support concurrent programming, allowing an application to perform many actions

simultaneously. While one thread executes a remote procedure call, another thread can process user input.

- Distributed File System (DFS)

  The DCE Distributed File Service (DFS) allows users to access and share files stored on a file server anywhere on the network, without having to know their physical location. Files are part of a single namespace, so no matter where the user is within the network, the file can be found using the same name.

- Diskless Support

  The OSF Distributed File System accommodates diskless workstations and provides well-defined, general-purpose protocols for diskless support.

These service may be set up on one or more servers. These servers and the clients accessing them are called a cell.

A cell is an independently administered set of clients and servers managed as a group.

9.2 Configuring the AIX Connections Server as a DCE Client

To set up your AIX Connections server as a DCE Client, you need to install the DCE client software on your server. The software needed is a part of the AIX operating system and is shipped with every AIX CD client to high-end server.

To install the DCE client, you can use SMIT or your preferred tool.

You need to install the following parts to be able to use the description in this chapter:

- dce.client.core.rte (DCE Client Services)

  If you want to configure your AIX Connections server into the DCE cell from your own workstation, you will also need to install:

- dce.compat (DCE SMIT interface)

Selecting both dce.client.core.rte and dce.compat will install the following filesets on your server:

```
dce.client.core.rte.admin ( DCE Client Administrative )
dce.client.core.rte.cds ( DCE Client CDS Tools )
dce.client.core.rte.config ( DCE Client Configuration )
dce.client.core.rte.rpc ( DCE Client RPC Tools )
dce.client.core.rte.security ( DCE Client Security Tools )
dce.client.core.rte.time ( DCE Client Time Tools )
dce.client.core.rte.zones ( DCE Client Time Zones )
dce.client.dfs.rte ( DCE DFS Client Services )

dce.msg.en_US.client.core.rte ( DCE Base Client Messages )
dce.msg.en_US.client.dfs.rte ( DCE DFS Client Messages
dce.msg.en_US.pthreads.rte ( DCE Threads Compatability Messages )

dce.pthreads.rte ( DCE Threads Compatability )

dce.compat.client.core.smit (DCE SMIT Client Tools)
dce.compat.client.dfs.smit (DCE SMIT DFS Clients Service)
dce.compat.dfs_server.smit (DCE SMIT DFS Base Server)
dce.msg.en_US.compat.client.core.smit (DCE SMIT base Messages)
```

Figure 93. AIX Filesets Installed for AIX Connections DCE Clients

After having installed the filesets, you are now ready to make your AIX Connections server a part of your DCE cell using SMIT.

Before doing this, you need to have the following information available:

- Cell name
- Security server's hostname
- Cell directory server's hostname
- Cell administrator's userid and password

When you have this information available, be sure that your AIX Connections server and the security server's time are synchronized. If the time difference between the two servers is too great, you might not be able to add your server to the cell.

To do this, enter the command `setclock hostname`, where `hostname` is the hostname of your security server.

Start up SMIT with the fastpath `DCE`. This will bring you to a screen like Figure 94 on page 144.

```
                    DCE (Distributed Computing Environment)

Move cursor to desired item and press Enter.

  Configure TCP/IP (If Not Already Configured)
  Configure DCE/DFS
  DCE Security & Users Administration
  CDS (Cell Directory Service) Administration
  DTS (Distributed Time Service) Administration
  RPC (Remote Procedure Call) Administration
  DFS (Distributed File Service) Administration
  Stop DCE/DFS Daemons
  Restart DCE/DFS Daemons
  Register Cell Globally
  Unregister Cell Globally
  Unconfigure DCE/DFS









F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 94. SMIT DCE Main Panel

From this SMIT panel, select **Configure DCE/DFS**; this will bring you to a screen like Figure 95.

```
                                Configure DCE/DFS

Move cursor to desired item and press Enter.

  List All Configured DCE/DFS Components
  Configure DCE/DFS Servers
  Configure DCE/DFS Clients
  DCE/DFS Start options
  Register Cell Globally



                            Type of Configuration

   Move cursor to desired item and press Enter.

     1 full configuration for this machine
     2 local only configuration for this machine
     3 admin only configuration for another machine

   F1=Help                 F2=Refresh              F3=Cancel
   F8=Image                F10=Exit                Enter=Do
   /=Find                  n=Find Next
```

Figure 95. SMIT Configuration of DCE

Select **Configure DCE/DFS Clients,** followed by **full configuration for this machine**; this will bring you to a screen like Figure 96 on page 145.

```
                        Full DCE/DFS Client Configuration

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* CELL name                                           [/.../itso.austin.ib
* CLIENTS to configure                                []
* SECURITY Server                                     [ev7]
  CDS Server (If in a separate network)               []
* Cell ADMINISTRATOR's account                        [cell_admin]
* LAN PROFILE                                         [/.../itso.austin.ib
  Client Machine DCE HOSTNAME                         [connect]
     The following fields are used
     ONLY if a DFS client is configured
* DFS CACHE on disk or memory?                        [disk]
* DFS cache SIZE (in kilobytes)                       [10000]
* DFS cache DIRECTORY (if on disk)                    [/var/dce/adm/dfs/ca




F1=Help            F2=Refresh          F3=Cancel          F4=List
Esc+5=Reset       F6=Command        F7=Edit            F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 96. Full DCE/DFS Client Configuration

Now fill in

- The cell name

  The DCE cell name always starts with /.../ followed by the name.

- What DCE clients to configure. Select **F4** for a list, from which you probably will select all the clients listed below:
  - rpc RPC Endpoint Mapper
  - sec_cl Security Client
  - cds_cl CDS Client
  - dts_cl DTS Client
  - dfs_cl DFS Client
- Hostname of the security server in the cell
- Hostname of the cell directory server
- The cell administrator's account (userid)
- The LAN profile, normally the same as the cell name
- The DCE hostname of your client

Press **Enter**, and you will now be prompted for the cell administrator's password.

Your AIX Connections server is now being defined as an:

RPC client	A remote procedure call client
Security client	A security client
CDS client	A cell directory service client

DTS client	A DCE time service client
DFS client	A Distributed File System client

When this process has finished, you need to exit SMIT and log in as the cell administrator. To do this, enter `dce_login <cell administarors accont>` on the AIX command line.

When prompted for the password of the cell administrator, enter it and start SMIT with the fastpath `DCE`.

Even though you are running SMIT on your local machine, the DCE configuration will now be sent to the suitable DCE server because your AIX Connections server now is part of the DCE cell. The information is sent to the DCE server based on RPC calls.

We now need to create a principal and an account for users who need to access the DCE cell through AIX Connections.

The principal can be anything from a user to a server in a DCE cell. Every principal must have a name and a password to access the DCE cell. During configuration of the AIX Connections server, a password file is created for the server, and during boot, the server is logged into DCE based on this password. The password file is encrypted and stored in /krb5/v5srvtab. If this password file is not present or correct, the server will not be able to log into the DCE cell.

To create a principal, select **DCE Security & Users Administraton** from the SMIT DCE panel.

Select **Principals and Aliases** to create your new principal.

Sample scripts *acsetup.dcecp* and *acunsetup.dcecp* in directory */usr/tn* are included with the product.

You will be prompted to assign a password to your principal. To access DFS file system in an easy way from AIX Connections, this password must match your AIX Connections password. We will discuss this more later.

Now, we need to create an account for our new principal.

Select **Accounts** from the DCE Security & Users Administration panel, and then select **Add an Account**.

Exit SMIT and type `dce_login` on the AIX command line. When prompted, enter your **principal name** and **password**.

You should now be able to access the DFS file tree by typing `cd /:` at the command prompt.

To exit the DCE cell, simply type `exit` on the command line.

9.3 Configuration of AIX Connections Services

We now need to configure our NB Realm of AIX Connections to access the DFS file tree. This is done by setting up a service of the type :file. This can be done using SMIT or the Web tool, or by simply adding the stanza in Figure 97 to the /usr/tn/services.NB file.

```
[ service dceconnect:file ]
description DCE connect
command /usr/tn/NB/DCE_LMfile
transport altnb
plex unique
client-encrytion=on
```

Figure 97. DCE File Service

The command must be /usr/tn/NB/DCE_LMfile, and the client-encryption must be set to on.

The next step is to create and assign volumes in the DFS file tree. Again, this can be done by using SMIT or the Web tool, or simply by adding the stanza in Figure 98 to the AIX Connections profile.file.

```
[ volume dce ]
path /:/directory name
```

Figure 98. Volume Defintion for DCE Integration

The colon(:) in the volumes definitions assigns you to the DFS file system.

To assign the volume defined above to our DCE-enabled service, use SMIT or just add the stanza from Figure 99 to the AIX Connections profile.file.

```
[ service NB dceconnect:file ]
volume dce
client-encrytion=on
```

Figure 99. DCE Service Definition

The last thing is to enable the AIX Connections user to log into the DCE cell. This can be done by the user or the administrator by executing the tndcepasswd command, as shown in Figure 100.

```
[root@connect]/usr/tn > dce_login
Enter Principal Name: ausres4
Enter Password:
[root@connect]/usr/tn > /usr/tn/tndcepasswd -u ausres4 -X DCE
Enter Your own password:
New password:
Re-enter new password:
```

Figure 100. DCE Password Configuration

Now, the user can log in to a domain or use local logon and access files in the DFS file system simply by using a GUI or net use commands.

DCE-enabled services *cannot* use proxy servers.

Chapter 10. Special Setups

In this section, we will focus on some special setups and uses of AIX Connections.

The topics covered in the section are:

- Printing to an SMB-based Server
- Printing to Novell NetWare Server
- Sharing CD-ROMs
- Single servers in the NB Realm of AIX Connections

10.1 Printing to an SMB-Based Server

Printing from any client able to connect to an AIX Connections server can be set up using the remote utilities from the AIX Connections client.

Create a print queue to the AIX spool system and use the `remote print` command as a backend.

To set up a queue that will send print jobs to an OS/2 LAN server or Microsoft Windows NT server, you need to add the stanza in Figure 101 to your `/etc/qconfig` file.

```
smbq:
 device = smbqdev
 up = TRUE

smbqdev:
        file = FALSE
        access = write
        backend = /usr/bin/smbq.ksh
```

Figure 101. Setup of Print Queue to SMB Server

You will need to create a small script – in our example called `/usr/bin/smbq.ksh` – to route your print job to the SMB server. The script could look like the one shown in Figure 102.

```
#!/bin/sh
#
PATH=$PATH:/usr/tn/NB/client
export PATH
ruprint -u USER -p PASSWORD -c  $1 //SERVER/PRINTER  2>&1
```

Figure 102. Ruprint Shell Script

In Figure 102, USER and PASSWORD refers to the userid and password on the server that owns the printer; SERVER is the name of the server; and PRINTER is the resource on the server.

An SMB server can also be a Windows 95 client or an OS/2 Peer where sharing is enabled and a local printer is shared.

10.2 Printing to Novell NetWare Server

As for the SMB environment, the Novell NetWare Remote Utilities can help us print from any AIX Connections client to a Novell NetWare server.

To do this, add the stanza in Figure 103 to your /etc/qconfig file.

```
nwq:
 device = nwqdev
 up = TRUE

nwqdev:
  file = FALSE
  access = write
  backend = /usr/bin/nwq.ksh
```

Figure 103. Setup of Print Queue to Novell NetWare Server

Again, you need to create a small script in which you use the ncprint command as a backend for the print queue. The script shown in Figure 104 can be used.

```
#!/bin/sh
#
PATH=$PATH:/usr/tn/NW/client
export PATH

ncprint -s SERVER -q QUEUE -u USER -p PASSWORD $1
```

Figure 104. Ncprint Shell Script

Here again, the USER and PASSWORD are the userid and password on the Novell NetWare server, and SERVER is the name of the Novell NetWare server with the printer or queue definition QUEUE. Before using this script, be sure the Novell NetWare server will allow unencrypted passwords.

10.3 Sharing CD-ROMs

A CD-ROM drive on the AIX Connections server can be accessed and used to install software on the AIX Connections clients. The way to do this is to create a CD-ROM filesystem using SMIT, define a volume referencing this filesystem and then make a reference to the volume from a suitable file service definition.

There are some things that you might need to know before doing this.

When a client accesses the CD-ROM, it will look like any other shared volume. AIX Connections uses the name of the service as a label on the drive. In our example, the label of the volume referenced in the CD-ROM file system will be LSCONNECT.

Some CD-ROMs and installation programs on CD-ROMs check the labels on the CDs.

In these situations, you will need to create a file service with a name equal to the label of the CD in the drive of the AIX Connections server.

Once the CD-ROM is mounted with a CD, you will not be able to unmount the CD-ROM filesystem as long as services that use the volume reflecting the CD-ROM are running.

If you want to change the CD in the drive, you need to unmount the CD-ROM filesystem.

10.4 Single Server in the NB Realm of AIX Connections

Version 4.1.5 of AIX Connections is able to participate in a domain and a Novell NetWare NetWare Directory Services tree, but the AIX Connections server cannot act as a domain controller or NDS server.

The NW Realm of AIX Connections is able to be used as login server. In this case the validation of the user and password is done by the AIX Connections server.

As described in Chapter 5, “Using AIX Connections in the NW Realm” on page 37, you also have the opportunity to create and use login scripts.

If you are in the NetBIOS environment, you might need to use local authorization to access the AIX Connections server. This might not be the perfect solution for you, but there are alternatives.

One might be able to use the NW Realm of AIX Connections to log you into the network and to then use NetBIOS to access your files and printers. This would mean that you first would have to use both protocols IPX and NetBIOS on the client side. If your client is a Windows 95 client, both protocols are included. On the server side, of course, you need to have both the NB Realm of AIX Connections and the NW Realm of AIX Connections active.

Chapter 11. Migration from AIX Connections 4.1.4

In this chapter, we will focus on the migration of AIX Connections 4.1.4 to 4.1.5.

As mentioned earlier, the structure of AIX Connections has changed a lot from Version 4.1.4 to the current version.

This fact has some impact when we want to migrate to Version 4.1.5.

First of all, most of the old, well-known configuration files are gone.

Migration of these files is done automatically, but you might find it nice to know where your earlier configuration ends up.

The 4.1.4 configuration files that no longer exist are:

For the NB Realm of AIX Connections:

/usr/tn/smb/services.nb
/usr/tn/smb/services/*
/usr/tn/smb/profile.smb

For the NW Realm of AIX Connections:

/usr/tn/nw/profile.tni
/usr/tn/nw/profile.nw

For the AT Realm of AIX Connections:

/usr/tn/at/profile.tmac
/usr/tn/at/mapfile
/usr/tn/at/services.tmac
/usr/tn/at/table_file

A migration install does not create any of the services or resources created on a first-time install. It only converts the existing release 1 configuration to the equivalent release 2 configuration.

In general, realm-specific files related to the network protocol are converted into the /usr/tn/config.tn file, and all services information is converted into /usr/tn/services.realm file. Information about volumes and printers (profile.smb, etc.) is converted to /usr/tn/profile.file, as shown in Table 8.

Table 8 (Page 1 of 2). AIX Connections Migration of Configuration Files

4.1.4	4.1.5
/usr/tn/smb/services.nb	/usr/tn/profile.file
/usr/tn/smb/services/*	/usr/tn/services.NB
/usr/tn/smb/profile.smb	/usr/tn/profile.file
/usr/tn/nw/profile.tni	/usr/tn/config.tn
/usr/tn/nw/profile.nw	/usr/tn/profile.file /usr/tn/services.NW
/usr/tn/at/profile.tmac	/usr/tn/profile.file
/usr/tn/at/mapfile	/usr/tn/profile.file

Table 8 (Page 2 of 2). AIX Connections Migration of Configuration Files	
4.1.4	**4.1.5**
/usr/tn/at/services.tmac	/usr/tn/services.AT
/usr/tn/at/table_file	/usr/tn/config.tn

User-specific files from Version 4.1.4, like $HOME/.profile.smb and $HOME/.profile.tmac, are replaced by the file $HOME/.profile.file.

Among other changes, we also might mention the following topics:

- Streams driver loading is automatic in AIX Connections 4.1.5.
- All realms start automatically from the /etc/inittab.
- Volumes are defined on a system basis for all three realms.
- Printers are defined on a system basis for NB Realm of AIX Connections and NW Realm of AIX Connections.

Important

Do not use the Quick Start configuration tool after a migration install.

Chapter 12. Considerations When Using AIX Connections Servers

In this chapter, we will focus on the use of AIX Connections servers compared to the traditional server environments for NB Realm of AIX Connections, NW Realm of AIX Connections and AT Realm of AIX Connections clients.

To understand the difference, it is very important to point out that an AIX Connections server is not an NT server, an AppleTalk server or an OS/2 LAN server.

AIX Connections is basically implementation of file and print services to all clients based on AIX and IBM RISC System/6000.

The disadvantage of this in an environment with real servers might be that the management of an AIX Connections server is done from the AIX side using SMIT or the Web tool and not using the GUI of an OS/2 LAN server, a Novell NetWare server or a NT server.

The commands to control the servers might be different from what the administrator is used to, but AIX Connections offers numerous advantages:

- AIX Connections is able to scale from a notebook to an SP/2 running the same solution.
- The commands to control all three servers are the same. So if you know how to manage the NB Realm of AIX Connections, you can easily manage the NW Realm of AIX Connections and AT Realm of AIX Connections as well.
- The interface or GUI of each server is the same (SMIT or Web tool). So if you know how to set up the NetBIOS, you will find it easy to set up the NW Realm of AIX Connections and the AT Realm of AIX Connections as well.
- For clients in the NB Realm of AIX Connections, AIX Connections gives you access to DCE without any changes on the client side.
- Last, but not least, by using AIX Connections, you base your PC server on a mature operating system – AIX, an operating system trusted by major banks to handle their daily transactions. You can take advantage of the capabilities of AIX such as HACMP. For more details on this topic, please refer to Chapter 13, “Why Use an AIX-Based Server?” on page 161.

  When using an AIX Connections-based server, you need to be able to handle the differences in the operating system of the client and the server. The differences can include file-naming conventions, file rights and special functions such as Novell NetWare VLMS, which may be built into the corresponding PC server software. On the AIX side, we need to pay attention to things like NIS domains, users and groups and system management procedures such as backup routines.

  These differences can be quite simple but also very complex. In the following pages, we will discuss some of these in detail for each realm.

Domains: If you have several AIX servers, you will probably use NIS (Network Information Service) to administer your users and passwords.

If the IBM RISC System/6000 server is running (NIS), the domain name used by AIX Connections NB Realm of AIX Connections must be the same as the NIS domain name.

The AIX Connections Domain is defined in the config.tn file in the AIX Connections home directory.

It might be a good idea to use the NIS server as a proxy server if you have more AIX Connections servers. By default, the AIX Connections password file is not distributed by NIS, but you can modify this routine or set up your security so that you always have valid information about AIX Connections users and passwords on your servers.

In a PC server, one server is a domain controller. The server keeps track of all users and passwords, and resources in the network. In this version of AIX Connections, the NB Realm of AIX Connections server cannot act as a domain controller.

Users: For a client to get access to the filesystem of the IBM RISC System/6000 by using a `net use` or a `map` command, he needs to be validated with a userid and password. AT Realm of AIX Connections and NW Realm of AIX Connections are able do this validation, but due to the fact that NB Realm of AIX Connections cannot act as a domain controller, you are not able to use NB Realm of AIX Connections as a login server. For clients like OS/2, OS/2 Warp DOS, Windows 3.1, Windows for Workgroups and Windows 95 to access the server, users need to log on locally. In the Windows environment, this is often referred to as a Windows logon. In the OS/2 environment, you may execute `logon /v`.

In all situations, the userid used to log on locally must exist as an AIX userid, and the password must match the AIX Connections password on the server to get access to the resources.

If you have a non-AIX Connections server as your domain controller, you can use this server to validate your userid and password in the NB Realm of AIX Connections and NW Realm of AIX Connections. Keep in mind that the only thing that happens in this situation is validation. The userid must still exist as an AIX user, and all rights to directories and files are controlled by the UID and GID of the AIX user.

Logon scripts set up on the non-AIX Connections proxy server will still be executed during logon.

Files - names and rights: AIX files and directories are controlled by three factors:

- The ownership of the file/directory
- The group membership of the user
- The access permission of the file/directory

DOS files do not have these characteristics. Access to DOS files is controlled by file attributes, such as Read-Only, System, Archive, or Hidden.

The differences in the way these access rights work means that the AIX file ownership permission is lost when a file is copied from a virtual drive to the client's local computer.

An AIX file to which the user does not have write permission will appear as a read-only DOS file.

The `archive` attribute normally shows that the files have been modified. This attribute is normally used by PC backup tools. The `archive` attribute is supported when running AIX Connections servers.

An AIX file for which the user does not have read permission will appear as a system file under DOS.

A hidden AIX file (such as .netrc) will appear as a hidden file under DOS with the name ″netrc″.

The AIX file naming convention and DOS file names are different, and a valid AIX file name is not necessarily a valid DOS or OS/2 file name. The NB Realm of AIX Connections applies a set of algorithms to any AIX file that is to be presented to a client.

This version of AIX Connections does support the use of OS/2 extended attributes in the NB Realm of AIX Connections.

OS/2 long filenames are supported in the NB Realm of AIX Connections and Windows 95 and Windows NT long filenames are supported in the NB Realm of AIX Connections as well as the NW Realm of AIX Connections.

NW Realm of AIX Connections File Attributes: NetWare adds a set of eight trustee rights to the normal DOS attributes. The trustee rights are shown in Table 9.

Table 9. NetWare File Attributes.

Flag	Trustee Rights
S	Supervisory
R	Read from file
W	Write to file
C	Create file/directory
E	Erase file/directory
M	Modify file/directory
F	File Scan
A	Access Control

These extended attributes are not supported directly under the NW Realm of AIX Connections.

Trustee rights are often used by network applications in the Novell NetWare environment. As an example, Microsoft Mail uses trustee rights on the in- and out-baskets for each user in the Mail Office.

The Macintosh environment: The Macintosh environment is very different from that of the other clients and from the AIX environment.

These differences, among others, deal with how the files and directories are stored on the IBM RISC System/6000 running the AT Realm of AIX Connections.

Macintosh files are stored in three parts:

- *The data fork* - The actual data contained in the file.
- *The resource fork* - Information about what application to start when the file is opened. This is known as associations in OS/2 and Windows.
- *The finder* - File information, such as file creator, type and the icon that is used for the file.

These three different file types must be stored in different directories on the server. The data fork is written to the current directory, the finder to a subdirectory named *.finderinfo* and the resource fork in a subdirectory named *.resource.*

A Macintosh file, named fileone, will be written from the Macintosh to the AIX directory /home/macuser as:

/home/macuser/fileone

/home/macuser/.finderinfo/fileone

/home/macuser/.resource/fileone

Macintosh file names can be 31 characters long, but they cannot distinguish lowercase and uppercase letters in a filename even though mixed-case file names are supported on the Macintosh. If the *fileone.txt* file exists, the user trying to create the *FILEone* file from the client will receive an error message.

AIX file names cannot contain blanks or slashes like Macintosh files. The Macintosh will translate these characters into colons followed by two hexadecimal digits.

The Macintosh file *in/out* will be translated to *in:2Fout*.

Macintosh folders correspond to directories on the server. The *Finder* information must be stored together with the actual directories. A Macintosh folder, called folderone, is created from the client in the AIX directory /home/macuser. The translation results in these files in the AIX filesystem:

/home/macuser/folderone

/home/macuser/.finderinfo/folderone

For eachv olume accessible to a Macintosh client, two *desktop files* are created.

- *.IDeskTop*

  This file maintains a database of the icons used for files.

- *.ADeskTop*

  This maintains which applications are to start when a file is opened.

These files are created the first time a user accesses the volume.

Due to these differences in the Macintosh and AIX operating systems as described earlier, the AT Realm of AIX Connections must know how to handle files that do not have any Finder information. Finder information is information provided about resources, such as the name of the application to launch when the file is opened. For this purpose, the Macintosh uses a mapfile described in the `/usr/tn/profile.file` as shown in Figure 105 on page 159.

```
[atalk-map defatmap ]
#                  mac      mac
#        exten     type    creator     conversion    comment
template-only off
suffix .Z LZIV ZIVU binary "A UNIX compress file."
suffix .zip ZIP ZIP binary "A PC Zip file."
suffix .mcw WDBN MSWB binary "A Windows Word file."
suffix .doc W6BN MSWD binary "A Windows Word file."
suffix .rtf TEXT MSWD binary "A WinWord Rich Text file."
suffix .xls XLW3 XCEL binary "A Windows Excel file."
suffix .xlt TEXT XCEL ascii "An Excel text file."
suffix .c TEXT MPS ascii "A UNIX C file."
suffix .h TEXT MPS ascii "A UNIX C header file."
suffix .o OBJ UNIX binary "A UNIX object file."
suffix .a AR UNIX binary "A UNIX archive library."
suffix .sit SIT! SIT! binary "A Stuffit(tm) file."
```

.

Figure 105. AT Realm of AIX Connections Mapfile Stanza

A set of file management tools is included in the AT Realm of AIX Connections. These are listed in Table 10.

Table 10. File Management Commands for Macintosh.

Command	**Purpose**
atattr	Sets and modifies Macintosh file attributes.
desk	Prints the information stored in a volume's Desktop database.
m2u	Converts Macintosh files to AIX files (change carriage return to linefeed).
macfsck	Checks the Macintosh filesystem.
macmd	Creates a Macintosh directory and the related files.
macrd	Removes a Macintosh directory and the related files.
macmv	Renames or moves Macintosh files or directories and related entries in special files.
macrm	Removes a Macintosh file and the related files.
maccp	Copies AIX files to Macintosh files, including related files.
pfinfo	Prints the Finder information for a file.
u2m	Converts AIX files to Macintosh files (change linefeed to carriage return).

Chapter 13. Why Use an AIX-Based Server?

AIX Connections allows users to integrate their AIX and PC environments in an easy and efficient way.

It provides cross-platform interoperability by providing a set of servers running on a RISC System/6000, which support data and resource access from IBM LAN server DOS, Windows and OS/2 requesters and compatible SMB clients, such as LAN Manager, Windows NT or Windows for Workgroups for the NB Realm of AIX Connections. For NW Realm of AIX Connections, the clients can be DOS, Windows or others. Macintosh clients are based on AppleTalk.

Using the IBM RISC System/6000 in an AIX environment as a server allows users to take advantage of the much greater disk capacity of IBM RISC System/6000 machines and the AIX Journal File System and Logical Volume Manager. This includes dynamic resizing and allocation, the ability to span multiple disks and transaction logging for outage recovery. It also utilizes the AIX print queue mechanisms, which allow AIX and PC applications to easily share the same resource regardless of where they are actually located. It allows users to intermix AIX and PC applications, data and resources.

AIX Connections:

- Provides a highly reliable environment for PCs and PC servers
- Helps maintain information integrity
- Delivers an integrated software platform on AIX designed for business-critical applications
- Provides the scalability for PC LAN environments
- Leverages existing customer investments

AIX Connections provides leading-edge PC-to-UNIX connectivity technology because it enables network-centric computing.

AIX Connections should be considered in the environments described below:

Any Environment

AIX makes a better server.

IBM RISC System/6000 and AIX have a long history as servers in commercial environments.

Some of the advantages of AIX Connections servers are:

- Reliability of IBM RISC System/6000 and AIX
- Advantages of JFS and LVM
- Security
- System and network management
- Connectivity
- Rich application catalog
- Application development
- Scalability

- Extensive capacity and performance-management tools

Low-Cost Additional PC Server

Any existing AIX system connected in a network with NetWare, SMB or AppleShare servers can become an additional server to those clients simply by adding AIX Connections. This is a lower-cost alternative to procuring a new hardware/software server solution.

High-End Single PC Server Environments

Traditional PC servers lack the hardware scalability to support a large number of clients on one server. This leads to the proliferation of servers. The management and control of a large number of servers leads to significant costs.

Scalability of the IBM RISC System/6000 servers is the significant factor in this case.

Consolidated Heterogeneous PC Servers

In this environment, clients from the Novell NetWare, SMB and Mac environments can share resources. AIX Connections will help consolidate your data by using AIX Connections as a focal point of your LAN.

The unique *functions of AIX Connections* to be a server for clients from different environments is significant, and the AIX system-management tool reduces the burden of managing multiple, disparate servers.

Commercial-Strength Server

In demanding commercial environments – with requirements for high availability, integration with existing LAN or network monitoring and central backup – AIX Connections is an excellent solution.

The *systems-management tools* available in AIX, and the use of a *mature operating system*, are AIX Connections advantages in this environment.

Two-Tier Client/Server Application Environment

AIX Connections provides an excellent server for client/server environments where PCs are used as applications clients. Database clients for operating systems and user interfaces commonly found in PC clients can access the database server on an AIX system by using PC protocols.

Again, the functions of AIX, the *scalability* of the hardware and the wide *application base* for AIX are advantages of AIX Connections.

Three-Tier Environment

PC clients often need to have access to other nodes in a network besides their server. These nodes could be UNIX-based systems, mainframes or any kind of computer.

The AIX *connectivity* allows these clients access to any system in both local- and wide-area networks.

13.1.1 AIX

Many customers will find AIX Connections an attractive and viable solution if they are seeking access to the rich communications capabilities, extensive disk capacity, advanced file system, and robust data and systems-management facilities offered by the AIX operating system and the IBM RISC System/6000 hardware.

AIX also offers a broad selection of tools for management and control:

SMIT Configuration of the AIX Connections servers is done through VSM or SMIT. For people not familiar with SMIT, a short description of the tool will help.

System Management Interface Tool (SMIT)

SMIT is a tool for system administration. It is menu based and includes the following elements:

- Installation, maintenance and administration of programs
- Administration of terminals, printers and so on
- Administration of TCP/IP, NFS and communications adapters
- Problem determination
- Administration of users and groups
- Administration of filesystems and backup procedures

The administrator is guided through a series of interactive menus that automatically create, execute and log the commands necessary.

Besides the environment and tasks, the functions of the AIX operating system listed below are beneficial in an AIX Connections solution.

- Large amount of data
- Connectivity
- Printing
- Journaled File System
- Backup
- HACMP
- System management

Visual System Management, VSM, provides an iconic interface for some system-management functions. Those most commonly used include user and password maintenance and print queue management.

ADSM ADSM is a client/server storage-management product that provides administrator-controlled, highly automated, centrally scheduled, network-based backup and archive functions for workstations and LAN fileservers. Clients can be running OS/2, NetWare, Windows, DOS, Macintosh, and other UNIX platforms.

HACMP Implementing an AIX Connections solution can also be based on the functions of the AIX High-Availability Cluster Multi-Processing/6000 (HACMP/6000).

High-Availability Cluster Multi-Processing/6000 (HACMP/6000) is a layered software product that runs on RISC System/6000s connected over a network to form a cluster. Such a cluster would usually be involved in providing critical services to end-users in a production

environment. HACMP/6000 can be configured to detect and react to node, network adapter and network failures in a manner that restores any critical services that may have been interrupted due to these failures. Apart from providing high availability, HACMP/6000 also provides a multiprocessing facility using applications executing on two or more nodes in a cluster with concurrent access to data on shared storage.

SystemView

SystemView for AIX is among IBM's consistent, cross-platform system management programs.

Simple menus guide the user in performing complex tasks, and they ensure consistency and the correct execution of tasks, such as:

- Operations management for networks, storage devices, printers, and workloads
- Performance management
- Problem management
- Change management, including change administration and software distribution support
- Configuration management

The SystemView for AIX product also manages other major UNIX vendors and OS/2, DOS and Microsoft Windows platforms.

NetVeiw/6000

NetView is a comprehensive suite of network-management tools that allows AIX to be a client or server in SNMP networks and a client in SNA networks. It offers a graphical interpretation of the state of the network components along with fault detection.

13.1.2 Summary

AIX Connections provides the capability to integrate multiple, disparate PC client environments on a world-class server with minimal impact on the end user. It supports sharing of data and printers among many clients, access to the AIX file system using PC protocols, access to the NetWare and SMB file systems from AIX applications, access to AIX applications, robust operations environments, and extensive system and network management, all at a low cost.

Hint

It has always been, and will always be, easier to manage - install, run and maintain - a smaller number of workstations running **one** operating system, than more workstations running different operating systems.

Chapter 14. Problem Determination

Even though AIX Connections is very easy to configure, you might have a situation where you are not able to connect to the server. This section describes some of the most common problems and solutions.

For further information on problem determination, see *AIX Connections, Administrators Guide*, SC23-1828-00.

First, let's concentrate on the server side:

- To verify that the AIX Connections service you are trying to connect to is available, use the tnstat commmand. You can use the -r option followed by the realm if you are only interested in one realm.

  To verify that NW Realm of AIX Connections is up and running, run the command /usr/tn/tnstat -r NW on the RISC/6000.

  This should give you an output similar to the following:

  ```
  TotalNET system is enabled.
  Transports: tnipx tnatk altnb
  NWservices are up.
          Transports used: tnipx
          nwconnect:file is accepting new connects.
          2 client(s) connected.
          nwconnect:term is accepting new connects.
          0 client(s) connected.
          nwconnect:nvt is accepting new connects.
          0 client(s) connected.
  ```

  If you do not see this, try to start the realm by using the tnstart command. Again, you may choose to use the -r realm flag.

  To start the NW Realm of AIX Connections, use the command /usr/tn/tnstart -r NW

  Also, you should check the log file located in the /usr/tn/<realm> directory.

  If this does not help, check your AIX Connections realm server configuration. Parameters, such as the network number, and frame types for the NW Realm of AIX Connections could be incorrect.

  In the AT Realm of AIX Connections, check the Macintosh zone entry of your configuration. Also, you should check the following:

  - Is the user a valid AIX user?
  - Does your client have TCP/IP installed, Can you 'see' the server using a ping?
  - Can you 'see' the server using a slist command (NW Realm of AIX Connections) or a net view command (NB Realm of AIX Connections)?

On the client side, you might find these points useful:

- If your DOS/Windows PC with the NetWare client software or DOS LAN requester installed fails to connect to a server, try to execute the network startup file (startnet.bat for a NetWare client) in steps.
- The SMB dialog used by AIX Connections and the dialog used by IBM requesters such as OS/2 LAN server and DOS LAN requester are not the same. This means that you are not able to locate your AIX Connections

server using the network browse function. Instead, you need to use the `net view \\servername` to verify that the server is alive.

- If you are using a client that supports the SMB dialog used by the NB Realm of AIX Connections and you do not find the server in the list, try to be patient. Sometimes, it will take minutes before the server appears in the list.
- The OS/2 Warp Connect Novell NetWare client, by default, uses the burned-in address of your network adapter.

  If you are running other network programs like OS/2 Communication Manager or OS/2 LAN requester and are using an alias for your network adapter hardware address, you will have to change the address for your Novell NetWare client.

  To work around this problem, please refer to 5.7, “OS/2 Warp Novell Netware Client 2.11” on page 63.
- If you can ′see′ a resource from the client but are not able to attach it to your client, the common cause is that you, as an AIX user, do not have access to the volume. Try to access the corresponding branch of the AIX file tree from AIX.
- If your client and the server are on different networks, be sure to set up routing using the NW Realm of AIX Connections, and configure NetBIOS over TCP/IP instead of NetBEUI for the NB Realm of AIX Connections.

Chapter 15. Terminal Emulation Using AIX Connections

Both the NB Realm of AIX Connections and the NW Realm of AIX Connections provide software to enable a DOS terminal between the client and the AIX Connections server without TCP/IP. For the NB Realm of AIX Connections, the service is enabled using NetBIOS, and for the NW Realm of AIX Connections, the service is based on either IPX or SPX II.

NW Realm of AIX Connections provides an interface to the IPX transport for DOS clients that have NetWare Virtual Terminal (NVT) installed. NVT is not a product that is shipped with NW Realm of AIX Connections, but you can connect to the server with third-party terminal emulation packages supporting NVT without the TCP/IP protocol.

NW Realm of AIX Connections also provides terminal emulation over SPX II. NWterm, shipped with NW Realm of AIX Connections, is a terminal-emulation program that will run over this SPX transport.

The terminal emulators are like a VT100 type.

Two DOS executables are shipped with AIX Connections and can be installed on the client simply by copying the file from the server to the client.

The two executables are:

- /usr/tn/NB/pccode/nbterm.exe for NB Realm of AIX Connections
- /usr/tn/NW/sys/public/nwterm.exe for NW Realm of AIX Connections

The functionality of the terminal emulators has not changed from Version 4.1.4 of AIX Connections.

What has changed is the way the services for the two terminal emulators are defined. During installation of AIX Connections Version 4.1.5, these services are automatically set up for you. This also includes the NVT support. The only thing you need to do is to transfer the DOS files to your client or just execute the program from the volumes pccode or sys/public, which also are defined for you automatically during installation. In Figure 106, you will see the definition of the NB Realm of AIX Connections terminal emulation service. Figure 107 on page 168 and Figure 108 on page 168 show the corresponding setup for the NW Realm of AIX Connections, first the SPX II setup followed by the NVT setup.

You can only use these terminal emulators to connect to servers having AIX Connections installed.

```
[ service lsconnecttty:term ]
description NB term on connect
command /usr/tn/NB/NBtty /usr/bin/login
```

Figure 106. NB Realm of AIX Connections Terminal Emulation Definition

```
[ service nwconnect:term ]
command /usr/tn/NW/NWtty /usr/bin/login
description NW term on connect
persistent off
```

Figure 107. NW Realm of AIX Connections Terminal Emulation Definition Based on SPX II

```
[ service nwconnect:nvt ]
command /usr/tn/NW/NWnvtd
description NW nvt term on connect
persistent on
```

Figure 108. NW Realm of AIX Connections Terminal Emulation Definition Based on NVT

To connect using either nbterm.exe or nwterm.exe, simply execute the program from the DOS command line, and you will see a screen like Figure 109.

Figure 109. Terminal Emulation

Here, you have to type the session number; each terminal emulator allows from 1 to 9 sessions with the server based on the same startup of the DOS program.

In the line ″Connect to″, you have to write the name of the service defined in the profile.file.

After you press **Enter**, you will see the login screen. When you want to open another session, or quit or do a shell command, you press the **Alt** and **Z** keys. This will enable you to alter the options of the program.

Figure 110 on page 169 shows an example of the NB Realm of AIX Connections terminal emulator nbterm connected to the AIX Connections server Connect.

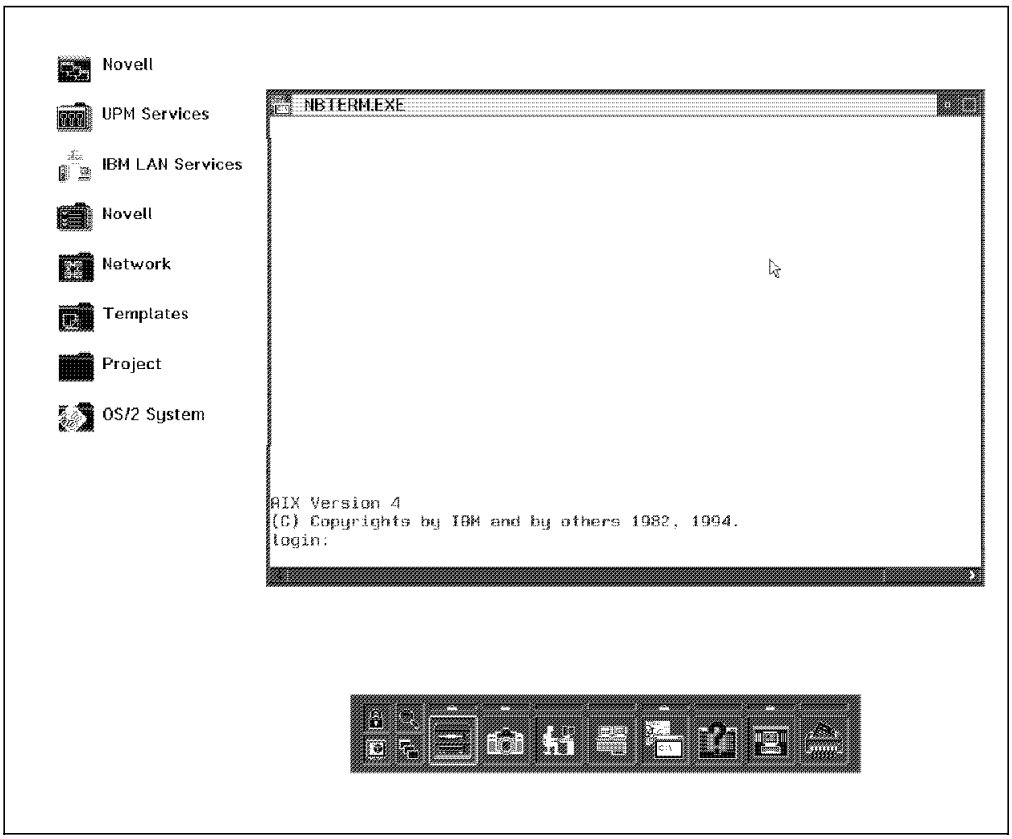

Figure 110. The Nbterm. NBterm lets users not running TCP/IP connect to the AIX-based server running AIX Connections for terminal emulation.

If you have problems connecting to the server, be sure that the corresponding services are active on the server. To verify that, execute `/usr/tn/tnstat` from the AIX command line or just check the existence of the daemons using the `ps -ef` command.

To use the nbterm, you need to find the NBdaemon active.

To use the nwterm, check the existence of NWptyd and NWtty. For clients that use NVT, check for NWnvtd deamon.

Chapter 16. Web Based HTML Administration Tool

In this chapter, we will focus on the new Web based administration tool. The tool is Web-based, and this makes it usable from any client or server in the network with the AIX Connections server.

We will go through the Main menu in detail in the following pages. The tool is divided into these main groups:

- Initial AIX Connections configuration
- General AIX Connections management
- Alternate NetBIOS/NetBEUI realm
- NetWare compatible realm
- AppleTalk compatible realm
- Transports
- Online AIX Connections documentation

We will now go through the different parts of the tool.

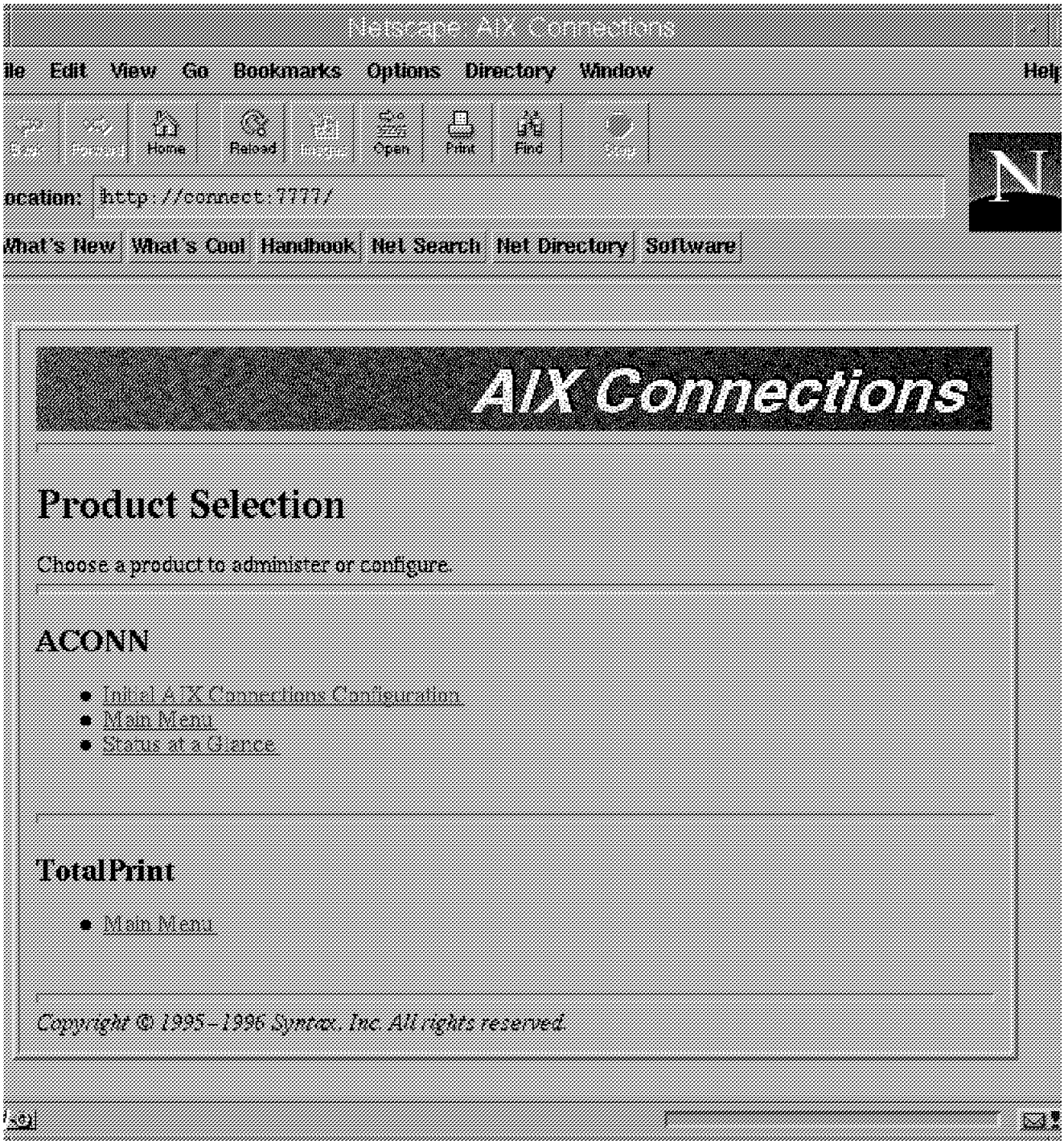

Figure 111. Web Tool Product-Selection Panel

16.1 Initial AIX Connections Configuration

- Initial AIX Connections Configuration

  This section corresponds to the Quick Start tool from SMIT. It will allow you to quickly and easily set up all three realms.

16.2 General AIX Connections Management

This section of the tool offers:

- Configuration of AIX Printers

  This wizard allows you to set up (create, delete or modify) AIX printers to be available for AIX Connections.

- System Control

  This section allows you to accept or reject services, start and stop services or display status of services on a systemwide basis.

- Information on any AIX Connections User

  This section allows you to display information on AIX Connections users.

- Customer Service Information Requests

  This function allows you to select all information on your system's AIX Connections setup. It can be used as documentation or input for problem reporting.

16.3 Alternate NetBIOS/NetBEUI Realm

This section of the tool offers:

- Alternate NetBIOS/NetBEUI File Service Wizard

  This file service wizard allows you to set up a new file service in the NB realm. It will guide you through the information that is necessary for your configuration.

- Configuration for Alternate NetBIOS/NetBEUI

  This section allows you to configure your NB realm services in detail.

- Alternate NetBIOS/NetBEUI Realm Configuration

  This section allows you to configure your NetBIOS attributes like workgroup names.

- Service Types

  This section allows you to modify, create or delete service types in the NB Realm of AIX Connections.

- Alternate NetBIOS/NetBEUI File Services Using a Template

  This section allows you to set up file services based on the rules of a template. If no templates are available, you will also be able to set up templates from here.

- File Services

  This section allows you to modify, create or delete file services in the NB realm.

- Alternate NetBIOS/NetBEUI Nonfile Services Using a Template

  This section allows you to set up nonfile services, such as terminal service, based on the rules of a template. If no templates are available, you will also be able to set up templates from here.

- Nonfile Services

  This section allows you to modify, create or delete nonfile services in the NB realm.

- Net Managers

  This section allows you to set up net managers that will monitor the activity of the realm based on SNMP.

- Server Control for Alternate NetBIOS/NetBEUI

  This section allows you to start and stop services, accept or reject new connections and display status of the services defined in the NB Realm of AIX Connections.

- Information on Alternate NetBIOS/NetBEUI Users

  This section allows you to get information on users active in the NB Realm of AIX Connections.

16.4 NetWare-Compatible Realm

This section of the tool offers:

- NetWare-Compatible Service Wizard

  This wizard will guide you through the steps necessary to set up a new service and configure the protocols needed.

- NW Realm Configuration

  This section allows you to configure the services of NW Realm of AIX Connections in detail. You will be able to accept, reject, start, stop and display the status of your service.

- NetWare Compatible Realm Configuration

  This section allow you to configure the IPX bindery load and transport list.

- Service Types

  This section allows you to configure (modify, create or delete) service types in the NW Realm of AIX Connections of AIX Connections.

- Creation of a NetWare-Compatible File Service Using a Template

  Please see the corresponding topic in the NB realm.

- File Services

  Please see the corresponding topic in the NB realm.

- Creation of a NetWare-Compatible Nonfile Service Using a Template

  Please see the corresponding topic in the NB realm.

- Nonfile Services

  Please see the corresponding topic in the NB realm.

- Net Managers

Please see the corresponding topic in the NB realm.

- Server Control for NetWare Compatibility

  Please see the corresponding topic in the NB realm.

- Information on NetWare Compatible Users

  Please see the corresponding topic in the NB realm.

16.5 AppleTalk-Compatible Realm

This section of the tool offers:

- Apple Talk-Compatible File Service

  This wizard will guide you through the steps necessary to set up a new service and configure the protocols needed.

- Configuration for AppleTalk Compatibility

  This section allows you to configure the AT Realm of AIX Connections and its service type.

- AppleTalk-Compatible Realm Configuration

  This section allows you to configure the AT Realm of AIX Connections transport list.

- Service Types

  This section allows you to modify, create or delete AT Realm of AIX Connections services.

- Creation of AppleTalk-Compatible File Services Using Templates

  Please see the corresponding topic in the NB realm.

- File Services

  Please see the corresponding topic in the NB realm.

- Creation of AppleTalk-Compatible Nonfile Services Using Templates

  Please see the corresponding topic in the NB realm.

- AppleTalk Print Services

  Please see the corresponding topic in the NB realm.

- Net Managers

  Please see the corresponding topic in the NB realm.

- Server Control for AppleTalk Compatibility

  Please see the corresponding topic in the NB realm.

- Information on AppleTalk-Compatible Users

  Please see the corresponding topic in the NB realm.

16.6 Transports

This section of the tool offers:

- Alternate NetBIOS/NetBEUI Interfaces

  This section allows you to modify, create or delete NetBIOS LANA transports.

- Configuration of an IPX/SPX Transport

  Using this wizard, you will be able to configure the IPX protocol, including setup of routing.

- AIX Connections IPX/SPX Configuration

  This section allows you to configure the IPX protocols in detail.

- Interfaces

  This section allows you to modify, create and delete IPX/SPX network interfaces.

- Routes

  This section allows you to set up static routes.

- Service Advertisement Protocol Configuration

  Advertisements add static entries to the SAP table.

- Configuration of AppleTalk Transport Services

  Using this wizard, you will be able to configure the AppleTalk transports like Macintosh zones and routers.

- AIX Connections AT Transport Configuration

  This section allows you to configure the AppleTalk in general.

- Interfaces

  This section allows you to configure the AppleTalk network on a dedicated network.

16.7 Online AIX Connections Documentation

This section of the tool offers access via a Web browser to the following:

- Online AIX Connections Documentation
- Up and Running!
- AIX Connections, Administrators Guide
- AIX Connections, Reference Guide
- AIX Connections, Client Guide
- README

Appendix A. Scenario

This chapter describes the scenario used to produce this document.

First, we will describe the network and the client and servers. This section also covers the different users defined.

Second, we will discuss the configuration files on the AIX Connections server and see how these files define the services provided by AIX Connections in the network.

In the end of this chapter, you will find all the configuration files relevant for our scenario. The files are:

- /usr/tn/config.tn
- /usr/tn/profile.file
- /usr/tn/service.NW
- /usr/tn/service.NB
- /usr/tn/service.AT
- /etc/qconfig
- /usr/bin/smbq.ksh
- /usr/bin/nwq.ksh
- AIX Connections Client Access to Other Servers

A.1 Network Configuration

In this section, we will describe the network setup. The names of the servers and client reflect their TCP/IP hostname, when available.

For detailed information, please refer to Figure 112 on page 179, which shows the configuration setup.

A.1.1 AIX Connections Server

The AIX Connections software is installed on the IBM RISC System/6000 named *connect*. The server has both token-ring and Ethernet cards installed and is attached to the domain itsc.austin.ibm.com with the nameserver ITSORUSI.

Several remote TCP/IP printers and a local printer are defined on our AIX Connections server.

A.1.2 Clients

On the token-ring segment, we have several PC clients.

OS2_WARP runs OS/2 Warp with OS/2 LAN Server Requester Version 4 and OS/2 Novell client.

This client is defined and normally logs into the OS/2 domain ITSCAUS. The domain controller in this domain is ITSCSV00.

WIN_95 runs Windows 95 and is set up to support both the SMB and the NetWare environment. WIN_95 is a member of the defined Windows NT domain named CONNECT.

WIN_NT is NT domain controller in the NT domain. It is set up to support remote TCP/IP printing and can also act as a normal SMB client to the AIX Connections server.

Two DOS clients, both running Windows for Workgroups, are also on the ring.

W4W runs a standard Microsoft network configuration, and W4W_NW has a Novell DOS/Windows client installed. These two clients are not configured with TCP/IP.

On the Ethernet side, we have a Mac client running a standard installation of MAC-OS Version 7.

A.1.3 Other Servers

On the token-ring, some non-AIX Connections servers have our interest:

1. First, the domain controller is the OS/2 domain ITSCAUS. This server is called ITSCSV00. The print server ITSCSV01 is sharing the printer IBM4039 in the same domain.
2. Second, we have a NetWare server NETW402. This server runs NetWare Version 4.02.
3. Third, the AIX servers are ITSORUSI and PRT3825.

   ITSORUSI is the nameserver in the AIX domain itsc.austin.ibm.com. This server also acts as a default gateway to the entire network. The server PRT3825 is the printserver in the domain.
4. Fourth, is the NT server WIN_NT, which acts as a domain controller in the Windows NT domain called CONNECT.
5. Last, EV7 is the security server in the DCE cell.

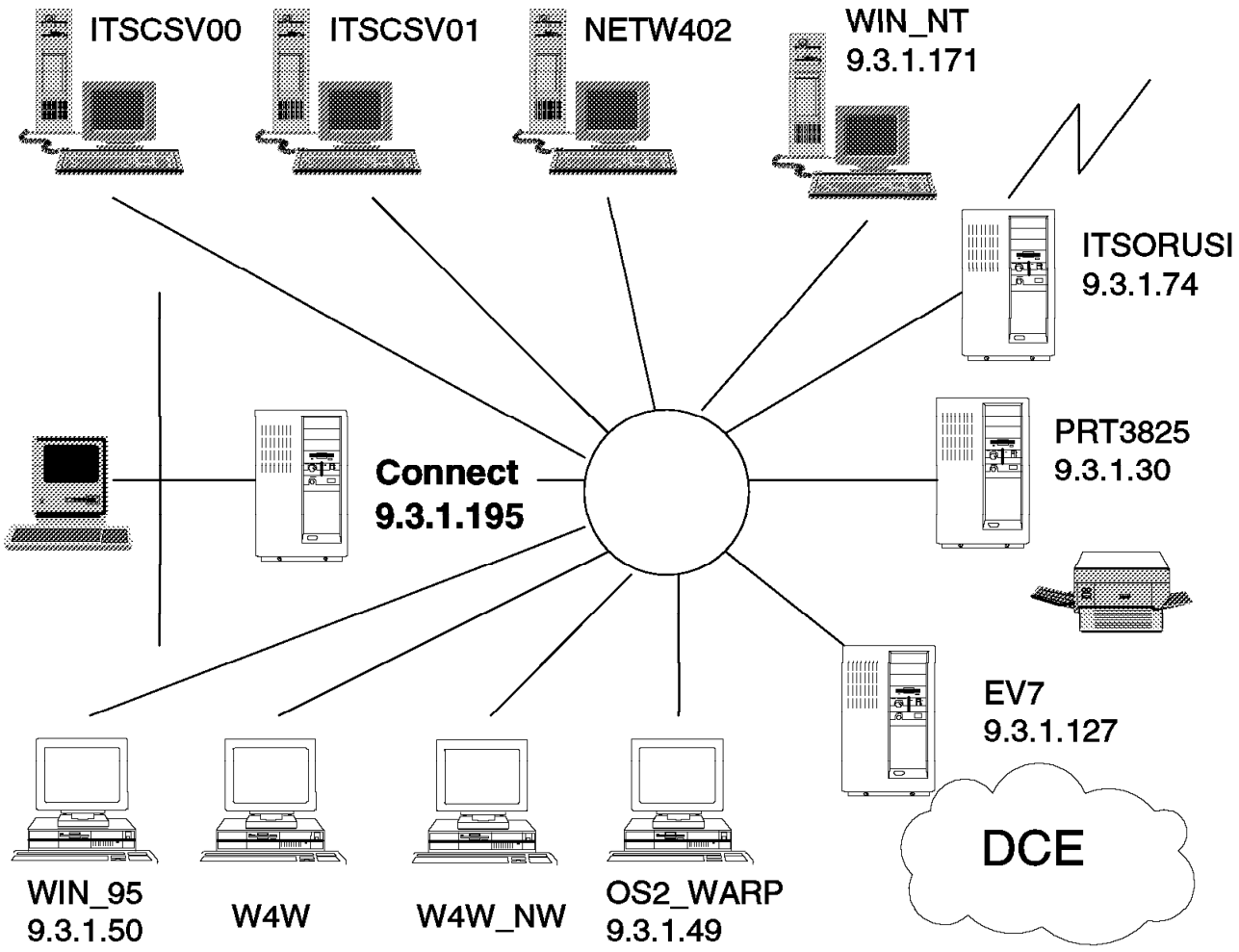

Figure 112. AIX Connections Scenario Configuration

A.2 Users

Several users are defined. In the network below, you will see see a list of them and where they belong. All users are defined on our AIX Connections server as normal AIX users.

Table 11 (Page 1 of 2). AIX Connections Users

Username	User defined with AIX Connections password	Defined on server
nw_1	yes	NWconnect
nw_2	no	NETW402
nt_1	yes	LSconnect
nt_2	no	WIN_NT
AUSRES4	no	ITSSV00
os2_1	yes	LSconnect

Table 11 (Page 2 of 2). AIX Connections Users

Username	User defined with AIX Connections password	Defined on server
MAC_1	yes	ATconnect

A.3 AIX Connections Services

Now let's take a closer look in the function of AIX Connections described in Chapter 2, "What You Can Do With AIX Connections" on page 9 and see how these functions relate to the configuration files.

The functions, in short, are:

- Data Storage and Retrieval
- Access to Printers Known by the AIX Server
- SMB, IPX Use of VT100 Emulation
- Using AIX Connections Servers as Clients to PC Servers
- Queuing Print Jobs to PC Servers
- SMB Access to DCE

Each of these functions will be described in the following pages.

Before going into detail with the above functions, let's concentrate on the communication part. Most of the communication setup is documented in the `/usr/tn/config.tn` file.

This file describes, among other things, the transport used between the server and the client. This includes things like IPX frame types, NetBIOS LANAs and NetBIOS domains.

This file also describes the relationship between network adapters and transport protocols.

As mentioned, any user having an AIX userid is able to access the AIX Connections servers.

These users must have an AIX Connections password if no proxy server is used. The use of proxy servers is supported using the NB Realm of AIX Connections (without DCE integration) and the NW Realm of AIX Connections.

Assuming that the users from Table 11 on page 179 without an AIX Connections password should access the AIX Connections server, we need to add a proxy server to the services used. This will be done using the `/usr/tn/services.NB` or `/usr/tn/services.NW` files.

Now, let's look at the AIX Connections functions described above.

A.3.1 Data Storage and Retrieval

Each client with a suitable requester can store and retrieve files from the server.

First of all, we need a connection between the client and the server. We can divide this connection in two: the real network communication and the functions that enable the file service.

The network communication is defined in the /usr/tn/config.tn file. In this file, you will find the relationship between the protocols used in AIX Connections; their attributes, such as frame types; and NetBIOS LANAs.

Each realm is described in /usr/tn/config.tn, as in Figure 113.

```
[ realm NB ]
transport altnb
lm-domain RSCONNECT
anninterval 300

This stanza describes that the NB realm uses the altnb
(NetBIOS) protocol, the domain is RSCONNECT and the
announcement interval is setup to be 300 seconds.

[ service-type NB file ]
type 0x20
description IBM NetBIOS file service
protocol NB-session

This stanza describes that the NB realm file service


[ service-type NB term ]
type 0x20
description IBM terminal service NetBIOS

This stanza describes that the NB realm terminal service
[ transport altnb ]
template-only off

[ interface altnb tr0 ]
device /dev/lana0

This stanza describes that relationship between the protocol
and the NetBIOS lana used.
```

Figure 113. NetBIOS Part of /usr/tn/config.tn File

Now, the transport between the client and the server is defined. We need to set up the file service.

The services are defined in the services.<realm.> file in the home directory of AIX Connections. One or more file services can be defined in each realm. The process that enables the client to connect to the server is the command /usr/tn/<realm>/<realm>file in the services file.

AIX Connections clients can access the AIX Connections server using either a volume or an attach-point definition. Volumes are defined on a systemwide basis

in the /usr/tn/profile.file file. Defined attach points are related to a specific service.

A volume definition is described as in Figure 114 in the file /usr/tn/profile.file.

```
[ volume home ]
template-only off
atalk-map defatmap
path %HOME%
```

Figure 114. Volume Definition in /usr/tn/profile.file

One or more attributes can be defined on the volume. In this case, an AppleTalk map file is set up.

Now, AIX Connections *knows* about our volume, so the last thing to do is to tell the services to use this volume. This is done in /usr/tn/profile.file. In Figure 115, an example of this definition is shown:

```
[ service NB lsconnect:file ]
browse-master on
browse-user root
printer ps
printer smbq
volume home
volume pccode
volume cd
```

Figure 115. File Services Definition

The definition above defines three volumes for the service lsconnect:file. Different attributes can be defined for the service. For more information about these, please refer to *AIX Connections, Administrators Guide SC23-1828-00* and *AIX Connections, Reference Guide SC23-1829-00*.

A.3.2 Access to Printers Known by the AIX Server

Clients can access printers known by the AIX server. All print queues defined in the /etc/qconfig file can be configured for AIX Connections.

A printer in AIX Connections is an AIX queue defined in the /etc/qconfig of the server. For a queue to be available in AIX Connections, it must be defined in the /usr/tn/profile.file file with at least the following stanza:

```
[ printer ps ]
template-only off
```

This stanza defines the AIX queue ps to be available to AIX Connections.

The printer support implemented in AIX Connections is different for the NB Realm of AIX Connections, NW Realm of AIX Connections and AT Realm of AIX Connections.

In the first case, printing is implemented on a file transfer basis. This means that the printer file from the client is automatically transferred to the server using AIX Connections file services and stored in the spool directory defined in the

/usr/tn/profile.file. In this file, the spool directory can be set up for each service by using the spooldir=<path> keyword in the service definition, as in Figure 115.

Printer support in the AT Realm of AIX Connections is different. Here, you have a special print service process. This service must be defined for each AIX printer you want to use.

The printer support is defined in the /usr/tn/services.AT file, like in Figure 116.

```
[ service ps:atlw ]
command /usr/tn/AT/ATlwprint -d ps3825 -f /usr/tn/AT/LWFonts -p /usr/bin/enc
```

Figure 116. AT Realm of AIX Connections Printer Service Definition

This definition will 'create' an Apple Laserwriter printer that will print to the AIX-defined printer ps3825.

Again, the service type atlw is definded in the /usr/tn/config.tn file.

The different 'printer' can now be added to the servers by using the keyword printer queue name in the service stanza of the /usr/tn/profile.file file as shown in Figure 115 on page 182.

A.3.3 SMB, IPX Use of VT100 Emulation

SMB and IPX clients can run VT100 terminal emulation based on either NetBIOS, IPX or SPX II.

To run a terminal session from an AIX Connections client, the service type term or nvt must be defined in the /usr/tn/config.tn file.

The service details are defined in the /usr/tn/services.<REALM> file. An example for NB clients is shown below. See Chapter 15, "Terminal Emulation Using AIX Connections" on page 167 for more information on terminal emulation.

```
[ service lsconnect:term ]
description NB term on connect
command /usr/tn/NB/NBtty /usr/bin/login
```

Figure 117. Terminal Service Definition

See Chapter 15, "Terminal Emulation Using AIX Connections" on page 167 for information on using the terminal emulators.

A.3.4 Using AIX Connections Servers as Clients to PC Servers

AIX Connections servers (NB Realm of AIX Connections and NW Realm of AIX Connections) can be clients to real PC servers.

To access a real PC server, you use the AIX Connections client functions. In A.3.7.9, "AIX Connections Client Access to Other Servers" on page 189 you will find an example of how to access an SMB server and mount a shared directory to your AIX filesystem.

This directory can be shared with other clients using AIX Connections.

In our example, we mounted the directory shared as C$: on the server WIN_NT on the AIX directory /mnt. Creating an AIX Connections volume using the path /mnt and adding this definition to one or more file services gives users access to the files on the server WIN_NT.

In our configuration file (A.3.7.2, " /usr/tn/profile.file" on page 186), a volume called nt is defined using the /mnt directory.

For more details on the AIX Connections client, please refer to Chapter 8, "What You Can Do With AIX Connections Client" on page 133 or *AIX Connections, Client Guide SC23-1762-01*.

A.3.5 Queuing Print Jobs to PC Servers

AIX Connections servers can print to servers like Novell NetWare servers, OS/2 LAN servers, Microsoft NT servers and any client able to share a printer.

Using the remote utilities of an AIX Connections client, you can create AIX printer queues that will route print to real PC servers. In A.3.7.6, " /etc/qconfig" on page 188, A.3.7.8, " /usr/bin/smbq.ksh" on page 189 and Figure 104 on page 150, you will find examples of how to set this up.

The AIX printer queues smbq and nwq are used.

A.3.6 SMB Access to DCE

AIX Connections gives clients from the SMB environment access to DCE.

Please refer to Chapter 9, "AIX Connections DCE Integration" on page 141 for at detailed discussion of this topic.

A.3.7 AIX Connections Configuration Files

The following are examples of the configuration files created or modified in our scenario.

A.3.7.1 /usr/tn/config.tn

```
[ totalnet ]
system-name connect
admin-user root
lm-domain rsconnet

[ realm NW ]
transport tnipx
bindery-load all

[ service-type NW file ]
type 4
fixed-socket 0x0451
protocol TNIL
description Netware-compatible file service

[ service-type NW term ]
type 0x0247
protocol SPX
fixed-socket 0x80ab
description IBM supplied remote tty service

[ service-type NW nvt ]
type 0x009e
protocol IPX
fixed-socket 0x8063
description NVT1 compatible terminal service

[ transport tnipx ]
template-only off
sapadvertise testing 4 0x451

[ interface tnipx internal ]
device internal
frame-type internal
net-number 000181

[ interface tnipx /dev/dlpi/tr:0:token-ring ]
device /dev/dlpi/tr:0
frame-type token-ring
net-number 00007007

[ realm AT ]
transport tnatk

[ service-type AT file ]
type AFPServer
description AppleTalk-compatible file service

[ service-type AT atlw ]
type LaserWriter
protocol PAP
description AppleTalk-compatible printer service

[ transport tnatk ]
template-only off

[ interface tnatk /dev/dlpi/et:0 ]
device /dev/dlpi/et:0


[ realm NB ]
transport altnb
lm-domain RSCONNECT
anninterval 300

[ service-type NB file ]
type 0x20
```

```
description IBM NetBIOS file service
protocol NB-session

[ service-type NB term ]
type 0x20
description IBM terminal service NetBIOS

[ transport altnb ]
template-only off

[ interface altnb tr0 ]
device /dev/lana0
```

A.3.7.2 /usr/tn/profile.file

```
[ general ]

[ printer ps ]
template-only off

[ printer ps3825 ]
template-only off

[ volume home ]
template-only off
atalk-map defatmap
path %HOME%

[ volume sys ]
template-only off
path /usr/tn/NW/sys

[ volume pccode ]
template-only off
path /usr/tn/smb/pccode

[ volume dce ]
path /:/home
template-only off

[ volume cd ]
path /cdrom
template-only off

[ volume nt ]
path /mnt
template-only off

[ atalk-map defatmap ]
#                 mac      mac
#        exten    type    creator     conversion    comment
template-only off
suffix .Z LZIV ZIVU binary "A UNIX compress file."
suffix .zip ZIP ZIP binary "A PC Zip file."
suffix .mcw WDBN MSWB binary "A Windows Word file."
suffix .doc W6BN MSWD binary "A Windows Word file."
suffix .rtf TEXT MSWD binary "A WinWord Rich Text file."
suffix .xls XLW3 XCEL binary "A Windows Excel file."
suffix .xlt TEXT XCEL ascii "An Excel text file."
suffix .c TEXT MPS ascii "A UNIX C file."
suffix .h TEXT MPS ascii "A UNIX C header file."
suffix .o OBJ UNIX binary "A UNIX object file."
suffix .a AR UNIX binary "A UNIX archive library."
suffix .sit SIT! SIT! binary "A Stuffit(tm) file."

[ service NW nwconnect:file ]
printer ps
printer ps3825
printer pcl
volume sys
volume home
```

```
[ service AT atconnect:file ]
printer ps
printer ps3825
volume home
volume nt

[ service NB lsconnect:file ]
browse-election-bias 1
browse-election-version 1
browse-master on
browse-user root
printer ps
printer ps3825
volume home
volume pccode
volume cd

[ service NB dceconnect:file ]
volume dce
```

A.3.7.3 /usr/tn/service.NW

```
[ service nwconnect:file ]
command /usr/tn/NW/NWfile
description NW server on connect server
persistent on

[ service nwconnect:term ]
command /usr/tn/NW/NWtty /usr/bin/login
description NW term on connect
persistent off

[ service nwconnect:nvt ]
command /usr/tn/NW/NWnvt
description NW nvt term on connect
persistent on

[ service dnwconnect:file ]
command /usr/tn/NW/NWfile
template-only on
description Tracing enabled NW server on
transport tnipx
persistent on

[ service jens:file ]
command /usr/tn/NW/NWfile
transport tnipx
```

A.3.7.4 /usr/tn/service.NB

```
[ service lsconnect:file ]
command /usr/tn/NB/LMfile
transport altnb
persistent off
description NB server on connect
plex unique
user root

[ service lsconnecttty:term ]
description NB term on connect
command /usr/tn/NB/NBtty /usr/bin/login

[ service dlsconnect:file ]
command /usr/tn/NB/LMfile -zin=9 -zout=9 -zerr=9 -zproc=9
template-only on
transport altnb
persistent off
description Tracing enabled NB server on

[ service lsconnecttty:tty ]
description NB term on connect
command /usr/tn/NB/NBtty /usr/bin/login
```

```
[ service dceconnect:file ]
description DCE connect
command /usr/tn/NB/DCE_LMfile
transport altnb
plex unique
```

A.3.7.5 /usr/tn/service.AT

```
[ service atconnect:file ]
command /usr/tn/AT/ATfile
transport tnatk
persistent off
description AT server on connect

[ service datconnect:file ]
command /usr/tn/AT/ATfile -zin=9 -zout=9 -zerr=9 -zproc=9
template-only on
transport tnatk
persistent off
description Tracing enabled AT server on

[ service ps:atlw ┐
command /usr/tn/AT/ATlwprint -d ps3825 -f /usr/tn/AT/LWFonts -p /usr/bin/enq

[ service ps4039:atlw ┐
command /usr/tn/AT/ATlwprint     -d ps4040 -f LWFonts -p /usr/bin/enq
```

A.3.7.6 /etc/qconfig

```
ps:
       device = lp0
lp0:
       file = /dev/lp0
       header = never
       trailer = never
       access = both
       backend = /usr/lib/lpd/piobe
ps3825:
       device = ps3825
       up = TRUE
       discipline = sjn
       host = prt3825
       s_statfilter = /usr/lpd/aixshort
       l_statfilter = /usr/lpd/aixlong
       rq = ps3825
ps3825:
       backend = /usr/lpd/rembak


smbq:
       device = smbqdev
       up = TRUE

smbqdev:
       file = FALSE
       access = write
       backend = /usr/bin/smbq.ksh

nwq:
       device = nwqdev
       up = TRUE

nwqdev:
       file = FALSE
       access = write
       backend = /usr/bin/nwq.ksh
```

A.3.7.7 /usr/bin/nwq.ksh

```
#!/bin/sh
#

PATH=$PATH:/usr/tn/NB/client
export PATH

ncprint -s  nw410 -q nwprtq -u nw_2 -p nw_2 $1
```

A.3.7.8 /usr/bin/smbq.ksh

```
#!/bin/sh
#

PATH=$PATH:/usr/tn/NB/client
export PATH

ruprint -u ausres4 -p welc0me -c $1 //ITSCSV01/IBM4039
```

A.3.7.9 AIX Connections Client Access to Other Servers

```
strload -f /usr/tn/client/tncdv.conf
/usr/tn/client/tncfs_conf -c
tnclogin -d -s win_nt -r NB -u ausres4 -p welc0me
mount -V tncfs -o nb win_nt:C$ /mnt
```

Appendix B. Capacity and Throughput

In the development of AIX Connections, several capacity measurements were made which can be used for system sizing. The basic configuration consisted of clients driving scripts of "typical" user applications including database, word processing, graphics and text and graphics applications. These were run under Window 3.1 and all executables including Windows were loaded from the server. The breakdown of the client I/O is as follows.

File	MB xfered	#reads	#writes	Application
dbase.ovl	9.6	12,013	0	Database
wp.fil	5.7	6,343	0	Word Processing
tmpdnlba.$db	4.3	2,839	2,658	Database
customer.mdx	1.8	6,176	0	Database
win386.exe	1.6	1,683	0	Windows 3.1
paradox.aux	1.4	3,601	0	Database
user.exe	1.2	1,528	0	Windows 3.1
flwmain.exe	1.1	1,522	0	Text and Graphics
customer.dbx	0.9	4,740	0	Database
00000008.$$$	0.7	43,522	43,522	Graphics

Figure 118. Data Transfer

Given this workload, here are the resulting measurements which were taken while driving the system.

NW is NWServer,

NB is LSServer over NetBEUI,

RFS is LSServer over TCP

	------ E20 ------			G30-4way	
	NW	NB	RFC	NW	NB
Elapsed time,sec	1419	1789	1716	2107	1210
User time,sec	233	192	196	333	234
System time,sec	1059	941	1060	1842	1761
Total CPU	1292	1133	1256	2175	1995
%Busy	91.2	63.3	73.2	25.8	41.2
%I/O wait	1.2	1.8	1.1	3.5	5.6
Receive packets(M)	1.0	0.8	1.7	1.0	0.78
Transmit pkts(M)	1.0	0.8	0.8	1.0	0.77
CPU/packet(Millisec)	0.63	0.73	0.50	1.06	1.29

Maximum packet rates:	------ E20 ------			G30-4way	
	NW	NB	RFC	NW	NB
Packet rate@50%CPU	793	685	1000	1628	1503
Packet rate@70%CPU	1111	959	1400	2276	2105

Figure 119. Application Data Transfer

Overall observations from these tables and other lab measurements:

- Disk I/O is low, only 1-5%.
- Over 82% of the packets were < 128 bytes.

- CPU use is proportional to the packets per second processed.
- Some applications transfer little data but use large numbers of packets, thus overloading the system.
- An E20 server requires 2 10Mbit Ethernet segments to overcome the network being the bottleneck.
- Memory usage is approximately 8MB base plus .65MB for each NW client, 1.3MB for each LS client, and 1.6MB for each Mac client. Realize that this is for active users, and that many occasional users can share this memory at a cost of paging.
- ″Typical″ clients we have seen range from 4 to 10 packets/sec per client depending on application and time of day. Unfortunately, this may not be ″typical″ for your server usage. The only safe way to plan a solution is to measure your packets per seconds during normal operations.
- Performance for systems not measured can be extrapolated by scaling the SPECInt92 ratings.

AIX Connections on a RISC/6000 is limited by cpu. The cpu appears to be most heavily used when a large number of packets must be processed. Even with this limitation, a Model E20 can process more packets than one Ethernet can transfer. Most dedicated PC servers do not have more than one LAN connection.

This is the only available capacity and throughput information available at this time. As more experience is gained in customer environments using ″real″ users, it will be electronically shared.

Appendix C. NWserver SYSTEM.INI

```
[boot]
shell=progman.exe
network.drv=netware.drv
mouse.drv=mouse.drv
language.dll=
sound.drv=mmsound.drv
comm.drv=comm.drv
keyboard.drv=keyboard.drv
system.drv=system.drv
386grabber=vga.3gr
oemfonts.fon=vgaoem.fon
fixedfon.fon=vgafix.fon
fonts.fon=vgasys.fondisplay.drv=vga.drv
display.drv=vga.drv
drivers=mmsystem.dll

[keyboard]
subtype=
type=4
keyboard.dll=
oemansi.bin=

[boot.description]
keyboard.typ=Enhanced 101 or 102 key US and Non US keyboards
mouse.drv=Microsoft, or IBM PS/2
language.dll=English (American)
system.drv=MS-DOS System
codepage=437
woafont.fon=English (437)
aspect=100,96,96
display.drv=VGA
network.drv=Novell NetWare (v4.0)
secondnet.drv=No Additional Network Installed

device=*vpd
mouse=*vmd
ebios=*ebios
woafont=dosapp.fon
display=*vddvga
EGA80WOA.FON=EGA80WOA.FON
EGA40WOA.FON=EGA40WOA.FON
CGA80WOA.FON=CGA80WOA.FON
CGA40WOA.FON=CGA40WOA.FON
keyboard=*vkd
network=*vnetbios, vipx.386, vnetware.38
netheapsize=16
device=*vcd
device=*vpicd
device=*vtd
device=*reboot
device=*vdmad
device=*vsd
device=*v86mmgr
device=*pageswap
device=*dosmgr
```

```
device=*vmpoll
device=*wshell
device=*PAGEFILE
device=*BLOCKDEV
device=*vfd
device=*parity
device=*biosxlat
device=*vmcpd
device=*combuff
device=*cdpscsi
device=vtdapi.386
device=vpmtd.386
device=vcomm.386
device=serial.386
device=lpt.386
device=ifsmgr.386
device=vcache.386
device=vshare.386
local=CON
FileSysChange=off
COM3Irq=4
COM3Base=03E8
COM4Irq=3
COM4Base=02E8
PagingFile=C:\WINDOWS\WIN386.SWP
MaxPagingFileSize=37342
TimerCriticalSection=1000
ReflectDOSInt2A=TRUE
OverlappedIO=OFF
UniqueDOSPSP=TRUE
PSPIncrement=5

[NonWindowsApp]
localtsrs=dosedit,ced

[vcache]
minfilecache=512

[mci]
WaveAudio=mciwave.drv
Sequencer=mciseq.drv
CDAudio=mcicda.drv

[drivers]
timer=timer.drv
midimapper=midimap.drv

]DDEShares[
CHAT$=winchat,chat,,31,,0,,0,0,0
SCHAT$=winchat,chat,,31,,0,,0,0,0
CLPBK$=clipsrv,system,,31,,0,,0,0,0
HEARTS$=mshearts,hearts,,15,,0,,0,0,0

[Network]
winnet=Novell/00040000
multinet=nonet
FileSharing=No
PrintSharing=No
```

```
[network drivers]
devdir=C:\WINDOWS
LoadRMDrivers=No
```

Note: If you also have the Microsoft Network installed, your SYSTEM.INI file may look a little different from the one above.

Appendix D. NB Realm of AIX Connections CONFIG.SYS

```
IFS=D:\OS2\HPFS.IFS /CACHE:64 /CRECL:4
DEVICE=D:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=D:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=D:\IBMCOM\LANMSGDD.OS2 /I:D:\IBMCOM
DEVICE=D:\IBMCOM\PROTMAN.OS2 /I:D:\IBMCOM
PROTSHELL=D:\OS2\PMSHELL.EXE
SET USER_INI=D:\OS2\OS2.INI
SET SYSTEM_INI=D:\OS2\OS2SYS.INI
SET OS2_SHELL=D:\OS2\CMD.EXE
SET AUTOSTART=PROGRAMS,TASKLIST,FOLDERS,CONNECTIONS,LAUNCHPAD
SET RUNWORKPLACE=D:\OS2\PMSHELL.EXE
SET COMSPEC=D:\OS2\CMD.EXE
LIBPATH=D:\MPTN\DLL;D:\IBMCOM\DLL;C:\IBMLAN\NETLIB;C:\MUGLIB\DLL;
D:\OS2\DLL;D:\OS2\MDOS;D:\;D:\OS2\A
PPS\DLL;.;\;\OS2\INSTALL;Z:\CID\LCU;Z:;\OS2\DLL;\OS2\MDOS;D:\MMOS2\DLL;
SET PATH=D:\MPTN\BIN;D:\IBMCOM;C:\IBMLAN\NETPROG;C:\MUGLIB;D:\OS2;
D:\OS2\SYSTEM;D:\OS2\MDOS\WINOS2;D
:\OS2\INSTALL;D:\;D:\OS2\MDOS;D:\OS2\APPS;\;\OS2;\OS2\SYSTEM;
\OS2\INSTALL;D:;D:\MMOS2;
SET DPATH=D:\IBMCOM;C:\IBMLAN\NETPROG;C:\IBMLAN;C:\MUGLIB;D:\OS2;
D:\OS2\SYSTEM;D:\OS2\MDOS\WINOS2;D:
\OS2\INSTALL;D:\;D:\OS2\BITMAP;D:\OS2\MDOS;D:\OS2\APPS;\;\OS2;
\OS2\SYSTEM;\OS2\INSTALL;D:;Z:\CID\LCU
;D:\MMOS2;D:\MMOS2\INSTALL;
BASEDEV=DETNE2.SYS
SET PROMPT=$i·$p“
SET HELP=D:\OS2\HELP;D:\OS2\HELP\TUTORIAL;D:\MMOS2\HELP;
SET GLOSSARY=D:\OS2\HELP\GLOSS;
SET IPF_KEYS=SBCS
PRIORITY_DISK_IO=YES
FILES=20
BASEDEV=IBMKBD.SYS
DEVICE=D:\OS2\BOOT\TESTCFG.SYS
DEVICE=D:\OS2\BOOT\DOS.SYS
DEVICE=D:\OS2\BOOT\PMDD.SYS
BUFFERS=90
IOPL=YES
DISKCACHE=D,LW,AC:D
MAXWAIT=3
MEMMAN=SWAP,PROTECT
SWAPPATH=D:\OS2\SYSTEM 2048 6144
BREAK=OFF
THREADS=256
PRINTMONBUFSIZE=134,134,134
COUNTRY=001,D:\OS2\SYSTEM\COUNTRY.SYS
SET KEYS=ON
SET BOOKSHELF=D:\OS2\BOOK;D:\MMOS2;
SET SOMIR=D:\OS2\ETC\SOM.IR;D:\OS2\ETC\WPSH.IR;D:\OS2\ETC\WPDSERV.IR
SET SOMDDIR=D:\OS2\ETC\DSOM
REM SET DELDIR=C:\DELETE,512;D:\DELETE,512;
BASEDEV=PRINT02.SYS
BASEDEV=IBM2FLPY.ADD
BASEDEV=IBM1FLPY.ADD
BASEDEV=IBM2ADSK.ADD
BASEDEV=XDFLOPPY.FLT
```

```
BASEDEV=OS2DASD.DMD
SET EPMPATH=D:\OS2\APPS;
PROTECTONLY=NO
SHELL=D:\OS2\MDOS\COMMAND.COM D:\OS2\MDOS
FCBS=16,8
RMSIZE=640
DEVICE=D:\OS2\MDOS\VEMM.SYS
DOS=LOW,NOUMB
DEVICE=D:\OS2\MDOS\VXMS.SYS /UMB
DEVICE=D:\OS2\MDOS\VDPMI.SYS
DEVICE=D:\OS2\MDOS\VDPX.SYS
DEVICE=D:\OS2\MDOS\VWIN.SYS
DEVICE=D:\OS2\MDOS\VW32S.SYS
DEVICE=D:\OS2\MDOS\VMOUSE.SYS
DEVICE=D:\OS2\BOOT\POINTDD.SYS
DEVICE=D:\OS2\BOOT\MOUSE.SYS
DEVICE=D:\OS2\BOOT\COM.SYS
DEVICE=D:\OS2\MDOS\VCOM.SYS
CODEPAGE=437,850
DEVINFO=KBD,US,D:\OS2\KEYBOARD.DCP
BASEDEV=IBM2FLPY.ADD
BASEDEV=IBM1FLPY.ADD
BASEDEV=IBM2ADSK.ADD
BASEDEV=XDFLOPPY.FLT
BASEDEV=OS2DASD.DMD
SET EPMPATH=D:\OS2\APPS;
PROTECTONLY=NO
SHELL=D:\OS2\MDOS\COMMAND.COM D:\OS2\MDOS
FCBS=16,8
RMSIZE=640
DEVICE=D:\OS2\MDOS\VEMM.SYS
DOS=LOW,NOUMB
DEVICE=D:\OS2\MDOS\VXMS.SYS /UMB
DEVICE=D:\OS2\MDOS\VDPMI.SYS
DEVICE=D:\OS2\MDOS\VDPX.SYS
DEVICE=D:\OS2\MDOS\VWIN.SYS
DEVICE=D:\OS2\MDOS\VW32S.SYS
DEVICE=D:\OS2\MDOS\VMOUSE.SYS
DEVICE=D:\OS2\BOOT\POINTDD.SYS
DEVICE=D:\OS2\BOOT\MOUSE.SYS
DEVICE=D:\OS2\BOOT\COM.SYS
DEVICE=D:\OS2\MDOS\VCOM.SYS
CODEPAGE=437,850
DEVINFO=KBD,US,D:\OS2\KEYBOARD.DCP
SET MMBASE=D:\MMOS2;
SET DSPPATH=D:\MMOS2\DSP;
SET NCDEBUG=4000
DEVICE=D:\MMOS2\SSMDD.SYS
DEVICE=D:\MMOS2\ROSTUB.SYS
DEVINFO=SCR,VGA,D:\OS2\BOOT\VIOTBL.DCP
SET VIDEO_DEVICES=VIO_VGA
SET VIO_VGA=DEVICE(BVHVGA)
DEVICE=D:\OS2\MDOS\VVGA.SYS
CALL=D:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=D:\IBMCOM\LANMSGEX.EXE
SET ETC=D:\MPTN\ETC
DEVICE=D:\MPTN\PROTOCOL\SOCKETS.SYS
DEVICE=D:\MPTN\PROTOCOL\AFOS2.SYS
DEVICE=D:\MPTN\PROTOCOL\AFNB.SYS
```

```
RUN=D:\MPTN\BIN\AFNBINI.EXE
RUN=D:\MPTN\BIN\CNTRL.EXE
CALL=D:\OS2\CMD.EXE /Q /C D:\MPTN\BIN\MPTSTART.CMD
DEVICE=D:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:C:\IBMLAN /N
DEVICE=D:\IBMCOM\PROTOCOL\NETBIOS.OS2
REM DEVICE=d:\ibmcom\srvifs\srvifs.sys
REM IFS=d:\ibmcom\srvifs\srvifsc.ifs *
RUN=C:\IBMLAN\NETPROG\LSDAEMON.EXE

SET RESTARTOBJECTS=STARTUPFOLDERSONLY
DEVICE=D:\IBMCOM\MACS\IBMTOK.OS2
OG\LSDAEMON.EXE

SET RESTARTOBJECTS=STARTUPFOLDERSONLY
DEVICE=D:\IBMCOM\MACS\IBMTOK.OS2
```

Appendix E. NB Realm of AIX Connections SYSTEM.INI

```
C:\ TYPE SYSTEM.INI

[boot]
shell=progman.exe
network.drv=wfwnet.drv
mouse.drv=mouse.drv
language.dll=
sound.drv=mmsound.drv
comm.drv=comm.drv
keyboard.drv=keyboard.drv
system.drv=system.drv
386grabber=vga.3gr
oemfonts.fon=vgaoem.fon
fixedfon.fon=vgafix.fon
fonts.fon=vgasys.fon
display.drv=vga.drv
drivers=mmsystem.dll

[keyboard]
subtype=
type=4
keyboard.dll=
oemansi.bin=

[boot.description]
keyboard.typ=Enhanced 101 or 102 key US and Non US keyboards
mouse.drv=Microsoft, or IBM PS/2
language.dll=English (American)
system.drv=MS-DOS System
codepage=437
woafont.fon=English (437)
aspect=100,96,96
display.drv=VGA
network.drv=Microsoft Windows Network (version 3.11)
secondnet.drv=No Additional Network Installed

[386Enh]
device=*vpd
mouse=*vmd
ebios=*ebios
woafont=dosapp.fon
display=*vddvga
EGA80WOA.FON=EGA80WOA.FON
EGA40WOA.FON=EGA40WOA.FON
CGA80WOA.FON=CGA80WOA.FON
CGA40WOA.FON=CGA40WOA.FON
keyboard=*vkd
network=*vnetbios,*vwc,vnetsup.386,vredir.386,vserver.386
netheapsize=20
device=*vcd
device=*vpicd
device=*vtd
device=*reboot
device=*vdmad
device=*vsd
```

```
device=*v86mmgr
device=*pageswap
device=*dosmgr
device=*vmpoll
device=*wshell
device=*PAGEFILE
device=*BLOCKDEV
device=*vfd
device=*parity
device=*biosxlat
device=*vmcpd
device=*combuff
device=*cdpscsi
device=vtdapi.386
device=vpmtd.386
device=vcomm.386
device=serial.386
device=lpt.386
device=ifsmgr.386
device=vcache.386
device=vshare.386
local=CON
FileSysChange=off
COM3Irq=4
COM3Base=03E8
COM4Irq=3
COM4Base=02E8
PagingFile=C:\WINDOWS\WIN386.SWP
MaxPagingFileSize=36864
netmisc=ndis.386,ndis2sup.386
netcard=ibmtok.386
transport=nwlink.386,nwnblink.386,netbeui.386
InDOSPolling=FALSE

[NonWindowsApp]
localtsrs=dosedit,ced

[vcache]
minfilecache=512

[mci]
WaveAudio=mciwave.drv
Sequencer=mciseq.drv
CDAudio=mcicda.drv

[drivers]
timer=timer.drv
midimapper=midimap.drv

[DDEShares]
CHAT$=winchat,chat,,31,,0,,0,0,0
SCHAT$=winchat,chat,,31,,0,,0,0,0
CLPBK$=clipsrv,system,,31,,0,,0,0,0
HEARTS$=mshearts,hearts,,15,,0,,0,0,0

[Network]
winnet=wfwnet/00025100
multinet=nonet
FileSharing=Yes
```

```
PrintSharing=Yes
LogonDisconnected=Yes
EnableSharing=Yes
UserName=GINNY
Workgroup=WORKGROUP
ComputerName=EUGENIAC
Comment=Eugenia Corzo
logonvalidated=no
reconnect=yes
DeferBrowse=yes
AutoLogon=Yes
StartMessaging=No
LoadNetDDE=Yes
LMLogon=0
LogonDomain=LSLILBIRD
DomainLogonMessage=Yes
cachethispassword=yes



[network drivers]
netcard=ibmtok.dos
transport=ndishlp.sys,*netbeui
devdir=C:\WINDOWS
LoadRMDrivers=No

[NWNBLINK]
LANABASE=1

[Password Lists]
*Shares=C:\WINDOWS\ShareOOO.PWL
ADCS=C:\WINDOWS\ADCS.PWL
GINNY=C:\WINDOWS\GINNY.PWL
NNY.PWL
```

Appendix F. NB Realm of AIX Connections WIN.INI

```
[windows]
spooler=yes
load=
run=
Beep=yes
NullPort=None
BorderWidth=3
CursorBlinkRate=530
DoubleClickSpeed=452
Programs=com exe bat pif
Documents=
DeviceNotSelectedTimeout=15
TransmissionRetryTimeout=45
KeyboardDelay=2
KeyboardSpeed=31
ScreenSaveActive=0
ScreenSaveTimeOut=120
device=IBM Laser Printer 4019,ibm4019,LPT1:

[Desktop]
Pattern=(None)
TileWallPaper=0
GridGranularity=0

[Extensions]
crd=cardfile.exe ¬.crd
trm=terminal.exe ¬.trm
txt=notepad.exe ¬.txt
ini=notepad.exe ¬.ini
pcx=pbrush.exe ¬.pcx
bmp=pbrush.exe ¬.bmp
wri=write.exe ¬.wri
rec=recorder.exe ¬.rec
hlp=winhelp.exe ¬.hlp
mmf=msmail.exe /f ¬.mmf

[intl]
sLanguage=enu
sCountry=United States
iCountry=1
iDate=0
iTime=0
iTLZero=0
iCurrency=0
iCurrDigits=2
iNegCurr=0
iLzero=1
iDigits=2
iMeasure=1
s1159=AM
s2359=PM
sCurrency=$
sThousand=,
sDecimal=.
sDate=/
```

```
sTime=:
sList=,
sShortDate=M/d/yy
sLongDate=dddd, MMMM dd, yyyy

[ports]
; A line with [filename].PRN followed by an equal sign causes
; [filename] to appear in the Control Panel's Printer Configuration dialog
; box. A printer connected to [filename] directs its output into this file.
; The file must be on one of your local drives; you cannot print to a network
; file.
LPT1:=
LPT2:=
LPT3:=
COM1:=9600,n,8,1,x
COM2:=9600,n,8,1,x
COM3:=9600,n,8,1,x
COM4:=9600,n,8,1,x
EPT:=
FILE:=
LPT1.DOS=
LPT2.DOS=
FAX:=

[FontSubstitutes]
Helv=MS Sans Serif
Tms Rmn=MS Serif
Times=Times New Roman
Helvetica=Arial

[TrueType]

[Sounds]
SystemDefault=ding.wav, Default Beep
SystemExclamation=ding.wav, Exclamation
SystemStart=chimes.wav, Windows Start
SystemExit=chimes.wav, Windows Exit
SystemHand=ding.wav, Critical Stop
SystemQuestion=ding.wav, Question
SystemAsterisk=ding.wav, Asterisk
RingIn=ringin.wav, Incoming Call
RingOut=ringout.wav, Outgoing Call

[mci extensions]
wav=waveaudio
mid=sequencer
rmi=sequencer

[Compatibility]
NOTSHELL=0x0001
WPWINFIL=0x0006
CCMAIL=0x0008
AMIPRO=0x0010
REM=0x8022
PIXIE=0x0040
CP=0x0040
JW=0x42080
TME=0x0100
VB=0x0200
```

```
WIN2WRS=0x1210
PACKRAT=0x0800
VISION=0x0040
MCOURIER=0x0800
_BNOTES=0x24000
MILESV3=0x1000
PM4=0x2000
DESIGNER=0x2000
PLANNER=0x2000
DRAW=0x2000
WINSIM=0x2000
CHARISMA=0x2000
PR2=0x2000
PLUS=0x1000
ED=0x00010000
APORIA=0x0100
EXCEL=0x1000
GUIDE=0x1000
NETSET2=0x0100
W4GL=0x4000
W4GLR=0x4000
TURBOTAX=0x00080000

[winsetup]
source_disk_path=A:\

[fonts]
Arial (TrueType)=ARIAL.FOT
Arial Bold (TrueType)=ARIALBD.FOT
Arial Bold Italic (TrueType)=ARIALBI.FOT
Arial Italic (TrueType)=ARIALI.FOT
Courier New (TrueType)=COUR.FOT
Courier New Bold (TrueType)=COURBD.FOT
Courier New Bold Italic (TrueType)=COURBI.FOT
Courier New Italic (TrueType)=COURI.FOT
Times New Roman (TrueType)=TIMES.FOT
Times New Roman Bold (TrueType)=TIMESBD.FOT
Times New Roman Bold Italic (TrueType)=TIMESBI.FOT
Times New Roman Italic (TrueType)=TIMESI.FOT
WingDings (TrueType)=WINGDING.FOT
MS Sans Serif 8,10,12,14,18,24 (VGA res)=SSERIFE.FON
Courier 10,12,15 (VGA res)=COURE.FON
MS Serif 8,10,12,14,18,24 (VGA res)=SERIFE.FON
Symbol 8,10,12,14,18,24 (VGA res)=SYMBOLE.FON
Roman (Plotter)=ROMAN.FON
Script (Plotter)=SCRIPT.FON
Modern (Plotter)=MODERN.FON
small fonts (VGA res)=SMALLE.FON
Symbol (TrueType)=SYMBOL.FOT

[embedding]
SoundRec=Sound,Sound,SoundRec.exe,picture
Package=Package,Package,packager.exe,picture
PBrush=Paintbrush Picture,Paintbrush Picture,pbrush.exe,picture

[PrinterPorts]
IBM Laser Printer 4019=ibm4019,LPT1:,15,45
Microsoft At Work Fax=EFAXDRV,FAX:,15,45
```

```
[devices]
IBM Laser Printer 4019=ibm4019,LPT1:
Microsoft At Work Fax=EFAXDRV,FAX:

[MRU_Files]
Order=dabc
a=\\LSLILBIRD\ADCS ADCS
b=\\LSLILBIRD\GINNY
c=\\LSLILBIRD\JENS
d=\\LSLILBIRD\TN

[MRU_WinPopup_Comp]
Order=a
a=\\LSLILBIRD

[WinPopup]
Sound=1
AlwaysOnTop=0
MaxOnMsgRcv=1

[Event Log Viewer]
msctls_headerbar=14005F00460046003C00320032003700C800

[Windows Help]
H_WindowPosition=[213,160,213,160,0]
M_WindowPosition=[90,1,425,476,0]

[Mail]
MAPI=1

MaxOnMsgRcv=1

[Event Log Viewer]
msctls_headerbar=14005F00460046003C00320032003700C800

[Windows Help]
H_WindowPosition=[213,160,213,160,0]
M_WindowPosition=[90,1,425,476,0]

[Mail]
MAPI=1
]
MAPI=1
```

Appendix G. Special Notices

This publication is intended to help those who evaulate, implement or maintain AIX Connections. The information in this publication is not intended as the specification of any programming interfaces that are provided by AIX or AIX Connections. See the PUBLICATIONS section of the IBM Programming Announcement for AIX Version 4.1.5 for more information about what publications are considered to be product documentation.

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Appendix H. Related Publications

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

H.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see “How To Get ITSO Redbooks” on page 213.

H.2 Redbooks on CD-ROMs

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Application Development Redbooks Collection	SBOF-7290	SK2T-8037
Personal Systems Redbooks Collection	SBOF-7250	SK2T-8042

H.3 Other Publications

These publications are also relevant as further information sources:

- *Up and Running!*, SC23-1758-02
- *AIX Connections, Reference Guide*, SC23-1829-00
- *AIX Connections, Client Guide*, SC23-1762-01
- *AIX Connections, Administrators Guide*, SC23-1828-00

How To Get ITSO Redbooks

This section explains how both customers and IBM employees can find out about ITSO redbooks, CD-ROMs, workshops, and residencies. A form for ordering books and CD-ROMs is also provided.

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List of Abbreviations

ADSM	ADSTAR Distributed Storage Manager
APA	All Points Addressable
APF	Account Profile File
DCE	Distributed Computing Environment
DLL	Dynamic Link Library
DMA	Direct Memory Access
DPF	Default Profile File
HACMP	High Availability Cluster Multi-Processing/6000
IBM	International Business Machines Corporation
IPX	Internetwork Packet Exchange
ITSO	International Technical Support Organization
JFS	Journaled File System
LVM	Logical Volume Manager
MPTS	Multiple Protocol Transport Services
NCP	NetWare Core Protocol
NetBIOS	Network Basic Input/Output System
NetBEUI	NetBIOS Extended User Interface
NFS	Network File System
NIS	Network Information Service
NVT	NetWare Virtual Terminal
ODI	Open Data Link Interface
OSI	Open Systems Interconnection
SDF	Service Definition File
SMB	Server Message Block
SMIT	System Management Interface Tool
SNA	Systems Network Architecture
SNMP	Simple Network Management Protocol
SPX	Sequenced Packet Exchange
TCP/IP	Transmission Control Protocol/Internet Protocol
TPI	Transport Provider Interface
UMB	Upper Memory Block
VLM	Virtual Loadable Modules
VSM	Visual Systems Management
XMS	Extended Memory Specification

Index

Special Characters

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