

Establishing a PPP Connection With NetWare Connect

BY JOHN E. JOHNSTON



NetWare Connect's dial-in services allow end users remote access to your NetWare resources using the IPX/SPX protocol and any other services on your network that utilize the TCP/IP protocol.

NETWARE Connect Version 2 provides a mechanism that allows a remote PC to dial into the network and establish a Point-to-Point protocol (PPP) session. This remote node connection supports both the TCP/IP and IPX/SPX protocols. This means that your end users can utilize the NetWare Connect dial-in service to access your NetWare resources using the IPX/SPX protocol and any other services on your network that utilize the TCP/IP protocol. This article demonstrates how to set up NetWare Connect to provide a PPP remote node connection. Additionally, this article illustrates how a Windows 95 workstation can be configured, using native Windows 95 dial-up networking services, to connect to a NetWare Connect file server.

OVERVIEW

NetWare Connect Version 2 is a very robust product that is comprised of many different services. One of these services, Point-to-Point Remote Node Services (PPRNS), provides a remote node connection that supports IPX/SPX and TCP/IP. The PPRNS service of NetWare Connect is the focus of this article. Before we start, we need a clear understanding of just what a "remote node connection" is and is not.

There are three basic methods available today to provide dial-up remote computing: remote control, multi-user remote control and remote node.

Remote Control

The remote control dial-up solution is the process where a remote PC dials up another PC residing on the network. Using specialized remote control software, such as Reachout or PCAnywhere, the remote PC takes over the control of the local PC. This allows the remote user to access the resources on the local network.

Multi-User Remote Control

Multi-user remote control solutions work in the same manner as the remote control solution in that the remote user dials up and takes over a computer attached to the network. The difference is that the multi-user solution utilizes a multi-tasking operating system, such as Windows NT or OS/2, and supports several remote control connections simultaneously on a single PC. WinFrame is the most commonly used multi-user remote control solution.

Remote Node

With a remote node connection, the remote PC dials into the network and,

rather than taking over another PC, the remote PC is connected directly to the network. While remote node dial-in is a very stable and robust remote connectivity method, it has a few problems:

Remote node is slow: When connecting to a network using remote node, you are replacing a 10, 16 or 100Mbps network pipe with a much slower 28.8 or 33.6Kbps telephone connection. Simply loading a large executable file can take several minutes to complete.

Software must be loaded locally: Due to the bandwidth problem mentioned above, it is imperative that the programs used by the remote node user be loaded on the remote PC's hard drive. While loading this software on the remote PC can make remote node connections very responsive, it does cause problems when software upgrades are required.

Remote node dial-in solutions do have their merits, however. Remote node hardware and software is relatively simple to set up, thus, making this solution very stable and reliable. Additionally, remote node is inexpensive to implement.

SOFTWARE REQUIREMENTS

The only software requirements for NetWare Connect are the NetWare Connect software itself and a copy of NetWare 3.12 or 4.x. The standard (multi-user) NetWare or NetWare Runtime can be used with NetWare Connect. NetWare Runtime (single-user) software is bundled with the eight and greater port licenses of NetWare Connect. When users dial into a NetWare Connect file server, they do not obtain a licensed connection from the NetWare Connect server (unless they actually log into that server). This allows you to use NetWare Runtime on a dedicated NetWare Connect file server, using this server as a connection mechanism to other servers on your network.

HARDWARE REQUIREMENTS

NetWare Connect requires either a dedicated or shared file server. This server will require a communications adapter, such as the

**Your end users can utilize
the NetWare Connect dial-in
service to access
your NetWare resources
using the IPX/SPX protocol
and any other services
on your network that utilize
the TCP/IP protocol**

DigiBoard adapter, to allow multiple modems to be connected to the NetWare Connect server.

TELEPHONE ISSUES

You must also provide telephone lines for the NetWare Connect server. Many sites choose to install an eight-port DigiBoard into their NetWare Connect server, requiring eight modems and eight telephone lines. The problem many face is that these eight telephone lines have eight distinct telephone numbers associated with them. So, if the end user calls modem #1 and gets a busy signal, that user must then change his software configuration to dial the telephone number for modem #2. The cure for this is to establish a telephone hunt group. This hunt group associates all of the telephone lines with a single telephone number. If modem #1 is busy, the call is automatically switched to the next modem in the hunt group.

ware configuration to dial the telephone number for modem #2. The cure for this is to establish a telephone hunt group. This hunt group associates all of the telephone lines with a single telephone number. If modem #1 is busy, the call is automatically switched to the next modem in the hunt group.

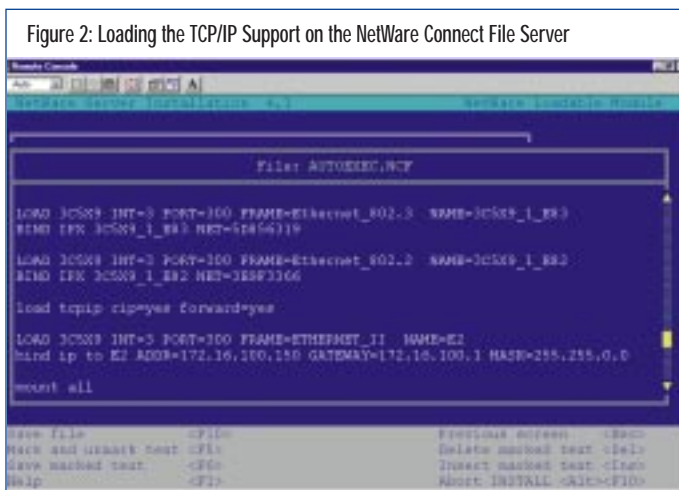
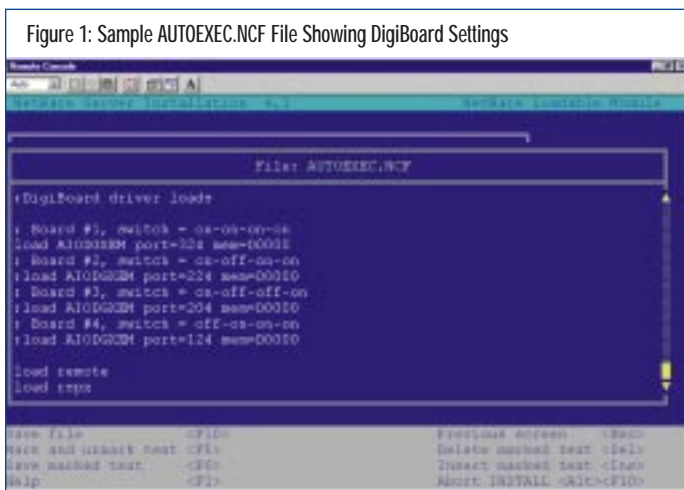
COMMUNICATIONS ADAPTER INSTALLATION

One of the most time-consuming and frustrating aspects of implementing NetWare Connect is installing and configuring the communications adapter. This adapter allows you to connect multiple modems to your NetWare Connect file server. The most common adapter in use today is the DigiBoard from Digi International.

The DigiBoard documentation is rather cryptic, and you may find yourself struggling for hours just to resolve I/O port and memory conflicts. However, software is provided with the DigiBoard to help resolve these conflicts. To help you with the dip switch settings, memory and port settings, see the sample AUTOEXEC.NCF statements in Figure 1. The four LOAD AIODGXEM statements show the most common configurations for the DigiBoard. Notice that the dip switch settings are shown along with the port and memory settings. **Note:** You should install the communications adapter and load the appropriate driver (e.g., AIODGXEM.NLM) before performing a NetWare Connect software installation.

TCP/IP SET UP

Before you implement NetWare Connect, you must have TCP/IP



set up on the file server that is to host the NetWare Connect software. **Note:** NetWare Connect will not run on a file server that is running NetWare/IP. You must use the standard NetWare TCP/IP protocol stack rather than NetWare/IP.

Setting up TCP/IP on the NetWare Connect server is relatively easy. The AUTOEXEC.NCF file in Figure 2 shows the statements required to load TCP/IP.

The first two lines in Figure 2 load the LAN driver for frame type 802.3, then bind the IPX protocol to that LAN driver. The second set of load/bind commands load the LAN driver with the 802.2 frame type and bind IPX to that driver.

The next statement loads tcpip.nlm. Notice the rip=yes and forward=yes parameters on this line. These parameters are required for the PPP connection.

The last set of load/bind parameters are used for the TCP/IP protocol. The load command loads the LAN driver with the Ethernet_II frame type. This is required for TCP/IP. Notice the bind statement for the IP protocol shown in Figure 2. The following is an explanation of the parameters on this bind statement:

ADDR=172.16.100.150: This is the TCP/IP address that is now assigned to the NetWare Connect file server.

GATEWAY=172.16.100.1: This is the TCP/IP gateway address. If you do not have a TCP/IP gateway in place, omit this parameter.

MASK=255.255.0.0: This is the subnet mask for the IP network to which the NetWare Connect file server is connected to.

NETWARE CONNECT INSTALLATION

Once you have NetWare (Runtime [single-user version of the NetWare operating system] or standard) installed on the server to be used by NetWare Connect, and you have TCP/IP loaded, you are ready to install the NetWare Connect software. While the installation is simple to perform, it will not be covered in this article. **Note:** Do not attempt to configure NetWare Connect after you load it. You must first

**NetWare Connect Version 2
is a very robust product
that is comprised
of many different services.
One of these services,
Point-to-Point Remote Node
Services (PPRNS),
provides a remote node
connection that supports
IPX/SPX and TCP/IP.**

apply any required maintenance to the product as described below.

APPLY NETWARE CONNECT MAINTENANCE

You *must* be at NetWare Connect maintenance level V2.0.30 or higher in order to implement the NetWare Connect PPP connection. Even if this is a brand new installation, you must check the maintenance level of your software before continuing. Doing so could save you a lot of time and aggravation.

To check the maintenance level of NetWare Connect, perform the following from the server's system console:

1. Load Install.
2. Select "Product Options."
3. Select "View/Configure/Remove installed products."

You will see a screen similar to the one shown in Figure 3. Notice that we are at level 2.0.30 in this example. The steps required to upgrade back-leveled NetWare Connect packages vary, depending upon the current maintenance level of the product:

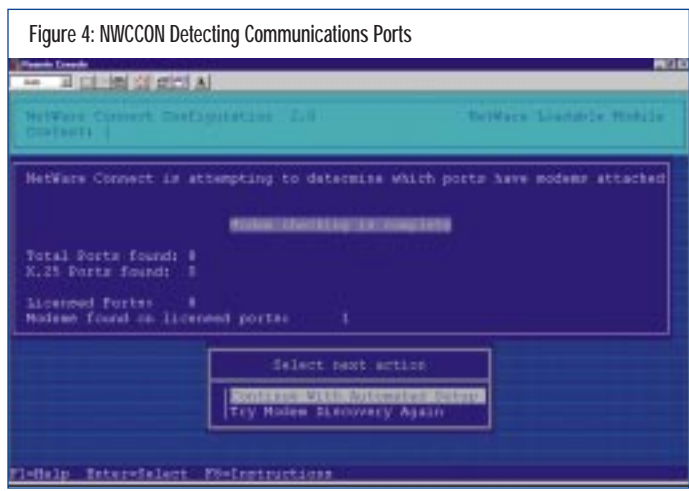
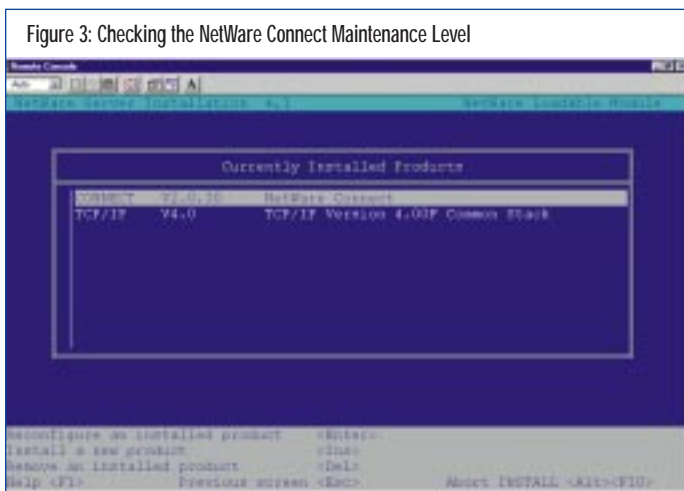
If the level is 2.0.18, apply the following patch files:

```
NWC201.EXE
NWC202.EXE
NWC206.EXE
NWC207.EXE
NWC208.EXE
```

If the level is 2.0.25, 2.0.27 or 2.0.28, apply the following patch files:

```
NWC206.EXE
NWC207.EXE
NWC208.EXE
```

These patch files can be obtained from the Novell Web site at www.novell.com. Each patch file comes with installation instructions. Follow these instructions carefully to apply all of the required maintenance to your NetWare Connect product.



UPDATE MODEM SCRIPT FILES

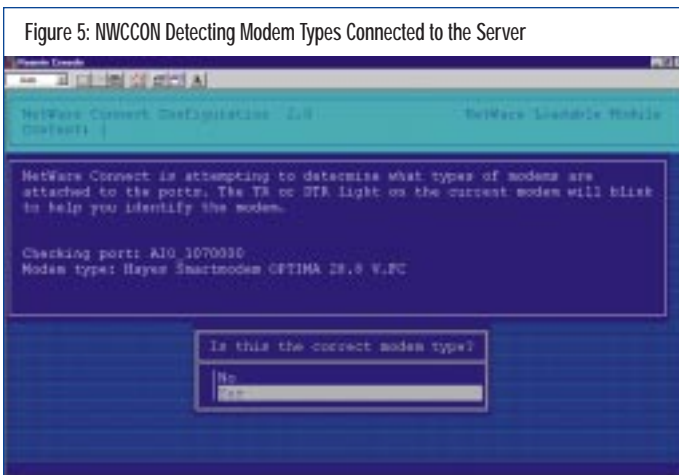
After installing the NetWare Connect maintenance, you should download and install the latest modem script files. Download file NWCMOD.EXE from the Novell Web site, then follow the instructions included with the file to perform the installation.

CONFIGURING NETWARE CONNECT

Now that you have NetWare Connect installed with the latest maintenance patches, you are ready to configure NetWare Connect. The NWCCON.NLM program is the configuration utility for NetWare Connect. **Note:** Before starting NWCCON, make sure all of the modems attached to your NetWare Connect file server are connected to the server and turned on.

The following steps are required to configure NetWare Connect for the PPP connection:

1. Enter "Load NWCCON" from the NetWare Connect file server console. The first time you run the NWCCON utility on a fresh install, the NWCCON utility will check to see that your communications adapter ports are operating correctly and will also check to see which ports have modems attached to them. The screen shown in Figure 4 will be displayed. Notice, in this case, eight communications ports were detected, but only one modem was connected.
2. Next, NWCCON will attempt to auto-detect the modems attached to your ports as shown in Figure 5. This is where it is important to have the latest NWCMODS installed to make sure your modem is identified and the proper modem scripts are used.
3. Next, you will be prompted for the NWC services you wish to install as shown in Figure 6. PPP connections require the PPPRNS service. The NCS service is used for the NASI connection service. You should install this service, as you may wish to utilize it in the future to perform dial-out services. The ARAS service is used to provide AppleTalk support.



The NetWare Connect PPRNS service provides a reliable method for providing access to your NetWare server's PD service and TCP/IP enabled resources.

If you do not need AppleTalk support, do not install the ARAS service.

PPRNS CONFIGURATION

After selecting the PPRNS service you will see a screen similar to Figure 7. From this screen you must configure the IPX and IP settings. You can choose to implement IP or IPX, or both IP and IPX. It is recommended that you implement both the IPX and IP protocols.

PPRNS IPX Configuration

When you select the IPX protocol, you will be prompted for an IPX network number, as shown in Figure 7. Enter a unique number in this field.

PPRNS IP Configuration

When you select the IP protocol, you will be prompted for the IP address and subnet mask, as shown in Figure 8. **Note:** The IP address specified in the PPRNS configuration must reside on a different subnet than the NetWare Connect file server.

The IP address and subnet mask specified in this step is for the WAN interface (modem ports) not the NetWare Connect Server itself. When configured properly, this single address is shared among all modem ports attached to your file server. This does not mean that each dial-in user will have the same IP address; they won't. I will talk more about the remote users' IP configurations later. The IP address specified in this step is used by the NetWare Connect file server to communicate with its WAN link (the communications adapter).

The IP address specified here must be on a different subnet than the NetWare Connect file server. This is accomplished by stub sub-networking. The whole process is controlled by the use of the subnet mask. The best way to illustrate this is with an example.

The IP address of the NetWare Connect file server in this article is 172.16.100.1, as controlled by the "bind IP" statement in Figure 2. The subnet mask for this address is 255.255.0.0. This makes this a class B IP address.

The IP address for the WAN link of this same server is 172.16.101.1 with a subnet mask of 255.255.255.0. The subnet mask of this WAN link specifies this as an address on a different

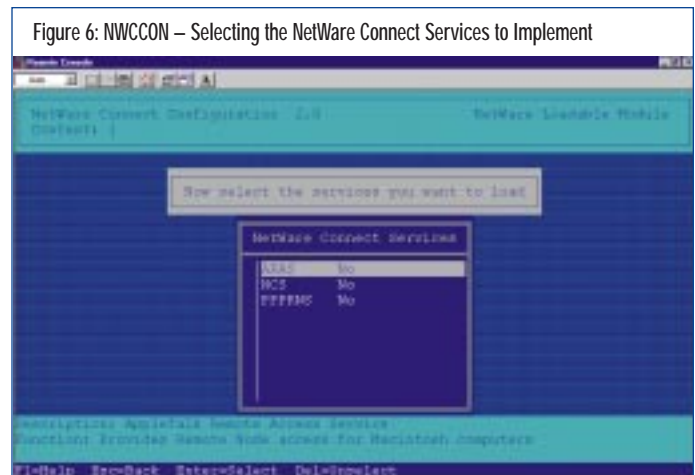


Figure 7: Configuring the IPX Settings for PPPRNS

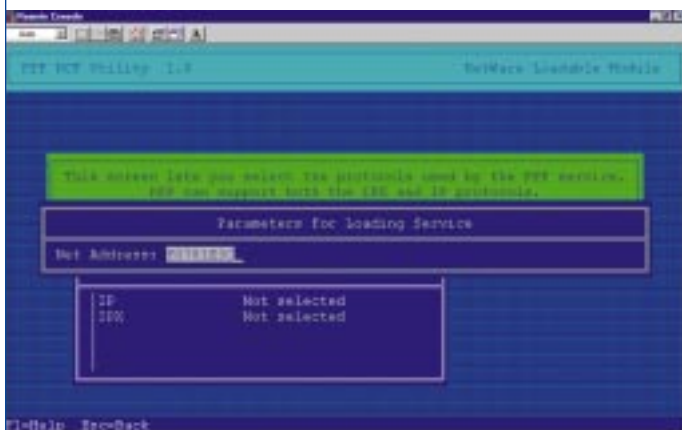


Figure 8: NWCCON – Specifying the IP Address of the WAN Link

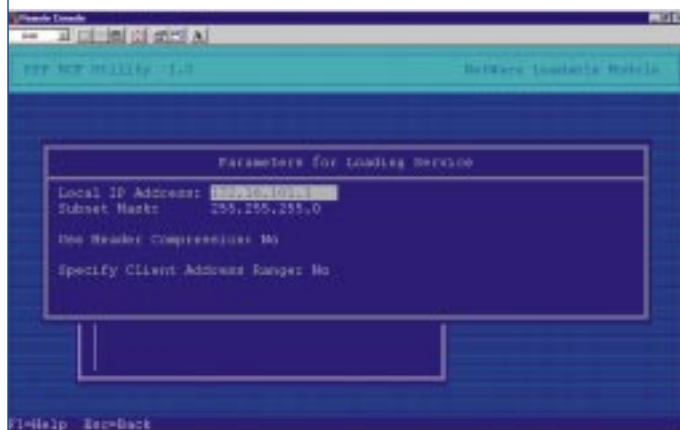


Figure 9: Messages From NWCSTART Showing Correct Stub Sub-Networking Configuration.

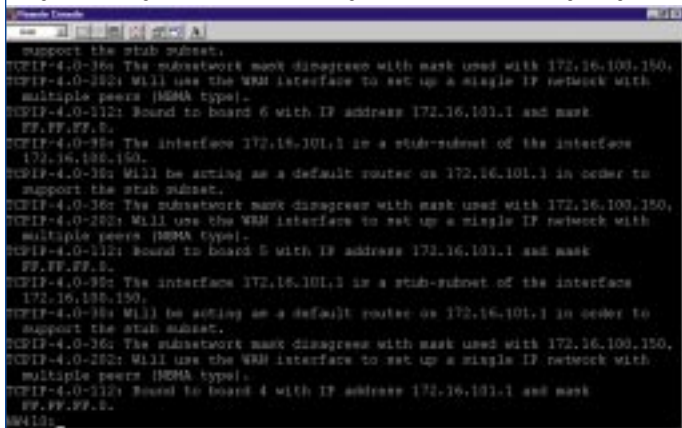
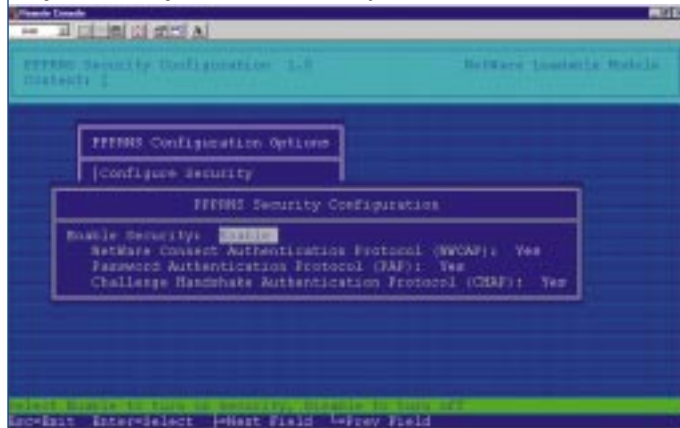


Figure 10: Enabling the PAP and CHAP Security Protocols



subnet than the NetWare Connect file server (255.255.255.0 vs. 255.255.0.0). By subnetting in this manner, we are wasting addresses, since all 254 nodes on the 172.16.101 subnet must be dedicated to the NetWare Connect server. We will be using other addresses in this subnet for the remote workstations, but the most we will need is nine addresses (one for the WAN link and eight for the modem ports). You can get creative with the subnet mask to prevent wasting addresses, but this is beyond the scope of this article.

You must ensure that your stub network is operating correctly before proceeding to the next set-up steps. When your stub subnet is set up correctly, you will see messages similar to the ones shown in Figure 9 when you issue the NWCSTART command to start NetWare Connect on your file server.

PPPRNS Security Configuration

You must enable the CHAP and PAP security protocols to implement the PPP connection, as shown in Figure 10. To do this, perform the following from NWCCON:

1. Configure NetWare Connect.
2. Select "Services."
3. Select "PPPRNS."
4. Select "Security."
5. Change PAP and CHAP to YES.

After enabling PAP and CHAP, you must specify a password for each user that you wish to provide PPP dial-in access.

Unfortunately, the end user's NetWare password cannot be used for the PPP dial-in access. You must specify another password for the user using the NWCCON utility. To specify a password for the user, perform the following from the NWCCON utility:

1. Configure NetWare Connect.
2. Select "Security."
3. Set User Remote Client Password.

STARTING NETWARE CONNECT

You are now ready to start the NetWare Connect software. Exit the NWCCON utility, then enter "NWCSTART" from the file server console. Watch closely for errors as the software initializes.

CLIENT SET UP

Setting up a Windows 95 workstation to dial up the NetWare Connect server is simple. From the Dial Up Networking folder, select "Make a New Connection". Then, enable the IPX/SPX protocols and the TCP/IP protocol, as shown in Figure 11. In the "Type of Dial-Up Server" field, select:

PPP: Windows 95, Windows NT 3.5, Internet

Click on TCP/IP settings and enter an IP address for the remote PC, as shown in Figure 12. You may also wish to specify DNS addresses if needed at your organization. Make sure you enter the correct telephone number, and you are ready to test the connection.

Figure 11: Selecting the Protocols on the Remote PC



Figure 12: Specifying the Client IP Address

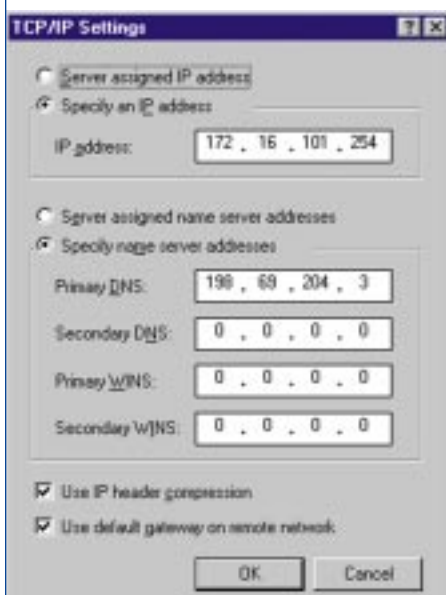


Figure 13: Using winipcfg to Check Remote PC TCP/IP Settings

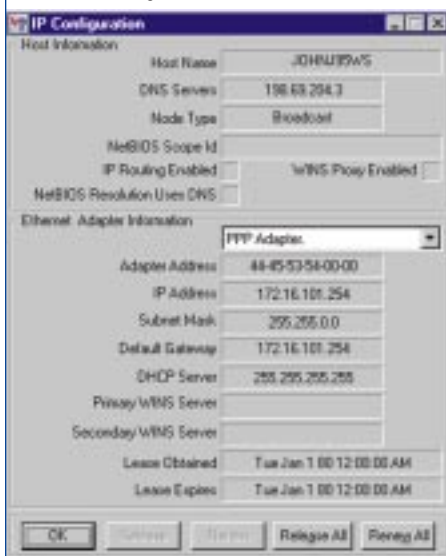
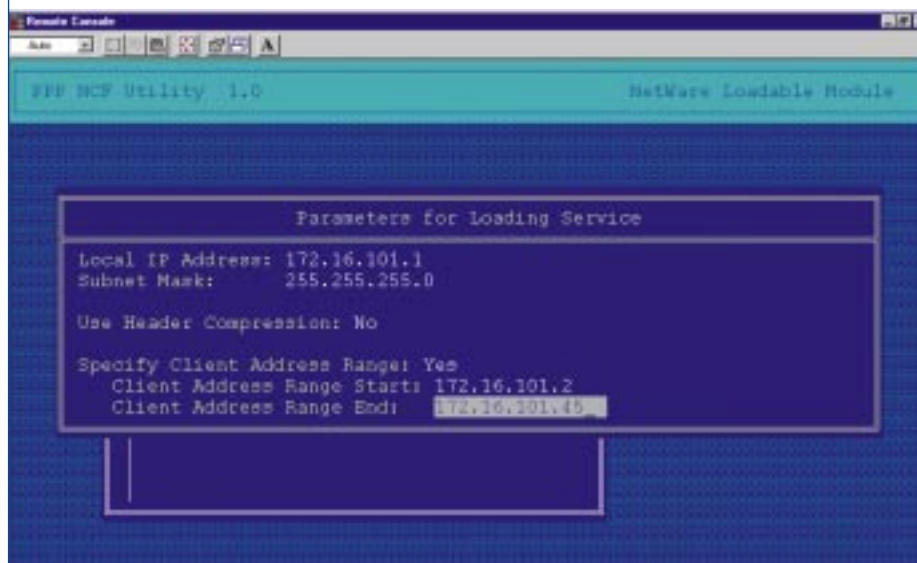


Figure 14: Specifying the DHCP Client Address Range



When you test the connection, make sure you enter a valid username and password. Once you successfully connect to your NetWare Connect file server, check your IP settings by performing the following from the remote PC:

1. Click on Start > Run.
2. Enter winipcfg.

The screen shown in Figure 13 will be presented. Check the TCP/IP parameters to ensure correctness.

DHCP IMPLEMENTATION

The NetWare Connect module DHCPD.NLM provides a method for the NetWare Connect file server to automatically assign IP addresses to the end user when they dial into the server. This helps the network administrator in two areas:

- ◆ The administrator does not have to assign (and keep track of) IP addresses for the remote dial-in users.
- ◆ The chance of assigning duplicate IP addresses is eliminated.

Setting up DHCPD.NLM

The first step to setting up DHCPD is to load the NLM. From the NetWare Connect system console enter the following command:

```
Load DHCPD.NLM log=yes
```

Note: The log=yes option causes the DHCP messages to be presented on a

special screen on the NetWare Connect file server. When first setting up DHCPD, you should enable the log function to help identify and correct configuration problems.

Now, start the NWCCON utility. Traverse the NWCCON panels as follows:

1. Set up NetWare Connect.
2. Select "NetWare Connect Services."
3. Highlight "PPRNS" and press Enter.
4. Highlight "IP" and press Enter.

The panel shown in Figure 14 will be displayed. Enter YES in the Specify Client Address Range field and press Enter. Enter a range that is included in your stub network set up in the Client Address Range Start and Range End fields. In this example, we chose address 172.16.101.2 for the starting address and 172.16.101.45 as the ending address in the range. **Note:** After completing the configuration of DHCPD, you must place the LOAD DHCPD command into the NWCSTART.NCF file. This command should be placed after the LOAD TCPIP command.

Client Configuration for DHCPD

Once you have the NetWare Connect file server configured with DHCPD, you are ready to modify the client dial-up networking parameters to accept the IP address assignment from the file server. From the dial up computer, modify the settings of the dial-up networking object created in the "Client

Figure 15: Modifying the Dial-up Networking Parameters to Accept the DHCPD-Assigned IP Address

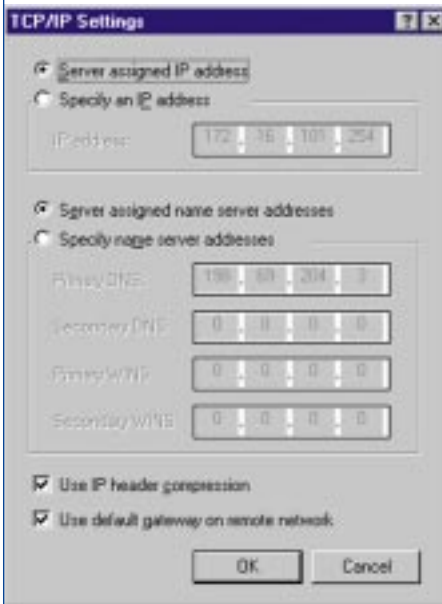
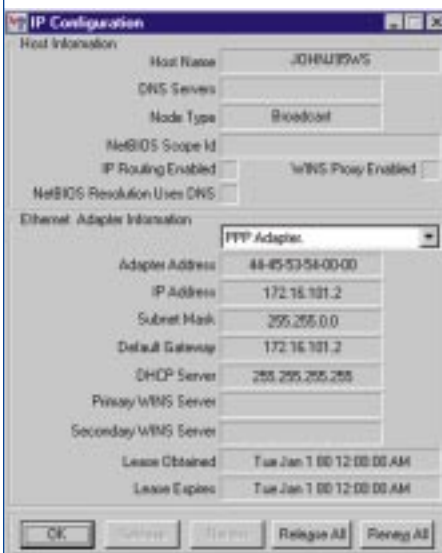


Figure 16: Verifying the Server-Assigned IP Address using WINIPCFG



Set Up” section above. To do this, perform the following:

1. Right click on the dial-up networking object that dials the NetWare Connect file server, then click on “Properties.”
2. Click on “Server Type.”
3. Click on “TCP/IP Settings.”
4. Enable the following settings, as shown in Figure 15:
 - ◆ Server-assigned IP address
 - ◆ Use default gateway on remote network

Testing the DHCPD Service

We are now ready to test the DHCPD service. From the remote PC, double-click on the dial-up networking object for the NetWare Connect server. After the connection to the server is established, click on Start > Run, then enter WINIPCFG. A panel similar to Figure 16 will be displayed. Notice the IP address and lease information in this figure. The IP address is within the range we specified in the DHCPD set up.

CONCLUSION

The NetWare Connect PPRNS service provides a reliable method for providing access to your NetWare server’s PD service and TCP/IP enabled resources. You can expand the PPRNS service by implementing the DHCPD.NLM function to automatically assign DNS addresses to your remote clients. **ts**



NaSPA member John E. Johnston is manager of technical support and communications for a major hospital in Pennsylvania. He designs and maintains cross-platform local and wide area networks utilizing NetWare, OS/2, DOS, and Windows. John can be contacted at johnj@fast.net.

©1998 Technical Enterprises, Inc. For reprints of this document contact sales@naspa.net.