MCSE

Workstation
Server
Enterprise

Coexistence With NetWare

Hands-on Lab Exercises 679

About Chapter 17

This chapter is all about protocols and services that increase the interoperability of Windows NT with NetWare.

The chapter describes NWLink IPX/SPX Compatible Transport, which provides protocol compatibility between Windows NT and NetWare computers. Routing this protocol using RIP for NWLink IPX/SPX Compatible Transport is also addressed.

Then the SAP Agent, which advertises a Windows NT computer's services to NetWare client computers, is introduced.

Next, this chapter explores Client Service for NetWare and Gateway Service for NetWare, which enable users of NT computers to access resources on a NetWare server. File and Print Services for NetWare and Directory Services Manager for NetWare are also explained.

Finally, Chapter 17 presents tips on troubleshooting common NetWare connectivity problems.

This chapter includes three hands-on labs. In these labs you'll install and configure NWLink IPX/SPX Compatible Transport, Client Service for NetWare, Gateway Service for NetWare, and RIP for NWLink IPX/SPX Compatible Transport.

Chapter 17 is a "must read" no matter which of the three Windows NT 4.0 Microsoft Certified Professional exams you're preparing for. This chapter covers numerous exam objectives, including objectives concerning network components, the NWLink IPX/SPX Compatible Transport protocol, implementing NT in a NetWare environment, configuring NT for interoperability with NetWare, and troubleshooting objectives on resolving connectivity problems.

Windows NT in a NetWare Environment

Microsoft includes several protocols and services with Windows NT that enable Windows NT computers to coexist with Novell NetWare servers and client computers on the same network.

In a nutshell, these components enable Windows NT computers to utilize the resources on NetWare servers, and, in limited circumstances, can also

enable Windows NT Server computers to share their resources with NetWare client computers in a heterogeneous networking environment. These protocols and sevices can be used for long-term integration in a mixed network operating system environment, or for the short-term during a migration from NetWare to Windows NT.

When you consider the large number of existing Novell NetWare networks, particularly when Windows NT was first released, it's not too surprising that Microsoft has developed and included these protocols and services with Windows NT. Solutions that enable both Windows NT and NetWare to be used on the same network were critical to Windows NT's wide acceptance in the network operating system arena.

Microsoft has addressed this challenge by developing various protocols and services that increase the interoperability of Windows NT with NetWare, including:

- NWLink IPX/SPX Compatible Transport
- RIP for NWLink IPX/SPX Compatible Transport
- SAP Agent
- Client Service for NetWare (CSNW)
- Gateway Service for NetWare (GSNW)
- File and Print Services for NetWare (FPNW)
- Directory Services Manager for NetWare (DSMN)

These protocols and services, including their features and how they are used, are discussed in detail in the following sections.

exam
preparation
pointer

Chapter 17 contains important information that is tested on all three of the Windows NT 4.0 exams. If you don't regularly use a NetWare server on your network, plan to review this chapter just before you take any of these exams.

If you're taking the Workstation exam, you can skip the sections on RIP for NWLink IPX/SPX Compatible Transport and Gateway Service for NetWare.

If you're taking either the Server or Enterprise exam, plan on studying the entire chapter.

The details in this chapter are *very* important! Plan on doing some brute memorization.

NWLink IPX/SPX Compatible Transport

NWLink IPX/SPX Compatible Transport is a routable transport protocol typically used in a combined Windows NT and NetWare environment. NWLink IPX/SPX Compatible Transport is Microsoft's version of Novell's IPX/SPX protocol. (*IPX/SPX* is the protocol used on most Novell NetWare networks.) NWLink provides protocol compatibility between Windows NT and NetWare computers. In addition to its functionality in a NetWare environment, NWLink also fully supports Microsoft networking.

NWLink IPX/SPX Compatible Transport, which is included with NT Server and NT Workstation, must be installed on NT Server and NT Workstation computers in order to enable them to communicate over the network with NetWare computers.

There are two important topics that need to be discussed before moving on to the installation of NWLink IPX/SPX Compatible Transport: frame types and network numbers. Because frame types and network numbers must be configured during installation, it's important to have a solid grasp of these basic network concepts.

Frame types

Frame types (also called *frame formats*) are accepted, standardized structures for transmitting data packets over a network. All frame types include certain common components, such as source address, destination address, data field, and cyclic redundancy check — but the various frame types include different combinations of *additional* fields beyond the common components.

Windows NT and NWLink IPX/SPX Compatible Transport support nine different frame types, which are described in Table 17-1.

TABLE 17-1 NWLINK IPX/SPX COMPATIBLE TRANSPORT FRAME TYPES		
FRAME TYPE	*DEFAULT/COMMON USAGE*	*NETWORK ADAPTERS THAT SUPPORT THIS FRAME TYPE*
Ethernet 802.2	Default frame type for NetWare 3.12 and later NetWare versions on Ethernet networks.	Ethernet

TABLE 17-1 *(continued)*

Frame Type	Default/Common Usage	Network Adapters That Support This Frame Type
Ethernet 802.3	Default frame type for NetWare 3.11 and earlier NetWare versions on Ethernet networks.	Ethernet
Ethernet II	Commonly associated with the TCP/IP protocol; not commonly used with NWLink IPX/SPX Compatible Transport.	Ethernet
Ethernet SNAP	Commonly associated with the AppleTalk protocol; not commonly used with NWLink IPX/SPX Compatible Transport.	Ethernet, FDDI
ARCNET	Default frame type for all versions of NetWare on ARCNET networks.	ARCNET
Token-Ring	Default frame type for all versions of NetWare on Token Ring networks.	Token Ring
Token-Ring SNAP	Commonly associated with the AppleTalk protocol; not commonly used with NWLink IPX/SPX Compatible Transport.	Token Ring
FDDI	Default frame type for NetWare 3.12 and later NetWare versions on FDDI networks.	FDDI
FDDI 802.3	Default frame type for NetWare 3.11 and earlier NetWare versions on FDDI networks.	FDDI

Before you select a frame type when installing and configuring NWLink IPX/SPX Compatible Transport, you should determine which frame type(s) are already in use on the network. You should select a frame type that *matches* the frame type already in use, or use the Windows NT auto frame type detection fea-

ture to automatically select a frame type. You can assign more than one frame type to an individual network adapter.

Frame type mismatching is a common cause of communications problems on networks that use NWLink IPX/SPX Compatible Transport. (This issue is covered in more depth in the "Troubleshooting Common NetWare Connectivity Problems" section in this chapter.)

Network Numbers

Network numbers are 32-bit binary numbers that uniquely identify an NWLink IPX/SPX Compatible Transport network segment for routing purposes. Because network numbers uniquely identify a network segment, they are used by IPX routers to correctly forward data packets from one network segment to another.

Network numbers are only assigned to Windows NT computers that use NWLink IPX/SPX Compatible Transport. Network numbers are assigned during the installation and configuration of NWLink IPX/SPX Compatible Transport.

Network numbers are commonly presented in an eight-digit hexadecimal format. (In a hexadecimal format, the numbers 0 through 9 and the letters A through F can be used.) Don't confuse a network number with a TCP/IP network ID or a computer's MAC (hardware) address.

There are two types of network numbers: network numbers and internal network numbers. A Windows NT computer that uses NWLink IPX/SPX Compatible Transport can have one or more network number(s) and an internal network number, as well.

When NWLink IPX/SPX Compatible Transport is used, a network number is assigned to each network adapter installed in a computer. A network number uniquely identifies the network segment to which the network adapter is connected. (If more than one frame type is assigned to a network adapter, then each frame type is assigned its own network number.) Windows NT can automatically detect and use the network number in use on a network segment. However, you can manually assign any unique eight-digit network number to a network adapter during the configuration of NWLink IPX/SPX Compatible Transport.

An internal network number must be assigned to a Windows NT computer that uses NWLink IPX/SPX Compatible Transport when more than one network adapter is installed in it. (If there is only one network adapter installed in a computer, Windows NT does not require you to assign an internal network number,

although you can assign an internal network number if you want.) An internal network number is an additional unique eight-digit network number that is used by the computer's operating system—an internal network number does *not* correspond to a specific network adapter installed in the computer. A Windows NT computer has only one internal network number, regardless of the number of network adapters installed in it.

Installing and Configuring NWLink IPX/SPX Compatible Transport

Installing and configuring NWLink IPX/SPX Compatible Transport is a fairly straightforward process. You should be prepared to enter the appropriate frame type(s) and network number(s) when prompted. If you have multiple adapters installed in your Windows NT computer, you will also have to assign an internal network number. Finally, only install this protocol at a time when you can shut down and restart the computer.

TO INSTALL AND CONFIGURE NWLINK IPX/SPX COMPATIBLE TRANSPORT ON A WINDOWS NT COMPUTER, FOLLOW THESE STEPS:

1. Select Start ➢ Settings ➢ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Protocols tab.

4. On the Protocols tab, click the Add command button.

5. In the Select Network Protocol dialog box, highlight NWLink IPX/SPX Compatible Transport in the Network Protocol list box. Figure 17-1 shows the Select Network Protocol dialog box. Notice NWLink IPX/SPX Compatible Transport is highlighted. Click OK.

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Server or Workstation source files (usually the i386 folder on your Windows NT Server or Workstation compact disc) is listed in the text box. Edit the text box as necessary. Click the Continue command button.

7. Windows NT installs NWLink IPX/SPX Compatible Transport. The Network dialog box reappears. Click the Close command button.
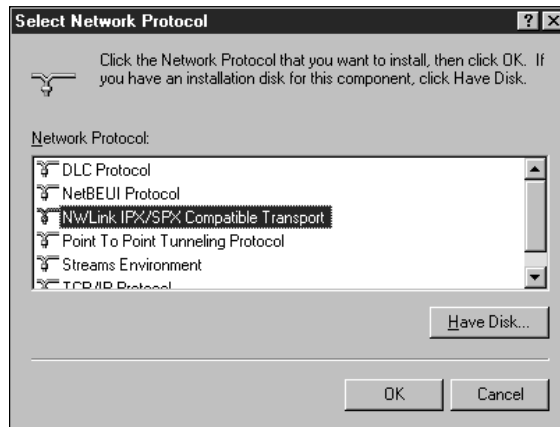
FIGURE 17-1 **Installing NWLink IPX/SPX Compatible Transport**

8. Windows NT performs various bindings operations.

9. If there is more than one network adapter installed in your computer, an NWLink IPX/SPX warning dialog box appears, indicating that you need to configure your computer's internal network number, as shown in Figure 17-2. Click the Yes command button.
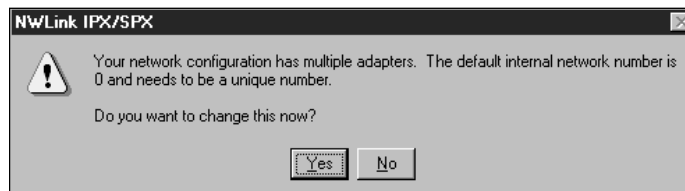

FIGURE 17-2 **Multiple network adapter warning**

10. The NWLink IPX/SPX Properties dialog box appears, as shown in Figure 17-3. Notice that you can configure the internal network number and the frame type in this dialog box. The configurable options in this dialog box are:

- **Internal Network Number:** Change the Internal Network Number to a unique nonzero hexadecimal number up to eight digits long.

- **Auto Frame Type Detection:** If you want Windows NT to automatically detect and assign a frame type to a network adapter, select the radio button next to Auto Frame Type Detection. Skip to Step 12.

- **Manual Frame Type Detection:** If you want to manually assign a frame type to a network adapter, select the radio button next to Manual Frame Type Detection, and click the Add command button.
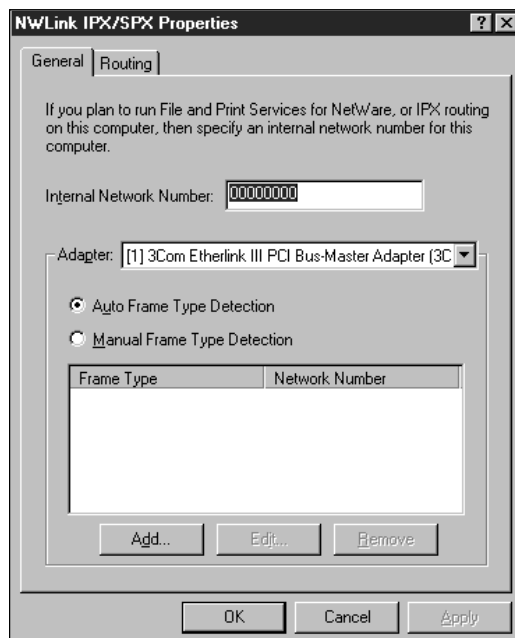
FIGURE 17-3 **Configuring the internal network number**

11. If you selected Manual Frame Type Detection, the Manual Frame Detection dialog box appears, as shown in Figure 17-4. Note the Frame Type drop-down list box and the Network Number text box. Select the desired frame type from the Frame Type drop-down list box. Type in a unique nonzero hexadecimal number up to eight digits long in the Network Number text box. Click the Add command button. (Note: All computers on a single subnet should use the same network number.)

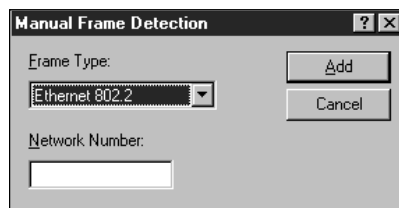**FIGURE 17-4** **Manually assigning a frame type and network number to a network adapter**

12. The NWLink IPX/SPX Properties dialog box reappears. If you want to configure a frame type and network number for an additional network adapter(s), select the network adapter from the Adapter drop-down list box, and then follow the instructions in Steps 10 and 11 to configure a frame type and network number for the network adapter.
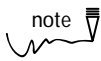
note ▼ **You can assign multiple frame types and network numbers to an individual network adapter.**

Figure 17-5 shows the NWLink IPX/SPX Properties dialog box after the configuration process is complete. Notice that two frame types and two network numbers are assigned to a single network adapter. Click OK.
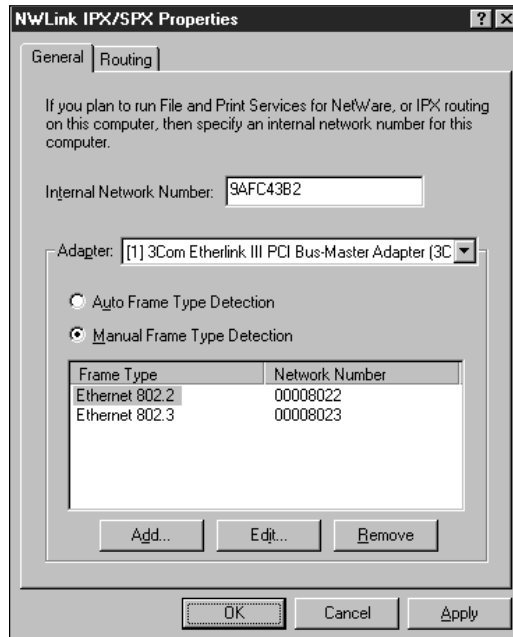
FIGURE 17-5 **Multiple frame types assigned to a network adapter**

13. A Network Settings Change dialog box appears, indicating you must shut down and restart the computer in order for the new settings to take effect. Click the Yes command button to restart the computer.

Routing NWLink IPX/SPX Compatible Transport

Windows NT Server computers can be configured to dynamically route NWLink IPX/SPX Compatible Transport. Windows NT can only dynamically route this pro-

tocol—there are no static routing configurations available. *Dynamic routing*, as you may recall from Chapter 16, involves the use of intelligent routers that are capable of automatically building and updating their routing tables.

In addition, Windows NT computers that are configured to route NWLink IPX/SPX Compatible Transport can also be configured to forward NetBIOS broadcasts (type 20 packets). This enables browsing on networks that use NWLink IPX/SPX Compatible Transport to cross routers and span multiple subnets. If NWLink IPX/SPX Compatible Transport is *not* configured to forward NetBIOS broadcasts, browsing is limited to a single network segment.

concept link **To refresh your knowledge of browsing on this protocol, refer to the section "Browsing on NWLink IPX/SPX Compatible Transport" in Chapter 13.**

To implement routing of NWLink IPX/SPX Compatible Transport on a Windows NT Server computer, RIP for NWLink IPX/SPX Compatible Transport must be installed. *RIP for NWLink IPX/SPX Compatible Transport* is the Windows NT Server service that enables the computer to function as a dynamic router for NWLink IPX/SPX Compatible Transport. RIP for NWLink IPX/SPX Compatible Transport can also be configured to enable the Windows NT Server computer to forward NetBIOS broadcasts (type 20 packets).

Installing and configuring RIP for NWLink IPX/SPX Compatible Transport

Before you install and configure RIP for NWLink IPX/SPX Compatible Transport, NWLink IPX/SPX Compatible Transport should be installed.

When you install and configure RIP for NWLink IPX/SPX Compatible Transport, RIP routing is enabled automatically.

Windows NT Server also installs the SAP Agent (discussed in the next section) automatically when RIP for NWLink IPX/SPX Compatible transport is installed.

Installing and configuring RIP for NWLink IPX/SPX Compatible Transport is not difficult. You should be prepared to choose whether to forward NetBIOS broadcasts when prompted. You will have to shut down and restart the computer at the end of the installation/configuration process.

TO INSTALL AND CONFIGURE RIP FOR NWLINK IPX/SPX COMPATIBLE TRANSPORT ON A WINDOWS NT SERVER COMPUTER, FOLLOW THESE STEPS:

1. Select Start ➢ Settings ➢ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Services tab.

4. On the Services tab, click the Add command button.

5. In the Select Network Service dialog box, highlight RIP for NWLink IPX/SPX Compatible Transport. Figure 17-6 shows the Select Network Service dialog box. Notice that RIP for NWLink IPX/SPX Compatible Transport is highlighted. Click OK.
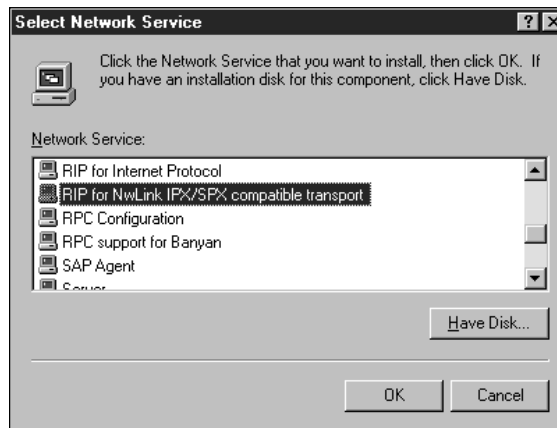
Figure 17-6 **Installing RIP for NWLink IPX/SPX Compatible Transport**

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Server source files (usually the i386 folder on your Windows NT Server compact disc) is listed in the text box. Edit this text box if necessary. Click the Continue command button.

7. The RIP for NWLink IPX Configuration dialog box appears, asking if you want to enable NetBIOS Broadcast Propagation, as shown in Figure 17-7. Click the Yes command button if you want to enable forwarding of NetBIOS broadcasts (type 20 packets). Otherwise, click the No command button.

RIP for NWLink IPX Configuration

NetBIOS Broadcast Propagation (broadcast of type 20 packets) is currently disabled.
If any Microsoft Windows clients use NwLink IPX to connect to this server, you must
enable this option to allow NwLink IPX to function correctly.
Enable this option only if you understand the routing implications because it might affect
your network performance.

Do you want to enable NetBIOS Broadcast Propagation?

Yes   No

FIGURE 17-7   **Configuring NetBIOS Broadcast Propagation**

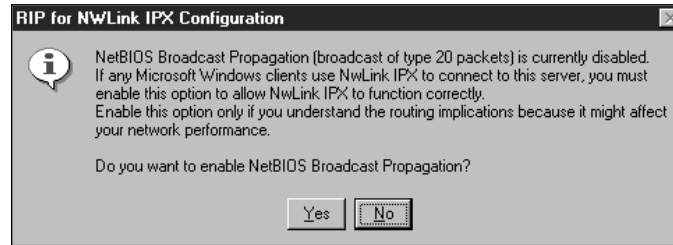**8.** The Network dialog box reappears. RIP routing is automatically enabled by
the installation of RIP for NWLink IPX/SPX Compatible Transport.
Additionally, the SAP Agent (discussed in the next section) is automatically
installed when RIP for NWLink IPX/SPX Compatible transport is installed.

Click the Close command button.

9. Windows NT performs various bindings operations.

10. A Network Settings Change dialog box appears, indicating that you must
shut down and restart the computer in order for the new settings to take
effect. Click the Yes command button to restart the computer.

SAP Agent

The *Service Advertising Protocol* (SAP) Agent is a Windows NT service that adver-
tises a Windows NT computer's services (such as SQL Server and SNA Server) to
NetWare client computers. The SAP Agent requires the use of NWLink IPX/SPX
Compatible Transport.

The SAP Agent should be installed when NetWare client computers will
access services on a Windows NT computer. The SAP Agent can be installed on
both Windows NT Server and Windows NT Workstation computers.

Installing SAP Agent

If you have already installed RIP for NWLink IPX/SPX Compatible Transport, the
SAP Agent is already installed. (Windows NT installs the SAP Agent automatically
when RIP for NWLink IPX/SPX Compatible transport is installed.)

NWLink IPX/SPX Compatible Transport should be installed prior to installing the SAP Agent.

If your computer is not functioning as a router but does offer services to NetWare client computers, follow the steps below to install the SAP Agent.

TO INSTALL THE SAP AGENT ON A WINDOWS NT COMPUTER, FOLLOW THESE STEPS:

1. Select Start ➣ Settings ➣ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Services tab.

4. On the Services tab, click the Add command button.

5. In the Select Network Service dialog box, highlight SAP Agent.

Figure 17-8 shows the Select Network Service dialog box. Notice that the SAP Agent is highlighted. Click OK.
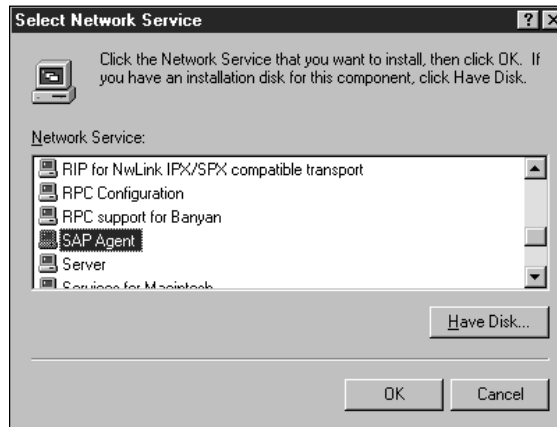
FIGURE 17-8   **Installing the SAP Agent**

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Server or Workstation source files (usually the i386 folder on your Windows NT Server or Workstation compact disc) is listed in the text box. Edit this text box if necessary. Click the Continue command button.

7. Windows NT installs the SAP Agent. The Network dialog box reappears. Click the Close command button.

8. Windows NT performs various bindings operations.

9. A Network Settings Change dialog box appears, indicating that you must shut down and restart the computer in order for the new settings to take effect. Click the Yes command button to restart the computer.

Client Service for NetWare (CSNW)

Client Service for NetWare (CSNW) is a Windows NT Workstation service that, when installed and configured on a Windows NT Workstation computer, enables users to access resources, such as files, folders, and printers, on a NetWare server. CSNW enables access to resources on NetWare 4.*x* servers as well as NetWare 3.*x* servers.

CSNW is included with Windows NT Workstation. CSNW requires the use of NWLink IPX/SPX Compatible Transport.

CSNW makes it possible for users of Windows NT Workstation computers to log in to NetWare 4.*x NetWare Directory Services* (NDS), and to browse and access resources in the NDS tree. (NDS is a distributed security database on NetWare 4.*x* servers that enables storage of user names, computer names, and resources in a hierarchical tree structure.) However, you can't manage NDS from a Windows NT Workstation computer running CSNW. To manage NDS, you must run Novell's client software for Windows NT on the Windows NT Workstation computer instead of CSNW.

Additionally, CSNW enables users to run NetWare login scripts during the Windows NT Workstation logon process.

CSNW also supports the use of long filenames on NetWare 3.12 and NetWare 4.1 servers that have the OS/2 name space (`OS2.nam`) installed, and on NetWare 4.11 servers that have the `Long.nam` name space installed.

CSNW can be installed on any Windows NT Workstation computer, and should be installed whenever users of the computer want to access resources on NetWare servers.

Installing Client Service for NetWare

You should install NWLink IPX/SPX Compatible Transport *before* you install CSNW on your Windows NT Workstation computer.

I recommend you only install this service at a time when you can shut down and restart the computer.

TO INSTALL CLIENT SERVICE FOR NETWARE (CSNW) ON A WINDOWS NT WORKSTATION COMPUTER, FOLLOW THESE STEPS:

1. Select Start ➢ Settings ➢ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Services tab.

4. On the Services tab, click the Add command button.

5. In the Select Network Service dialog box, highlight Client Service for NetWare. Figure 17-9 shows the Select Network Service dialog box. Note that Client Service for NetWare is highlighted. Click OK.
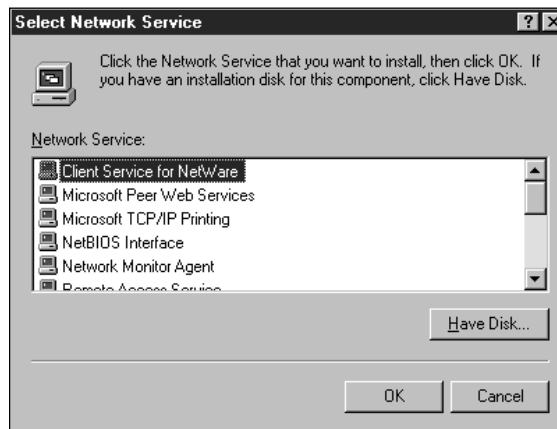
FIGURE 17-9 **Installing Client Service for NetWare**

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Workstation source files (usually the i386 folder on your Windows NT Workstation compact disc) is listed in the text box. Click the Continue command button.

7. Windows NT installs Client Service for NetWare. The Network dialog box reappears. Click the Close command button.

8. Windows NT performs various bindings operations.

9. A Network Settings Change dialog box appears, indicating that you must shut down and restart the computer in order for the new settings to take effect. Click the Yes command button to restart the computer.

Configuring Client Service for NetWare

You can either configure CSNW the first time you log on after installing CSNW, or you can configure CSNW at a later time by using the CSNW application in Control Panel.

When configuring CSNW, you should be prepared to enter either the name of a preferred NetWare 3.*x* server you want to use or your tree and context for a NetWare 4.*x* server.

**TO CONFIGURE CLIENT SERVICE FOR NETWARE (CSNW),
FOLLOW THESE STEPS:**

1. The next time you boot your computer after installing CSNW, the Select NetWare Logon dialog box appears. (Note: This dialog box only appears the *first* time you log on after installing CSNW.)

  ○ If you want to configure CSNW now, skip to Step 4.

  ○ If you choose to configure CSNW at a later time, click OK in the Select NetWare Logon dialog box. When you decide to initially configure or change the configuration of CSNW, begin the configuration process at Step 2.

2. Select Start ≻ Settings ≻ Control Panel.

3. In the Control Panel dialog box, double-click the CSNW icon.

4. The Client Service for NetWare dialog box appears, shown in Figure 17-10. Notice the various configuration options available.

To configure CSNW, you must select from one of two primary options: Preferred Server, or Default Tree and Context. You can also select print and login script options in this dialog box.

  ○ **Preferred Server:** Select the radio button next to Preferred Server if you primarily access resources on NetWare 3.*x* servers. Then select the NetWare server of your choice from the Select Preferred Server drop-down list box.

  ○ **Default Tree and Context:** Select the radio button next to Default Tree and Context if you primarily access resources on NetWare 4.*x* servers. Then enter the tree name and context that contain your NetWare 4.*x* user account in the Tree and Context text boxes. (Note: You have to know this information—browsing is *not* supported in this section.)
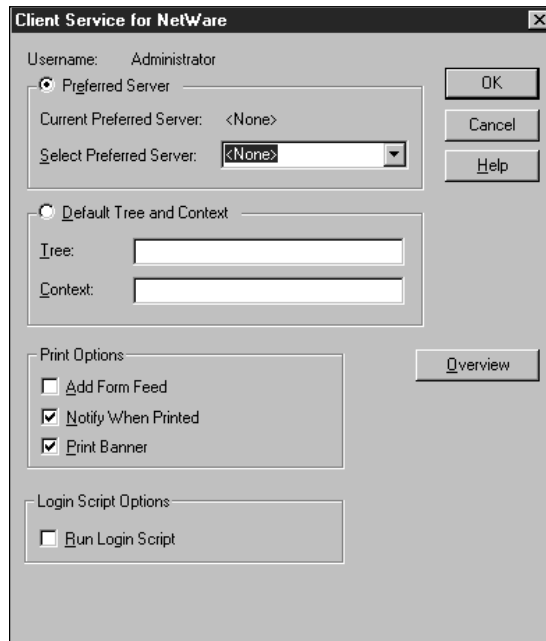
FIGURE 17-10 Configuring Client Service for NetWare

- **Print Options:** If you print to a printer on a NetWare server, you can configure the Print Options section of the Client Service for NetWare dialog box. There are three options you can select:

  - **Add Form Feed:** Selecting this check box causes an additional form feed to be sent at the end of each print job. Deselect this check box if an additional blank page is printing at the end of each of your print jobs. By default, this check box is not selected.

  - **Notify When Printed:** Selecting this check box causes a pop-up message to appear on your screen after a print job is sent by the NetWare server to the print device. Clear this check box if you no longer want to receive these messages. This check box is selected by default.

  - **Print Banner:** Selecting this check box causes an additional sheet of paper that identifies the user that initiated the print job (called a *banner page*) to be printed at the beginning of each print job. If you want to save paper, deselect this check box. This check box is selected by default.

- **Login Script Options:** Selecting the check box next to Run Login Script in this section causes the NetWare login script to run during the Windows NT logon process. By default, this check box is not selected.

  When you are finished configuring this dialog box, click OK.

5. If you are configuring CSNW by using the CSNW application in Control Panel, a Client Service for NetWare dialog box appears, indicating that your configuration changes will take effect the next time you login. Click OK.

6. The Control Panel dialog box reappears (if you are configuring CSNW by using the CSNW application in Control Panel). Exit Control Panel.

Gateway Service for NetWare (GSNW)

Gateway Service for NetWare (GSNW) is a Windows NT Server service that, when installed and configured on a Windows NT Server computer, provides all of the functionality of Client Service for NetWare (CSNW). Additionally, GSNW enables the Windows NT Server computer to transparently share resources (files, folders, and printers) located on a NetWare server to client computers of the Windows NT Server computer. GSNW accomplishes this by converting the *Server Message Blocks* (SMBs) from the client computers of the Windows NT Server computer into *NetWare Core Protocol* (NCP) requests that are recognized by the NetWare server.

GSNW does *not* enable a Windows NT Server computer to share its resources with NetWare client computers. You should install *File and Print Services for NetWare* (FPNW) if you want to accomplish this. (FPNW is discussed later in this chapter.)

GSNW is included with Windows NT Server. Like CSNW, GSNW requires the use of NWLink IPX/SPX Compatible Transport.

GSNW can be installed on any Windows NT Server computer.

Installing Gateway Service for NetWare

You should install NWLink IPX/SPX Compatible Transport *before* you install GSNW on your Windows NT Server computer.

I recommend you only install this service at a time when you can shut down and restart the Windows NT Server computer.

**TO INSTALL GATEWAY SERVICE FOR NETWARE (GSNW) ON
A WINDOWS NT SERVER COMPUTER, FOLLOW THESE STEPS:**

1. Select Start ≻ Settings ≻ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Services tab.

4. On the Services tab, click the Add command button.

5. In the Select Network Service dialog box, highlight Gateway (and Client) Services For NetWare. Figure 17-11 shows the Select Network Service dialog box. Note that Gateway (and Client) Services for NetWare is highlighted. Click OK.
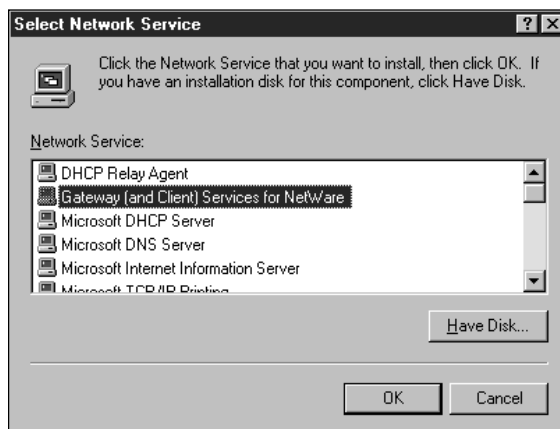
FIGURE 17-11 **Installing Gateway Service for NetWare**

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Server source files (usually the `i386` folder on your Windows NT Server compact disc) is listed in the text box. Click the Continue command button.

7. Windows NT installs Gateway Service for NetWare. The Network dialog box reappears, as shown in Figure 17-12. Notice that Gateway Service for NetWare is listed in the Network Services list box. Click the Close command button.

8. Windows NT performs various bindings operations.

9. A Network Settings Change dialog box appears, indicating that you must shut down and restart the computer in order for the new settings to take effect. Click the Yes command button to restart the computer.

FIGURE 17-12 Gateway Service for NetWare installed
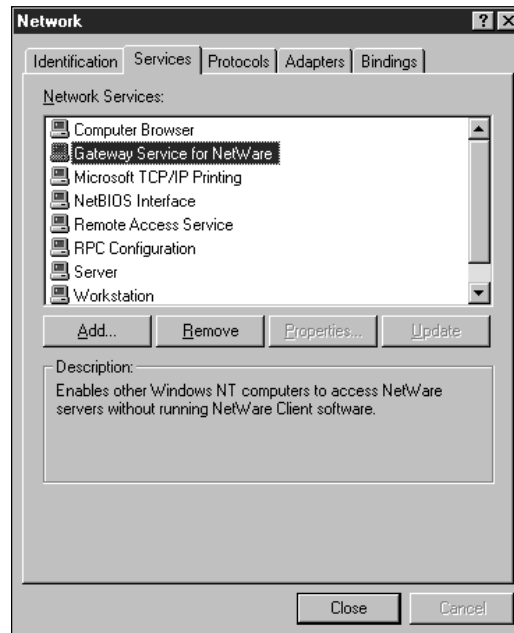
Configuring Gateway Service for NetWare

You can either configure GSNW the first time you log on after installing GSNW, or you can configure GSNW at a later time by using the GSNW application in Control Panel.

When configuring GSNW, you should be prepared to enter either the name of a preferred NetWare 3.*x* server you want to use or your tree and context for a NetWare 4.*x* server.

Pay particular attention to the gateway configuration options, including the user account used to configure the gateway. The user account on the NetWare server *must* be a member of the NTGATEWAY group on the NetWare server, and the NTGATEWAY group *must* have the appropriate NetWare permissions to the share.

The following sections explain the steps necessary to perform some common GSNW configurations. The first section discusses how to configure GSNW, and then how to share a folder on the NetWare server with client computers of the Windows NT Server computer. The second section explains how to share a printer

on a NetWare server (with client computers of a Windows NT Server computer) from a Windows NT Server computer that is running GSNW.

**TO CONFIGURE GATEWAY SERVICE FOR NETWARE (GSNW)
ON A WINDOWS NT SERVER COMPUTER AND SHARE A
FOLDER ON THE NETWARE SERVER, FOLLOW THESE STEPS:**

1. The next time you boot your computer after installing GSNW, the Select NetWare Logon dialog box appears. (Note: This dialog box only appears the *first* time you log on after installing GSNW.)

- If you want to configure GSNW now, skip to Step 4.

- If you choose to configure GSNW at a later time, click OK in the Select NetWare Logon dialog box. When you decide to initially configure or change the configuration of GSNW, begin the configuration process at Step 2.

2. Select Start ➢ Settings ➢ Control Panel.

3. In the Control Panel dialog box, double-click the GSNW icon.

4. The Gateway Service for NetWare dialog box appears, as shown in Figure 17-13. Notice the various configuration options available.
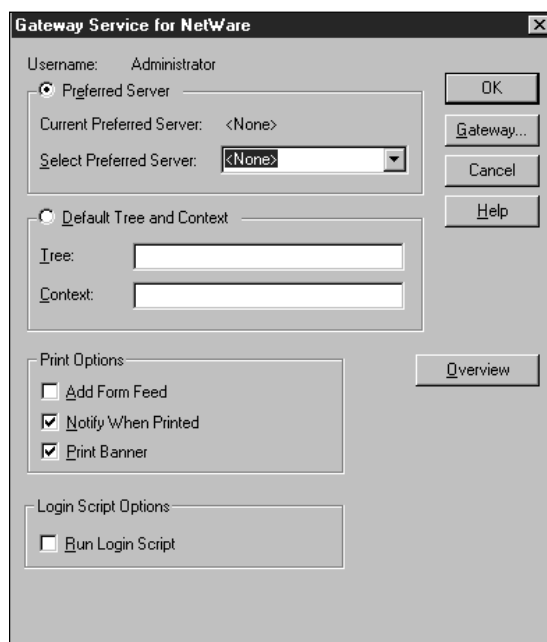

FIGURE 17-13 Configuring Gateway Service for NetWare

To configure GSNW, you must select from one of two primary options: Preferred Server, or Default Tree and Context. You can also select print, login script, and gateway options in this dialog box.

- **Preferred Server:** Select the radio button next to Preferred Server if you primarily access resources on NetWare 3.*x* servers. Then select the NetWare server of your choice from the Select Preferred Server drop-down list box.

- **Default Tree and Context:** Select the radio button next to Default Tree and Context if you primarily access resources on NetWare 4.*x* servers. Then enter the tree name and context that contain your NetWare 4.*x* user account in the Tree and Context text boxes. (Note: You have to know this information—browsing is not supported in this section.)

- **Print Options:** If you print to a printer on a NetWare server, you can configure the Print Options section of the Gateway Service for NetWare dialog box. There are three options you can select:

  - **Add Form Feed:** Selecting this check box causes an additional form feed to be sent at the end of each print job. Deselect this check box if an additional blank page is printing at the end of each of your print jobs. By default, this check box is not selected.

  - **Notify When Printed:** Selecting this check box causes a pop-up message to appear on your screen after a print job is sent by the NetWare server to the print device. Clear this check box if you no longer want to receive these messages. This check box is selected by default.

  - **Print Banner:** Selecting this check box causes an additional sheet of paper that identifies the user that initiated the print job (called a banner page) to be printed at the beginning of each print job. If you want to save paper, deselect this check box. This check box is selected by default.

- **Login Script Options:** Selecting the check box next to Run Login Script in this section causes the NetWare login script to run during the Windows NT logon process. By default, this check box is not selected.

- **Gateway:** You can configure the gateway if you want to share resources located on NetWare servers with clients of your Windows NT Server computer. To configure the gateway, proceed to Step 5. If you don't want to configure the gateway at this time, click OK and skip to Step 11.

5. To configure the gateway, click the Gateway command button.

6. The Configure Gateway dialog box appears, as shown in Figure 17-14. Note the check box next to Enable Gateway. You can configure the following items in this dialog box:
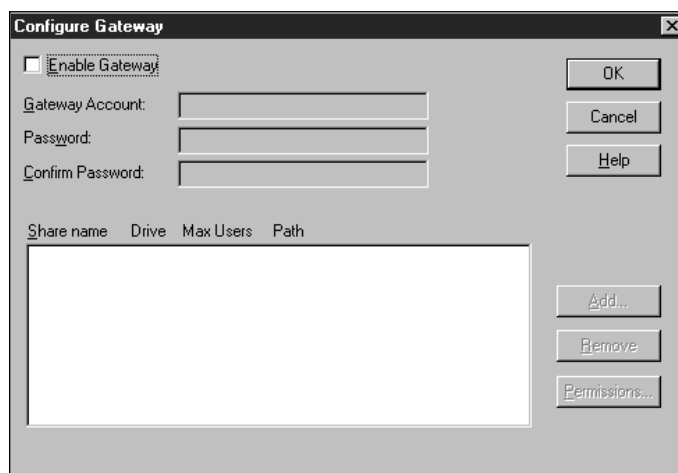
FIGURE 17-14 **Configuring the gateway**

- **Enable Gateway:** Before you can share any resources located on a NetWare server with client computers of your Windows NT Server computer, the check box next to Enable Gateway must be selected. (If you enable the gateway and you login to the NetWare server, GSNW uses two user connections on the NetWare server: one for you, and one for the gateway. When using a five-user client license on the NetWare server, logging in and using the gateway leaves you only three connections.)

- **Gateway Account:** Enter a user account on the NetWare Server that you want to share resources from in the Gateway Account text box. If the user account is on a NetWare 4.*x* server, enter the complete account name, in the format: *.user_name.organizational_unit.organization_name*. This user account *must* be a member of a group on the NetWare server called NTGATEWAY. The gateway won't function correctly if the user account listed in this text box is not a member of this group. Also, the NTGATEWAY group must have the appropriate NetWare permissions to the resources that you want to share by using the gateway.

- **Password and Confirm Password:** Enter the password (and confirm it by retyping it) for the user account on the NetWare Server (that you entered in the Gateway Account text box) in the Password and Confirm Password text boxes. To share a folder from a NetWare server, click the Add command button.

7. The New Share dialog box appears, as shown in Figure 17-15. The following options can be configured in this dialog box.

- **Share Name:** Type in the name of the share, as you want it to appear to client computers of the Windows NT Server computer, in the Share Name text box.
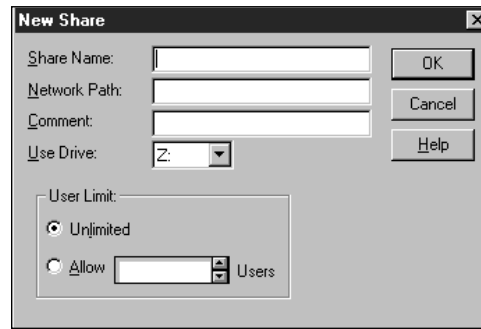
FIGURE 17-15 Creating a gateway share

- **Network Path:** Type in the complete UNC path to the NetWare folder that you are sharing in the Network Path text box. (For more information on UNC paths for NetWare resources, see the section in this chapter on "Using CSNW and GSNW to Access Resources on NetWare Servers.")
- **Comment:** Type in a comment that will appear in the browse list of the client computers of the Windows NT Server computer. This configuration is optional.
- **Use Drive:** Select a drive letter that GSNW will use to connect to the NetWare server. This drive letter can't already be in use on this computer.
- **User Limit:** In the User Limit section, select the radio button next to either Unlimited or Allow *xx* Users. If you select Allow *xx* Users, enter the maximum number of concurrent users that will be allowed to access the share.

    Click OK.

 8. The Configure Gateway dialog box reappears. Click the Permissions command button if you want to configure share permissions on the gateway share.

 9. The Access Through Share Permissions dialog box appears, as shown in Figure 17-16. Note that this is the standard NT Share Permissions dialog box. Configure the share permissions as desired. (Note: The most restrictive combination of share permissions and NetWare file and folder permissions applies**.**) Click OK.

 10. The Configure Gateway dialog box reappears. Click OK.

 11. If you are configuring GSNW by using the GSNW application in Control Panel, a Gateway Service for NetWare dialog box appears, indicating that your configuration changes will take effect the next time you log in. Click OK.
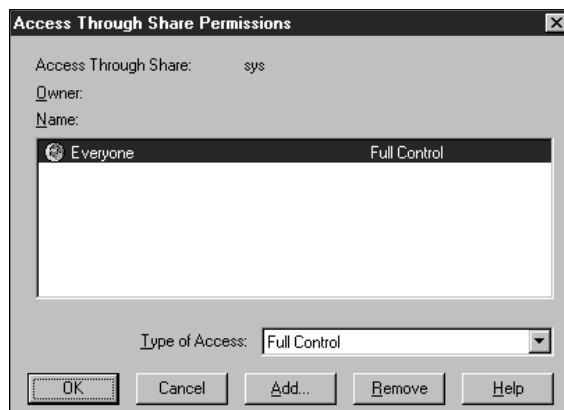
FIGURE 17-16 **Setting permissions on a gateway share**

12. The Control Panel dialog box reappears (if you are configuring GSNW by using the GSNW application in Control Panel). Exit Control Panel.

TO SHARE A PRINTER ON A NETWARE SERVER (WITH CLIENT COMPUTERS OF A WINDOWS NT SERVER COMPUTER) FROM A WINDOWS NT SERVER COMPUTER USING GSNW, FOLLOW THESE STEPS:

1. Enable the gateway, if you haven't already done so, as explained in Steps 5 and 6 in the previous section.

2. Select Start ➢ Settings ➢ Printers.

3. In the Printers dialog box, double-click Add Printer.

4. The Add Printer Wizard dialog box appears. Select the radio button next to Network Printer Server. Click the Next command button.

5. The Connect to Printer dialog box appears. In the Printer text box, type the UNC path to the NetWare printer. Or, browse the shared network printers in the Shared Printers list box. Click OK.

6. A Connect to Printer warning dialog box appears, indicating that you need to install a printer driver. Click OK.

7. The Add Printer Wizard dialog box appears. Select the manufacturer and printer model from the list boxes. Click OK.

8. The Add Printer Wizard dialog box appears, asking whether you want your Windows-based programs to use this printer as the default printer. Select the appropriate radio button. Click the Next command button.

9. Click the Finish command button.

10. In the Printers dialog box, highlight the printer you just created. Select File➢ Properties.

11. In the Printer Properties dialog box, click the Sharing tab.

12. On the Sharing tab, select the radio button next to Shared. Enter a share name in the Share Name text box. Click OK.

13. Close the Printers dialog box.

Using CSNW and GSNW to Access Resources on NetWare Servers

Resources on NetWare 3.*x* servers and NetWare 4.*x* servers are accessed by using two different types of UNC path names.

To access resources on NetWare 3.*x* servers from Windows NT computers that are running either CSNW or GSNW, you can use standard UNC path names in the format:

`\\server_name\share_name`

For example, to connect to a volume named `SYS` on a NetWare 3.*x* server named `NWSERVER`, use the following UNC path name:

`\\nwserver\sys`

You can use these UNC path names when:

- Configuring the gateway by using the GSNW application in Control Panel
- Connecting to a printer by using the Add Printer Wizard
- Connecting to a shared folder in Windows NT Explorer

To access resources on NetWare 4.*x* servers from Windows NT computers that are running either CSNW or GSNW, you can use UNC path names in the format:

`\\tree_name\volume_name.organizational_unit.organization_name\folder_name`

For example, to connect to the `Public` folder in a volume named `NWSERVER_SYS` (on a NetWare 4.*x* server) in the `Sales` organizational unit in the `Widgets` organization in a tree named `CORP`, use the following UNC path name:

`\\corp\nwserver_sys.sales.widgets\public`

You can use these UNC path names when:

o Configuring the gateway by using the GSNW application in Control Panel

o Connecting to a printer by using the Add Printer Wizard

o Connecting to a shared folder in Windows NT Explorer

File and Print Services for NetWare (FPNW)

File and Print Services for NetWare (FPNW) is a Windows NT Server service that enables NetWare client computers to transparently access shared files, folders, printers, and applications on a Windows NT Server computer. FPNW is a Windows NT Server add-on product that does *not* ship with Windows NT Server — it must be purchased separately from Microsoft.

No additional software needs to be installed on the NetWare client computers.

FPNW is designed primarily for use during a period of coexistence while migrating from NetWare to Windows NT. FPNW can be used, however, as a long-term solution to allow NetWare client computers to access resources on a Windows NT Server computer. Bear in mind that a Windows NT Server computer running FPNW uses more processor power than a standard Windows NT Server computer, and you may need to compensate for this.

When a NetWare client computer accesses resources on a Windows NT Server computer that has FPNW installed, the NetWare client software treats the Windows NT Server computer, for all intents and purposes, as a NetWare server.
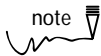
note **A recent release of Novell NetWare client software, called Client32, is unable to access resources on a Windows NT Server computer that runs FPNW. It appears as though Novell has written specific code that prevents its Client32 software from accessing FPNW servers. If you want to implement FPNW, you will have to use NetWare client software that predates Client32.**

concept link   **For more information on FPNW, see the *Microsoft Windows NT Server 4.0 Resource Kit for Version 4.0* (Microsoft Press, 1996).**

web links   **Also check out the Microsoft Web site at:**
`www.microsoft.com/ntserver/info/addons4netware.htm`.

Directory Services Manager for NetWare (DSMN)

Directory Services Manager for NetWare (DSMN) is a Windows NT Server service that makes it possible for an administrator to use User Manager for Domains to manage user accounts in the Windows NT domain *and* user accounts on up to thirty-two NetWare 3.12 servers. DSMN also enables users of client computers to use a single user account and password to access resources on both NetWare 3.12 servers and Windows NT computers.

DSMN is a Windows NT Server add-on product that does *not* ship with Windows NT Server—it must be purchased separately from Microsoft.

web links   **For more information on DSMN, check out the Microsoft Web site at:** `www.microsoft.com/ntserver/info/addons4netware.htm`.

Troubleshooting Common NetWare Connectivity Problems

There are several common NetWare connectivity problems. Most NetWare connectivity problems are caused by incorrectly configuring NWLink IPX/SPX Compatible Transport, CSNW, or GSNW on the computer that is experiencing the problem. Most user-reported problems relate to an inability to connect a Windows NT computer to resources on NetWare servers.

Table 17-2 shows the most common configuration errors that cause NetWare connectivity problems and recommended solutions to these problems.

TABLE 17-2 COMMON NETWARE CONFIGURATION ERRORS AND RECOMMENDED SOLUTIONS

CONFIGURATION ERROR	*RECOMMENDED SOLUTION*
Frame type mismatch/network number mismatch	Both the NT client and the NetWare server normally must use the same frame type. Additionally, these computers must use the same network number if they are located on the same network segment. To find out what frame type and network number are being used on the NetWare server, type **config** at the : prompt on the NetWare server. Normally, you can use the NT autodetect feature for frame type selection on an NT computer. However, if you are unable to connect to a resource while using the autodetect feature, try manually configuring the frame type and network number on the NT computer to match those of the NetWare server. Remember, NetWare 3.11 and earlier versions use the Ethernet 802.3 frame type by default on Ethernet networks. NetWare 3.12 and later versions use the Ethernet 802.2 frame type by default on Ethernet networks.
Gateway user account is not a member of the NTGATEWAY group on the NetWare server	Make the gateway user account a member of the NTGATEWAY group on the NetWare server.
The gateway user account has permissions to access the resource on the NetWare server, but the NTGATEWAY group does not have these permissions	The NTGATEWAY group must have the appropriate permissions to access the shared resource on the NetWare server. Assign permissions to the NTGATEWAY group using the appropriate NetWare administration utility on the NetWare server. Remember that the most restrictive combination of gateway share permissions and NetWare file and folder permissions applies.
You have shared a NetWare printer, but have not enabled the gateway	Enable the gateway, even though you are not sharing any files or folders on the NetWare server.

Key Point Summary

This chapter explored the Windows NT protocols and services that increase the interoperability of Windows NT with NetWare. These components enable Windows NT computers to utilize the resources on NetWare servers, and, in limited circumstances, can also enable Windows NT Server computers to share their resources with NetWare client computers in a heterogeneous networking environment.

- *NWLink IPX/SPX Compatible Transport* is a routable transport protocol that is typically used in a combined Windows NT and NetWare environment, and provides compatibility between Windows NT and NetWare computers. NWLink IPX/SPX Compatible Transport, which is included with NT Server and NT Workstation, must be installed on NT computers in order to enable them to communicate over the network with NetWare computers. NWLink IPX/SPX Compatible Transport can be installed on both Windows NT Server and Windows NT Workstation computers.

- *Frame types* (also called *frame formats*) are accepted, standardized structures for transmitting data packets over a network. A frame type must be configured during the installation and configuration of NWLink IPX/SPX Compatible Transport. It is important that the frame type you select matches the frame type already in use on the network. Frame type mismatching is a common cause of communications problems on networks that use NWLink IPX/SPX Compatible Transport.

- *Network numbers* are 32-bit binary numbers that uniquely identify an NWLink IPX/SPX Compatible Transport network segment for routing purposes. Network numbers are only assigned to Windows NT computers that use NWLink IPX/SPX Compatible Transport, and are assigned during the installation and configuration of this protocol. Network numbers are commonly presented in an eight-digit hexadecimal format.

  - There are two types of network numbers: *network numbers* and *internal network numbers*. A *network number* is assigned to each network adapter installed in the computer. Additionally, an *internal network number* must be assigned to a Windows NT computer when more than one network adapter is installed in it. The internal network number does *not* correspond to a specific network adapter, but rather is used by the computer's

operating system. A Windows NT computer has only one internal network number, regardless of the number of network adapters installed in it.

- *RIP for NWLink IPX/SPX Compatible Transport* is a Windows NT Server service, that when installed and configured on a Windows NT Server computer, enables the computer to function as a dynamic router for NWLink IPX/SPX Compatible Transport. RIP for NWLink IPX/SPX Compatible Transport can also be configured to enable a Windows NT Server computer to forward NetBIOS broadcasts (type 20 packets.) When you install and configure RIP for NWLink IPX/SPX Compatible Transport, RIP routing is automatically enabled. Additionally, Windows NT Server automatically installs the SAP Agent when RIP for NWLink IPX/SPX Compatible Transport is installed.

- The *Service Advertising Protocol (SAP) Agent* is a Windows NT service that advertises a Windows NT computer's services (such as SQL Server and SNA Server) to NetWare client computers. The SAP Agent requires the use of NWLink IPX/SPX Compatible Transport. The SAP Agent can be installed on both Windows NT Server and Windows NT Workstation computers.

- *Client Service for NetWare* (CSNW) is a Windows NT Workstation service that allows users to access resources (such as files, folders, and printers) on a NetWare server. CSNW enables access to resources on NetWare 4.*x* servers as well as NetWare 3.*x* servers. CSNW also enables users to run NetWare login scripts during the Windows NT logon process. CSNW is included with Windows NT Workstation, and requires the use of NWLink IPX/SPX Compatible Transport. You can't manage NetWare Directory Services (NDS) from a Windows NT Workstation computer running CSNW. To manage NDS, you must run Novell's client software for Windows NT on the Windows NT Workstation computer *instead* of CSNW.

    - You can configure CSNW the first time you log on after installing CSNW, or you can configure CSNW at a later time by using the CSNW application in Control Panel. When you configure CSNW, you must select from one of two options: *Preferred Server* (if you want to access resources on NetWare 3.*x* servers) or *Default Tree and Context* (if you want to access resources on NetWare 4.*x* servers.) There are also three print options you can configure: Add Form Feed, Notify When Printed, and Print Banner. Finally, you can configure CSNW to run the NetWare login script during the NT logon process.

- *Gateway Service for NetWare* (GSNW) is a Windows NT Server service that provides all of the functionality of CSNW. Additionally, GSNW enables the Windows NT Server computer to transparently share resources (files, folders, and printers) located on a NetWare server to client computers of the Windows NT Server computer. Like CSNW, GSNW requires the use of IPX/SPX Compatible Transport.

  - GSNW does *not* enable, however, a Windows NT Server to share its resources with NetWare client computers. You should install File and Print Services for NetWare (FPNW) if you want to accomplish this.

  - When configuring GSNW, pay particular attention to the gateway configuration options. The user account on the NetWare server *must* be a member of the NTGATEWAY group on the NetWare server, and the NTGATEWAY group *must* have the appropriate NetWare permissions to the gateway share.

- To access resources on NetWare 3.*x* servers from Windows NT computers that are running either CSNW or GSNW, use standard UNC path names in the format: `\\server_name\share_name.`

- To access resources on NetWare 4.*x* servers from Windows NT computers that are running either CSNW or GSNW, use UNC path names in the format: `\\tree_name\volume_name.organizational_unit.organization_name\folder_name.`

- *File and Print Services for NetWare (FPNW)* is a Windows NT Server service that enables NetWare client computers to transparently access shared files, folders, printers, and applications on a Windows NT Server computer. FPNW is an NT Server add-on product—it does not ship with NT Server and must be purchased separately from Microsoft.

- *Directory Services Manager for NetWare* (DSMN) is a Windows NT Server service that makes it possible for an administrator to use User Manager for Domains to manage user accounts in the Windows NT domain *and* user accounts on up to thirty-two NetWare 3.12 servers. This service also enables users of client computers to use a single user account and password to access resources on both NetWare 3.12 servers and Windows NT computers. DSMN is an NT Server add-on product—it does not ship with NT Server and must be purchased separately from Microsoft.

○ Most NetWare connectivity problems are caused by incorrectly configuring NWLink IPX/SPX Compatible Transport, CSNW, or GSNW on the computer that is experiencing the problem. Most user-reported problems relate to an inability to connect to resources on NetWare servers. The most common configuration errors that cause NetWare connectivity problems include: frame type mismatch and/or network number mismatch, the gateway user account is not a member of the NTGATEWAY group, the NTGATEWAY group does not have the necessary permissions to access the resource, and the gateway is not enabled.

Applying What You've Learned

Now it's time to regroup, review, and apply what you've learned in this chapter.

The Instant Assessment questions bring to mind key facts and concepts.

The hands-on lab exercises will really reinforce what you've learned, and give you the opportunity to practice some of the tasks tested by the Microsoft Certified Professional exams.

Instant Assessment

1. Which routable transport protocol is typically used in a combined Windows NT and NetWare environment because it provides compatibility between Windows NT and NetWare computers?

2. What are frame types?

3. What frame type configuration error is a common cause of NetWare connectivity problems?

4. What is a network number?

5. What are the two types of network numbers?

6. Which Windows NT Server service, when installed and configured on a Windows NT Server computer, enables the computer to function as a dynamic router for NWLink IPX/SPX Compatible Transport?

7. What conversion does GSNW perform to enable client computers of a Windows NT Server computer to access resources on a NetWare server?

8. What does the SAP Agent do?

9. Which Windows NT Workstation service enables users to access resources (such as files, folders, and printers) on NetWare servers?

10. What are two common configuration errors that cause NetWare connectivity problems?

11. Which Windows NT Server add-on product enables an administrator to use User Manager for Domains to manage user accounts in the Windows NT domain *and* user accounts on up to thiry-two NetWare 3.12 servers?

12. What are the three print options you can configure in CSNW?

13. Which Windows NT Server service enables users to access resources (such as files, folders, and printers) on NetWare servers, and also permits resources located on a NetWare server to be transparently shared with client computers of the Windows NT Server computer?

14. Which Windows NT Server add-on product enables NetWare client computers to transparently access shared files, folders, printers, and applications on a Windows NT Server computer?

15. When configuring the gateway using GSNW, of what group on the NetWare server must the gateway user account on the NetWare server be a member?

16. What UNC path name format must you use to access resources on NetWare 3.*x* servers from Windows NT computers that are running either CSNW or GSNW?

17. What UNC path name format must you use to access resources on NetWare 4.*x* servers from Windows NT computers that are running either CSNW or GSNW?

T/F

18. GSNW does *not* allow a Windows NT Server computer to share its resources with NetWare client computers.   _____

19. CSNW and GSNW both require the use of NWLink IPX/SPX Compatible Transport.   _____

20. You can manage NDS from a Windows NT Workstation computer running CSNW.   _____

21. RIP for NWLink IPX/SPX Compatible Transport can be configured to forward NetBIOS broadcasts (type 20 packets).   _____

concept link   **For answers to the Instant Assessment questions see Appendix D.**

Hands-on Lab Exercises

The following hands-on lab exercises provide you with practical opportunities to apply the knowledge you've gained in this chapter about the protocols and services that increase the interoperability of Windows NT with NetWare.

Lab 17.29   *Installing and configuring NWLink and Client Service for NetWare*

The purpose of this lab exercise is to give you hands-on experience in installing and configuring NWLink IPX/SPX Compatible Transport, and also in installing and configuring Client Service for NetWare on a Windows NT Workstation computer.

Workstation

This lab consists of two parts:

Part 1: Installing NWLink and Client Service for NetWare

Part 2: Configuring Client Service for NetWare and NWLink

Begin this lab by booting your computer to Windows NT Workstation. Log on as Administrator. Place your Windows NT Workstation compact disc in your computer's CD-ROM drive.

Follow these steps carefully.

Part 1: Installing NWLink and Client Service for NetWare

In this section, you install NWLink IPX/SPX Compatible Transport and Client Service for NetWare on a Windows NT Workstation computer.

1. Select Start ➢ Settings ➢ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Protocols tab.

4. On the Protocols tab, click the Add command button.

5. In the Select Network Protocol dialog box, highlight NWLink IPX/SPX Compatible Transport in the Network Protocol list box. Click OK.

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Workstation source files (usually the i386 folder on your Windows NT Workstation compact disc) is listed in the text box. Edit the text box as necessary. Click the Continue command button.

7. Windows NT installs NWLink IPX/SPX Compatible Transport. The Network dialog box reappears. Click the Services tab.

8. On the Services tab, click the Add command button.

9. In the Select Network Service dialog box, highlight Client Service for NetWare. Click OK.

10. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Workstation source files (usually the `i386` folder on your Windows NT Workstation compact disc) is listed in the text box. Click the Continue command button.

11. Windows NT installs Client Service for NetWare. The Network dialog box reappears. Click the Close command button.

12. Windows NT performs various bindings operations.

13. A Network Settings Change dialog box appears, indicating that you must shut down and restart the computer in order for the new settings to take effect. Click the Yes command button to restart the computer. Continue to Part 2.

Part 2: Configuring Client Service for NetWare and NWLink

In this section you configure Client Service for NetWare and NWLink IPX/SPX Compatible Transport on a Windows NT Workstation computer.

1. When the computer restarts, reboot to Windows NT Workstation. Log on as Administrator.

2. When the Select NetWare Logon dialog box appears, click OK.

3. Select Start ➢ Settings ➢ Control Panel.

4. In the Control Panel dialog box, double-click the CSNW icon.

5. The Client Service for NetWare dialog box appears.

   o If your computer is connected to a network that has a NetWare server, configure the Select Preferred Server option, or Default Tree and Context option, as appropriate. (Obtain the appropriate configuration settings from your network administrator.) Configure the Print Options and Login Script Options as desired or as instructed by your network administrator.

   o If your computer is *not* connected to a network that has a NetWare server, ensure that the radio button next to Preferred Server is selected, and accept the default Select Preferred Server option of <None>.

   Click OK.

6. The Control Panel dialog box reappears. Double-click Network.

7. In the Network dialog box, click the Protocols tab.

8. On the Protocols tab, double-click NWLink IPX/SPX Compatible Transport.

9. The NWLink IPX/SPX Properties dialog box appears. In the Frame Type drop-down list box, select Ethernet 802.2. In the Network Number text box, type **12345678** (if you are connected to a network that uses IPX, obtain an appropriate network number from your network administrator). Click OK.

10. The Network dialog box reappears. Click the Close command button.

11. A Network Settings Change dialog box appears, indicating that you must shut down and restart the computer in order for the new settings to take effect. Click the Yes command button to restart the computer.

Lab 17.30 *Installing and configuring NWLink and Gateway Service for NetWare*

Server
Enterprise

The purpose of this lab exercise is to give you hands-on experience in installing and configuring NWLink IPX/SPX Compatible Transport, and also in installing and configuring Gateway Service for NetWare on a Windows NT Server computer.

This lab consists of two parts:

Part 1: Installing NWLink and Gateway Service for NetWare

Part 2: Configuring Gateway Service for NetWare

Begin this lab by booting your computer to Windows NT Server. Log on as Administrator. Place your Windows NT Server compact disc in your computer's CD-ROM drive.

Follow these steps carefully.

Part 1: Installing NWLink and Gateway Service for NetWare

In this section, you install NWLink IPX/SPX Compatible Transport and Gateway Service for NetWare on a Windows NT Server computer. Additionally, you configure NWLink IPX/SPX Compatible Transport.

1. Select Start ➢ Settings ➢ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Protocols tab.

4. On the Protocols tab, click the Add command button.

5. In the Select Network Protocol dialog box, highlight NWLink IPX/SPX Compatible Transport in the Network Protocol list box. Click OK.

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Server source files (usually the `i386` folder on your Windows NT Server compact disc) is listed in the text box. Edit the text box as necessary. Click the Continue command button.

7. Windows NT installs NWLink IPX/SPX Compatible Transport. The Network dialog box reappears. Click the Services tab.

8. On the Services tab, click the Add command button.

9. In the Select Network Service dialog box, highlight Gateway (and Client) Services for NetWare. Click OK.

10. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Server source files (usually the `i386` folder on your Windows NT Server compact disc) is listed in the text box. Click the Continue command button.

11. Windows NT installs Gateway Service for NetWare. The Network dialog box reappears. Click the Close command button.

12. Windows NT performs various bindings operations.

13. An NWLink IPX/SPX warning dialog box appears, indicating that you need to configure your computer's internal network number. Click the Yes command button.

14. The NWLink IPX/SPX Properties dialog box appears. Change the Internal Network Number to **87654321.** Select the radio button next to Manual Frame Type Detection, and click the Add command button.

15. In the Manual Frame Detection dialog box, select Ethernet 802.2 from the Frame Type drop-down list box. Type in a Network Number of **12345678** (If you are connected to a network that uses IPX, obtain an appropriate network number from your network administrator.) Click the Add command button.

16. In the NWLink IPX/SPX Properties dialog box, click OK.

17. A Network Settings Change dialog box appears, indicating that you must shut down and restart the computer in order for the new settings to take effect. Click the Yes command button to restart the computer. Continue to Part 2.

Part 2: Configuring Gateway Service for NetWare

In this section, you configure Gateway Service for NetWare on a Windows NT Server computer.

1. When the computer restarts, reboot to Windows NT Server. Log on as Administrator.

2. When the Select NetWare Logon dialog box appears, click OK.

3. Select Start ≻ Settings ≻ Control Panel.

4. In the Control Panel dialog box, double-click the GSNW icon.

5. The Gateway Service for NetWare dialog box appears.

- If your computer is connected to a network that has a NetWare server, configure the Select Preferred Server option, or Default Tree and Context option, as appropriate. (Obtain the appropriate configuration settings from your network administrator.) Configure the Print Options and Login Script Options as desired or as instructed by your network administrator.

- If your computer is *not* connected to a network that has a NetWare server, ensure that the radio button next to Preferred Server is selected, and accept the default Select Preferred Server option of <None>.

Click the Gateway command button.

6. The Configure Gateway dialog box appears. Notice the various options in this dialog box. Click OK.

7. The Gateway Service for NetWare dialog box reappears. Click OK.

8. The Control Panel dialog box reappears. Exit Control Panel.

Lab 17.31 *Installing and configuring RIP for NWLink IPX/SPX Compatible Transport*

MCSE

Enterprise

The purpose of this lab exercise is to give you hands-on experience installing and configuring RIP for NWLink IPX/SPX Compatible Transport.

Begin this lab by booting your computer to Windows NT Server. Log on as Administrator. Place your Windows NT Server compact disc in your computer's CD-ROM drive.

Follow these steps carefully.

1. Select Start ≻ Settings ≻ Control Panel.

2. In the Control Panel dialog box, double-click Network.

3. In the Network dialog box, click the Services tab.

4. On the Services tab, click the Add command button.

5. In the Select Network Service dialog box, highlight RIP for NWLink IPX/SPX Compatible Transport. Click OK.

6. A Windows NT Setup dialog box appears. Ensure that the correct path to your Windows NT Server source files (usually the i386 folder on your Windows NT Server compact disc) is listed in the text box. Edit this text box if necessary. Click the Continue command button.