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Enhancing

NetWare

Connectivity

with

NLSP™

Routing

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IPX™ Upgrade for NetWare Servers 1.0 Installation and Configuration Guide

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NETWORK COMPUTING PRODUCTS

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About This Guide

This guide provides the information you need to install and configure NetWare® Link Services Protocol™ (NLSP™) software on a Novell® NetWare file server.

This guide is written for network managers, administrators, and consultants responsible for installing and maintaining NetWare software on an Internetwork Packet Exchange™ (IPX™) internetwork.

Chapter Summaries

This section briefly summarizes each chapter in this guide. Use these summaries to help you locate specific topics, or to help you decide which portions of this guide contain new information.

Chapter 1, "Installing IPX Upgrade for NetWare Servers," introduces NLSP and explains how to install the software on a local or remote NetWare server.

Chapter 2, "Configuring IPX Upgrade for NetWare Servers," explains how to add the necessary **LOAD** and **BIND** commands to the server AUTOEXEC.NCF file and how to activate the configuration when you are finished. This chapter also explains how to use a new **SET** command option to control Type 20 packet traffic on the server.

Chapter 3, "Examining Your IPX Network," explains how to use the IPX network management console (IPXCON) to examine NLSP routers and NetWare LANs. IPXCON is useful for monitoring and troubleshooting IPX systems throughout your IPX network.

Conventions Used in This Guide

The *IPX Upgrade for NetWare Servers 1.0 Installation and Configuration Guide* uses the documentation conventions described in this section. The following sections describe the conventions used:

- "Terminology," on this page
- "New Terms and Important Information," on this page
- "System Messages," on this page
- "User Input" on page ix
- "Special Characters" on page ix
- "Graphic Symbols" on page x

Terminology

The following terms summarize frequently performed actions:

- "Select" means to use the cursor keys to highlight an item *and* press <Enter>.
- "Enter" means to type the indicated text *and* press <Enter> (as one complete operation). It is shown in one of two ways; for example:

  Enter **`LOAD INETCFG`** or **`LOAD  INETCFG`** <Enter>

New Terms and Important Information

Highlighting emphasizes new terms and important information.

System Messages

Regular (nonboldface, nonitalic) monospaced character strings represent system prompts or responses; for example:

```
message example
```


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User Input

This guide uses the following conventions to denote user input:

- **`Highlighted`** monospaced character strings represent user input, which must be entered exactly as shown; for example:

  `LOAD INETCFG` <Enter> `or` **`Load inetcfg`** <Enter>

- *`Highlighted`* and lowercase character strings show descriptive names for items that you must replace with appropriate values. For example, in the following NetWare console command, you replace *`driver`* with the specific name of a driver:

  `UNBIND IPX FROM` *`driver`* <Enter>

Special Characters

This guide uses special characters to denote the following:

- Asterisks * in text denote third-party trademarks.
- Angle brackets `< >`, brackets `[ ]`, braces `{ }`, vertical bar |, parenthesis `( )`, and quotation marks " are used as metacharacters and, as such, you must not type these as part of user input.
- Angle brackets `< >` enclose a descriptive name for any value that is provided as output by a computer; for example:

  ```
  IPXRTR:3.00:32:Failed to unbind duplicate LAN
  board <name>
  ```

  Characters enclosed in angle brackets can also represent keys; for example:

  - "Press <Ins>" means you press the <Insert> key on your keyboard.
  - Keys joined by a plus sign are pressed in combination. "Press <Ctrl>+<Alt>+<Delete>" means you press those keys simultaneously.

- Square brackets [ ] enclose an option item; for example:

  BIND IPX TO *board_name* **NET=***network_number* [**RIP=***RIP_state*] [**SAP=***SAP_state*] <Enter>

  If a command, such as the preceding one, is too long to fit on one line, it wraps to the next line; such a command must be entered after the console prompt (:) but before the end-of-line (EOL) character.

- Braces { } enclose multiple items separated by the vertical bar | character. You must specify only one of the items; for example:

  LOAD IPXRTR [**ROUTING=**{**NLSP**|**RIPSAP**|**NONE**}]

- Vertical bars | separate items in a list of alternatives. If the list is enclosed in square brackets [ ], you can use any one or none of the items. If the list is enclosed in braces { }, you must use any one, but only one, of the items.

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Graphic Symbols

In printed documentation, the following symbols appear in the left margin to identify different categories of information:

Procedure

1. This symbol identifies the first step of a procedure. To accomplish a specific task, follow the steps in the procedure.

Note

This symbol indicates sidelights, discussions, and general points of interest related to the current subject.

Important

This symbol points out key concepts or facts about the product.

Suggestion

This symbol points out hints, tips, or helpful information that you should know.

Online documentation omits these symbols, but either maintains the font change or labels the information for easy identification.

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Related Novell Publications

See the following Novell publications for information about IPX, NLSP, RIP, SAP, and related topics:

- *IPX Upgrade for NetWare Servers 1.0 NLSP Migration Guide* (Novell part number 100-002432-001)
- *NetWare Link Services Protocol In-Depth* (Novell part number 481-000085-001)
- *NetWare Link Services Protocol Specification* (Novell part number 100-001708-002)
- *The Novell Network Registry* (Novell part number 461-000248-001)

Additional Reading

The following publications provide general technical information about routing and related topics:

- *Interconnections: Bridges and Routers*, by Radia Perlman. Addison-Wesley Publishing Company, Inc.
- *Routing in Today's Internetworks*, by Mark Dickie. Van Nostrand Reinhold, an International Thomson Publishing company.
- *Novell's Guide to Multiprotocol Internetworking*, by Laura A. Chappell and Roger L. Spicer. Novell Press: Sybex.

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chapter **1**

Installing IPX Upgrade for NetWare Servers

This chapter explains how to install IPX™ Upgrade for NetWare® Servers 1.0 on NetWare 3™ servers, NetWare 4.01 servers, and NetWare 4.02 servers. IPX Upgrade for NetWare Servers provides NetWare Link Services Protocol™ (NLSP™) software, Novell's *link state* routing protocol, and RIP/SAP functionality for IPX LANs.

Note: This product provides NLSP and RIP/SAP routing only for LAN-based NetWare servers. You must use other Novell or third-party products if you want to run NLSP or RIP/SAP over a WAN connection.

This chapter contains the following sections:

- "Introduction to IPX Upgrade for NetWare Servers," on this page

  This section identifies the primary features of IPX Upgrade for NetWare Servers and its operational requirements.

- "Installing IPX Upgrade for NetWare Servers" on page 2

  This section gives simple, step-by-step procedures for installing IPX Upgrade for NetWare Servers on a local NetWare server or one or more remote NetWare servers.

Introduction to IPX Upgrade for NetWare Servers

NetWare servers have traditionally used the Routing Information Protocol (RIP) to route IPX packets, and the Service Advertising Protocol (SAP) to exchange service information with other NetWare servers. In addition to providing this same functionality for network devices that rely on RIP and SAP (NetWare 2 servers, for example), IPX Upgrade for NetWare Servers provides NLSP, a highly efficient routing protocol for IPX internetworks.

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NLSP is derived from IS-IS (Intermediate System-to-Intermediate System), the link state routing protocol developed by the International Standards Organization (ISO). Like IS-IS, NLSP exchanges routing information between routers and makes routing decisions based on that information. For workstation-to-router communication, NLSP routers use RIP.

Unlike RIP and SAP, which periodically broadcast routing and service information, NLSP transmits routing information only when a change occurs in a route or service, or every two hours—whichever occurs first.

To run IPX Upgrade for NetWare Servers, your server must be a PC running NetWare 3, NetWare 4.01, or NetWare 4.02. Additionally, one or more Novell-certified network interface boards must be installed in the PC.

Installing IPX Upgrade for NetWare Servers

This section explains how to install the software on local and remote NetWare 3, NetWare 4.01, or NetWare 4.02 servers.

Important

This product cannot be installed on any server running NetWare MultiProtocol Router™ 2.0, 2.1, or 2.11 software, NetWare WAN Links™ 2.0 software, or NetWare MultiProtocol Router Plus™ 2.1 or 2.11 software.

Installing the Software on a Local Server

To install IPX Upgrade for NetWare Servers on a local server, complete the following steps:

Procedure

1. **Start the server if it is not already running.**

2. **At the server console prompt, type**

   `LOAD INSTALL` <Enter>

3. **If you are using a NetWare 4.01 or NetWare 4.02 server, press** <Enter> **to select *Maintenance/Selective Install*. If you are using a NetWare 3 server, continue to the next step.**

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4. **Select *Product Options*, then press** <Enter>**.**

   A new window displays the NetWare products currently installed on your server.

5. **Press** <Ins>**.**

   A new window displays a prompt with drive A: as the default.

6. **Insert the *IPX Upgrade for NetWare Servers Disk 1* diskette into the server disk drive.**

7. **If you are installing the software from drive A:, just press** <Enter>**. If you are installing the software from drive B:, replace "A:" with "B:", then press** <Enter>**. If you are installing the software on a NetWare 4.02 server, press** <F3> **to change drives.**

   The *Installation Options* menu appears after a few moments.

8. **The selection *Install on Local Server Only* is already highlighted; just press** <Enter>**.**

   The files on the first diskette are copied to a temporary directory on the server.

9. **When prompted, replace the *IPX Upgrade for NetWare Servers Disk 1* diskette with the *IPX Upgrade for NetWare Servers Disk 2* diskette, then press** <Enter>**.**

   The files on the second diskette are copied to the temporary directory. All files are then installed in their respective destination directories on the server.

   The following message appears when all files have been installed:

```
Installation was successful. Bring down and
restart each server on which you installed the
software to ensure that it uses the newest NLM
files.
<Press ENTER to continue>
```

10. **Press** <Enter>**.**

    The *Installation Options* menu reappears.

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11. **Press** <Esc>**, then select *Yes*.**

    The *Currently Installed Products* window reappears, showing the software you just installed.

12. **Press** <Esc> **to return to the *Installation Options* menu.**

13. **Press** <Esc> **again, then exit the INSTALL utility.**

14. **Remove the *IPX Upgrade for NetWare Servers Disk 2* diskette from the drive.**

Installing the Software on a Remote Server

This section explains how to install IPX Upgrade for NetWare Servers on one or more remote servers. Before you begin, make sure of the following:

- All servers have enough connection slots available.

  For example, NetWare Runtime™ 3.11 software—because it is a single-user version of NetWare—has only one connection slot. A remote installation occupies a connection slot on both the local and remote servers.

- You have sufficient access rights to each remote server.

  If the remote server is running NetWare 3, you must know its SUPERVISOR password.

  If the remote server is running NetWare 4.01 or NetWare 4.02, you must know the ADMIN password *or* a username/password with equivalent access rights.

Before the software can be installed on a remote server, the remote server must be running RSPAWN. If RSPAWN is not already loaded, you must either load it manually at the remote server—if the server is physically accessible—or load it from a local NetWare workstation as explained in "Loading RSPAWN on the Remote Server" on page 5.

Figure 1-1 summarizes the steps you follow to install IPX Upgrade for NetWare Servers on a remote server.

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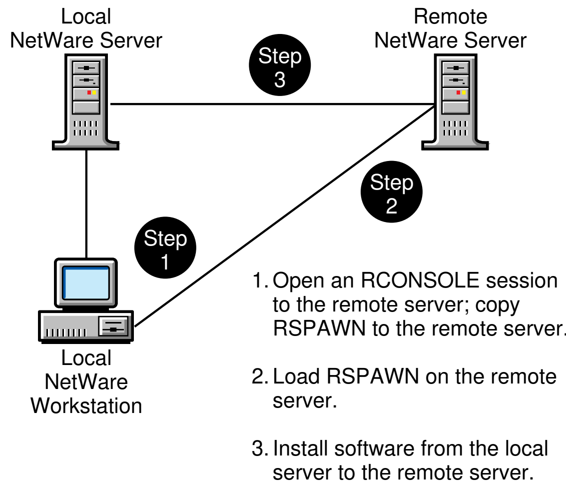
Figure 1-1
Installation on a Remote Server



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Loading RSPAWN on the Remote Server

To load RSPAWN on a remote server, you must first open a session to the server using the RCONSOLE utility from a NetWare workstation.

If the most current version of RSPAWN—the one on the first installation diskette—is already loaded on the remote server, skip to “Installing the Software on the Remote Server” on page 7.

Important

REMOTE.NLM and RSPX.NLM must be loaded on the remote server before you can open a remote session to it with RCONSOLE. If you are unfamiliar with RCONSOLE and are running NetWare 3, see *NetWare Version 3.1x System Administration*. If you are running NetWare 4™ software, see *NetWare 4 Supervising the Network*.

To load RSPAWN on the remote server from a local NetWare workstation, complete the following steps:

Procedure

1. **Log in to the nearest local server as SUPERVISOR.**

   This enables the workstation to run RCONSOLE from the server.

2. **At the workstation prompt, type**

   RCONSOLE <Enter>

Note

If you are using a NetWare 4.01 or NetWare 4.02 version of RCONSOLE, select *SPX* as the connection type.

A new window displays the available servers.

3. **Select the remote server from the list, then press** <Enter>**.**

4. **Enter the remote server password, then press** <Enter>**.**

   The screen displays the remote server console.

5. **Insert the *IPX Upgrade for NetWare Servers Disk 1* diskette into the workstation disk drive.**

6. **Display the RCONSOLE *Available Options* menu.**

   If you are using a NetWare 3 version of RCONSOLE, press the Asterisk (*) key.

   If you are using a NetWare 4.01 or NetWare 4.02 version of RCONSOLE, press <Alt>+<F1>.

7. **Select *Transfer Files To Server*.**

8. **Enter A:\RSPAWN.NLM or B:\RSPAWN.NLM as the source path, depending on the workstation drive from which you are installing the software, then press** <Enter>**.**

9. **Enter SYS:\SYSTEM as the remote server target path, then press** <Enter>**.**

   After a few moments, a message indicates that the file upload is complete.

10. **Press** <Esc> **twice to return to the remote server prompt.**

11. **At the remote server prompt, type**

    `LOAD RSPAWN` <Enter>

Suggestion

To simplify other remote installations you do on this remote server, add the following line to the remote server AUTOEXEC.NCF file:

`LOAD RSPAWN`

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12. **Remove the *IPX Upgrade for NetWare Servers Disk 1* diskette from the workstation disk drive.**

13. **Redisplay the list of available servers:**

    If you are using a NetWare 3 version of RCONSOLE, press <Shift>+<Esc>, then select *Yes*.

    If you are using a NetWare 4.01 or NetWare 4.02 version of RCONSOLE, press <Alt>+<F1>, then select *Yes*.

14. **Press** <Esc>**, then select *Yes*, to exit RCONSOLE.**

Installing the Software on the Remote Server

This section explains how to install IPX Upgrade for NetWare Servers on one or more remote servers. After you load RSPAWN on a remote server, complete the following steps from the *local* server console:

Procedure

1. **At the server console prompt, type**

    `LOAD INSTALL` <Enter>

2. **If you are using a NetWare 3 server, continue to the next step. If you are using a NetWare 4.01 or NetWare 4.02 server, press** <Enter> **to select *Maintenance/Selective Install*.**

3. **Select *Product Options*, then press** <Enter>**.**

    A new window displays the products currently installed on the local server.

4. **Press** <Ins>**.**

    A new window displays a prompt with A: as the default drive.

5. **Insert the *IPX Upgrade for NetWare Servers Disk 1* diskette into the local server disk drive.**

6. **If you are installing the software from drive A:, just press** <Enter>**. If you are installing the software from drive B:, replace "A:" with "B:", then press** <Enter>**.**

    The *Installation Options* menu appears after a few moments.

7. **Select *Install on Multiple Servers*, then press** <Enter>**.**

   A new window displays the available file servers that are running a version of RSPAWN.

8. **Highlight a server, then press** <Enter>**.**

   Note: To install the software on two or more servers, press <F5> to select each server. When you are done, press <Enter>.

9. **Before the installation begins, you are prompted for login information for each server you selected:**

   - If the remote server is running NetWare 3, the following fields appear:

   ```
   Username: REMOTE_SERVER_NAME/SUPERVISOR
   Password:
   ```

   - If the remote server is running NetWare 4.01 or NetWare 4.02, the following fields appear:

   ```
   Server: REMOTE_SERVER_NAME
   Username: ADMIN
   ```

   Note: If you want to use a different username login, just delete ADMIN, type the username, then press <Enter>. Remember that the username you use must have access rights that are equivalent to those held by ADMIN.

10. **If the username does not have a password, just press** <Enter>**; otherwise, enter the password, then press** <Enter>**.**

    The files on the first diskette are copied to a local temporary directory.

11. **When prompted, replace the *IPX Upgrade for NetWare Servers Disk 1* diskette with the *IPX Upgrade for NetWare Servers Disk 2* diskette, then press** <Enter>**.**

    The files on the second diskette are copied to the local temporary directory. All files are then installed in their respective destination directories on each server you selected in Step 8.

The following message appears when all files have been installed on each remote server:

```
Installation was successful. Bring down and
restart each server on which you installed the
software to ensure that it uses the newest NLM
files.
<Press ENTER to continue>
```

12. **Press** <Enter>**.**

    The *Installation Options* menu reappears.

13. **Press** <Esc>**, then select *Yes*.**

    The *Currently Installed Products* window for the local server reappears.

14. **Press** <Esc> **to return to the *Installation Options* menu.**

15. **Press** <Esc> **again, then exit the INSTALL utility.**

16. **Remove the *IPX Upgrade for NetWare Servers Disk 2* diskette from the drive.**

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chapter 2

Configuring IPX Upgrade for NetWare Servers

This chapter explains how to configure IPX™ Upgrade for NetWare® Servers 1.0 by adding **LOAD** and **BIND** commands to the server AUTOEXEC.NCF file.

Important: This is strictly a command-based configuration; you cannot use the Internetworking Configuration utility (INETCFG) to configure this product.

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This chapter contains the following sections:

- “Loading Files” on page 12

  This section describes each of the **LOAD** commands you add to the server AUTOEXEC.NCF file. These commands enable—or, if you choose, disable—IPX™ routing on the server. This section also indicates which commands are required and recommended for different versions of NetWare.

- “Binding IPX to a Network Interface” on page 15

  This section explains how to bind IPX to the server’s LAN interfaces. It also describes the different **BIND** command options for selectively enabling or disabling RIP, SAP, or NLSP™ routing on an interface.

- “Activating the Configuration” on page 15

  This section explains how to activate the router configuration.

- “Sample Configurations” on page 16

  This section provides sample AUTOEXEC.NCF files you can customize to suit your own server and network configurations.

- “Controlling the Propagation of Type 20 Packets” on page 18

  This section explains how to control the way the server propagates type 20 packets on the network.

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Loading Files

This section presents the minimum set of **LOAD** commands required to enable—or disable—IPX routing on a NetWare server. Make certain you load all required NetWare Loadable Module™ (NLM™) files before binding IPX to any network interface.

The following NLM files represent the minimum set required for NLSP operation:

- **IPXRTR—**IPX protocol stack that contains the NLSP and RIP/SAP routing software. IPXRTR uses the loadable router interface that comes with NetWare 4.01.

- **IPXSTACK—**Patch that provides the NetWare 4™ loadable router interface for NetWare 3™ software. IPXSTACK is required only on NetWare 3 servers.

- **NCPIDFIX—**Patch that satisfies a requirement in the NetWare 4.01 loadable router interface. NCPIDFIX is required only on NetWare 4.01 servers.

All other required NLM files are loaded automatically by these files.

Important

A fourth NLM file, IPXRTRNM, provides the Simple Network Management Protocol (SNMP) instrumentation for IPX, NLSP, RIP, and SAP Management Information Base (MIB) variables. IPXRTRNM allows you to monitor the server from a remote location using the IPX network management console (IPXCON) or other SNMP management systems. Although IPXRTRNM is not required for NLSP operation, Novell recommends that you load it as part of the server configuration. Chapter 3, “Examining Your IPX Network,” explains some of the ways you can use IPXCON. Note also that IPXRTRNM automatically loads SNMP.NLM and CLIB.NLM; make sure the server has enough memory to run these additional NLM files.

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About IPXRTR

IPXRTR contains the NLSP and RIP/SAP routing software. The **LOAD IPXRTR** command supports the *ROUTING* parameter, with which you can specify the following options:

- **ROUTING=NLSP** enables NLSP routing on the server. However, if IPXRTR detects RIP routers on the network, it automatically runs RIP/SAP *in addition to* NLSP.
- **ROUTING=RIPSAP** enables RIP/SAP routing—the default setting. In this case, IPXRTR operates like a typical RIP/SAP router.
- **ROUTING=NONE** disables *all* IPX routing on the server.

Important

As a normal part of its operation, a NetWare server forwards IPX packets between its network interfaces. With *ROUTING=NONE* enabled, the server still performs its duties as a file server, but broadcasts only its own services and internal network number—not those associated with its network interfaces. (A server operating in this way is sometimes called a *multihomed* server.) Use *ROUTING=NONE* only if you do not want the server to forward packets between its interfaces. Also, do not use *ROUTING=NONE* in a network running only NLSP.

Loading IPXRTR without specifying one of these options enables RIP/SAP routing by default.

By default, NLSP *broadcasts* its packets on an IPX network. NLSP uses broadcast as its default transmission mode because some LAN drivers do not properly support packet multicast. You can, however, configure NLSP to use *multicast* transmission. For this purpose, the **LOAD IPXRTR** command supports the *MCAST* parameter, with which you can specify the following options:

- **MCAST=YES** enables NLSP packet multicast on the server.
- **MCAST=NO**, the default option, enables NLSP packet broadcast on the server.

Loading IPXRTR without the *MCAST* parameter specifies broadcast transmission by default.

Note

IPXRTR detects the NLSP packet transmission mode of other systems on the LAN. Even if you load IPXRTR with *MCAST=YES*, IPXRTR automatically reverts to broadcast if it discovers another system using broadcast.

LOAD Commands Required on a NetWare 3 Server

To run IPX Upgrade for NetWare Servers on a NetWare 3 server, add the following lines to the server AUTOEXEC.NCF file:

LOAD IPXSTACK

LOAD IPXRTR

LOAD IPXRTRNM (Recommended but not required)

Without the *ROUTING* parameter, the **LOAD IPXRTR** command enables only RIP/SAP routing. To enable NLSP routing, enter the **LOAD IPXRTR** command as follows:

LOAD IPXRTR ROUTING=NLSP

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LOAD Commands Required on a NetWare 4.01 Server

To run IPX Upgrade for NetWare Servers on a NetWare 4.01 server, add the following lines to the server AUTOEXEC.NCF file:

LOAD NCPIDFIX

LOAD IPXRTR

LOAD IPXRTRNM (Recommended but not required)

Without the *ROUTING* parameter, the **LOAD IPXRTR** command enables only RIP/SAP routing. To enable NLSP routing, enter the **LOAD IPXRTR** command as follows:

LOAD IPXRTR ROUTING=NLSP

LOAD Commands Required on a NetWare 4.02 Server

To run IPX Upgrade for NetWare Servers on a NetWare 4.02 server, add the following lines to the server AUTOEXEC.NCF file:

LOAD IPXRTR

LOAD IPXRTRNM (Recommended but not required)

Without the *ROUTING* parameter, the **LOAD IPXRTR** command enables only RIP/SAP routing. To enable NLSP routing, enter the **LOAD IPXRTR** command as follows:

LOAD IPXRTR ROUTING=NLSP

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Binding IPX to a Network Interface

The command for binding IPX to a network interface is as follows:

`BIND IPX` *`boardname`* `NET=`*`network_number`* <Enter>

The variable *`boardname`* is the name of the network interface board associated with the LAN driver; *`network_number`* is the external network number of the IPX network to which the interface is connected.

You can override the routing default you specify in the **`LOAD IPXRTR`** command by adding one of the following options to the **`BIND`** command line:

`RIP=YES|NO|AUTO`
`SAP=YES|NO|AUTO`
`NLSP=YES|NO`

Note: You cannot, however, enable NLSP on an interface after you have disabled NLSP routing from the **`LOAD IPXRTR`** command.

These options have the following meaning:

- **YES** enables RIP, SAP, or NLSP routing on the network interface.
- **NO** disables RIP, SAP, or NLSP routing on the network interface.
- **AUTO** accepts and broadcasts RIP or SAP packets only if non-NLSP devices—such as NetWare 2 servers—are operating on the network.

Important: Specific **`BIND`** command lines are required for interfaces connected to networks running UnixWare™, OS/2* Named Pipes, and NetWare/IP™. For configuration instructions, see the *IPX Upgrade for NetWare Servers 1.0 NLSP Migration Guide*.

Activating the Configuration

To activate the configuration, bring down and then restart the server.

Sample Configurations

This section provides sample configurations for IPX Upgrade for NetWare Servers. Each sample shows the commands you add to the server AUTOEXEC.NCF file.

RIP/SAP Routing on a NetWare 3.11 Server

This sample configuration enables RIP/SAP routing on a NetWare 3.11 server. This is the most basic configuration, which replaces the standard RIP/SAP operation with that provided by IPX Upgrade for NetWare Servers, but adds server and network monitoring capability:

```
LOAD IPXSTACK
LOAD IPXRTR
LOAD IPXRTRNM
#Load and bind LAN board
LOAD NE3200 SLOT=3 FRAME=ETHERNET_II
  NAME=ORDER_ENTRY_NET
BIND IPX ORDER_ENTRY_NET NET=C9971223
```

NLSP Routing on a NetWare 4.01 Server

In addition to enabling NLSP routing on a NetWare 4.01 server, this sample configuration loads IPXRTRNM to provide server and network monitoring capability:

```
LOAD NCPIDFIX
LOAD IPXRTR ROUTING=NLSP
LOAD IPXRTRNM
#Load and bind LAN board
LOAD NE3200 SLOT=3 FRAME=ETHERNET_II
  NAME=ORDER_ENTRY_NET
BIND IPX ORDER_ENTRY_NET NET=C9971223
```


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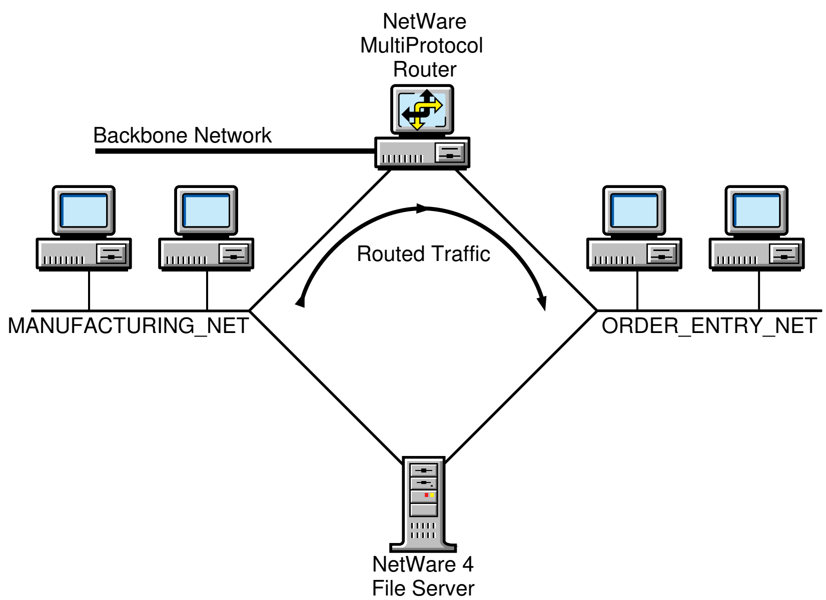
IPX Routing Disabled on a NetWare 4.02 Server

This sample configuration disables IPX routing on a NetWare 4.02 server. Disabling IPX routing makes more computing resources available for NetWare file and print services. This is useful when you already have a dedicated IPX router on the network, such as the one shown in Figure 2-1.

Figure 2-1
IPX Routing Disabled on a NetWare File Server



Disabling IPX routing on the file server in Figure 2-1 forces traffic from the MANUFACTURING_NET network to pass through the server running the NetWare MultiProtocol Router™ software—instead of the file server—to reach the ORDER_ENTRY_NET network.

The AUTOEXEC.NCF file on the file server looks like this:

```
#ROUTING=NONE disables all IPX routing
LOAD IPXRTR ROUTING=NONE
LOAD IPXRTRNM
#Load and bind LAN boards
LOAD NE3200 SLOT=3 FRAME=ETHERNET_II
  NAME=ORDER_ENTRY_NET
BIND IPX ORDER_ENTRY_NET NET=C9971223
LOAD NE2000 SLOT=4 FRAME=ETHERNET_SNAP
  NAME=MANUFACTURING_NET
BIND IPX MANUFACTURING_NET NET=C997F13A
```

Controlling the Propagation of Type 20 Packets

IPX Upgrade for NetWare Servers includes a new **SET** command option that enables you to control the propagation of type 20 packets through the server's interfaces. Type 20 is a special IPX packet type that refers to any propagated packet. NetBIOS packets, for example, are type 20 packets.

To use this command, you type the following command at the server console:

SET IPX NETBIOS REPLICATION OPTION [**0**|**1**|**2**|**3**] <Enter>

You can type the command by itself to check the current setting, or you can specify one of the following numeric options:

- **0**—Server discards, rather than propagates, any type 20 packet it receives. This option disables type 20 packet propagation.

- **1**—Server receives and propagates type 20 packets through *all* its interfaces regardless of whether those interfaces are equal-cost routes to the same source (that is, the server from which the packets originated).

- **2**—Option that affects how the server propagates type 20 packets in two ways:
    - The server does not "repropagate" type 20 packets originating from the same source but received through different interfaces. For example, if Server A receives a type 20 packet from Server B, it forwards the packet through its other interfaces. If Server A then receives the *same* packet from Server C, it discards it. This is a packet forwarding mechanism known as *reverse path forwarding*.
    - The server does not propagate type 20 packets through the same interface from which it receives them. This is known as *split horizon*, a technique used with RIP and other distance vector routing protocols.
- **3**—Server propagates type 20 packets the same way as option **2**, but *does not* forward them across WAN connections.

chapter 3 Examining Your IPX Network

This chapter explains how to use the IPX™ network management console (IPXCON) to examine any NLSP™ system or NetWare® LAN in your IPX network. IPXCON can help you identify problems with your routers and LANs.

IPXCON uses SNMP to exchange management information and statistics with NLSP routers on the network. IPXCON operates over either IPX or Internet Protocol (IP) networks using the User Datagram Protocol (UDP) transport.

This chapter contains the following sections:

- "Selecting a Server or Router" on page 22

  This section explains how to select a NetWare server or router for monitoring.

- "Determining Where NLSP is Running in Your Network" on page 23

  This section explains how to determine which systems on your network are running NLSP.

- "Checking Your Network for Inactive Routers" on page 24

  This section explains how to identify inoperable routers.

- "Checking Your Network for Duplicate Network Numbers" on page 26

  This section explains how to determine whether systems are using the same network number.

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- “Checking Your Network for Duplicate System IDs” on page 27

  This section explains how to determine whether systems are using the same NLSP System ID.

- “Finding NLSP Routers with Insufficient Memory” on page 27

  This section explains how to determine whether any NLSP router on the network does not have enough memory to process routing information.

- “Finding the Designated Router on a LAN” on page 28

  This section explains how to determine which NLSP router on a LAN is the *Designated Router*.

Selecting a Server or Router

IPXCON gives you management access to any server or dedicated router that uses NLSP as its routing protocol. In this section, the term *local system* refers to the server or router from which you load IPXCON; *remote system* refers to any other server or router on the network.

If You Want to Access the Local System

To gain management access to the local system, just type the following command at the prompt:

LOAD IPXCON <Enter>

IPXCON accesses the local system by default.

If You Want to Access a Remote System

Complete the following steps to gain management access to a remote server or router:

Procedure 23

1. **Go to a local server or router and type the following command at the prompt:**

   LOAD IPXCON <Enter>

   The *Available Options* window appears.

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2. ***SNMP Access Configuration* is already highlighted; just press** <Enter>**.**

   The *SNMP Access Configuration* window appears.

3. **Select the *Transport Protocol* field.**

   The *Transport Protocol* window appears.

4. **Select *TCP/IP* or *IPX*.**

   The *SNMP Access Configuration* window reappears.

5. **The *Host Address* field is already highlighted; press** <Ins> **to see a list of available hostnames and addresses.**

   Note

   If you already know the system's hostname or address, just type it in.

6. **Scroll through the list to find the system; press** <Enter> **to select it.**

   Important

   IPXCON can only access systems that are running IPXRTRNM. If you do not see the system in this list, check whether IPXRTRNM is loaded on that system.

7. **Press** <Esc> **to return to the *Available Options* menu.**

   In a few moments, IPXCON begins recording statistics for the system you selected.

Determining Where NLSP is Running in Your Network

After migrating your network, you can identify which LANs on your IPX network are using NLSP or RIP—or both—as the routing protocol.

If you partitioned your IPX network into routing areas, note the following points:

- The procedure in this section shows only the LANs and NLSP routers that are within the same routing area as the system you are currently monitoring.
- RIP should be running only on the routers at area boundaries.

For an explanation of routing areas, see the *IPX Upgrade for NetWare Servers 1.0 NLSP Migration Guide*.

To find LANs on which NLSP or RIP is running, complete the following steps:

Procedure 23

1. **Load IPXCON and select a system as described in "Selecting a Server or Router" on page 22.**

2. **Select *NLSP Information*.**

   The *NLSP Information* window appears.

3. **Select *LANs*.**

   The *Known LANs* window displays the following information about each NetWare LAN of which the local system is aware:

   - **Network Number—**External network number of the LAN.
   - **Throughput—**Number of megabits per second (Mbps) reported by the LAN board.
   - **Delay—**Time, in microseconds, for packets to reach the LAN from the Designated Router.

   If NLSP is importing RIP routes to a LAN, the entry is labeled *RIP Active*. If the entry is labeled *Unreachable*, the LAN is no longer accessible from the local system. No label means that NLSP is the only routing protocol running on the LAN and that the LAN is reachable.

4. **Select one of the LANs to see which NLSP routers are on it.**

Checking Your Network for Inactive Routers

You can use IPXCON to identify routers on your network that are inactive—that is, not routing—for some reason. This information can often help you locate a defective network interface.

To check your network for inactive routers, complete the following steps:

Procedure 23

1. **Load IPXCON and select a system as described in "Selecting a Server or Router" on page 22.**

2. **Select *NLSP Information*.**

   The *NLSP Information* window appears.

3. **Select *Routers*.**

   IPXCON lists the NLSP routers known to the system you are monitoring.

4. **Scroll through the list.**

   Any router labeled *Unreachable* is either down or has a defective network interface.

   Any router labeled *Overloaded* has run out of memory and can no longer process NLSP routing information.

   Routers not labeled *Unreachable* or *Overloaded* are operating properly.

5. **Select one of the routers.**

   A new window displays the following information:

   - **Attachment—**NLSP routers or IPX networks connected to the router you selected.
   - **Network—**If the attachment is an IPX network, the network's external network number; if the attachment is a router, the router's internal network number.
   - **Media Type—**LAN or WAN medium, such as Ethernet 802.3 or X.25.

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- **Throughput—**Number of Mbps reported by the router's interface board.

Note

For WANs, the throughput value is an estimate. Because of rounding errors, this estimate is typically less than the actual speed of the WAN link.

- **Delay—**Estimated time, in microseconds, for packets to be forwarded to the attached medium.

Checking Your Network for Duplicate Network Numbers

Each external network number that identifies a LAN on your IPX network must be unique. Incorrect configurations and other problems can cause two LANs to have the same external network number.

One way in which this can occur is when a bridge connecting two LAN segments fails—a condition known as a *split LAN*. When the bridge fails, each segment becomes a separate LAN but retains the same external network number. As a result, routers forwarding packets to that network number see two destinations and simply choose the nearest one.

To check your network for duplicate network numbers, complete the following steps:

Procedure

1. **Load IPXCON and select a system as described in "Selecting a Server or Router" on page 22.**
2. **Select *NLSP Information*.**

   The *NLSP Information* window appears.
3. **Select *LANs*.**

   The *Known LANs* window appears. The LANs are listed in numeric order by network number.
4. **Scroll through the list of LANs; look for duplicate network numbers.**

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Checking Your Network for Duplicate System IDs

To check your network for duplicate System IDs, complete the following steps:

Procedure

1. **Load IPXCON and select a system as described in “Selecting a Server or Router” on page 22.**

2. **Select *NLSP Information*.**

   The *NLSP Information* window appears.

3. ***System Information* is already highlighted; just press** <Enter>**.**

4. **The field associated with *Detailed NLSP System Information* is already highlighted; just press** <Enter>**.**

5. **Check the numbers associated with the *Sequence Number Skips* and *Own LSP Purges* fields.**

   If either of these numbers is increasing, there are two or more NLSP routers on your network with the same System ID. Change the System ID on one of the routers.

Finding NLSP Routers with Insufficient Memory

To check your network for routers that have run out of memory, complete the following steps:

Procedure

1. **Load IPXCON and select a system as described in “Selecting a Server or Router” on page 22.**

2. **Select *NLSP Information*.**

   The *NLSP Information* window appears.

3. ***System Information* is already highlighted; just press** <Enter>**.**

   The field associated with *Level 1 Overloaded* should read *No*. If it reads *Yes*, the router does not have enough memory to process routing information.

4. **As a further check, select *Detailed NLSP System Information*.**

   The *Level 1 Database Overloads* field indicates how many times the router has run out of memory.

Finding the Designated Router on a LAN

The *Designated Router* is an NLSP router elected by its peers to represent and keep track of the connectivity of its LAN. The Designated Router handles exchanges of link state information on behalf of all other NLSP routers on the LAN.

To find the Designated Router on a LAN, complete the following steps:

Procedure 23

1. **Load IPXCON and select a system as described in “Selecting a Server or Router” on page 22.**

2. **Select *Circuits*.**

   The *Circuits* window displays the name, type, and state of each circuit. Only broadcast (LAN) circuits have Designated Routers.

3. **Select a broadcast circuit.**

   The *Circuit Information* window displays, among other information, the name of the Designated Router and the external network number of the LAN it represents.

4. **To see more information about the Designated Router, complete the following steps:**

   4a. Record the name of the Designated Router.

   4b. Press <Esc> **until you return to the *Available Options* menu.**

   4c. Select *SNMP Access Configuration*.

   4d. Select *IPX* as the transport protocol.

   4e. Type the name of the Designated Router in the *Host Address* field, then press <Enter>**.**

   4f. Press <Esc> **to return to the *Available Options* menu.**

   In a few moments, IPXCON begins recording statistics for the Designated Router.

User Comments

We want to hear your comments and suggestions about this guide. Please send them to the following address:

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