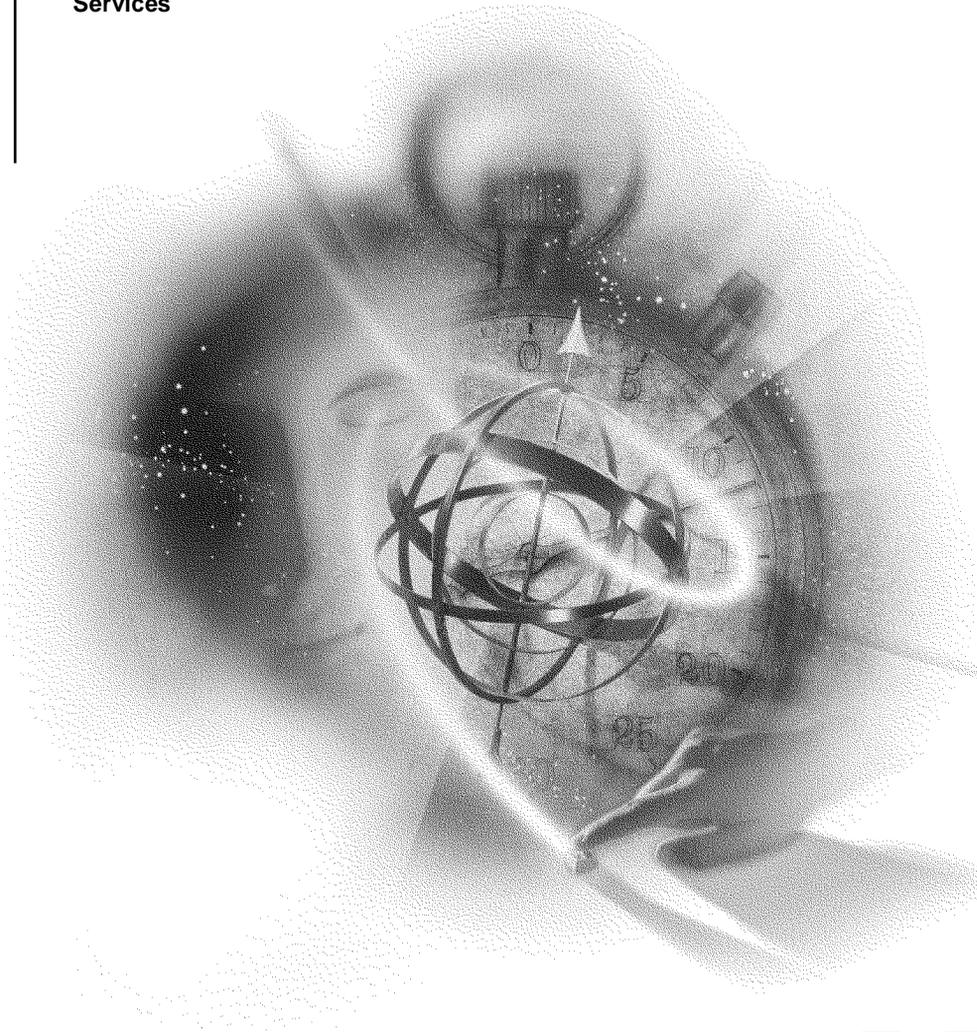


VERSION 4.2

Print

Services



NetWare[®] 4
NETWORK SOFTWARE

Novell[®]

disclaimer

Novell, Inc. makes no representations or warranties with respect to the contents or use of this documentation, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves the right to revise this publication and to make changes to its content, at any time, without obligation to notify any person or entity of such revisions or changes.

Further, Novell, Inc. makes no representations or warranties with respect to any software, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves the right to make changes to any and all parts of Novell software, at any time, without any obligation to notify any person or entity of such changes.

export notice

This product may require export authorization from the U.S. Department of Commerce prior to exporting from the U.S. or Canada.

trademarks

Novell and NetWare are registered trademarks of Novell, Inc. in the United States and other countries.

A complete list of trademarks and their respective owners appears in "Trademarks" on page 287.

Copyright © 1993-1999 Novell, Inc. All rights reserved. No part of this publication may be reproduced, photocopied, stored on a retrieval system, or transmitted without the express written consent of the publisher.

U.S. Patent Nos. 5,157,663; 5,349,642; 5,455,932, 5,553,139; 5,553,143; 5,594,863; 5,608,903; 5,633,931; 5,652,854; 5,671,414; 5,677,851; 5,692,129. U.S. and Foreign Patents Pending.

**Novell, Inc.
122 East 1700 South
Provo, UT 84606
U.S.A.**

www.novell.com

Online Documentation: To access the online documentation for this and other Novell products, and to get updates, see www.novell.com/documentation.

**Print Services
December 1998
104-000045-001**

Contents

How to Use This Manual

Command Syntax Conventions	xiii
NET.CFG File Section Headings and Parameter Settings	xiv

1 Introduction to NetWare Print Services

Steps in the Network Printing Process	1
Step 1: Print Data Is Generated and Transmitted	2
Step 2: Data Is Redirected to a Network Queue	3
Step 3: Data Is Stored in a Print Queue	4
Step 4: Print Data Is Transmitted to a Printer Station	5
Step 5: Print Data Is Transmitted to the Printer	5
Step 6: The Printer Formats the Data and Completes the Print Job	6
Using the NetWare Printing Utilities	7

2 Planning and Setting Up NetWare Print Services

NetWare 4 Printing Enhancements	9
Directory Services	9
Individual Objects	10
New Management Tools	10
Cross-Platform Support	10
Bimodal Utilities	10
Quick Setup	10
Centralized Administration	11
Polled Mode	11
Other Changes You Must Plan For	11
Different Configuration Locations	11
New Database Formats	12
Relocated Print Job Configuration Databases	12
Relocated Print Device Databases	13
Bindery Services	13
NetSync	14
Typical Network Printing Setups	14
Simple Printing Setup	15
Mid-Range Printing Setup	15
Advanced Printing Setup	16

Setting Up NetWare Print Services	18
Using Print Services Quick Setup in NetWare Administrator.	18
Using Quick Setup in PCONSOLE	19
Additional Startup Tasks	21
Task 1: At the Netware server console, load PSERVER.NLM.	21
Task 2: At a DOS workstation with a printer attached, load NPRINTER.EXE.	22
Task 3: At a Windows 95/98 workstation running the Novell Client with a printer attached, run NPTWIN95.EXE.	22
Tailoring Your Printing Configuration.	22
Printing Task List.	24
Printing from Applications Not Designed for Network Printing	26
Additional Information	27

3 Managing Print Services with the NetWare Administrator Utility

Requirements	29
Printing Tasks Handled through NetWare Administrator.	29
Using the Browser	32
Parts of the Browser	32
How Objects Appear	34
Printing Your Directory Tree Layout	34
Using the Printing Object Dialogs	36
Parts of the Object Dialogs.	36
Pages of the Object Dialogs	37
Setting Up Print Services with NetWare Administrator.	39
Procedure	39
Creating Print Queues	40
Creating Printers	43
Assigning Print Queues to Printers.	45
Creating Print Servers	46
Assigning Printers to Print Servers.	48
Adding Printing Objects	49
Modifying NetWare Print Services	50
Moving Printing Objects	51
Viewing the Assignments for Printing Objects	51
Renaming Printing Objects.	52
Deleting Printing Objects	52
Print Queue Options	53
Assigning Queue Operator Flags	53
Viewing or Modifying Print Jobs	53
Viewing Details of Print Jobs.	54
Viewing or Changing the List of Users for a Print Queue	56
Viewing or Changing the List of Operators for a Print Queue	56

Printer Options	56
Configuring Printers	56
Viewing and Modifying a Printer's Status	60
Changing Printer Type	63
Setting Up Printer Event Notifications	64
Changing a Print Queue's Priority	66
Designating a New Default Print Queue	67
Specifying Printer Features	67
Print Server Options	69
Viewing Your Printing Layout and Status	69
Enabling and Viewing the Print Server Auditing Log	71
Adding, Changing, and Removing Print Server Passwords	74
Unloading Print Servers	75
Working with Print Job Configurations	76
Creating Print Job Configurations	76
Viewing or Modifying Print Job Configurations	80
Selecting a Default Print Job Configuration	81
Procedure	81
Working with Printer Forms	81
Creating Printer Forms	82
Mounting Printer Forms	83
Viewing or Modifying Printer Forms	85
Deleting Printer Forms	86
Working with Print Device Definitions	86
Purpose of Print Device Definitions	86
Creating Print Device Definitions	87
Viewing or Modifying Print Device Definitions	88
Creating or Modifying Print Device Functions	90
Importing Print Device Definitions	91
Exporting Print Device Definitions	93
Working with Print Device Modes	94
Creating Print Device Modes	95
Viewing or Modifying Print Device Modes	96
Procedure	96
Referencing Bindery Queues	97
Procedure	97

4 Managing Print Services Using PCONSOLE

New PCONSOLE Features for NetWare 4	99
Quick Setup Feature	99
Integrated Setup	99
Simplified Navigation	99
Printing Tasks Handled through PCONSOLE	100

Modifying NetWare Print Services	102
Creating or Modifying Print Queues	102
Procedure	102
Creating or Modifying Printers	102
Creating or Modifying Print Servers	104
Print Queue Options	105
Assigning Queue Operator Flags	105
Creating or Manipulating Print Jobs	105
Setting Print Job Parameters	106
Printer Options	108
Configuring Printers	108
Viewing or Modifying a Printer's Status	110
Changing Printer Type	114
Assigning Multiple Print Queues and Printers	114
Mounting Printer Forms	115
Print Server Options	117
Viewing a Print Server's Status	117
Changing a Print Queue's Priority	118
Designating a New Default Print Queue	119
Adding, Changing, and Removing Print Server Passwords	119
Enabling and Viewing the Print Server Auditing Log	120
Procedure	121
Unloading Print Servers	122
Using PCONSOLE in Bindery Mode	123
Using Quick Setup to Create Bindery Printing Objects	124
Referencing Bindery Queues	125
Understanding Bindery Reference Queues and Reference Print Servers	126
Additional Information	127

5 Sending Jobs to Network Printers Using CAPTURE and NPRINT

Using CAPTURE	129
Printing Tasks Handled through CAPTURE	129
Command Syntax	130
Command Parameters	131
Printing to a Network Printer	135
Printing to a Different Directory Services Context	138
Printing with Print Job Configurations in a Different Context	139
Adding CAPTURE to Login Scripts	140
Tips on Using CAPTURE	141
Using NPRINT	142
Printing Tasks Handled through NPRINT	142
Command Syntax	142
Command Parameters	144
Tips on Using NPRINT	146

6 Setting Up and Servicing Print Servers

New Print Server Features for NetWare 4	149
Support for 255 Printers	150
Increased Performance	150
Configurable Queue Sampling Interval	151
Support for Macintosh and UNIX	151
PSERVER Console	151
Auto-Reconnect	151
Address Restrictions for Remote Printers	151
Support for PostScript Banner.	152
Auditing Log	152
Requirements	152
Using PSERVER.NLM	153
Printing Tasks Handled through PSERVER.NLM	153
Command Syntax	154
Managing the Print Server from the Console	154
Managing Printers from the Print Server Console.	157
Servicing NetWare 4 Clients and Queues with a NetWare 3 Print Server	162
Servicing NetWare 3 Clients and Queues with a NetWare 4 Print Server	163
Procedure	163
Using Third-Party Network-Direct Print Devices with NetWare 4	164
Remote Printer Mode	165
Queue Server Mode.	166
Setting Up Printing on a Network Using SFT III.	168
SFT III Printing Setup A (Most Fault Tolerant)	169
SFT III Printing Setup B (Less Fault Tolerant)	170
Troubleshooting Print Server Problems.	171
Additional Information	172

7 Setting Up Printers Attached to Workstations or Servers

New NPRINTER Features for NetWare 4.	174
MS Windows Support	174
NLM Version.	174
Improved Performance	175
Requirements	175
Using NPRINTER.EXE	176
Printing Tasks Handled through NPRINTER.EXE	177
Command Syntax	177
Running Port Drivers from Local Drives.	178
Running Port Drivers on DOS or MS Windows Workstations.	179

Using NPRINT (Windows 95/98)	182
Sharing a Printer Attached to a Windows 95/98 Workstation	182
Managing NPRINT (Windows 95/98) and the Shared Printer	186
Running NPRINT Manager from a Local Drive	187
Setting Up Network Printing on a Windows 95/98 Workstation	188
Procedure	188
Using NPRINT.NLM	189
Printing Tasks Handled through NPRINT.NLM	190
Loading NPRINT.NLM	190
Using Network-Attached Printers	192
Troubleshooting Tips for Administering Printer Stations	192
Printing Is Slow Using NPRINT.EXE as a Remote Network Station . . .	192
The Message Printer Is Not Connected Appears on the Console Screen . .	193
Remote Serial Printer Self-Tests Successfully But Is Not Working as Network Device	193
NPRINT.EXE Does Not Initialize or Hangs Periodically at Random . . .	193
Workstation Hangs When NPRINT Loads	194
Print Jobs Are Ruined When Printing Locally	194
NPRINT Cannot Reconnect to Print Server that was Downed and Loaded on Different NetWare Server	195
Port Driver Status Is Waiting for Job But Printer Is Not Attached	195
NPRINT.EXE Does Not Run from Local Drive	195
Additional Information	196

8 Creating and Managing Print Job Configurations

New Print Job Configuration Features for NetWare 4	197
Public Print Job Configurations Allowed	197
Limit of 37 Print Job Configurations Removed	198
Printing Tasks Handled through PRINTCON	198
Working with Print Job Configurations	198
Location of Print Job Configuration Databases	198
Creating Print Job Configurations	199
Creating Bindery Print Job Configurations	200
Deleting Print Job Configurations	201
Renaming Print Job Configurations	202
Viewing or Modifying Print Job Configurations	202
Print Job Configuration Parameters	203
Additional Information	205

9 Working with Print Device Definitions and Printer Forms

Purpose of Print Device Definitions	207
Location of Print Device Databases	208
Printing Tasks Handled through PRINTDEF	209
Working with Print Device Definitions	209
Viewing Print Device Definitions	209
Viewing Functions for Print Device Definitions	210
Creating or Modifying Print Device Definitions	210
Importing Print Device Definitions	213
Importing Print Device Definitions from another NetWare Server	214
Exporting Print Device Definitions	215
Working with Print Device Modes	217
Creating Print Device Modes	217
Viewing Print Device Modes	220
Modifying Print Device Modes	220
Working with Printer Forms	222
Creating or Modifying Printer Forms	222
Viewing a List of Forms	224
Viewing Form Definitions	224
Mounting Printer Forms	224

10 Using NETUSER, PSC, and PUPGRADE

Using NETUSER	227
Printing Tasks Handled through NETUSER	228
Additional Information	228
Using PSC	229
Printing Tasks Handled through PSC	229
Command Syntax	229
Command Parameters	230
Tips on Using PSC	231
Using PUPGRADE.NLM	231
Printing Tasks Handled through PUPGRADE.NLM	232
Upgrading NetWare 3 Printing Objects with PUPGRADE	232
Additional Information	234

A Setting Up and Servicing Printers

Selecting the Best Type of Printer for Your Setup	235
Parallel Printers	235
Serial Printers	236
Printer Languages	236
Printing with PostScript	237
Improving Printer Performance	239

Preventing Printer Problems	239
Preventing Problems with Laser Printers.	240
Preventing Problems with Dot Matrix Printers	240
Troubleshooting Printers	241
General Printer Troubleshooting	241
Troubleshooting Laser Printers.	242
Troubleshooting Dot Matrix Printers	243
Troubleshooting Network-Related Printer Problems	244

B Cabling Printers

Parallel Printers	246
Serial Printers	247
Optimal Serial Cabling	250
Functions on the PC Side of Serial Printer Cables.	252
Functions on the Printer Side of Serial Printer Cables	254
Pin Connectors.	255

C Optimizing Network Printing Performance

Parallel Versus Serial Ports	259
Estimating Data Transmission Rates.	260
Software Version Incompatibilities	261
Document Type	261
Printer Configuration	261
Polled versus Interrupt Mode.	261
Buffer Size	262
Timer Tick Values	262
Queue Sampling (Polling) Interval	263
Network-Direct Print Devices.	263
Computer Type.	264
Overburdened Servers or High Network Traffic	265
Application and Driver Software	265
Printer and Data Type	266
Suggestions	267

D Troubleshooting Printing Problems

Troubleshooting Flow Charts	269
Troubleshooting Notes	272
1. Determining the Printer Language of Your Print Job	272
2. Determining the Printer Languages Your Printer Supports	273
3. Checking Your Non-Network (Local) Printer Setup	273
4. Determining Whether Your Job Is an ASCII Text File	276
5. Checking the Contents of Your Job for Incorrect Control Sequences	277

X Print Services

6. Determining Whether Your Job Is Currently in the Print Queue . . . . .	.278
7. Determining Whether Your Job Ever Reached the Print Queue . . . . .	.278
8. Determining Where Your Job Was Sent . . . . .	.279
9. Activating Jobs on Hold Status . . . . .	.280
10. Troubleshooting Jobs Stuck in Active Status . . . . .	.280
11. Troubleshooting Jobs Stuck in Ready Status . . . . .	.281
12. Troubleshooting Jobs Stuck in Adding Status. . . . .	.282
13. Using CAPTURE to Redirect Parallel Ports to Network Queues . . . . .	.282
14. Troubleshooting Jobs Printed Slowly . . . . .	.282
15. Determining Whether a Printer Is Connected as a Network Printer. . . . .	.283
16. Troubleshooting Jobs Printed in Pieces on Separate Pages . . . . .	.283
17. Determining the Status of Your Print Job . . . . .	.284
18. Solving NetWare Printing Problems When Running MS Windows . . . . .	.284
19. Isolating Bad Hardware or Corrupt Software . . . . .	.285

Trademarks

Novell Trademarks . . . . .	.287
Third-Party Trademarks. . . . .	.293

How to Use This Manual

This manual represents a major revision of the previous version of *Print Services*. Major differences between this manual and the NetWare® 4.0 print manual include the following:

- ◆ Expanded overview and conceptual information
- ◆ Information about printing in mixed NetWare 4™ and NetWare 3™ environments
- ◆ Complete reorganization of the material in the manual
- ◆ Greatly expanded optimizing and troubleshooting discussions
- ◆ Step-by-step examples for performing the most common tasks
- ◆ Information on new functionality in the product

Note: In Novell documentation, an asterisk denotes a trademarked name belonging to a third-party company. Novell trademarks are denoted with specific trademark symbols, such as ™.

Command Syntax Conventions

This section explains the command syntax used in NetWare documentation. The following example illustrates several command line syntax conventions.

```
MAP [P | NP] [options ...] drive := [drive : | path ]
```

After typing the command, press Enter to execute the command.

Convention	Explanation
Boldface characters	Boldface characters indicate items that you type at the prompt, such as commands.
<i>Italicized</i> characters	Italicized characters indicate variables that you replace with information pertinent to your task.
... (ellipses)	Ellipses indicate that parameters, options, or settings can be repeated.
[]	An item enclosed in square brackets is optional. You can enter the command with or without the item.
[[]]	Items enclosed by nested square brackets are optional, but if you use the items within the innermost brackets, you must also use the items within the outer brackets.
|	When items are separated by a delimiter bar, you can use either item, but not both.
{ }	Curly braces indicate that you must choose one of the enclosed options.

NET.CFG File Section Headings and Parameter Settings

NET.CFG section headings and parameter settings are shown in uppercase when used as a reference item and lower case when used in syntax or working examples.

For example:

NETBIOS VERIFY TIMEOUT specifies how often in (ticks) NetBIOS sends a keep-alive packet to the other side of a session to preserve the session.

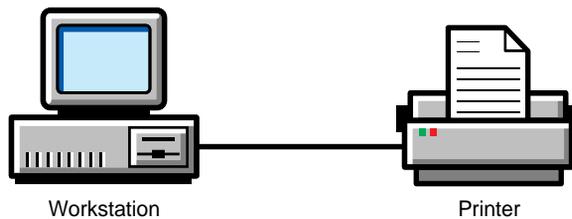
If no packets are being exchanged on the NetBIOS session by the software that established the session, NetBIOS sends packets at regular intervals to make sure that the session is still valid.

Syntax	<code>netbios verify timeout <i>number</i></code> Replace <i>number</i> with a number of ticks.
Default	54 (approximately 3 seconds)
Range	4 to 65,535
Example	To make NetBIOS wait longer before sending a request-for-acknowledgment packet, you could place the following lines in your NET.CFG file: <code>netbiosnetbios verify timeout 1350</code>

Because interpretation of this file is not case-sensitive, you can type its contents in uppercase or lowercase letters.

Introduction to NetWare Print Services

To users not familiar with network printing, the printing process may seem fairly simple. In non-network printing, data is generated on a stand-alone computer and then sent to a printer cabled directly to the computer.



- ◆ Storage
- ◆ Intermediate processing
- ◆ Transmission between various processing locations

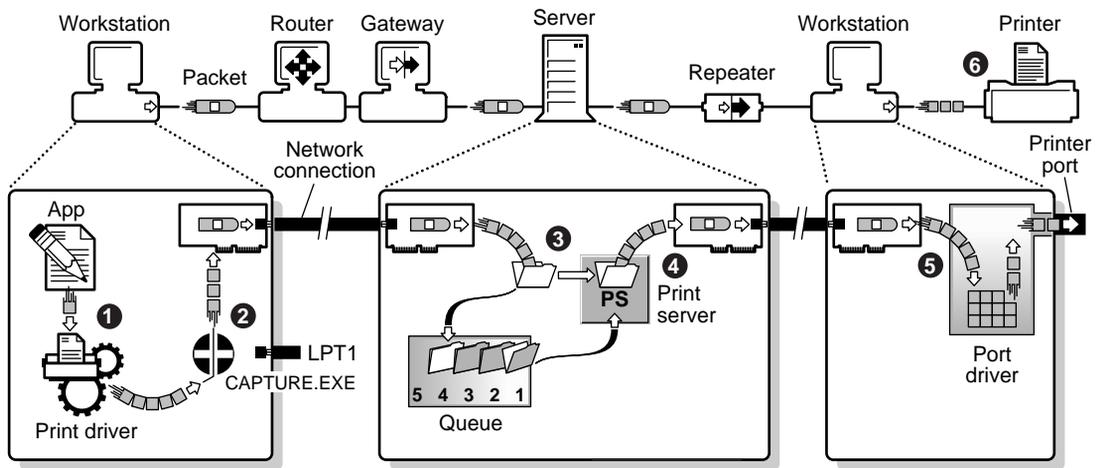
In network printing, printers are often shared and several intervening steps must take place (see Figure 1-1 on page 2).

These steps, described in this chapter, can greatly affect the complexity of the print job's journey and the time it takes for a print job to arrive at the printer.

Steps in the Network Printing Process

Each step in the printing process affects the time necessary for a print job to be completed at the printer. The following scenario describes a typical path print data might follow during this process.

Figure 1-1
A Typical Network Printing Setup



Step 1: Print Data Is Generated and Transmitted

1. The application compiles the data entered by the user and passes it on to a print driver.

Initially, there is only an application data file or possibly a document file with imbedded image definition data. No print data yet exists.

2. A print driver generates the actual printer data and passes it toward LPT1.

The driver may be part of the application software, or may have been supplied with the operating system, or may have come from a third party. Print data now exists in one of the formats described in "Printer Languages" on page 236.

The speed at which print data can be generated varies greatly. As complexity increases with additional formatting and graphical requirements, the time required to generate print data increases. Streams of simple text characters are created almost instantaneously on modern systems. Formatted text, which requires precise alignment of varying fonts and sizes, produces higher quality output but is more complex and takes longer to

generate. Some types of graphics are so complex that they may require hours for a single image to be generated.

Step 2: Data Is Redirected to a Network Queue

In non-network printing, data generation and transmission can be nearly simultaneous on a single computer. However, during network printing, data is not sent directly to a printer as it is in non-network printing. Instead, the data is redirected to a file in a print queue where it is stored while waiting to be sent to a printer.

Redirection of print data and storage in a queue has several advantages for network users:

- ◆ The application and the user can resume work without waiting for the printer to complete a print job.
- ◆ Multiple users can share a single printer.
- ◆ Users can send jobs to printers at different locations.
- ◆ Print jobs can be sequenced so that high priority jobs are sent to the printer first.
- ◆ Large print jobs can be stored until they can be printed at a time (such as after normal work hours) that does not disrupt other printing.

With NetWare[®] software, sending a print job to a queue can be accomplished in two ways:

- ◆ Manually via the NPRINT utility
 - ◆ Automatically via the CAPTURE utility, which intercepts the data headed toward LPT1 or other parallel ports.
1. In either case, the data is assembled into small packets, which are labeled and passed to a network interface board and the associated driver software.
 2. At the network interface, each packet is transmitted toward the destination file server that will store the data.

3. The individual packets travel over the network medium, possibly having to traverse repeaters, routers, gateways, and bridges along the way.
4. Upon the data's arrival at the destination NetWare server, another network interface (board and software) receives each packet of data, and may also check the packets for transmission errors and/or send acknowledgments back to the sending interface.

Step 3: Data Is Stored in a Print Queue

1. Each packet of data is then passed to the file storage area. At the NetWare server, the data packets are stripped of their labeling information and stored as a file on the server's hard drive.

It is important that any data storage area be large enough to hold both the largest print job likely to be stored and all the print jobs likely to be queued up at any one time on a busy day.

2. When the data for a complete job has all been received and stored, the file is closed and the filename is added to the queue associated with the printer.

At this point, the application and user are able to resume work.

3. The stored print job waits in the queue until the print server is able to transmit it to a printer.

If a print job is behind another job in the queue, the associated print server will request and receive the data file information immediately upon completion of the preceding job. The delay can be long if there are many other print jobs waiting in the print queue, or if the user stipulated that this job should print at some particular time in the future.

However, if the queue was empty when the completed data file name was passed to NetWare queue management system, the associated print server requests the data file information after the next predefined sampling interval. The default sampling interval is 15 seconds, but can be altered in NetWare 4™ software with PCONSOLE.

Step 4: Print Data Is Transmitted to a Printer Station

1. After the print server receives the print job information, it begins reading the print data from the queue.
2. The print server assembles the data into small packets, labeling each and passing them to a network interface board and associated software.
3. The individual packets are transmitted over the network to the printer station, possibly traversing repeaters, routers, and bridges along the way.

As the packets are sent, the print server gets packets back from the printer station containing information about the status of the printer, the amount of data that has actually been sent to the printer, and how many packets the print station currently has room to receive.

Step 5: Print Data Is Transmitted to the Printer

The following discussion describes one of several printer configurations.

1. At the workstation the printer is attached to, a network interface board (and associated driver software) receives each packet of data, possibly checking the packets for transmission errors and sending acknowledgments back to the sending interface.
 2. The packet labels are removed, the workstation's foreground task is interrupted, and the print data is passed to the port driver (NPRINTER).
 3. When NPRINTER is loaded, the printer port is initialized and the interrupts are enabled. If the printer is not busy, one character is printed. Control is returned to the workstation's foreground task.
 4. After each character is accepted by the printer, a hardware interrupt returns control to the port driver long enough to send one more byte.
- ◆ If configured not to use interrupts (polled mode), NPRINTER instead gets control once each clock tick (18.2 ticks per second) and makes a fixed number of attempts to send bytes before

relinquishing control to the foreground task for the remainder of the clock tick period.

- ◆ If the byte is sent through a parallel port, it is put on the port and a strobe signal is sent. Later, a corresponding return signal notifies the hardware that the printer is ready for more, generating the hardware interrupt mentioned in the preceding paragraph.
- ◆ Bytes transmitted through a serial port are passed at a fixed rate, one bit at a time, until all bits have been sent (assuming that all handshaking has occurred properly). The serial port generates the interrupt mentioned earlier when all bits have been sent. Additional hardware signals or characters sent back from the printer are monitored by NPRINTER to verify the printer's readiness for more data.

Ideally, the time that NPRINTER is taking control of the workstation to transfer data to the printer is spread out and small enough that the interference is rarely noticed by the user.

Step 6: The Printer Formats the Data and Completes the Print Job

1. Data travels by cable to the printer, where it is stored until enough data has been accumulated and converted to complete a single physical cycle.

The cycle for a laser printer is a full page; the physical cycle for most other printers is one pass of a print head. The formatting process can be brief or lengthy depending on the type of data being processed.

Data is usually transmitted to a printer via a Centronics-type parallel port or an RS-232 type serial port, depending on the printer type used.

2. During this process, the computer communicates with the printer, waiting for a ready signal between each byte that is sent.

Usually the computer spends much more time waiting than sending. However, it is possible to take advantage of these delays. Allowing the CPU to handle the user's foreground tasks during these large delays is what makes it possible for the printer's background task to operate with little apparent interference.

Note: If the printer has insufficient memory to store new data until the physical cycle has finished with the old data, the printer may signal NPRINT to suspend transmission during each cycle.

3. When the last physical cycle of the printer is complete, the print job is done.

Using the NetWare Printing Utilities

NetWare 4 allows you to use graphical or text utilities to create or modify your network printing environment. The following table describes the tasks that each utility performs.

Table 1-1
NetWare 4 Printing Utilities

Utility type	Utility	Tasks
<i>Graphical</i>	NetWare Administrat or	Creates, assigns, modifies, deletes, and monitors print queues, print servers, and printers. Monitors, modifies, pauses and deletes print jobs. Creates, modifies, and deletes print job configurations, printer forms, and print devices.
	NetWare User Tools	Enable user to access network resources, map drives, set up printing, and send messages. Printing tasks include setting printer options, connecting and disconnecting print queues, and making print queue connections permanent.
<i>Command Line</i>	CAPTURE	Redirects workstation output to a network printer or file.
	NPRINT	Prints files from outside an application.
	PSC	Monitors and controls printer and print server status from the command line. Provides layout of printing setup.

Utility type	Utility	Tasks
<i>Menu</i>	PCONSOL E	Creates, assigns, modifies, deletes, and monitors print queues, print servers, and printers. Sends, monitors, modifies, pauses, resumes, and deletes print jobs. Quickly installs basic print services.
	NPRINTE R	Loads NetWare port driver (NLM™ on the NetWare server, EXE on the workstation).
	NETUSER	Captures workstation output to a network printer, prints files from outside of an application, and monitors print queues. Sends, redirects, monitors, modifies, or deletes print jobs.
	PRINTCO N	Creates, modifies, and deletes print job configurations to simplify using the CAPTURE, NPRINT, and PCONSOLE utilities.
	PRINTDEF	Defines printer forms for use in CAPTURE, NPRINT, and print job configurations. Defines print devices in a database for use in print job configurations.
<i>NLM</i>	PSEVER	Loads print server software. Monitors, modifies, pauses, resumes, and aborts print jobs.
	PUPGRAD E	Upgrades NetWare 3™ printing objects, print job configurations, and printer definitions to NetWare 4.

Note: If your application supports NetWare print services, you do not need CAPTURE and NPRINT to send network print jobs. If your application supports your printer, you do not need to define a print device through PRINTDEF.

Planning and Setting Up NetWare Print Services

NetWare[®] 4[™] print services represent a significant advancement in both performance and versatility from NetWare 3[™] print services. This section describes some of the major changes that have been made.

For additional information about NetWare 4 printing enhancements, see the following discussions:

- ◆ “New PCONSOLE Features for NetWare 4” on page 99
- ◆ “New Print Server Features for NetWare 4” on page 149
- ◆ “New NPrinter Features for NetWare 4” on page 174
- ◆ “New Print Job Configuration Features for NetWare 4” on page 197

NetWare 4 Printing Enhancements

The following section describes major enhancements incorporated into NetWare 4 Print Services.

Directory Services

NetWare 4 establishes a new framework for handling network resources that is much different from previous versions of NetWare. A replicated and distributed database replaces the NetWare 3 bindery as the storage medium for network information.

This database, part of the Novell[®] Directory Services[™] technology, organizes network components, such as servers, printers, and network users, as objects within a hierarchical tree structure.

Individual Objects

In Novell Directory Services, the print server, print queue, and printer are individual objects. They can be created and modified in any order with text or graphical utilities.

One advantage this change provides is that network users never need to know about print queues or print servers in NetWare 4. Users can send their print jobs directly to a printer by specifying the printer name.

New Management Tools

NetWare 4 provides a wide variety of new tools to manage these network objects, including NetWare Administrator and NetWare Tools™ utilities that define objects and navigate through the tree structure using a graphical user interface.

Since network printing takes place through queues (regardless of the platform from which a print job originates), a number of these tools—such as PCONSOLE—involve queue creation and management.

A queue created with one of these tools can be used not only by Windows 3.1x, Windows 95/98, and Windows NT clients, but also by Macintosh* and UNIX* clients, if certain conditions are met.

Cross-Platform Support

In addition to DOS and MS Windows, NetWare 4 print servers also can support Macintosh and UNIX printers.

Bimodal Utilities

All text-based NetWare 4 printing utilities are bimodal, so that from the new set of utilities you can administer both NetWare 3 and NetWare 4 networks and servers.

Quick Setup

The Print Services Quick Setup option in NetWare Administrator and the Quick Setup option in PCONSOLE provide simple ways to get your initial printing setup running quickly.

Centralized Administration

You can create a NetWare 4 print server that replaces NetWare 3 print servers. NetWare 4 print servers can service queues on NetWare servers that have not yet been upgraded to NetWare 4.

In addition, remote printers and direct-connect printers configured in NetWare 3 can communicate with NetWare 4 print servers.

Polled Mode

Polled mode is now supported and is the default for printer configurations. Users can now get their printer running without having to worry about which interrupt the port is set to or whether the port supports interrupts. This means that you can now get your printers running much more quickly and easily. Then, if you want to find out whether interrupts will increase performance, you can reconfigure your system when time allows.

Other Changes You Must Plan For

Different Configuration Locations

The introduction of Directory Services affects the way configuration information is stored.

- ◆ In NetWare 3, the print server's configuration information was stored in SYS:SYSTEM. In NetWare 4, configuration data is stored as objects in the Directory. For example, in NetWare 3, printers were print server attributes; in NetWare 4, printers are Directory objects.
- ◆ In NetWare 3, print job configurations created with NetWare's PRINTCON utility were stored as database files in the users' subdirectories in SYS:MAIL. In NetWare 4, you can create both *public* (or *global*) and *private* databases. Private databases are still created by users and are stored as attributes of user objects. The public databases are created by the network supervisor to be used by all users, and are stored as attributes of container objects.

- ◆ In NetWare 3, database files created with NetWare's PRINTDEF database (containing print device definitions and printer form definitions) were stored as a file in SYS:PUBLIC. In NetWare 4, the database is stored as an attribute of a container object.

New Database Formats

The format of PRINTCON and PRINTDEF databases has changed. In bindery mode, the new databases have new names so there is no confusion between them and the old databases. In Directory Services, the new databases are now attributes of objects.

For information on the name and location of these databases, see the following sections, "Relocated Print Job Configuration Databases" on page 12 and "Relocated Print Device Databases" on page 13.

If you are not using UNIX or any third-party utilities that require the NetWare 3 databases, we recommend that you delete the old databases. But if you do have these third-party utilities, you will need to keep the old databases because the new ones have a new format that the utilities may not be able to read.

The old and new databases can coexist. If you want to maintain the old ones and have been using NetWare utilities to do it, you should use the NetWare 3 utilities to maintain them. Use the NetWare 4 utilities to maintain the NetWare 4 databases. However, there is little reason to maintain NetWare 3 databases.

Switching to bindery mode in the new utilities will not maintain the old databases. Bindery mode allows you to maintain a bindery version of the new databases.

Relocated Print Job Configuration Databases

Both the format and location of the database for print job configurations have changed for NetWare 4:

- ◆ In NetWare 3, the PRINTCON database was
`SYS:MAIL\username\PRINTCON.DAT.`
- ◆ In the NetWare 4 Directory, the database is an attribute of a container object or User object. Configurations can be modified

through the Print Job Configurations option of PRINTCON or the Print Job Configurations dialog for the container object in NetWare Administrator.

- ◆ In NetWare 4 bindery mode, the public database is
SYS:PUBLIC\PRINTJOB.DAT

The private database is

SYS:MAIL*<usernumber >*\PRINTJOB.DAT

Relocated Print Device Databases

The print device definitions supplied in NetWare 4 are copied to the SYS:PUBLIC directory during installation. Additional device definitions imported or created are also stored in this directory unless you specify another location.

Both the format and location of the print device database have changed for NetWare 4.

- ◆ In NetWare 3, the database for print device definitions is
SYS:PUBLIC\NET\$PRN.DAT
- ◆ In the NetWare 4 Directory, this database is an attribute of a container object. Print device definitions can be accessed through the Print Devices option of PRINTDEF or the Print Devices dialog for the container object in NetWare Administrator.
- ◆ In NetWare 4 bindery mode, the database is
SYS:PUBLIC\PRINTDEF.DAT

Bindery Services

NetWare 4 maintains compatibility with previous versions of NetWare clients. NetWare's bindery services provide access to NetWare 3 objects such as users and servers.

For example, all network objects in bindery mode must reside at levels defined by the bindery context that applies to the server. The bindery context of the server is set by an entry in its AUTOEXEC.NCF file (or by manually using the SET BINDERY CONTEXT command).

NetSync

The NetSync™ management utility converts NetWare 3 bindery information, including printing information, incorporating it into the Directory of NetWare 4.1. (NetSync does not support NetWare 4 releases prior to NetWare 4.1.)

NetSync is designed to solve many of the compatibility problems users currently encounter when operating in mixed NetWare 4.1 and NetWare 3 environments (NetSync is not compatible with NetWare 4.0x). Through NetSync, a single NetWare 4.1 print server can be used to service printers and queues for up to 12 NetWare 3 servers.

NetSync provides the following capabilities:

- ◆ Allows network supervisors of mixed NetWare 3.1x and NetWare 4.1 networks to use NetWare 4.1 utilities to manage objects from one point (the NetWare 4.1 bindery context).
- ◆ Allows centralized administration of mixed networks.

Complete documentation on NetSync is found in *Installing and Using NetSync*.

Typical Network Printing Setups

This section will stress general principles that can be of value for a variety of network printing configurations.

NetWare 4 print services requires that you create at least one of each of the three printing objects:

- ◆ Print queue
- ◆ Print server
- ◆ Printer

The following three examples show how the three printing objects can be arranged as you require.

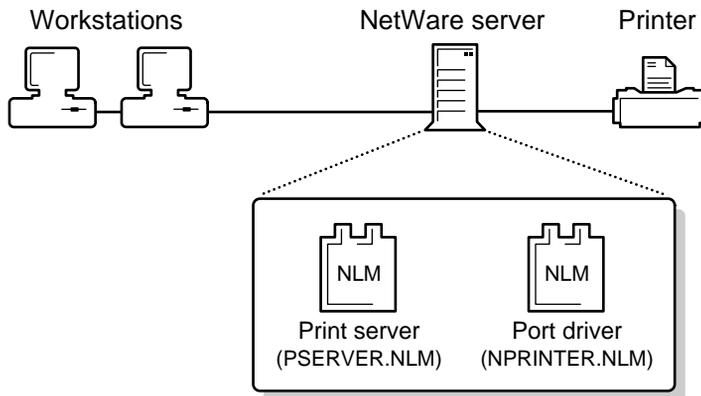
To set up any of the layouts described in the following pages, you may use NetWare Administrator or PCONSOLE. The easiest way to get a printing setup up and running is by using a quick setup feature in either NetWare Administrator (see “Using Print Services Quick Setup in NetWare Administrator” on page 18) or PCONSOLE (see “Using Quick Setup in PCONSOLE” on page 19).

For detailed information on setting up NetWare printing in a graphical environment, see “Setting Up Print Services with NetWare Administrator” on page 39.

Simple Printing Setup

In this setup, a printer is cabled to the printer port of a NetWare server running PSERVER.NLM. Users can select a printer by name, or they can specify a print queue, when sending a print job.

Figure 2-1
Simple Printing

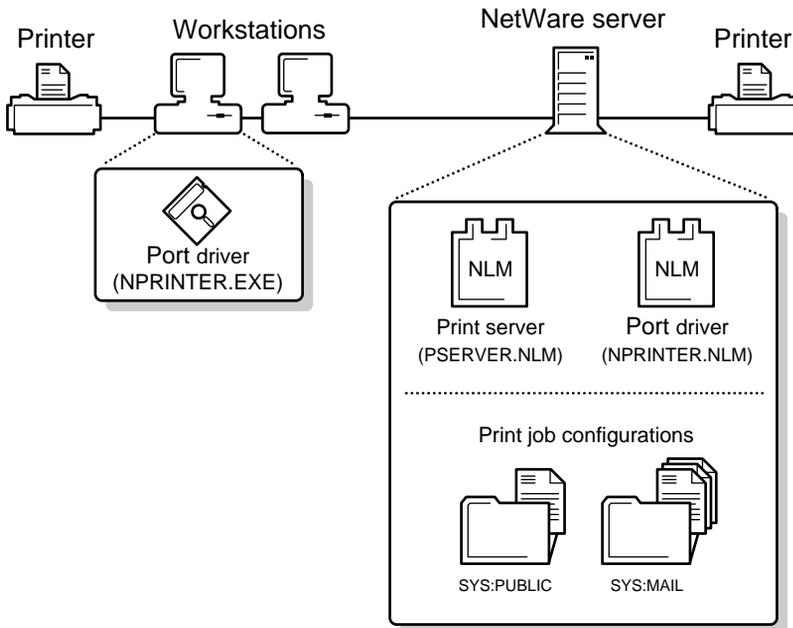


Mid-Range Printing Setup

NetWare print services allow some printers to be cabled to workstations and some to a NetWare server. To automate printing, users can specify printer, banner page, tabs, and other options by using print job configurations. Print job configurations are groups of print job options that simplify CAPTURE and NPRINT. Print job configuration information is stored for users (private) or container objects (public).

Information on creating print job configurations is found in “Creating Print Job Configurations” on page 199.

Figure 2-2
Mid-Range Printing



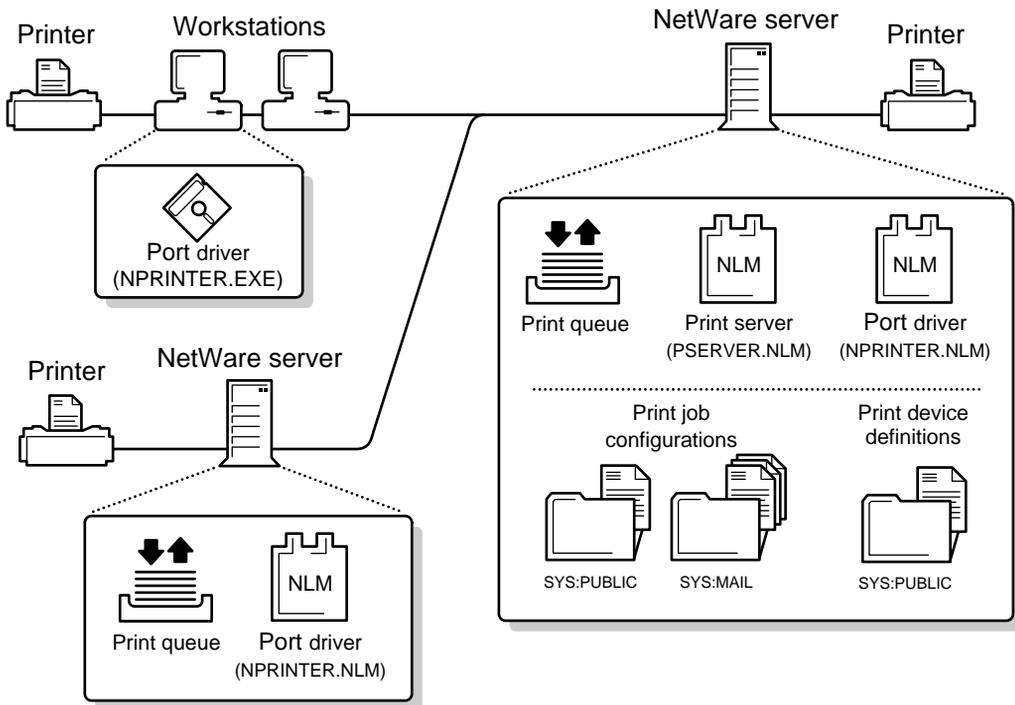
Advanced Printing Setup

A complex printing environment may use any combination of these features:

- ◆ One printer assigned to service multiple print queues. Both NetWare 4 and NetWare 3 print queues may be used.
- ◆ Multiple printers assigned to service one print queue
- ◆ Various print job configurations
- ◆ Printer reset at the end of print jobs (defined in PRINTDEF)

- ◆ Printer definitions (If your application does not format print jobs for a specific printer, NetWare provides print device definitions for many common printers.)
- ◆ Multiple printing environments (such as AppleTalk* printers, UNIX printers, or printers attached directly to the network cabling)
- ◆ Multiple print servers

Figure 2-3
Complex Printing



Setting Up NetWare Print Services

NetWare Print Services requires a Print Server object, a Printer object, and a Print Queue object in order for network users to share printers.

You can use either NetWare Administrator or PCONSOLE to create your printing setup. Novell recommends that you use NetWare Administrator's Print Services Quick Setup option or PCONSOLE's Quick Setup option to initially perform this task (as described in the next two sections), and then complete the tasks outlined in "Additional Startup Tasks" on page 21.

After experimenting with the resulting setup, you will probably want to tailor the configuration to match your specific needs.

Note: If you upgraded from a previous version of NetWare that used print services, your printing environment should already be installed. In this case, the procedures described here are unnecessary.

Using Print Services Quick Setup in NetWare Administrator

Use the Print Services Quick Setup option to define your initial Print Server, Printer, and Print Queue objects and assign a print queue to a printer.

Procedure

1. **Install your printer.**
2. **Log in to the NetWare server as user ADMIN or equivalent.**
3. **Run Windows*, and then run NetWare Administrator.**
4. **From the Tools menu, choose Print Services Quick Setup.**
5. **In Print Server Name, type a name for this Print Server object (or browse to an existing print server).**
6. **In Printer Name, type a name for this Printer object.**
7. **In Printer Type, type or select a printer type.**

When you choose a printer type, a dialog box specific to your printer type displays.

8. **Complete the dialog box for your printer type.**
 - ◆ AIO
 - ◆ AppleTalk
 - ◆ Parallel
 - ◆ Serial
 - ◆ UNIX
9. **In Print Queue Name, type a name for this Print Queue object.**
10. **In Print Queue Volume, type a name for this print queue volume (or browse to choose a volume).**
11. **Choose Create.**

This completes the first part of setting up NetWare Print Services. But the Printer object you created is not yet associated with any physical printer.
12. **Complete the setup tasks outlined in “Additional Startup Tasks” on page 21.**

Using Quick Setup in PCONSOLE

Use the Quick Setup option to define your initial print server object, printer object, and print queue object and to assign a print queue to a printer.

The following quick setup procedure will assume two laser printers, called PR_Far and PR_Near. They will be serviced by a print server called PS_1 through two queues called Q_Far and Q_Near, both located on a single NetWare server which will be called NWFS_1.

Printer PR_Far will be connected to the parallel port LPT1 on the NetWare server, and printer PR_Near will be connected to parallel port LPT1 on a client workstation.

Procedure

1. **Connect your printers to the parallel (LPT) port of the workstation.**

2. **Log in to the NetWare server as user ADMIN or equivalent.**

For example:

```
LOGIN NWFS_1/.ADMIN.NOVELL
```

3. **Type PCONSOLE at the command line.**

This is normally found in volume SYS:PUBLIC.

The Available Options menu appears.

4. **If the current context is the desired one, skip to Step 5. If not,**

- 4a. **Select the Change Context option.**

- 4b. **Enter the desired context or press <Insert> to browse.**

Being in the correct context is critical to the success of your setup; therefore, you must change to the context in which the print related objects are to reside.

5. **Use Quick Setup to define PS_1, PR_Far, and Q_Far.**

- 5a. **Select the Quick Setup option.**

- 5b. **At the Print server: prompt, select the print server name.**

Press <Enter> to bring up a list of current print servers. If no print servers are in that context, PCONSOLE will select a name based on your current context.

- 5c. **Press <Insert>; then enter the name PS_1.**

- 5d. **Select New printer: and enter PR_FAR.**

- 5e. **Select New print queue: and enter Q_FAR.**

- 5f. **Press <F10> to save the changes.**

If you accept the default names for the printing objects, you need only to press <F10>. To select a different volume, press <Insert> to browse for a volume to hold the print queue. Change the names and printer configuration as you wish.

6. Use Quick Setup to add PR_Near and Q_Near.
 - 6a. Select the Quick Setup option.
 - 6b. Select print server PS_1.
 - 6c. Select New printer: and enter PR_NEAR.
 - 6d. Select New print queue: and enter Q_NEAR.
 - 6e. Select the Location field; then select Manual Load.
 - 6f. Press <Esc>; then select Yes to save the changes.
7. Press <F10> to save the changes.
8. Complete the setup tasks outlined in “Additional Startup Tasks” on page 21.

Additional Startup Tasks

Before you can make printers available for network users to capture and print to, you need to complete Task 1 described below. Complete the additional tasks that are applicable to your hardware configuration.

Task 1: At the Netware server console, load PSERVER.NLM.

Type `LOAD PSERVER` , then follow the prompts to browse for the name of the print server you want.

You can also include the print server name in your load command. For example:

```
LOAD PSERVER .PS_1.NOVELL <Enter>
```

This command can be placed in your AUTOEXEC.NCF file.

Specify the context if it is different from your server's bindery context.

Where a printer is physically attached, an NPrinter must be loaded. If the printer is physically attached to the server, the printer is defined as auto load and PSERVER.NLM will automatically load NPrinter.NLM.

You must load a network port driver for any printer configured as Manual Load. Printers cabled directly to the network use print driver software stored in the printer.

Task 2: At a DOS workstation with a printer attached, load NPRINT.EXE.

The port driver syntax is as follows:

```
NPRINT printservername printernumber
```

For example, the following command connects printer PR_NEAR to the print server:

```
NPRINT PS_1 1
```

Task 3: At a Windows 95/98 workstation running the Novell Client with a printer attached, run NPTWIN95.EXE.

Note: Each printer requires a network port driver (like NPRINT.EXE or NPRINT.NLM). For Windows 95/98 workstations, NPTWIN95.EXE serves this purpose. It automatically loads the port driver software (NPTR95.NLM and NPTDRV95.NLM) and NPRINT Manager (a printer setup and management utility in Windows 95).

After starting the Novell Client software, double-click NPTWIN95.EXE (the port driver executable, usually located in the SYS\PUBLIC\WIN95 folder on your server), and then complete the Add Network Printer dialog box.

After the NetWare port driver is loaded, network workstations can send print jobs to the printer. For more information, see “Using NPRINT (Windows 95/98)” on page 182.

Upon completion of these tasks, the printer should be available to network users, who can then capture the printer.

Tailoring Your Printing Configuration

After you have completed the Quick Setup process and gained some experience with that setup, you may want to modify it to better serve the needs of your network's users. This section explains some of the configuration options available to you.

Assigning Unique Object Names

Names for each object must be unique (per context in NetWare 4 and per server in NetWare 3). Names should be meaningful and unambiguous.

You may want to put a sign on each printer listing the NetWare context and printer name. If you are using a NetWare 3 setup, you may prefer to list names of the NetWare server and print queue(s) used instead.

Managing Security

Attaching all printers directly to NetWare servers may yield security and administrative advantages. Attaching printers to workstations may yield increased flexibility and accessibility. The ideal mix for each installation is different and will change as needs change.

The number of printers that can be attached to each server or workstation is limited first by the port hardware. Most DOS-based PCs have a maximum of three parallel and four serial ports.

Important: The type of port used *must* match the type of port on the printer. The printer must be set up and cabled properly as described in the printer's documentation.

Managing Interrupts

NetWare supports both interrupt and polled mode operation in your printer configuration. Polled mode, the default, generally provides satisfactory performance. If optimal performance is important for you setup, interrupt mode with parallel port operation is often fastest; polled mode serial port operation is generally slower.

Polled mode avoids problems that may occur if interrupts conflict with one another. The interrupt to be used by each port must be configured properly in the hardware, must be unique, and must match the NetWare configuration set in PCONSOLE or NetWare Administrator in order to use that port properly in interrupt mode.

Polled mode also can be used for printers assigned to a specific port if all of the interrupts are already assigned.

Keep in mind, however, that multiple printers using polled mode on one workstation may adversely affect foreground operation on that workstation.

Improving Output by Adding Resources

In some situations, you can increase the printing output on your network by using additional resources.

- ◆ More than one printer may service a single queue. This can be useful when you have similar printers in close proximity by providing increased throughput and avoiding work stoppage if one printer fails.
- ◆ More than one queue may be assigned to a single printer. Among other things, this allows a full queue attached to a failed printer to be assigned to a running printer, which will then print jobs from both the original and the newly added queue.
- ◆ While only one print server can run on a NetWare file server at a given time, that single print server can service up to 255 printers under NetWare 4.

Performance factors, however, may limit the number of printers that one print server can service effectively.

Printing Task List

The following table lists many of the major printing tasks you will need to perform on your network and indicates the NetWare utilities you can use to perform them.

Table 2-1
Printing Tasks

Task	Utility
Assign Print Queue objects to printers.	NetWare Administrator (Printer object), PCONSOLE (Printers or Print Servers options)
Assign Printer objects to print servers.	NetWare Administrator (Print Server object), PCONSOLE (Print Servers option)

Task	Utility
Control printer and print server.	NetWare Administrator, PCONSOLE, PSC, PSERVER
Create, assign, modify, or delete Print Queue, Print Server, and Printer objects.	NetWare Administrator, PCONSOLE
Create print jobs.	CAPTURE, NETUSER, NPRINT, PCONSOLE
Customize print job characteristics with print job configurations.	NetWare Administrator (User, Organization, and Organizational Unit objects), PRINTCON
Customize printer characteristics with printer forms and print devices (printer definition files).	NetWare Administrator (Organization and Organizational Unit objects), PRINTDEF
Delete, modify, or reorder print jobs.	NetWare Administrator, NETUSER, PCONSOLE
Get configuration layout and status of printing.	NetWare Administrator, PCONSOLE, and PSC
Monitor printer and print server.	NetWare Administrator, PCONSOLE, PSC, PSERVER
Monitor print jobs.	NetWare Administrator, NETUSER, PCONSOLE, PSERVER
Print files.	CAPTURE, NETUSER, NPRINT, PCONSOLE
Run print server on NetWare server.	PSERVER
Run network printer on NetWare server.	NPRINTER.NLM
Run network printer on a DOS or Windows 3.1x workstation.	NPRINTER.EXE
Run network printer on a Windows 95/98 workstation.	NPRINTER (Windows 95)
Upgrade NetWare 3 printing.	PUPGRADE.NLM

Printing from Applications Not Designed for Network Printing

Many applications are designed for network printing. For example, WordPerfect submits print jobs directly to the print queue. Since you can specify the number of copies, a banner page, and so forth inside such applications, you do not need graphical NetWare Tools or the text utilities CAPTURE, NPRINT, NETUSER, or PCONSOLE to send network print jobs. Such applications usually supply the necessary print driver (escape sequences, etc.) and include it with each network print job.

However, there are many applications that are not designed for network printing. The following NetWare printing utilities can be used when printing with applications that are not designed for NetWare print services.

- ◆ Text utilities (CAPTURE, NPRINT, NETUSER, PCONSOLE, PRINTCON, PRINTDEF)
- ◆ GUI utilities (NetWare Administrator, NetWare User Tools for MS Windows 3.1x)

If your application cannot send print jobs to a network printer or print queue, the text utilities NETUSER, NPRINT, or PCONSOLE allow you to send print-ready files to a printer.

CAPTURE is used to redirect workstation output from an LPT port to the network.

The graphical NetWare User Tools for MS Windows provide the same functionality. For information on the NetWare Tools, see your Novell Client documentation.

PRINTCON or the graphical NetWare Administrator can be used to create print job configurations.

PRINTDEF or the graphical NetWare Administrator can be used to create printer forms and print device definitions.

Additional Information

For more information about	See
Print queue	"Print queue" in <i>Concepts</i>
Print server	"Print server" in <i>Concepts</i>
Printer	"Printer" in <i>Concepts</i>
Print job configuration	"Print job" in <i>Concepts</i>
Print job configuration	Chapter 8, "Creating and Managing Print Job Configurations," on page 197 "Working with Print Job Configurations" on page 76 (NetWare Administrator)
Print device definition	"Working with Print Device Definitions" on page 209 (PRINTDEF) "Working with Print Device Definitions" on page 86 (NetWare Administrator)
Novell Directory Services objects	"Object" in <i>Concepts</i>
Multiple print queues servicing one printer or multiple printers	"Setting Up Print Services with NetWare Administrator" on page 39 (NetWare Administrator)
servicing one print queue	"Print Queue Options" on page 105 (PCONSOLE)
NetWare Administrator	Chapter 3, "Managing Print Services with the NetWare Administrator Utility," on page 29

Managing Print Services with the NetWare Administrator Utility

With NetWare® Administrator, you can perform the administrative tasks available in NETADMIN, FILER, PCONSOLE, PRINTCON, and PRINTDEF, but you use one utility with a graphical interface.

This chapter explains how to set up and manage NetWare print services using the NetWare Administrator graphical utility.

Requirements

Before completing tasks in this chapter, you need the following:

- NetWare 4™ server.
- Network workstation running NetWare Administrator.
- At least one printer functioning properly in its current environment.

If your printer is not functioning properly, see Appendix D, “Troubleshooting Printing Problems,” on page 269.

Printing Tasks Handled through NetWare Administrator

The following table lists the printing tasks you can accomplish in Novell® Directory Services™ software with NetWare Administrator.

Table 3-1

Printing Tasks Performed with NetWare Administrator

Object Class	Task	Procedure Location
All	Print browser display of Directory tree	"Printing Your Directory Tree Layout" on page 34
Print Queue	Assign a print queue to a printer	"Assigning Print Queues to Printers" on page 45
	Assign queue operator flags	"Assigning Queue Operator Flags" on page 53
	Create a print job configuration	"Working with Print Job Configurations" on page 76
	Create a print queue	"Creating Print Queues" on page 40
	Reference a bindery queue	"Referencing Bindery Queues" on page 97
	Delete a print queue	"Viewing the Assignments for Printing Objects" on page 51
	View or modify print jobs	"Viewing or Modifying Print Jobs" on page 53
	View or modify a print queue	"Print Queue Options" on page 53
	View print queue assignments	"Viewing the Assignments for Printing Objects" on page 51
Printer	Assign a print queue to a printer	"Assigning Print Queues to Printers" on page 45
	Move a printer	"Moving Printing Objects" on page 51
	Rename a printer	"Viewing the Assignments for Printing Objects" on page 51
	View or modify a printer	"Printer Options" on page 56
	View printer status	"Printer Options" on page 56

Object Class	Task	Procedure Location
Print Server	Assign a printer to a print server	"Assigning Printers to Print Servers" on page 48
	Audit a print server	"Enabling and Viewing the Print Server Auditing Log" on page 71
	Create a print server	"Creating Print Servers" on page 46
	Delete a print server	"Viewing the Assignments for Printing Objects" on page 51
	View status of a print server	"Viewing Your Printing Layout and Status" on page 69
	Move a print server	"Moving Printing Objects" on page 51
	Unload a print server	"Unloading Print Servers" on page 75
	View print server assignments	"Viewing the Assignments for Printing Objects" on page 51
	View your current printing layout	"Printer Options" on page 56
	Modify a print server	"Print Server Options" on page 69
Container object	Create print job configurations to simplify using CAPTURE and NPRINT.	"Working with Print Job Configurations" on page 76
	Create a print device definition for use in print job configurations	"Referencing Bindery Queues" on page 97
	Create or modify printer forms	"Creating Printer Forms" on page 82
	Import a print device definition for use in print job configurations	"Importing Print Device Definitions" on page 91

Object Class	Task	Procedure Location
Container object (<i>cont'd.</i>)	Modify a print device definition for use in print job configurations	"Viewing or Modifying Print Device Definitions" on page 88
	View your current printing layout	"Viewing Your Printing Layout and Status" on page 69
User	Create print job configurations to simplify using CAPTURE and NPRINT	"Working with Print Job Configurations" on page 76

Using the Browser

The browser is the initial screen that appears when you open NetWare Administrator. All basic administrative functions are initiated here.

The browser is where you work with Novell Directory Services (NDS) objects, with files, and with directories.

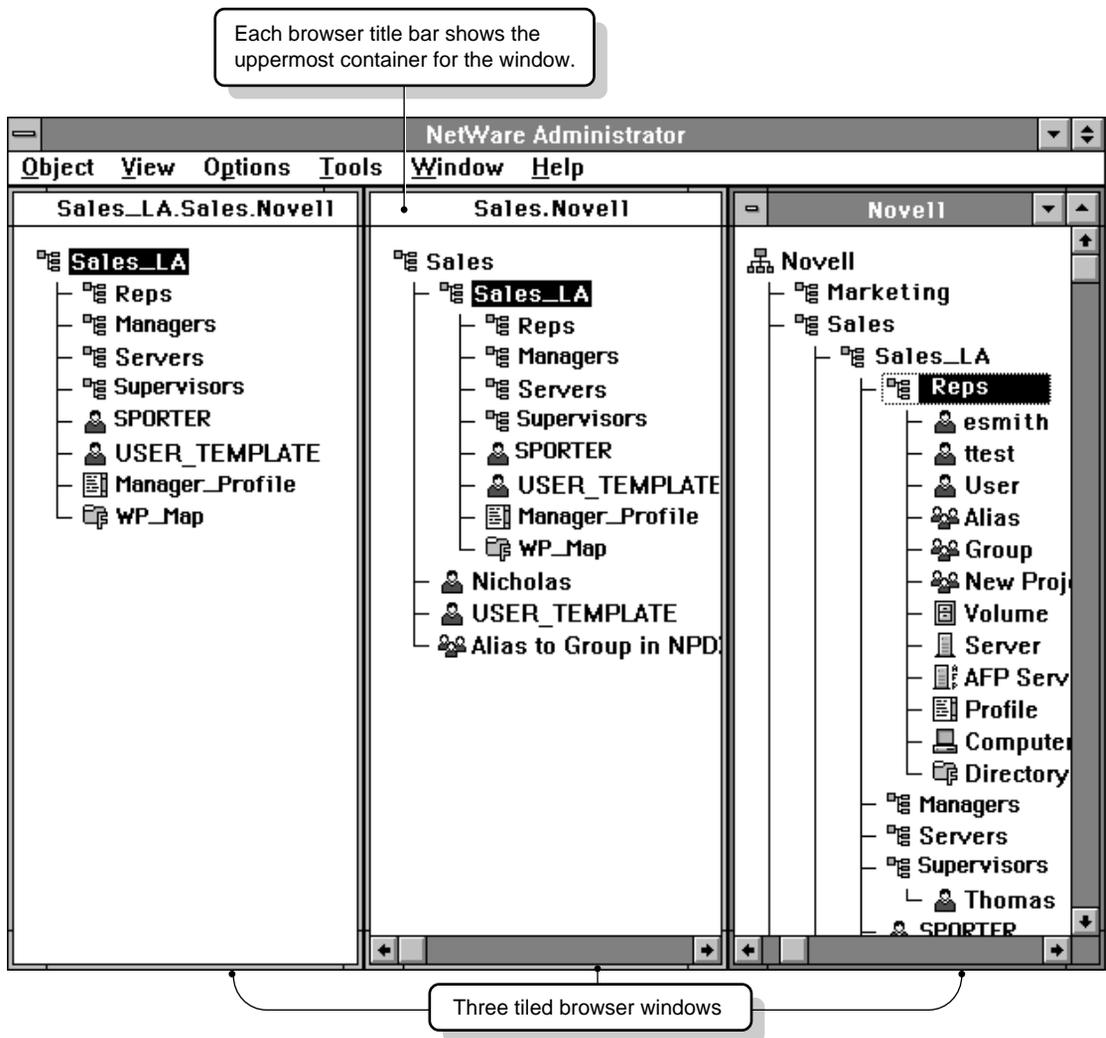
Parts of the Browser

The browser displays the NDS™ objects in your current context. You select objects in order to perform administrative tasks for the network.

You can open as many as nine browser windows to display the contents of individual containers. The following figure shows three tiled browser windows.

To open another browser window, select a container, go to the Tools menu, then select the Browser option.

Figure 3-1
Browser Window with Multiple Tiles



Browser Context

The title bar displays the browser context, which is the name of the container object that the browser window starts browsing from.

To view multiple browser windows at the same time, open the windows, then select Tile from the Window menu.

How Objects Appear

The browser displays the following when you expand a container object to view its contents:

- ◆ The container that holds the object
- ◆ An icon representing the class of the object
- ◆ The name of the object
- ◆ The object's hierarchical location in relation to other objects in the Directory tree

For example, this is how a printer object named COLOR PRINTER would appear when it is created in an Organizational Unit called GRAPHICS DEPARTMENT:

```

  ☐ Graphics Department
    └─ 🖨 Color Printer

```

Printing Your Directory Tree Layout

After you have completed modifications to your Directory tree structure, you may find it useful to have a printout of the entire tree or of expanded sections of that tree. The following procedure allows you to generate a printed version of the layout shown on your browser screen.

You can print the objects listed in the browser as a one item per line list, in a two column format, or as a file that you can manipulate or print later.

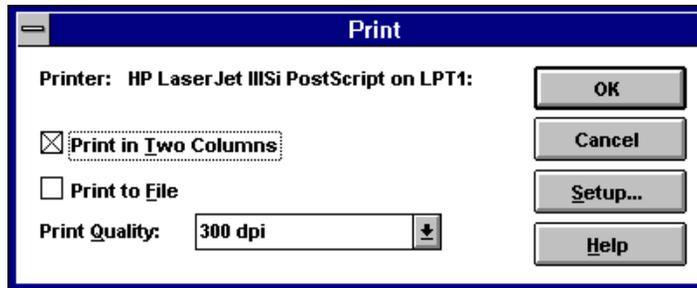
Before beginning the following procedures, be sure you have set up your printing environment in the MS Windows Print Manager Options menu.

Procedure

1. **At the main browser screen, expand all container objects you want displayed in the printout. Then choose the Object menu.**
2. **Select the Print... option.**

The Print window appears, similar to the following figure.

Figure 3-2
Print Dialog



3. Select the options you want to use.

- ◆ **Print in Two Columns** allows you to choose the format of the printed objects, either as a list with each object on a separate line, or in two columns if you want to use fewer pages for your printout. The default is two columns.
- ◆ **Print to File** allows you to save the objects listed in the browser to a file.
- ◆ **Print Quality** allows you to elect the dots per inch for the print job.
- ◆ **OK** saves all changes and returns you to the browser.
- ◆ **Cancel** closes this dialog without making any changes.
- ◆ **Setup** allows you to select the way the information prints on the page, the paper size and source, and the printer.

4. Use Setup to select the page layout, if needed.

- ◆ **Printer** allows you to choose the printer to print to.
- ◆ **Orientation** allows you to choose layout of the information on the page.
- ◆ **Paper** allows you to choose the paper size and source for the print job.
- ◆ **OK** saves all changes and returns you to the browser.
- ◆ **Cancel** closes this dialog without making any changes.
- ◆ **Options** allows you to choose to print to the printer or to a file, change the margins, set the scaling, or send a header.

Using the Printing Object Dialogs

NetWare Administrator is set up so you can view or edit all information about an object in one place: the object dialog. NetWare Print Services has three printing objects: print server, printer, and print queue.

Every printing object has its own object dialog. Each object dialog is titled by the class of object and the object name. You can enter additional information about the object in this dialog to help you manage network resources and to store information for searches.

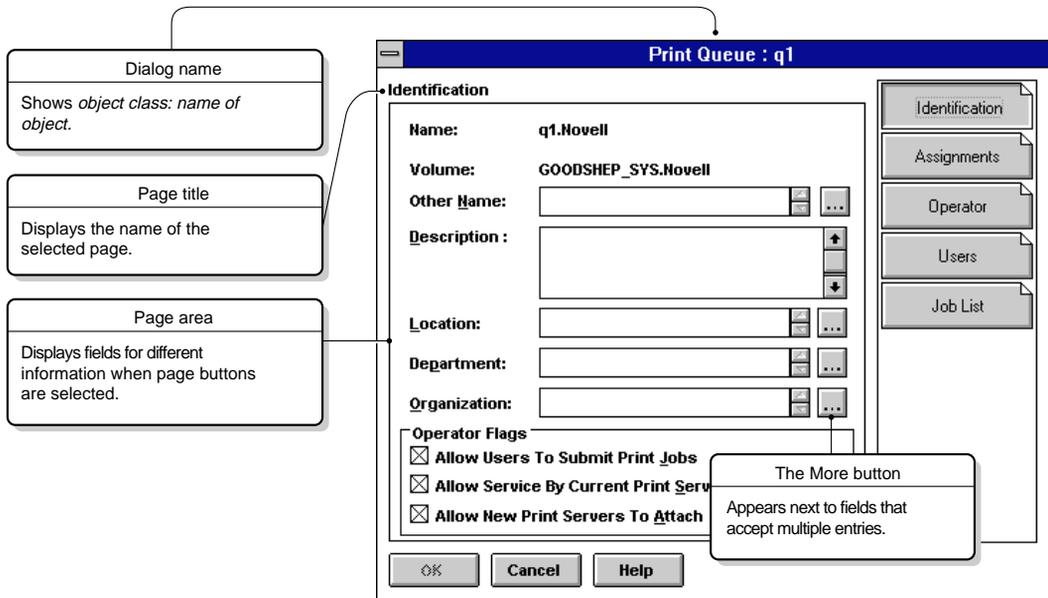
You can open dialogs for objects in several ways:

- ◆ Double-click on leaf objects in the Directory tree. (Double-clicking on a container object displays the objects it holds.)
- ◆ Single-click on objects in the Directory tree and choose Details from the Object menu.
- ◆ Right-click the mouse on the object in the Directory tree; then select Details from the menu that appears.

Parts of the Object Dialogs

The following figure illustrates some of the fields and controls found in the Identification page of a Print Queue object.

Figure 3-3
Object Dialog for a Print Queue Object



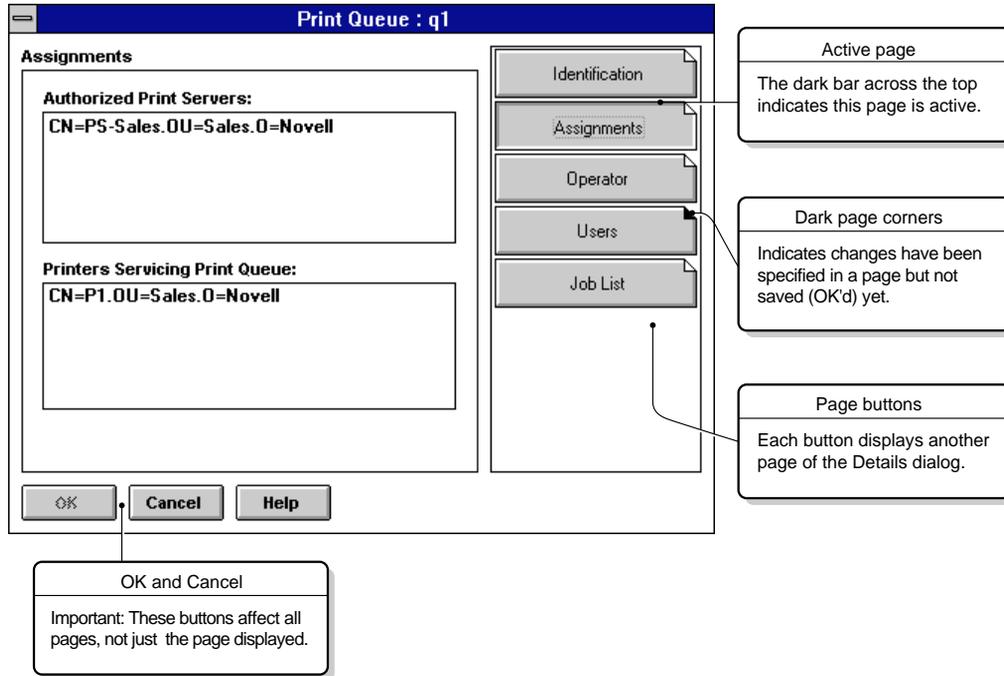
Pages of the Object Dialogs

Information in object dialogs is divided into pages that you view one at a time. To see the kind of information you want, select the appropriate page from the right-hand side of the dialog.

The pages are part of one object dialog. When you select a different page, you are still in the same dialog.

The following figure illustrates the Assignments page of an Object dialog.

Figure 3-4
Assignments Page of an Object Dialog



Using OK and Cancel

OK and Cancel affect the entire dialog, not just individual pages.

To return to the browser without changing *any* page, select Cancel. To save the changes entered to *every* page, select OK. A confirmation box allows you to verify your choice.

Using the Dark Page Corners in the Page Buttons

As you work from page to page making changes, the buttons for those pages display a black corner to remind you that you have entered changes that have not been saved.

If you specify changes in several pages and decide you *do not* want to keep some of the changes, remember the following:

- ◆ You can delete unwanted information from the pages or fields.
- ◆ If you choose Cancel, you can choose whether you want to save changes or not. If you choose not to save changes, you'll lose the changes you *want* to keep in the other pages.

Changes made in print job configurations and print device definitions take effect immediately. The Cancel option is grayed on these dialogs.

Choose Help in any dialog for further information about the object class you are creating.

Setting Up Print Services with NetWare Administrator

This section describes how to set up a basic printing environment using the NetWare Administrator graphical utility.

The Print Services Quick Setup feature in NetWare Administrator can automatically create the following printing objects with default settings and assignments. (See “Using Print Services Quick Setup in NetWare Administrator” on page 18.)

-  Print Server
-  Printer
-  Print Queue

The following procedure will enable you to create these objects with NetWare Administrator.

Procedure

- 1. Connect printers to the network in any of the following ways:**
 - ◆ To the network cable (network-attached printers)
 - ◆ To the parallel or serial port of a workstation
 - ◆ To the parallel or serial port of a NetWare server
- 2. Enter NetWare Administrator and select the container object that you want to create printing objects in.**

The following steps use the Organizational Unit Sales under Organization Novell. After completing these steps, the printing objects appear in the NetWare Administrator browser.

Creating Print Queues

The following procedure lets you create a Print Queue object to represent a physical print queue on the NetWare server.

You must have a print queue, along with a print server and a printer, in order for network users to share printers.

Procedure

1. **From the browser's Object menu for the Organization or Organizational unit, choose Create.**

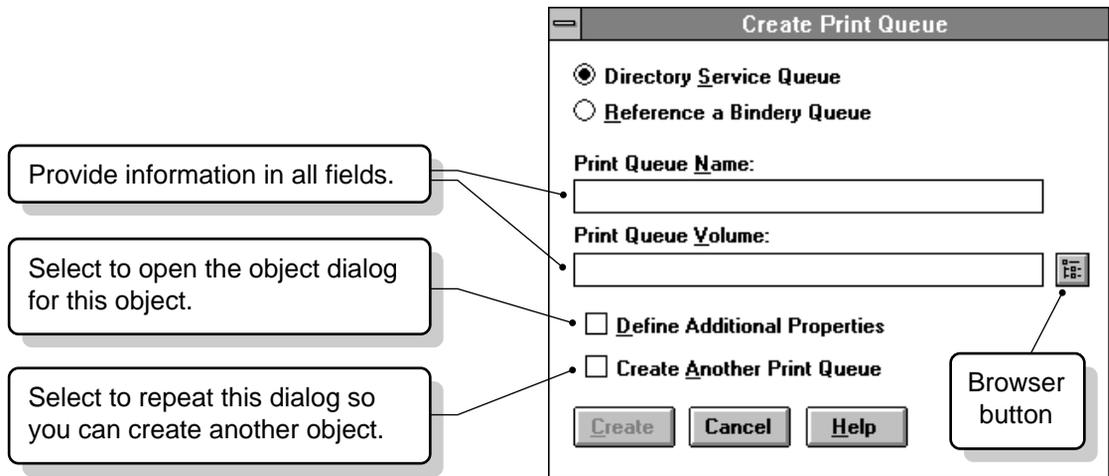
The New Object dialog appears similar to that shown in the following figure.



2. **Choose Print Queue.**

The Create Print Queue dialog appears similar to the following figure.

Figure 3-5
Create Print Queue Dialog



- ◆ **Directory Service Queue** allows you to create both a print queue object in your Directory tree and a physical directory for that print queue on a server.
- ◆ **Reference a Bindery Queue** allows you to create a print queue object for a print queue that already exists outside your Directory tree. This queue is a previously defined directory on a NetWare 3™ server or a NetWare 4 server in another Directory tree. Creating a print queue object for this queue allows you to manage printing outside of your current Directory tree.
- ◆ **Print Queue Name** shows the name of the print queue.
- ◆ **Print Queue Volume** shows the name of the object representing the volume on which the print jobs sent to this print queue are stored.
- ◆ **Define Additional Properties** lets you define more information about this print queue immediately after creating it.
- ◆ **Create another Print Queue** repeats this dialog rather than returning to the browser.
- ◆ **Create** creates the new Print Queue.
- ◆ **Cancel** returns to the browser without creating a Print Queue.

3. Select Directory Service Queue.

This is the default.

4. Type a name in Print Queue Name.

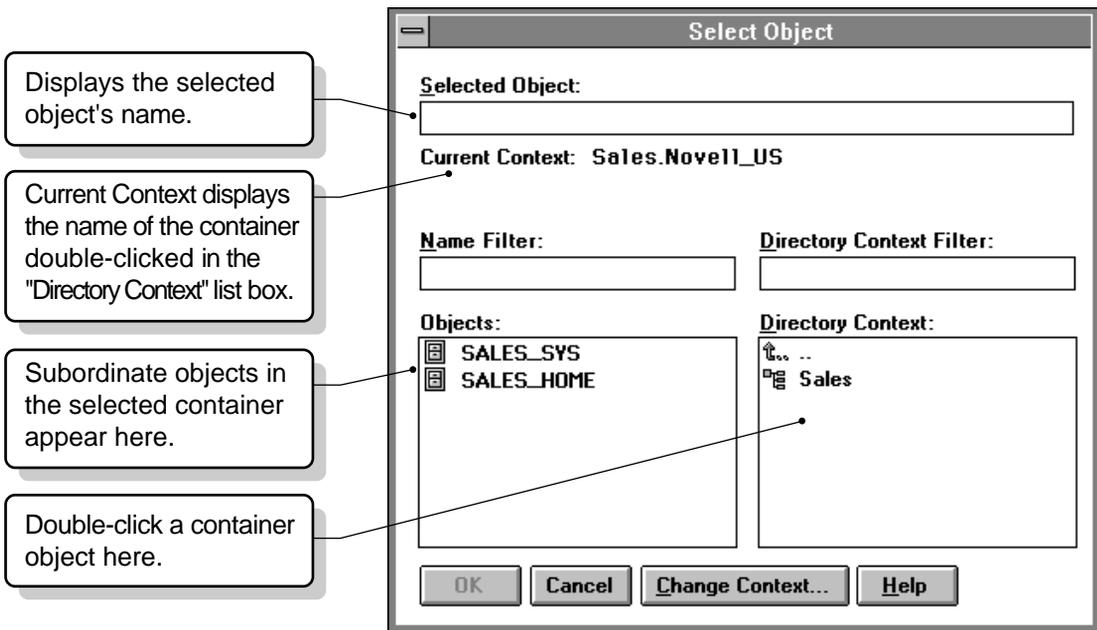
For example, type Q1.

5. Choose the browser button to select a print queue volume.

You cannot create a queue until you have selected a volume.

The Select Object dialog appears, similar to that shown in the following figure.

Figure 3-6
Select Object Dialog



6. In the Directory Context field, browse until the volume you want is listed in the Objects field.

When you are creating a print queue, only volumes appear in the Objects field.

To limit the range of volumes listed, you can use the optional Name Filter and Directory Context Filter fields. These fields allow you to use the wildcard delimiter (*) in the same way it is used in DOS. For example, to list only containers beginning with BR in the Directory Context Filter field, you would type BR*.

Because the number of simultaneous print jobs in the print queue is limited only by disk space, be sure to choose a volume with sufficient disk space.

7. Select the volume in the Objects field. Then choose OK.

You are returned to the Create Print Queue field.

8. At the Create Print Queue dialog, select Create.

Novell recommends one print queue for each printer.

Creating Printers

The following procedure lets you create a Printer object to represent a physical printer on the network.

You must have a printer, along with a print server and a print queue, in order for network users to share printers.

Procedure

1. From the browser's Object menu for the Organization or Organizational unit, choose Create.

The New Object dialog appears.

2. Select Printer.

The Create Printer dialog appears.

3. Type a name of your choice in the Printer Name field.

For example, type P1.

This is both the name of the Printer object as it appears in the Directory tree and as it is loaded at the NetWare server console or workstation. Object naming conventions must be followed.

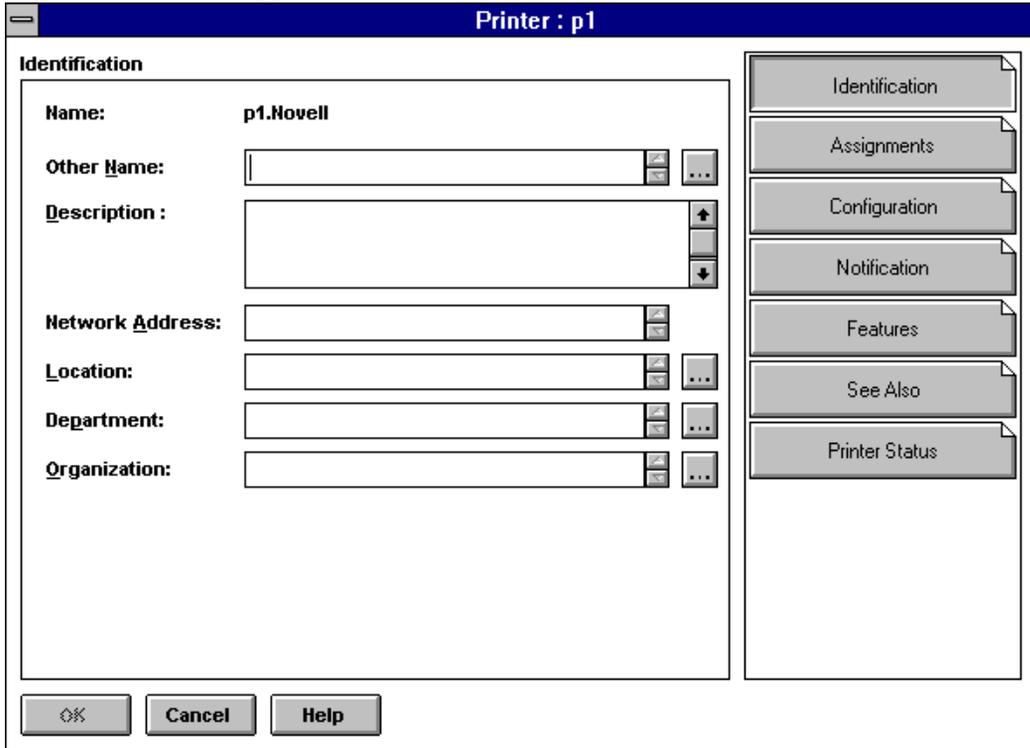
4. (Optional) Mark the Define Additional Properties box.

This allows you to define additional information about this printer immediately after you create it.

5. Select Create.

The object dialog for Printer P1 appears, similar to that shown in the following figure.

Figure 3-7
Printer Identification Page



For context-sensitive help in adding information to this dialog, select Help.

Assigning Print Queues to Printers

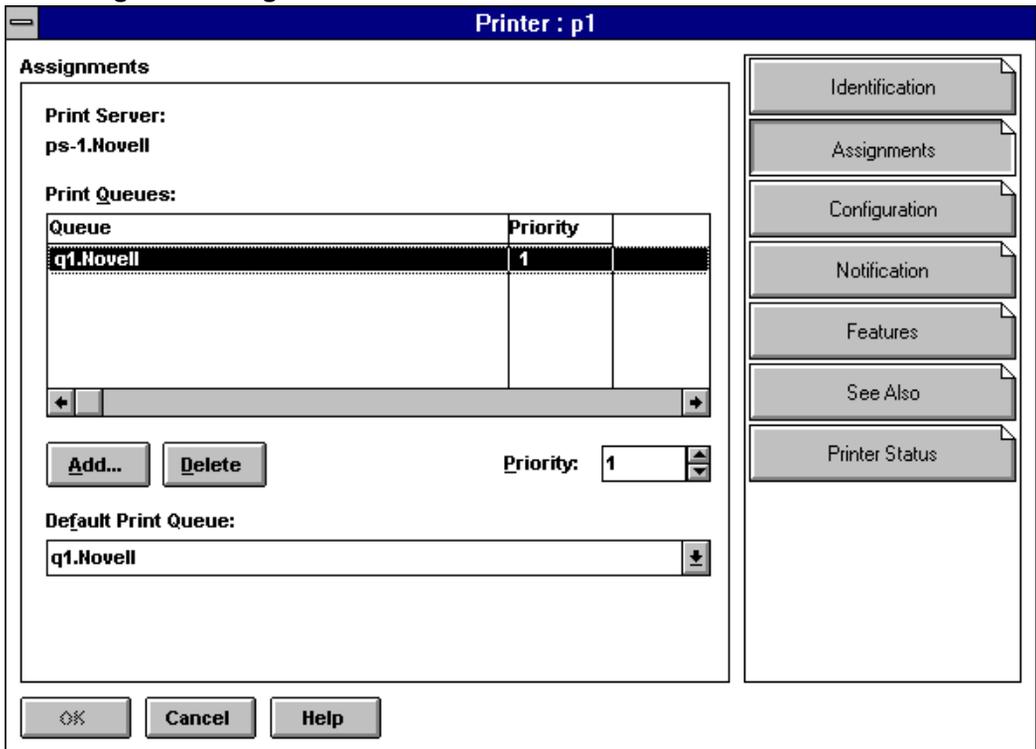
A print queue must be assigned to a printer before the printer can take print jobs from the network.

Procedure

1. From the browser, select the object Details dialog by double-clicking on the printer object.
2. From the Printer dialog, select the Assignments page.

The Assignments page appears, similar to the following figure.

Figure 3-8
Printer Assignments Page



3. Select Add.

The Select Object dialog appears, similar to that shown on Figure 3-6 on page 42. Only print queue objects appear in the list of objects.

- 4. In the Directory Context field, browse until the queue you want is listed in the Objects field.**

When you are assigning a print queue to a printer, only print queues appear in the Objects field.

To limit the range of print queues listed, you can use the optional Name Filter and Directory Context Filter fields. These fields allow you to use the wildcard delimiter (*) in the same way it is used in DOS. For example, to list only containers beginning with BR in the Directory Context Filter field, you would type BR*.

- 5. Select the print queue in the Objects field. Then choose OK.**

You are returned to the Printer dialog.

- 6. Select the Configuration page and make any necessary changes, including parameters available after selecting Communication.**

See “Configuring Printers” on page 56.

Creating Print Servers

The following procedure lets you create a print server.

You must have a print server, along with a printer and a print queue, in order for network users to share printers.

Procedure

- 1. From the browser's Object menu for the Organization or Organizational unit, select Create.**

The New Object dialog appears.

- 2. Select Print Server.**

The Create Print Server dialog appears.

- 3. Type a name of your choice in the Print Server Name field.**

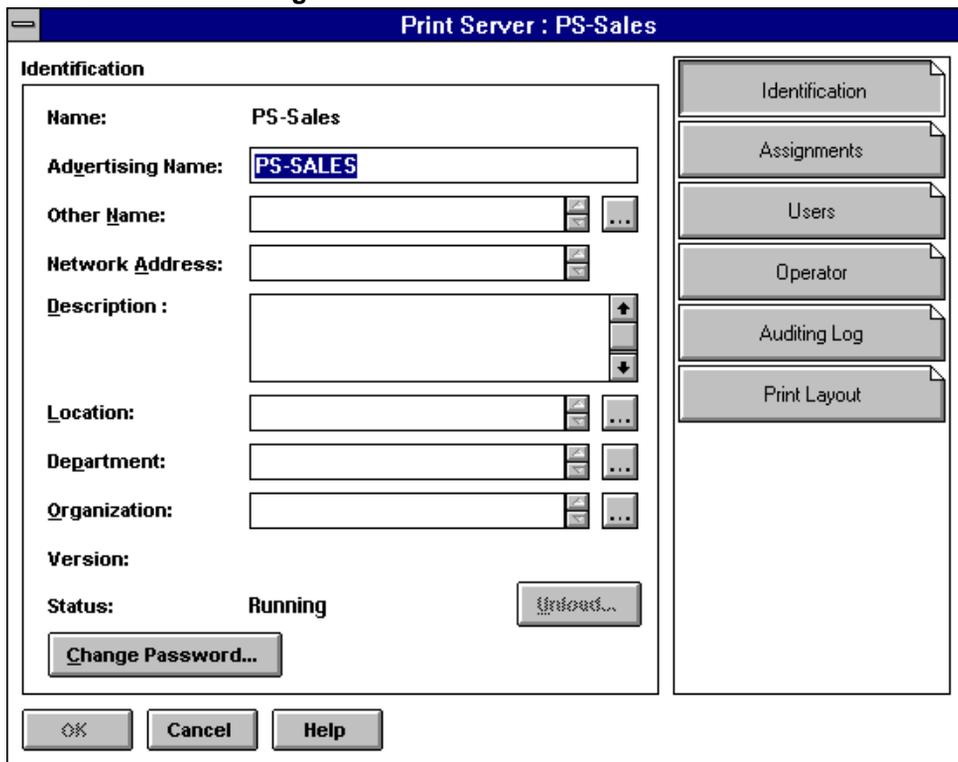
Not all print server names will be valid Service Advertising Protocol (SAP) names. For example, SAP names may not exceed 47 characters, they cannot contain spaces, and they must be in all-

caps. In addition, many double-byte characters used on certain code pages are not valid SAP characters. For more information, see “Service Advertising Protocol (SAP)” in *Concepts* .

4. **Mark the Define Additional Properties box.**
5. **Select Create.**
6. **Enter information in the Print Server dialog.**

The Print Server dialog for the print server you created appears, similar to the one shown here. The information you enter can later help you search for and manage network resources.

Figure 3-9
Print Server Identification Page



For context-sensitive help in adding information to this dialog, select Help.

Assigning Printers to Print Servers

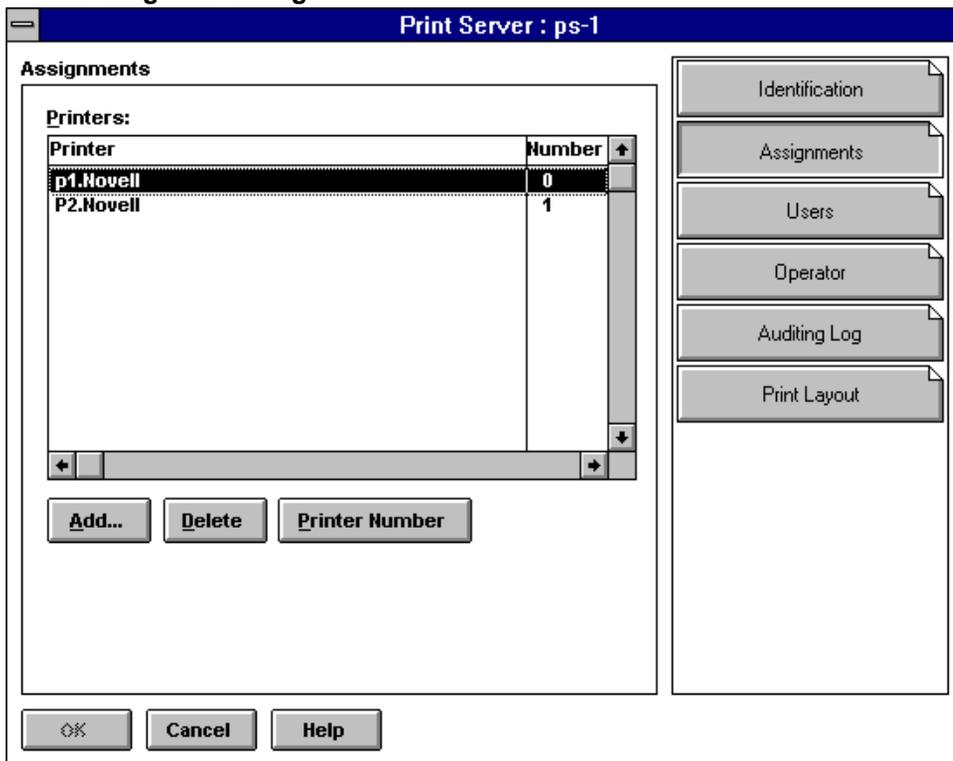
A network printer must be assigned to a print server before you can perform network printing.

Procedure

1. From the Print Server dialog, select the Assignments page.

The Assignments page appears, similar to that shown in the following figure.

Figure 3-10
Print Server Assignments Page



Remember that print queues are assigned to printers, not to print servers. See “Assigning Print Queues to Printers” on page 45.

2. Select Add, and select the Printer object you want to assign.

The Select Object dialog appears.

- 3. In the Directory Context field, browse until the printer you want is listed in the Objects field.**

When you are assigning a printer to a print server, only printers appear in the Objects field.

To limit the range of printers listed, you can use the optional Name Filter and Directory Context Filter fields. These fields allow you to use the wildcard delimiter (*) in the same way it is used in DOS. For example, to list only containers beginning with BR in the Directory Context Filter field, you would type BR*.

- 4. Select the printer in the Objects field. Then select OK.**

You are returned to the Print Server dialog.

- 5. Select OK.**

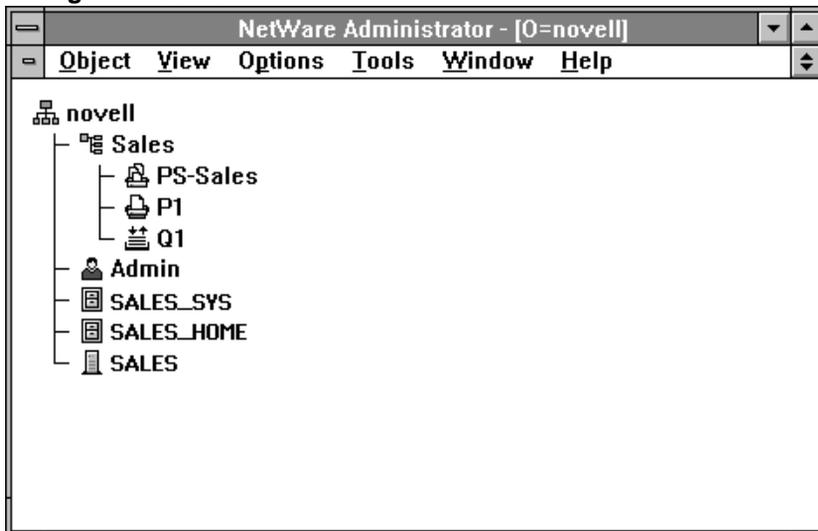
Adding Printing Objects

If you followed the instructions, you have now created and properly assigned the three necessary printing objects (at least one print server, printer, and print queue).

Each print server can service up to 255 printers (0-254).

When you are finished, your NetWare Administrator browser could resemble Figure 3-11 on page 50.

Figure 3-11
Browser Showing Print Server



Repeat this process for each additional printer you want to add to your setup.

You do not need to create a print server for each printer, but you must assign each printer to an existing print server.

When you have created and assigned all of your queues and printers, load the print server software (PSERVER.NLM) on a NetWare 4 server.

For information on loading the print server, see “Using PSERVER.NLM” on page 153.

Modifying NetWare Print Services

NetWare print services has a dialog for each of the three types of printing objects: Print Queue, Printer, and Print Server.

You access printing objects using the same method used for other objects in the browser.

Warning: Because the pages are all part of one dialog, do not choose OK or Cancel until you are finished with all pages and are ready to close the object dialog. If you specify changes in several pages and decide you do not want to keep some of the changes, remember the following:

1. You must manually delete unwanted information from the fields.
2. If you choose Cancel, you can choose whether you want to save changes or not. If you choose not to save changes, you'll lose the changes you *want* to keep in the other pages.

Like other Novell Directory Services leaf objects, you can move, delete, or rename printing objects.

You cannot copy Novell Directory Services objects, but you can create aliases to reference objects in other contexts. See “Creating Leaf Objects” in *Supervising the Network* or “Alias object” in *Concepts*.

Moving Printing Objects

To move an object, select the object in the browser and choose Move from the Object menu, or hold down <Ctrl> while dragging a leaf object and dropping it onto another container.

When an object is moved, the name is changed to reflect the new context.

Moving an object is like changing part of the object's complete name or like changing its context.

When you move an object, all references and assignments to the object are automatically changed as well.

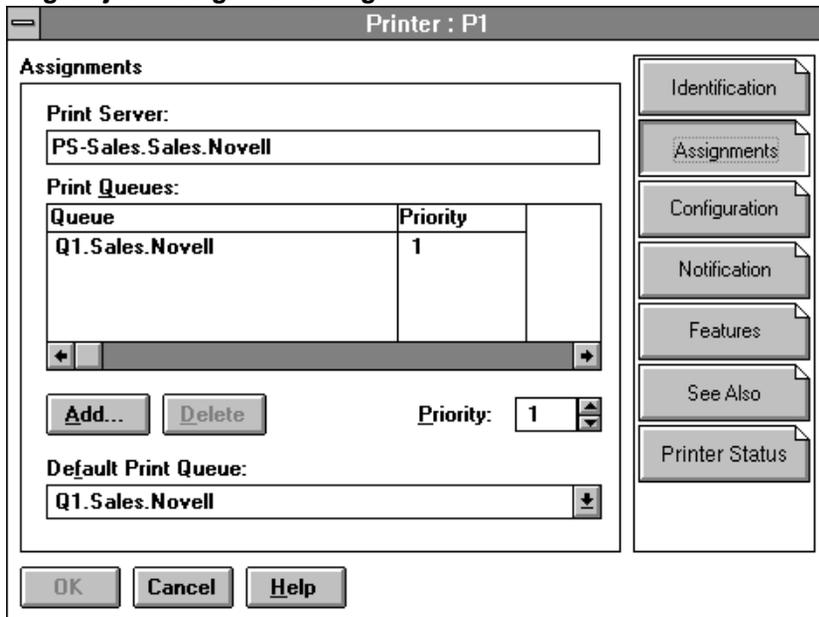
Viewing the Assignments for Printing Objects

The Assignments pages for the Print Queue, Printer, and Print Server object dialogs show the current assignments for those printing objects. Use the following steps to view printing assignments.

Procedure

1. **Select the printing object you want to view in the browser.**
The dialog for that object appears.
2. **Select the Assignments page, as shown in the following figure.**

Figure 3-12
Typical Printing Object Assignments Page



Hint: A complete graphical representation of your printing setup can be obtained by viewing the Printing Layout page available from the Organizational Unit or Print Server dialog accessed from the browser.

Renaming Printing Objects

When you rename an object, all references and assignments to the object are automatically changed as well.

To use rename, select an object in the browser and choose Rename from the Object menu. If you select the option to save the old name, it is stored as a value in the Other Names property.

Deleting Printing Objects

When you delete an object, all references and assignments to the object are automatically deleted as well. Delete cannot be undone.

To use delete, select an object in the browser and choose Delete from the Object menu.

Print Queue Options

Assigning Queue Operator Flags

By selecting the Details page from the Print Queue object dialogue, a print queue operator with appropriate rights can set flags that limit access to the selected print queue:

- ◆ **Allow Users To Submit Print Jobs** Allows queue users to submit print jobs to the queue if the option is set to Yes.
- ◆ **Allow Service By Current Print Servers** Allows assigned print servers to service print jobs in the queue if the option is set to Yes.
- ◆ **Allow New Print Servers To Attach** Allows print servers to attach to the queue if the option is set to Yes.

Viewing or Modifying Print Jobs

Use the following steps to view or modify print jobs.

Procedure

1. **From the browser, select a print queue object.**

The Print Queue object dialog appears.

2. **Select Job List.**

A list of print jobs in the print queue appears.

3. **Do one of the following:**

- ◆ *To view information about a print job, select it, then see the next section.*
- ◆ *To hold a print job in the queue without printing it, highlight it and select Hold.*
- ◆ *To activate a print job currently on Hold status in the queue so that it can be printed, highlight it and select Resume.*
- ◆ *To delete a print job, highlight it and select Delete.*

Note: Most applications can send print jobs to a network printer or print queue. This is usually the easiest way to create print jobs with the correct format for your printer, etc. If you are running on a Windows 3.1x workstation and your application can print only to a local port, use the NetWare User Tools to redirect your workstation port to the network. See your Novell Client documentation.

Viewing Details of Print Jobs

You must be an operator of this Print Queue to change a print job that you did not submit.

Procedure

1. From the browser, select a Print Queue object.

The Print Queue object dialog appears.

2. Select the Job List page.

A list of print jobs in the print queue appears.

3. Select the print job you want to view details about.

If you are an operator, or you submitted the print job that you are viewing, you can change any of the fields that are not grayed.

- ◆ **Print Job** Shows the job number of this print job.
- ◆ **File Size** Shows the file size, in bytes, of this print job.
- ◆ **Client** Shows the name of the User that submitted this print job.
- ◆ **Description** Shows a description that was entered for this print job.
- ◆ **Status** Shows the status of this print job. For example: Ready, Held, or Active.
- ◆ **User Hold** Indicates that the print job has been put on hold by the User who submitted the print job.
- ◆ **Operator Hold** Indicates that the print job has been put on hold by the Queue operator.
- ◆ **Service Sequence** Shows this print job's position in line to be printed.

- ◆ **Number of Copies** Shows how many copies of this print job the print server will send to the printer.
- ◆ **File Contents** Shows the type of file that was sent for this print job.
- ◆ **Byte Stream** Indicates that this print job consists of a byte stream file, such as a graphic, or PostScript* file.
- ◆ **Text** Indicates that this print job consists of a text file, containing only ASCII characters.
- ◆ **Tab Size** Used only with text files and indicates how many spaces are sent to the printer each time a Tab character is received as part of the print job.
- ◆ **Form Feed** Shows whether or not a form feed character is sent to the printer at the end of this print job.
- ◆ **Notify When Job is Printed** Shows whether Users are notified when this print job has been completed.
- ◆ **Entry Date** Shows the date that this print job was submitted to the Queue.
- ◆ **Entry Time** Shows the time that this print job was submitted to the Queue.
- ◆ **Form** Shows which printer form will be used to print this print job. You can select from available printer forms using the drop-down box.
- ◆ **Print Banner** Shows whether or not a banner page with identification information will be printed as the first page of this print job.
- ◆ **Name** Indicates what will be printed as the name of the User who sent this print job. This is only valid if a banner page is printed.
- ◆ **Banner Name** Indicates what will be printed as the name of the print job. This is only valid if a banner page is printed.
- ◆ **Defer Printing** Indicates that the printing of this job is to be delayed until a later date and time.
- ◆ **Target Date** Shows the date that this print job will be printed. This field is valid only if Defer Printing is selected.
- ◆ **Target Time** Shows the time that this print job will be printed. This field is only valid if Defer Printing is selected.

Viewing or Changing the List of Users for a Print Queue

Objects that are listed as users of a print queue are allowed to submit print jobs to that print queue and to manage jobs that they submit.

The Users page lists users of the print queue. This list is created and maintained by the network supervisor.

Viewing or Changing the List of Operators for a Print Queue

Operators of a print queue are allowed to manage the print jobs in the print queue. This includes activities such as deleting print jobs or changing their order. Use the Operators page to record operators of a print queue.

Printer Options

Configuring Printers

The default printer configuration uses polled mode and LPT1 of the NetWare server running the print server.

Procedure

1. **From the browser, select the Details dialog for the printer you want to configure by double-clicking on the printer object.**

The printer Identification page appears.

2. **Complete or modify the fields as needed.**

These fields are optional.

- ◆ **Other name** Lists identification information associated with this printer that helps you search for and identify specific printers.
- ◆ **Description** Describes the function the printer performs (such as print Sales documents).

- ◆ **Network Address** Lists the 16-digit (8-byte) number associated with the NetWare Server or workstation that this printer is cabled to.
- ◆ **Location** Specifies the printer's physical location (such as a person's office).
- ◆ **Department** Shows the department or division that generally uses the printer.
- ◆ **Organization** Lists the organization that can use the printer.

3. Select the Configuration page.

A printer Configuration page appears similar to the following shown for a parallel printer. This page allows you to store or define information about the hardware configuration of this printer and how it is used in the network.

Figure 3-13
Printer Configuration Page

The screenshot shows a window titled "Printer : P1" with a "Configuration" section. The settings are as follows:

- Printer Type:** Parallel (dropdown menu)
- Banner Type:** Text (dropdown menu)
- Service Interval:** 15 (spin box)
- Buffer Size in KB:** 3 (spin box)
- Starting Form:** 0 (spin box)
- Network Address Restriction:** (empty text field with a "Set..." button)
- Service Mode for Forms:** Minimize form changes within print queues (dropdown menu)

On the right side, there is a vertical list of tabs: Identification, Assignments, Configuration, Notification, Features, and See Also. At the bottom of the window are three buttons: OK, Cancel, and Help.

4. **Complete the configuration fields as required by your printer type.**

- ◆ **Printer Type** Displays the list of types from which you can select. Types of printers currently appearing in this menu are

Parallel

Serial

UNIX Printer

AppleTalk Printer

Other/Unknown (for example, OS/2 or configured by NPRINTERR)

XNP

AIO

Parallel, serial, XNP (eXtended NetWare Printer protocol)

AppleTalk, UNIX and AIO printers require unique settings.

The default values are for a parallel printer that is cabled to the LPT1 port of a NetWare Server running PSERVER.NLM.

- ◆ **The Communication parameter windows** Allow you to view and modify the values defined for the selected printer type. Different dialogs are used depending on which printer type is selected. The appropriate window appears automatically whenever you change the printer type except when Other/Unknown or XNP (Extended NetWare Printer protocol) is selected.

Communication can be used to access these parameter windows.

- ◆ **Banner Type** Shows whether the printer produces banner pages in text or PostScript mode. The banner type must match the default printer type.
- ◆ **Service Interval** Shows how often the print server checks the print queue for print jobs going to this printer. The default is every 5 seconds. Values from 1 to 255 are allowed.
- ◆ **Buffer Size in KB** Shows how large each piece of data sent to this printer can be. The default is 3 KB (3,072 bytes). Values from 3 to 20 are allowed.
- ◆ **Starting Form** Shows the number of the printer forms that this printer will service when the NetWare port driver is loaded. Printer forms are defined in the Organization or

Organizational Unit object above this printer. Any Form Number defined there can be used here (values from 0 to 254 are possible).

- ◆ **Network Address Restrictions** Shows the network addresses that this printer can use. Set is used to add an IPX network address to this field.
- ◆ **Service Mode for Forms** Determines how forms needed for print jobs affect the order in which the print server processes those jobs. Selecting this field displays the list of service modes from which you can select.

When a print job requests a printer form other than the form currently mounted in the printer, the print server does not service the job until a print server operator reports that the new form is mounted. A print server operator can use PCONSOLE, PSC, or NetWare Administrator to mount the new form.

The following service mode options determine how often the print server requires you to change printer forms:

Change forms as needed The priority of each print queue and the order of print jobs in the print queue determine which print job to service next. You might have to change forms often.

Minimize form changes within print queues The print server requires you to mount a new form for a print job before servicing print jobs with the currently mounted form in a print queue with a lower priority.

Minimize form changes across print queues The print server services all print jobs requiring the currently mounted form before requesting a form change. Print jobs in lower priority print queues that require the mounted form are serviced before print jobs in a high priority print queue that require a different form.

Service only currently mounted form The print server never requests a form change. If no print job requiring the current form is available, nothing is printed.

5. When you are finished, select OK.

Viewing and Modifying a Printer's Status

You must be an operator or user of a print server that services a printer to be able to see the printer's status.

Use the following procedure to view a printer's status.

Procedure

1. From the browser, select the Details dialog for the printer you want to configure.

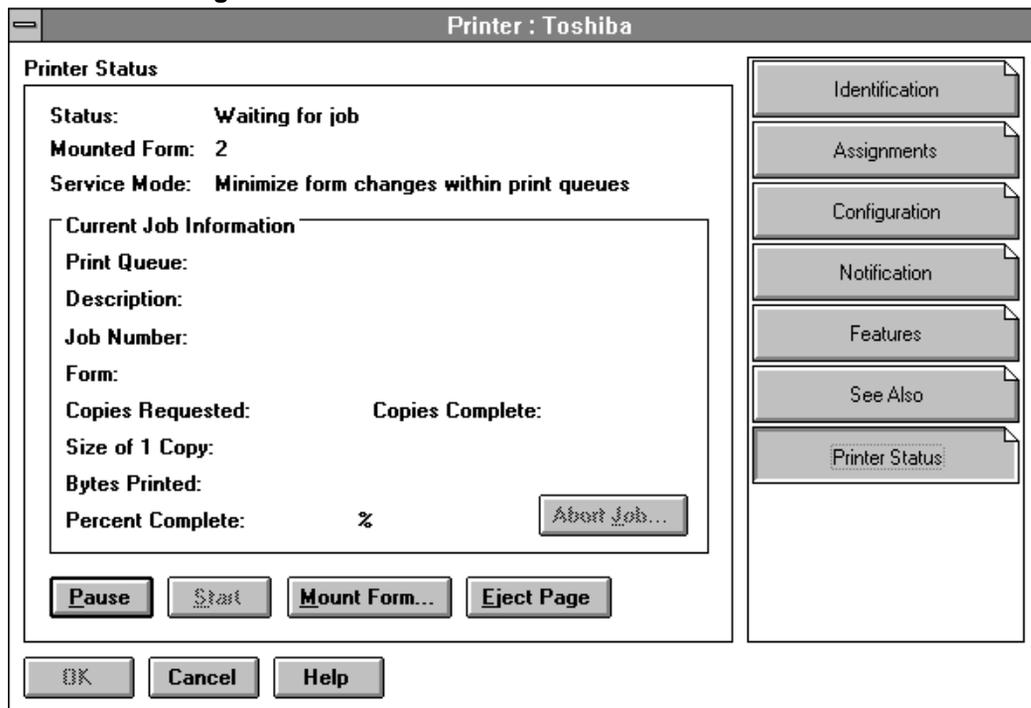
The printer Identification dialog appears.

2. Select Printer Status.

A dialog appears similar to the following showing the various status elements for printers.

If the printer status option does not appear, the printer is not connected.

Figure 3-14
Printer Status Dialog



3. Modify this printer's status as necessary.

- ◆ **Status** Status shows the current status of this port driver and printer. Possible statuses include the following:

Not connected

Waiting for form

Out of paper

Printing

Paused

Stopped

Off-line

Private

Ready

Waiting for job

Ready to go down

Note: The port driver (NPRINTER) status for a defined but unattached serial printer is Waiting for job even though the printer is not attached, and the printer status is Running. If a print job is put into the queue for this printer, the port driver status changes to Ready (Waiting for printer) or Printing job but the printer status changes to Offline. Defined but unattached parallel printers show a status of Not connected.

- ◆ **Mounted Form** Shows the number of the form that is currently mounted in the printer. Only print jobs that specify this printer form number can be printed until a new printer form is mounted by selecting Mount Form.
- ◆ **Service Mode** Shows which service mode is being used by this printer and its associated print queue. The Service Mode determines how jobs within a print queue are organized for the most efficient use of the printer.
- ◆ **Current Job Information** Includes all of the information about the print job that is currently being printed on this printer. Most of this information can only be changed by going to the print queue and selecting this print job from the list of jobs.

Print Queue Indicates the print queue that is submitting this print job.

Description Indicates the banner name. By default, the banner name with CAPTURE is the port and with NPRINT it is the filename.

Job Number Is the print job ID.

Form Shows which printer form this print job is using. This print job cannot be printed unless this Form matches the Mounted Form field above the Current Job Information.

Copies Requested Indicates the number of copies of this print job that the User who submitted it requested to be printed.

Copies Complete Indicates how many of those copies requested have been printed so far.

Size of 1 Copy Indicates the size of each copy of this print job. This is like the File Size field when you see the details of a print job within the print queue.

Bytes Printed Indicates the total number of bytes in one copy of a print job that have been printed

Percent Complete Indicates how much of this print job is completed, which is determined both by the size of one copy and the number of copies requested for this print job.

- ◆ **Abort Job** Allows you to cancel this print job and immediately stop printing.
- ◆ **Pause** Changes the status of this printer to Paused. If no jobs are printing and Paused is used, the status is changed to Stopped. Only a print queue operator can perform this action.
- ◆ **Start** Changes the status of this printer from Paused to Printing, Stopped to Printing, or Stopped to Waiting for Job.
- ◆ **Mount Form** Allows you to specify a new printer form that you have mounted on this printer. When you use this option, the Mounted Form field will change to reflect the newly mounted form. Only print jobs that specified the new form can be printed.

- ◆ **Eject Page** Sends a command to this printer to eject the page that is being printed. This is like a Form Feed command.
 - ◆ **Close** Closes this dialog and returns to the Identification page of the Printer object dialog.
4. **Choose Close to return to the Identification page of the Printer object dialog.**

Changing Printer Type

Use the following procedure to change your printer type.

Procedure

1. **From the browser, select the Details dialog for the printer you want to configure by double-clicking on the printer object.**

The printer Identification page appears.

2. **Choose Configuration.**

The printer Configuration page appears.

3. **Using the down arrow to the right of the Printer Type field, choose the correct printer type from the list.**

For printers that attach directly to the network, select type Other/Unknown. (For example, HP* IIIsi or 4si, COMPAQ* PageMarq 20, GENICOM 7170, or Talaris 1794 Printstation.)

A dialog appears where you must check the communication values for the selected printer type. (Other/Unknown and XNP do not have a dialog; they are configured elsewhere.)

4. **Make any necessary changes in the communication parameters dialog for this printer type.**

See “Configuring Printers” on page 56 for information on these parameters.

5. **Choose OK.**

You return to the Configuration page.

Setting Up Printer Event Notifications

The Notification page controls the objects that are notified when the printer requires servicing (for example, when it is out of paper or jammed). You can do the following:

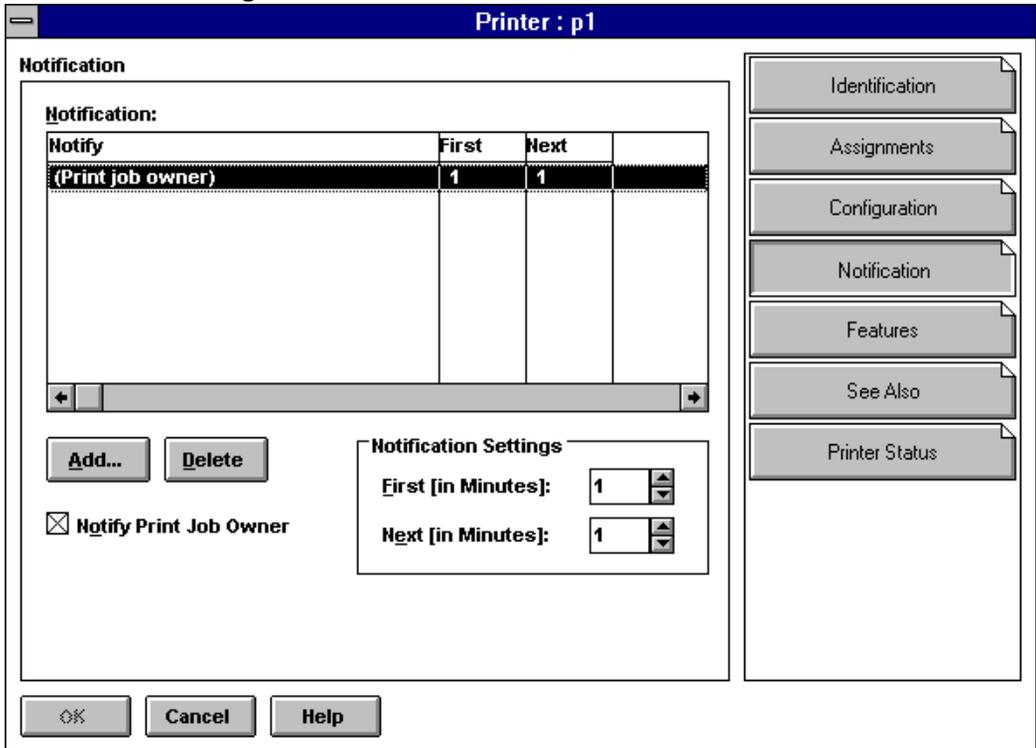
- ◆ Add or delete User or container objects that receive printer error messages
- ◆ Specify how soon and how frequently printer error messages arrive
- ◆ Specify that the print job owner receive the printer status messages

Procedure

1. **From the printer's Identification dialog, select the Notification page.**

A page similar to the following is displayed:

Figure 3-15
Printer Notification Page



2. On this page, configure your notification options.

The Notification list box shows objects that are notified about this printer.

- ◆ **Add** Allows you to add objects to the Notify list.
- ◆ **Notification Settings** Allow you to specify how long (in minutes) after an event that a first notice is sent to the objects in the Notify field and how long (in minutes) after the first notification of an event that subsequent notices are sent to the objects.
- ◆ **Delete** Allows you to delete the selected object from the Notification list box. If you delete the (Print job owner) entry, you can add it to the list by selecting the Notify Print Job Owner check box.)

- ◆ **Notify Print Job Owner** Enters the print job owner as an object in the Notification list, so that the object that sends the print job receives notifications. By default, this object is included in the Notification list.
- ◆ **OK** Saves changes in all pages of this dialog.
- ◆ **Cancel** Closes this dialog without saving changes in any page.

Changing a Print Queue's Priority

A print queue's priority determines whether the print server will send print jobs from that print queue to the printer before or after print jobs in other print queues assigned to the printer.

Use the following procedure to modify a print queue's priority.

Procedure

1. **Select a Printer object from the browser and go to the Assignments page.**

The priority of the selected print queue is shown in the Priority field.

2. **Enter the new priority for the selected print queue in the Priority field.**

You can select a number from 1 to 10, inclusive. Print queues with lower priority numbers will be serviced before print queues with higher numbers.

3. **Choose OK.**

The priority is changed, and you return to the browser.

Designating a New Default Print Queue

Procedure

1. **Choose the arrow to the right of the Default Print Queue field.**

The print queues listed above in the Print Queues list appear in the drop-down list box.

2. **Select a print queue from the list.**

The selected print queue appears in the Default Print Queue field.

The default print queue will be used for print jobs that specify a printer but do not specify a print queue (for example, with the CAPTURE command).

Specifying Printer Features

The printer Features page allows you to store information about your printer, including the following:

- ◆ Printer language
- ◆ Amount of memory
- ◆ Supported typefaces
- ◆ Supported cartridges

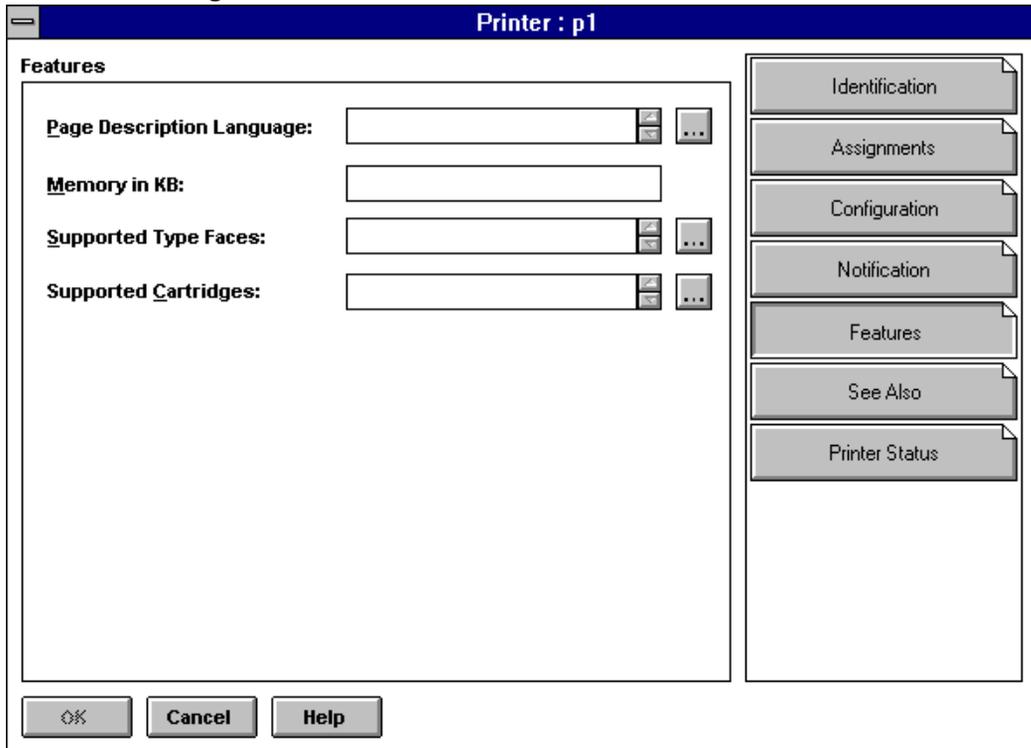
You can access this information through searches. For example, you can search for printers with at least 4 MB (4096 KB) of memory and the Futura font.

Procedure

1. From the printer's Identification dialog, select the Features page.

A page similar to the following is displayed:

Figure 3-16
Printer Features Page



2. On this page, specify the information you want to store:

- ◆ **Page Description Language** Shows the languages supported by the printer. To add a language, choose the button to the right of the Page Description Language field and then choose Add for each language the printer supports.

A printer language is a protocol or type of printing that this printer can receive (for example, PCL, PCL-V, or PostScript).

Enter the main printer languages that this printer supports so that users can search for printers that support the language they need.

To enter other printer languages for this printer, choose the button to the right of the Page Description Language field. Add other descriptions in the Add Value dialog that appears.

- ◆ **Memory in KB** Shows the amount of RAM installed in the printer.
- ◆ **Supported Type Faces** Shows the fonts that the printer can use. You must enter the correct typefaces; they are not read from the printer.

A typeface is a collection of fonts in different stroke weights and sizes that this printer can produce (for example, Helvetica and Times Roman).

Enter the typefaces that this printer supports so that users can search for printers that support a typeface they need.

- ◆ **Supported Cartridges** Lists the font cartridges that the printer can use. You must enter the correct cartridges; they are not read from the printer.
- ◆ **OK** Saves changes in all pages of this dialog.
- ◆ **Cancel** Closes this dialog without saving changes in any page.

Print Server Options

Viewing Your Printing Layout and Status

The Print Layout page in NetWare Administrator shows a map of your printing setup. You can see which print objects are assigned to each other and the status of each object. This information can help you quickly determine if printing is operational or which print objects may have problems.

The Print Layout page can be accessed from two locations in NetWare Administrator.

- ◆ The Details or object dialog box for a container object
- ◆ The Details or object dialog box for a print server

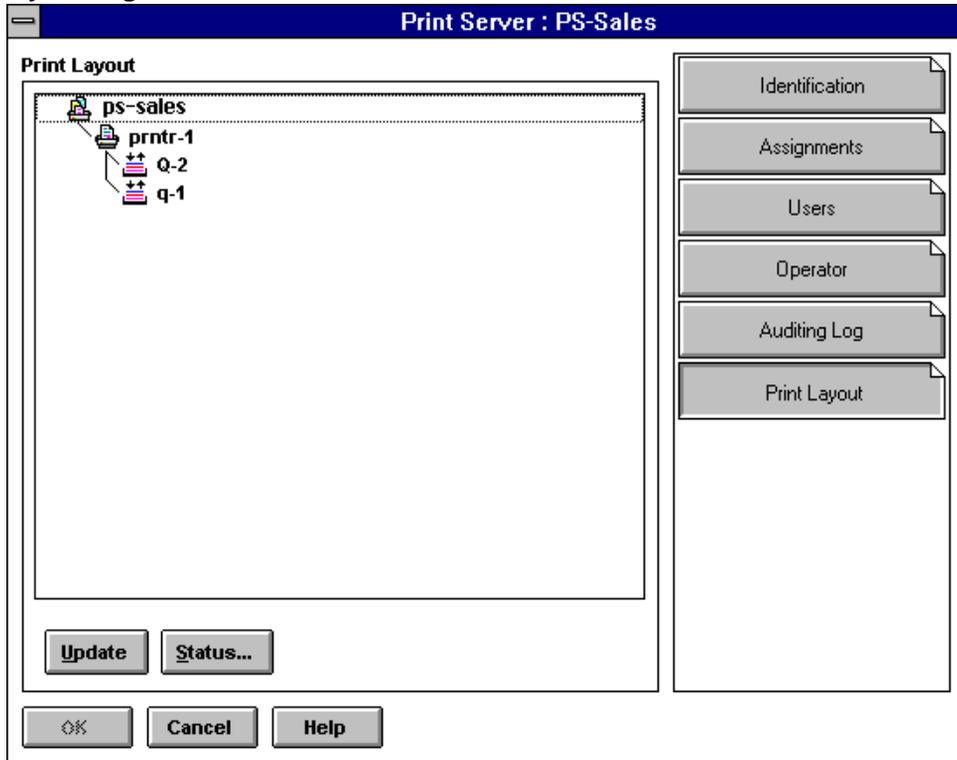
Print Layout Features

- ◆ A dashed line between objects means the connection is established for the current print server session only rather than configured to connect every time the print server is loaded.
- ◆ The status of the print server and each element on the display is represented visually through trouble icons along the left margin.
- ◆ You can invoke information about each object by highlighting the object and clicking on the right-hand mouse button.
- ◆ You can view print jobs in a queue by double-clicking on that queue's icon.
- ◆ You can expand and collapse an object by double-clicking on the left-hand mouse button.
- ◆ Update refreshes the print layout tree to reflect any changes with the print objects.
- ◆ Status provides a brief summary of the selected print object's details. For complete detail information, select the object in the browser and choose Details.

Status for print jobs is not available in the Print Layout page. You must manage print jobs from the Queue object the job is stored in.

The following figure shows a typical Print Layout page for a Print Server object.

Figure 3-17
Print Layout Page for Print Server



Enabling and Viewing the Print Server Auditing Log

The PSERVER auditing log provides information about all jobs that have been printed. Auditing records are retained as ASCII files so that they can be read with any text editor.

By default, no audit log is created. When you enable the audit log feature you can do the following:

- ◆ **View the log** Use the scroll bars to browse through the current log.
- ◆ **Limit the log size** By default, the log has no size limitations. The log's current size is displayed in the dialog.
- ◆ **Delete the log** Deleting an audit log destroys the current log and, if auditing is enabled, starts a new log by the same name in the same directory.

In designing the auditing log, Novell® has recognized that companies do accounting in a variety of ways. For this reason, the auditing log provides a basic default format based on ASCII text and a fixed record length. Both characteristics are designed to make it as easy as possible to write a customized program to retrieve the information it needs in a format determined by a particular company.

The auditing log is sufficiently flexible to record whatever information a printer sends to it. Regardless of printer type, the log will record how many bytes a job took to print, the user who submitted the job, when the job entered the print queue, when the job was printed, and what printer serviced the job.

If the printer is an XNP type used by Macintosh or UNIX, the log might also indicate how long it took to print the job, how many pages were printed, when the job was printed, and when the job was submitted.

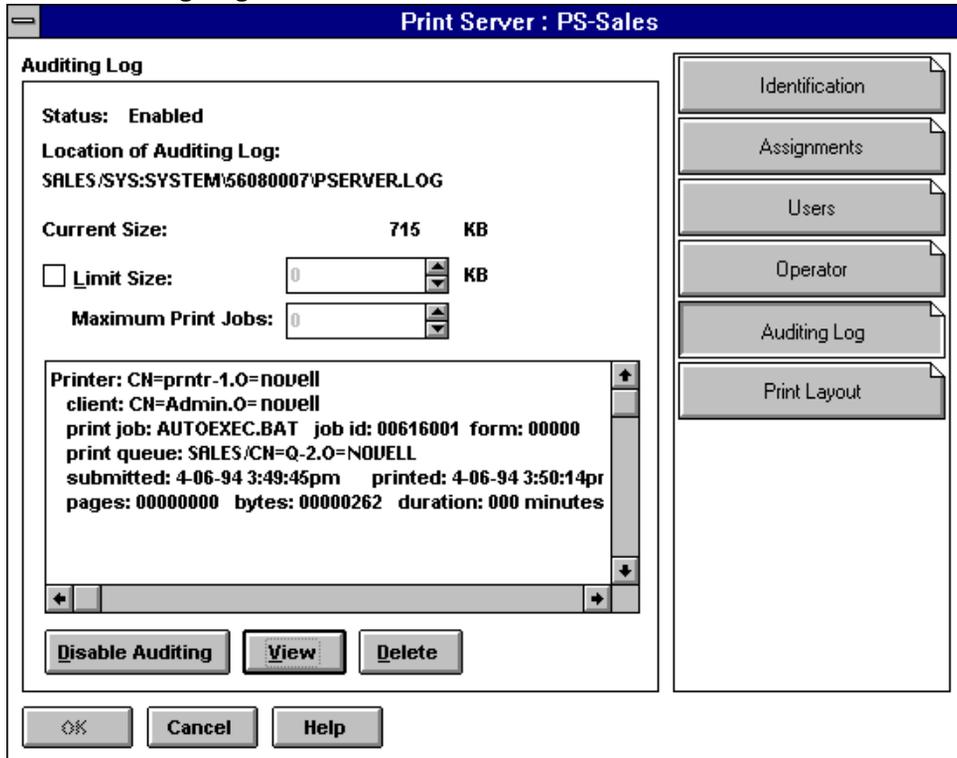
To enable the auditing log from NetWare Administrator or to modify the log, use the following procedure.

Procedure

- 1. From the browser, choose the Print Server object you want to audit and, from the Object menu, select Details.**
- 2. Select Auditing Log.**

An Auditing Log dialog similar to the following appears.

Figure 3-18
Print Server Auditing Log



3. Select Enable Auditing.

If you enable auditing, the print server maintains a log of the operations it performs. If the print server is already running, it needs to be brought down and loaded again for this change to take effect.

If you do not enable auditing, the print server will not write to the log. If the print server is already running, it needs to be brought down and loaded again for this change to take effect.

If the auditing log file becomes full, either by using all available disk space or by reaching the size limit set with the Limit Size option, the print server ceases storing auditing information. To avoid losing valuable accounting information, process or archive the information and delete the auditing log file on a regular basis.

4. Specify whether you want to Limit Size of the log file.

In this field, you should specify the maximum size (in kilobytes) that the auditing log file can reach before the print server stops appending auditing information. Without this limit it is possible for the file to grow until all available disk space is used.

5. **After auditing has been enabled, unload and then reload the print server**
6. **(Optional) Submit a print job to ensure that the log is recording information on print jobs properly.**
7. **To view the auditing log, select View.**
8. **To delete the auditing log, select Disable Auditing.**
9. **Select OK.**

You can also view the auditing log from PCONSOLE.

Adding, Changing, and Removing Print Server Passwords

For added security, you can limit access to your print server by assigning a password to it. Use the following procedure to do this with NetWare Administrator.

Procedure

1. **From the browser, choose the Print Server object you want to modify, and, from the Object menu, select Details.**

The print server Identification page appears.

2. **Select Change Password.**

The Change Password window appears. (The Old Password field is permanently grayed.)

3. **Complete the fields as needed.**

- 3a. **To assign a new password, type the new password in both the New Password and Retype New Password fields. Then select OK.**

Only alphanumeric characters and underscores are valid. Passwords are not case sensitive.

- 3b. To remove a password, make sure that the fields are blank, then select OK. When prompted, confirm that you want to remove the password assignment by selecting Yes. (Cancel is the default.)**

Unloading Print Servers

A print server can be created in NetWare Administrator, but it must be loaded at the server console. However, an active (Status: running) print server can be unloaded in NetWare Administrator with the following procedure.

If Unload is not activated, the print server may not be running. If it is running, you are not designated as an operator for that print server. In order to proceed, a designated print server operator must be logged in to the workstation you are using.

Procedure

- 1. From the browser, choose the Print Server object you want to unload and, from the Object menu, select Details.**
- 2. Select Unload.**
- 3. Do one of the following:**
 - ◆ Select Unload Print Server Immediately if you want the print server to go down without completing any current print jobs.

Print jobs in the queue will remain in the queue until the print server is reloaded or they are manually deleted.
 - ◆ Select Unload Print Server After Current Jobs if you want a print job already being printed to be completed before the print server goes down.

Other jobs in the queue will remain in the queue until the print server is reloaded or they are manually deleted.

Working with Print Job Configurations

Print job configurations are groups of print job options that simplify the use of CAPTURE and NPRINT. You can use NetWare Administrator to create or modify print job configurations. These configurations may specify a default printer or other options for users who use CAPTURE, NPRINT, NETUSER, or PCONSOLE to send print jobs to a network printer or print queue.

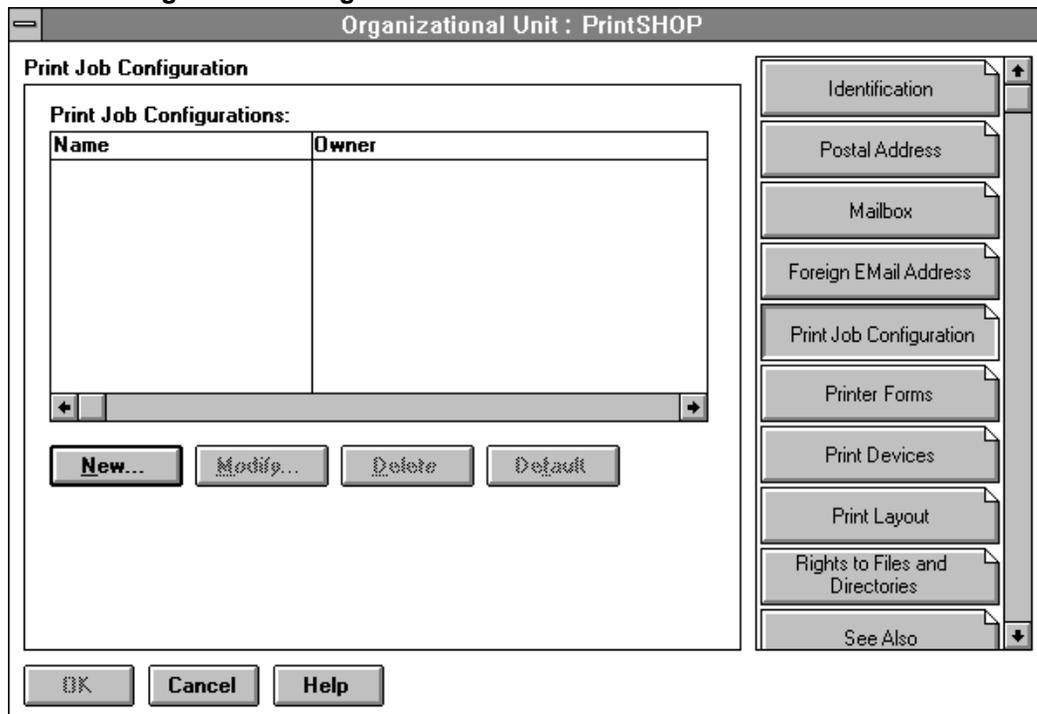
Creating Print Job Configurations

Procedure

1. Choose the **Print Job Configuration page of a User: <name>, Organization or Organizational Unit dialog**.

The Print Job Configuration dialog appears, similar to the following figure.

Figure 3-19
Print Job Configuration Dialog



- ◆ **Name** Lists the names of the print job configurations that can be used. Print job configurations that were defined in any Organization or Organizational Unit above this object are included in this list.
- ◆ **Owner** Lists the object where each configurations was defined.
- ◆ **New** Opens the Print Job Configuration page, where you can enter a name and parameters for a new print job configuration.
- ◆ **Modify** Opens the Print Job Configuration page for a highlighted print job configuration, where you can view and modify the parameters of the configuration.
- ◆ **Delete** Removes the selected print job configuration from the list. It can no longer be used.
- ◆ **Default** Marks the selected print job configuration as the default configuration, as noted by the printer icon.
- ◆ **OK** Saves changes in all pages of this dialog.
- ◆ **Cancel** Closes this dialog without saving changes in any page.

2. **Select New.**

The Print Job Configuration page appears, similar to Figure 3-20 on page 78.

Figure 3-20
Print Job Configuration Page

The screenshot shows a 'Print Job Configuration' dialog box with the following fields and options:

- Print Job Name:** [Text box]
- Form Name:** [Text box with dropdown arrow]
- Number of Copies:** [Text box containing '1']
- File Contents:** [Text box containing 'Byte Stream' with dropdown arrow]
- Tab Size:** [Text box containing '8']
- Local Printer:** [Text box containing 'lpt1' with dropdown arrow]
- Printer/Queue:** [Text box with printer icon]
- Device:** [Text box with dropdown arrow]
- Mode:** [Text box with dropdown arrow]
- Form Feed:**
- Print Banner:**
- Notify When Done:**
- Enable Timeout:**
- Timeout Count:** [Text box containing '5']

Buttons at the bottom: **OK**, **Cancel**, **Help**

3. Select and complete the fields appearing on this page.

The following fields are on this page:

- ◆ **Print Job Name** Lists the name of this print job configuration (as listed in the Job Configuration list box) that you specify to be used for a printing job. This field cannot be changed when you modify other fields later.
- ◆ **Number of Copies** Indicates how many copies of the file to print. The number of copies can range from 1 to 65,000.
- ◆ **File Contents** Allows you to choose either Text or Byte stream (the default).

Choose Text when you want tabs to be converted to spaces. Also choose Text to print ASCII text.

Choose Byte stream if you are printing from within an application and you want the application to handle the formatting commands. Also choose Byte stream if you will be downloading fonts on a laser printer.

- ◆ **Tab Size** Specifies the width in characters that each tab character should be expanded to. This field is only available if you select Text in File contents.
- ◆ **Form Feed** Determines whether a form feed is sent when a job is completed.
- ◆ **Notify When Done** Determines whether a message is sent to the workstation of the print job originator when the job has finished printing.
- ◆ **Local Printer** Specifies which of your computer's parallel ports will be captured. The values listed are LPT1 through LPT9.
- ◆ **Auto end cap** Determines if the CAPTURE command automatically ends when a print job is completed.
- ◆ **Printer/Queue** Allows you to select the Printer or Queue object that the print job configuration should use. The Select Object dialog appears when the browser button is selected.
- ◆ **Device** Allows you to select which print device definition this print job configuration uses.
- ◆ **Mode** Allows you to select the mode this print job configuration uses. The modes listed are defined by the device definition you selected.
- ◆ **Form Name** Allows you to select which printer form this print job configuration uses.
- ◆ **Print Banner** Determines if this print job configuration includes a banner page at the beginning of each print job. If this check box is selected, the next two fields are available.
- ◆ **Name** Identifies the user who sent this print job. This is only valid if a banner page is printed.
- ◆ **Banner Name** Indicates the name of the print job. This is only valid if a banner page is printed.
- ◆ **Enable timeout** Determines if each print job will time out after a specified period of time. If this is selected, Timeout Count can be set.
- ◆ **Timeout Count** Shows the number of seconds that must pass without data being sent to the queue before the print job

is closed. You must select Enable timeout to enter a value here. Timeout can range from 1 to 1000 seconds.

4. Choose OK.

The NET.CFG file now includes a network PRINTERS=<number> option that you may specify if you choose. This option allows you to specify the number of logical ports (0-9) you would like to be able to capture. The default is 3. If you specify a print job configuration that has a complex printer mode, you may need to increase the bytes (default 64, range 0 to 255) in the PRINTER HEADER=*number* option.

See your Novell Client documentation and Chapter 8, “Creating and Managing Print Job Configurations,” on page 197 for more information.

Viewing or Modifying Print Job Configurations

The Print Job Configuration page lists the names of different print job configurations you can use. You can add new job configurations or modify the parameters of existing configurations.

Procedure

- 1. Choose the Print Job Configuration page of a user Organization or Organizational Unit dialog.**

The Print Job Configuration page appears.

- 2. Select the name of the print job configuration you wish to modify.**

The Print Job Configuration page appears.

- 3. Follow the procedures described in the previous section, “Creating Print Job Configurations” on page 76 starting at Step 3.**

- 4. To delete a configuration, choose the Delete option.**

Selecting a Default Print Job Configuration

You can select a default print job configuration from the Print Job Configuration page to have your most frequently used print job configuration automatically used in CAPTURE and NPRINT.

The default configuration is identified by a printer icon in the margin to left of the print job.

Use the following procedure to change to a new default print job configuration.

Procedure

1. **Select the print job configuration that you want to make the default configuration from the Print Job Configurations list box.**
2. **Choose Default.**

The printer icon to the left of the configuration names moves to the selected configuration. That configuration is now the default.

Working with Printer Forms

Printer forms affect the order in which the print server processes print jobs.

Printer forms include information about the length and width of different types of paper used in your printer. You can designate printer forms to prevent your print jobs from printing on the wrong paper. The print server operator is notified when a form change is needed. Printer forms are configured in PRINTDEF or NetWare Administrator.

When a print job requests a printer form other than the form currently mounted in the printer, the print server does not service the job until a print server operator reports that the new form is mounted. A print server operator can use PCONSOLE, PSC, or NetWare Administrator to mount the new form.

Printer form names must begin with an alphabetic character and can have up to 12 alpha-numeric characters. Numbers can range from 0 to

255. Length can range from 1 to 255. Width can range from 1 to 999. These numbers are for your reference only.

Note: Printer forms are stored in the Directory Services database. In bindery mode, printer forms are stored in a file named PRINTDEF.DAT in SYS:PUBLIC.

Creating Printer Forms

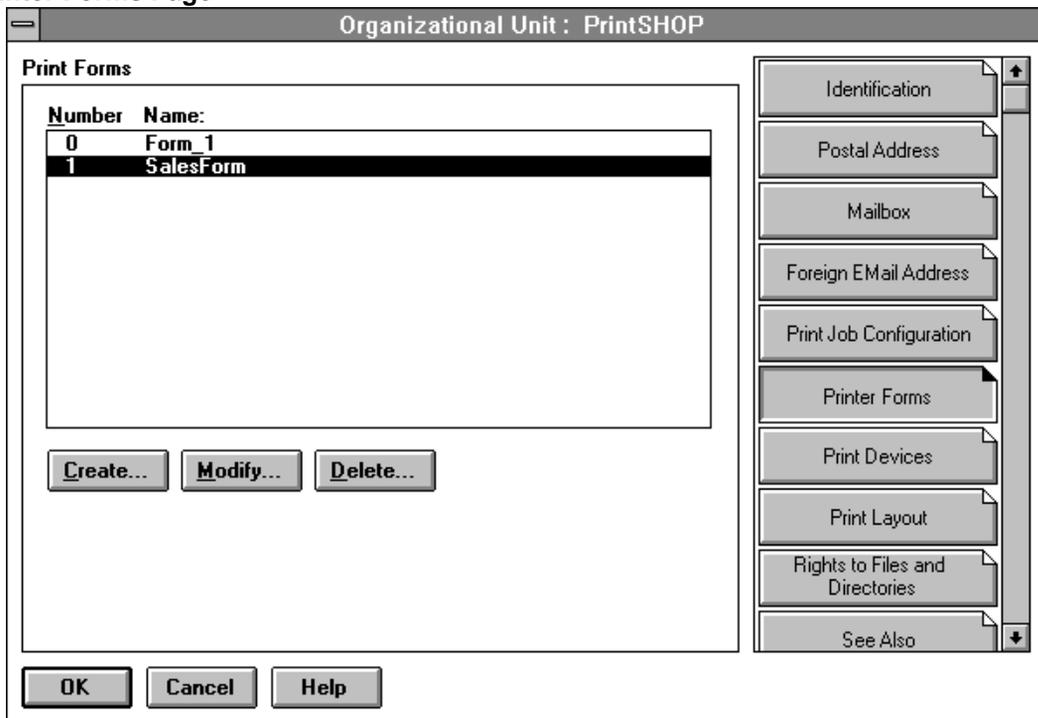
To create a printer form, use the following procedure:

Procedure

1. From the browser's Object menu, select a container object and then choose Details.
2. At the Object dialog, press the Printer Forms page.

The Printer Forms page appears, similar to the following figure.

Figure 3-21
Printer Forms Page



3. Choose Create.

The Create New Form dialog appears.

4. Enter a name for the form in the Name field.

The name must begin with a letter and must be unique. It can be up to 12 characters long. Spaces are converted to underscores (_).

5. Enter a number from 0 to 255 for the form in the Number field.

6. Enter a number from 1 to 255 for the form in the Length field.

This is the length of the printer form you are defining, measured in lines of text.

7. Enter a number from 1 to 999 in the Width field.

This is the width of the printer form you are defining, measured in characters.

8. Choose OK.

A printer form with the name that you entered is listed in the Printer Forms: list box.

The width field of the printer form is for information only. The length field is primarily for information only, also, but the information is also used by the rewind function for the printer. The primary functionality forms provide is to notify the operator when a different form is required (that is, different paper should be loaded in the printer).

Mounting Printer Forms

Printer forms can be designated in an effort to prevent your printer from printing a print job on the wrong paper. When the print server detects a print job in the queue, and that print job calls for a form different from the one currently mounted in the intended printer, the print job will not be serviced until a new form is mounted. Each printer form has a unique name and number.

Mounting a printer form consists of two elements:

- ◆ **Changing the paper** NetWare has no way of determining whether the paper was actually changed or not. It relies on information it receives from the operator.

- ◆ **Mounting the form through the software** This is the information that NetWare receives from the operator and that is required in order for printing to continue.

To mount a printer form, you need the following prerequisites:

- ◆ The print server must be loaded and accessible.
- ◆ The printer must be installed, assigned to the print server, and connected.
- ◆ A queue must be created and assigned to the printer.
- ◆ At least one printer form must have been created.

To mount a printer form with NetWare Administrator, use the following procedure.

Procedure

1. **From the browser, select the Details dialog for the printer you want to configure by double-clicking on the printer object.**

The printer Identification page appears.

2. **Select Printer Status.**

The Printer Status page appears similar to that shown in Figure 3-14 on page 60 .

If Printer Status does not appear, the printer is not connected.

3. **Select Mount Form.**

The Mount Form window appears. A list of existing forms appears in the Defined Forms field.

4. **Select the form you want to mount.**

The form number appears in the box below.

5. **Select OK.**

You can also mount printer forms from PCONSOLE or at the print server console. See “Mounting Printer Forms” on page 115 (PCONSOLE) or “Viewing a List of Forms” on page 224 (PSERVER).

Viewing or Modifying Printer Forms

Procedure

1. **From the browser's Object menu, select a container object and then choose Details.**

2. **At the Object dialog, press the Printer Forms page.**

The Printer Forms page appears, listing all current forms in that container.

3. **Highlight the form you wish to modify and select Modify.**

The Modify Printer Form dialog appears. The values for the printer form that you selected appear in the fields of the dialog. You can change any of the fields.

4. **(Optional) Enter a new name in the Name field.**

The name must begin with a letter, and must be unique. It can be up to 12 characters long. Spaces are converted to underscores (_).

5. **(Optional) Enter a number from 0 to 255 in the Number field.**

6. **(Optional) Enter a number from 1 to 255 in the Length field.**

This is the length of the printer form you are redefining, measured in lines of text.

7. **(Optional) Enter a number from 1 to 999 in the Width field.**

This is the width of the printer form, measured in characters.

8. **Choose OK.**

The form is now modified. You do not have to choose OK in the object dialog to complete the action.

You return to the Printer Forms list. The printer form that you selected in Step 1 is still selected. It may appear with a different name if you changed the Name field in Step 2.

Deleting Printer Forms

Procedure

1. **Select a printer form from the Printer Forms list box.**
2. **Choose Delete.**

The Delete Printer Form dialog appears. The values for the printer form that you selected appear in the fields, but are grayed. You can see what values you are deleting as part of this printer form, but you cannot change them here.

3. **Choose OK.**

You return to the Printer Forms list box. The printer form that you selected is deleted from the list of printer forms. You do not have to choose OK in the object dialog to complete the action.

The Delete operation cannot be undone. You must Add a new printer form with the deleted values.

Working with Print Device Definitions

If your application does not have the print driver for your printer, NetWare supplies print device definitions for many common printers.

Purpose of Print Device Definitions

Print device definitions are sets of functions and modes found in files with .PDF extensions that correspond to printers, plotters, and other peripherals.

The major functions of these definitions is to ensure that the job is printed properly and that the printer is left in a known state after completing a print job.

Printer functions (also referred to as *control sequences*, *escape sequences* or *printer commands*) give instructions to the printer. Print device definitions contain the necessary control sequences for such items as boldface type, underlining, rest, and other printer controls.

To define a printer's functions, you enter control sequences or printer commands into the print device database. To do this, you need the technical reference manual that came with your printer.

Print device definitions do not necessarily represent the full functionality of the printer. A print device definition can be modified to change the functions the machine will actually perform.

Note: Print device definitions are used by print job configurations. You must create and use a print job configuration to specify a print device mode for print jobs. See "Working with Print Job Configurations" on page 76.

To see the print device definitions included in NetWare, change to the SYS:PUBLIC directory and type

```
NDIR *.pdf <Enter>
```

Creating Print Device Definitions

If your printers are not included among the definitions provided with your application or with NetWare, you need to create your own definitions consisting of functions and modes for each printer you will be using.

You can use the Print Devices page for the Organization or Organizational Unit dialog to create a new print device definition. The correct escape sequences are normally found in your printer's documentation.

Procedure

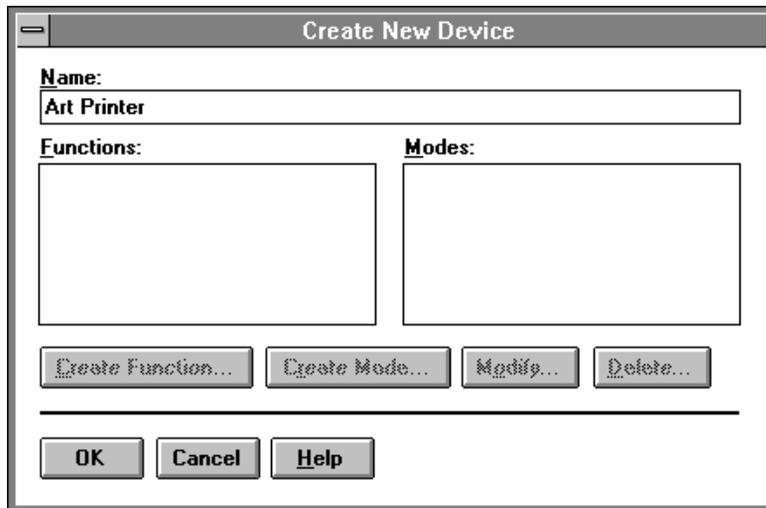
1. **From the browser's Object menu for the Organization or Organizational unit, choose Details.**
2. **At the Object dialog, select the Print Devices page.**

The Print Devices page appears.

3. **Choose Create.**

The Create New Device window appears similar to Figure 3-22 on page 88.

Figure 3-22
Create New Device Window



4. Enter a device name in the Name field.

You can use up to 32 characters. The name must begin with alphabetic character. Spaces are allowed in the name.

5. Choose OK.

The name of the print device you entered is added to the list. You will need to use Modify to define functions and modes for this print device before using it.

Viewing or Modifying Print Device Definitions

The following procedure is used to modify an existing print device definition that was previously created. You can add, change, or delete the existing functions and modes that are defined for this print device.

You can also change the name of the print device, and the name of any of the print device's functions or modes.

A *function* is an action that the printer can perform, such as creating bold text or using proportional spacing.

A *mode* is a combination of functions that you define to prepare the printer for specific printing needs. For example, you might define a

print mode called Title that includes functions for bold, double-wide, and letter-quality printing.

Procedure

1. From the browser's Object menu for the Organization or Organizational unit, choose Details.

2. At the Object dialog, select the Print Devices page.

The Print Devices page appears. A list of existing print device definitions is displayed in the Name field.

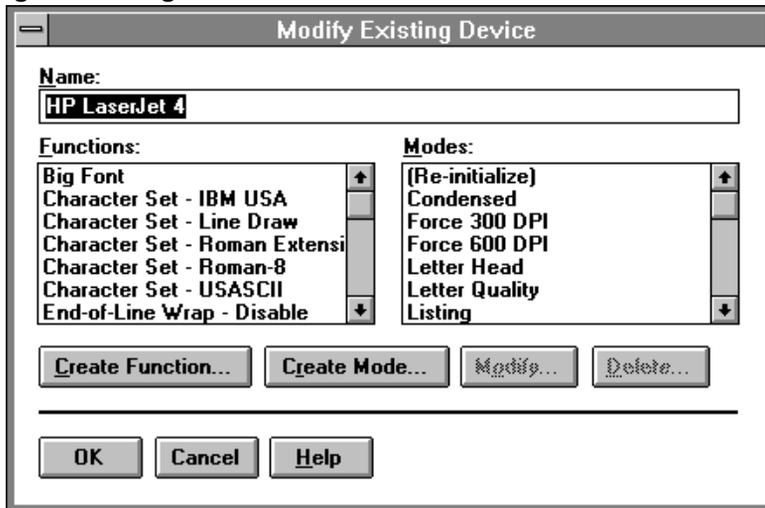
3. Highlight the print device definition you want to modify.

4. Select Modify.

The Modify Existing Device page appears similar to the following figure.

Figure 3-23

Modify Existing Device Page



5. Complete the fields and options as needed:

- ◆ **Name** Shows the name of this print device.
- ◆ **Functions** Shows the functions that have been entered for this print device. These include all of the capabilities of this print device, such as compressed or letter-quality printing.
- ◆ **Modes** Shows the modes that have been entered for this print device. A mode is a combination of functions that you define to serve a specific printing need.
- ◆ **Create Function** Allows you to add a function to the Functions list. See “Creating or Modifying Print Device Functions” on page 90.
- ◆ **Create Mode** Allows you to define a new mode and add it to the Modes list.
- ◆ **Modify** Allows you to change the selected mode or function by adding or removing functions or control sequences, respectively, from its definition.
- ◆ **Delete** Deletes the selected mode or function. The functions that were a part of a selected mode are not affected; they are still part of the print device definition.

6. Make the desired changes and select OK.

Creating or Modifying Print Device Functions

This feature allows you to enter a name and the necessary control sequences to define or modify a print device function. The necessary control sequences (also called control codes or escape sequences) are described in the operator's manual of your printer.

A function is an action that the print device can perform, such as bold text or proportional spacing. You cause the print device to perform the function by sending control codes to the print device.

When you select the Create Function page of the Modify Print Device dialog, the name of the print device is at the top of the page.

Procedure

- 1. Enter a name for the function you wish to modify or create in the Function Name field.**

You can use any name that you want to, but you should choose names that represent the printer's actions. Function names must be unique (no two names can be the same) and no longer than 32 characters. Function names are not case sensitive. You can use both letters and numbers.

For detailed information on naming and defining print device functions, use [onlineHelp](#).

- 2. Enter the characters used by this printer as a control sequence to engage this function.**

If a character in the control sequence has an ASCII value less than 33 or equal to 127, the character is displayed as a delimited acronym, as listed below. If the character's ASCII value is greater than 127, it is displayed as a delimited ASCII value. The value is a decimal number.

The space character can be entered as a space or as a delimited token. A space is displayed as a delimited token.

Except for delimited tokens, characters in a function follow the used as is rule. This means that the characters you see displayed are the actual characters that make up the function.

Detailed information on creating and modifying functions can be found in [Help](#).

- 3. Choose OK.**

You return to the Modify Existing Device dialog. The function that you entered is listed in the Functions list.

Importing Print Device Definitions

The print device definition Import feature allows you to import a definition for a new print device into the device database so that can be used by objects in this container. A definition consists of a name, functions, and modes.

With NetWare, Novell ships a set of commonly used .PDF files, which are found in the SYS:PUBLIC directory. In order to use these definitions in your job configurations, they must be imported.

Import allows you to use an existing definition without re-entering all of the functions and modes. You may import a definition that was provided with NetWare or that was created for another container.

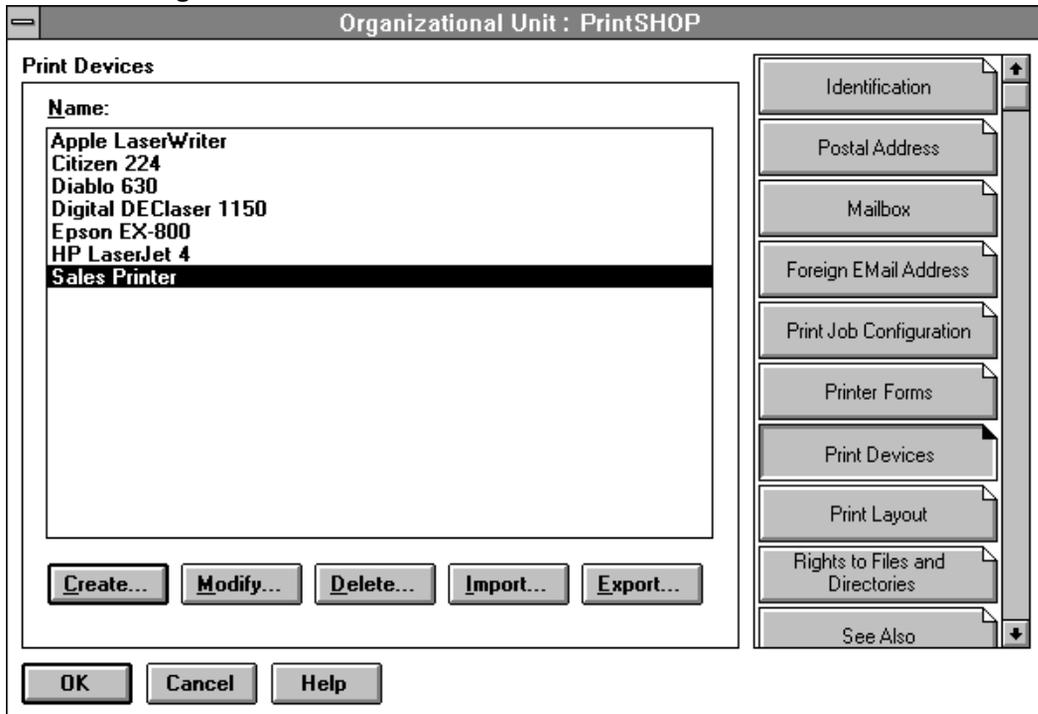
You can import a print device definition by using the following procedure.

Procedure

1. From the browser's Object menu for the Organization or Organizational unit, choose Details.
2. At the Object dialog, select the Print Devices page.

The Print Devices page appears, similar to the following figure.

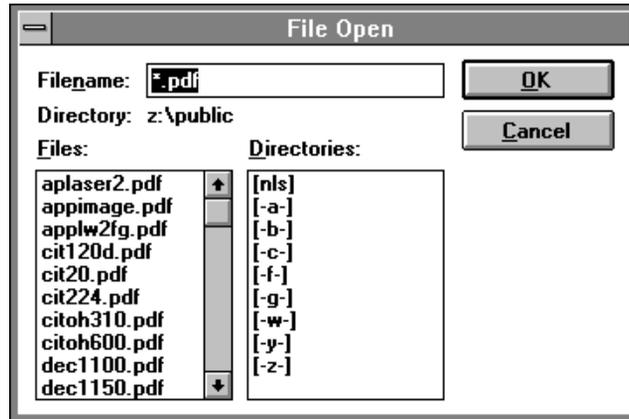
Figure 3-24
Print Devices Page



3. Choose Import.

The print device definition File Open dialog, similar to the following figure, appears with a list of print device definitions (.PDF files) available in your current directory.

Figure 3-25
File Open Dialog



4. Use the Files selection list to locate the file for the print device definition that you want to import.

The file extension .PDF is used for print device definition files.

5. Select the filename that corresponds to the printer you want to import into the device database, and then press OK.

The print device definition is added to the Print Devices list box, and the definition contained in the file can now be used by objects in this container.

Exporting Print Device Definitions

This feature allows you to export a definition for a print device from a database in one container so that it can be imported for use in databases in other containers without re-entering all functions and modes.

Use the following procedure to export a print device definition.

Procedure

1. **Select a print device definition from the Print Devices window.**
2. **Choose Export.**

The File Save As window appears.

3. **Find the directory where you want to create a file containing this print device definition.**

The file extension .PDF is used for print device definition files.

The name of the print device is used as the filename when you export a definition. All spaces are removed and the first eight characters of the print device are used.

4. **Choose OK.**

The print device definition is saved with the same filename as the definition that is listed. All functions and modes are included in the definition.

The definition can now be imported to a database in another container.

Working with Print Device Modes

After you define the functions for a print device definition, you can combine these functions into modes.

A mode is a combination of functions that you define to allow the print device to meet specific printing needs.

For example, you could create a Final Printout mode for the HP LaserJet that would include the functions for 10 cpi, Emphasized printing, and Near-letter quality printing.

As a network supervisor, you must determine what your printing needs are and then define the modes you will need.

Important: In most printers, the order of the functions is important. See your printer's documentation for more details.

Creating Print Device Modes

Use the following procedure to create a new mode.

Procedure

- 1. From the Modify Existing Device page, select Create Mode.**

The Create New Mode page appears.

- 2. Enter a name for the new mode in the Mode Name field.**

You can choose any 8-character name that begins with a letter. You should use names that reflect the purpose of the print device mode.

For example, you might have modes for different types of documents like memos or reports, or for different user's preferred settings, or for the requirements of different papers or forms that you use.

- 3. Select the function that you want to be executed first from the Device Functions list; then choose Add Below.**

- 4. Select the function that you want to be executed next from the Device Functions list; then select Add Below.**

You can select the same function more than once if the mode requires it.

- 5. Repeat Step 4 until all of the functions that you want as part of this mode are listed in the correct order in the Mode Functions list box.**

If you make a mistake, use Delete or Add Above to rearrange the functions listed in Mode Functions.

- 6. Choose OK.**

You return to the Modify Existing Device dialog.

Viewing or Modifying Print Device Modes

This feature allows you to modify a print device mode that you previously entered.

You can change the name of the mode or change the functions executed from this mode.

A mode is a combination of functions that you define to allow the print device to meet specific printing needs. For example, you might define a print device mode called Title that includes functions for bold, double wide, and letter-quality printing.

Use the following procedure to modify an existing print device mode.

Procedure

1. **From the Modify Existing Device dialog, select the mode you want to modify and choose Modify.**
2. **(Optional) Enter a new name for the mode in the Mode Name field.**
3. **Select the function that you want to add to the mode from the Device Functions list.**
4. **Select the function in the Mode Functions list next to where you want to insert the new function.**
5. **Choose Add Below or Add Above to insert the selected device function in the correct place in the Mode Functions list.**
6. **(Optional) Select any mode function that you want to delete from the definition of this mode; then choose Delete.**

The selected function is no longer part of this mode. The function is still a part of this print device definition, but is not used for this mode.

7. **Repeat Steps 2 through 5 as needed.**
8. **Choose OK.**

You return to the Modify Print Device dialog.

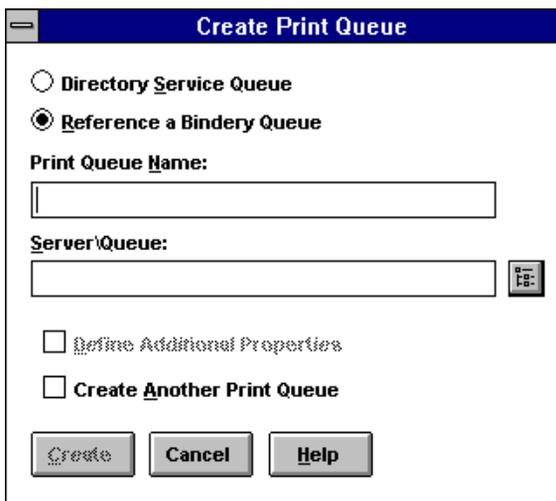
Referencing Bindery Queues

The following procedure lets you reference a bindery queue and add it to your list of print queues available for printing.

Procedure

1. **At the Create Print Queue screen, shown in the following figure, select Reference a Bindery Queue.**

Notice that the screen changes when this option is selected.

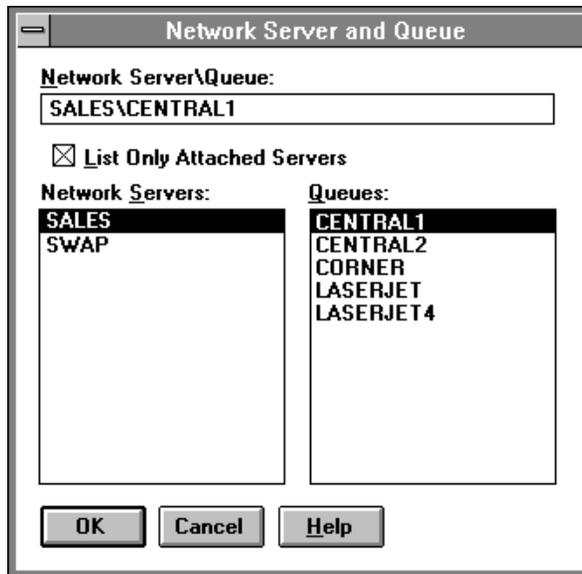


2. **(Optional) If you want to assign a bindery reference queue name different from the queue's name on the NetWare 3 server, enter the reference name into the Print Queue Name field.**

If you do not want to assign a reference name, leave the field blank.

3. **Click on the browser button to select a bindery server and queue.**

The Network Server and Queue window appears, similar to the following figure.



- ◆ **Network Server\Queue** Displays the queue that will appear in the directory tree and the queue's bindery server.
- ◆ **List Only Attached Servers** Allows you to limit the list of bindery servers to only those you are currently attached to or expand the list to all bindery servers in the network. If your network is large, building a list of all servers can take some time.
- ◆ **Network Servers** Lists servers outside of your Directory tree from which you may want to access queues.
- ◆ **Queues** Lists queues available on the server highlighted in the Network Servers list.

4. Select List Only Attached Servers to select whether you want this option turned on or off.

To see a list of all available servers, turn off this option. Select the name of the server you want to attach to. Log in to this server at the prompt.

5. At the list of print queues that appears, select the queue you want to reference.

If no queue names appear, no queues have been defined on that server. Select OK.

6. At the Create Print Queue dialog, select Create.

4 **Managing Print Services Using PCONSOLE**

This chapter explains how to set up and administer print services with the PCONSOLE utility.

The graphical NetWare[®] Administrator utility provides similar functionality to that provided in PCONSOLE. See Chapter 3, “Managing Print Services with the NetWare Administrator Utility,” on page 29.

New PCONSOLE Features for NetWare 4

Quick Setup Feature

The Print Services Quick Setup option in NetWare Administrator and the Quick Setup option in PCONSOLE both provide simple ways to get a printing setup.

Integrated Setup

You are now able to use PCONSOLE to configure Macintosh and UNIX printers. Before, a separate utility was required to do that.

Simplified Navigation

In PCONSOLE for NetWare 4[™] software, the same functionality can be accessed from multiple menus.

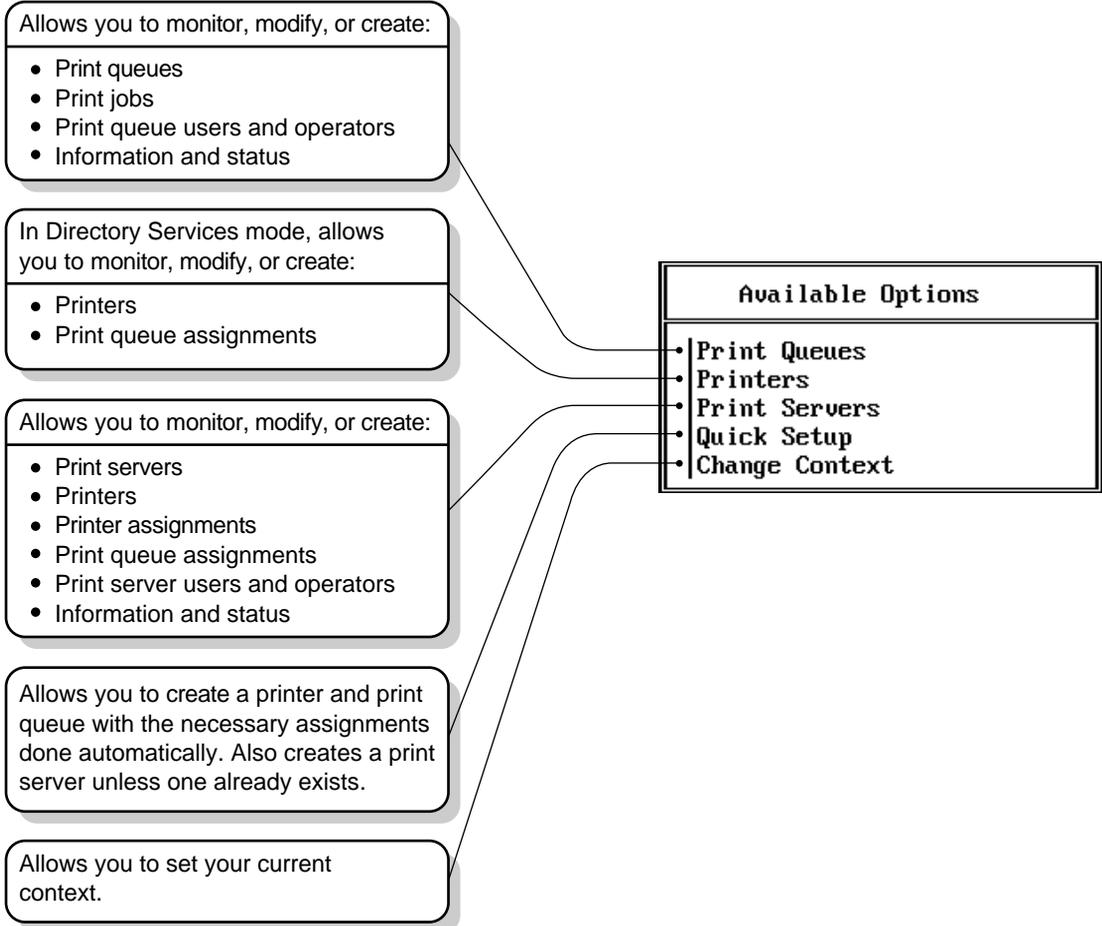
For example, when you select a printer and bring up a list of queues to add to it, if the queue that you want hasn't been created yet, you can create it from there.

Printing Tasks Handled through PCONSOLE

The following figure lists the administrative tasks you can perform with PCONSOLE.

Figure 4-1

PCONSOLE Tasks



Note: You must be running in Directory Services mode to make use of the full functionality of PCONSOLE.

Table 4-1

Navigation Procedures for Common PCONSOLE Tasks

Task	Procedure
Audit printing.	"Adding, Changing, and Removing Print Server Passwords" on page 119
Changing your printer type.	"Creating or Modifying Printers" on page 102
Create a print queue, printer, and print queue with all of the necessary assignments done automatically.	"Setting Up NetWare Print Services" on page 18
Create or modify a print queue.	"Print Queue Options" on page 105
Create or configure a printer.	"Creating or Modifying Printers" on page 102
Create or modify a print server.	"Creating or Modifying Print Servers" on page 104
Create, modify, or view print jobs.	"Creating or Manipulating Print Jobs" on page 105
Print a file already formatted for the printer (ASCII or otherwise).	<ol style="list-style-type: none"> 1. From PCONSOLE `s Available Options menu, choose a print queue under Print Queues, and then choose the Print Jobs option. 2. Press <Insert> and follow the instructions in the information lines. 3. When you are finished with the screen New Print Job to be Submitted, press <F10> or <Escape> and choose Yes to save changes and print.
View printer status.	"Viewing or Modifying a Printer's Status" on page 110
View print server status.	"Viewing a Print Server's Status" on page 117
View version information for this utility. Also view the names and version number of all files required to run this utility.	Type <code>PCONSOLE /VER</code> <Enter>.

Modifying NetWare Print Services

After you have created your initial printing setup with Quick Setup, you will undoubtedly want to expand or modify that setup as your printing needs change.

Creating or Modifying Print Queues

This section describes how to use PCONSOLE to create or modify print queues. You can also perform this procedure with NetWare Administrator. See “Creating Print Queues” on page 40.

Procedure

1. **From PCONSOLE's main menu, select Print Queues.**

A list of print queues appears.

2. **To add a queue, press <Insert>. To change a name, highlight the name; then press <F3>.**

3. **To delete a queue, highlight the queue and press .**

4. **To (re)configure a queue, select the desired queue name.**

Changes can be made to users, operators, and print servers for the selected queue.

Keep in mind that queue users can submit jobs to that queue (via CAPTURE and NPRINT). Operators can manipulate all queue jobs.

Adding print server names to the list of Print Servers will authorize the servicing of remote print queues.

Creating or Modifying Printers

The following procedures explain how to use PCONSOLE to create a printer and match NetWare to your hardware configuration. You can also use NetWare Administrator to create and configure printers. See “Creating Printers” on page 43.

Procedure

1. **From PCONSOLE's main menu select the Printers option.**

The Printers list box appears.

- 1a. **To add a printer, press <Insert>.**
- 1b. **To delete a printer, press .**
- 1c. **To change a name, highlight the name then press <F3>.**
- 1d. **To (re)configure a printer, select the desired printer name.**

The fields most likely to need changes are Printer Type, Configuration, and Print Queues Assigned.

For new printers to work, all three of these fields must be properly set up.

2. **Select the printer to be configured.**

The Printer Configuration window appears.

3. **Select Printer Type; then select the type of printer you are using.**
4. **Select Configuration.**

The window for the printer type you selected appears.

5. **Complete the configuration fields on the screen.**

See “Configuring Printers” on page 108 for a table explaining each of these fields.

6. **Press <Esc> and select Yes to save your changes.**
7. **To assign a new printer, use PCONSOLE to associate it to a print server**
 - 7a. **Select the Print Servers option on PCONSOLE's main screen.**
 - 7b. **Select the desired print server name.**

- 7c. Select Printers; then press <Insert> and browse to the desired printer.**

If the desired printer has not yet been created, press <Insert> to create a new printer.

Creating or Modifying Print Servers

This section describes the procedure when using PCONSOLE. You can also perform this procedure with NetWare Administrator. See “Setting Up Print Services with NetWare Administrator” on page 39 and “Modifying NetWare Print Services” on page 102.

Procedure

- 1. From PCONSOLE's main menu, select Print Servers.**

A list of print servers appears.

- 1a. To add a print server, press <Insert>.**

- 1b. To delete a server, press .**

- 1c. To change a name, highlight the name; then press <F3>.**

Not all print server names will be valid Service Advertising Protocol (SAP) names. For example, SAP names may not exceed 47 characters, they cannot contain spaces, and they must be in all-caps. In addition, many double-byte characters used on certain code pages are not valid SAP characters. For more information, see “Service Advertising Protocol (SAP)” in *Concepts*.

- 1d. To (re)configure a print server, select the desired name.**

Changes can be made to operators, users, and properties for the selected print server.

- 2. To assign a printer to a print server, use the Print Servers option to select the desired print server name; then select Printers, press <Insert>, and browse to the desired printer.**

Keep in mind that print server users can read that print server's status and active configuration, but only operators can manipulate those items.

Print Queue Options

Assigning Queue Operator Flags

By selecting Status from the Print Queue Information menu, a print queue operator with appropriate rights can set flags that limit access to the selected print queue:

- ◆ **Allow users to submit print jobs** Allows queue users to submit print jobs to the queue if the option is set to Yes (the default).
- ◆ **Allow service by current print servers** Allows assigned print servers to service print jobs in the queue if the option is set to Yes (the default).
- ◆ **Allow new print servers to attach** Allows print servers to attach to the queue if the option is set to Yes (the default).

Creating or Manipulating Print Jobs

NPRINT, CAPTURE, NETUSER, and PCONSOLE can be used to create print jobs. Print jobs also may be manipulated using PCONSOLE and NETUSER. The following procedure can be used with PCONSOLE.

Procedure

1. **From PCONSOLE's Available Options menu, select Print Queues.**
2. **Select the queue in which the job resides or is to be submitted; then select Print Jobs.**

This brings up a screen which lists the print jobs in the queue.

3. **To submit a file for printing from this screen,**
 - 3a. **Press <Insert>.**
 - 3b. **Enter the directory path to the desired file (or press <Insert> again to browse).**
 - 3c. **Select the desired file and press <Enter>.**

The Print Job Information screen appears.

3d. Modify the configuration parameters as desired. Then press <Esc>.

See Table 4-2 on page 106 for information on each of these parameters.

4. To change an existing print job's configuration from the Print Jobs screen, select the job and alter its configuration parameters as desired.

See Table 4-2 on page 106 for information on each of these parameters.

5. To delete a print job from the Print Jobs list, press .

Setting Print Job Parameters

You can change or set the following parameters for print jobs. Many of these parameters are also command line options for NPRINT and CAPTURE.

**Table 4-2
Print Job Parameters in PCONSOLE**

Parameter	Description
Print job	The ID number of the job to be printed.
Client	The name and station number of the object that submitted or is submitting the job.
Description	You can enter a description of the file you are printing for identification purposes. The default is the filename.
Status	The status of the print job.
User hold	You can put your print job on hold. If you do, the file is not printed until you remove the hold. The User Hold parameter can be changed by either the owner of the print job (the person who submitted it) or a print queue operator. Type Y (for Yes) to place a hold on the job; type N (for No) to remove the User Hold parameter.
Operator hold	The Operator Hold parameter can be changed only by a print queue operator. If the Operator Hold parameter is set to Yes, the job is not printed until the operator resets the parameter to No.

Parameter	Description
Service sequence	If you are a print queue operator, you can change the Service sequence parameter. The service sequence is the position of the print job in the print queue.
Number of copies	You can choose the number of copies you want printed.
File contents	<p>You can choose either Text or Byte stream (the default).</p> <p>Choose Text when you want tabs to be converted to spaces. Also choose Text to print ASCII text.</p> <p>Choose Byte stream if you are printing from within an application and you want the application to handle the formatting commands. Also choose Byte stream if you will be downloading fonts on a laser printer.</p>
Tab size	If you chose Text (from the File Contents menu), use the Tab Size field to specify the number of spaces you want the tabs in your file set to. Default is 8 spaces.
Form feed	<p>If you want the printer to advance to the top of the next page after your print job, choose Yes. If you <i>don't</i> want the printer to advance to the top of the next page, choose No.</p> <p>Some applications have a form feed at the end of the file, so adding another causes an extra blank page to be fed through.</p>
Notify when done	If you select Yes, you will receive a screen message telling you when the job has printed.
Form	You can choose the form number or form name you want the job printed on. (Form names are defined in PRINTDEF.)
Print banner	If you want a banner page printed before the file, choose Yes. If not, choose No. Default is Yes.
Name	If you choose to print a banner page, you can enter text up to 12 characters long in the Name field. It is printed in the first large print area of the banner. The default is your username.
Banner name	The default is the filename of the print job, but it can be another name you specify.
Defer printing	If you want the job to be printed as soon as possible, choose No. If you want to print the job later, choose Yes. If you choose Yes, you can enter a target date and time for printing. (See the following explanations for Target date and Target time)

Parameter	Description
Target date	Enter the date you want your job printed on. (You can set this option only if you chose Yes for Defer Printing.)
Target time	Set the time at which you want your job printed. (You can set this option only if you chose Yes for Defer Printing.) The job entry date and time, print job number, file size, and client name cannot be changed.

Hint: If extra (blank) pages are coming out at the end of print jobs, the extra form feed should have been suppressed for those jobs. If the final page of a job requires a form feed to be pressed at the printer or is tacked on to the start of the next job, the form feed should have been specified in the job configuration. A job will not start until any defer date and time have been satisfied and any operator and user holds have been removed. The owner of a job can set and remove a user hold, but only a queue operator can set or remove an operator hold.

Printer Options

Configuring Printers

The following table lists the parameters for configuring a printer from PCONSOLE.

Table 4-3
Printer Configuration Parameters in PCONSOLE

Parameter	Options	Description
Print server	NA	The print server the printer is assigned to. If no print server is assigned, the field will say (None).
Printer number	NA	The logical number assigned to the printer (0-254).
Printer status	NA	Indicates whether the printer is printing, paused, stopped, or waiting for a job.

Parameter	Options	Description
Printer type	Parallel, Serial, UNIX, AppleTalk, Other/Unknown, XNP, or AIO	You must select one of the listed types of printers. When the Other/Unknown option is used, the print server is provided with information about the printer when you run NPRINT. This allows you to set up a printing slot for a printer without specifying which port the printer is attached to.
Configuration	The options shown below are for parallel printers. For information pertaining to other printer types, use Help.	This option takes you to a screen listing configuration options for the type of printer you have selected. For example, the configuration options for a parallel printer are listed here. Options for other printer types are available in online Help.
	Port	LPT1, LPT2, LPT3. This specifies the port to which the parallel printer is cabled (workstation or server). Default is LPT1.
	Location	Manual Load (remote) or Auto Load (Local). Only printers cabled directly to the print server can autoloading. The default is Auto Load (Local).
	Interrupt	Lists available interrupt settings along with None (polled mode). Polled mode is the default in NetWare 4. Interrupts are used to signal the processor of some event that needs attention. Most devices in the computer are configured to use a particular interrupt. You should have recorded the interrupts your printing ports use. Polled mode eliminates the potential for interrupt conflicts and is the recommended option.
	Address restriction	If you have selected the Manual Load option, allows you to set address restrictions for a remote printer so that it can be loaded only on a specified workstation or network. Default is No.
	Network address	Lists the address of the network the printer can be loaded on. Default is all.
	Node address	Lists the address of the workstation or server (node) the printer can be loaded on. Default is all.

Parameter	Options	Description
Starting form	0-254	Indicates the form that the printer will use most often.
Buffer size in KB	3KB-20KB	Indicates the size of the buffer to be used with this printer. The buffer size directly affects the amount of memory used by NPRINT and PSERVER. The default is 3KB. Range is 3KB through 20KB.
Banner type	Text or PostScript	Indicates the mode to be used for printing banner pages. The mode specified must match the default mode for your printer type.
Service mode for forms	Change forms as needed, Minimize form changes within print queues, Service only currently mounted form, Minimize form changes across print queues	Determines the mode in which multiple print jobs in a queue will be serviced by the printer based on their forms.
Sampling interval	Default: 5 seconds	Specifies the interval, in seconds, at which the print server will look for print jobs in the print queue. Values from 1 to 255 are allowed.
Print queues assigned	NA	Lists the print queues currently assigned to be serviced by the printer. To assign a queue to this printer, highlight this field and press <Enter>.
Notification	NA	Indicates the printing objects (including users) to be notified in case of printer problems.

Viewing or Modifying a Printer's Status

You must be an operator or user of a print server that services a printer to be able to see the printer's status.

Use the following procedure to view a printer's status.

Procedure

1. **From the Available Options menu, select Printers.**

The Printers window appears with a list of active printers.

2. Select the desired printer from the list.

The Printer <name> Configuration window appears.

3. Choose Printer Status: (See Form).

A Status window appears showing the various status elements for printers.

4. Modify the printer's status as needed.

Here are the status fields shown in the Status window:

- ◆ **Status** Shows the current status of this port driver and printer. Possible statuses include the following:

Not connected
Waiting for form
Out of paper
Printing job
Paused
Stopped
Off-line
Private
Printer is waiting for a print job
Running
Ready to go down

Note: The port driver (NPRINTER) status for a defined but unattached serial printer is Waiting for job even though the printer is not attached, and the printer status is Running. If a print job is put into the queue for this printer, the port driver status changes to Printing job but the printer status changes to Offline. Defined but unattached parallel printers show a status of Not connected.

- ◆ **Printer control** Introduces a window with the following options:

Pause printer Places the current print job on hold. Only a print queue operator can perform this action. The printer will remain idle until it receives a Start printer command.

Stop printer Stops the printer and returns the print job to the print queue. The printer will remain idle until it receives a Start printer command.

Start printer Changes the status of this print job from On hold to Active, which will start printing again if the correct form is mounted and the printer is active.

Form feed Causes the printer to advance to the top of the next page.

Mark top of form Causes a line of asterisks (*) to be printed across the page. This option is useful when you are trying to align the page on a printer.

Abort print job Allows you to cancel this print job and immediately stop printing.

Rewind printer Pauses the printer and sets the print job to start printing at the beginning after you start the printer.

- ◆ **Service mode** Determines how forms needed for print jobs affect the order in which the print server processes those jobs. Selecting this field displays the list of modes from which you can select.

Printer forms include information about the length and width of different types of paper used in your printer. You can designate printer forms to prevent your print jobs from printing on the wrong paper. The print server operator is notified when a form change is needed. Printer forms are configured in PRINTDEF.

When a print job requests a printer form other than the form currently mounted in the printer, the print server does not service the job until a print server operator reports that the new form is mounted. A print server operator can use PCONSOLE, PSC, or NetWare Administrator to mount the new form.

The following service mode options determine how often the print server requires you to change printer forms:

Change forms as needed

The priority of each print queue and the order of print jobs in the print queue determine which print job to service next. You might have to change forms often.

Minimize form changes within print queues

The print server requires you to mount a new form for a print job before servicing print jobs with the currently mounted form in a print queue with a lower priority.

Minimize form changes across print queues

The print server services all print jobs requiring the currently mounted form before requesting a form change. Print jobs in lower priority print queues that require the mounted form are serviced before print jobs in a high priority print queue that require a different form.

Service only currently mounted form

The print server never requests a form change. If no print job requiring the current form is available, nothing is printed.

- ◆ **Mounted form** Shows the number of the form that is currently mounted in the printer. Only print jobs that specify this printer form number can be printed until a new printer form is mounted with the Mount Form button.

The remaining fields include information about the print job currently being printed on this printer. Most of this information can only be changed by going to the print queue and selecting this print job from the list of jobs.

- ◆ **NetWare server** Indicates the server on which the print queue holding the job resides.
- ◆ **Print queue** Indicates the print queue from which this print job is being serviced.
- ◆ **Description** Indicates the name of the file being printed unless a different name was assigned to the job.
- ◆ **Print job number** Displays the print job ID.
- ◆ **Form** Shows which printer form this print job is using. This print job cannot be printed unless this Form matches the Mounted Form field above the Current Job Information.
- ◆ **Copies requested** Indicates the number of copies of this print job that the User who submitted it requested to be printed.
- ◆ **Finished** Indicates how many bytes of this copy have been printed.
- ◆ **Size of one copy** Indicates the size of each copy of this print job.
- ◆ **Percent complete** Indicates how much of this print job is completed, which is determined both by the size of one copy and the number of copies requested for this print job.

Changing Printer Type

You must be an operator or user of a print server that services a printer to be able to change the type of printer you are using.

Procedure

1. **From the Available Options menu, select Printers.**

The Printers window appears with a list of active printers.

2. **Select the desired printer from the list.**

The Printer *<name>* Configuration window appears.

3. **Choose Printer Type.**

A window appears showing the connection types available.

4. **Choose the correct printer type from the connection types listed.**

For printers that attach directly to the network, select type Other/Unknown. (For example, HP IIIsi or 4si, COMPAQ PageMarq 20, GENICOM 7170, or Talaris 1794 Printstation.)

5. **Modify the configuration for the type of printer you have selected.**

See “Configuring Printers” on page 108 for information on parameters for parallel printers. For detailed information on other printer types, use Help.

Assigning Multiple Print Queues and Printers

This section explains how to assign multiple print queues and printers on Novell Directory Services™ servers. You can use PCONSOLE to do the following:

- ◆ Assign multiple print queues to service a single printer
- ◆ Assign a single print queue to service multiple printers
- ◆ Assign multiple print queues to service multiple printers
- ◆ Assign printers to service print servers in available containers

Procedure

1. **From the Available Options menu, select Printers.**

The Printers window appears with a list of active printers.

2. **Select the first printer you want a queue assigned to, highlight Print queues assigned, and press <Enter>.**

A list of print queues currently assigned to this printer appears.

- ◆ To assign a print queue not appearing on this list to the printer, press <Ins> to browse, and select a print queue. Repeat for each print queue you want to assign to this printer.
- ◆ You can also choose another printer and assign the same print queues to it, if you wish.

3. **To assign a printer to a print server, choose a print server under Print Servers, highlight Printers, and press <Enter>.**

A list of printers currently assigned to this print server appears. Press <Insert> to browse and select a printer from available container objects.

You will need to unload and then load the print server before the printer configurations you have just assigned will take effect. See “Using PSERVER.NLM” on page 153.

Mounting Printer Forms

Printer forms can be designated in an effort to prevent your printer from printing a print job on the wrong paper. When the print server detects a print job in the queue, and that print job calls for a form different from the one currently mounted in the intended printer, the print job will not be serviced until a new form is mounted. Each printer form has a unique name and number.

Mounting a printer form consists of two elements:

- ◆ **Changing the paper** NetWare has no way of determining whether the paper was actually changed or not. It relies on information it receives from the operator.

- ◆ **Mounting the form through the software** This is the information that NetWare receives from the operator and that is required in order for printing to continue.

To mount a printer form, you need the following prerequisites:

- ◆ The print server must be loaded and accessible.
- ◆ The printer must be installed and assigned to the print server.
- ◆ A queue must be created and assigned to the printer.
- ◆ At least one print form must have been created.

For information on creating printer forms with PRINTDEF, see “Creating or Modifying Printer Forms” on page 222. For information on creating printer forms with NetWare Administrator, see “Creating Printer Forms” on page 82.

To mount a printer form with PCONSOLE, use the following procedure.

Procedure

1. **Enter PCONSOLE and choose a specific printer from the Printers option of the Available Options menu.**
2. **Highlight the Printer status field and press <Enter>.**
3. **Highlight the Mounted form field in the printer information screen and type the number of the form you wish the printer to service. Then press <Enter>.**

Print jobs using that form in the print queue will now print.

Printer forms also can be mounted in NetWare Administrator, at the print server console, and from the command line using PSC. Procedures for each method are described in Chapter 9, “Working With Print Device Definitions and Printer Forms,” on page 207.

Print Server Options

Viewing a Print Server's Status

To determine the status of a print server, use the following procedure.

Procedure

1. **From the Available Options menu, select Print Servers.**

The Print Servers window appears.

2. **Select the print server you want information about.**
3. **At the Print Server Information window, select Information and Status.**

The Information and Status window gives you information on the following:

- ◆ **Print server type** If it is not running, the type is shown as Unavailable. A print server running on a NetWare 4 file server is of type NetWare Loadable Module™. NetWare 3™ print servers might be either NetWare Loadable Module or Dedicated DOS types. NetWare 2 print servers might be NetWare Server VAP or Bridge VAP.
- ◆ **Print server version** The version of this print server.
- ◆ **Number of printers** The number of printers that are assigned to this print server.
- ◆ **Current server status** Can be one of the following. If the status is Running, you may select one of the other two options to bring down the print server.
 - Running** The print server is currently running.
 - Going down after current jobs** The print server finishes any print jobs currently in progress; then it goes down.
 - Down** The print server is going down; current print jobs are returned to their print queues.
- ◆ **Advertising name** The name the print server uses to advertise itself on the network. The default is the same name

as the Print Server object. If you want to change it, the new name must be from 2 through 47 characters in length, including spaces and underscores. It must be different from all other advertising print server names.

Changing a Print Queue's Priority

A print queue's priority determines whether the print server will send print jobs from that print queue to the printer before or after print jobs in other print queues assigned to the printer.

Use the following procedure to assign or modify a print queue's priority.

Procedure

- 1. From the Available Options menu, select Print Servers.**

A list of active print servers appears.

- 2. Select the print server servicing the queue you want to modify.**

The Print Server Information window appears.

- 3. Select Printers.**

A list of printers assigned to this print server appears.

- 4. Select the printer the queue is assigned to.**

The Printer name Configuration form appears.

- 5. Select Print queues assigned: (See List).**

The print queue list appears.

- 6. Highlight the queue you want to modify, and press <Enter>.**

- 7. From the Choose Desired Action window, select Change the priority of this print queue.**

- 8. Delete the current priority number and type in the new priority.**

Designating a New Default Print Queue

Use the following procedure to designate a default print queue.

Procedure

1. **From the Available Options menu, select Print Servers.**

A list of active print servers appears.

2. **Select the print server servicing the queue you want to modify.**

The Print Server Information window appears.

3. **Select Printers.**

4. **From the list, select the printer the queue is assigned to.**

The Printer name Configuration form appears.

5. **Select Print queues assigned: (See List).**

6. **Highlight the appropriate queue, and press <Enter>.**

7. **From the Choose Desired Action window, select Make this the default print queue.**

The default print queue will be used for print jobs that specify a printer but do not specify a print queue (for example, with the CAPTURE command).

Adding, Changing, and Removing Print Server Passwords

For added security, you can limit access to your print server by assigning a password to it. Use the following procedure to do this with PCONSOLE.

Procedure

1. **From the Available Options menu, select Print Servers.**

The Print Servers window appears.

2. Select the print server you want to modify.

The Print Server Information window appears.

3. Select Password.

4. At the prompt, type the new password you want to assign. Then retype it at the confirmation prompt.

Your new password is now in effect.

5. (Optional) To remove a password entirely, press <Enter> at the Enter new password prompt and the confirmation prompt.

Enabling and Viewing the Print Server Auditing Log

The PSERVER audit log provides information about all jobs that have been printed. Auditing records are retained as ASCII files so that they can be read with any text editor. The log can be viewed in PCONSOLE as well as NetWare Administrator.

Figure 4-2

Typical Entry in the Auditing Log

Printing Log
Printer: CN=printer1.0=Novell
client: CN=Admin.0=Novell
print job: SALES.RPT job id: 00704001 form: 00000
print queue: MKTNG/CN=RQ2.0=NOVELL
submitted: 3-16-94 4:47:29pm printed: 3-16-94 4:48:39pm
pages: 00000000 bytes: 00000262 duration: 000 minutes

In designing the auditing log, Novell has recognized that companies do accounting in a variety of ways. For this reason, the auditing log provides a basic default format based on ASCII and a fixed record length. Both characteristics are designed to make it as easy as possible

to write a customized program to retrieve the information it needs in a format determined by a particular company.

The auditing log is sufficiently flexible to record whatever information a printer sends to it. Regardless of printer type, the log will record how many bytes a job took to print, the user who submitted the job, when the job entered the print queue, when the job was printed, and what printer serviced the job.

If the printer is an XNP type used by Macintosh or UNIX, the log might also indicate how long it took to print the job, how many pages were printed, when the job was printed, and when the job was submitted.

To enable the auditing log from PCONSOLE, use the following procedure.

Procedure

- 1. From the Available Options menu, select Print Servers and select a print server.**

The Print Server Information screen appears.

- 2. Select Audit.**

At the Print Services Auditing menu, the following options are available:

- ◆ Configuration
- ◆ View Auditing Log
- ◆ Delete Auditing Log

- 3. Select Configuration.**

The Auditing Information screen appears.

- 4. Specify Yes in the Enable auditing field.**

If you enable auditing, the print server maintains a log of the operations it performs. If the print server is already running, it needs to be brought down and loaded again for this change to take effect.

If you do not enable auditing, the print server will not write to the log. If the print server is already running, it needs to be brought down and loaded again for this change to take effect.

If the auditing log file becomes full, either by using all available disk space or by reaching the size limit set with the Limit Size option, the print server ceases storing auditing information. To avoid losing valuable accounting information, process or archive the information and delete the auditing log file on a regular basis.

5. Specify whether you want to Limit size of log file.

If you select Yes, a field appears for the maximum size (in kilobytes) that the auditing log file can reach before the print server stops appending auditing information. In this field, you should specify the maximum size (in kilobytes) that the auditing log file can reach before the print server stops appending auditing information. Without this limit it is possible for the file to grow until all available disk space is used.

6. After auditing has been enabled, unload and then reload the print server.

7. (Optional) Submit a print job to ensure that the log is recording information on print jobs properly.

8. To view the Auditing Log, select View Auditing Log from the Print Services Auditing menu.

9. To delete the Auditing Log, select Delete Auditing Log from the Print Services Auditing menu.

Unloading Print Servers

A print server can be created in PCONSOLE, but it must be loaded at the server console. However, an active (Status: Running) print server can be unloaded from PCONSOLE with the following procedure.

If the Unload option is not activated, the print server may not be running. If it is running, you are not designated as an operator for that print server. In order to proceed, a designated print server operator must be logged in to the workstation you are using.

Procedure

1. **From the Available Options menu, select Print Servers.**

A list of available print servers is displayed.

2. **Select the name of the print server you want to unload.**

The Print Server Information menu is displayed.

3. **Select Information and Status.**

The Current server status: field should indicate that the print server is Running. If it is not, you cannot unload it.

4. **Select the Running status field.**

5. **Do one of the following:**

- ◆ Select Going down after current print jobs if you want a print job already being printed to be completed before the print server goes down.

Other jobs in the queue will remain in the queue until the print server is reloaded or they are manually deleted.

- ◆ Select Down if you want the print server to go down immediately.

Any jobs in the queue will remain in the queue until the print server is reloaded or they are manually deleted.

Using PCONSOLE in Bindery Mode

You can add a NetWare 4 server and NetWare 4 clients to your network and still retain your existing PSERVER.EXE and NetWare 3 environment.

- ◆ If you use PCONSOLE from NetWare 4 and use bindery mode, you define objects that a bindery-based print server knows how to access for configuration information upon loading.
- ◆ If you use the Directory Services mode to configure the information, you define objects that a Directory Services-based

print server knows how to access for configuration information when loading.

To change between Directory Services and bindery modes, press <F4> at the Available Options menu. The last menu option in bindery mode changes to Change Current NetWare Server from Change Context.

Using Quick Setup to Create Bindery Printing Objects

The Quick Setup option, new in PCONSOLE for NetWare 4, can be used to create printing objects in bindery mode as well as Directory Services mode. For instructions on setting up network printing in Directory Services mode with this option, see “Using Quick Setup in PCONSOLE” on page 19.

When you use Quick Setup in bindery mode, you can attach to a bindery-based server or get a bindery attachment to a NetWare 4 server. Either way, you get the following items created and tied together:

- ◆ A *print server* created in SYS:SYSTEM directory of the current server, with a hexadecimal directory (such as SYS:SYSTEM\FA010002), that contains the following four hidden files:
 - PRINT.000 (printer configuration information)
 - DESCRIPT (description information)
 - NOTIFY.000 (Notify list)
 - QUEUE.000 (queue serviced by printer information)
- ◆ A *printer* created in the print server subdirectory (such as, the PRINT.000 file in SYS:SYSTEM\FA010002) (Non-D.S. object).
- ◆ A *queue* created in SYS:SYSTEM directory of the current server, with a hexadecimal directory (such as, SYS:SYSTEM\7701000F.QDR), that has two Hidden files in it. In the example above, the files would be named Q_0177.SRV and Q_0177.SYS.

You would use Bindery mode on a NetWare 4 server if you want to load a bindery-based print server (such as PSERVER.NLM on a NetWare 3 file server) that is servicing queues on a NetWare 4 server. This means the NetWare 3 PSERVER.NLM or other bindery based print server has

to access the queue and the notification information on each server that it is servicing queues from.

If you need to load PSERVER.NLM on a NetWare 4 server, use only the Directory Services mode when defining printing objects.

See “Using Quick Setup in PCONSOLE” on page 19 for instructions on using this Quick Setup feature.

Note: If you use bindery mode to configure the print server, printer, and queue (such as with Quick Setup), and then try to view the printer information in Directory Services mode, you will not see the printer because no Directory Services Printer object was created. You must switch PCONSOLE into the mode in which the Printer object was created in order to view or manage that object.

Referencing Bindery Queues

The following procedure allows a NetWare 3 print server to service NetWare 4 clients so that your NetWare 4 users can print to the existing NetWare 3 setup. For information on performing this task with NetWare Administrator, see “Referencing Bindery Queues” on page 97

NetWare 3 references NetWare 4 servers outside your Directory tree as well as bindery print queues in your current tree.

Procedure

1. **Select Print Queues from PCONSOLE's Available Options menu.**
2. **Press <F6> (Add Bindery-Ref Queue).**

The bindery <F6> option allows you to choose a NetWare 3 server and to select queues from that server. A queue object is created on the NetWare 4 server that points to the queue on the NetWare 3 server.

- ◆ If prompted, insert the name of the NetWare 3 server.
- ◆ If prompted, type in a username and password.

3. **Select the server name. If the server you want is not on the list, press <Insert>.**

A list of available servers appears.

After you have selected the server and entered the username and password, the Bindery Print Queues list appears.

4. Select the name of the bindery queue to be imported.

The imported print queue will now be shown on your NetWare 4 server's Print Queues list.

5. Using the CAPTURE utility, capture to the new bindery reference queue on the NetWare 4 clients.

You can set CAPTURE using the command line, or you can insert the CAPTURE command in the container login script or in individual user login scripts.

You can now use NetWare 4 utilities to print to queues serviced by a NetWare 3 print server.

Understanding Bindery Reference Queues and Reference Print Servers

When you reference a bindery queue on a NetWare 3 server, a bindery reference queue is created on the NetWare 4 server to represent the NetWare 3 queue. This reference queue is actually a pointer to the real NetWare 3 queue.

A print server is also created on the NetWare 3 server with the same name as the print server on the NetWare 4 server that is referencing that queue.

This new NetWare 3 print server will not know the password for the NetWare 4 print server, and will not have a password when it is created. This means that the new print server can log into the Directory Services database without a password even though the NetWare 4 print server of that name requires a password.

As a network supervisor, you may wish to address this issue in one of the following ways:

- ◆ Leave the new print server as is (no password)
- ◆ Assign the same password to the new print server as is used by the NetWare 4 print server
- ◆ Assign a different password to the new print server, which will limit access to the bindery queue being referenced.

Additional Information

For more information about	See
Creating, modifying, or deleting print queues, printers, and print servers with NetWare Administrator utility	"Setting Up Print Services with NetWare Administrator" on page 39 (NetWare Administrator)
Referencing NetWare 3 print queues	"Referencing Bindery Queues" on page 97 "NetSync" on page 14

Sending Jobs to Network Printers Using CAPTURE and NPRINT

Many applications are designed for network printing. For example, WordPerfect* submits print jobs directly to the print queue. Because you can specify the number of copies, a banner page, and so forth from inside such applications, you do not need specialized NetWare® utilities to send network print jobs. Such applications usually supply the necessary print driver (control sequences, functions, etc.) and include it with each network print job.

However, there are many applications that are not designed for network printing. CAPTURE is a command line utility that allows you to print from applications not designed for NetWare print services. It sets up redirection parameters for printing output from your workstation; the NetWare DOS Requester™ software then redirects the workstation output from an LPT port to the specified network printer or file.

The primary function of NPRINT is to print files from outside an application.

Using CAPTURE

Printing Tasks Handled through CAPTURE

You can use CAPTURE to perform the following tasks:

- ◆ Set flags to redirect DOS print jobs to a network printer (or file) from an application designed to print to workstation parallel (LPT) ports.

Note: CAPTURE cannot be used to redirect jobs to a serial port.

- ◆ Redirect print screen text to a network printer or file.

Command Syntax

The following example represents a typical CAPTURE command:

```
CAPTURE [P=printername | Q=queuename] [L=1 or LPT1]
        [options]
```

For example, to redirect the LPT1 port to printer P_1 with no banner or form feed, type

```
CAPTURE P=P_1 L=1 NB NFF
```

If you are using a print job configuration, you do not need to specify other options except to override options in your job configuration:

```
CAPTURE J=JOB1
```

Material sent to the LPT1 port (for example, print screens or DOS piping.) will now print at printer P1. To end the capture, type

```
CAPTURE L=1 EC
```

Table 5-1

Syntax for Common CAPTURE Tasks

Task	Syntax
Capture to network printer P1.	<code>CAPTURE P=P1 <Enter></code>
Capture to print queue Q1.	<code>CAPTURE Q=Q1 <Enter></code>
End a capture.	<code>CAPTURE EC <Enter></code>
Hold the print job in the queue.	<code>CAPTURE HOLD <Enter></code>
List the printing parameters for the job to be printed.	<code>CAPTURE D <Enter></code>
Redirect printer output to a file.	<code>CAPTURE CR=<i>filename</i> <Enter></code>
Redirect printer output to a printer.	<code>CAPTURE P=<i>printername</i> <Enter></code>
Use print job configuration Charts.	<code>CAPTURE J=CHARTS <Enter></code>
View online help.	<code>CAPTURE /? <Enter></code>

Task	Syntax
View all online help screens.	CAPTURE /? ALL <Enter>
View help for the Banner option.	CAPTURE /? B <Enter>
View current capture settings.	CAPTURE SH <Enter>

Command Parameters

Replace *option* with one or more of the following. The options help you define how a job is printed. Separate options with a space or forward slash (/) Options are not case-sensitive.

Table 5-2

CAPTURE Options

Option	Syntax	Description
All	ALL	When used with the End Capture (EC) option, it ends the capture of all LPT ports. Used with the /? option, it displays all online help screens.
Autoendcap(End capture automatically)	AU	Specifies that the captured data be closed and sent to the printer when you exit an application. Default: Autoendcap enabled
Banner	B=text	Indicates what will appear in the lower half of the banner page. Limit is 12 characters. Replace <i>text</i> with any word or phrase up to 12 characters long. To allow spaces in a banner name, enclose the name in quotation marks (for example, ON THE GO) Default: The captured port (for example, LPT1)
Cancel	CA	Used in conjunction with the EC option. Ends the capture of data to LPT ports and discards the data that was being captured.
Cancel and end capture	ECCA	Ends the capture of data to LPT ports and discards the data that was being captured. If the CReate (CR=) option was used in the original Capture statement, the file is closed but not discarded.

Option	Syntax	Description
Copies	C = <i>number</i> (1-65,000)	Specifies the number of copies. CAPTURE allows up to 65,000 copies in NetWare 4™ software. Default is 1 copy.
Create	CR = <i>path and filename</i>	Creates a file in which to store printed data. This option can be used only with the TI =, AU , or NA options.
Details	D	Lists the printing parameters for a capture. It also indicates whether a print job configuration was used.
End capture	EC	<p>Ends the capture of data to an LPT port. When used in conjunction with the L=<i>number</i> option, it ends the capture to the port number specified. When used without the L=<i>number</i> option, it defaults to the LPT1 port. When used with the ALL option, it ends the capture for all LPT ports. If data was being captured to a network file, the file is closed.</p> <p>The CA option can be used with this option to end the capture of data to LPT ports and discard the data that was being captured.</p> <p>Running CAPTURE again will end the current capture and assign new values.</p>
Form	F = <i>name or number</i>	<p>Specifies the form that the printer will use. (You must define forms using PRINTDEF or NetWare Administrator before users can use form names or numbers.) With an invalid name or number, CAPTURE gives a warning message.</p> <p>Default: F=0</p>
Form feed	FF	<p>Enables form feed after your print job has been printed. FormFeed enabled means that the printer starts printing the next job at the top of the next sheet of paper. However, if an application automatically enables form feed at the end of a file, adding this option causes an extra blank page to be fed through.</p> <p>Default: FormFeed enabled</p>
Help	/? or /H	Displays general help information. Specific options are displayed for certain utilities on the initial help screen.
Hold	HOLD	Allows you to send a print job to a queue without having it print. To release the hold on the job, you can use either PCONSOLE or NetWare Administrator.

Option	Syntax	Description
Job configuration	J=name	<p>Indicates the print job configuration to use; does not require other options except to override print job configuration options. If no job configuration is specified and a default job configuration exists, it will be used. (Use the Details option to see what job configuration is being used.)</p> <p>If no default print job is used, you will need to specify either a printer or queue in the command line.</p> <p>You can also use this option to specify the context in which to look for a print job configuration if it is outside the current search path by identifying the container or user owning the configuration.</p>
Keep	K	<p>Ensures that the NetWare server keeps all data it receives from your workstation if your workstation hangs or loses power while you are capturing data to the server. When the server notices your workstation is no longer connected, it sends the data it received from your workstation to a print queue for printing. Use this option if you plan to capture data over several hours.</p> <p>If you do not include the Keep option and your workstation hangs while sending data to the captured port, the NetWare server discards the data it has received.</p>
LPT port	L=number (1-9) or LPT<number>	<p>Indicates the local LPT port you want captured. You can set network printers in your NET.CFG file by using the command NETWORK PRINTERS=number (1-9).</p> <p>You can specify LPTn instead of L=n.</p>
Name	NAM=text	<p>Indicates what will appear in the upper half of the banner page. Limit = 12 characters.</p> <p>Default: The username you used to log in</p>
No autoendcap(Continue capture)	NA	<p>Specifies that the captured data not be closed and sent to the printer when you exit an application. This allows more information to be added to the print job.</p> <p>When this option is used, the capture will not close unless you also specify TI= in the command. Otherwise, you must issue an EC command to close the capture.</p>
No banner	NB	Suppresses banner page.

Option	Syntax	Description
No form feed	NFF	Suppresses form feed at the end of a print job.
No notify	NNOTI	Specifies that the user not get a message after the print job prints. Do not confuse this option with the notification option in PCONSOLE that informs designated users when the printer is having problems. Default: NoNOTify enabled
No tabs	NT	Specifies that tabs are not converted to spaces in a print job. This is also called byte stream. This option ensures that all the tab characters in your print job arrive at the printer unchanged. Use this option for most network printing situations, especially when printing graphics. Default is NT (byte stream).
Notify	NOTI	Specifies that the user get a message after the print job prints. This option does not notify you if the printer has a problem or if your job cannot be printed.
Printer	P=name	Indicates to which printer the print job should be sent; you may set a default in a print job configuration. Do not use this option with the Q= option.
Queue	Q=name	Indicates to which print queue the print job should be sent; you may set a default in a print job configuration. Do not use this option with the P= option.
Server	s=name	Specifies the NetWare server if you want the print job sent to a bindery print queue. Not used for Directory Services print queues. Default = current tree or server.
Show	SH	Shows the current status of LPT (parallel) ports. Do not use with other options.
Tabs	T=number (1-18)	Specifies the number of spaces to be substituted for each tab in a print job (default=8). Specify NT (No tabs) for byte stream print jobs.

Option	Syntax	Description
Timeout	TI=number (0-1000)	<p>Specifies the number of seconds to wait after the last data is received before closing the print job.</p> <p>If your timeout is not long enough, you may have problems printing some files, especially files with graphics. Increase the timeout if only parts of files are being printed or if the files do not print at all.</p> <p>Default: TI=0 (Timeout disabled)</p>
Version	/VER	Displays version information for this utility. Also lists the names and version number of all files required to run this utility.

Printing to a Network Printer

To print to a network printer from an application that is not designed to run on a network, follow these steps.

Procedure

1. **Type the following at the command line:**

```
CAPTURE P=printername TI=number LPT1
```

2. **Enter your application.**
3. **Either open or create the files you want to print.**
4. **Print your data using the print keys for your application.**

Your application sends the print job to the parallel ports. Before the print job arrives at the port, CAPTURE sets flags that redirects the job to the appropriate queue.

5. **When you have finished printing the files you need, exit the application.**

In most applications, printing begins immediately after you send the job.

- ◆ If Autoendcap (**AU**) is enabled, your job is queued when you exit the application.
- ◆ If Timeout (**TI**) is enabled, the job is sent to the print queue in the specified number of seconds.

Printing Data without Exiting an Application

In most applications, printing begins immediately after you send the job.

- ◆ You can use the Timeout (TI) option to delay printing for a specified number of seconds without closing the print job and exiting the application.

If your timeout is not long enough, you may have problems printing some files, especially files with graphics. Increase the timeout if only parts of files are being printed or if the files do not print at all. The default is `TI=0` (Timeout disabled).

- ◆ You can use the Notify (NOTI) option if you want to know when your job has been printed. For example, if a default print job configuration is being used, type

```
CAPTURE P=printername TI=2 NOTI
```

Two seconds after the application last writes to the file, CAPTURE sends your print job to the print queue. A message appears across the bottom of your screen indicating that your job has been printed.

Printing Data to Different Parallel Ports

Suppose you often use CAPTURE to print from two different applications: AppA and AppB. AppA does *not* allow you to designate which parallel port to send print jobs to; therefore, its print jobs are sent to LPT1. However, AppB has a SETUP program that allows you to designate a parallel port.

Suppose also that AppA requires a different form than AppB and that you want to put form A (for AppA) in printer P_1 and form B (for AppB) in printer P_2.

Use the SETUP program in AppB to send your data through LPT2 to printer P_2. When you capture data from AppA, type

```
CAPTURE LPT1 P=P_1
```

When you capture data from AppB, type

```
CAPTURE LPT2 P=P_2 <Enter>
```

You can add other options to these commands.

Printing Screen Displays

To print information displayed on your screen, follow these steps.

Procedure

1. **Before you access the screen you want to print, type**

```
CAPTURE P=printername TI=number LPT1
```

You can include any of the CAPTURE options except **SHOW**.

2. **Access the screen you want to print.**
3. **Press <Shift><Print Screen>.**

Note: DOS redirects print jobs to the port. If no printer is attached or port captured, your machine may hang. To prevent this, include the following line in the NET.CFG file on your workstation boot diskette: `LOCAL PRINTERS = 0`

Saving Data from Several Applications or Files to a Single File

Suppose you want to move in and out of applications or files, saving data from each, and store all the data in one file called TEST on a network drive.

Use the Create (**CR**) and the No autoendcap (**NA**) options. Specifying No autoendcap allows you to move in and out of applications or files without prematurely closing the file you are creating.

To save data to a file to your current directory, type

```
CAPTURE CR=TEST NA TI=0
```

To save data to a file called TEST that is located in the REPORTS directory, type

```
CAPTURE CR=COUNT_SYS:SALES\REPORTS\TEST NA TI=0
```

To end the capture, type

```
CAPTURE EC
```

Saving Data to a NetWare Server You are Not Attached To

If you specify a NetWare server you are not attached to in your CAPTURE command, CAPTURE attaches you as user GUEST unless GUEST requires a password. In this case, you are prompted to enter both a username and a password before you continue with the capture.

Printing to a Different Directory Services Context

If you want to print to a printer or print queue in a Novell Directory Services™ context different from your current context, you can accomplish this in one of the following ways:

- ◆ If the printer or print queue you want to use is in a different context from your current context in the Directory tree, you can specify the location of the printer in your CAPTURE or NPRINT command.

Note that the example shows the CAPTURE command. You can do the same thing with NPRINT.

For example:

```
CAPTURE P=.P_1.DALLAS.SWRGN.NOVELL
```

(The period at the beginning indicates that the entire context is being specified.)

To view all container objects in the tree below your current context, type

```
CX /T
```

- ◆ Change your context to the one containing the printer or print queue object you want to access. You can use CX to change to the correct context.

To view the names of all printers or print queues in and below the current context, type whichever one of the following commands is applicable:

```
NLIST PRINTER /N /S
```

```
NLIST QUEUE /N /S
```

Printing with Print Job Configurations in a Different Context

Occasionally, you may want to send print jobs using a print job configuration in another context.

In releases prior to NetWare 4.02, searches for print job configurations were limited to your current context and the context immediately above it in the Directory tree.

Beginning with NetWare 4.02, a new feature was added to the `J=` flag in `CAPTURE` and `NPRINT` that allows you to use a print job configuration anywhere in your Directory tree, so long as you have the rights to do this.

By using this feature, you can limit your search for the specified job configuration to a specific context or to the owner of the database that contains the configuration.

Note that the examples show only the `CAPTURE` command. You can do the same thing with `NPRINT`.

The syntax for this feature is as follows:

```
CAPTURE J=jobname:context
```

For example, to use printer `P_1` to print a document using print job configuration `RPT` located in container object `.DALLAS.SWRGN.NOVELL`, your command would be as follows:

```
CAPTURE P=P_1 LPT1 J=RPT:.DALLAS.SWRGN.NOVELL
```

Note: Placing the period in front of the container name indicates that you are specifying an absolute context path; that is, you are showing the context all the way up to the root. If you want to specify only a relative context path (one that does not go all the way to the root) you should not use the period. For more information, see *Guide to NetWare 4 Networks*.

You can specify any context anywhere in the tree, so long as you have rights to the context or user you specify.

If you specify a user rather than a context, the command syntax is as follows:

```
CAPTURE J=JOB1:CN=username .SALES.NOVELL
```

If you do not know the job configuration's name, select the Change Current Object option from the PRINTCON Available Options menu. From the Enter Object field, you can press <Insert> to browse the tree. At the context you want, you can view the configurations you have rights to see.

Adding CAPTURE to Login Scripts

You can add a CAPTURE command to the container login script or to a user login script. For example, in the login script, type

```
#CAPTURE Q=queuename TI=n
```

or

```
#CAPTURE Q=queuename AU
```

You can include any other command options you want. If you include the Timeout or Autoendcap option in the login script, to print a screen display for example, you only need to press <Shift><Print Scrn>.

If you type a CAPTURE command at the DOS prompt, it overrides the command in your login script if you capture the same port.

Container Login Script

Suppose you want to include a CAPTURE command in the container login script for group SALES so they can use printer P_0. Add the following lines to the container login script:

```
IF MEMBER OF SALES THEN BEGIN  
#CAPTURE P=P_0 options  
END
```

Note that in the above example, if you are using a bindery queue, you would have to add a server name to your parameters (for example, S=SALES-PRINT).

User Login Script

Suppose a user often prints from a non-network application by using CAPTURE. The user wants to send a file to printer P_1, which is

servicing queue Q_1. The user wants to print the file without a banner or a form feed and releases this job to the print queue five seconds after the application last writes to the file.

Add the following lines to the user login script:

```
#CAPTURE P=P_1 NB NFF TI=5
```

Tips on Using CAPTURE

- ◆ You do not need to use CAPTURE if you use a NetWare-aware application that is configured to send print jobs to printers or print queues.
- ◆ When setting up your Directory structure, keep printers, print job configurations, and users as close together in the tree as possible. CAPTURE is normally a very fast utility, but performance slows considerably if it is searching all around the network for objects and databases.
- ◆ For optimal performance, use the *Q=queue* option instead of the *P=printer* option. If you specify the printer name, CAPTURE will still have to find the queue.
- ◆ Use the *S=servername* option only if you are going out of your current Directory tree, not if you are capturing within your current tree. This option is intended primarily for use with NetWare 3™ (bindery) servers.
- ◆ If a print job is defined, CAPTURE will use all of the options in that job except those in the command line. The command line options override all other configuration options.
- ◆ Default options include a banner page, automatic endcap, one copy, no tabs, and form feed. You can set options by specifying a print job configuration or options at the command line.
- ◆ All options function with a preceding forward slash (/), but none require it except */VER* and */?*. No options are needed if a default printer or print queue is specified in a default print job configuration.

- ◆ Because CAPTURE settings must be reset each time you reboot your computer, consider placing the command in the system or individual login scripts. See “Login Script Commands and Variables” in *Supervising the Network*.
- ◆ NetWare 4 allows you to specify the printer name instead of a print queue. You can still capture to print queues.
- ◆ CAPTURE only sets up redirection from parallel (LPT) ports; you cannot specify a serial (COM) port in CAPTURE.
- ◆ The NET.CFG file now includes a **NETWORK PRINTERS=*number*** option. Replace *number* with the number of printers (logical ports) you would like to capture at the same time (0-9). The default is 3.

For example, if you set

```
NETWORK PRINTERS=9
```

the CAPTURE command can be **CAPTURE L=9** even though the physical port doesn't exist.

- ◆ If you specify a print job configuration that has a large printer mode, you may need to increase the bytes (default 64, range 0 to 254) in the **PRINTER HEADER=*number*** option. See your Novell Client documentation for more information.

Using NPRINT

Printing Tasks Handled through NPRINT

NPRINT is used to send a file to a printer. This would include plain text (ASCII) files such as AUTOEXEC.BAT and any application software output already formatted for a printer.

Command Syntax

Unlike CAPTURE, where options may be entered in any order, NPRINT requires that the filename be specified immediately after you type NPRINT according to the following format:

```
NPRINT filename [P=printername | Q=queue name ]  
  [/option ...]
```

For example, to print file JANUARY.RPT in the current directory to printer P_1 with no banner or form feed, type

```
NPRINT JANUARY.RPT P=P_1 NB NFF
```

Multiple filenames can be entered in the same command by separating them with commas.

```
NPRINT JANUARY.RPT, FEBRUARY.RPT P=P_1 NB NFF
```

Table 5-3

Syntax for Common NPRINT Tasks

Task	Syntax
Print file MARCH.PRJ using print job configuration REPORTS.	<code>NPRINT MARCH.PRJ J=REPORTS <Enter></code>
Print five copies of file MARCH.PRJ on printer P1 with no banner.	<code>NPRINT MARCH.PRJ P=P1 C=5 NB <Enter></code>
Print all files beginning with MA with extension .PRJ.	<code>NPRINT MA*.PRJ <Enter></code>
Hold the print job MARCH.PRJ in the queue.	<code>NPRINT MARCH.PRJ HOLD <Enter></code>
List the printing parameters for the print job MARCH.PRJ.	<code>NPRINT MARCH.PRJ J=REPORTS D <Enter></code>
Send file MARCH.PRJ to network printer P1 in the same context.	<code>NPRINT MARCH.PRJ P=P1 <Enter></code>
Send file MARCH.PRJ to print queue Q1 in the same context.	<code>NPRINT MARCH.PRJ Q=Q1 <Enter></code>
View online help.	<code>NPRINT /? <Enter></code>
View all online help screens.	<code>NPRINT /? ALL <Enter></code>
View specific help for the Banner option.	<code>NPRINT /? B <Enter></code>
View the version number of this utility	<code>NPRINT /VER <Enter></code>

Command Parameters

Replace *filename* with the name of the file you want to print. Include wildcard characters, drive letters, and directory paths if necessary.

Replace *option* with any of the options listed in the following table. You do not need to use options if a default print job configuration specifies a printer or print queue.

Table 5-4

NPRINT Options

Option	Syntax	Description
All	ALL	Used after the <i>/?</i> option, it displays all online help screens.
Banner	B=name	Indicates what will appear in the lower half of the banner page. Limit = 12 characters. Replace <i>name</i> with any word or phrase up to 12 characters long. To allow spaces in a banner name, enclose the name in quotation marks (for example, ON THE GO). Default: The print job file name
Copies	C=number (1-65,000)	Specifies the number of copies. NPRINT allows up to 65,000 copies. The default is 1.
Delete	DEL	Automatically deletes the file after it is printed. The default is not to delete the file of files.
Details	D	Lists the printing parameters for the job to be printed. It also indicates whether a print job configuration was used.
Form	F=name or number	Specifies the form that the printer will use. (You must define forms using PRINTDEF or NetWare Administrator before users can use form names.) Default: 0.
Form feed	FF	Enables form feed after your print job has been printed. FormFeed enabled means that the printer starts printing the next job at the top of the next sheet of paper. However, if an application automatically enables form feed at the end of a file, adding this option causes an extra blank page to be fed through. Default: FormFeed enabled
Help	/? or /H	Displays context-sensitive online help.

Option	Syntax	Description
Hold	HOLD	Allows you to send a print job to a queue without having it print. To release the hold on the job, you can use either PCONSOLE or NetWare Administrator.
Print job configuration	J=name	<p>Indicates the print job configuration to use; does not require other options except to override print job configuration options. If no job configuration is specified and a default job configuration exists, it will be used. (Use the Details option to see what job configuration is being used.)</p> <p>If no default print job is used, you will need to specify either a printer or queue in the command line.</p> <p>You can also use this option to specify the context in which to look for a print job configuration if it is outside the current search path by identifying the container or user owning the configuration.</p> <p>Beginning with NetWare 4, a new feature was added to the J= flag in CAPTURE and NPRINT that allows you to use a print job configuration anywhere in your Directory tree, so long as you have the rights to do this.</p>
Name	NAM=text	<p>Indicates what will appear in the upper half of the banner page. Limit = 12 characters.</p> <p>Default: The username you used to log in</p>
No banner	NB	Suppresses banner page.
No form feed	NFF	Suppresses form feed at the end of a print job.
No notify	NNOTI	<p>Specifies that the user not get a message after the print job prints. Do not confuse this option with the notification option in PCONSOLE that informs designated users when the printer is having problems.</p> <p>Default: NoNOTIfy enabled</p>
No tabs	NT	Specifies that tabs are not converted to spaces in a print job. This is also called byte stream. This option ensures that all the tab characters in your print job arrive at the printer unchanged. Use this option for most network printing situations, especially when printing graphics. Default is NT (byte stream).
Print queue	Q=name	Indicates to which print queue the print job should be sent; you may set a default in a print job configuration.

Option	Syntax	Description
Printer	P = <i>name</i>	Indicates to which printer the print job should be sent; you may specify a default in a print job configuration.
Server	S = <i>name</i>	Specifies the NetWare server if you want the print job sent to a bindery print queue. Not used for Directory Services print queues. Default = current tree or server.
Tabs	T = <i>number</i> (1-18)	Specifies the number of spaces to be substituted for each tab in a print job (default=8). Specify NT (No tabs) for byte stream print jobs.
Version	/VER	Displays version information for this utility. Also lists the names and version number of all files required to run this utility.

Tips on Using NPRINT

- ◆ Default options include a banner page, no tabs, and form feed. You can override the default options by specifying options at the command line.
- ◆ If you use an application that does not format print jobs for your printer, NetWare supplies 58 printer definitions for printers. Import one of these or create your own using NetWare Administrator or PRINTDEF. Each printer definition contain the functions and modes for the printer.

Printer definitions can only be referenced in print job configurations. To print a non-ASCII file that is not formatted for the printer, NPRINT must use the **J**=*name* option to specify the print job configuration that includes the printer definition unless the correct job configuration is the default.
- ◆ If you specify a print job configuration that has a large printer mode, you can increase the bytes (default 64, range 0 to 255) in the **PRINTER HEADER**=*number* option. See your Novell Client documentation for more information.
- ◆ Options with no filename specified require a preceding forward slash (/), including **/D**, **/H**, **/?**, and **/VER**.
- ◆ No options are needed if a default printer or print queue is specified in a default print job configuration.

- ◆ NetWare 4 now allows you to specify the printer name instead of a print queue. You can still print to print queues.
- ◆ If you print to a print queue on the same NetWare server, an asterisk (instead of a whirligig) will appear with Please Wait and will remain until all the data is transferred. For example, 12MB of information may take some time. The whirligig appears if the source file and the destination queue are on different NetWare servers. In this case, the data does not transfer as quickly.

If you have multiple printers assigned to one print queue, the printer and print queue options will not guarantee what printer services your print job. Novell recommends that you have one print queue assigned to each printer unless all the printers are the same.

Setting Up and Servicing Print Servers

A print server is a *software* program that monitors and manages printers and print queues. PSERVER is the native NetWare print server that takes jobs from a NetWare® print queue and directs them (via NPRINTER) to the assigned printer. In NetWare 4™ software, PSERVER is available only as a NetWare Loadable Module™ (NLM™) program that can be loaded on a NetWare server.

Multiple print servers (PSERVER.NLM programs) cannot run concurrently on the same NetWare server.

Third party print devices that connect directly to the network are also available. These products, when operated in either remote printer or queue server mode, provide similar functionality to PSERVER. For more information, see “Using Third-Party Network-Direct Print Devices with NetWare 4” on page 164.

PSERVER typically uses about 27 KB of NetWare server RAM for each configured printer, depending on your buffer configurations.

After the print server is loaded, a port driver (NPRINTER.EXE, NPTWIN95.EXE, or NPRINTER.NLM) must be loaded for each network printer. The print server (PSERVER.NLM) must be loaded before an NPRINTER can be loaded. See Chapter 7, “Setting Up Printers Attached to Workstations or Servers,” on page 173.

New Print Server Features for NetWare 4

PSERVER.NLM for NetWare 4 represents a significant advancement over previous versions. This section describes the most important changes that have occurred.

Support for 255 Printers

The print server in NetWare 4 supports up to 255 printers. How effectively it can support a large number of printers depends primarily on the speed of your printers. The faster your printer, the greater the likelihood you will notice that performance has been affected by a large number of printers. For example, network-attached printers running in remote printer mode are usually capable of high printing speeds if the print server is not heavily loaded.

If the print server cannot service multiple fast printers without falling behind, you may notice that printing has slowed down. The print server is more capable of keeping up with multiple slower printers; therefore, you would probably not notice a difference except with the faster printers.

Another factor that may affect performance is how heavily loaded the NetWare server is to begin with, and how often the printers are required to perform. If most of your printers are frequently idle, you can support more printers than would be possible if the printers are constantly in use.

Increased Performance

In NetWare 4, the communication between PSERVER.NLM and remote printers is considerably faster than it was in NetWare 3™ software.

In most cases, the speed of the communication even in NetWare 3 was faster than data could travel through a parallel or serial port. So if you have a printer running that is attached to a workstation (using NPrinter or RPrinter), you probably will not notice much change. But the change should be noticeable with network-connect printers running in remote printer mode.

This improved communication means that network-connect printers can now be run in remote printer mode with little or no negative effect on performance. In NetWare 3, these printers had to be configured in queue server mode for highest efficiency.

An additional performance enhancement is the configurable queue polling interval feature described in the following section.

Configurable Queue Sampling Interval

Previously, queue sampling (polling) always occurred at 15 second intervals. If a query was made and no job was in the queue, the queue would not be queried again for 15 seconds. (As long as there were jobs in the queue, continual queries would be made.)

In NetWare 4, the default queue sampling interval has been reduced to 5 seconds. This interval is configurable for up to 255 seconds, but the lower default setting will increase printer performance in most cases, especially when using a fast printer.

Support for Macintosh and UNIX

In NetWare 4, Macintosh and UNIX* printers can be serviced by PSERVER.NLM.

PSERVER Console

There is now a console on the print server that allows you to administer printers and print jobs. Previously, these tasks could only be performed from PCONSOLE. See “Managing Printers from the Print Server Console” on page 157.

Auto-Reconnect

In previous NetWare releases, if the print server was servicing queues on a file server that went down, the queue list was lost.

Now, if a queue resides on a remote NetWare server and that server goes down for any reason, service for that queue resumes automatically when the server comes back up.

Address Restrictions for Remote Printers

When you configure a print server, you have the option of putting an address restriction specifying that a printer must run from a specified address (a node address and network segment) in order to connect to the print server. If you retain the unrestricted option (which is the default), the print server will allow the remote printer to connect to it from any address.

Support for PostScript Banner

You can now configure a printer so that PostScript banners will be generated for that printer. When using this option, you must be sure to select a banner type that matches your default printer type.

Auditing Log

The auditing log provides tighter security and billing information about all jobs that have been printed. It can be read through PCONSOLE and through NetWare Administrator.

In designing the auditing log, Novell[®] recognized that companies do accounting in a variety of ways. For this reason, the auditing log provides a basic default format based on ASCII and a fixed record length. Both characteristics are designed to make it as easy as possible to write a customized program to retrieve the information it needs in a format determined by a particular company.

The auditing log is sufficiently flexible to record whatever information a printer sends to it. Regardless of printer type, the log will record how many bytes a job took to print, the user who submitted the job, when the job entered the print queue, when the job was printed, and what printer serviced the job.

If the printer is an XNP type used by Macintosh or UNIX, the log might also indicate how long it took to print the job, and how many pages were printed.

Requirements

Before completing any tasks in this chapter, you need the following:

- NetWare 4 server.
- Printer(s) functioning properly in their current environment. If a printer functions properly in its current environment (non-network or otherwise), it will work with NetWare print services. If your printer is not functioning properly, see Appendix B, "Cabling Printers," on page 245 or Appendix D, "Troubleshooting Printing Problems," on page 269.

- ❑ Print server, print queue, and printer that have been created and assigned using one of the following:
 - ◆ NetWare Administrator (graphical utility; see “Managing Print Services with the NetWare Administrator Utility” on page 29)
 - ◆ PCONSOLE.EXE (text utility; see Chapter 4, “Managing Print Services Using PCONSOLE,” on page 99)

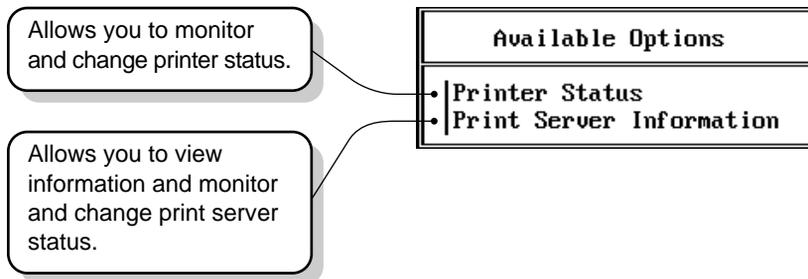
Note: If a print server is running, you must bring it down and up again in order for certain changes to take effect (for example, when creating a new printer, assigning a printer to another print server, or enabling auditing). However, you do not have to reload the print server if you change print queue assignments for printers, create a print queue, etc.

Using PSERVER.NLM

Printing Tasks Handled through PSERVER.NLM

The following figure shows you the tasks you can do with PSERVER.NLM.

Figure 6-1
Available Options Menu



Keep in mind that only one print server (PSERVER.NLM) can be loaded on a NetWare server. If you need to service more than 255 printers, you can also load PSERVER.NLM at another NetWare server.

Command Syntax

To load PSERVER.NLM, type the following at the NetWare server console:

```
LOAD PSERVER <Enter>
```

The Enter print server name window appears. Press <Enter> to browse the directory tree for existing print servers in the Contents of current context window. Select the print server.

Note: If you have a bindery context set, it will be shown in the window. If the print server is in the bindery context, insert the print server name at the beginning of the bindery context. If the print server is not in the bindery context, use <Backspace> to clear the window, and then press <Enter> to browse.

If you know the name of your print server, provide the name in your command line. You may need to include the context path:

```
LOAD PSERVER [ .CN=printservername . OU=container  
              .O=container ]
```

For example, to load print server PS-SALES in the Sales context of organization Novell, type

```
LOAD PSERVER .PS-SALES.SALES.NOVELL <Enter>
```

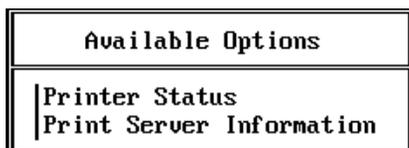
For automatic execution, place this command in your AUTOEXEC.NCF file.

To unload a print server at the command line of your console, type the following at the DOS prompt:

```
UNLOAD PSERVER
```

Managing the Print Server from the Console

When you load PSERVER.NLM, the Available Options menu appears:



The Print Server Information option brings up a window similar to the following:

Figure 6-2
Print Server Information and Status Window

Print Server Information and Status	
Version:	4.10
Type:	Netware Loadable Module
Advertising name:	SALES_PS
Number of printers:	1
Queue service modes:	4
Current status:	Running

Only the Current status field can be modified from this window.

Version

This field shows the version of PSERVER.NLM being used with this Print Server object to control Print Services.

Type

The type of this print server. If it is not running, the type is shown as Unavailable.

A print server running on a NetWare 4 file server is of type NetWare Loadable Module (NLM).

NetWare 3 print servers might be either NLM or Dedicated DOS types.

NetWare 2 print servers might be NetWare Server VAP or Bridge VAP.

Advertising name

This field shows the name the print server uses in network communications.

Number of printers

This field shows the number of printers serviced by this print server.

Queue service mode

This field shows the number of the current mode that controls the order in which the print server services print jobs in the queue according to the printer forms the jobs are to be printed on. You can change this mode in either PCONSOLE or NetWare Administrator.

Printer forms include information about the length and width of different types of paper used in your printer. You can designate printer forms to prevent your print jobs from printing on the wrong paper. The print server operator is notified when a form change is needed. Printer forms are configured in PRINTDEF or NetWare Administrator.

When a print job requests a printer form other than the form currently mounted in the printer, the print server does not service the job until a print server operator reports that the new form is mounted. A print server operator can use PCONSOLE, PSC, or NetWare Administrator to mount the new form.

The following service modes determine how often the print server requires you to change printer forms:

- ◆ **Change forms as needed**

The priority of each print queue and the order of print jobs in the print queue determine which print job to service next. You might have to change forms often.

- ◆ **Minimize form changes within print queues**

The print server requires you to mount a new form for a print job before servicing print jobs with the currently mounted form in a print queue with a lower priority.

- ◆ **Minimize form changes across print queues**

The print server services all print jobs requiring the currently mounted form before requesting a form change. Print jobs in lower priority print queues that require the mounted form are serviced before print jobs in a high priority print queue that require a different form.

- ◆ **Service only currently mounted form**

The print server never requests a form change. If no print job requiring the current form is available, nothing is printed.

Current status

Pressing <Enter> at the Current status field produces a menu from which you can unload the print server if you wish. You can either unload the print server immediately or unload it after active print jobs have been completed.

Note: Do not change the status from Running unless you really want to bring down the print server. You do not receive a confirmation prompt.

- ◆ **Running**

The print server is currently running.

- ◆ **Unload after active print jobs**

The print server finishes any print jobs currently being printed; then it goes down.

- ◆ **Unload**

The print server is going down; current print jobs are returned to their print queues.

Managing Printers from the Print Server Console

The Printer Status option provides a list of printers that can be serviced by this print server. When you select the printer you want to monitor, the Print Server Console screen appears similar to the following.

Figure 6-3
Print Server Console Screen

```
NetWare Print Server v4.10                               NetWare Loadable Module
Print server: SALES_PS.Novell                             Status: Running

Printer: printer1.Novell
Type: Automatic load (Local), LPT1                       Printer control

Current status: Waiting for job

Queues serviced: (See list)
Service mode: Minimize form changes within print queues
Mounted form: 0

NetWare server:
Print queue:
Print job ID:
Description:
Print job form:

Copies requested:                                         Finished:
Size of 1 copy:                                           Finished:
Percent complete:
```

In addition to monitoring the configuration and status of your printers, you can perform a number of administrative tasks from the Print Server Console as well.

On the following pages, some of the items in Figure 6-3 are explained.

Printer

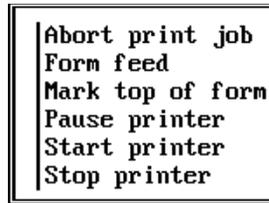
Shows the name and context of the printer being serviced.

Type

Indicates whether the printer is configured for automatic or manual loading, and shows the port number.

Printer Control

Provides access to a menu of printer functions. The following figure shows the menu that appears when the printer is attached to a server.



When you select the option you want, the change is reflected in the Current status field of the Print Server Console.

- ◆ **Abort print job** Allows you to stop the current print job and remove it from the print queue.
- ◆ **Form feed** Ejects a page from a paused or stopped printer.
- ◆ **Mark top of form** Allows you to print a line of asterisks (*) across a row of continuous paper in a paused or stopped printer to help you align the paper in the printer.
- ◆ **Pause printer** Allows you to temporarily stop a printer, but it will continue to service the active print job where it left off when the printer is restarted.
- ◆ **Start printer** Allows a stopped or paused printer to be restarted.
- ◆ **Stop printer** Stops the printer and returns the current print job to the queue.

If your printer is attached to a workstation or directly to the network running in remote printer mode, a Private/Shared option is also displayed. This option indicates whether remote (manually loaded) printers attached to workstations can be used by network users (Shared) or by the workstation user only (Private).

Current Status

Status shows the current status of this port driver and printer. Possible statuses include the following:

Not connected
Waiting for form
Out of paper
Printing
Paused
Stopped
Off-line
Private
Ready
Waiting for job
Ready to go down

Note: The port driver (NPRINTER) status for a defined but unattached serial printer is Waiting for job even though the printer is not attached, and the printer status is Running. If a print job is put into the queue for this printer, the port driver status changes to Printing job but the printer status changes to Offline. Defined but unattached parallel printers show a status of Not connected.

Queues Serviced

Selecting this option takes you to a list of print queues the printer you selected can service. If you want to add a queue to the list and you have the proper rights, press <Ins >. At the Enter Queue Name window, press <Ins > again to browse for the queue you want to add. Select the queue you want to add and press <Enter>.

You can also delete queues from this list.

Service Mode

This field allows you to access the following menu of service modes.

<p>Change forms as needed Minimize form changes across print queues Minimize form changes within print queues Service only currently mounted form</p>

This menu allows you to specify how form changes will be handled by the printer.

- ◆ **Change forms as needed** Indicates that all print jobs will be serviced as they arrive, without considering how the printer form currently in use compares with the printer form of the next print job. You may have to change printer forms often.
- ◆ **Minimize form changes across print queues** Indicates that the print server will service print jobs in print queues with lower priorities before it will require you to mount a new form for a print job in a higher priority print queue.
- ◆ **Minimize form changes within print queues** Indicates that the print server will require you to mount a new form for a print job before servicing print jobs with the currently mounted form in a print queue with a lower priority.
- ◆ **Service only currently mounted forms** Holds any print jobs that specify a printer form other than the one currently in use on this printer. In this mode, the printer will never request a form change. If no print job requiring the current form is available, it will not print anything.

Mounted Form

This option allows you to change the number of the form the printer is currently using.

Nonconfigurable Information

The following information is displayed on the print server console Printer Status screen, but cannot be modified from this location.

- ◆ **NetWare server** Identifies the server where the volume resides that stores all data for the queue currently submitting print jobs.
- ◆ **Print queue** Identifies the print queue currently submitting print jobs.
- ◆ **Print job ID** Indicates the number assigned to this print job.

- ◆ **Description** Indicates the banner name. By default, the banner name with CAPTURE is the port and with NPRINT it is the filename.
- ◆ **Print job form** Shows which printer form this print job is using. This print job cannot be printed unless this Form matches the Mounted Form field above the Current Job Information.
- ◆ **Copies requested** Indicates the number of copies of this print job that the User who submitted it requested to be printed.
- ◆ **Finished** Indicates how many of those copies requested have been printed so far.
- ◆ **Size of 1 copy** Indicates the size of each copy of this print job. This is like the File Size field when you see the details of a print job within the print queue.
- ◆ **Finished** Indicates the total number of bytes in one copy of a print job that have been printed
- ◆ **Percent Complete** Indicates how much of this print job is completed, which is determined both by the size of one copy and the number of copies requested for this print job.

Servicing NetWare 4 Clients and Queues with a NetWare 3 Print Server

A NetWare 3 print server can service queues on a NetWare 4 server. Queues to be serviced must be created in the context designated as the bindery context. (See the “Novell Directory Services Parameters” listing for the SET utility in *Utilities Reference* for a discussion of the SET BINDERY CONTEXT parameter.) These queues are then visible to the bindery.

Servicing NetWare 3 Clients and Queues with a NetWare 4 Print Server

The following procedure explains how to use PCONSOLE to allow a NetWare 4 print server to service NetWare 3 print queues and NetWare 3 clients.

Procedure

1. **Log in to the NetWare 4 server as Admin or equivalent.**
2. **Run PCONSOLE and select Print Queues from the Available Options menu.**
3. **Press <F6> (Add Bindery-Ref Queue).**

The Add Bindery-Ref Queue option allows you to choose a NetWare 3 server and to select queues from that server. A queue object is created on the NetWare 4 server that points to the queue on the NetWare 3 server.

- 3a. **If prompted, insert the name of the NetWare 3 server.**
- 3b. **If prompted, type in a username and password.**
4. **Select the server name.**
If you were prompted for Steps 3a and 3b, this step is omitted.
5. **Select the name of the bindery queue to be serviced.**
6. **Return to the Available Options menu and select Printers.**
7. **Select a printer.**
 - 7a. **If the printer you want is not listed, press <Insert>, type in a new printer name, and press <Enter >.**
 - 7b. **Select the new printer.**
 - 7c. **At the Printer Configuration window, specify the printer type.**
8. **Move the cursor to Print queues assigned and press <Enter >.**

- 9. Press <Insert > for a list of queues in the Object, Class window. Select the queue you want and press <Enter>.**

You return to the Print Queue list. Press <Esc > until you return to the Available Options menu.

- 10. Select Print Servers to assign the printer to the print server.**

- 11. Load the print server that services the selected printer.**

See “Using PSERVER.NLM” on page 153.

Jobs submitted to NetWare 3 queues will now be serviced.

You can set CAPTURE or NPRINT using the command line, or you can insert the CAPTURE command in the system login script or in individual user login scripts.

Using Third-Party Network-Direct Print Devices with NetWare 4

NetWare 4 supports existing network-direct printers and hardware queue servers produced by various manufacturers. These devices either connect to a printer and then to the network or are installed in a port at the printer.

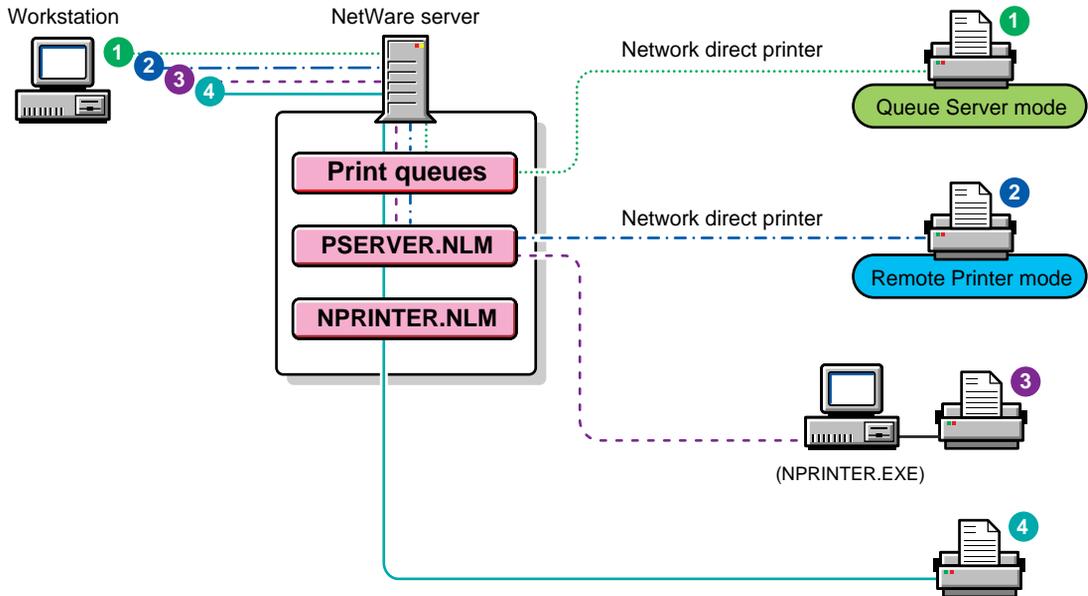
In many cases, these devices offer a fast, effective, low-cost printing solution in NetWare 4 as well as NetWare 3 environments.

Typically, these print devices are shipped with their own installation utilities. The manufacturer's utilities configure the device to recognize network print components and to communicate with the network. To effectively use network-direct print devices in a NetWare 4 environment, you will need to know the manufacturer's procedures for installing the specific device that you are using.

Many of these devices can be configured to run in either queue server mode or remote printer mode, as described in the following sections.

The following figure illustrates representative network printing setups incorporating network-direct print devices used in both queue server and remote printer modes.

Figure 6-4
Network-Direct Print Devices Running on
Same Network with Printers Attached to a
Workstation and a NetWare Server



Remote Printer Mode

In this mode, the device functions in a way similar to a workstation running the NetWare 4 NPRINTER or the NetWare 3 RPRINTER. Devices configured for remote printer mode are controlled by a NetWare print server.

By using this mode, you are Directory Services aware and will also get notification and other functionality available through PCONSOLE. These advantages are generally not available in queue server mode described in the next section.

Devices running in this mode under NetWare 4 run considerably faster than they did under NetWare 3. The increased speed and flexibility offered with NetWare 4 makes remote printer mode a very effective way of providing network printing with these devices.

Queue Server Mode

In this mode, the hardware print server directly accesses the print queue using NetWare Core Protocol™ calls. In NetWare 3, this mode was faster than remote printer mode, but the improved performance of the NetWare 4 PSERVER has minimized this distinction.

Queues created in the bindery context can be seen by both Novell Directory Services™ and bindery users, so both types of users can access these hardware print servers.

Network-direct print devices developed before NetWare 4 are designed to work well with the NetWare bindery. When used in queue service mode, some of these products present the following set of common issues of concern to the network supervisor within a NetWare 4 environment.

- ◆ Some network-direct print devices and their installation programs are designed to look in the bindery for network printing information. In order for these devices to see binderies and queues, they must be in the same bindery context as these printers and queues.
- ◆ The queue's volume must be located on the same server as the queue.
- ◆ Queues serviced by network-direct printers must be created in the bindery context where the queue server is defined. The bindery context tells the NetWare server which Directory Services objects should be visible as bindery information.
- ◆ Queue users should be in the same bindery context as the queue.
- ◆ In NetWare 3, print server configuration files for bindery printers are located in the SYS:SYSTEM directory. In NetWare 4, these files have been replaced by attributes of the print server. Because most network-direct print devices are designed to access information from the bindery and are not Directory Services aware, you must create print device configurations in the bindery emulation mode of PCONSOLE in order for the configuration files these devices require to be created.

- ◆ Some of these direct-connect devices need to be configured within the 16 printer limitation for NetWare 3 print servers.

When using these devices in remote printer mode, you should reserve printer slots 0-15 for them.

- ◆ NetWare 3 created the group EVERYONE by default. Some of the network-direct print devices assume that this group exists in NetWare 4. For these devices, make sure that group EVERYONE is a user of the affected queue. You may need to create this group in the context where the printer is defined before the device will be able to communicate with the network.

- ◆ Some network-direct devices require a running print server before you can configure for remote-printer mode.

Because the communication protocol between print servers and network-direct devices running in remote printer mode did not change in NetWare 4, the running print server can be a NetWare 4 print server.

- ◆ Some of the utilities provided with these print devices can only be operated with the SUPERVISOR right and do not recognize Supervisor equivalents. You will need to log in as SUPERVISOR in bindery mode rather than logging in as ADMIN in Directory Services mode.

- ◆ Some devices include a remote printer configuration utility that requires you to complete duplicate configuration steps. In such cases, you should first define the remote printer in the NetWare 4 PCONSOLE utility, and then define the printer again using the third party utility.

As a result of these duplicate steps, you may end up with unused NetWare 3 printer configuration files on the NetWare 4 server.

Setting Up Printing on a Network Using SFT III

NetWare® 4 SFT™ III (System Fault Tolerant, level III) uses two mirrored NetWare servers to provide uninterrupted network services to clients. If one server fails, its mirrored partner automatically takes over. For more information, see “Server Mirroring” in *Concepts*. For information on installing NetWare 4 SFT III™, see *Installation and Upgrade*.

In situations where printing fault tolerance is not required, a single printer may be sufficient and the location of the printers on the network is flexible. Because routers can be a point of failure, for the most reliable printing on an SFT III network, printers should be located on the same local area network segment as *both* SFT III mirrored servers.

Where fault tolerant printing is important there must be at least two identical printers on the network. They need to be identical to insure proper functioning of printer device definitions. In both cases, the printers should be located near one another since they will be assigned the same print queues, and the user will not know in advance which will print a particular job.

The printers can be set up in one of two ways depending on user needs and the level of fault tolerance desired. The characteristics of each setup are described in the following table.

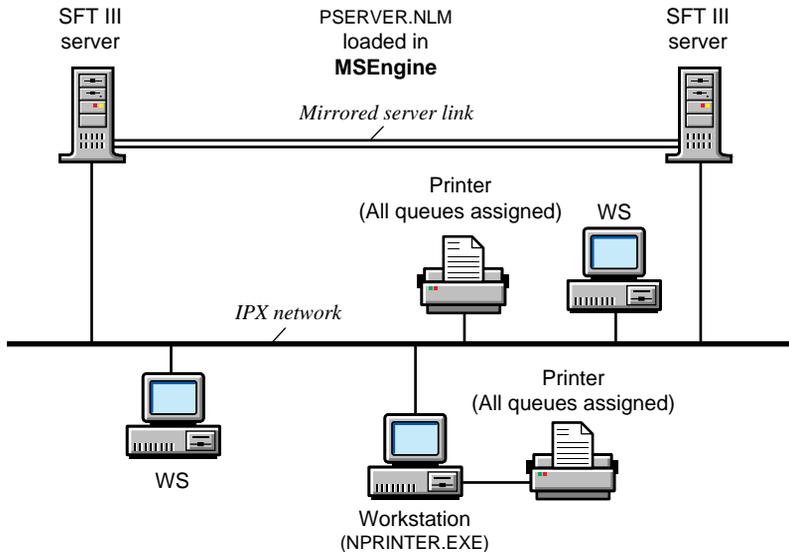
Setup A (Most fault tolerant)	Setup B (Less fault tolerant)
The mirrored servers do not need to be close together to have the printers close together	The mirrored servers must be close together to permit printers to be close together
Printers are not connected to the mirrored servers	Printers are connected to the mirrored servers.
If either mirrored server and either printer are functional, printing will continue.	If one mirrored server and its attached printer are functional, printing will continue. If one mirrored server and the printer attached to the other mirrored server fail, printing will not continue

Note: In SFT III v3.11, PSERVER.NLM was loaded in the IOEngine. In SFT III v4.1 PSERVER.NLM is loaded in the MSEngine so that the print server is mirrored. NPRINT.NLM, if used, is loaded in the IOEngine.

SFT III Printing Setup A (Most Fault Tolerant)

The following figure illustrates a fault tolerant printing setup using SFT III.

Figure 6-5
SFT III Network Printing Setup A



The procedure for setting printers up in this way on an SFT III network is listed below.

Procedure

1. **Connect the printers to workstations.**

Workstations should be located on the same segment as both SFT III servers or connected directly to the segment if the printers are equipped with network interface cards.

2. **From a workstation, use PCONSOLE or NetWare Administrator to set up network printing.**

- 2a. **In the configuration for each printer, assign the same print queues to both printers.**

- 2b. **Configure each printer for Manual Load.**

3. **At the SFT III server console, change to the MSEngine and load PSERVER.**

To automate loading, insert the following command in the MSAUTO.NCF file:

```
LOAD PSERVER .<printserver name >.context
```

4. **Load NPRINT on the workstations where the printers are attached.**

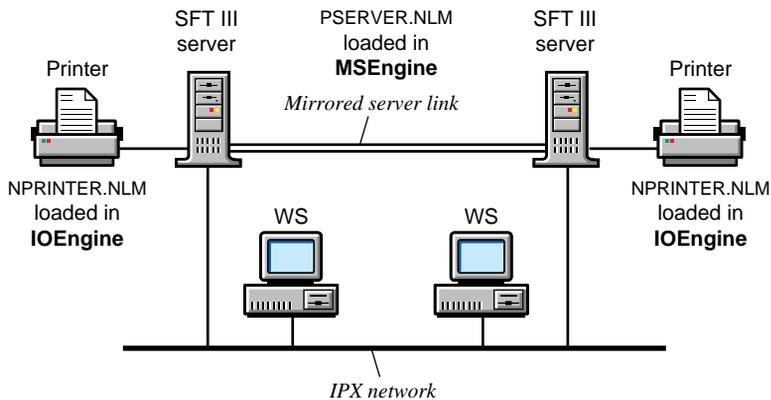
To automate, put the following line in each workstation's AUTOEXEC.BAT file:

```
NPRINT <printserver name > <printer number >
```

SFT III Printing Setup B (Less Fault Tolerant)

The following figure illustrates a less fault tolerant network printing setup using SFT III.

Figure 6-6
SFT III Network Printing Setup B



The procedure for setting printers up in this way on an SFT III network is listed below.

Procedure

1. **Connect a printer to each SFT III server.**
2. **From a workstation, use PCONSOLE or NetWare Administrator to set up network printing.**
 - 2a. **In the configuration of each printer, assign the same print queue to both printers.**
 - 2b. **Configure each printer for Manual Load.**
3. **At the SFT III console, change to the MEngine and load PSERVER, using the following syntax:**

```
LOAD PSERVER .<printserver name >.context
```

To automate loading, put this command in the MSAUTO.NCF file.

4. **Load NPrinter.NLM in the IO_ENGINE of each server, using the following syntax:**

```
NPrinter <printserver name > <printer number >
```

To automate loading put this command in the IOAUTO.NCF file of each server.

Troubleshooting Print Server Problems

The first step in troubleshooting print server-related printing problems is to use PCONSOLE , NetWare Administrator, or the print server console to monitor what is happening with your printers and print server.

- ◆ You can check on a printer that is not working by using the Information and Status option from the Print Server Information menu in PCONSOLE. This option will tell you whether the print server is running. You can also view printer status at the print server console.
- ◆ You can stop, pause, and start the printer, as well as abort or rewind a print job or realign the paper in PCONSOLE. Use the Printer Configuration option to access the Printer status form and select the Printer Control menu.

- ◆ For information on performing similar tasks with NetWare Administrator, see “Viewing Your Printing Layout and Status” on page 69 and “Viewing and Modifying a Printer’s Status” on page 60.

For a comprehensive discussion of printing troubleshooting strategies, see Appendix D, “Troubleshooting Printing Problems,” on page 269.

Additional Information

For more information about	See
Creating, modifying, or deleting print servers	“Creating Print Servers” on page 46 (NetWare Administrator) “Creating or Modifying Print Servers” on page 104 (PCONSOLE)
Modifying a server's AUTOEXEC.NCF file	“Creating or Editing a Server Batch (.NCF) File” in <i>Supervising the Network</i>

Setting Up Printers Attached to Workstations or Servers

This chapter explains how to use Novell® network port driver software. Every network printer requires a software program called a *port driver* to print network print jobs.

When you are finished with the instructions in this chapter, you should have a NetWare® port driver (NPRINTER) loaded for each network printer.

You must use NPRINTER.EXE or NPTWIN95.EXE if your printer will be attached to a workstation. Use NPRINTER.NLM if your printer will be attached to a NetWare server.

Printers attached directly to servers running PSERVER.NLM may be configured to be loaded either automatically (using the Auto Load (Local) option) or manually (using the Manual Load option). Printers attached to workstations can only be configured for manual loading.

The terms *local*, *remote*, *auto load*, and *manual load* may be confusing at first. Keep in mind that *local* and *auto load* are the same thing while *remote* and *manual load* are the same thing.

Configuring your printer to Auto Load (Local) means that when you load your print server, it is also going to load NPRINTER with the printers that you have configured as Auto Load (Local) printers.

Configuring your printer to Manual Load means that you can load a printer remotely; that is, NPRINTER may be run on a different machine from the print server.

In addition, you may want to load PCONSOLE on that workstation to allow you to monitor the status of these printers.

A network printer can print jobs sent from any network workstation. Network printers include printers that are cabled in any of the following ways:

- ◆ **To a DOS workstation (NPRINTER.EXE).** For standard systems, you can attach up to 3 parallel and 4 serial printers to a workstation.
- ◆ **To a Windows 95/98 workstation (NPTWIN95.EXE).** For standard systems, you can attach up to 3 parallel and 4 serial printers to a workstation.
- ◆ **To a NetWare server (NPRINTER.NLM).** For standard systems, you can attach up to 3 parallel and 4 serial printers to a single machine.
- ◆ **Directly to the network cabling.** See “Using Third-Party Network-Direct Print Devices with NetWare 4” on page 164.

Note: Only printers cabled to a NetWare server running the print server may have NPRINTER.NLM loaded automatically when PSERVER.NLM loads. Manually loaded NPRINTER NLM™ modules display a separate status screen on the NetWare server console. Any NPRINTER NLM configured for Auto Load (Local) is tracked in the print server console screen.

New NPRINTER Features for NetWare 4

MS Windows Support

While RPRINTER for NetWare 3™ software supports MS Windows, the support provided for MS Windows by NPRINTER in NetWare 4™ software has been improved.

NLM Version

In NetWare 4, the port driver has been taken out of PSERVER.NLM and has become NPRINTER.NLM. This allows greater flexibility in setting up your network and in deploying your network resources.

For example, you may now choose to include only one print server object in your Directory Services context. You can use this print server

to service printers attached to NetWare servers that do not have a print server running. This was not possible in NetWare 3.

The use of NPRINT.NLM also allows you to unload the port driver without bringing down the print server.

Improved Performance

Tests indicate that NPRINT executes faster than RPRINT. The effect this added speed will have on printing performance on your own network will be determined by such items as port speed (the speed at which data can pass through your port), printer speed, type of data being printed (for example, graphics vs. text), and the speed of the machine NPRINT is running on.

For example, if you are printing graphics data from a fast machine that has a fast parallel port, and you also have a fast printer, the performance improvement should be quite noticeable. On the other hand, if you are printing to a serial port, you will not see any performance difference.

Requirements

Before completing tasks in this chapter, you need the following:

- NetWare 4 server.
- Print server, print queue, and printer that have been created and assigned using one of the following:
 - ◆ NetWare Administrator (See “Using Print Services Quick Setup in NetWare Administrator” on page 18.)
 - ◆ PCONSOLE (See “Using Quick Setup in PCONSOLE” on page 19.)
- Print server (PSERVER.NLM) loaded on a NetWare server. (See “Using PSERVER.NLM” on page 153.)
- Printer cabled to a network workstation running DOS or MS Windows directly to the network or to a NetWare server.

Hint: Make sure each printer functions properly in its current environment. If a printer functions properly in its current environment (non-network or otherwise),

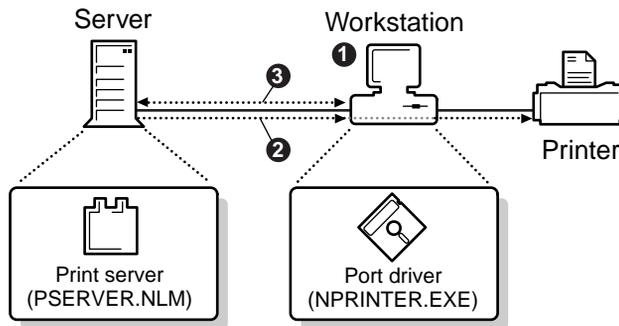
it will work with NetWare print services. If your printer is not functioning properly, see Appendix D, "Troubleshooting Printing Problems," on page 269 or Appendix B, "Cabling Printers," on page 245.

Using NPRINT.EXE

The NetWare port driver portion of NPRINT.EXE for a DOS or MS Windows workstation is a terminate-and-stay-resident program that can be loaded either from the NPRINT menu or from the command line.

The following figure illustrates the path taken by print data from a print queue on a NetWare server to a printer attached to a network workstation.

Figure 7-1
Data Path for Print Jobs from PSERVER to a Printer



- 1 NPRINT waits for a print job.
- 2 PSERVER sends print job data to the printer via NPRINT. After checking for printer readiness, NPRINT sends print job data until the printer's buffer is full or until its own buffer is empty.
- 3 NPRINT requests more data from PSERVER and also sends its status.

Printing Tasks Handled through NPRINT.EXE

Table 7-1

NPRINT.EXE Tasks

To get to the screen where you can	Do the following
Load a printer configured as manual load or type Other/Unknown.	<ol style="list-style-type: none">1. Type <code>NPRINT</code> <Enter> .2. Select a print server then a printer, or press <F4> and <Enter> to browse and select a printer.3. Press <F1> for help from here.
Load port driver for printer P_1 for organizational unit Sales in organization Novell.	<code>NPRINT .P_1.SALES.NOVELL</code> <Enter>
Load port driver for printer P_1 (logical number 0) for print server PS-SALES (NetWare 3 syntax).	<code>NPRINT PS-SALES 0</code> <Enter>
View the status of all loaded port drivers.	<code>NPRINT /s</code> <Enter>
Unload the port driver loaded last.	<code>NPRINT /U</code> <Enter>
View Help for the command-line NPRINT.	<code>NPRINT /?</code> <Enter>

Command Syntax

`NPRINT [printer |printserver printernumber] option`

NPRINT.EXE can be loaded up to seven times on the same workstation. This is because you can load NetWare port drivers for up to 3 LPT and 4 COM workstation ports with NPRINT.EXE (menu or command-line)

The following figure shows you options available with NPRINT.EXE at a DOS workstation.

Table 7-2

NPRINTER.EXE Options

Parameter	Syntax or variable	Description
Buffer	B = <i>number</i>	Overrides defined buffer size (3-60 KB). The default is 3.
Printer	<i>printername</i>	Indicates a Printer object for which to load the NetWare port driver. Syntax requires either the printer name or the print server name plus the printer number.
Print server	<i>printserver name</i>	Indicates the print server assigned to the printer you want to load. Syntax requires either the printer name or the print server name plus the printer number.
Printer number	<i>printer number</i>	Indicates the logical printer number of the printer you want to load. Syntax requires either the printer name or the print server name plus the printer number.
Show	/S	Shows the current status of all loaded NetWare port drivers.
Timing	T =<1-9>	Controls the duration of the strobe signal. The default is 1 (allowed range is 1-9). Assigning a higher number gives more priority to the machine's foreground tasks, which will in turn slow down printing but improve overall workstation performance.
Unload	/U	Unloads the most recently loaded NetWare port driver.
Version	/VER	Displays version information for this utility. Also lists the names and version number of all files required to run this utility.
Help	/? or /H	Displays online help.

Running Port Drivers from Local Drives

If you want to avoid logging in to the network before running NPRINTER.EXE, it is possible to run the program from a local drive. However, to ensure the proper execution of the program, you must copy all associated files to the same directory as the one containing the executable file on your local drive.

To get a list of all of the associated files and correct version numbers of each, type NPRINTER /VER at the network command line.

Running Port Drivers on DOS or MS Windows Workstations

The NetWare port driver portion of NPRINTER.EXE for a DOS or MS Windows workstation is a TSR (terminate-and-stay-resident) program that can be loaded either from the NPRINTER menu or from the command line.

NPRINTER.EXE can run any printer configured in NetWare Administrator or PCONSOLE as Manual Load.

Note: Each loaded NPRINTER.EXE occupies 2 KB more of workstation RAM than the buffer size defined for that printer. Buffer sizes can be set in either PCONSOLE or NetWare Administrator, or the command line. You can load NPRINTER.EXE up to 7 times per workstation. Buffer size can be changed in PCONSOLE and in NetWare Administrator. NPRINTER options loaded from the command line override these configuration settings.

Loading Port Drivers on MS Windows Workstations

If your workstation uses MS Windows 3.0 or 3.1, you must load NPRINTER.EXE before you load MS Windows *and* you must perform one of the following options:

- ◆ In PCONSOLE or NetWare Administrator, configure the printers to use polled mode instead of a specific interrupt number. (After selecting a printer, select the printer type at the Printer Configuration screen and then select Interrupt: None at the Configuration field.)
- ◆ If you want to use a specific interrupt, place the following lines in the MS Windows SYSTEM.INI file under the heading [386Enh]:

```
LPT1AutoAssign=0  
LPT1irq=-1
```

Replace LPT1 with the port that the printer is cabled to (for example: LPT2, COM1, COM2).

Loading Port Drivers from the NPRINTER Menu

The NPRINTER menu allows you to load printers configured as Manual Load and printers of type Other/Unknown. This menu also allows you to view available print servers or printers before selecting which printer to load. Printers configured as type Other/Unknown can

be configured at load time as parallel or serial with the interrupt you select.

Procedure

1. **(Optional) Log in.**
2. **Type the following:**

```
NPRINTER <Enter>
```

A list of available print servers appears.

Press <F4 > to switch to Directory Services mode and then press <Insert > to browse for a printer and skip the remaining steps. Press <F1> for help. Switching to Directory Services mode only determines how you find a printer. You will still have the advantages of Directory Services without using Directory Services mode to find a printer.

3. **Choose a print server.**

A list of printers assigned to the print server appears.

For example, to load a printer that is assigned to PS-SALES, choose PS-SALES. A list of printers not in use that are assigned to PS-SALES appears.

4. **Choose a printer.**

For example, to load network printer P_1, choose P_1 from the list of available printers on PS-SALES.

If you choose a printer of type Other/Unknown, you will be asked to specify the printer type (parallel or serial), the port, the interrupt, and so forth.

Loading Port Drivers from the Command Line

The command line option of NPRINTER allows you to quickly load a port driver without entering a menu. We recommend that you use the command-line option in the workstation's AUTOEXEC.BAT file to load the network port driver each time the workstation boots.

Procedure

1. **Log in.**
2. **Type the following at the command line:**

```
NPRINTER printername
```

Depending on the default context for the workstation, you may need to specify the full name that includes the directory context. For example, to load the port driver for printer P_1, type one of the following:

```
NPRINTER .P_1.SALES.NOVELL
```

or

```
NPRINTER printservername printername
```

For example, to load printer P1, which has printer number 0 and is assigned to PS-Sales, type

```
NPRINTER PS-SALES 0
```

(The printer number can be determined in NetWare Administrator or PCONSOLE utilities)

Place this line in AUTOEXEC.BAT following your network login command for automatic execution.

Hint: NPRINTER.EXE can be executed without logging in if you copy all necessary NPRINTER files to a local workstation drive. To get a list of the necessary files and correct version numbers, type NPRINTER /VER.

Unloading Port Drivers from the Command Line

You must unload port drivers one at a time, beginning with the one most recently loaded. To unload a port driver, type

```
NPRINTER /U
```

Using NPRINT (Windows 95/98)

Use NPRINT Manager to allow network users to share a printer attached to a Windows 95/98 workstation.

When you run NPRINT Manager after the initial setup, the program checks which printers need to be loaded. If the print server is running and the printer specified is free, that printer is loaded, and its information window is displayed in the NetWare Nprinter Manager window.

Sharing a Printer Attached to a Windows 95/98 Workstation

NPTWIN95.EXE, the NPRINT Manager executable, allows network users to share a printer physically attached to a Windows 95/98 workstation that is running the Novell Client. Figure 7-1 on page 176 illustrates this principle using NPRINT.EXE on a DOS workstation as an example.

Running NPRINT Manager and adding a local printer makes the local printer available to network users. Any printer you add will remain available to the network during that session of Windows 95/98. You can also specify that the printer will be activated whenever NPRINT Manager starts.

NPTWIN95.EXE can run any printer configured in NetWare Administrator or PCONSOLE as Manual Load.

Prerequisites

- 386, 486, or 586 workstation
- Printer cabled to the workstation as if ready for local printing
- Initial print setup completed, which includes creating and associating a Print Server object, Printer object and Print Queue object (See "Setting Up NetWare Print Services" on page 18.)
- PSERVER.NLM loaded at the server console

- Windows 95/98 operating system running on the workstation
- Novell Client running on the workstation

Important: NPTWIN95.EXE is not compatible with the Microsoft* NetWare Client.

Procedure

Upon completion of this procedure, network users should be able to capture a port for the shared printer, and then begin printing to the shared printer.

1. **Ensure the Windows 95/98 workstation with the attached printer is running the Novell Client.**
2. **At the workstation, log in to the network as any user.**
3. **Double-click Network Neighborhood.**
4. **Navigate to the SYS\PUBLIC\WIN95 folder on your server.**
5. **Double-click NPTWIN95 (the NPRINT Manager program).**
6. **(Conditional) If the Add Network Printer dialog box does not display, choose Printers and then choose Add.**

The dialog box does not display after you have added your first printer to the program.

7. **Choose an NDS printer or bindery-based print server and printer.**
 - 7a. **Choose either NDS Printer or a Bindery-Based Printer.**
 - 7b. **Choose the button labeled ... to browse.**
 - 7c. **(Conditional) If adding a bindery-based printer, choose a print server to view printers that you have rights to.**

The print servers displayed in the Print Servers and Printers window are all those which are advertising to your server. But when you choose a print server, only printers you have rights to will display.

- 7d. **Choose a printer.**

An NDS Printer object displayed might not be available if it is incompatible with your setup or if its print server is not running.

7e. Choose OK.

8. (Conditional) If the Set Properties dialog box displays, set printing properties in the displayed box, and choose OK.

The dialog box will only display if the selected printer was previously defined as Other/Unknown.

8a. Choose an LPT or COM port.

8b. Choose an interrupt setting or Polled.

Polled mode is usually the default setting for interrupts. However, dedicated interrupts usually provide better printing performance.

If you do not know what interrupt to set or if you are having interrupt conflicts, try using the polled mode. A polled mode printer may not be as fast as an interrupt-driven printer, but it avoids the difficulty of identifying an available interrupt and the conflicts that can arise from choosing an incorrect interrupt.

8c. Choose a buffer setting from 3 KB to 60 KB of memory.

8d. (Conditional) If a COM port was selected, set the following to correspond with your serial printer settings.

- ◆ Baud Rate
- ◆ Data Bits
- ◆ Stop Bits
- ◆ Parity
- ◆ XON/XOFF

8e. Choose OK.

9. (Optional) If you want NPRINT to load this printer and the required NLM programs the next time the program is run, check Activate Printer When Nprinter Manager Loads.

If the box is unchecked, the printer being added will only remain active for this Windows 95 session, and the printer must be added again to the program before it will be available as a shared printer to network users.

10. Choose OK.

11. Verify that the printer was successfully set up by ensuring the printer's status window displays and the settings are correct.

- ◆ If this is the only printer added to NPrinter Manager, from the Printers menu, choose Clear, and then choose Add and add the printer again.
- ◆ If there are other printers added to NPrinter Manager, (1) from the Printers menu, choose Properties and uncheck Activate Printer When NPrinter Manager Loads, (2) choose Remove, and (3) add the printer again.

12. (Optional) Close the NetWare NPrinter Manager window by choosing Printers and then choosing Exit.

By closing the window, you exit the program but leave the NLM programs required for printing loaded. Network users will still be able to print to the printers that have been added to the window.

13. (Optional) To automatically run NPTWIN95 when you start the workstation, add NPTWIN95 to the workstation STARTUP folder.

13a. From the Windows 95 desktop, choose Start, and then point to Settings.

13b. Choose Taskbar, and then choose the Start Menu Programs tab.

13c. Choose Add, and then choose Browse.

13d. Navigate to the NPTWIN95 file, and then double-click it.

13e. Choose Next, and then double-click Startup.

13f. Type the name that you want to see on the StartUp menu (like NPrinter), and then choose Finish.

13g. (Conditional) If Windows 95 prompts you to choose an icon, choose one, and then choose Finish.

14. **(Optional) To avoid logging in to the network before running NPRINTER Manager, copy the required files to your hard drive, as described in “Running NPRINTER Manager from a Local Drive” on page 187.**

The attached printer should now be available as a shared network printer. Network users can now capture a port for the printer and begin printing to it. For information on capturing a port at a Windows 95 workstation running Novell Client, see “Setting Up Network Printing on a Windows 95/98 Workstation” on page 188.

Managing NPRINTER (Windows 95/98) and the Shared Printer

After you complete the required steps to activate the shared printer (see “Sharing a Printer Attached to a Windows 95/98 Workstation” on page 182), the NPRINTER program can be used to perform the following printing tasks.

Table 7-3

NPRINTER Manager Tasks

Task	Procedure
Add a printer to the NetWare Nprinter Manager window.	<ol style="list-style-type: none"> 1. From the Printers menu, choose Add. 2. Choose to add an NDS printer or bindery-based printer. 3. Browse to the printer, highlight it, and click OK. 4. If you want to load this printer the next time the NPRINTER Manager runs, check Activate Printer When Nprinter Manager Loads. If not, uncheck the box.
Change all printers attached to the workstation from network printers to local printers.	<ol style="list-style-type: none"> 1. Notify users of the printers' changing status. 2. From the Printers menu, choose Clear.
Temporarily down a network printer attached to the workstation.	<ol style="list-style-type: none"> 1. Notify users of the temporary situation. 2. In the NetWare Nprinter Manager window, make the printer's information window active. 3. From the Printers menu, choose Remove.

Task	Procedure
Temporarily down all network printers attached to the workstation.	<ol style="list-style-type: none"> 1. Notify users of the temporary situation. 2. From the Printers menu, choose Remove All.
View current printer configuration or status.	In the NetWare Nprinter Manager window, make the printer's information window active, and then from the Printers menu, choose Properties.

Running NPRINTER Manager from a Local Drive

If you want to avoid logging in to the network before running NPRINTER Manager, it is possible to run the program from a local drive. However, to ensure the proper execution of the program, you must copy all associated files to the same directory as the one containing the executable file NPTWIN95.EXE on your local drive.

If you have added NPRINTER Manager to the StartUp folder or if you have created any shortcut buttons for the program, the paths to NPTWIN95.EXE will need to be updated.

Procedure

Complete the following to load NPRINTER Manager on a hard drive.

1. **From the Windows 95/98 desktop, open My Computer, choose a local drive, and create a folder called Nprinter.**
2. **Choose Network Neighborhood and then navigate to the SYS\PUBLIC\WIN95 folder on the server.**
3. **Copy the following files from the SYS\PUBLIC\WIN95 folder to the Nprinter folder in My Computer.**
 - ◆ NPTWIN95.EXE (usually displays without the .EXE extension)
 - ◆ NPTWIN95.DLL
 - ◆ NPTWIN95.HLP
 - ◆ NPTR95.NLM
 - ◆ NPTDRV95.NLM

- ◆ NPTDRV95.MSG
- ◆ NRDDLL95.DLL
- ◆ NWADLG95.DLL
- ◆ NWADMR95.DLL
- ◆ NWCOMN95.DLL
- ◆ BIDS45F.DLL
- ◆ CW3215.DLL
- ◆ OWL252F.DLL

4. **Update the path in the StartUp folder or shortcut, if applicable.**

Setting Up Network Printing on a Windows 95/98 Workstation

In order to make use of network printers, all network users are required to capture a printer at their workstations. If, from a Windows 95/98 workstation running Novell Client, you want to capture a shared printer, this is the only procedure you should follow.

Note: The Add Printer program accessed through My Computer does not support printing to shared network printers.

Procedure

1. **Double-click Network Neighborhood.**
2. **Navigate to the network location where the printer or print queue resides.**
3. **Double-click the printer.**
4. **Follow the screen prompts using the following guidelines.**
 - ◆ Capture a printing port for the attached printer.
 - ◆ Change the printer name only to change the way the printer displays in My Computer. The default name will still display in Network Neighborhood.

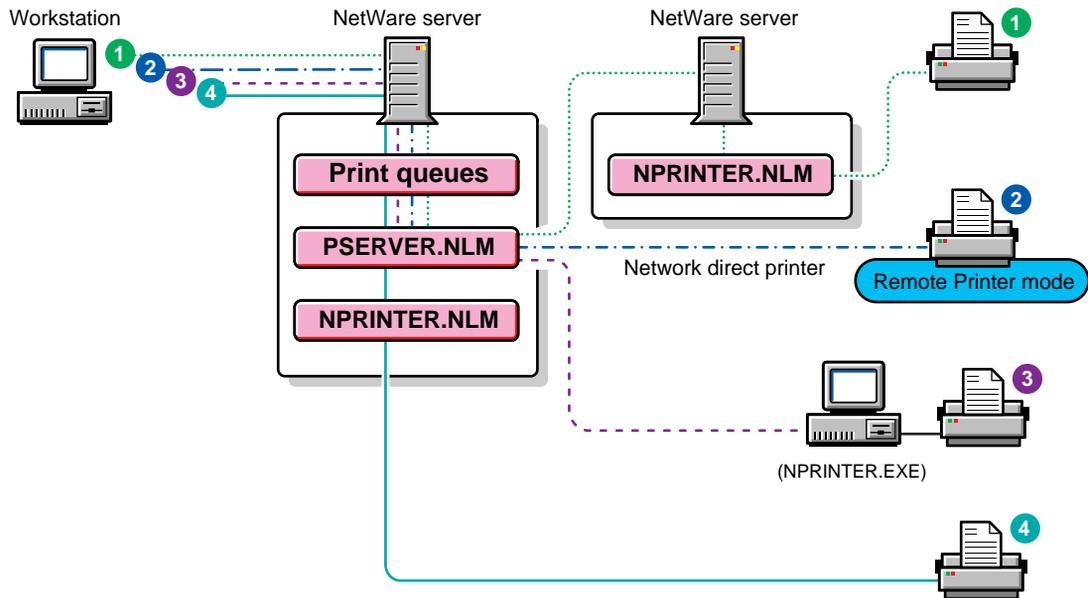
- ◆ Verify that this printer has been chosen as the default (see statement below Printer name box). You might have to choose Yes.

Using NPRINT.NLM

NPRINT.NLM allows you to attach network printers directly to a NetWare server, even a server other than the one on which your print server (PSERVER.NLM) is running.

The following figure shows typical printing setups using NPRINT.NLM, NPRINT.EXE, and a network-direct printer in remote mode, which contains its own port driver.

Figure 7-2
Typical NPRINT Setups



Printing Tasks Handled through NPRINT.NLM

Table 7-4

NPRINT.NLM Tasks

Task	Procedure
Load printer P_1 (logical number 0) for print server PS-SALES.	Type <code>LOAD NPRINT PS-SALES 0</code> <Enter>.
Unload a manually loaded NPRINT.NLM.	Go to the Status screen and press <Escape>.
Unload all loaded NPRINT.NLMs.	Type <code>UNLOAD NPRINT</code> <Enter>.

Loading NPRINT.NLM

NPRINT.NLM can be loaded on a NetWare server multiple times.

When a printer is configured to be loaded on the same server where the PSERVER is running, it can be configured to load automatically or manually. Specify which loading option you want to use as part of your printer configuration in either the PCONSOLE or NetWare Administrator utility.

If Auto Load (Local) is selected, NPRINT.NLM loads whenever the print server is loaded. (The default is Auto Load (Local).)

Configuring printers attached to the server that loads PSERVER as Manual Load allows you to determine when you want the port driver to be loaded. This can be useful if you must limit the number of resources running on your network at a given time.

NPRINT cannot load until the print server is running.

To load NPRINT.NLM, at the NetWare server console, type one of the following:

```
LOAD NPRINT printername
```

Depending on the default context for the NetWare server, you may need to specify the full name that includes the directory context. For example, to load the port driver for printer P_1, type one of the following:

```
LOAD NPRINTER .P_1.SALES.NOVELL
```

or

```
LOAD NPRINTER printservername printernumber
```

For example, to load printer P1, which is printer number 0 (as seen in NetWare Administrator or PCONSOLE) and is assigned to print server PS-Sales, type

```
LOAD NPRINTER PS-SALES 0
```

Hint: If NPRINTER is to be loaded on the same NetWare server as the print server, the printer can be configured as Auto Load (Local). If NPRINTER is to be loaded on a NetWare server other than where print server is running, the LOAD command can be placed in the AUTOEXEC.NCF file for automatic loading and the printer should be configured as Manual Load.

The following figure illustrates the status screen that appears if you manually load NPRINTER.NLM.

```
Print server:  PS-SALES
Printer:       0
Printer name:  P1.Sales.Novell
Printer type:  LPT1
Interrupt:    Polled
```

```
Status:
  NPRINTER status:  Waiting for Print Job
  Printer status:   Running
```

The status screen for a serial printer displays four characteristics used in RS-232-C serial communication: DCD (Data Carrier Detect), DSR (Data Set Ready), CTS (Clear To Send), and RI (Ring Indicator). You can typically interpret the high and low signal levels as follows:

- ◆ DCD remains low unless the printer is off or disconnected
- ◆ DSR remains high while in use by NPRINTER

- ◆ CTS fluctuates high when the printer is ready to receive data and low when the printer is unavailable
- ◆ RI (currently not used) remains constant depending on the port

Using Network-Attached Printers

For information on using port drivers for printers attached directly to the network, see “Using Third-Party Network-Direct Print Devices with NetWare 4” on page 164.

Troubleshooting Tips for Administering Printer Stations

For a comprehensive discussion of strategies for troubleshooting network printing, see Appendix D, “Troubleshooting Printing Problems,” on page 269.

Printing Is Slow Using NPRINT.EXE As a Remote Network Station

The following are possible reasons why printing with might be substantially slower using NPRINT.EXE as a remote network station than using the same printer locally from DOS:

- ◆ You may have an IRQ conflict.
Change to polled mode.
- ◆ Your port may not support hardware interrupts.
If this is the problem, use polled mode. (You can get the ability to use interrupts by installing an I/O board that supports them.)
- ◆ You may be using the wrong type of cable or a defective cable.
Try a new cable. Some printers require a non-standard parallel cable. They will work with a standard cable, but not effectively. Examples: IBM 4019 & 4029.

The Message Printer Is Not Connected Appears on the Console Screen

This message may indicate that NPRINTERR has not yet been loaded to activate a printer that has been previously defined in PCONSOLE.

Remote Serial Printer Self-Tests Successfully But Is Not Working As Network Device

Serial printers must be configured the same way as they are configured in NetWare utilities PCONSOLE or NetWare Administrator. The printer must be configured through its DIP switches or through menus. See your printer's documentation for details.

The printer configurations must agree on baud rate, data bits, stop bits, XON/XOFF, and parity.

NPRINTERR.EXE Does Not Initialize or Hangs Periodically at Random

Sometimes the presence of a router between the NPRINTERR station and the print server can cause problems for NPRINTERR, causing the printer to hang.

A similar problem may occur when you reboot the workstation to re-establish a lost connection. In this case, you sometimes get a message telling you the printer is still in use. You see this message when the previous SPX connection has not timed out, which usually takes at least 30 seconds.

If you have increased the SPX™ abort and IPX™ Retry counts, the time-out sequence is even longer.

To resolve either of these problems, first make sure the following conditions have been met:

- ◆ Your machine has sufficient memory.
- ◆ You are running current versions of software such as NPRINTERR and NetWare VLM™ programs.
- ◆ The PSERVER NLM is running.

Attempts to start NPRINTERR when PSERVER is not running will cause an error.

If none of these is the cause of the problem, try increasing the following two parameters in your NET.CFG file:

```
SPX ABORT TIMEOUT= retry_number
IPX RETRY COUNT= retry_number
```

SPX ABORT TIMEOUT defaults to 540 ticks or approximately 30 seconds. IPX RETRY COUNT defaults to 20.

You can also try loading NPRINT through a batch file at the workstation. That file can include an IF statement to retry NPRINT until PSERVER is functioning. For example:

```
:LOOP
NPRINT pserver printernumber
IF ERRORLEVEL 1 GOTO :LOOP
ECHO Port driver loaded successfully.
```

Workstation Hangs When NPRINT Loads

Sometimes NPRINT conflicts with the network interface board settings and hangs. This problem may be caused by conflicting settings on the LAN adapter board.

Either change to polled mode or change the board settings to avoid the conflict.

Print Jobs Are Ruined When Printing Locally

A print job on a printer may be ruined if the user on the station to which the printer is physically attached does not have a CAPTURE invoked and attempts to print locally. To prevent this, capture LPT1 on this workstation so that NetWare handles the job.

Another method is to reverse the Private and Shared printer options so that the printer is designated as Private. This can be done at the print server console from the Printer Control option window or from the PSC command-line utility.

PSC provides the quickest way to do this. Issue the PSC Private (PRI) command from the DOS prompt. You can then issue the PSC Shared (SHA) command to reverse the status for shared network printing again.

NPRINTER Cannot Reconnect to Print Server That Was Downed and Loaded on Different NetWare Server

If you bring down PSERVER.NLM and bring it up on a different NetWare server from the one it was originally loaded on, port drivers that were connected to that print server initially lose their connection.

When NPRINTER is connected to PSERVER.NLM, the port driver stores the network address of the NetWare server where the print server was loaded. If the print server is then loaded on a different NetWare server, the port driver cannot attach to the print server again unless it is reattached to the new running print server.

If you do not reattach the port driver, and later reload the print server on the original NetWare server, the port driver will connect as before because the network address of the NetWare server and the information stored by the port driver once again match.

Port Driver Status Is Waiting for Job But Printer Is Not Attached

The port driver (NPRINTER) status for a defined but unattached serial printer is “Waiting for job” even though the printer is not attached, and the printer status is “Running.” If a print job is put into the queue for this printer, the port driver status changes to “Ready (Waiting for printer)” or “Printing job” but the printer status changes to “Offline.”

Defined but unattached parallel printers show a status of “Not connected.”

NPRINTER.EXE Does Not Run from Local Drive

If you want to run NPRINTER.EXE from your local drive, be sure to copy all the necessary files. To get a list of all the necessary files and correct version numbers, type `NPRINTER /VER`.

An alternative is to put them in the LOGIN directory on the network, which is the directory that is accessible prior to logging in. This will eliminate the security risk and user error problems that can occur from leaving a workstation logged in and not supervised.

Additional Information

For more information about	See
Creating, modifying, or deleting print servers or printers	“Setting Up Print Services with NetWare Administrator” on page 39 (NetWare Administrator)
	“Modifying NetWare Print Services” on page 50 (NetWare Administrator)
	“Creating or Modifying Print Servers” on page 104 (PCONSOLE)
	“Creating or Modifying Printers” on page 102 (PCONSOLE)
	“Using PCONSOLE in Bindery Mode” on page 123 (PCONSOLE)
Modifying a server's AUTOEXEC.NCF file	“Creating or Editing a Server Batch (.NCF) File” in <i>Supervising the Network</i>
Modifying a workstation's AUTOEXEC.BAT file	Novell Client documentation

Creating and Managing Print Job Configurations

You may find yourself repeatedly using certain sets of configuration parameters when printing with NPRINT or CAPTURE. Setting these parameters whenever you add a job to PCONSOLE's queue job list can also be redundant. Creating print job configurations can simplify this process.

Print job configurations are used to associate a name with a common set of parameters, including destination queue names or printer names (in NetWare® 4™ software).

You can create print job configurations with PRINTCON or NetWare Administrator. This chapter will deal only with PRINTCON. Refer to “Working with Print Job Configurations” on page 76 for information on using NetWare Administrator.

New Print Job Configuration Features for NetWare 4

The format of the PRINTCON databases has changed for NetWare 4. See “Location of Print Job Configuration Databases” on page 198.

If you are not using any applications or management tools that require the NetWare 3™ database, we recommend that you delete it (SYS:MAIL*usernumber*> \PRINTCON.DAT).

Public Print Job Configurations Allowed

In previous versions of NetWare, all print job configurations were *private*, that is, owned by the individual user. In NetWare 4, administrators can also create *public* print job configurations that can be shared by all users on your network.

Users still have the option of adding their own private configurations. But with public print jobs, the supervisor only has to do it once.

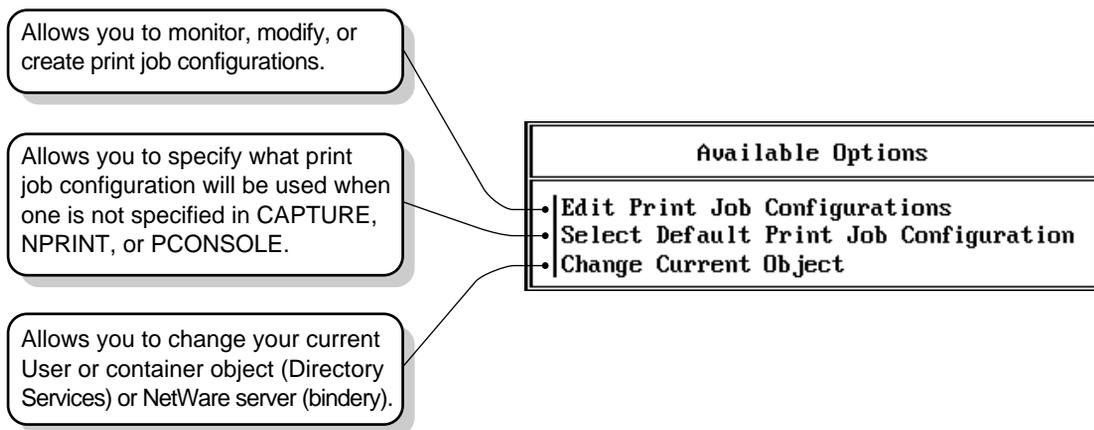
Limit of 37 Print Job Configurations Removed

The 37 print job configuration limit in NetWare 3 has been removed. There is no limit now.

Printing Tasks Handled through PRINTCON

The following figure illustrates the tasks you can perform with PRINTCON.

Figure 8-1
PRINTCON Tasks



Working with Print Job Configurations

Print job configurations are groups of print job options that simplify the use of CAPTURE and NPRINT. You can use PRINTCON to create or modify print job configurations and to specify a default print job configuration for users who use CAPTURE, NPRINT, NETUSER, or PCONSOLE to send print jobs to a network printer or print queue.

Location of Print Job Configuration Databases

Both the format and location of the database for print job configurations have changed for NetWare 4.

- ◆ In NetWare 3, the PRINTCON database was
SYS:MAIL*<usernumber>* \PRINTCON.DAT.
- ◆ In the NetWare 4 Directory, the database is an attribute of a container object or User object. Configurations can be modified through the Print Job Configurations option of PRINTCON or the Print Job Configurations dialog for the container object in NetWare Administrator.
- ◆ In NetWare 4 bindery mode, the public database is
SYS:PUBLIC\PRINTJOB. DAT.

The private database is

SYS:MAIL*<usernumber>* \PRINTJOB.DAT

Creating Print Job Configurations

To create a print job configuration, complete the following steps.

Procedure

1. **From PRINTCON, select Edit Print Job Configurations from the Available Options menu.**
2. **Press <Insert> from the Print Job Configurations list.**
3. **Type the name (up to 31 characters) of the configuration you want to create in the Enter New Name entry box and press <Enter>.**
4. **Select the new print job from the Print Job Configurations list.**
The Edit Print Job Configuration form is displayed.
5. **Use the arrow keys to highlight the item you want to modify**
Make the change by typing a new value and pressing <Enter>, or by selecting an item from the menu provided.

The configuration parameters are explained in “Print Job Configuration Parameters” on page 203.
6. **After you have set up your configuration, press <F10>.**

Creating Bindery Print Job Configurations

Procedure

- 1. Load PRINTCON and press <F4> to switch to bindery mode.**

You may receive a warning message at this point telling you that you must have a SYS:MAIL directory before you can create a private bindery print job database. To do this you must log into this server in bindery mode.

If you are not attached to a bindery server, a list of servers you are already attached to is displayed.

- 1a. Press <Insert> and browse through the Other NetWare Servers list until you select the bindery server you want to attach to.**

- 1b. Log in to the bindery server you selected by entering your username and password at the prompts.**

You then return to the list of attached servers, which now includes the bindery server you logged in to.

- 1c. Select the bindery server to make it the current server.**

You are returned to the Available Options menu.

- 2. Select the Edit print job configurations option.**

The Print Job Configurations list appears.

- 3. At the Print Job Configurations list, press <Insert> to create a new configuration.**

If you are logged in to the bindery server as a Supervisor or equivalent user, the options of Private Database or Public Database will appear. Print jobs created for the private database are stored in the users MAIL directory, and public database jobs are stored in SYS:PUBLIC directory.

When a user goes into PRINTCON to edit print jobs, all job configurations from both the user's print job database (in the MAIL directory) and those in the PUBLIC database are shown. If the job configuration is a public job, it will have (Public) listed next to the configuration name.

Here are some additional points to keep in mind:

- ◆ Bindery-based users will have access only to print job configurations created by a bindery based user.
- ◆ Directory Services based users will have access only to print job configurations created in Directory Services mode.
- ◆ Only users defined in the bindery context will have access to bindery-based print job configurations.
- ◆ Bindery-based users (users in the bindery context) have a MAIL directory created for them. Private print jobs are stored in PRINTJOB.DAT in the users MAIL directory. (Notice the name has been changed from PRINTCON.DAT to PRINTJOB.DAT.)
- ◆ Public print job configurations for bindery-based users are stored in SYS:PUBLIC\PRINTJOB.DAT file.

Note: For Directory Services users, the print job configurations are an attribute in the Directory and are replicated wherever a partition in which they are defined is replicated.

Deleting Print Job Configurations

Procedure

1. From **PRINTCON**, select **Edit Print Job Configurations** from the **Available Options** menu.
2. Highlight the configuration you want to delete from the **Print Job Configurations** list; then press ****.
3. Select **Yes** in the **Delete Current Print Job Configuration** confirmation box.

Renaming Print Job Configurations

Procedure

1. From PRINTCON, select Edit Print Job Configurations from the Available Options menu.
2. Highlight the configuration you want to rename in the Print Job Configurations list, and press <F3> (the Modify key).
3. Type the new name in the Change name to entry box, and then press <Enter>.

Viewing or Modifying Print Job Configurations

Procedure

1. From PRINTCON, select Edit Print Job Configurations from the Available Options menu.
2. Highlight the configuration you want to edit from the Print Job Configurations list. Press <Enter>.
3. Make the change by typing a new value in the desired field and pressing <Enter>, or by selecting an item from the list provided.

The configuration parameters are explained in “Print Job Configuration Parameters” on page 203.

4. To save the changes you have made, press <F10>.

Print Job Configuration Parameters

The following parameters can be set or changed.

Table 8-1

PRINTCON Configuration Parameters

Parameter	Explanation
Number of copies	Type a number from 1 to 65,000. Default: 1
File contents	You can choose either Text or Byte stream (the default). Choose Text when you want tabs to be converted to spaces. Also choose Text to print ASCII text. Choose Byte stream if you are printing from within an application and you want the application to handle the formatting commands. Also choose Byte stream if you will be downloading fonts on a laser printer.
Tab size	This parameter applies only if you choose Text as the File contents setting. Type a number from 1 to 18. The number of spaces you specify replaces all tab characters in your print job. If File contents is set to Byte stream, this field is blank. Default: 8
Form feed	Type Y for Yes or N for No. Choose Yes if you want the printer to advance to the top of the next page after your print job. Choose No if you <i>do not</i> want the printer to advance to the top of the next page. Some applications already have a form feed at the end of the file, so setting this parameter can cause an extra blank page to be fed through. Default: Yes
Notify when done	Type Y for Yes or N for No. If you choose Yes, you are notified that your data has been printed. A message appears across the bottom of your screen. Default: No notification

Parameter	Explanation
Form name	Specifies the form that the printer will use. If an invalid form name is used, CAPTURE will use the default value, (None). (You must define forms using PRINTDEF or NetWare Administrator before users can use form names or numbers.) With an invalid name or number, CAPTURE gives a warning message but still redirects the port using default form values. Default is None.
Print banner	Type Y for Yes or N for No. Choose Yes if you want a banner to be printed before the file is printed. Default: Yes
Name	If you print a banner, you can specify the username that appears on the upper part of the banner page. You can use the default username, or you can type any text (up to 12 characters long). Default: Your username
Banner name	Indicates what will appear in the lower half of the banner page. Limit is 12 characters. Use any word or phrase up to 12 characters long. To allow spaces in a banner name, enclose the name in quotation marks (for example, ON THE GO). Default: The captured port (for example, LPT1) or, when using NPRINT, the filename.
Local printer	This parameter is used only with CAPTURE. You can specify which local parallel printer port (LPT1, LPT2, or LPT3) you want to capture. Default: LPT1
Auto endcap	This parameter is used only with CAPTURE. Type Y for Yes or N for No. Choose Yes if you want the captured data to be printed when you exit an application or when the application closes the printer. Choose No if you don't want the captured data to be printed until you issue a CAPTURE EC command. An alternative is to add <code>TI=number</code> to your CAPTURE command. Default: Yes
Enable timeout	This parameter is used only with CAPTURE. Type Y for Yes or N for No. Choose Yes if you want the captured data to be sent to the queue after the number of seconds you define as the Timeout count has elapsed since receiving data. Default: No

Parameter	Explanation
Timeout count	<p>Specifies the number of seconds the operating system should wait after the last data is received before closing the print job.</p> <p>If your timeout is not long enough, you may have problems printing some files, especially files with graphics. Increase the timeout if only parts of files are being printed or if the files do not print at all.</p> <p>Default: 5</p>
Printer/Queue	Indicates to which printer or print queue the print job should be sent. Bindery mode uses only queue names.
Device	Press <Enter> to see a list of print devices defined in PRINTDEF you can use.
Mode	Press <Enter> to see a list of the modes for the print devices you chose. A mode is a set of control sequences defined in PRINTDEF.

Additional Information

For more information about	Refer to
Creating print job configurations with NetWare Administrator	“Working with Print Job Configurations” on page 76 (NetWare Administrator)

Working with Print Device Definitions and Printer Forms

If your application does not have the print driver for your printer, NetWare® supplies print device definitions for many common printers.

Purpose of Print Device Definitions

Print device definitions are sets of functions and modes found in files with .PDF extensions that correspond to printers, plotters, and other peripherals.

The two primary purposes of these definitions are to set the printer up so that the job is printed properly and to ensure that the printer is left in a known state after completing a print job.

Printer functions (also referred to as *control sequences*, *escape sequences*, or *printer commands*) give instructions to the printer. Print device definitions contain the necessary control sequences for such items as boldface type, underlining, and other printer controls.

To define a printer's functions, you enter control sequences or printer commands into the print device database. To do this, you need the technical reference manual that came with your printer.

Print device definitions do not necessarily represent the full functionality of the printer. A print device definition can be modified to change the functions the machine will actually perform.

Note: Print device definitions are used by print job configurations. You must create and use a print job configuration to specify a print device mode for print jobs. See “Working with Print Job Configurations” on page 198.

Location of Print Device Databases

The print device definitions (.PDF files) supplied in NetWare 4™ software are copied to the SYS:PUBLIC directory during installation. Additional device definitions that you create are also stored in this directory unless you specify another location.

Both the format and location of the print device database have changed for NetWare 4:

- ◆ In NetWare 3™ software, the database for print device definitions was

SYS:PUBLIC\NET\$PRN.DAT

- ◆ In the NetWare 4 Directory, the database is an attribute of a container object accessed through the Print Devices option of PRINTDEF (or the Print Devices dialog for the container object in NetWare Administrator).

- ◆ In NetWare 4 bindery mode, the database is

SYS:PUBLIC/PRINTDEF.DAT

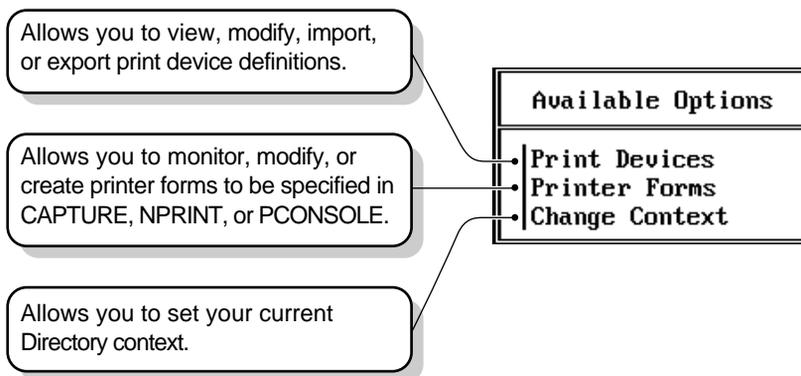
Note: To see the print device definitions included in NetWare, change to the SYS:PUBLIC directory and type `NDIR *.pdf <Enter>` New definitions are added periodically.

Print device definitions can be created and modified in the graphical NetWare Administrator utility and in PRINTDEF. This chapter describes the procedures for using PRINTDEF. For information on using NetWare Administrator, see “Working with Print Device Definitions” on page 86.

Printing Tasks Handled through PRINTDEF

The following figure shows you the tasks you can perform with PRINTDEF.

Figure 9-1
Available Options Menu



Working with Print Device Definitions

If your application does not have the print driver for your printer, NetWare supplies print device definitions for many common printers. If your print driver is not included among those provided in your application or in NetWare, you can use PRINTDEF to create a new print device definition and to specify the correct control sequences according to your printer's documentation.

Viewing Print Device Definitions

Procedure

1. **From the PRINTDEF Available Options menu, select Print Devices.**
2. **Select Edit Print Devices from the Print Device Options menu.**

A list of the print device definitions appears. If the Defined Print Devices list is empty, none have been defined in or imported to the database.

Viewing Functions for Print Device Definitions

A *device function* is a control sequence (a string of control code characters) that controls a printing characteristic for a printer.

To view the functions and control sequences for a print device definition, complete the following steps.

Procedure

1. **From the PRINTDEF Available Options menu, select Print Devices.**

The Print Device Options menu is displayed.

2. **Select Edit Print Devices**

The Defined Print Devices list is displayed.

3. **Select the print device definition corresponding to the printer whose device functions you want to view.**

The Device Options menu is displayed.

4. **Select Device Functions.**

The functions and corresponding control sequences that have been defined for the selected printer appear.

If the control sequence for a function is too long to be displayed in the Printer Functions list (longer than 32 characters), select that control sequence and press <Enter>. The control sequence appears in the Function Definition entry box.

Creating or Modifying Print Device Definitions

If a device definition for your printer is not included among those provided with your application or with NetWare, you need to create your own definition. Each print device definition consists of functions and modes.

Printer functions (also referred to as *control sequences*, *escape sequences*, or *printer commands*) give instructions to the printer. To define a printer's functions, you enter control sequences or printer commands into the

PRINTDEF database. To do this, you need the technical reference manual that came with your printer.

As a network supervisor, you can define or modify a printer's functions by completing the following steps.

Note: Because NetWare can place the functions only at the beginning or end of a print job, the best functions to use are those that affect the entire document (such as Condensed or Landscape).

Procedure

- 1. From the PRINTDEF Available Options menu, select Print Devices.**

The Print Device Options menu is displayed.

- 2. Select Edit Print Devices**

The Defined Print Devices list is displayed.

- 3. (Optional) To delete an existing definition, highlight the definition and press .**

- 4. (Optional) To modify an existing definition, highlight the definition and press <Enter>.**

- 5. (Optional) To create a new device definition, press <Insert>. Type the name you want to assign to the new print device definition in the New Device Name entry box.**

The name should be recognizable to users (for example, a brand name such as IBM ProPrinter), and it cannot be more than 32 characters in length.

The name of the printer you just typed is highlighted.

- 6. If you are creating or modifying a definition, press <Enter>.**

- 7. Select Device Functions from the Device Options menu.**

The Functions for Device *printername* list is displayed.

- 8. To add a new print function, press <Insert>.**

- 9. Type a name to identify the printer command in the Function Definition entry box and press <Enter>.**

Function names must be unique (no two names can be the same) and no longer than 32 characters. Function names are not case sensitive. You can use both letters and numbers.

For example if you are defining the HP LaserJet and you want to include the print function for resetting the printer, you would type

Reset <Enter>

The Control Sequence option is highlighted.

For detailed information on naming and defining print functions, use onlineHelp.

- 10. Enter the control sequences or printer commands for the specified print device.**

The documentation that came with the printer should have a chapter or section explaining printer commands. Consult that documentation.

Press <F1> for Help to see syntax used in creating definitions.

For example, to enter the HP LaserJet print function for reset, you would type

<Esc>**E** <Enter>

- 11. To save and insert the new control sequence into the Functions list, press <F10>.**

Important: When you enter the print functions for a device, be sure to create a reset control function. This control sequence needs to be used to return the printer to a known state.

- 12. Repeat Steps 7 though 10 for each function or control sequence you want to enter.**
- 13. (Optional) You may edit any of the device functions or control sequences. Press <Enter> to access the Function Definition screen, and modify as needed.**
- 14. (Optional) To delete a function, highlight the function and press .**
- 15. Press <F10> to save the modified function.**

Importing Print Device Definitions

Use the following steps to import a print device definition from a .PDF file into the print device database.

Procedure

1. **Log in as user Admin or equivalent at a workstation and type the following at the command line:**

```
PRINTDEF <Enter>
```

The Available Options menu appears.

2. **Select Print Devices.**
3. **Select Import Print Device from the Print Device Options menu.**

The Source Directory appears with the default SYS:PUBLIC if PRINTDEF was started from a network drive.

4. **Press <Enter>.**

The Available .PDFs window appears.

5. **Select the .PDF file you want to add to your database from the Available .PDFs list.**

If you try to import a print device definition that has the same name as an existing print device definition, the New Device Name entry box appears, prompting you to rename the new definition. Type the revised name and press <Enter>.

The new print device definition is added to the print device definition database. You are returned to the Print Device Options menu.

Importing Print Device Definitions from another NetWare Server

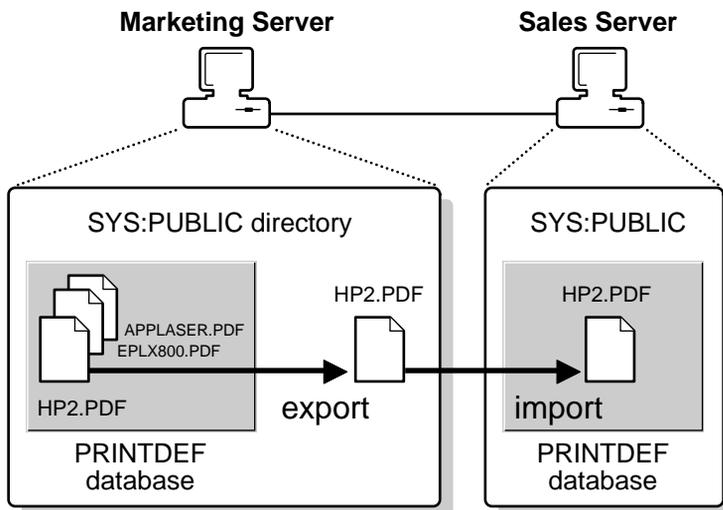
If you want to use another NetWare server's print device definition, you must import the definition from that server. First export the print device definition from the original server into a .PDF (Print Definition) file. You can then import the .PDF file to the database on your server. You can copy only one definition at a time.

You must have the Supervisor right (user Admin or equivalent) on both NetWare servers (or the Admin of the other server will need to help you).

Figure 9-2 on page 214 illustrates the steps in copying a print device definition. This example shows how to copy a typical print device definition from NetWare server **MARKETING** to NetWare server **SALES**.

First, export the definition from the PRINTDEF database on **MARKETING** to the SYS:PUBLIC directory on **MARKETING**. Then import the definition from the SYS:PUBLIC directory on **MARKETING** to the PRINTDEF database on **SALES**.

Figure 9-2
Importing .PDF Files from another Server



Exporting Print Device Definitions

You can export a print device definition from a database to your current directory, to another directory on the current NetWare server, or to a directory on another server. Decide where you want to export the definition, and complete one of the following sections.

Exporting to a Directory

Procedure

1. **From the PRINTDEF Available Options menu, select Print Devices.**

The Print Device Options menu is displayed.

2. **Select Export Print Device**

The Defined Print Devices list is displayed.

3. **Select the device definition you want to export from the Defined Print Devices list.**

The Destination Directory window appears. The SYS:PUBLIC directory is the default if PRINTDEF was started from a network drive.

When exporting and importing .PDF files, press <Insert> to browse directories.

4. **After specifying the destination directory, press <Enter>, then type the name you want to give the file in the Export File Name entry box. Press <Enter>.**

The name can be up to eight characters long but cannot include an extension. You will probably want to use the name of the printer so the file is easily recognizable (for example, HP_LASER).

The file is created with a .PDF extension and is placed in the specified directory.

You are returned to the Print Device Options menu.

Exporting to a Directory on another Server

If you want to export the file to a directory on another server, you must have the Supervisor right on the other server.

Procedure

1. **From the PRINTDEF Available Options menu, select Print Devices.**

The Print Device Options menu is displayed.

2. **Select Export Print Device**

The Defined Print Devices list is displayed.

3. **Select the device definition you want to export from the Defined Print Devices list.**

The Destination Directory window appears. The SYS:PUBLIC directory is the default if PRINTDEF was started from a network drive.

4. **Press <Insert>.**

The Network Directories list box appears.

5. **Select the .. entry at the top of the list. Continue pressing <Enter> until the Volumes window appears.**

This window lists the servers and volumes you are currently attached to, and provides the username through which you made the attachment.

6. **Select the NetWare server you want to export to.**

A list of volumes for the destination NetWare server appears.

7. **Select the volume and continue selecting directories to complete the path.**

8. **After you have selected the complete directory path, press <Esc> and then <Enter>.**

9. **Type the name you want to give the file in the Export File Name box and press <Enter>.**

The name can be up to eight characters long but cannot include an extension. You will probably want to use the name of the printer so the file is easily recognizable (for example, HP_LASER).

The file is created with a .PDF extension and is placed in the specified directory.

Working with Print Device Modes

After you define the functions for a print device definition, you can combine these functions into modes.

A mode is a combination of functions that you define to allow the print device to meet specific printing needs.

For example, you could create a Final Printout mode for the HP LaserJet that would include the functions for 10 cpi, Emphasized printing, and Near-letter quality printing.

As a network supervisor, you must determine what your printing needs are and then define the modes you will need.

Note: In most printers, the order of the functions is important. See your printer's documentation for more details.

Creating Print Device Modes

Use the following procedure to create a new mode.

Procedure

1. **From the PRINTDEF Available Options menu, select Print Devices.**
2. **Select Edit Print Devices from the Print Device Options menu.**
The Defined Print Devices window appears.
3. **Select the name of the device you want to create a mode for, then press <Enter>.**

The Device Options menu appears.

4. Select Device Modes.

The Modes for Device *devicename* window appears.

For previously created print devices, a list of modes may already exist in this window. For newly created devices, the only mode to appear is the (Re-initialize) mode, which exists by default. However, the appropriate printer commands are not yet assigned to this mode.

The (Re-initialize) mode contains the functions that are appended to the beginning and end of a print job to ensure that the printer starts in a known state and returns to a known state. It is the only mode that does this.

4a. To set up the (Re-initialize mode), highlight the mode and press <Enter>.

4b. To see a list of all defined functions for the print device, press <Insert>.

Most printers have a single control sequence for reset.

4c. Select the function or control sequence for resetting the printer.

If your printer does not have a single reset function, you must enter all your printer's Cancel functions into the Reinitialize mode. Mark multiple functions by highlighting each and pressing <F5> (the Mark key).

4d. Press <Esc> to return to the Modes for Device <devicename> window.

5. Create additional modes as needed.

5a. At the Modes for Device *devicename* window, press <Insert>.

5b. Type the name of the mode you want to create (for example, Final Printout) in the New Mode Name entry box and press <Enter>.

5c. Select the new mode name.

The Functions for Mode *modename* window appears.

5d. Enter the functions for the new mode in the list.

- ◆ To see the list of all defined functions for that print device, press <Insert>.
- ◆ To highlight the functions you want to include in the new mode, use <F5> (the Mark key). Then press <Enter>.

For example, if you want to create a Final Printout mode for My Printer and include 10 cpi, Emphasized printing, and Near-letter quality printing, highlight and mark each of these options. Then press <Enter>.

The order of the functions in the functions list may be important to the printer.

Normally, any function you add is placed at the end of the Functions for Mode *modename* list. However, you can insert a new function anywhere in the list:

- ◆ Highlight the function following the line where you want the new function added.
- ◆ Press <F5> (the Mark key) and then press <Insert> to go to the Available Functions... list.
- ◆ Highlight the function you want to include at the marked location in the new mode and press <F5> (the Mark key).
- ◆ Press <Enter>.

The functions you choose appear in the Functions for Mode *modename* list.

When you have completed the Functions list, press <Escape> to return to the Modes list.

- 6. To delete an item from the modes list, highlight that mode and press <Delete>. Then press <Enter>.**
- 7. Repeat Steps 1 through 5 for each mode or combination of functions you want to create.**
- 8. When you are finished entering modes for one print device, press <Esc> to return to the Defined Print Devices list.**

Viewing Print Device Modes

If one or more print device definitions have been created or imported, you can view their associated modes by following these steps.

Procedure

1. **From the PRINTDEF Available Options menu, select Print Devices.**

The Print Device Options menu is displayed.

2. **Select Edit Print Devices.**

The Defined Print Devices list is displayed.

3. **Select the device you wish to view and press <Enter>.**

The Device Options menu appears.

4. **Select Device Modes.**

The Modes for Device *devicename* window appears.

5. **Select the desired mode. The list of functions associated with that mode appear.**

Modifying Print Device Modes

This feature allows you to modify a print device mode that you previously entered.

You can change the name of the mode or change the functions executed from this mode.

Use the following procedure to view or modify an existing print device mode.

Procedure

1. **From the PRINTDEF Available Options menu, select Print Devices.**

2. **Select Edit Print Devices from the Print Device Options menu.**

The Defined Print Devices window appears.

- 3. Select the name of the device you want to create a mode for, then press <Enter>.**

The Device Options menu appears.

- 4. Select Device Modes.**

The Modes for Device *devicename* window appears.

For previously created print devices, a list of modes may already exist in this window.

For newly created devices, the only mode to appear is the (Reinitialize) mode, which exists by default. However, the appropriate printer commands are not yet assigned to this mode.

- 5. Highlight the mode you wish to modify. Press <F3> if you wish to change the name of the mode. Press if you wish to delete the mode. Otherwise, press <Enter>.**

The Functions for Mode *name* is appears.

- 6. Add or delete any functions you wish from the list.**

- ◆ To view the functions already used in an existing mode, press <Enter>.

You cannot modify these functions from this screen. To edit print device functions, return to the Device Options menu and select Device Functions.

- ◆ To add new functions to the mode, place your cursor in the list at the location you want the first new function to appear, and then press <Ins>.

The Available Functions for Device *name* list appears. Mark the functions you want to use with <F5>, then press <Enter> to place them in the mode function list.

Functions will be added in the order they were marked.

- ◆ To delete functions from the mode, press .

Working with Printer Forms

Printer forms can be designated in an effort to prevent your printer from printing a print job on the wrong paper. The printer forms you define are used as you set up print job configurations. For example, you might want some jobs to be printed on letter-size sheets of paper and others on green-bar continuous-feed paper.

Printer forms include information about the length and width of different types of paper used in your printer. The print server operator is notified when a form change is needed. Printer forms are configured in PRINTDEF or NetWare Administrator.

When a print job requests a printer form other than the form currently mounted in the printer, the print server does not service the job until a print server operator reports that the new form is mounted. A print server operator can use PCONSOLE, PSC, or NetWare Administrator to mount the new form.

Printer form names must begin with an alphabetic character and can have up to 12 alpha-numeric characters. Numbers can range from 0 to 254. Length can range from 1 to 255. Width can range from 1 to 999. These numbers are for your reference only.

Note: Printer forms are stored in the Directory Services database. In bindery mode, printer forms are stored in a file named PRINTDEF.DAT in SYS:PUBLIC.

Creating or Modifying Printer Forms

Procedure

1. **From the PRINTDEF Available Options menu, select Printer Forms.**

A list of the forms that have been defined for printing appears.

2. **Press <Insert>, then type the name of the new form you want to define in the Forms Definition Form entry box and press <Enter>.**

The first character of the form name must be alphabetic, and the form name cannot exceed 12 characters. Examples of form names

include White_8x11, Continuous, Checks, Green_Bar, and Standard.

- 3. Type the number you want to assign to the form and press <Enter>**

You should probably assign the most commonly used form as form 0, because 0 is the default form. Form numbers must fall between 0 and 255.

- 4. Type the length of the form in lines per page and press <Enter>.**

The number must fall between 1 and 255. This number is for your reference only. Use a number that makes sense to you. For example, if your printer is set to 6 lines per inch and your paper measures 8.5 by 11 inches, you might select 66.

- 5. Type the width of the form in characters per line and press <Enter>.**

The number must fall between 1 and 999. This number is for your reference only. Use a number that makes sense to you. For example, if your printer is set to 10 characters per inch and your paper measures 8.5 by 11 inches, you might select 85.

- 6. To save changes, press <F10>.**

- ◆ Repeat steps 2 through 8 for each form you want to define.
- ◆ To edit a form, highlight it in the Forms list and press <Enter>. Then follow steps 2 through 8 to make any necessary changes.
- ◆ To delete a form from the Forms list, highlight that form and press <Delete>. Then select Yes in the confirmation box.

Viewing a List of Forms

To see which forms have been defined for your printers in PRINTDEF, select Printer Forms from the Available Options menu.

A list of the forms that have been defined for printing appears.

Viewing Form Definitions

To see what parameters have been set for a specified form, complete the following steps.

Procedure

1. **From the PRINTDEF Available Options menu, select Printer Forms.**

A list of the forms that have been defined for printing appears.

2. **Select the form whose definition you want to view.**

The Forms Definition window appears. It contains the form's name, the number you assigned to it, and the form's length and width.

While both a form name and form number are specified when the form is created or modified, only the number can be specified when you are mounting a form.

Mounting Printer Forms

After a printer form has been created, it must be mounted before the print server will recognize it. Printer forms can be mounted from the Print Server Console, from PCONSOLE, from NetWare Administrator, or from the command line using PSC.

Mounting a printer form consists of two elements:

- ◆ **Changing the paper** NetWare has no way of determining whether the paper was actually changed or not. It relies in information it receives from the operator.

- ◆ **Mounting the form through the software** This is the information that NetWare receives from the operator and that is required in order for printing to continue.

To mount a printer form, you need the following prerequisites:

- ◆ The print server must be loaded and accessible.
- ◆ The printer must be installed and assigned to the print server.
- ◆ A queue must be created and assigned to the printer.
- ◆ At least one print form must have been created.

The following paragraphs explain the different ways a form can be mounted through the software.

Mounting a Printer Form from the Print Server Console

At the NetWare Server console, use <Alt>+<Esc> to toggle to the Print Server screen. Choose a specific printer from the Printer Status option of the Available Options menu. Highlight the Mounted form field in the printer information screen and type the number of the form you wish the printer to service. Print jobs using that form in the print queue will now print.

Mounting a Printer Form with PCONSOLE

Enter PCONSOLE and choose a specific printer from the Printers option of the Available Options menu. Highlight the Printer Status field and press <Enter>. Highlight the Mounted form field in the printer information screen and type the number of the form you wish the printer to service. Print jobs in the print queue using that form will now print.

Mounting a Printer Form with NetWare Administrator

See “Mounting Printer Forms” on page 83.

Mounting a Printer Form with PSC

From the command line, issue the following:

```
PSC PS=printserver P=printernumber MO F=formnumber
```

For example:

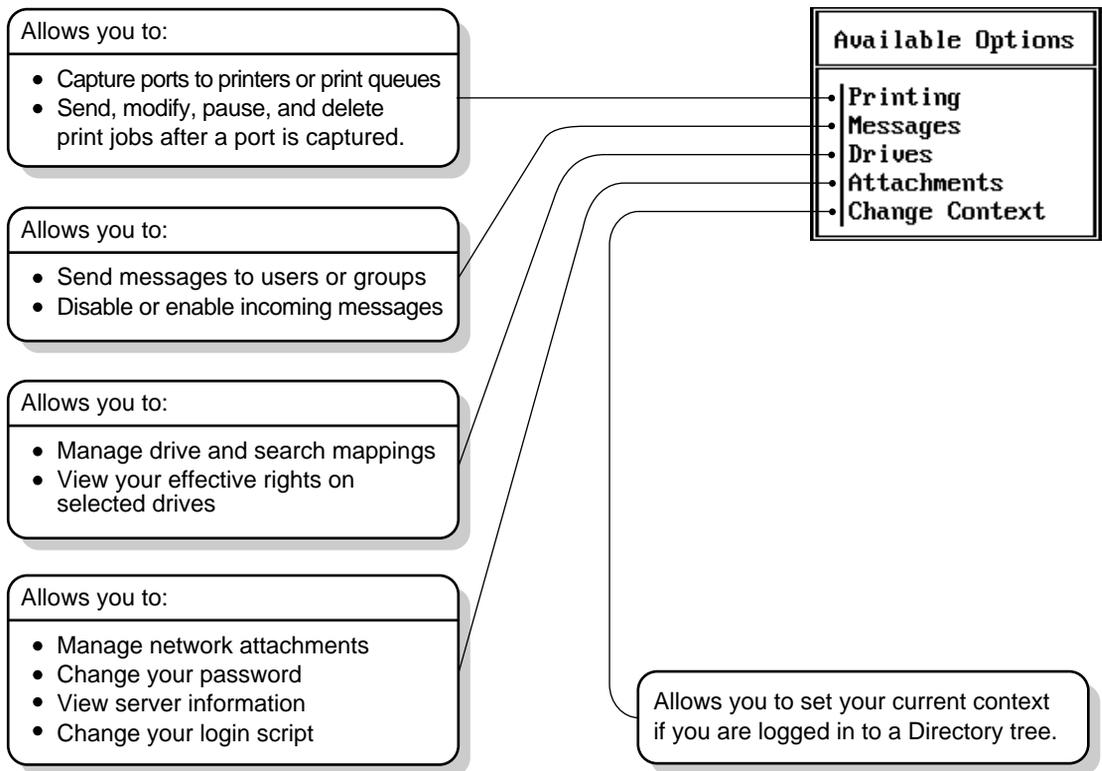
```
PSC PS=.DALLAS.SALES.NOVELL P=2 MO F=1
```

This chapter explains the purpose and use of three printing utilities: NETUSER, PSC, and PUPGRADE.

Using NETUSER

NETUSER is a workstation utility used to perform a variety of network tasks, as shown in the following illustration.

Figure 10-1
NETUSER Tasks



Printing Tasks Handled through NETUSER

Table 10-1

NETUSER Tasks

To perform the following task	Do the following
Capture a printer.	<ol style="list-style-type: none">1. At the NETUSER Available Options menu, choose an LPT port under Printing. (Press <F4> to toggle between Novell® Directory Services™ and bindery modes.)2. Select Change Printers; then choose a printer or print queue from the Printers/Print Queues menu.
Print a job.	<ol style="list-style-type: none">1. At the NETUSER Available Options menu, select a port that has been redirected to a network printer or print queue under Printing.2. Select the Print Jobs option. Press <Insert> and follow the instructions in the information lines.3. When you are finished with the screen New Print Job to be Submitted, press <F10> or <Esc> and choose Yes to save changes and print.
Attach to a NetWare server.	<ol style="list-style-type: none">1. At the NETUSER Available Options menu, select Attachments; then press <Alt><F1> to display more options at the bottom of the screen.2. Press <Insert> to display a list of available servers.3. Press <F1> for help from here.

Additional Information

For more information about	See
NET.CFG file	Novell Client documentation

Using PSC

PSC is a command line utility that allows you to do many of the tasks you might otherwise perform in PCONSOLE or NetWare Administrator.

Printing Tasks Handled through PSC

Tasks you can perform with PSC include the following:

- ◆ View network printer information
- ◆ Control network printers
- ◆ Control the print server

Command Syntax

`PSC PS=printserver P=printernumber [option ...]`

Table 10-2

Syntax for Common PSC Tasks

Task	Syntax
Cancel downing of Sales Print Server.	<code>PSC PS=PS-SALES CD <Enter></code>
Remove printer from the list of network printers.	<code>PSC PS=<i>printserver</i> PP=<i>printernumber</i> PRI <Enter></code>
Stop printer 1 on PS-SALES	<code>PSC PS=PS-SALES P=1 STO <Enter></code>
View all online help screens.	<code>PSC /? ALL <Enter></code>
View your current print layout in list format.	<code>PSC L <Enter></code>
View online help.	<code>PSC /? <Enter></code>
View specific online help for the START option.	<code>PSC /? STAR <Enter></code>
View status of all printers for PS-Sales.	<code>PSC PS=PS-SALES P=ALL STAT <Enter></code>

Command Parameters

Replace *printserver* with the context, if necessary. The *printer* must be a printer number. Replace *option* with one option from the following table.

Table 10-3
PSC Options

Option	Syntax	Description
Abort	AB	Stops the current print job and deletes it from the print queue. The print server and printer must be specified.
Cancel down	CD	Cancels the Going down after current jobs option available in PCONSOLE, NetWare Administrator, and the print server console. The print server and printer must be specified.
Form feed	FF	Advances the printer to the top of the next page. The printer must be paused, stopped, or waiting for a print job. The print server and printer must be specified.
Help	/? or /H	Displays online help.
List	L	Displays a tree layout of the current printing setup.
Mark	M [character]	Prints a line of whatever character you indicate so that you can see which line the printer will start printing on. Default: *
Mount form	MO F=number	Tells the print server that you have mounted a new form on the printer. Specify the form number (form names are referenced only in NetWare Administrator and PRINTDEF).
Pause	PAU	Stops the printer temporarily. The Start (STAR) option continues printing the print job from the point that the print job was paused. The print server and printer must be specified.
Private	PRI	Removes the printer from the list of network printers. Use if you don't want other network users to print on the specified printer. The print server and printer must be specified.

Option	Syntax	Description
Shared	SHA	Removes the Private flag and makes the network printer available to the print server. The print server and printer must be specified.
Start	STAR	Restarts the printer after you have stopped or paused it. The print server and printer must be specified.
Status	STAT	Displays the status (print job name, ID, and percent complete) on one or more printers on the specified print server. The print server must be specified.
Stop	STO	Stops the printer and returns the print job to the print queue. The STARt option prints the print job from the beginning.
Server	<i>s=name</i>	Indicates which NetWare server contains the print server you want to manage. Default = current server (bindery-based). This option is not needed when specifying a print server in the same Directory tree.
Version	/VER	Displays version information for this utility. Also lists the names and version number of all files required to run this utility.

Tips on Using PSC

- ◆ You can use PCONSOLE to accomplish many of the same tasks, but PSC can be placed in batch files or typed quickly at the DOS prompt.
- ◆ The Server option will require you to attach to the specified server with a bindery connection.

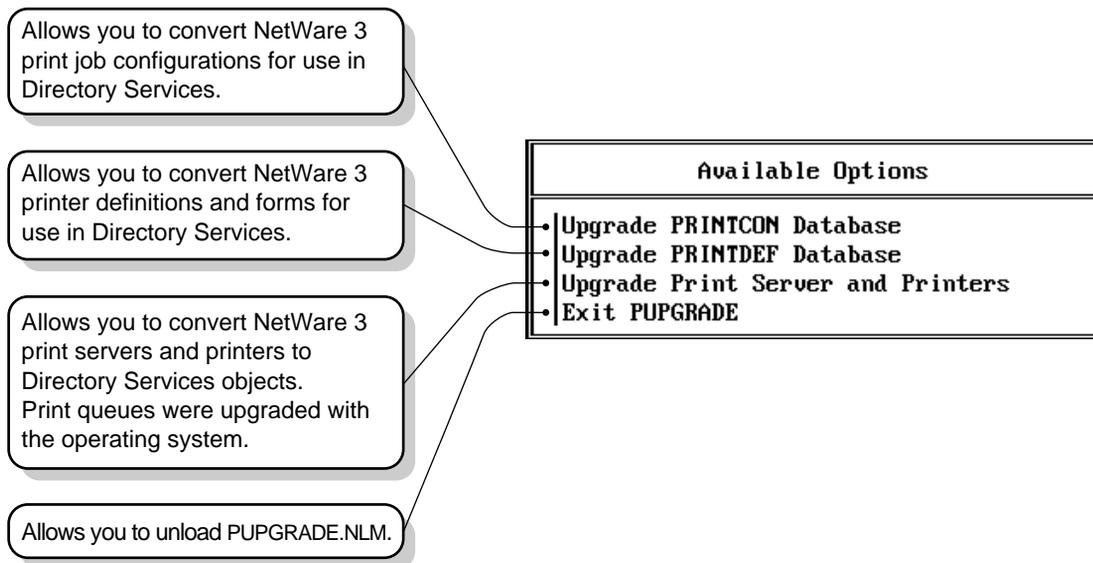
Using PUPGRADE.NLM

The PUPGRADE module allows you to upgrade your NetWare 3™ print servers and printers to NetWare 4™ Directory Services objects and your NetWare 3 PRINTCON and PRINTDEF databases to NetWare 4 format. Unless you run PUPGRADE, your NetWare 3 bindery printing objects will not be upgraded.

Printing Tasks Handled through PUPGRADE.NLM

The following figure shows the tasks you can perform with PUPGRADE.NLM.

Figure 10-2
PUPGRADE Tasks



Upgrading NetWare 3 Printing Objects with PUPGRADE

Use the following procedure to upgrade bindery print servers, printers, print job configurations, or print device definitions.

Procedure

1. At the system console, type `LOAD PUPGRADE` <Enter>.
2. Type in your username at the prompt.

You must be user ADMIN or equivalent. For example, you might type

```
.ADMIN.NOVELL
```

You will also be prompted for a password.

The Available Options screen appears.

3. Select the option you want.

Each option is discussed in the following paragraphs.

Upgrading the PRINTCON Database

When you select Upgrade PRINTCON Database, a log appears that shows the elements of the database as they are upgraded. No action is required.

When the upgrade process is complete, the log is stored in ASCII format as file SYS:SYSTEM/PRINTCON.UPG. Here you can read the upgrade information and review any errors that may have occurred.

Upgrading the PRINTDEF Database

When you select Upgrade PRINTDEF Database, an Enter Context window appears with the container object listed (example: O=Novell). Select the context shown or type in the context you want to use. Then press <Enter>.

A log appears that shows the forms, device definitions, functions, and modes that are being upgraded. No action is required.

When the upgrade process is complete, the log is stored in ASCII format as file SYS:SYSTEM/PRINTDEF.UPG. Here you can read the upgrade information and review any errors that may have occurred.

Upgrading a Print Server and Associated Printers

When you select Upgrade Print Server and Printers, a list of the existing NetWare 3 print servers appears. Select the server you wish to upgrade.

Note: Only print servers that existed before the NetWare server was upgraded will appear on this list. After you have upgraded your NetWare 3 server, you cannot add any bindery objects that PUPGRADE will recognize. If you add a bindery print server after the NetWare server is upgraded, the print server will not have a Directory Services object ID assigned to it. PUPGRADE will only find the old bindery ID, not the Directory Services object ID it is looking for.

A log appears that shows the print server being upgraded, printers that are being upgraded, notification objects, print queues, and so forth. No action is required.

Important: User SUPERVISOR is not carried over to the NetWare 4 environment. Also, because user ADMIN does not exist in NetWare 3, user ADMIN is not included in the list of authorized users for upgraded print queues. In addition, user ADMIN is not included as an authorized operator for upgraded print queues and print servers. You must manually add user ADMIN to these lists before it is authorized.

When the upgrade process is complete, the log is stored in ASCII format as file SYS:SYSTEM/<*printserver*>.UPG. Here you can read the upgrade information and review any errors that may have occurred. Each print server will have its own upgrade log file.

Additional Information

For more information about	See
Creating, modifying, or deleting print servers or printers	“Creating Print Servers” on page 46 (NetWare Administrator)
	“Creating Printers” on page 43 (NetWare Administrator)
	“Creating or Modifying Print Servers” on page 104 (PCONSOLE)
	“Creating or Modifying Printers” on page 102 (PCONSOLE)
	“Using PCONSOLE in Bindery Mode” on page 123

Setting Up and Servicing Printers

A printer converts print data to dot patterns and physically manipulates paper and ink to produce a printed image.

The purpose of this chapter is to help you determine the type of printers you need and to configure your printer setup for optimal performance.

Several types of printers are in common use today:

- ◆ Impact printers (usually dot matrix)
- ◆ Ink-jet (including bubble-jet and paint-jet) printers
- ◆ Laser printers
- ◆ Electrostatic printers
- ◆ Thermal wax transfer and dye sublimation printers

Of these, the laser printer is the most common in network environments.

Selecting the Best Type of Printer for Your Setup

The following information compares parallel and serial printers.

Parallel Printers

Parallel port speeds vary greatly, but are mostly much better than serial port speeds. Here are some characteristics of parallel printing:

- ◆ Much faster than serial
- ◆ Ten feet maximum standard distance; some cables guarantee 150 feet

- ◆ Limited error checking but relatively error-free
- ◆ Interrupts set by the installer
- ◆ Universally compatible

Laser printers that seem otherwise similar may have varying maximum parallel port speeds. Consult with your printer vendor if this is a major issue for you.

Serial Printers

Here are some characteristics of serial printing:

- ◆ Transmits data more slowly than parallel
- ◆ Standard maximum distance 25 feet; some cables guarantee 500 feet
- ◆ Has better error checking capability
- ◆ May require less expensive cabling
- ◆ The installer sets interrupt, XON/XOFF, parity, baud rate, data bits and stop bits

See Appendix B, “Cabling Printers,” on page 245 for more information.

Printer Languages

In the printer, a formatter converts the print data to dot patterns, storing enough dots to make a complete physical cycle, usually a single pass of a print head or a single page. The formatter accepts print data in one or more forms, sometimes called printer languages. Formatters that handle more than one such language may include commands to switch between languages, or they may switch automatically by analyzing the data stream.

Such languages fall into two general categories:

Printer languages such as PCL, HPGL, and ESC-P These languages use data streams in which the data consists of (1) text bytes, (2) 2-5 byte command strings for horizontal and vertical spacing and line- image (vector) graphics, and (3) strings of bit-image (raster) graphics. This data is easily and quickly converted.

Page description languages (PDLs), such as PostScript (PS) and PCL-V These languages are actually a subset of the printer languages group, but they use much more complex data streams. Consisting largely of verbose English phrases and programmatic constructions, PDLs allow more complex data manipulations than the simpler printer languages, but require more time to convert.

Choosing the right printers for your network involves more than determining a printer's output speed. PostScript printers can accommodate most inconsistencies that PCL printers cannot, so if possible, make sure your printers are PostScript compatible.

Printing with PostScript

PostScript is a page description language by Adobe* Systems Incorporated. It is a popular way for applications to interface with high quality printers when sharp graphics and many printing fonts are required. It is interpreted by built-in hardware or an add-on cartridge or system board chip at the printer.

The PostScript language handles information differently than ordinary printing. You must be aware of PostScript's unique characteristics to avoid problems when using it.

The PostScript language is what the printer uses to guide the printing processes. Therefore, the printer must be capable of understanding the PostScript language. We refer to such printers as true PostScript printers. An interesting feature of the PostScript printer is that it will flush the entire print job if there is anything about the print job that it does not understand, with no error messages whatsoever. The printer will blink as if everything were just fine and then it just stops. Because of this feature, it is very difficult to diagnose the problem.

Since the printer needs this language for its printing processes, it must have a driver that generates the code for each file that is sent to the

printer. These drivers are provided by each application that supports PostScript printing. If the application does not provide this driver, it will be impossible to print in PostScript mode.

Most PostScript printers are capable of printing in PostScript mode or in regular text mode. This is done by the flip of a switch. Each printer will be different, so you will need to refer the user to your printer manual for instructions.

Here are some guidelines for PostScript printing on a network:

- ◆ Use the No Tabs (NT) parameter for all PostScript print jobs sent with CAPTURE or NPRINT.

The No Tabs setting sends the file as a byte stream. This means that the control characters will not be interpreted by the server but will instead be sent directly to the printer to be interpreted.

- ◆ You should also use the No Form Feed (NFF) parameter in NPRINT and CAPTURE commands when sending jobs to PostScript printers.
- ◆ Some PostScript printing problems can be resolved by updating the PostScript drivers for applications (including MS Windows).
- ◆ Make sure that print jobs going to PostScript printers are properly configured for PostScript. You must use byte stream mode when sending PostScript jobs to the printer.
- ◆ Make sure there is enough buffer space, using NET.CFG to increase it if necessary.
- ◆ If using a PostScript cartridge on an HP LaserJet or similar printer, make sure that the cartridge is completely installed in the bay. There will be an audible click as the cartridge snaps tight. If the cartridge is not completely installed, PostScript is not available at the printer. This means the incoming PostScript code from the application is unintelligible and garbage will print.
- ◆ Some printers, such as the HP 3Si models, require a switch to be set to use PostScript. Check that the SYS SWITCH is on if PostScript printing is not working.

- ◆ A problem can occur when PRINTDEF is used to create PostScript PDFs (Printer Definition Files) which include modes that are larger than the default shell header buffer size of 64 bytes. This print header defines a space for printer setup codes once the job is completed.

You can expand the print header buffer using the print header parameter in your workstation's NET.CFG file. The simple solution is to set its size to the maximum of 255 bytes. (This applies to CAPTURE, but not to NPRINT.)

Figure A-1
Sample Workstation NET.CFG File with Print Header and Print Tail Parameters

```
cache buffers = 10
file handles = 50
long machine type = compaq
print header = 72
print tail = 24
show dots on
spx connections = 60
```

Improving Printer Performance

For hints on improving printer performance, see Appendix C, “Optimizing Network Printing Performance,” on page 259.

Preventing Printer Problems

The following suggestions are not intended to be prescriptive or comprehensive. Always refer to the documentation accompanying your printer before attempting any preventive maintenance on the machine.

- ◆ Vacuum around inside occasionally to prevent a build-up of loose paper particles.
- ◆ Make sure that any belts used are at the proper tension.

- ◆ Clean the paper and ribbon paths periodically. Use a dry lint-free cloth. Plastic gloves will protect your hands from ink residue build-up.
- ◆ Clean the corona wires and rollers on a laser.
- ◆ Do *not* lubricate any moving parts, except as directed by your owner's manual.
- ◆ Try to maintain a narrow range of temperature and humidity around printers. Some printer components may be sensitive to environmental changes.

Preventing Problems with Laser Printers

- ◆ Toner cartridges can open in transit and create a mess. Always ship them in their protective sealed packaging and separately from the printer.
- ◆ Be sure to take the time to clean the corona wire and the roller every time you change the print cartridge.
- ◆ Laser printers need to dissipate a lot of heat. Give them adequate ventilation.
- ◆ Refilled toner cartridges work fine and save money, as long as they have only been refilled once. After that, they can become unreliable. Patronize only reputable vendors that you know refill them only once.
- ◆ Be careful when using envelopes and address labels in laser printers that are not intended for laser use. If the glue melts during fusion, there could be expensive damage.

Preventing Problems with Dot Matrix Printers

- ◆ Make sure the print head has enough free air around it to dissipate heat. Do not place other electronics too close to it.
- ◆ Use good quality ribbons. The cheap ones may use ink that lacks needed lubricants or uses an acid that can hurt your print head over time.

- ◆ Do not turn the platen head using the knob when the printer is on. This can damage the stepper motor. A system administrator may wish to use the knob when first loading a new box of paper and then remove it from the machine.
- ◆ Dot matrix printer ribbons will dry out eventually if they are not used.
- ◆ Some dot matrix printers do not have the strength of impact to deal effectively with multi-part forms.
- ◆ Check with the Seiko Epson Corporation before trying to replace the print head on its older dot matrix models. Some of these routinely burned out the main circuit board when the print head failed.
- ◆ It is often cheaper to get a standard stepper motor from a local electronics store than to order it by part number from the printer's manufacturer.
- ◆ A dot matrix printer has more control of its dot placement up-and-down than right-to-left. Its right-to-left motion is precise to 1/216th of an inch. Vertical spacing is accurate to 1/240th. This will effect the appearance of detailed graphics.

Troubleshooting Printers

For a comprehensive discussion of strategies for troubleshooting printing problems, see Appendix D, “Troubleshooting Printing Problems,” on page 269.

General Printer Troubleshooting

- ◆ Make sure the printer has power and is on-line. If you are using a manual printer sharing device, make sure the switch is set to activate the correct printer.
- ◆ Turn it off and on again to reinitialize any internal settings that may have gone astray.
- ◆ Use the printer's own self-test, according to the manufacturer's recommendation. If it fails, you have verified that the problem is

within the printer. If the print head is not moving at all, the transport motor may have failed.

- ◆ If the printer passes the self-test, try a test print using the Print Screen capability within DOS. If the Print Screen fails, you know the problem is in the relationship between the printer and the computer. Inspect the cable and the cable connections. Replacing the cable with a known good cable is worth trying since cables are so frequently the source of printer problems. Cables can fail with broken wires, loose or broken pins, or incorrect pin-outs.
- ◆ The message out of paper is sometimes erroneously reported when there is plenty of paper, and can indicate a physical problem with the printer.
- ◆ If the Print Screen succeeds, the problem may be with your application or its configuration. For example, your application may be set up to direct output to a file instead of the printer, or you might be directing the output to the wrong communications port.

Warning: Some printers differ from computers in that they do not have shielded power supplies. That means that a plugged-in printer can expose you to full outlet power, which is enough to kill you. Never open a printer case unless the printer is unplugged!

Troubleshooting Laser Printers

- ◆ Be sure all dip switches are properly set for your configuration. Laser configuration is sometimes done by a control panel of buttons with an LED display that permits you to alter configuration memory. Be sure that the application being used is properly configured for the printer as set up.
- ◆ Fuzzy laser output could mean you have a dirty corona wire or you are running out of toner. Horizontal lines or splotches indicate possible damaged or dirty print drums or rollers. Since some of these components are part of the cartridge, a useful quick fix is simply to change the cartridge.
- ◆ If laser images seem disproportionately long or short, the drive motor may not be moving the paper through at the correct speed.
- ◆ Failure of a laser printer to go on-line might be a communication interface problem. It could also indicate a faulty control panel. Try

powering up the printer with the cable removed. If it now goes to ONLINE (or READY), suspect the cable or its connector.

- ◆ If you are printing totally black pages, suspect a broken or fouled corona wire. If that is not the case, replace the toner cartridge.
- ◆ If the print appears speckled, it is probably the fault of the primary corona grid which is part of the toner cartridge. Replace the toner cartridge.
- ◆ If white streaks appear in your printing, shake the toner cartridge to insure an equal distribution of powder. If that doesn't work, clean the transfer corona assembly. Contamination on the assembly will prevent it from holding the electrical charge needed to attract toner from the drum.
- ◆ A repetitive pattern of printing defects, such as an identical smudge every two inches may indicate a defective fusing roller. Try cleaning it according to your hardware vendor's instructions. If that does not work, you may need to replace the fusing roller assembly.

Troubleshooting Dot Matrix Printers

- ◆ If the printer self-tests OK but will not print jobs from the computer, check the following:
 - ◆ Dip switch settings
 - ◆ Proper driver for your application software
 - ◆ Bad or disconnected cable
- ◆ Some printers have both serial and parallel connections. If one doesn't work, change cables and try the other. Be sure to change any dip switch settings needed by the printer to acknowledge the change. If this works, you may have had a physical problem with the output port on the computer or the input port of the printer that you tried the first time.
- ◆ If a dot matrix printer shuts down and recovers frequently, it may be having problems with its thermistor. A thermistor is a device used to keep the printer from overheating. Try replacing this part before you replace the entire print head.

- ◆ Some printers can be set by dip switches for unidirectional or bidirectional printing. Bidirectional is normally faster, but might cause problems with graphic output for some combinations of applications and printers. If you suspect this problem, reset your dip switches for unidirectional printing.
- ◆ If your output is double-spaced when you expect single-spaced, you may be getting an extra Carriage Return and Line Feed at the end of every line. Reset the dip switch(es) controlling this.
- ◆ If your print quality is poor, first check the ribbon for wear. Also examine the print head spacing. Your head may be too far away from the platen for your current paper thickness. If adjusting the spacing doesn't solve the problem, clean the print head itself with a cotton swab dipped lightly in alcohol.

Troubleshooting Network-Related Printer Problems

The following information may be helpful in resolving printer problems. For a comprehensive discussion of printing troubleshooting, see Appendix D, "Troubleshooting Printing Problems," on page 269.

- ◆ If a network printer sometimes goes off-line for no apparent reason and works fine when it is reinitialized, you may have a static problem. Large amounts of static can be generated by certain special papers, such as carbonless forms. Make sure your printer is properly grounded.
- ◆ Plotters need to function much as printers in order to accept a job to plot, but plotters can have no direct interaction between themselves and the application.

For example, the AutoCAD application talks directly to a COM port, then waits for a reply from that port. Since NetWare[®] software only redirects printing to LPT ports, AutoCAD ends up waiting for COM port activity when there won't be any.

You can handle this problem by saving a print job to a file and then using NPRINT or PCONSOLE to print the job. An alternative would be to plot to a file named LPT1 after capturing the device LPT1 with the CAPTURE command.

B *Cabling Printers*

This chapter contains general rules and standard specifications for parallel and serial printing. For more specific information on your printer, see the printer's documentation or owner's manual.

The majority of printers use parallel cabling because both installation and operation are fast and trouble-free. Serial printers offer greater cabling distances, but these distances are usually not needed because network printers can attach to any DOS or Windows workstation or NetWare[®] server.

The following chart illustrates the basic differences between parallel and serial printers.

Table B-1
Parallel Versus Serial Printers

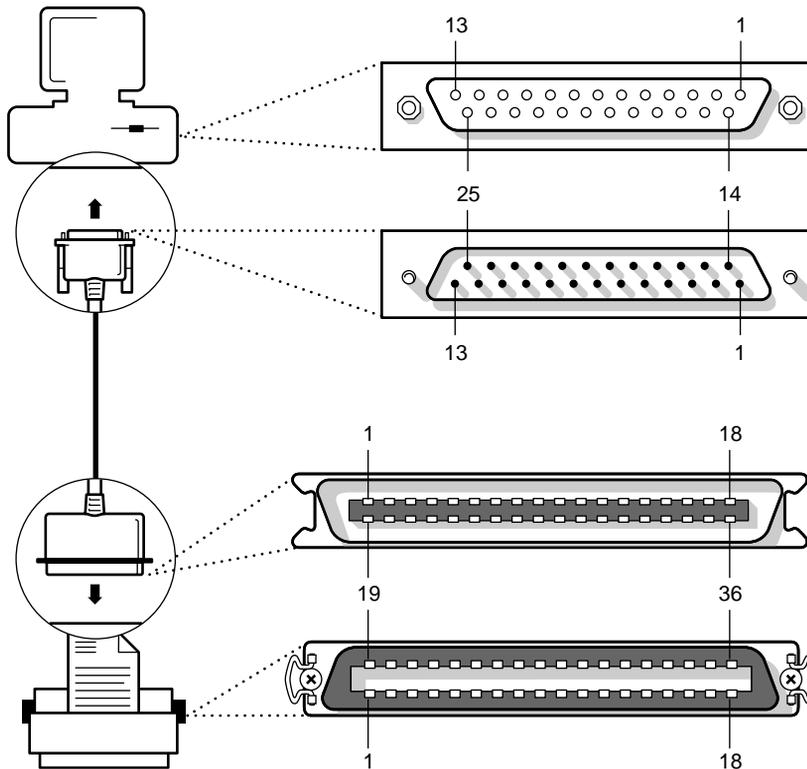
Item	Parallel	Serial
Speed	Potentially much faster than serial	Slower than parallel
Distance	10 feet standard maximum. Some cables guarantee 150 feet	25 feet standard maximum. Some cables guarantee 500 feet or more
Error checking	Limited because relatively error-free	Parity (reduces speed by about 10 percent)
Software	Installer sets interrupt	Installer sets interrupt, XON/XOFF, parity, baud rate, data bits, and stop bits
Hardware	Universally compatible	Installer may need to check and set pin settings

Hint: We recommend that you use parallel printing instead of serial whenever possible. This greatly reduces your risk of having printing problems.

Parallel Printers

PCs generally have a female 25-pin parallel port. Parallel printers generally have a Centronics 36-pin parallel port. A cable with a male 25-pin connector and a Centronics 36-pin connector connects the hardware. See the following figure.

Figure B-1
Parallel Interface



Serial Printers

PCs generally have either a male 9-pin or 25-pin serial port. Serial printers generally have a female 25-pin serial port.

Three different cabling scenarios connect most PCs and serial printers. Figure B-2 on page 248, Figure B-3 on page 249, and Figure B-4 on page 250 cover each scenario.

Table B-2
Cabling Serial Printers

If you have these types of connectors	See
Male 25-pin serial port on PC Female and male 25-pin connectors on cable	Figure B-2 on page 248
Male 9-pin serial port on PC Female 9-pin and male 25-pin connectors on cable	Figure B-3 on page 249
Male 9-pin serial port on PC Female 9-pin and 25-pin connectors on a converter Female and male 25-pin connectors on cable	Figure B-4 on page 250

Most serial cables have 25-pin connectors on each end. A standard serial cable is called straight-through. This is used for modems and does not work for printing. No-modem or null-modem cables work for the majority of serial printers.

You need to buy a 25-pin to 9-pin adaptor if you have a 9-pin port on your PC. Printers generally have 25-pin male ports.

NetWare serial printing parameters default to the most common settings: polled interrupt, no XON/XOFF, no parity, 9600 baud rate, 8 data bits, and 1 stop bit. These settings function with most serial printers.

When XON/XOFF is enabled, the software controls the flow of data between the PC and the printer. When XON/XOFF is disabled, the hardware controls the data flow.

Figure B-2
Serial Cable with Two 25-Pin Connectors

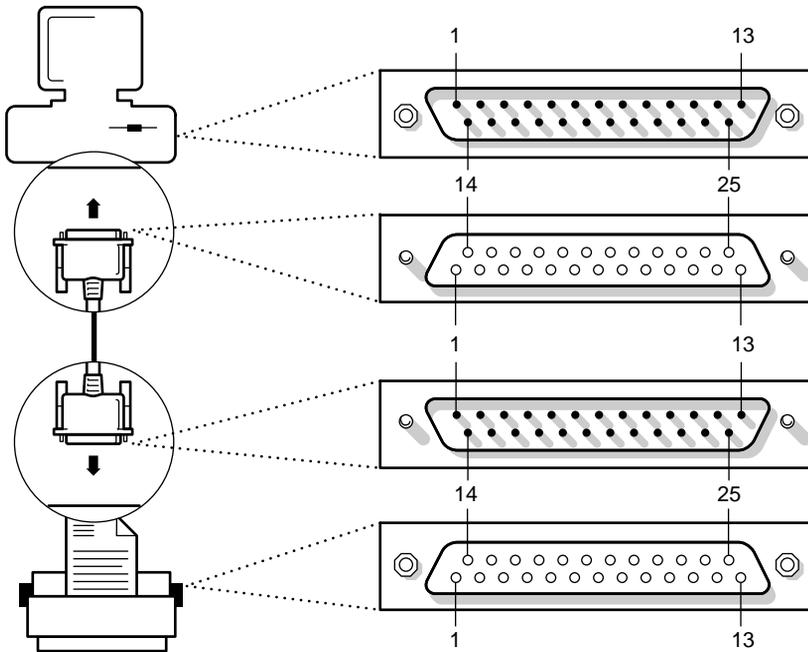


Figure B-3
Serial Cable with 9-Pin and 25-Pin
Connectors

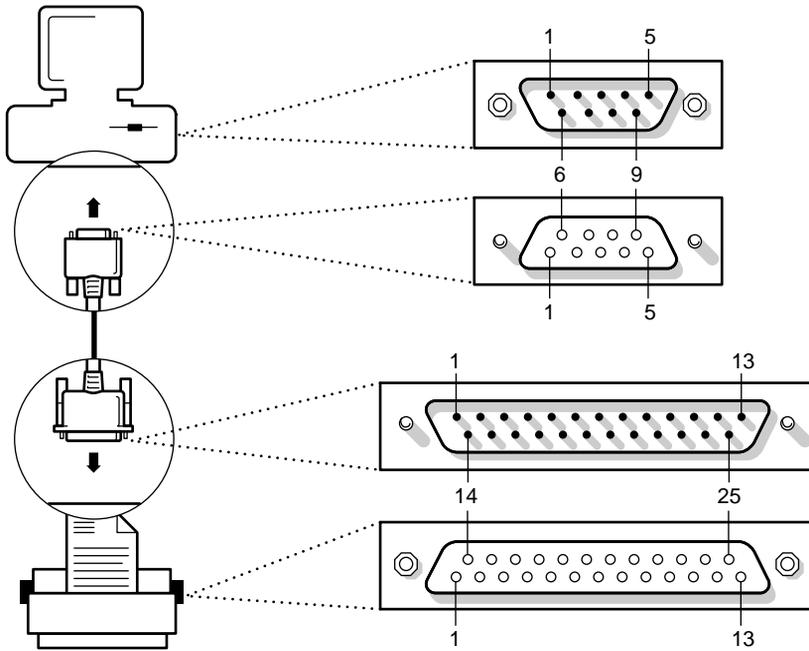
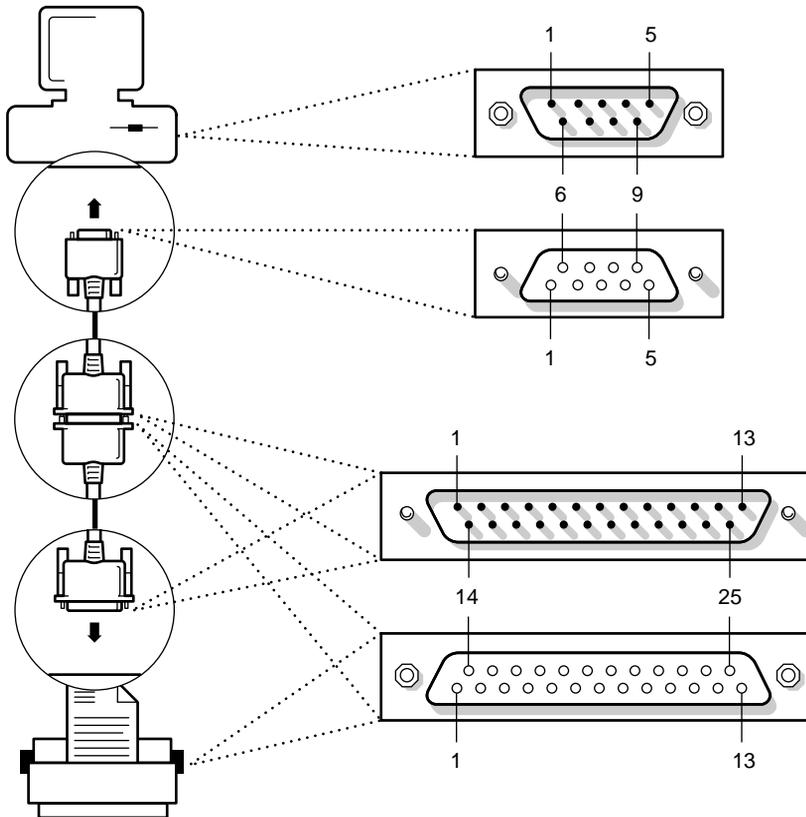


Figure B-4
Serial Cable with Two 25-Pin Connectors and
a 9-Pin to 25-Pin Converter



Optimal Serial Cabling

This section explains how Novell uses RS-232-C serial communication for printing.

Note: Anyone making changes to their cabling pin configurations should be familiar with soldering techniques and with tracing wires using a multimeter or color-coding.

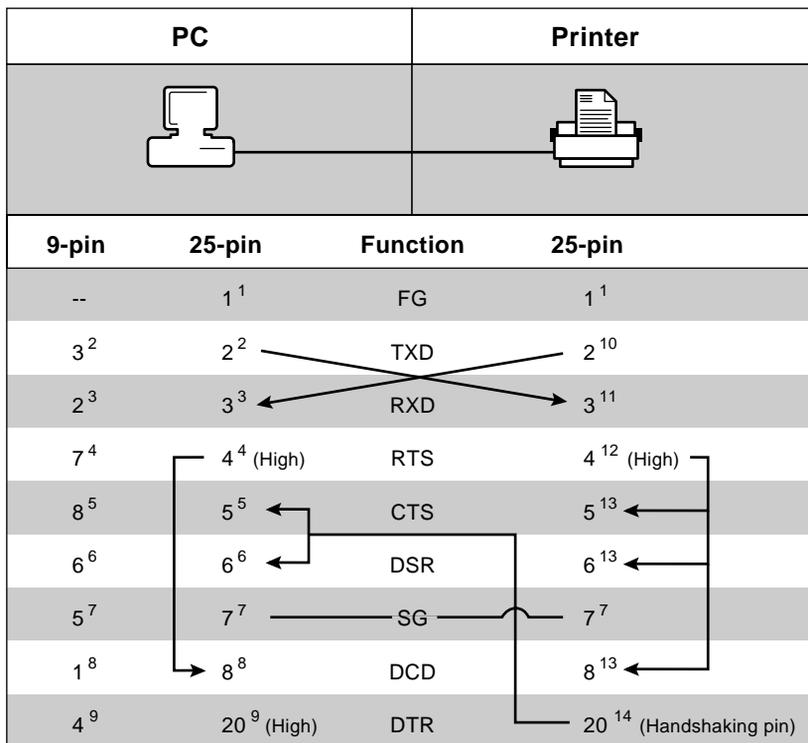
Serial printers cabled to PCs generally use the RS-232-C interface, which was developed specifically for terminal-to-modem

communications, or communication between Data Terminal Equipment (DTE) and Data Communications Equipment (DCE). Proper *handshaking*, the exchange of signals to control the flow of data between hardware devices, allows data to flow correctly between DTE and DCE devices.

Since PCs and printer are both DTE, they must send signals as DTE. However, they must be cabled so that they receive signals as if from DCE. Because PC and printer vendors implement this serial handshaking in different ways, many problems occur when the signals are not correctly routed between them.

The following chart shows optimal cabling between 9 and 25-pin PC connectors and a 25-pin printer connector for NetWare print services. Each pin handles certain functionality, as explained in the following sections.

Figure B-5
Optimal Serial Pin Connections



Note: Superscript numbers in the graphic correspond to notes on the next couple of pages. In parallel communication, a high signal level ranges around 5 volts. A low signal level ranges around 0 volts. In serial communication, the low range is -3 to 3 volts, the high ranges are -15 to -3 and 3 to 15. In the following sections, the conventions input and output determine what controls the signal. Input means the signal is controlling the device; output means the device is controlling the signal.

Functions on the PC Side of Serial Printer Cables

1. **FG (Frame Ground reference pin)**

It is not necessary for you to use this pin, and using the pin can cause ground loop problems if the PC and printer are connected to different power sources. You have a Frame Ground pin only on a 25-pin connector, and it uses Pin 1.

2. **TXD (Transmit Data output pin)**

The PC sends data (the print job) through this pin which connects to Pin 3 on the printer. The PC uses Pin 3 on a 9-pin connector and Pin 2 on a 25-pin connector. This attaches the PC's transmit pin to the printer's receive pin.

3. **RXD (Receive Data input pin)**

The PC receives XON/XOFF characters through this pin, which connects to Pin 2 on the printer. The PC uses Pin 2 on a 9-pin connector and Pin 3 on a 25-pin connector. This attaches the printer's transmit pin to the PC's receive pin.

4. **RTS (Request To Send output pin)**

NetWare print services sets the signal level high for this pin (and the DTR pin) on the PC and keeps it in that state. The PC uses Pin 7 on a 9-pin connector and Pin 4 on a 25-pin connector. This signal can be used as a source for a high signal level to enable certain functions on some printers. If your printer cable connects this pin to a pin on the printer that requires a high signal level, printing will function properly. You can achieve the same results by following the steps in note 12.

Note: Early versions of NetWare print services set the signal level high on this pin when sending data and set the signal level low when not sending data. The timing of the signal changes caused many problems with printers that require a high signal level for data input. Beginning with

version 1.22R, NetWare Print Services constantly maintains a high signal level for this pin.

5. **CTS (Clear To Send input pin)**

NetWare print services uses this pin for its hardware handshaking. The PC uses Pin 8 on a 9-pin connector and Pin 5 on a 25-pin connector. This pin connects to the pin on the printer that controls the flow of data. This is generally pin 20 on the printer, but some printer vendors use other pins (see note 14). If the signal level is high for this pin, data will be sent to the printer. Data is not sent when the signal level is low.

Note: If this signal level stays low for about 10 seconds while servicing a print job, NetWare print services reports an off-line condition.

6. **DSR (Data Set Ready input pin)**

NetWare print services does not use this pin. Other print services may require a high signal level for both Pins 5 and 6 on the PC for proper data flow control. Novell recommends that you tie (solder) Pins 5 and 6 together to provide printing compatibility for other print services.

7. **SG (Signal Ground reference pin)**

NetWare print services uses this pin to provide a reference for signal levels. The PC uses Pin 5 on a 9-pin connector and Pin 7 on a 25-pin connector. The printer uses Pin 7.

8. **DCD (Data Carrier Detect input pin)**

Some PCs may require a high signal level on this pin to enable the PC to receive data from the printer. The XON/XOFF protocol will not function correctly with a low signal level. If you do not use the XON/XOFF protocol, the signal level on this pin can be high or low. The PC uses Pin 1 on a 9-pin connector and Pin 8 on a 25-pin connector.

Novell recommends that you maintain a high signal level on this pin by tying (soldering) it to another pin that has a high signal level. Tie Pin 1 on a 9-pin connector to either Pin 7 or Pin 4. Tie Pin 8 on a 25-pin connector to Pin 4 or Pin 20.

9. **DTR (Data Terminal Ready output pin)**

NetWare print services sets the signal level high for this pin (and the RTS pin) on the PC and keeps it in that state. The PC uses Pin

4 on a 9-pin connector and Pin 20 on a 25-pin connector. This signal can be used as a source for a high signal level to enable certain functions on some printers. If your printer cable connects this pin to a pin on the printer that requires a high signal level, printing will function properly. You can achieve the same results by following the steps in note 12.

Note: Early versions of NetWare print services set the signal level high on this pin when sending data and set the signal level low when not sending data. The timing of the signal changes caused many problems with printers that require a high signal level for data input. Beginning with version 1.22R, NetWare Print Services constantly maintains a high signal level for this pin.

Functions on the Printer Side of Serial Printer Cables

1. TXD (Transmit Data output pin)

The printer sends XON/XOFF data through this pin which connects to Pin 2 on a 9-pin connector and Pin 3 on a 25-pin connector on the PC. The printer uses Pin 2. This attaches the printer's transmit pin to the PC's receive pin.

2. RXD (Receive Data input pin)

The printer receives data (the print job) through this pin which connects to Pin 3 on a 9-pin connector and Pin 2 on a 25-pin connector on the PC. The printer uses Pin 3. This attaches the PC's transmit pin to the printer's receive pin.

3. RTS (Request To Send output pin)

The signal level for Pin 4 is always high as long as the printer is on. This signal can be used as a source of a high signal level to enable certain functions on some printers. We recommend that you tie (solder) Pin 4 to Pins 5, 6, and 8 on the printer; however, this may not work if your printer uses these pins differently.

4. CTS, DSR, and DCD (Clear To Send, Data Set Ready, and Data Carrier Detect input pins, respectively)

One or more of these pins may be used to enable certain functionality on the printer. We recommend that you tie (solder) these pins to Pin 4 on the printer to maintain a high signal level (see note 12).

5. DTR (Data Terminal Ready output pin)

The printer often uses this pin for the hardware handshaking signal. If the printer supports DTR handshaking, it should use Pin 20. However, some printers use Pins 11 or 19 (or other pins besides Pin 20) to implement their handshaking.

The handshaking pin should be connected to Pin 8 on a 9-pin connector and Pin 5 on a 25-pin connector on the PC (and also Pin 6 on either connector if you followed the recommendation in note 5).

Pin Connectors

Use the following four illustrations to learn pin locations in 25-pin and 9-pin male or female connectors. Parallel and serial printers only use 25-pin connectors. PCs use 25-pin connectors for parallel ports and either 25-pin or 9-pin connectors for serial ports.

Figure B-6
25-Pin Male Interface

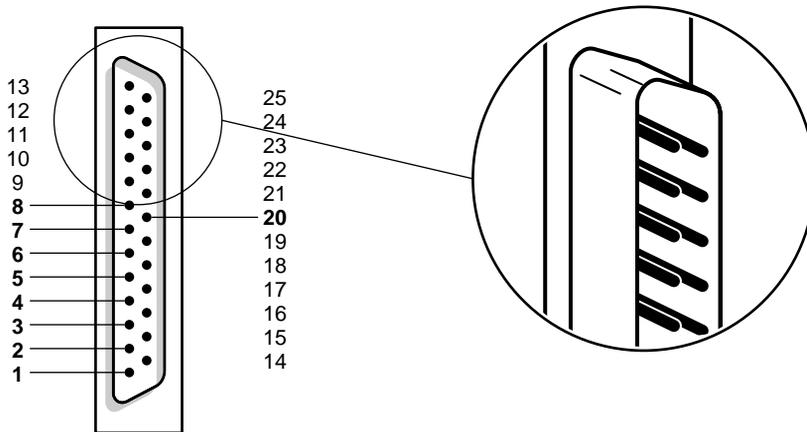


Figure B-7
25-Pin Female Interface

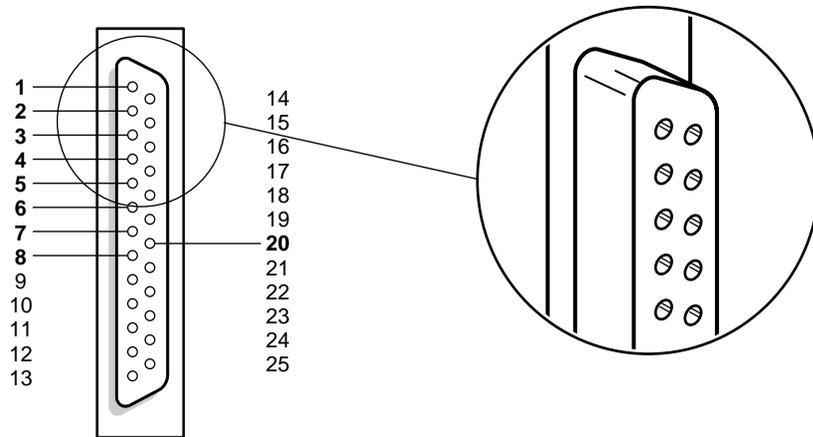


Figure B-8
9-Pin Male Interface

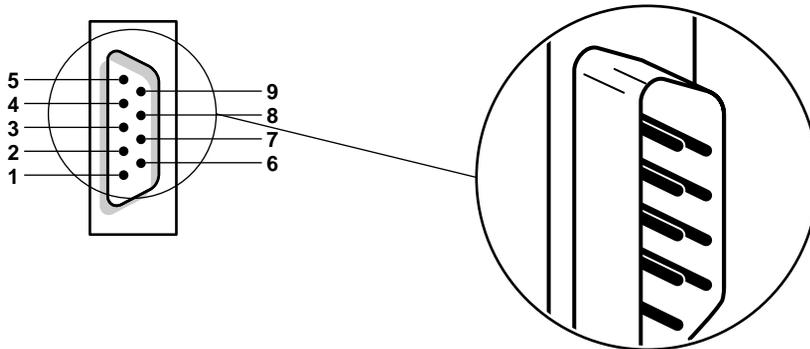
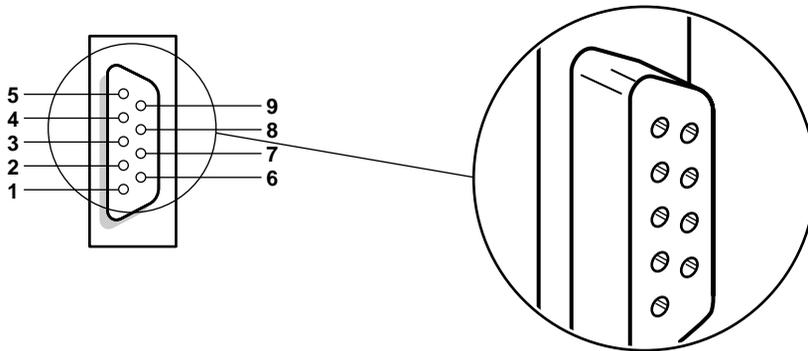


Figure B-9
9-Pin Female Interface



Optimizing Network Printing Performance

NetWare® 4™ print services represent substantial performance gains over the performance of previous NetWare releases. However, network printing can be complex; printing performance on any network can be no faster than the throughput of the slowest component of the system.

Most performance problems you may encounter in a NetWare 4 printing environment will result from causes unrelated to NetWare software. The following discussion identifies many of these causes and offers some recommendations for alleviating them.

Parallel Versus Serial Ports

The primary factor that affects network printing speed is whether you connect the printers to parallel ports or serial ports. Parallel ports normally are about two times faster than serial ports at 9,600 baud, and up to four times faster than serial ports at 4,800 baud. Unless distance requires the use of a serial port, use the parallel port for best performance.

NPRINTER.EXE software for NetWare 4 and RPRINTER for releases after NetWare 3.11 can send data to a printer's parallel port as fast as most laser printers can receive it. The current limit is about 35KB per second and will increase as new versions take advantage of new hardware that is likely to appear.

Serial ports are essentially limited by the baud rate used. In general, the data rate in bytes per second will approximate the baud rate divided by ten. At 9600 baud, the maximum data throughput is about 0.96K bytes per second. NPRINTER.EXE for 4.0 and RPRINTER for releases after NetWare 3.11 support 19.2K baud and 38.4K baud, which yield maximum data throughputs of about 1.92K bytes and 3.84K bytes per second, respectively.

Estimating Data Transmission Rates

With bit-mapped graphic images, including text output from many word processing configurations, printer speed may be limited solely by how fast the data can pass through the workstation's print port to the printer.

Choose an interface that is fast enough to keep up with the bulk of the print jobs to be run on a particular printer. To do this, you will need to estimate the data transmission rate for that printer.

- ◆ For printers rated in characters-per-second (CPS), use the CPS rating for the preferred font and point size as the estimated data transmission rate. Assume that only print engine limitations will limit printer output.
- ◆ For page-per-second rated printers, estimate print data transmission this way:
 - ◆ For a representative print job, count the number of pages to be printed.
 - ◆ Print the job to a file and record the finished file size in bytes.
 - ◆ Divide the total pages (pages-per-job) by the pages-per-minute and multiply by 60 to yield seconds-per-job.
 - ◆ Divide the total bytes (bytes-per-job) by seconds-per-job to yield the bytes-per-second needed to keep up with the print engine.

For example, a six-page job would take a minimum of 60 seconds on a 6-page-per-minute laser printer. If the job printed 12,000 bytes (a likely low end for plain text), the target throughput is 0.2KB per second. The same job on a 17-page-per-minute printer would yield a target throughput of 0.6KB per second.

For another example, a one-page graphic of 1 million bytes would target the 6-page-per-minute printer at 100KB per second and would target the 17-page-per-minute printer at 283KB per second.

This method of estimating data transmission is not useful for PostScript or other page description language printing which requires print job formatting at the printer.

If possible, use an interface that can provide print data transmission rates as fast as the target throughput calculated above.

Software Version Incompatibilities

The factor having the next greatest impact on printing performance after port type is the application and print driver version. To avoid difficulties with either, you should maintain a record of all versions, configurations, and type of applications for each of your installations.

Test all updates and note changes in performance before distributing new versions to end users.

Document Type

The third most important factor affecting printing performance is the type of documents you are printing. Files containing graphics require considerably more time to print than files consisting of straight text.

Printer Configuration

Polled versus Interrupt Mode

When configuring printers in NetWare 4, the default is polled mode. Polled mode, while theoretically not as fast as interrupt mode, still sends data faster than most printers can process it.

The advantage of polled mode is that it eliminates any possibility for interrupt conflicts with different hardware configurations. However, on complex printing setups with multiple printers running off a single workstation, polled mode may noticeably slow the execution of other tasks running on that workstation.

On a workstation that is running only NPRINT with no other operations assigned to it, interrupt mode should be faster than polled mode.

On a non-dedicated workstation, polled mode usually provides the best performance.

Buffer Size

On workstations running NPRINT, throughput is affected by the buffer size defined for the printer. On dedicated workstations, no non-printing resources require memory on the machine, so larger buffers will speed up your printing without degrading the performance of other workstation tasks.

With no load on the network, maximum data rate can be achieved with any buffer size larger than 5KB. The default buffer size is 3KB. As network traffic increases, packet delays decrease throughput for any buffer size. For very busy networks, a buffer size of 20KB may be desirable to ensure having enough data stored to carry over long packet delays. The buffer size needed for maximum data throughput will range from 6KB to 20KB depending on the traffic load on any particular network.

On non-dedicated workstations, you should normally use the default buffer size of 3 KB. A high buffer size may slow down your workstation because it requires more memory, even though printing speed may increase.

Try different settings to get best performance from your own setup. For example, if the printer is printing a lot of graphics data, you may want to increase the buffer size.

Timer Tick Values

If your workstation is bogging down due to printing, increase the timing interval when you load NPRINT. This is done by adding the `/T=<1-9>` option to the NPRINT command.

The higher the tick setting, the faster the overall workstation performance, but with this increase in overall performance comes a decrease in printing performance.

A timer tick value of 2 takes twice as long to service a job as a timer tick value of 1. The allowable range is 1–9.

The timer tick value in polled mode is proportional to the length of time a job will take to print, assuming that the printer is capable of printing at the data throughput speed.

Queue Sampling (Polling) Interval

Set the queue sampling (polling) interval in your printer configuration to fit your network's usage patterns

The delay between the time a job enters an empty queue and when it starts printing is determined by the printer's Sampling Interval setting. In NetWare 4, this parameter can be set in PCONSOLE or the NetWare Administrator. The default is 5 seconds. The maximum is 255 seconds.

When a printer is idle, the print server assigned to that printer queries the assigned queue at regular intervals. The sampling interval is the number of seconds between each query.

This interval also represents the maximum wait-to-start time for a print job once it enters an empty queue (assuming no other queues are involved and the printer is ready). On average, the wait will be half of the maximum time. For single-page, text-only jobs, this delay may be the bulk of the total wait time.

If such jobs are common, try lowering this setting. However, many idle printers making frequent queries can add noticeably to network traffic. A reasonable compromise must be reached, based on your network's configuration and usage characteristics.

Network-Direct Print Devices

Most network-direct print devices have two modes: a queue-server mode (also called print-server mode) and remote-printer mode:

In NetWare 3™ software, queue server mode was often up to 20% faster than remote printer mode. However, in NetWare 4 versions and releases after NetWare 3.11, remote printer modes are nearly as fast as queue server modes, making the trade-offs fairly even between the two modes.

Remote printer mode allows additional flexibility in controlling printer forms and in monitoring printers via PCONSOLE and the NetWare Administrator utility.

Note: Using external network-direct hardware that still connects to the printer's parallel port will provide little improvement in printing speed over NPRINT on printers that cannot accept data faster than 35KB per second through the parallel port. This includes most current printers.

Computer Type

Performance may be limited by slower computers. Use faster machines whenever possible on your system, especially for servers that will be handling the most traffic and workstations tied to fast printers.

NPRINTER for NetWare 4 is a fast print utility. Using older, slower machines with fast printers can result in situations where printer data throughput is so high as to impose noticeable delays on foreground tasks.

These delays will be more noticeable on machines with slower processors and slower clock speeds.

In such situations, these delays can be reduced or eliminated by setting the buffer size to 3KB to limit throughput. (This the default setting.) This can be done in PCONSOLE at the Printer Configuration screen. You can also do this in the NetWare Administrator.

The least influential factors for low-end network systems are the type of hardware you use (for the file server, print server, and workstation) and the NetWare print service configuration you select. By low-end, we mean a network where the print queue typically contains only one job at a time. You can increase printing speed by increasing the speed of the workstation CPU. However, remember that printing one job in a queue requires the application to finish before the print service takes over and sends the job to a printer.

Make sure that file server and workstation hardware are appropriate for the tasks to be performed. Upgrading any component, such as replacing a slow hard drive with a faster hard drive, can usually increase performance, but may not if the upgraded component is limited by some other bottleneck in the system.

The performance of NetWare servers can be degraded by excessive file activity. Adding random access memory (RAM) to a server for use by NetWare file caching may increase performance on busy servers.

Overburdened Servers or High Network Traffic

Performance may be limited by too few servers or an excessive amount of traffic on the network itself. Additional servers may reduce the load on an overburdened server.

As network use increases, delays in delivery of data packets may increase.

- ◆ Increased Ethernet traffic increases packet-start delays and the possibility of packet collisions.
- ◆ Packet collisions require data to be retransmitted, possibly slowing delivery of print job data to the printer.
- ◆ On a token-ring network, traffic directly increases the delay in receiving tokens and the start of data transmission.

Proper planning of the total network using individual segments separated by routers and bridges can keep localized network traffic at reasonable levels.

Effective network administration, including the careful division of print resources among file servers and workstations to reduce multi-hop links on common paths, also can help reduce print job delays.

Application and Driver Software

Generating print data is often the most time-consuming stage of the printing process. In the simplest situations, such as printing directly from DOS, data generation is essentially instantaneous. However, word processors may take from several seconds to several minutes per page to generate data, with delays increasing with the addition of graphics and complex fonts or formatting. Generating graphical data using AutoCAD software or other types of visualization applications may take from several seconds to many hours per page.

Using different drivers can result in dramatic differences in both the speed at which data is generated and the quality of the data generated. While sometimes these differences are a trade-off between speed and quality, there are other cases where one driver will supply both better quality and faster performance than another.

For example, AutoCAD output using an HPGL driver is usually several times faster than output using a PCL driver. If the target printer can use either driver, using the HPGL driver will increase data generation speed while providing output of equal or superior quality.

Be sure to match application and driver for best performance. When possible, choose application software and print drivers that are efficient for the tasks to be performed.

- ◆ Install the applications that take the most time and are used the most often on the fastest workstations available.
- ◆ Investigate the driver/application options available for a particular task. Be sure to consider drivers produced by third-party manufacturers.
- ◆ Test the efficiency of each option with one or two representative tasks.

Select the best possible combination from your tests.

Printer and Data Type

Another important printing bottleneck is in the printer itself and the type of data being sent to the printer.

For most jobs on non-laser (head-pass cycle) printers and for printing plain text jobs on laser (page cycle) printers, the physical printer engine is usually the limiting factor. The speed of the printer is rated in pages per minute for page cycle (such as laser) printers and characters per second for head cycle printers.

When a page description language (PDL) such as PostScript is used, the formatter in the printer may be the limiting factor. The speed of PDL formatting varies greatly between printers. Unfortunately, the technical specifications for most printers seldom address this parameter.

Non-PDL print jobs that include a lot of graphics or formatting may send so many bytes per page that the interface may become the limiting factor. This is discussed in the following section.

It matters little whether you connect network printers directly to the NetWare server, to an external queue server, or to a workstation. One

notable exception to avoid is running NetWare 2 core print services on a loaded 286 NetWare server.

Printing to a local printer from a network workstation is not much faster than printing to a network printer. The reason for this is that once printing port limitations are equalized, the application controls speed more than the network does. More precisely, in many instances the lag time between the print request and transmission on the network is greater than the transmission time on the network.

Suggestions

Use a printer that is appropriate for your needs.

- ◆ Make sure laser, thermal transfer, and other advanced printers have NetWare print device definition (a .PDF file) available prior to purchase, unless one comes with the printer.
- ◆ If printing is frequent and if time and quality are paramount, a fast laser printer may be necessary.
- ◆ If you use PostScript or another high-level PDL for the majority of your print jobs, the speed of the printer's formatter becomes more important.
- ◆ If the mix of your print jobs contains mostly plain text, the speed of the print engine (as described in pages per second or characters per second) is of primary importance.
- ◆ Advanced printers, such as laser and thermal transfer printers, may require complex drivers to handle printer control information. Since software is now available to drive most of these printers, there should be no problem.

Troubleshooting Printing Problems

This appendix will assist you in resolving printing problems, which may exist on three levels:

Hardware problems These problems involve hardware configurations or malfunctions. The printer might be out of paper, jammed, off-line, broken, or not cabled correctly.

Logical problems These problems involve improper or incomplete configurations or corrupted software. The queue might be assigned to the wrong printer, the queue might not be serviced by a print server, or the wrong printer number is used when loading NPRINTER.

Procedural problems These problems usually result from typing errors or unfamiliarity with the printing environment. The wrong port may be captured, the wrong queue may be specified, or the print job parameters may be taken from a different object than expected.

Troubleshooting Flow Charts

Regardless of the type of problem, the following information should help you isolate and resolve it. The flow charts and notes on the following pages provide a basic approach to resolving network printing problems.

If you cannot solve your printing problem and you decide to call your Novell® Authorized ResellerSM representative, write down details such as error messages, procedure to reproduce the failure, configuration, etc. before you call. Referring to these notes should help technical support personnel solve your problem faster.

Figure D-1

Troubleshooting: No Printer Output

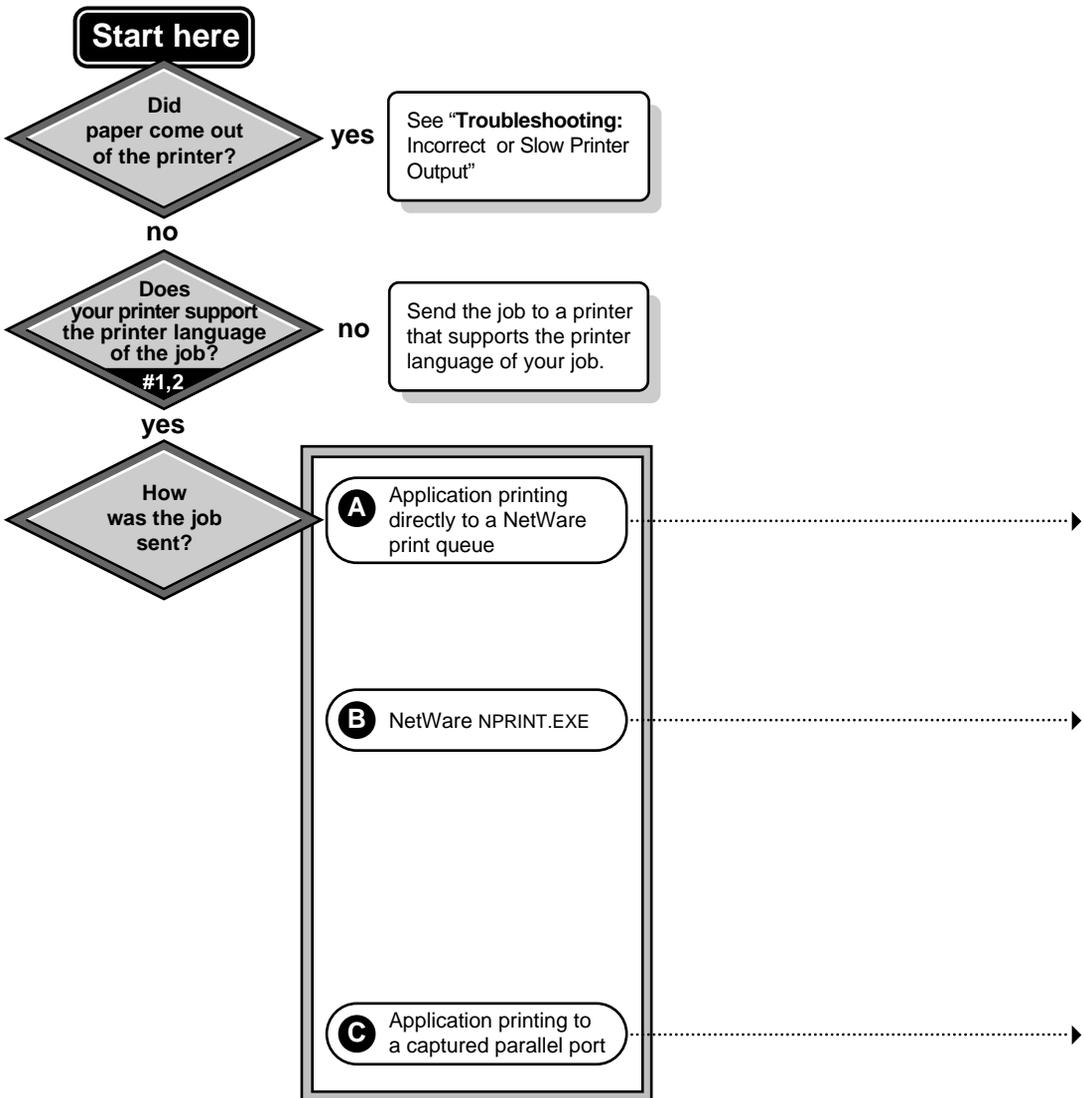
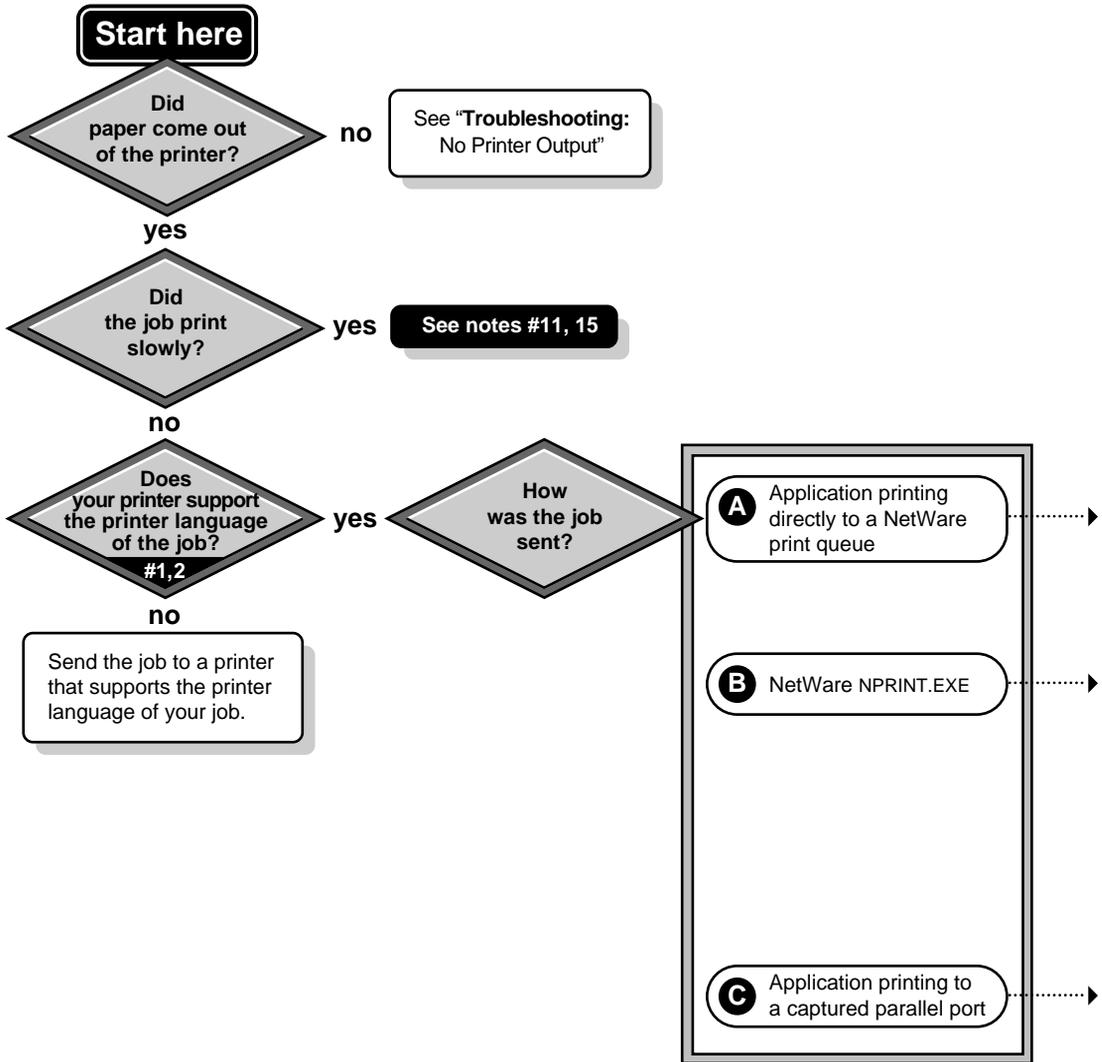


Figure D-2

Troubleshooting: Incorrect or Slow Printer Output



Troubleshooting Notes

1. Determining the Printer Language of Your Print Job

Print jobs can be generated in a variety of printer languages. See “Printer Languages” on page 236 for a discussion of the various types. Different applications with printing capability will generate print jobs using different languages. Similarly, certain printers support some languages but not others. For example, many PCL printers do not support PostScript printing. (See “2. Determining the Printer Languages Your Printer Supports” on page 273 for more information.)

To be sure you are sending your print job to a printer that can support the language used by your application, you must determine the language used by your print job. Sending a print job to a printer that does not support the printer language used in that print job will produce unexpected results varying from no printer output to incorrect printer output.

In MS Windows and DOS applications, the print driver you are using in a specific application can provide information about the type of job the application creates when the document is printed. The name of the print driver can be seen in many applications by choosing the Select Printer option from the file menu.

- ◆ Print drivers that generate PostScript print jobs usually have either the word PostScript or the letters PS in their names.
- ◆ Print drivers that generate PCL print jobs occasionally have the letters PCL in their names but usually make no reference to a the printer language they are using.

If your application does not allow you to select a print driver, it generates an ASCII text print job. In DOS, copying or redirecting a text file to an LPT port prints an ASCII text job. For example, **TYPE <filename > LPT1** or **DIR > LPT1**.

A large family of printer languages, the page description languages (PDLs), including PostScript, do not support printing this type of job. However, ASCII text files can be printed by non-PDL languages such as PCL.

The language of a print job can also be determined by examining the print job's data. However, an understanding of the characteristics of printer languages is necessary in order to determine the language type. See "5. Checking the Contents of Your Job for Incorrect Control Sequences" on page 277 for information on examining print job data.

2. Determining the Printer Languages Your Printer Supports

The printer languages your printer supports can be determined by reading your printer's documentation. Many printers can support multiple languages. For example, many printers now support both PCL and PostScript print jobs.

Commands can be sent to these printers to cause them to switch languages. For example, to print a PostScript job on a printer that supports both PostScript and PCL jobs, a command sequence may need to be sent with the job that tells the printer to SwitchToPostScript. This command sequence can be referenced in a print job configuration and implemented by using the `J=` option with `CAPTURE` or `NPRINT` using the following syntax:

```
CAPTURE J=SWITCHPS
```

or

```
NPRINT J=SWITCHPS
```

Some printers can detect the language used by a print job and switch to the appropriate language automatically.

3. Checking Your Non-Network (Local) Printer Setup

A printer will not function with NetWare print services if it does not function without NetWare print services.

To determine whether your printer is functioning properly, first print the job to the printer locally. If the printer is connected to a server, issue the server `DOWN` command and bring the machine up as a workstation so you can print the job to a local printer. This will determine whether the problem exists within network printing.

Check for the following problems.

Insufficient Printer Memory

During printing, the printer must have sufficient memory to hold the entire page to be printed. If it does not, it will print the part of the page it has in memory and continue printing on the next page. This problem occurs when printing large graphics jobs.

- ◆ Add more memory to the printer, if possible.
- ◆ If your application allows, configure it for the amount of memory that your printer has. This will allow the application to send data to the printer in a more manageable format.

Incompatible Printer Language Versions

If unexpected strings or characters appear in your printer output, and you are sure that the printer language in your print job is the same as the language supported by your printer (see Notes 1 and 2), you may have different language versions.

If the language version used by the print driver in your application is newer than the version your printer can interpret, some commands may not be recognized by your printer. This can cause unexpected strings or characters to appear randomly throughout your print job.

Try using an older language version to create your job. For example, if this symptom occurs while printing to an HP LaserJet IIIsi and the print driver you are using is for an HP LaserJet 4si, try using a printer driver for an HP LaserJet IIIsi.

Interrupt Conflicts

If your print job is printing slowly, you may have an interrupt conflict between the port and another device.

Reconfigure your printer to run in polled mode. Polled mode is the default in NetWare 4™ software. If printing performance improves, either continue using polled mode or configure your printer to use a unique interrupt. See “Polled versus Interrupt Mode” on page 261 for more information.

Cabling Problems

If random, unexpected characters appear in your printer output, your printer cables may be too long or improperly attached. Make sure that everything is connected properly and that the cabling is within specified lengths and in good condition.

For more information on cabling, see Appendix B, “Cabling Printers,” on page 245.

Incorrect Printer Configuration

Run the configuration program supplied with the printer, or use DOS commands like MODE or PRINT to check that the printer settings are accurate. For example, if the printer is cabled to LPT2, make sure to send print jobs to LPT2. Use the documentation supplied with the printer to check other necessary settings.

If you cannot get a printer cabled to a workstation to print locally, check the workstation's NET.CFG file to see if it contains the following line:

```
LOCAL PRINTERS=0
```

If NET.CFG contains this line, temporarily remark it so it is not executed (place a pound sign # in front of it) or change the line to read as follows:

```
LOCAL PRINTERS=number
```

(The *number* should be the number of printers attached to the machine).

Faulty Hardware

The printer may be failing and need service or replacement. If necessary, have faulty hardware repaired. See Appendix A, “Setting Up and Servicing Printers,” on page 235 for more information.

4. Determining Whether Your Job Is an ASCII Text File

Print jobs that are not ASCII text files should be printed as Byte Stream files. ASCII text files may be printed as Text files. The difference between these two types is whether tab conversion is enabled.

Tab conversion means that as a job is printed, a tab character is replaced by a specified number of spaces. Tab conversion takes place if File contents is set to Text in the print job configuration or if Tabs is set in the CAPTURE command.

If the jobs to be printed are ASCII text files, the File contents should be set to Text. Tab size can then be set to 1 through 18. This is the number of spaces that will be substituted for each full tab that is encountered. This is set in the CAPTURE command using the **T=** parameter.

For example, to set the tab conversion to 6 spaces, the command is as follows:

```
CAPTURE T=6
```

Any job that is not an ASCII text file should be printed with File contents set to Byte Stream. This is because tab conversion usually causes graphics to be printed incorrectly. Text from most word processors is printed as graphics.

Byte Stream is the default setting. It can be manually set in the CAPTURE command using the NT (No Tabs) parameter. The command is as follow:

```
CAPTURE NT
```

To determine if a file is an ASCII text file, the DOS TYPE command can be used to look at it. For example, the syntax for checking the AUTOEXEC.BAT file is as follows:

```
TYPE AUTOEXEC.BAT
```

If the file can be read properly when it is displayed, it is probably an ASCII text file.

Another way to determine this is to try printing the file. If the file contains tabs, yet prints out legibly and in the proper format, it is an ASCII text file.

If you have determined that the job is text, yet it will not print properly with File contents: Text (or **T**=<1 through 18> in the CAPTURE command), change the setting to File contents: Byte Stream (or **NT** in the CAPTURE command.)

5. Checking the Contents of Your Job for Incorrect Control Sequences

Your print job may contain incorrect functions or control sequences. The following procedure explains how to view the contents of your job using PCONSOLE.

Use a text editor to view the print job.

Procedure

1. **Send the print job to a print queue using CAPTURE or NPRINT with the HOLD option.**
2. **At PCONSOLE's Available Options menu, select Print Queues. Select the print queue servicing the print job.**
3. **At the Print Queue Information menu, select Information. Write down the Object ID number. This is your print queue number.**
4. **Exit PCONSOLE and return to DOS.**
5. **Go to the QUEUES directory. The default location is SYS:QUEUES.**
6. **Change to the queue directory. The name of the queue directory is the Object ID followed by .QDR.**
7. **Type DIR to see a list of the print jobs in the queue.**
Print jobs are listed by ID number in the queue.
8. **Using FILER or a standard text editor, bring up the print job so that you can view all data and control sequences in the job.**

If there are multiple jobs in the queue, you will have to look at each one until you find the correct job.

Control sequences assigned to the job by NetWare are attached to the beginning and/or end of the job by the CAPTURE or NPRINT utilities. The control sequences to be attached to the print job are determined by the Device and Mode fields of the print job configuration that was used when CAPTURE or NPRINT were run.

The Details (D) option of CAPTURE or NPRINT will show which print job configuration is being used.

Print job configurations can be created or modified using PRINTCON or the NetWare Administrator utility. The print job configuration may reference a print device definition (Device definitions can be created or modified using PRINTDEF or the NetWare Administrator utility.)

9. Refer to the documentation for your printer to verify that the control sequences in your job are correct for the printer.

Some PostScript print device definitions include modes that are larger than the buffer size for the print header, which is 64 bytes. This buffer can be increased up to 255 bytes by adding PRINT HEADER=*number* to the NET.CFG file.

CAPTURE uses this buffer. NPRINT does not.

6. Determining Whether Your Job Is Currently in the Print Queue

In PCONSOLE, select the queue from the Print Queues list and then Print Jobs. The name of the user who sent the job is in the Name column.

If the job is not shown here, either it did not reach the queue or was sent to the printer and then removed from the queue.

7. Determining Whether Your Job Ever Reached the Print Queue

If your print job was sent to the queue but nothing is currently in the queue, you must determine whether the job did not reach the queue or whether it reached the queue and then disappeared without printing.

In order to determine this, you must disable the operator flag for the print queue titled Allow service by current print servers using PCONSOLE or the NetWare Administrator utility.

To access the queue operator flags in PCONSOLE, select the Status option from the Print Queue Information menu. In the NetWare Administrator utility, the flags are on the Details page of the Queue object. Disabling this operator flag essentially puts the queue on hold.

Next, print the job again. You can now look to see if the job is in the queue by selecting Print Jobs from the Print Queue Information menu in PCONSOLE or by selecting the Job List page of the Queue object in the NetWare Administrator utility.

If the job does not show up here, it never reached the queue.

8. Determining Where Your Job Was Sent

If the job was printed to a captured port, type `CAPTURE SH` at the command line. The name of the queue being captured to will be shown on the first line.

If the job was printed using NPRINT, type `NPRINT /D` (Details) at the command line. This will show the print job configuration being used. (Note that a slash must precede the Details option when using NPRINT. The slash is not necessary when using CAPTURE.)

You can determine which printer or queue is specified in this job configuration using PRINTCON or the NetWare Administrator utility.

In MS Windows, you can determine where the job is being sent by opening User Tools and clicking on the printer icon. The printer or queue will be shown next to the port you printed to from the application.

The parameters used by CAPTURE and NPRINT are determined by the default print job unless they are overridden in the command. The default print job is configured using PRINTCON or the NetWare Administrator utility.

9. Activating Jobs on Hold Status

To release jobs on operator or user hold using PCONSOLE, select the queue from the Print Queues list and then select Print Jobs. Select the job that is held and change the User hold and Operator hold fields to No.

To accomplish the same task using the NetWare Administrator utility, the User hold and Operator hold fields can be found by selecting Job Details in the Print Queue dialog.

To release jobs on operator or user hold using the NetWare Administrator utility, select Job List from the Print Queue dialog. Highlight the print job and select Resume.

The only way the print job could have been placed on operator hold is for a print queue operator to have manually placed the job on hold using PCONSOLE or the NetWare Administrator utility.

The print job could have been placed on user hold manually by the user or queue operator using PCONSOLE or the NetWare Administrator utility, but also could have been placed on hold automatically.

There are several ways a print job can be placed on hold automatically:

- ◆ **User Tools.** Under the NetWare Printer Connections window, select LPT Settings.... The first parameter in the list is Hold.
- ◆ **CAPTURE.** Issue the CAPTURE command with a HOLD option.
- ◆ **NPRINT.** Issue the NPRINT command with a HOLD option.

10. Troubleshooting Jobs Stuck in Active Status

If your print job is stuck in Active status, one possibility is that the job is being sent slowly. You can usually determine this on a laser printer if the light is blinking to indicate that it is receiving data.

If you press the form feed button on the printer, the printer should print part of the page. (Some graphics jobs may be binary files, which require that the /B option be used with CAPTURE.)

If you are using a serial printer, some possible causes are as follows:

- ◆ The baud rate is low.
- ◆ The cable or port is bad.
- ◆ XON/XOFF needs to be enabled or disabled.
- ◆ The printer may have been turned offline.
- ◆ If the printer is configured to use interrupts, there may be a conflict. This will cause slow printing. The configuration of the printer may need to be changed to polled mode.

If you are using a parallel printer, some possible causes are as follows:

- ◆ The cable or port is bad.
- ◆ The printer may have been turned offline.
- ◆ If the printer is configured to use interrupts, there may be a conflict. This will cause slow printing. The configuration of the printer may need to be changed to polled mode.

Another possibility is that the printer has been paused or is out of paper. This can be determined in PCONSOLE or the print server console screen.

11. Troubleshooting Jobs Stuck in Ready Status

If your job is stuck in Ready status, the printing configuration may not be complete:

- ◆ The print server may not be set up to service the printer.
- ◆ The print server may not be assigned to the queue.
- ◆ The queue may not be assigned to the printer.
- ◆ An operator flag may be set for the queue in PCONSOLE to not allow service by current print servers. Select the queue and then Status from the Print Queue Information menu.

Other possibilities include the following:

- ◆ The job may be waiting for a new form to be mounted.
- ◆ Other jobs may be ahead of this job in the queue.
- ◆ The printer may be servicing another queue with a higher priority.
- ◆ The printer may have been stopped. Check the status of the printer in PCONSOLE or at the print server console.

12. Troubleshooting Jobs Stuck in Adding Status

One reason for jobs to appear stuck while the status is Adding is that the application may be printing slowly. This is likely to happen when the application is generating graphics to be printed.

Another possible explanation is that the CAPTURE command includes the options **NA** (No Autoendcap) and **TI=0** (No Timeout). If this is the case, status will remain Adding until an End Capture command (CAPTURE EC) is issued.

13. Using CAPTURE to Redirect Parallel Ports to Network Queues

Many applications are not designed for network printing. CAPTURE is a command line utility that allows you to print from applications not designed for NetWare print services. It sets up redirection parameters for printing output from your workstation. The NetWare DOS Requester then redirects the workstation output from an LPT port to the specified network printer or file.

For complete information on using CAPTURE, see “Using CAPTURE” on page 129.

14. Troubleshooting Jobs Printed Slowly

There are several explanations for slow printing.

- ◆ The application may be generating the output for the printer. This can cause a long delay before the job is even sent to the queue. Look at the status of the application to determine if this is the case.
- ◆ Interrupt conflicts may exist between the port and another device. Configure the printer for no interrupts (polled mode).

- ◆ The baud rate may be slow (serial printer).
- ◆ XON/XOFF may need to be enabled (serial printers).
- ◆ Your hardware (cable, port, printer) may be faulty.
- ◆ The `/B` parameter may be needed with CAPTURE if the job is a binary file.

15. Determining Whether a Printer Is Connected as a Network Printer

In order for a printer to be accessed by the network, ALL of the following must occur:

- ◆ The printer must be properly connected to a server or workstation (or to the network cabling with a network-direct device).
- ◆ The printer must be functional as a local printer (unless it is a network-direct printer). If a printer will not work locally, it will not work as a network printer. See “3. Checking Your Non-Network (Local) Printer Setup” on page 273 for more information.
- ◆ The printer must be configured and have a queue assigned to it (using PCONSOLE or the NetWare Administrator utility).
- ◆ The server or workstation the printer is connected to must have the port driver loaded (NPRINTER).

16. Troubleshooting Jobs Printed in Pieces on Separate Pages

A print job can be broken and printed on separate pages for several reasons:

- ◆ The CAPTURE timeout setting may be too short. If there is a pause in the flow of data between the application and the port, and it is long enough for the timeout to end the job, the next data that comes will be sent to the queue as a new job. The new job will be printed on a new page because a form feed is issued.
- ◆ Misinterpreted control characters in a job may also cause a form feed in the middle of a job. Sometimes this problem can be corrected by sending the job as Byte Stream (No Tabs).

- ◆ The printer may not have sufficient memory to hold the entire page to be printed. If it does not, it will print the part of the page it has in memory and continue printing on the next page. This problem occurs when printing large graphics jobs.

17. Determining the Status of Your Print Job

To determine the status of your print job using PCONSOLE, select Print Jobs from the Print Queue Information menu. Look in the Status field for the job.

To determine the status of your job using the NetWare Administrator utility, click the Job List page in the Print Queue dialog and look in the Status field.

18. Solving NetWare Printing Problems When Running MS Windows

Sometimes printing problems the occur when running MS Windows can be resolved by any combination of the following, which are set in the Printers option in the MS Windows Control Panel:

- ◆ Change the printer port connection to print to LPT1.DOS instead of LPT1. This can help to speed up printing.
- ◆ Disable Fast Printing Direct to Port if you get the error Print device is already in use. (This action may slow printing slightly.)
- ◆ Disable Print Manager. This can help to speed up printing but disables the MS Windows spooler.

In Windows 3.x, printing problems may be corrected with User Tools by one or both of the following techniques:

- ◆ Disable Tabs using User Tools.
- ◆ Match the banner type with the MS Windows printer driver type (PostScript or Text).

19. Isolating Bad Hardware or Corrupt Software

If the previous notes do not yield a solution to your printing problem, you may have bad hardware or corrupted printing software.

The following suggestions will help you to isolate the specific location of the problem in your printing setup.

Procedure

- 1. Use a different method to send the job to the queue.**

If a different method works, there may be a problem with CAPTURE.EXE, NPRINT.EXE, or the options that are being used with them.

If you are currently using CAPTURE, try NPRINT. If you are currently using NPRINT, try a DOS COPY to a captured port. Make sure you use similar options with CAPTURE and NPRINT.

- 2. Print the job using CAPTURE or NPRINT using the HOLD option.**

- 3. Find the print job name in the queue as described in “5. Checking the Contents of Your Job for Incorrect Control Sequences” on page 277.**

- 4. If it is a text file, view the contents of it using FILER.**

If the job is corrupt, the problem occurred before or while the job was written to the queue.

- 5. If the job is not corrupt or you cannot tell because it is graphics, make a reference file by copying the job file to a different name or directory.**

- 6. Allow the job to print by removing it from hold status.**

- 7. Print the reference file by using PCONSOLE or NPRINT, or by copying it to a captured port.**

Warning: When printing the reference file, do not use a print job configuration that specifies a mode. This will cause the control codes to be duplicated in the job.

8. Compare the printout of the reference file to the first printout.

If the two printouts are different, the job is being corrupted after it is written to the queue. There may be a problem with the printer hardware (port, cable, printer) or the print server (PSERVER.NLM), port driver (NPRINTER), or printer configuration.

9. If the printouts are the same, print the same job from the application again using the HOLD option.

10. Use DOS COMP, MS-DOS FC, or a similar utility to compare the reference file and the job that has been reprinted from the application.

If these files do not compare, the job is being corrupted before or during being written to the queue.

11. If a NetWare utility appears to have a problem, recopy it to ensure that it is not corrupt.

If the problem persists, contact your Novell Authorized Reseller to see if there is an updated version of the utility.

Trademarks

Novell Trademarks

Access Manager is a registered trademark of Novell, Inc. in the United States and other countries.

Advanced NetWare is a trademark of Novell, Inc.

AlarmPro is a registered trademark of Novell, Inc. in the United States and other countries.

AppNotes is a trademark of Novell, Inc.

AppTester is a trademark of Novell, Inc. in the United States.

BrainShare is a registered service mark of Novell, Inc. in the United States and other countries.

C-Worthy is a trademark of Novell, Inc.

C3PO is a trademark of Novell, Inc.

CBASIC is a registered trademark of Novell, Inc. in the United States and other countries.

Certified NetWare Administrator in Japanese and CNA-J are service marks of Novell, Inc.

Certified NetWare Engineer in Japanese and CNE-J are service marks of Novell, Inc.

Certified NetWare Instructor in Japanese and CNI-J are service marks of Novell, Inc.

Certified Novell Administrator and CNA are service marks of Novell, Inc.

Certified Novell Engineer and CNE are service marks of Novell, Inc.

Certified Novell Salesperson is a trademark of Novell, Inc.

Client 32 is a trademark of Novell, Inc.

ConnectView is a registered trademark of Novell, Inc. in the United States and other countries.

Connectware is a trademark of Novell, Inc.

Corsair is a registered trademark of Novell, Inc. in the United States and other countries.

CP/Net is a registered trademark of Novell, Inc. in the United States and other countries.

Custom 3rd-Party Object and C3PO are trademarks of Novell, Inc.

DeveloperNet is a trademark of Novell, Inc.

Documenter's Workbench is a registered trademark of Novell, Inc. in the United States and other countries.

ElectroText is a trademark of Novell, Inc.

Enterprise Certified Novell Engineer and ECNE are service marks of Novell, Inc.

Envoy is a registered trademark of Novell, Inc. in the United States and other countries.

EtherPort is a registered trademark of Novell, Inc. in the United States and other countries.

EXOS is a trademark of Novell, Inc.

Global MHS is a trademark of Novell, Inc.

Global Network Operations Center and GNOC are service marks of Novell, Inc.

Grammatik is a registered trademark of Novell, Inc. in the United States and other countries.

Graphics Environment Manager and GEM are registered trademarks of Novell, Inc. in the United States and other countries.

GroupWise is a registered trademark of Novell, Inc. in the United States and other countries.

GroupWise 5 is a trademark of Novell, Inc.

GroupWise XTD is a trademark of Novell, Inc.

Hardware Specific Module and HSM are trademarks of Novell, Inc.

Hot Fix is a trademark of Novell, Inc.

InForms is a trademark of Novell, Inc.

Instructional Workbench is a registered trademark of Novell, Inc. in the United States and other countries.

Internetwork Packet Exchange and IPX are trademarks of Novell, Inc.

IPX/SPX is a trademark of Novell, Inc.

IPXODI is a trademark of Novell, Inc.

IPXWAN is a trademark of Novell, Inc.

LAN WorkGroup is a trademark of Novell, Inc.

LAN WorkPlace is a registered trademark of Novell, Inc. in the United States and other countries.

LAN WorkShop is a trademark of Novell, Inc.

LANalyzer is a registered trademark of Novell, Inc. in the United States and other countries.

LANalyzer Agent is a trademark of Novell, Inc.

Link Support Layer and LSL are trademarks of Novell, Inc.

MacIPX is a registered trademark of Novell, Inc. in the United States and other countries.

ManageWise is a registered trademark of Novell, Inc. in the United States and other countries.

Media Support Module and MSM are trademarks of Novell, Inc.

Mirrored Server Link and MSL are trademarks of Novell, Inc.

Mobile IPX is a trademark of Novell, Inc.

Multiple Link Interface and MLI are trademarks of Novell, Inc.

Multiple Link Interface Driver and MLID are trademarks of Novell, Inc.

My World is a registered trademark of Novell, Inc. in the United States and other countries.

N-Design is a registered trademark of Novell, Inc. in the United States and other countries.

Natural Language Interface for Help is a trademark of Novell, Inc.

NDS is a trademark of Novell, Inc.
NDS Manager is a trademark of Novell, Inc.
NE/2 is a trademark of Novell, Inc.
NE/2-32 is a trademark of Novell, Inc.
NE/2T is a trademark of Novell, Inc.
NE1000 is a trademark of Novell, Inc.
NE1500T is a trademark of Novell, Inc.
NE2000 is a trademark of Novell, Inc.
NE2000T is a trademark of Novell, Inc.
NE2100 is a trademark of Novell, Inc.
NE21500T is a trademark of Novell, Inc.
NE3200 is a trademark of Novell, Inc.
NE32HUB is a trademark of Novell, Inc.
NEST is a trademark of Novell, Inc.
NEST Autoroute is a trademark of Novell, Inc.
NetExplorer is a trademark of Novell, Inc.
NetNotes is a registered trademark of Novell, Inc. in the United States and other countries.
NetSync is a trademark of Novell, Inc.
NetWare is a registered trademark of Novell, Inc. in the United States and other countries.
NetWare 3 is a trademark of Novell, Inc.
NetWare 3270 CUT Workstation is a trademark of Novell, Inc.
NetWare 3270 LAN Workstation is a trademark of Novell, Inc.
NetWare 386 is a trademark of Novell, Inc.
NetWare 4 is a trademark of Novell, Inc.
NetWare 5 is a trademark of Novell, Inc.
NetWare Access Server is a trademark of Novell, Inc.
NetWare Access Services is a trademark of Novell, Inc.
NetWare Application Manager is a trademark of Novell, Inc.
NetWare Application Notes is a trademark of Novell, Inc.
NetWare Asynchronous Communication Services and NACS are trademarks of Novell, Inc.
NetWare Asynchronous Services Interface and NASI are trademarks of Novell, Inc.
NetWare Aware is a trademark of Novell, Inc.
NetWare Basic MHS is a trademark of Novell, Inc.
NetWare BranchLink Router is a trademark of Novell, Inc.
NetWare Care is a trademark of Novell, Inc.
NetWare Communication Services Manager is a trademark of Novell, Inc.
NetWare Connect is a registered trademark of Novell, Inc. in the United States.
NetWare Core Protocol and NCP are trademarks of Novell, Inc.
NetWare Distributed Management Services is a trademark of Novell, Inc.
NetWare Document Management Services is a trademark of Novell, Inc.
NetWare DOS Requester and NDR are trademarks of Novell, Inc.
NetWare Enterprise Router is a trademark of Novell, Inc.
NetWare Express is a registered service mark of Novell, Inc. in the United States and other countries.

NetWare Global Messaging and NGM are trademarks of Novell, Inc.
NetWare Global MHS is a trademark of Novell, Inc.
NetWare HostPrint is a registered trademark of Novell, Inc. in the United States.
NetWare IPX Router is a trademark of Novell, Inc.
NetWare LANalyzer Agent is a trademark of Novell, Inc.
NetWare Link Services Protocol and NLSP are trademarks of Novell, Inc.
NetWare Link/ATM is a trademark of Novell, Inc.
NetWare Link/Frame Relay is a trademark of Novell, Inc.
NetWare Link/PPP is a trademark of Novell, Inc.
NetWare Link/X.25 is a trademark of Novell, Inc.
NetWare Loadable Module and NLM are trademarks of Novell, Inc.
NetWare LU6.2 is trademark of Novell, Inc.
NetWare Management Agent is a trademark of Novell, Inc.
NetWare Management System and NMS are trademarks of Novell, Inc.
NetWare Message Handling Service and NetWare MHS are trademarks of Novell, Inc.
NetWare MHS Mailslots is a registered trademark of Novell, Inc. in the United States and other countries.
NetWare Mirrored Server Link and NMSL are trademarks of Novell, Inc.
NetWare Mobile is a trademark of Novell, Inc.
NetWare Mobile IPX is a trademark of Novell, Inc.
NetWare MultiProtocol Router and NetWare MPR are trademarks of Novell, Inc.
NetWare MultiProtocol Router Plus is a trademark of Novell, Inc.
NetWare Name Service is a registered trademark of Novell, Inc. in the United States and other countries.
NetWare Navigator is a trademark of Novell, Inc.
NetWare Peripheral Architecture is a trademark of Novell, Inc.
NetWare Print Server is a trademark of Novell, Inc.
NetWare Ready is a trademark of Novell, Inc.
NetWare Requester is a trademark of Novell, Inc.
NetWare Runtime is a trademark of Novell, Inc.
NetWare RX-Net is a trademark of Novell, Inc.
NetWare SFT is a trademark of Novell, Inc.
NetWare SFT III is a trademark of Novell, Inc.
NetWare SNA Gateway is a trademark of Novell, Inc.
NetWare SNA Links is a trademark of Novell, Inc.
NetWare SQL is a trademark of Novell, Inc.
NetWare Storage Management Services and NetWare SMS are trademarks of Novell, Inc.
NetWare Telephony Services is a trademark of Novell, Inc.
NetWare Tools is a trademark of Novell, Inc.
NetWare UAM is a trademark of Novell, Inc.
NetWare WAN Links is a trademark of Novell, Inc.
NetWare/IP is a trademark of Novell, Inc.
NetWire is a registered service mark of Novell, Inc. in the United States and other countries.

Network Navigator is a registered trademark of Novell, Inc. in the United States.

Network Navigator - AutoPilot is a registered trademark of Novell, Inc. in the United States and other countries.

Network Navigator - Dispatcher is a registered trademark of Novell, Inc. in the United States.

Network Support Encyclopedia and NSE are trademarks of Novell, Inc. Network Support Encyclopedia Professional Volume and NSEPro are trademarks of Novell, Inc.

NetWorld is a registered service mark of Novell, Inc. in the United States and other countries.

Novell is a service mark of Novell, Inc. and a registered trademark of Novell, Inc. in the United States and other countries.

Novell Academic Education Partner and NAEP are service marks of Novell, Inc.

Novell Alliance Partners Program is a collective mark of Novell, Inc.

Novell Application Launcher is a trademark of Novell, Inc.

Novell Application Notes is a trademark of Novell, Inc.

Novell Authorized CNE is a trademark and service mark of Novell, Inc.

Novell Authorized Education Center and NAEC are service marks of Novell, Inc.

Novell Authorized Partner is a service mark of Novell, Inc.

Novell Authorized Reseller is a service mark of Novell, Inc.

Novell Authorized Service Center and NASC are service marks of Novell, Inc.

Novell BorderManager is a trademark of Novell, Inc.

Novell BorderManager FastCache is a trademark of Novell, Inc.

Novell Client is a trademark of Novell, Inc.

Novell Corporate Symbol is a trademark of Novell, Inc.

Novell Customer Connections is a registered trademark of Novell, Inc. in the United States.

Novell Directory Services and NDS are trademarks of Novell, Inc.

Novell Distributed Print Services and NDPS are trademarks of Novell, Inc.

Novell ElectroText is a trademark of Novell, Inc.

Novell Embedded Systems Technology is a registered trademark of Novell, Inc. in the United States and other countries and

NEST is a trademark of Novell, Inc.

Novell Gold Authorized Reseller is a service mark of Novell, Inc.

Novell Gold Partner is a service mark of Novell, Inc.

Novell Labs is a trademark of Novell, Inc.

Novell N-Design is a registered trademark of Novell, Inc. in the United States and other countries.

Novell NE/2 is a trademark of Novell, Inc.

Novell NE/2-32 is a trademark of Novell, Inc.

Novell NE3200 is a trademark of Novell, Inc.

Novell Network Registry is a service mark of Novell, Inc.

Novell Platinum Partner is a service mark of Novell, Inc.

Novell Press is a trademark of Novell, Inc.

Novell Press Logo (teeth logo) is a registered trademark of Novell, Inc. in the United States and other countries.

Novell Replication Services is a trademark of Novell, Inc.

Novell Research Reports is a trademark of Novell, Inc.

Novell RX-Net/2 is a trademark of Novell, Inc.

Novell Service Partner is a trademark of Novell, Inc.

Novell Storage Services is a trademark of Novell, Inc.

Novell Support Connection is a trademark of Novell, Inc.

Novell Technical Services and NTS are service marks of Novell, Inc.

Novell Technology Institute and NTI are registered service marks of Novell, Inc. in the United States and other countries.

Novell Virtual Terminal and NVT are trademarks of Novell, Inc.

Novell Web Server is a trademark of Novell, Inc.

Novell World Wide is a trademark of Novell, Inc.

NSE Online is a service mark of Novell, Inc.

NTR2000 is a trademark of Novell, Inc.

Nutcracker is a registered trademark of Novell, Inc. in the United States and other countries.

OnLAN/LAP is a registered trademark of Novell, Inc. in the United States and other countries.

OnLAN/PC is a registered trademark of Novell, Inc. in the United States and other countries.

Open Data-Link Interface and ODI are trademarks of Novell, Inc.

Open Look is a registered trademark of Novell, Inc. in the United States and other countries.

Open Networking Platform is a registered trademark of Novell, Inc. in the United States and other countries.

Open Socket is a registered trademark of Novell, Inc. in the United States.

Packet Burst is a trademark of Novell, Inc.

PartnerNet is a trademark and service mark of Novell, Inc.

PC Navigator is a trademark of Novell, Inc.

PCOX is a registered trademark of Novell, Inc. in the United States and other countries.

Perform3 is a trademark of Novell, Inc.

Personal NetWare is a trademark of Novell, Inc.

Pervasive Computing from Novell is a registered trademark of Novell, Inc. in the United States and other countries.

Portable NetWare is a trademark of Novell, Inc.

Presentation Master is a registered trademark of Novell, Inc. in the United States and other countries.

Print Managing Agent is a trademark of Novell, Inc.

Printer Agent is a trademark of Novell, Inc.

QuickFinder is a trademark of Novell, Inc.

Red Box is a trademark of Novell, Inc.

Reference Software is a registered trademark of Novell, Inc. in the United States and other countries.

Remote Console is a trademark of Novell, Inc.

Remote MHS is a trademark of Novell, Inc.

RX-Net is a trademark of Novell, Inc.
RX-Net/2 is a trademark of Novell, Inc.
ScanXpress is a registered trademark of Novell, Inc. in the United States and other countries.
Script Director is a registered trademark of Novell, Inc. in the United States and other countries.
Sequenced Packet Exchange and SPX are trademarks of Novell, Inc.
Service Response System is a trademark of Novell, Inc.
Serving FTP is a trademark of Novell, Inc.
SFT is a trademark of Novell, Inc.
SFT III is a trademark of Novell, Inc.
SoftSolutions is a registered trademark of SoftSolutions Technology Corporation, a wholly owned subsidiary of Novell, Inc.
Software Transformation, Inc. is a registered trademark of Software Transformation, Inc., a wholly owned subsidiary of Novell, Inc.
SPX/IPX is a trademark of Novell, Inc.
StarLink is a registered trademark of Novell, Inc. in the United States and other countries.
Storage Management Services and SMS are trademarks of Novell, Inc.
Technical Support Alliance and TSA are collective marks of Novell, Inc.
The Fastest Way to Find the Right Word is a registered trademark of Novell, Inc. in the United States and other countries.
The Novell Network Symbol is a trademark of Novell, Inc.
Topology Specific Module and TSM are trademarks of Novell, Inc.
Transaction Tracking System and TTS are trademarks of Novell, Inc.
Universal Component System is a registered trademark of Novell, Inc. in the United States and other countries.
Virtual Loadable Module and VLM are trademarks of Novell, Inc.
Writer's Workbench is a registered trademark of Novell, Inc. in the United States and other countries.
Yes, It Runs with NetWare (logo) is a trademark of Novell, Inc.
Yes, NetWare Tested and Approved (logo) is a trademark of Novell, Inc.
Yes, Tested and Approved is a trademark of Novell, Inc.
Z.E.N.works is a trademark of Novell, Inc.

Third-Party Trademarks

All third-party trademarks are the property of their respective owners.

