

Novell NetWare® 6

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NOVELL DISTRIBUTED PRINT SERVICES
ADMINISTRATION GUIDE



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Welcome to Novell Distributed Print Services

Novell® Distributed Print Services™ (NDPS®) offers improvements over Novell's legacy queue-based print service architecture. NDPS was designed to handle the increased complexity of managing modern printers in a network environment and to exploit the new functionality offered by these printers. The power and versatility of NDPS will help you get the most out of your printing resources, whether you're in a small workgroup or an enterprise-wide system.

NDPS works in conjunction with iPrint to allow true location-based printing. With iPrint, users use their Web browser to locate and install printers and their print drivers on their workstations. NDPS provides the infrastructure to move the print jobs between the workstations and the printers.

NDPS is fully compatible with your existing queue-based printing resources, which means that you can make the transition from your legacy printing setup gradually.

For more information about migrating your queue-based system to NDPS, see the [Chapter 2, “Planning the Migration to Novell Distributed Print Services,” on page 35](#).

The following information will assist you in understanding and setting up NDPS:

- ♦ [Chapter 1, “Understanding Novell Distributed Print Services,” on page 13](#)
- ♦ [Chapter 2, “Planning the Migration to Novell Distributed Print Services,” on page 35](#)
- ♦ [Chapter 3, “Setting Up a New NDPS Printing System,” on page 57](#)
- ♦ [Chapter 4, “Managing Printers,” on page 71](#)

- ♦ Chapter 5, “Managing the Print Services Manager,” on page 87
- ♦ Chapter 6, “Managing the Broker,” on page 91
- ♦ Chapter 8, “Troubleshooting Your Print System,” on page 111

Documentation Conventions

In this documentation, a greater-than symbol (>) is used to separate actions within a step and items in a cross-reference path.

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1

Understanding Novell Distributed Print Services

Novell® Distributed Print Services™ (NDPS®) is the default and preferred print system in NetWare®. It is designed to handle the increased complexity of managing printing devices in any type of network environment, ranging in size from small workgroups to enterprise-wide systems. NDPS allows you to use iManage, Novell's Web-based management tool. You can also designate those printers for automatic installation on user workstations, without any action by your users.

NDPS replaces the existing queue-based printing technology. You don't have to set up print queues, printer objects, or print servers, and link them together. Instead, all of your management tasks are focused on the printer itself, which can be configured as an eDirectory™ object.

To better understand how NDPS works, read the following sections:

- ♦ [“Overview of NDPS” on page 13](#)
- ♦ [“Comparing NDPS with Queue-Based Print Services” on page 19](#)
- ♦ [“Understanding NDPS Printers” on page 20](#)
- ♦ [“Understanding the Architecture of NDPS” on page 21](#)

Overview of NDPS

NDPS is the default and preferred print system in NetWare. Novell's legacy, queue-based print system is also fully supported, which allows your users to continue printing as they always have until you complete the transition to NDPS. NDPS provides full support for IP-based as well as IPX™-based printing, giving you a wide variety of system configuration options to fit your organization's specific needs.

Some of the most significant features of NDPS include the following:

- ♦ “Bi-directional Feedback and Control” on page 14
- ♦ “Configurable Event Notification” on page 15
- ♦ “Tight Integration with eDirectory” on page 16
- ♦ “Automatic Printer Driver Download and End User Convenience” on page 16
- ♦ “Printer and Job Configuration Options” on page 17
- ♦ “Job Scheduling Options” on page 17
- ♦ “Protocol Independence” on page 17
- ♦ “Compatibility with Multiple Clients, Applications, and Operating Systems” on page 17
- ♦ “Support for Existing Printers (Full Backward Compatibility)” on page 18

Bi-directional Feedback and Control

Novell Distributed Print Services lets clients and printers exchange information about printers and print jobs. For example, this interchange allows users and administrators to get real-time information about a printer such as

- ♦ Its status

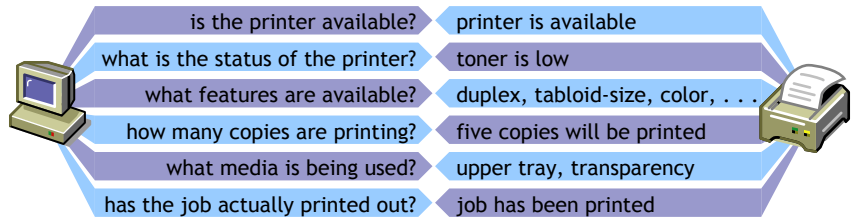
For example, it reports such information as whether the printer needs toner or paper, whether it is online, and whether the lid is open.

- ♦ Its configuration properties and features

For example, does it support color? Duplexing? How many pages has it printed since it was last serviced?

NDPS also lets you view information about a print job's properties and status, including

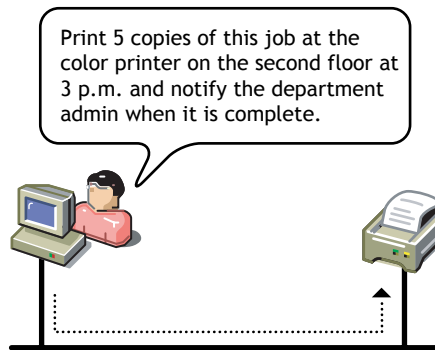
- ♦ The number of copies being printed
- ♦ Job hold and scheduling information
- ♦ Notification when the job has actually been completed



The bi-directional feedback provided by NDPS is limited only by the bi-directional capabilities of the printer itself. In many cases, NDPS actually enhances information provided about printers that do not have bi-directional capabilities.

Configurable Event Notification

With Novell Distributed Print Services, you can customize event notification. Event notification allows you to specify who should be notified of an event or problem, and how that person should be notified. It also allows you to identify the specific events or problems that you want notification messages sent for. For example, you can configure notification so that the owner of a print job will receive a screen pop-up message when the job has actually been printed.



You can also ensure that the printer operator is notified when a problem such as a paper jam occurs on the printer. Notification methods provided by NDPS include pop-up screen messages, e-mail, and log file records, while third-parties can develop other mechanisms such as beeper notification if they wish.

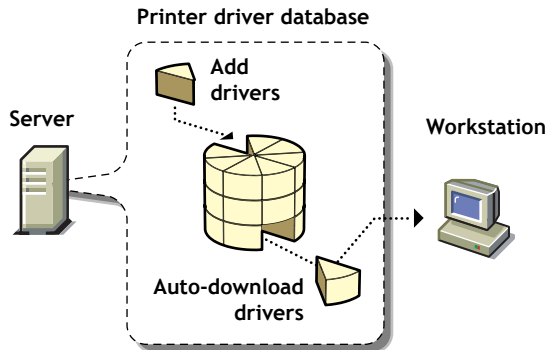
Tight Integration with eDirectory

Novell Distributed Print Services is designed to take full advantage of Novell eDirectory. Integration with eDirectory allows you to create a single eDirectory object—an NDPS Printer object—to represent each printer on the network. As a Printer object, printers become as secure as the other objects in the tree, and they are just as easy to manage.

In the eDirectory tree, printers can be conveniently grouped. For example, you can group and manage all of your printers by department, workgroup, or location. You can also search for printers with specific capabilities, because those capabilities are properties of the NDPS printer object.

Automatic Printer Driver Download and End User Convenience

Not only does NDPS make printer management easier for you as an administrator, it also makes printing easier for end users. NDPS provides a database that includes drivers for most printers in common use today. From this database, you can select drivers you want to be automatically installed on client workstations when a user adds a printer. This eliminates the need for users to provide the printer driver themselves. You can add drivers to this database as they become available.



An NDPS client can also modify printer configurations. For example, a user can configure a printer to use a different size paper or to print a cover page. Users can change the properties of any installed printer that the administrator has not locked. Also, using NDPS, users can view the current status of any available printer to see how many print jobs are waiting to be printed before they send their jobs. These NDPS features help make end-user printing easier and more effective than the methods of the past.

From this list, you can select drivers you want to be automatically downloaded and installed on client workstations. You can add drivers to this database as they become available.

Printer and Job Configuration Options

The NDPS interface supports many printer options in common use today, while the open architecture of NDPS allows printer manufacturers to add their own custom interfaces for specific printers. This means that as new printer features become available, you can access them through NDPS.

Job Scheduling Options

NDPS allows you to configure and schedule print jobs to be processed according to time of day, job size, or media availability.

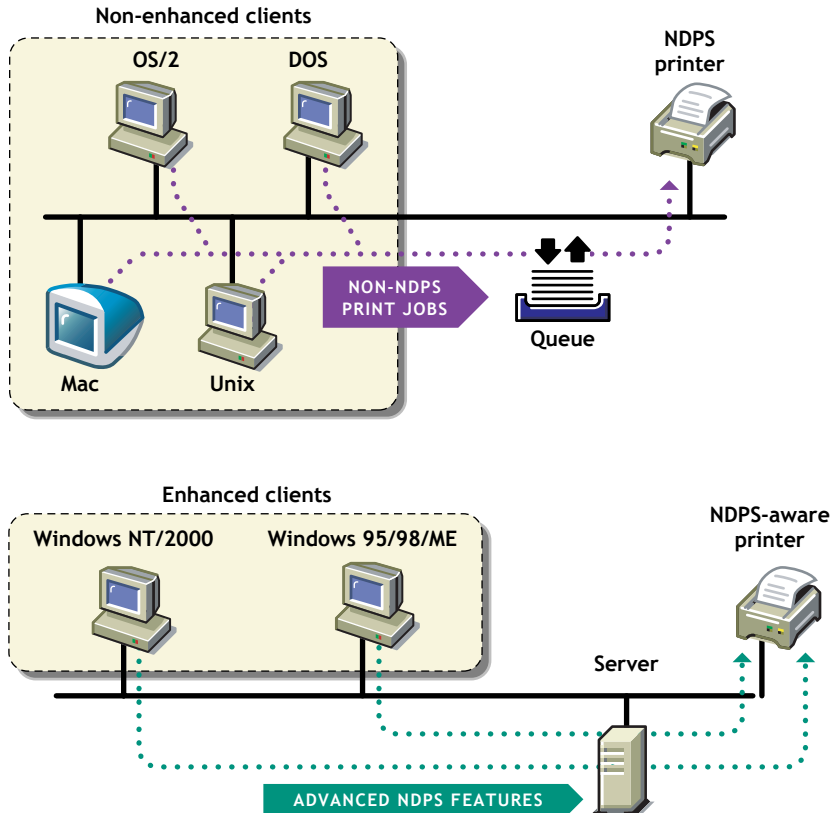
Protocol Independence

The entire NDPS architecture is protocol independent. NDPS can be used in an IPX-based environment, a pure TCP/IP environment, or a combination of both. The third-party gateways being developed to work with NDPS are also protocol independent.

Most printers that support TCP/IP today do not have a discovery protocol like SAP for IPX-based networks. The Service Locator Protocol (SLP) will eventually be embedded in printers and will provide a discovery protocol that can be used with NDPS.

Compatibility with Multiple Clients, Applications, and Operating Systems

NDPS provides an enhanced Windows* client to take advantage of all of the advanced features provided by NDPS. All clients that are not NDPS-aware can still print to NDPS printers, and you can use all of your existing applications with NDPS. Although your queue-based print clients won't be able to take full advantage of the advanced features available in NDPS, they won't lose any of the printing ability they have now. This backward-compatibility feature of NDPS makes it well-suited for heterogeneous networks.



Support for Existing Printers (Full Backward Compatibility)

NDPS lets you preserve your investment in your existing printing resources. All clients can print to legacy printers. All currently available printers can be used in NDPS environments. In fact, major printer manufacturers have developed gateways for their existing printers to enable them to take advantage of many new features available with NDPS.

Comparing NDPS with Queue-Based Print Services

The architecture of Novell legacy queue-based print services was based on the creation and linking of three components: printers, print queues, and print servers. Setting up queue-based printing was often a complex task. In order to print, users first had to capture the printer port. Then the client would redirect the data to a file in a print queue, where it was stored while waiting to be sent to a printer by the print server.

With NDPS, printer, print queue, and print server functions are combined into a single entity called a Printer Agent. The need to create print queues has been eliminated, and users send print jobs directly to printers.

Even though NDPS does not require queues, your networks might continue to include queue-based printers and clients not currently supported by NDPS. The backward compatibility of NDPS allows you to continue using these queue-based services and resources transparently, as is illustrated in the following scenarios:

- ♦ You can print through NDPS to an existing queue, allowing you to access systems that require a queue connection (for example, mainframe systems using NetWare HostPrint[®] and certain proprietary systems).
- ♦ NDPS can service existing queues, allowing you to use NDPS on the server even though your client platform is not currently running NDPS. This allows you to install and run NDPS while you are changing your client workstations to NDPS.

For a discussion of NDPS support for legacy printing, see [“Supporting Queue-Based Client Workstations” on page 86](#).

The following table summarizes the major differences between NDPS and queue-based printing services.

Queue-Based (Legacy) Print Services	Novell Distributed Print Services
Administrators create and link print queues, printers, and print servers, and users submit print jobs to the queues. These three objects must be maintained separately once the system is in place.	Administrators create Printer Agents, allowing users to submit print jobs directly to printers. All management functions are centered on the printer itself.
Uni-directional communications only. Feedback consists of pop-up windows reporting a nonconfigurable set of events.	Bi-directional communications supported. Configurable event notification includes e-mail, pop-up windows, event logs and other methods, including third-party methods such as beepers and faxes. Events reported are limited only by a printer's capability.

Queue-Based (Legacy) Print Services	Novell Distributed Print Services
Does not accommodate add-ons or extensions from third parties.	Extensible framework for print devices, including snap-in interfaces.
Administrators must create and configure Printer objects manually. Plug-and-print public access printing not available.	Plug-and-print option available for installing public access printers using specially designed third-party gateways.

Understanding NDPS Printers

NDPS printers can be any of the following types:

- ◆ Network-direct printers using a gateway provided by a third-party printer manufacturer
- ◆ Remote printers using RP, LPR, or queue-based protocols
- ◆ Local printers attached directly to a file server

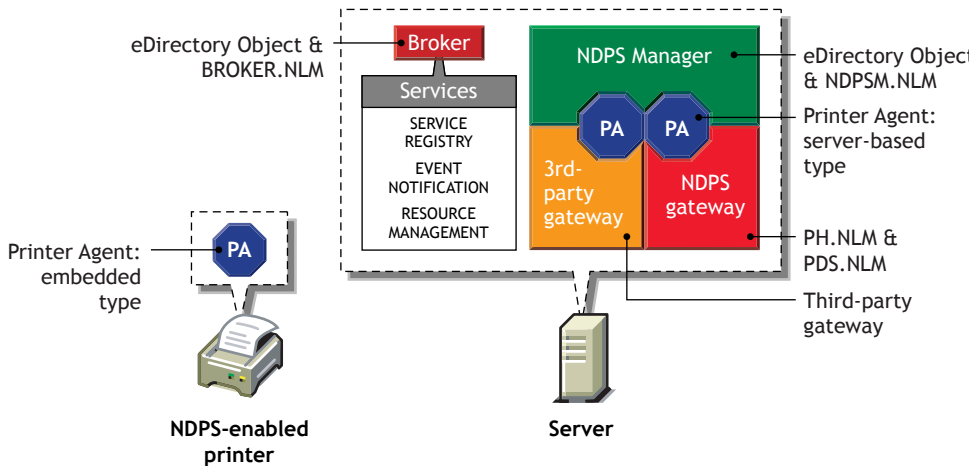
Any printer, regardless of its physical type or connection mode, can be configured as either a public access printer or a controlled access printer.

The following table compares the two types of printers.

Issue	Public Access Printers	Controlled Access Printers
Integration with eDirectory	Not associated with an eDirectory Printer object.	Associated with an eDirectory Printer object.
Availability	Immediately available to everyone on the network. Can be made automatically available through third-party gateways or embedded solutions.	Available only to network users who have rights assigned to them.
Administration	Require minimal administrative action.	Created and administered as an eDirectory object.
Network security	No network security.	Full range of network security options through eDirectory.
Event notification	Provide only job event notification.	Full range of event and status notification options including e-mail, pop-up windows, event logs and third-party methods, such as beepers and faxes.

Understanding the Architecture of NDPS

The architecture of Novell Distributed Print Services ensures the scalability of the printing environment, allowing you to print in LAN, WAN, and enterprise document production environments. It also allows you to print to devices ranging from simple dot-matrix printers to laser printers and large-scale production devices.



To understand exactly how NDPS works, you need to understand its major architectural components. See the following sections for information on the various components:

- ♦ [“Understanding Printer Agents” on page 22](#)
- ♦ [“Understanding the NDPS Manager” on page 24](#)
- ♦ [“Understanding Printer Gateways” on page 25](#)
- ♦ [“Understanding the Broker” on page 27](#)

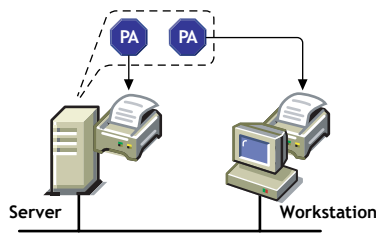
Understanding Printer Agents

Before a printer can be incorporated into a NDPS printing environment, it must be represented by a Printer Agent. No Printer Agent can represent more than one printer, and no printer can be represented by more than one Printer Agent.

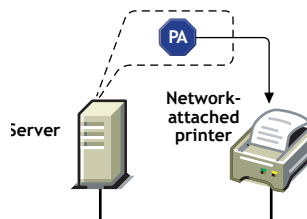
The Printer Agent lies at the heart of NDPS, combining the functions previously performed by a printer, print queue, print server, and spooler into one intelligent and simplified entity.

The Printer Agent can be any of the following:

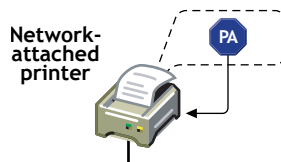
- ♦ A software entity running on a server that represents a printer attached to a server or workstation.



- ♦ A software entity running on a server that represents a network-attached printer.

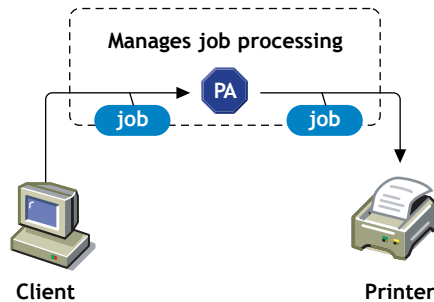


- ♦ An entity embedded within a network-attached printer.

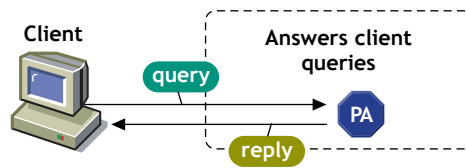


A Printer Agent provides the following services:

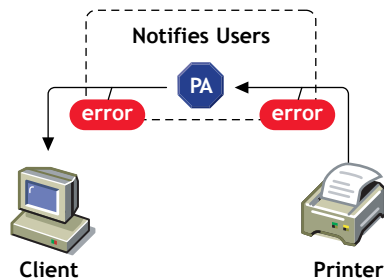
- ♦ It manages the processing of print jobs and many operations performed by the printer itself.



- ♦ It answers queries from network clients about a print job or document, or about the attributes of the printer.

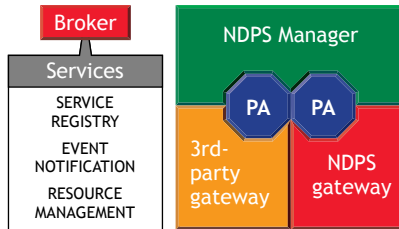


- ♦ It generates event notification so that interested parties can be notified of job completion, printing problems, errors, or changes in the status of a print job, document, or printer.



For information about other major NDPS components, see the following:

- ♦ “Understanding the NDPS Manager” on page 24
- ♦ “Understanding Printer Gateways” on page 25
- ♦ “Understanding the Broker” on page 27



Understanding the NDPS Manager

A NDPS Manager provides a platform for Printer Agents that reside on the server. An NDPS Manager must be created as an object in the eDirectory tree before you can create server-based Printer Agents.

The NDPS Manager object stores information used by the NetWare Loadable Module™ (NLM™), NDPSM.NLM. You can manually load this NLM at the server console.

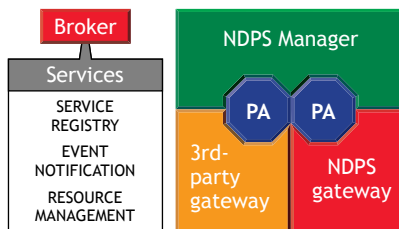
A single NDPS Manager can control multiple Printer Agents. (There is no hard limit.)

A specific NDPS Manager can be loaded only on one server. If it controls a local printer, it must be loaded on the server that the local printer is attached to.

While you can perform some configuration and management tasks directly through the NDPS Manager console interface, iManage is the main tool for performing these tasks.

For information about other major NDPS components, see the following:

- ♦ [“Understanding Printer Agents” on page 22](#)
- ♦ [“Understanding Printer Gateways” on page 25](#)
- ♦ [“Understanding the Broker” on page 27](#)



Where to Place NDPS Managers

Use the following guidelines to determine where and when to place an NDPS Manager.

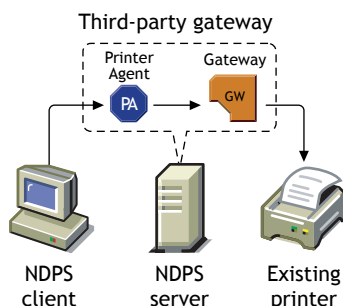
- ♦ Only one NDPS Manager can be loaded per server. Load this resource only on servers configured to service print jobs. The only exception to this rule is any server which has a printer connected directly to it. In that case, the NDPS Manager must be loaded on that server as well.
- ♦ Whenever possible, place the NDPS Manager and the printers it controls on the same LAN segment for optimal performance.
- ♦ Whenever possible, consider assigning your Printer Agents to more than one NDPS Manager so that the print load will be spread over multiple servers. This will facilitate load balancing and reduce the possibility of a single point of failure which would disable all printing on your network.

Understanding Printer Gateways

Gateways allow NDPS clients to send jobs to printers that are not NDPS-aware (that is, printers that are not equipped with embedded NDPS Printer Agents). You select and configure a printer gateway when you create a new Printer Agent.

Gateways translate NDPS queries or commands to printer-specific language that the physical printer can use. This is possible because gateways are configured to know the specific type (make and model) of printer being used.

The following diagram illustrates a typical gateway configuration.

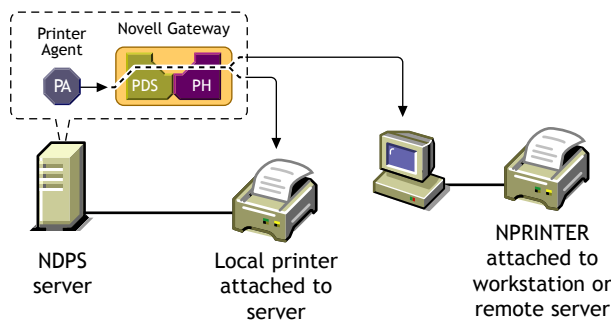


Third-party gateways are developed by printer manufacturers to support printers directly attached to the network. Because these gateways are

developed to interact with specific proprietary printers, they can provide a wider array of information and offer options that are not available for the generic Novell gateway. Some third-party gateways provide utilities that can be configured to automatically create Printer Agents when one of their printers is attached to the network.

For more information, see [Chapter 9, “Selecting the Correct Gateway to Use,” on page 135](#).

The Novell gateway (illustrated below) supports LPR/LPD and IPP printing, local and remote printers, including those using NPRINT or queue-based technology as well as those configured with RP mode enabled in IPX environments or LPR mode enabled in TCP/IP environments.

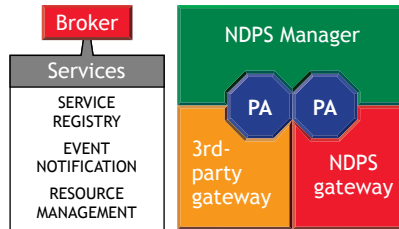


The Novell gateway is designed to be used with printers that don't have an embedded Printer Agent and don't yet have a proprietary, third-party gateway provided for them by their manufacturers.

RP printers are those that support Novell's legacy Remote Printer protocol. It is supported by many network-attached printers. LPR is a UNIX*-based printing protocol used by network-attached printers in TCP/IP environments to service jobs submitted to print queues.

For information about other major NDPS components, see the following:

- ♦ [“Understanding Printer Agents” on page 22](#)
- ♦ [“Understanding the NDPS Manager” on page 24](#)
- ♦ [“Understanding the Broker” on page 27](#)



Understanding the Broker

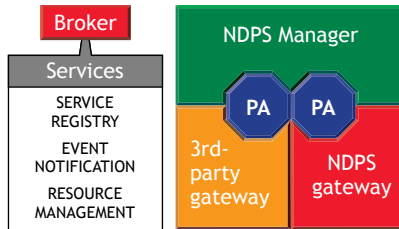
The Broker provides three network support services not previously available in NetWare: the Service Registry Service (SRS), Event Notification Service (ENS), and Resource Management Service (RMS).

While these services are invisible to end users, network administrators should be aware of them. NDPS uses these services in the following ways:

- ♦ **Service Registry Service.** The Service Registry allows public access printers to advertise themselves so that administrators and users can find them. This service maintains information about device type, device name, device address, and device-specific information such as the manufacturer and model number. See [“Understanding the Service Registry Service” on page 28](#).
- ♦ **Event Notification Service.** This service allows printers to send customizable notifications to users and operators about printer events and print job status. The Notification Service supports a variety of delivery methods including NetWare pop-up, log file, e-mail, and programmatic. See [“Understanding the Event Notification Service” on page 29](#).
- ♦ **Resource Management Service.** This service allows resources to be installed in a central location and then downloaded to clients, printers, or any other entity on the network that needs them. The Resource Management Service supports adding, listing, and replacing resources including printer drivers, printer definition (PDF) files, banners, and fonts. See [“Understanding the Resource Management Service” on page 31](#).

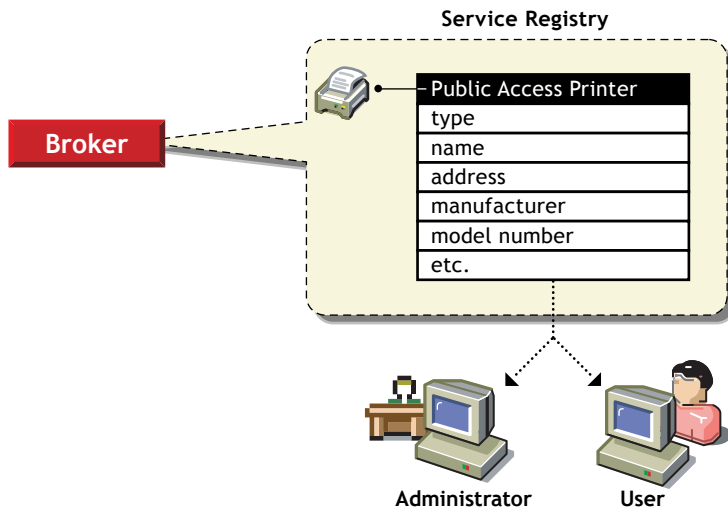
For information about other major NDPS components, see the following:

- ♦ [“Understanding Printer Agents” on page 22](#)
- ♦ [“Understanding the NDPS Manager” on page 24](#)
- ♦ [“Understanding Printer Gateways” on page 25](#)



Understanding the Service Registry Service

The Service Registry allows public access printers to advertise themselves so that administrators and users can find them. This service maintains information about device type, device name, device address, and device-specific information such as the printer manufacturer and model number.



Before Novell Distributed Print Services (NDPS), each printer had to periodically advertise its availability through the Service Advertising Protocol (SAP), which was effective but created a lot of traffic on the wire.

The Service Registry Service helps minimize the network traffic problem created by many printers advertising through the SAP. (For information on turning off the SAP, see the documentation for your printer.) When you attach a public access printer to the network, it registers with the SRS. When an application or user wants to use a printer, it can contact an SRS and retrieve a list of all registered printers on the network.

NOTE: For IPX, the SRS uses SAP type 8202; for IP environments, it uses Multicast.

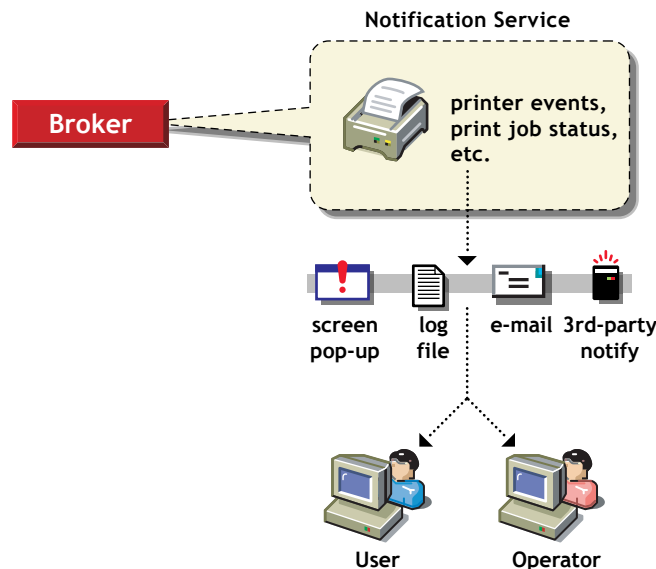
Through the SRS, plug-and-print public access printers, as well as those created manually, are immediately made available to users.

If there are multiple Service Registries running on the network, they synchronize automatically. This synchronization allows users to choose public access printers anywhere on the network.

In addition to printer information, the SRS also maintains lists of other services available, such as Event Notification Services and Resource Management Services. For more information, see “[Understanding the Event Notification Service](#)” on page 29, “[Understanding the Resource Management Service](#)” on page 31, and “[Enabling and Disabling Brokered Services](#)” on page 98.

Understanding the Event Notification Service

Novell Distributed Print Services (NDPS) printers can be configured to provide event notification regarding print jobs and printer status. Administrators can configure event notification for interested parties, that is, non-job-owners that you wish to be notified of a defined printer or server event that occurs during the processing and printing of a job. See “[Configuring Interested-Party Notification](#)” on page 84 for more information.



The Event Notification service supports both consumers of events (users) and suppliers of events (printers). Users can register with the ENS by identifying the types of events they want to be notified about, while the printer can register the kinds of events it is capable of reporting. For example, the administrator for a specific printer (by default a Manager of that printer) can designate an Operator to be notified if the printer runs out of paper or if the toner is low. Similarly, users can be notified when their jobs have finished printing.

Delivery Methods

The availability of the following delivery options is dependent on which of them you have enabled. (See [“Enabling Event Notification Delivery Methods” on page 97](#) for more information.)

- ♦ **Pop-up notification.** Messages will pop up on the screen for individuals designated to receive them. (Pop-up notification is always enabled when the ENS is enabled.)
- ♦ **SMTP notification.** Messages will be sent to the recipient through SMTP (Simple Mail Transfer Protocol) in IP-based systems.
- ♦ **Log file notification.** Messages are written to a file at a designated location on a NetWare server that the recipient has rights to.
- ♦ **Programmatic notification.** Two programmatic notification delivery methods are shipped with NDPS: SPX™ and RPC.

The open architecture of NDPS allows third parties to develop additional delivery methods as well.

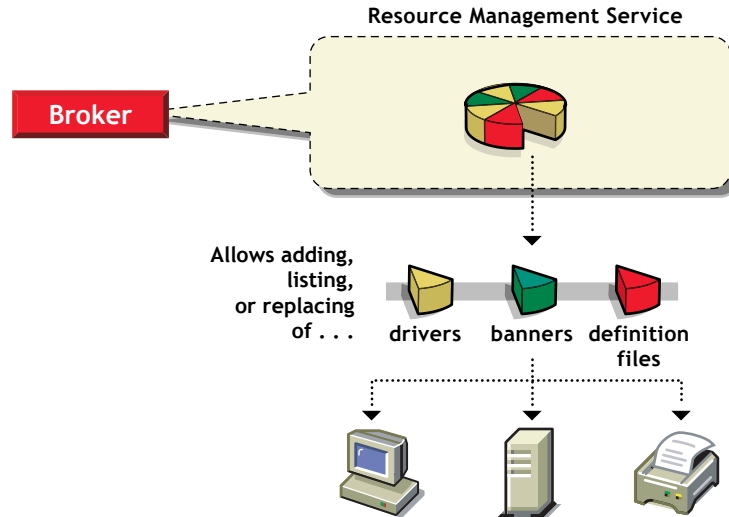
NDPS is enabled to work with SNMP. In addition, some third-party gateways are SNMP-enabled independently of the NDPS software.

For more information about other brokered services, see the following:

- ♦ [“Understanding the Service Registry Service” on page 28](#)
- ♦ [“Understanding the Resource Management Service” on page 31](#)

Understanding the Resource Management Service

This service allows resources to be installed in a central location and then downloaded to clients, printers, or any other entity on the network that needs that resource. It provides a single place where a variety of file types are stored for immediate access by Novell Distributed Print Services (NDPS). The Resource Management Service (RMS) supports adding, listing, and replacing resources including printer drivers, printer definition files (PDFs), banners, and fonts.



Resources

The Resource Management Service allows you to add, list, and replace the following resources:

- ♦ Banners (see [“Adding Banner Pages”](#) on page 92)
- ♦ Windows printer drivers (see [“Adding or Updating Printer Drivers”](#) on page 96)

Benefits

Some of the benefits offered by the Resource Management Service include

- ♦ Improved resource sharing
- ♦ More manageable resource distribution and updating

- ♦ Automatic printer driver download from a central repository
- ♦ Plug-and-print printer availability
- ♦ Availability of network resources to applications through a common interface

For more information about other brokered services, see the following:

- ♦ [“Understanding the Service Registry Service” on page 28](#)
- ♦ [“Understanding the Event Notification Service” on page 29](#)

Where to Place NDPS Brokers

Although the distribution of your Brokers is not really a critical issue initially, you will probably want to give some thought to this issue as you do your preliminary planning. You will not need to create a Broker on all of your servers, but you will want your Brokers sufficiently well distributed so that your brokered services (Service Registry Service, Event Notification Service, and Resource Management Service) will be readily available on the system when needed. When possible, you should run the Broker on the same server as the NDPS Manager.

As you gain experience with your new system, you might want to add or delete Brokers to optimize the efficiency of your system or to store your brokered resources (maintained in the Resource Management database) where you want them.

Given Novell's minimum design requirements, at least one Broker object should be created at each physical WAN location. To clarify this statement, let's take a quick look at the three services offered by the Broker object: Service Registry Service (SRS), Event Notification Service (ENS), and Resource Management Service (RMS). These services are transparent to end users, administrators must be aware of them and understand how they affect printing, LAN traffic, and the minimum implementation requirements needed.

Service Registry Service: The Service Registry Service allows public access printers to advertise themselves so that end users can find them. This service maintains information about device type, device name, device address, and device-specific information such as the printer manufacturer and model number. For more information, see [“Understanding the Service Registry Service” on page 28](#).

The following table summarizes the issues and recommendations regarding SRS.

Issue	Recommendations
Reliability of server / fault tolerance	On multi-server networks, enable at least two SRS per network. Network traffic (network layout) Enable at least one SR per site (WAN link).
Memory	1MB base for SR, an additional 10KB per resource added (such as NDPS Manager)

Event Notification Service: NDPS printers can be configured to provide event notification of print jobs and printer status. Administrators can configure event notification for all interested parties. That is, non-job owners as well can be notified of a defined printer or server event which occurs during the processing and printing of a job. For more information, see [“Understanding the Event Notification Service” on page 29](#)

Here are the issues and recommendations relating to ENS.

Issue	Recommendations
Number of trees	Enable at least one ENS per tree.
Reliability of server / fault tolerance	On multiserver networks, enable at least two ENs per tree.
Performance	Enable additional ENS as needed.
Methods availability	Make sure that the methods you need are enabled for each ENS you have installed. Novell provides NetWare pop-up, log file, e-mail, and programmatic methods. Third parties can develop other types of notification methods as well.

Resource Management Service: This service allows resources to be installed in a central location and then downloaded to clients, printers, or any other entity on the network that needs that resource. It provides a single place where

a variety of file types are stored for immediate access by NDPS. For more information, see [“Understanding the Resource Management Service” on page 31](#).

Issue	Recommendations
Number of trees	Enable at least one RMS per tree.
Reliability of server / fault tolerance	On multiserver networks, enable at least two RMS per tree. Be sure to keep the databases synchronized after you have created them
Disk Space	Allow 50 MB for each RMS to ensure adequate space for resources added in the future. Size may vary considerably depending on the number of languages, platforms, and drivers your system supports.

2

Planning the Migration to Novell Distributed Print Services

There is no single ideal strategy for implementing the Novell® Distributed Print Services™ (NDPS®) printing system or for upgrading your current queue-based system to take advantage of the many printer management and ease-of-use features provided by NDPS. However, the information provided in this section will help you understand the planning issues you should consider and the migration scenarios available to make a successful transition. Once the transition to NDPS is complete, you can follow the steps in the *iPrint Administration Guide* to set up and configure iPrint.

Because NDPS provides full support for IP-based as well as IPX™-based printing, it offers a wide variety of system configuration options to fit your organization's specific needs. Novell's legacy, queue-based print system is also fully supported, which allows your users to continue printing as they always have until you complete the transition to NDPS.

If you have not already done so, read in the **Chapter 1, “Understanding Novell Distributed Print Services,”** on page 13 before you proceed further to ensure that you understand the terms and concepts discussed in this section.

Establishing a Planning Base

The key to a successful move to NDPS lies in understanding both what you are starting with and what you want when you have completed your move. As part of this understanding process, you should also anticipate the critical issues and decisions you will need to deal with as you implement the transition.

Establishing your planning base consists of the following tasks:

- ♦ [“Assessing Your Current Printing Environment” on page 36](#)
- ♦ [“Identifying Critical Planning Issues” on page 37](#)
- ♦ [“Designing Your New System” on page 39](#)

Assessing Your Current Printing Environment

Beginning with NetWare® 5, NDPS became the default and preferred print system while still offering compatibility with Novell’s legacy, queue-based print system. Because both printing systems are supported, your users can continue printing as they always have until you complete the transition to NDPS.

For information about the differences between queue-based print services and NDPS, see [Chapter 1, “Understanding Novell Distributed Print Services,” on page 13](#).

Your first planning task should be to determine what kind of printing system you currently have. You can then begin narrowing down your options for how to proceed. In nearly all cases, your system will consist of one or more of the following:

- ♦ **NetWare Legacy (Queue-Based) Printing System**—If your current printing solution is based on the NetWare legacy, queue-based system, you will find information on upgrading to NDPS in [“Migrating from Queue-Based Printing to NDPS” on page 48](#).
- ♦ **NetWare 3.x Printing System**—If you currently have a NetWare 3.1x server bindery and file system and you are using a relatively small number of printers, you should consider implementing your NDPS system from scratch and then deleting all of your legacy printing objects. However if your system is large and you do not want to create your NDPS printing system from scratch, you can implement an NDPS printing system on your network using the process described in [“Migrating from Queue-Based Printing to NDPS” on page 48](#).
- ♦ **NetWare for UNIX or NFS Printing System** Several scenarios can be used to incorporate NDPS into environments that use NFS* Print Services:
 - ♦ [“NetWare-to-UNIX Printing” on page 54](#)
 - ♦ [“UNIX-to-NetWare Printing” on page 55](#)

Migrating any of these configurations to NDPS will result in simpler and more reliable printing, in addition to the benefits inherent in using NDPS.

- ♦ **Non-NetWare System** If you are implementing a new Novell network from scratch, or if you are changing over from a different networking system altogether (such as Windows* NT*, Windows 2000, 3COM*, or LAN Manager*), you should implement NDPS as your printing solution. If any of your current printers or print clients require queues, the backward compatibility of NDPS allows you to integrate those printers and clients into your system. In all other cases, we recommend that you use an all-NDPS printing setup.

Identifying Critical Planning Issues

The transition to your new printing system will go much more smoothly if you have identified the major issues involved before you begin the process. The following items provide a starting point for accomplishing this. We suggest that you develop your own checklist of issues, using the following as a starting point.

- ♦ “Which Protocol(s) Will Be Used (IP and/or IPX)?” on page 37
- ♦ “When Will Clients Be Upgraded?” on page 38
- ♦ “How Much Network Security Will Be Needed?” on page 38
- ♦ “How Will Brokered Services Be Distributed?” on page 38

Which Protocol(s) Will Be Used (IP and/or IPX)?

A prominent feature of NetWare is support for IP-based communication and system technologies. Selecting the protocol family (IP, IPX, or both) to be used by a network has a direct impact on the way you must configure your printers for NDPS. NetWare provides a rich variety of print configurations so that one or more print systems and one or more protocol families may be employed to best accomplish the goals of a system.

In NetWare, NetWare Core Protocol™ (NCP™) communication can travel on top of IPX or on top of IP in a configuration referred to as Pure IP (the IP NCPs are no longer IPX packets encapsulated inside IP). All applications that use NCP and do not interface directly with IPX or SPX™ can operate as Pure IP applications.

NetWare also supports existing applications that directly access IPX-based protocols (make IPX/SPX or SAP calls) through its Compatibility Mode

(CMD). Compatibility Mode is implemented as a set of system components that allow IPX client or server applications to locate and communicate with their IPX counterparts without IPX packets being visible on the wire. Compatibility Mode components translate SAP advertise and query requests into their SLP equivalents, allowing IPX applications to dynamically advertise and/or discover without generating IPX traffic on the wire.

All NDPS components are IP-aware and IPX-aware, so they do not rely on Compatibility Mode to implement IP-based communication.

When Will Clients Be Upgraded?

If you have a fairly large number of workstation clients, you might find it inconvenient to try to upgrade them to NDPS all at once. Because NDPS allows you to implement all of the server management components while allowing your workstation users to continue to print to queues just as they always have, you can upgrade these clients at a pace that suits your needs while you take advantage of the management benefits NDPS provides immediately. See [“Making the Transition Gradually” on page 41](#) for more information.

How Much Network Security Will Be Needed?

NDPS is tightly integrated with eDirectory™ to maximize both the security and ease-of-management that eDirectory provides. The level of security you desire for each of your printers can be as flexible as you want it to be, ranging from total public access to tightly controlled access. Printer security for controlled access printers is ensured through the assignment of the Manager, Operator, and User access control roles. For more information, see [Chapter 7, “Managing Printing Security,” on page 103](#).

How Will Brokered Services Be Distributed?

While the distribution of your Brokers is not a critical issue initially, you will probably want to give some thought to this issue as you do your preliminary planning. You will not need to create a Broker on all of your servers, but you will want your Brokers sufficiently well distributed so that your brokered services (Service Registry Service, Event Notification Service, and Resource Management Service) will be readily available on the system when needed. As you gain experience with your new system, you may want to add or delete Brokers to optimize the efficiency of your system or to store your brokered resources (maintained in the Resource Management database) where you want them.

For guidelines on when and where to enable various brokered services, see [Chapter 6, “Managing the Broker,” on page 91](#).

Designing Your New System

As a final planning step, before you begin the implementation process, you should create a written record of all the network resources and components that will be incorporated into your new printing system (printers, servers, workstation clients, routers, etc.). Then, you should draw a diagram of how these components will fit together in your modified eDirectory tree.

The steps to designing your NDPS system are described below:

- ❑ Make a record of your printing resources.

Write a list that you can refer to as you make a diagram of your eDirectory tree. This record helps you to include all of the printing resources you need for your network when you start to create the eDirectory objects.

For example, you might record that you have two printers for one location on your network. One will be used for everyone in the office, and the other is used only by the production team. This information can guide you in creating your diagram.

- ❑ Create a diagram of the new eDirectory tree.

We recommend that you create a diagram of the printing layout you want to implement in your new system. The diagram will help you simplify and reorganize your setup.

The diagram you create can take a variety of forms. Drawing a tree diagram is the most common. You can also create a list that includes all the objects that will be in the tree. Or you might prefer to create an organization chart with responsibilities and resources listed by each name.

The diagram should be centered on the printers and the NDPS Manager. (Keep in mind that only one NDPS Manager can be loaded on a server.) Although there are other items that might be included in the diagram, such as the NDPS Broker; printer users, managers, and Operators; or printer configuration information, the printers and the NDPS Manager are all that is necessary at this stage. Place the printers in the appropriate areas. Place an NDPS Manager on the server that you want to handle the Printer Agents that correspond with those printers.

Determining Your Implementation Strategy

Now that you have done some initial information-gathering, identified the major issues you will face, and created a diagram of the new eDirectory layout you want to implement, you can now consider your strategy for implementing your new or upgraded NDPS system.

If you have not already done so, be sure to read [Chapter 1, “Understanding Novell Distributed Print Services,” on page 13](#) in the before you proceed.

The following topics are discussed in this section:

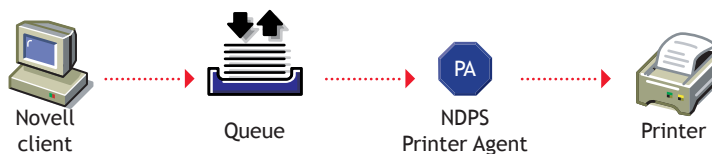
- ♦ [“General Transition Guidelines” on page 40](#)
- ♦ [“Making the Transition Gradually” on page 41](#)
- ♦ [“Maintaining Your Queues during the Transition” on page 42](#)
- ♦ [“Understanding Your Implementation Options” on page 44](#)

General Transition Guidelines

The following guidelines generically apply to any transition scenario and should expedite your decision process.

- ♦ NDPS provides simple and reliable configurations for Pure IP environments. You will need to use a gateway that supports IP like the Novell gateway or a third-party gateway.
- ♦ Migrate the server side first, then migrate your end-users gradually. A sensible approach to deploying NDPS into a system is to first replace the server components of your legacy printing system with the NDPS server components. Since the NDPS Manager (NDPSM.NLM) and the Print Server (PSERVER.NLM) can run simultaneously on a server, this transition can be accomplished one queue/printer at a time. Users can then be gradually switched to print directly to NDPS printers instead of queues.

This transitional configuration would look this way:



See “[Maintaining Your Queues during the Transition](#)” on page 42 for more details on this printing configuration.

Eventually, only a few queues serviced by NDPS Printer Agents will remain to support your DOS and Windows DOS-box printing needs, while most printing will be through the following basic NDPS configuration and its variations, which will be explained in “[Using Legacy Printers and NDPS Gateways](#)” on page 44.

- ♦ Determine which gateway you will use. For more information about available gateways, see [Chapter 9, “Selecting the Correct Gateway to Use,”](#) on page 135.

Making the Transition Gradually

If you are using a queue-based printing system, you can continue to use your existing system without modification. Because of the advantages provided by NDPS, however, we recommend that you begin the transition as soon as it becomes convenient.

In general, we suggest you make the move gradually, and begin by implementing the NDPS server components and management features. This strategy allows you to set up your new printers and optimize the distribution of your brokered resources while your end users continue printing through the same queues they always have. Then, when you are satisfied that your NDPS printing components are set up and configured the way you want them, you can begin upgrading your end users to the new system gradually.

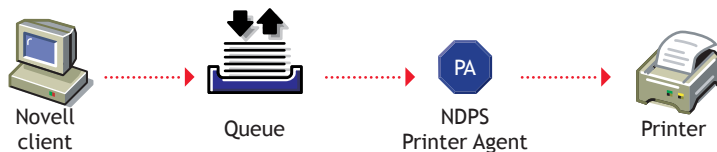
If you will be implementing iPrint, the Novell Client 32™ is not required. Instead, users install a browser plug-in that allows them to install printers and print drivers to their workstations. See the [Novell Client for Windows](#) for more information.

Advantages to Running NDPS on the Server	Additional Advantages of Running NDPS on Clients also
Easier (and in many cases, the only way) to support Pure IP	Automatic driver download when a user logs on to the network (assuming that you have implemented this Remote Printer Management function)
Custom printer management tools	Remote workstation printer management

Advantages to Running NDPS on the Server	Additional Advantages of Running NDPS on Clients also
Simpler management and configuration	Local printer installation and management integrated into native operating system facilities
Advanced error reporting and troubleshooting tools for administrators	Public access printing
	Queues no longer needed
	Potentially less network traffic
	Improved error reporting and troubleshooting tools for users
	Advanced job-related event notification

Maintaining Your Queues during the Transition

NDPS Printer Agents, either embedded into printers or running as part of an NDPS Manager, can be configured to retrieve jobs from queues in addition to accepting jobs from NDPS users.



Maintaining your queues allows you to gradually migrate users to NDPS because users' workstations can continue to print to existing queues and be moved to NDPS as time permits. Workstations can even be configured to print to both queues and NDPS printers.

In addition to allowing for a gradual transition to NDPS, this configuration is also the only support currently available for DOS and Windows DOS-box printing and for handling printing requests from other systems such as UNIX or Macintosh*. It also allows Novell clients to submit jobs to NetWare queues, providing these clients with access to NDPS-managed printers.

After you have created NDPS Printer objects to represent the printers that are still servicing queues, you can delete your legacy Print Server and Printer objects (but not your Queue objects) if you want, reducing the number of objects in your tree you need to manage.

In most cases, you will want to upgrade your administrator workstations to NDPS first because NDPS allows administrators to quickly benefit from its advanced capabilities such as automatic printer driver download, extended job management, and event notification.

Administrators can accomplish much of the migration remotely by removing the CAPTURE statements from users' login scripts and installing NDPS printers on their workstations using the NDPS Remote Printer Management functionality. For more information, see [Chapter 1, “Understanding Novell Distributed Print Services,” on page 13.](#)

Advantages to Maintaining Your Queues While Transitioning to NDPS	Disadvantages to Maintaining Your Queues While Transitioning to NDPS
Allows gradual migration to NDPS	Users printing through queues don't have access to the NDPS advanced features
Allows administrators quick access to NDPS management tools	Two levels of indirection for queue users
Supports clients not directly supported by NDPS (UNIX, Macintosh, OS/2*, DOS)	Requires management of both NDPS printers and legacy queues
Supports NetWare 4 clients	

Understanding Your Implementation Options

Possible scenarios for printing with NetWare range from maintaining a legacy queue-based system (available only for IPX-based systems), to integrating NDPS into a heterogeneous print system, to implementing a pure NDPS printing system in a Pure IP environment. A wide range of heterogeneous configurations exist between all IPX and Pure IP systems, and between all-queue-based and all-NDPS systems. However, becoming one hundred percent Pure IP and utilizing the most advanced printing features of NetWare implies full deployment of NDPS.

Keep in mind that there is no requirement to modify current NetWare printing configurations immediately, and any modifications you make may be implemented gradually (see [“Making the Transition Gradually” on page 41](#)).

Your available implementation options are described in the following sections:

- ♦ [“Using Legacy Printers and NDPS Gateways” on page 44](#)
- ♦ [“Using Printers with Embedded NDPS Technology” on page 47](#)

Using Legacy Printers and NDPS Gateways

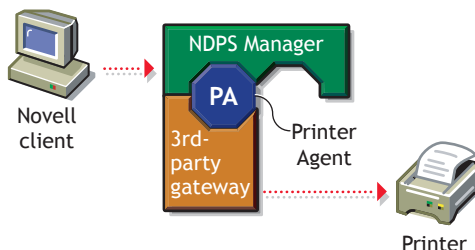
Gateways allow NDPS clients to send jobs to printers that are not NDPS-aware (that is, printers that are not equipped with embedded NDPS Printer Agents). You select and configure a printer gateway when you create a new Printer Agent.

Gateways translate NDPS queries or commands to printer-specific language that the physical printer can use. This is possible because gateways are configured to know the specific type (make and model) of printer being used.

You can implement NDPS through two types of gateways: third-party gateways and the generic Novell gateway. Each type of implementation is described here.

Printing through Third-party Gateways

A third-party gateway is designed specifically for a printer or printer family.



This scenario requires two components running on a NetWare server: the NDPS Manager and the third-party gateway. The NDPS Manager is an integral part of NDPS and implements a platform on which to run Printer Agents. The third-party gateway is provided by the printer manufacturer for a specific printer or class of printers.

Printer Agents (unless embedded in the printer itself) are created to run on the NDPS Manager to front-end printers which do not contain NDPS capabilities and make them appear to users and administrators as full NDPS printers. The NDPS Manager uses NDPS to communicate with users and administrators on one end, but requires a gateway to communicate with the printer on the other.

Some printer manufacturers have developed proprietary mechanisms for dynamically discovering their printers and for providing comprehensive access to their printers' capabilities. Gateways developed by these printer manufacturers can be snapped in to the NDPS Manager to give NDPS administrators and users enhanced access to the printers.

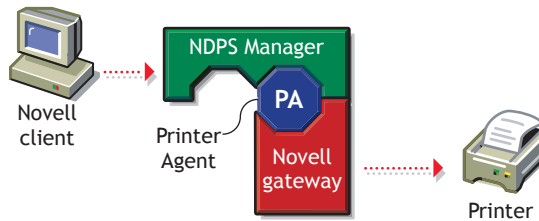
Different levels of NDPS functionality are available depending on the actual implementation of a specific gateway and the capabilities of the protocols used by the gateway.

Advantages of Printing through a Third-Party Gateway	Disadvantages of Printing through a Third-Party Gateway
Might support Pure IP	Currently not all existing printers have third-party gateways
Might provide pseudo plug-and-print capabilities	Some manual configuration might be required

Advantages of Printing through a Third-Party Gateway	Disadvantages of Printing through a Third-Party Gateway
Feedback and control as good as the protocols used by the gateway	
Simple administration	

Printing through the Novell Gateway

For legacy and specialized printers that are not supported by third-party gateways, NetWare includes a generic Novell gateway that allows the NDPS Manager to communicate with print devices using the LPR/LPD protocol on IP, the Internet Printing Protocol, and the RP protocol on IPX.

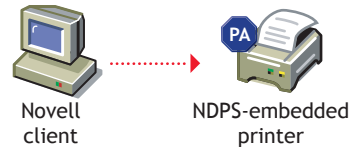


Using the Novell gateway, jobs can also be written to a queue as a way to route them to a different print system or to network printers set up in QServer mode.

Advantages of Printing through the Novell Gateway	Disadvantages of Printing through the Novell Gateway
Support for Pure IP via LPR as well as support for IPX	Some manual configuration required during the creation of the Printer Agent
Feedback and control as good as the protocol employed	Typically less printer information available than with third-party gateways

Using Printers with Embedded NDPS Technology

As printers with embedded NDPS technology become more available, this will become the optimal configuration and achieve the most powerful NDPS capabilities.



With this configuration, administrators and end-users can directly interact with print devices. This configuration requires printers to have an embedded NDPS Printer Agent. A Printer Agent is the NDPS component that receives and processes NDPS printer and job requests and provides a standard interface to all NDPS users and administrators regardless of the type of printer it represents. As with other printing solutions, in order for users to print, these printers must be installed on the users' workstations. Administrators can remotely install these printers for users by using NDPS Remote Printer Management functionality. Many printer manufacturers are working to embed NDPS into their next generation of printers.

Advantages of using Printers with Embedded NDPS Technology	Disadvantages of using Printers with Embedded NDPS Technology
True plug-and-print capability	At present, limited availability of fully enabled NDPS printers
Peer-to-peer printing	
Exceptional feedback and control	
Simplest administration	

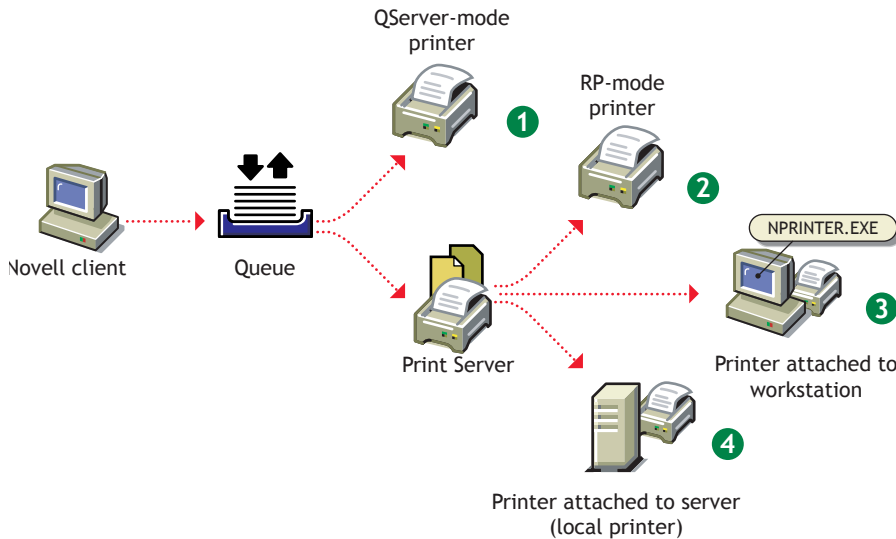
Migration Scenarios

The following scenarios will help you better understand the process for making the transition to a NDPS environment that will best meet your printing needs.

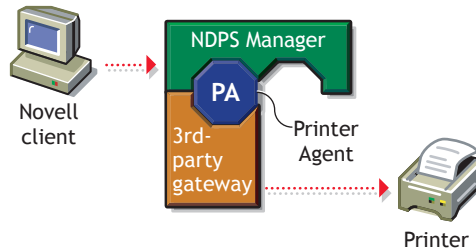
- ♦ “Migrating from Queue-Based Printing to NDPS” on page 48
- ♦ “Migrating from IPX-Based NDPS to IP-based NDPS” on page 50
- ♦ “Migrating from NFS to NDPS” on page 53

Migrating from Queue-Based Printing to NDPS

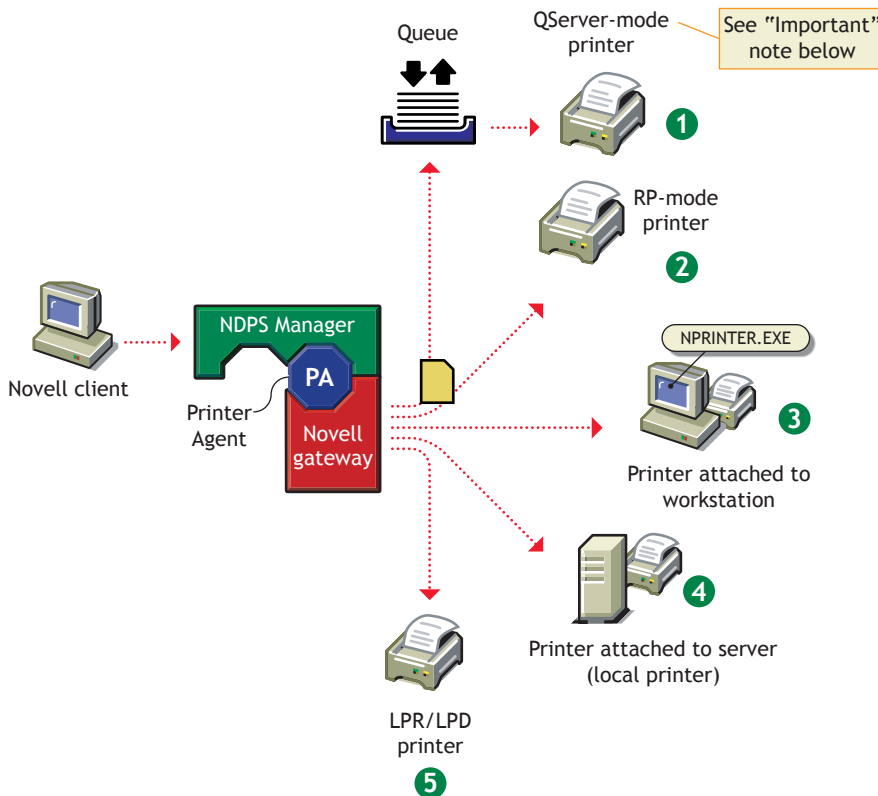
Most queue-based printing in NetWare networks is currently realized through one of the following configurations:



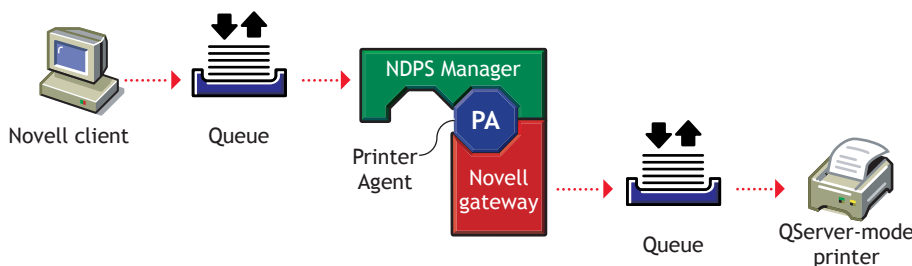
When migrating to NDPS from any of these configurations, you should first consider the protocols, connection methods used, and potential need to configure the printer in determining which gateway to use. If a third-party gateway is used, the resulting configuration would look as follows:



The Novell gateway provides a straightforward migration path. The NDPS configurations corresponding to the queue-based printing configurations illustrated earlier, as well as an additional configuration for Pure IP support, are shown in the following illustration:



The first NDPS configuration above is not recommended because a back-end queue is still required, increasing network traffic and delaying job completion. In addition, while transitioning to NDPS, there would be two queues in the print path as shown in the following illustration:



If you are migrating a QServer-mode printer, we recommend that you reconfigure it for LPR as in configuration #5 or RP as in configuration #2 if possible. Choose configuration #5 if the network supports IP and the printer supports LPR/LPD. Choose configuration #2 if the network supports IPX and the printer supports RP. Configurations #3 and #4 are available if the printer does not support LPR or RP, but you still want to benefit from many NDPS features without the need for a queue. Notice that configurations #2 through #5 require you to configure the print device to enable a new protocol.

Notice that if the NPRINT.EXE in configuration #3 is running on a NetWare client, it is possible to realize IP-only printing to a remote printer, though not Pure IP. However, if IP is desired, configuration #5 is preferable and is Pure IP.

Migrating from IPX-Based NDPS to IP-based NDPS



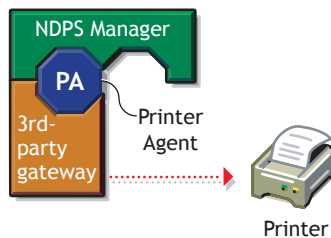
NDPS 3.0, which is included in NetWare 6, is written to support IP natively. All communication between NDPS clients and NDPS back-end services will automatically switch to use the protocol or protocols available at the client and server. Thus, much of the effort to switch to an IP network will consist of configuring the clients and servers to use IP only. (This is normally done during the installation process.) However, there are some protocols used by

NDPS gateways to communicate with printers that have inherent IPX dependencies. This section provides guidelines for switching these configurations to use IP-based protocols. None of the changes described will require the clients' installation and configuration to change.

The following scenarios are described in this section:

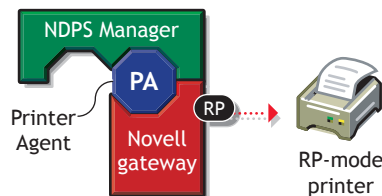
- ◆ “Migrating an IPX-Based Third-Party Gateway to IP” on page 51
- ◆ “Migrating a Printer in RP Mode to IP” on page 51
- ◆ “Migrating a Printer in QServer Mode to IP” on page 53

Migrating an IPX-Based Third-Party Gateway to IP

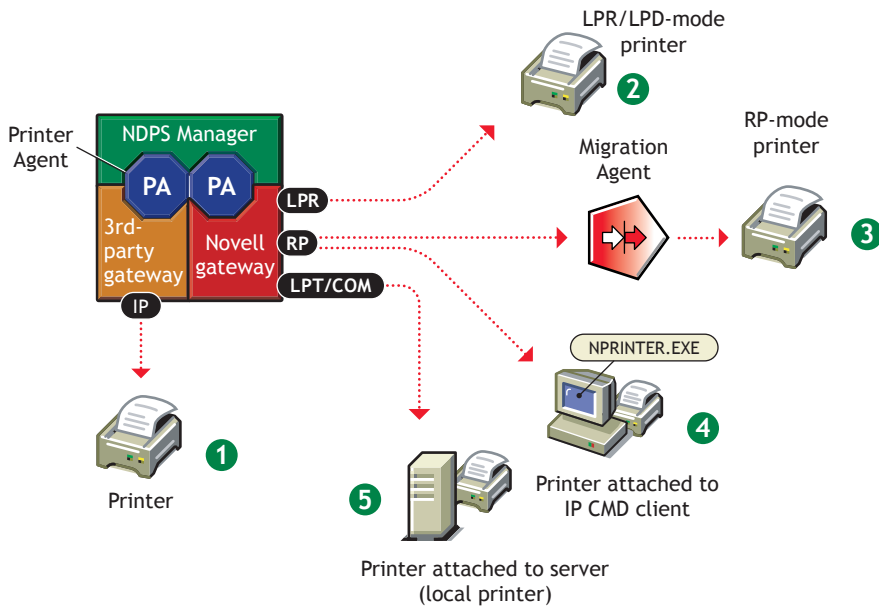


Several third-party gateways support both IPX-based and IP-based communication to printers. The process to switch a third-party gateway to use IP is likely to differ from gateway to gateway and should be explained in each gateway's documentation. If a specific third-party gateway doesn't support IP, you might need to use the Novell gateway.

Migrating a Printer in RP Mode to IP



The Remote Printer protocol (RP) is inherently IPX-based. Configurations using printers in remote printer mode can use one of the following configurations to conform to an IP setting:

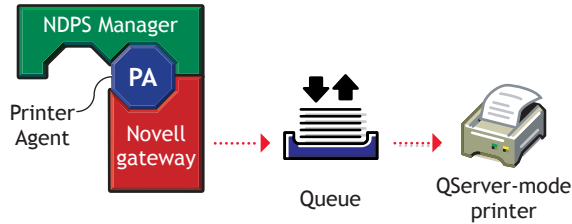


As stated before, the best way today to communicate to a printer with NDPS is through a third-party gateway. If you plan to reconfigure a printer to support IP, you should check whether a third-party gateway for that printer has become available.

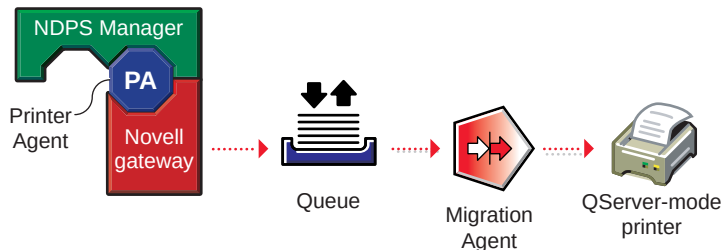
Option #2 is simpler and offers better performance than option #3, but it requires the printer to support LPR/LPD mode and have IP configured. Options #4 and #5 are also simple, but they might not be a viable option in some settings because they require the printer to be directly attached to a workstation or server. Of the three options, only #5 maintains a Pure IP environment.

Option #3 requires an isolated IPX segment to exist in the network. Communication with this segment can be filtered and/or translated by a Migration Agent, thus maintaining the IP segments free of IPX communication. The advantages of option #3 are that it doesn't require any changes to the current printing configuration and doesn't add much overhead to networks that already manage isolated IPX segments.

Migrating a Printer in QServer Mode to IP



The best alternatives for this scenario to support IP are to (1) use a third-party gateway (see [“Migrating a Printer in RP Mode to IP” on page 51](#)) or (2) reconfigure the Novell gateway to communicate with the printer through a different protocol altogether. If neither of these options are feasible, the following configuration is available to isolate the IPX traffic generated by printers in QServer mode:



The advantages of this option are that it doesn't require any changes to the current printing configuration and doesn't add much overhead to networks that already manage isolated IPX segments.

Migrating from NFS to NDPS

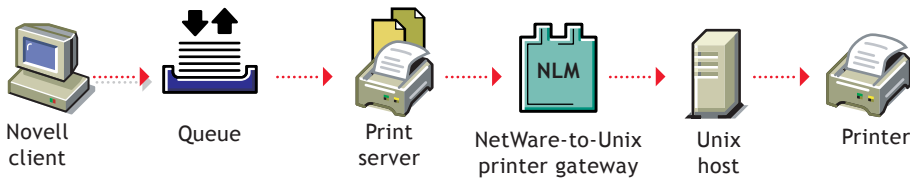
Several scenarios can be used to incorporate NDPS into environments that use NFS Print Services:

- ♦ [“NetWare-to-UNIX Printing” on page 54](#)
- ♦ [“UNIX-to-NetWare Printing” on page 55](#)

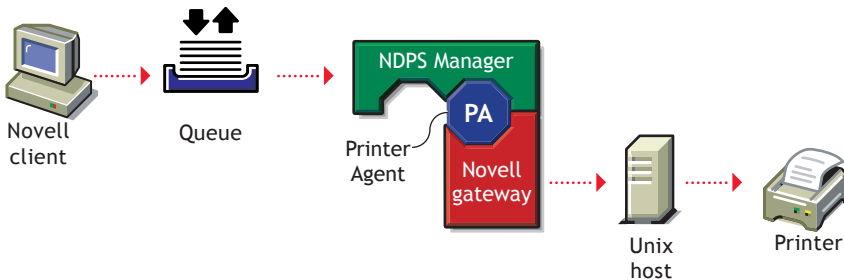
In most cases, migrating one of these configurations to NDPS will result in simpler and more reliable printing, in addition to the benefits inherent in using NDPS. This section discusses how NDPS can be used to replace or work with NFS Print Services.

NetWare-to-UNIX Printing

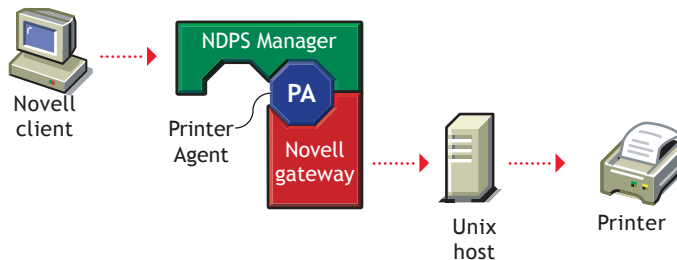
The following shows how to route jobs from NetWare out to a UNIX system. This configuration is as follows:



Again, by replacing the Print Server and NetWare-to-UNIX Printer Gateway with the NDPS Manager, the following configuration is possible:

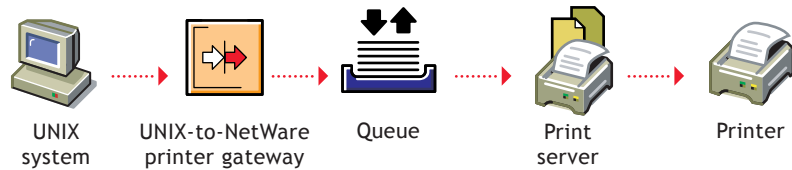


The Novell gateway uses LPR to communicate with the UNIX host. Eventually the clients can also be switched to NDPS, yielding the following configuration:

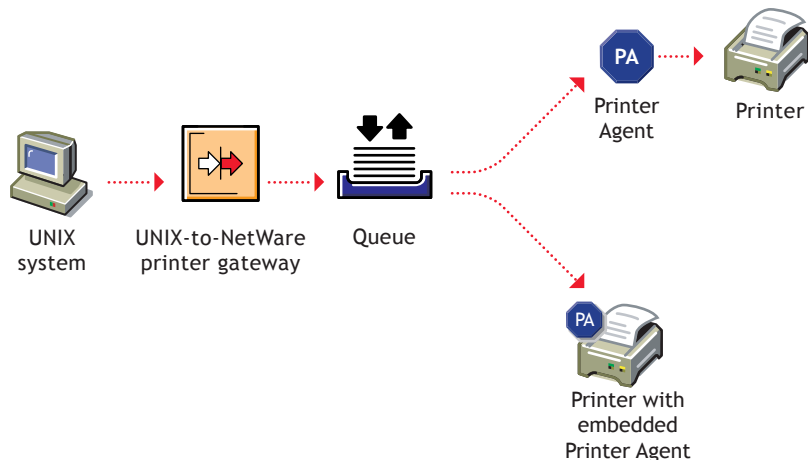


UNIX-to-NetWare Printing

This configuration uses the NFS Print Services to route print jobs from a UNIX system into NetWare. The following is a common use of the UNIX-to-NetWare Printer Gateway:



As discussed in “[Maintaining Your Queues during the Transition](#)” on page 42, a Printer Agent can be set to service queues, enabling one of the following setups:



This configuration allows administrators to route jobs out of UNIX systems into NDPS using the same mechanism they use today, while giving them extended capabilities to manage the printers that service those jobs.

3

Setting Up a New NDPS Printing System

Creating a new Novell® Distributed Print Services™ (NDPS®) system will not automatically disable your current printing setup. Users can continue to print just as they always have until you decide to replace old printing setup with NDPS. You can do this gradually or all at once.

Before setting up your new NDPS printing system, we recommend that you read [Chapter 2, “Planning the Migration to Novell Distributed Print Services,”](#) on page 35.

This chapter discusses the following:

- ♦ “Creating NDPS Brokers” on page 61
- ♦ “Creating NDPS Manager” on page 61
- ♦ “Creating NDPS Printers” on page 62
- ♦ “Setting Up NDPS Printers to Service Legacy Queues” on page 65
- ♦ “Configuring Queue-Based Printers” on page 65
- ♦ “Printing from Macintosh Workstations” on page 68
- ♦ “Setting Up LPR Clients on UNIX” on page 69
- ♦ “Preparing Client Workstations to Use NDPS” on page 69

For information on setting up printing in other situations, see [Appendix A, “Configuring Remote Printers,”](#) on page 137.

Getting Started

The following tasks are basic to creating a new NDPS printing system. These steps assume that NetWare® is installed and running.

1. **Create an NDPS Broker, if one does not exist.**

The Broker provides three network support services: the [Service Registry Service](#), [Event Notification Service](#), and [Resource Management Service](#).

See [“Creating NDPS Brokers” on page 61](#) for more information.

2. **Create an NDPS Manager.**

The NDPS Manager is used to create and manage server-based Printer Agents (similar to the way PSERVER is used on servers to manage printing resources in legacy printing). You must create an NDPS Manager on each server you will be controlling NDPS printers from.

See [“Creating NDPS Manager” on page 61](#) for more information.

3. **Create one or more NDPS Printer Agents.**

NDPS printers must be represented by a logical entity known as a Printer Agent. You will need to create one for each printer.

The Printer Agent lies at the heart of NDPS, combining the functions previously performed by a printer, print queue, print server, and spooler into one intelligent and simplified entity.

For more information, see [“Understanding Printer Agents” on page 22](#).

Create a controlled access printer (NDPS Printer Object). While any printer, regardless of its physical type or connection mode, can be configured as either a public access printer or a controlled access printer, we recommend you create an NDPS printer when possible.

For more information, see [“Creating NDPS Printers” on page 62](#).

4. **Install a client on each workstation.**

- ♦ **iPrint:** If you will be implementing iPrint, the Novell iPrint Client (a set of browser plug-ins) will need to be installed on each workstation. For more information on setting up workstations to work with iPrint, see [Setting Up iPrint on Client Workstations](#) in the *iPrint Administration Guide*.
- ♦ **Printing for UNIX and Macintosh:** Unix and Macintosh users can print to NDPS using LPR. See [“Printing from Macintosh](#)

Workstations” on page 68 and “Setting Up LPR Clients on UNIX” on page 69 for more information.

- ♦ **Novell Client 32:** The Novell Client is required in order for NDPS features to be available on your client workstations. Other clients can print to NDPS printers through the backward compatibility feature, but only NDPS clients can take full advantage of the advanced features offered by NDPS.

See “Preparing Client Workstations to Use NDPS” on page 69 for more information.

NOTE: If users will be accessing printers through iPrint, you do not need to install the Novell Client. For more information on iPrint, see [Setting Up iPrint on Client Workstations](#) in the *iPrint Administration Guide*.

5. Install printers on individual workstations.

You can do this in any of the following ways:

- ♦ If you are using iPrint, see [Setting Up iPrint on Client Workstations](#) in the *iPrint Administration Guide* for more information.
- ♦ Designate printers to be automatically installed on users' workstations through the NDPS Remote Printer Management feature available through iManage. See “Designating Printers to Be Automatically Installed” on page 75 for more information.
- ♦ Install printers manually on each workstation using the Windows Add Printer function in the Printers folder.

Setting Up NDPS on Your Servers

During the initial installation and setup process, there are some issues you should be familiar with:

- ♦ “Rights Required for Configuring NDPS Installation” on page 60
- ♦ “Using iManage” on page 60
- ♦ “Changing the Location of a Broker” on page 60
- ♦ “Updating the AUTOEXEC.NCF File” on page 60

Rights Required for Configuring NDPS Installation

You must have the Supervisor right at the root of the tree because the schema will be modified. In order to install the resource database (in the SYS:NDPS\RESDIR directory), the administrator must also have file system rights (rights to the volume) where it will be installed.

After the schema has been extended, a user installing another Broker must have at least Read, Write, Modify, and Create rights for the container where the Broker will reside.

Using iManage

To set up NDPS you will need to use iManage, a browser-based management tool for eDirectory. For more information about setting up iManage, see the *Novell iManage Administration Guide*.

Changing the Location of a Broker

NDPS allows you to customize your printing setup for maximum efficiency. You might occasionally want to change the location of one or more Brokers. For example, you might want a Broker to be in a different eDirectory container. If you want to change the location of a Broker after it has been created, you can use NetWare Administrator to move the Broker object into the desired container, provided you have Supervisor or equivalent rights to the new container.

Updating the AUTOEXEC.NCF File

After creating a Broker, you should add the following command to the AUTOEXEC.NCF file to automatically load the broker when the server is started.

load broker *brokername.context*

For more information about managing the Broker, see [Chapter 6, “Managing the Broker,”](#) on page 91.

Creating NDPS Brokers

Each eDirectory™ tree should have at least one NDPS Broker. You might want to create additional Brokers in certain situations. For example, you might want to create a Broker on a local server for each site on a wide area network (WAN). See “Where to Place NDPS Brokers” on page 32 for information on broker placement.

- 1** In iManage, click iPrint Management > Create Broker.

- 2** Fill in the fields.

Click help for explanations about the fields.

- 3** Click OK.

To modify the Broker properties, click Manage Broker, and then select the Broker you want to modify.

Creating NDPS Manager

A NDPS Manager provides a platform for Printer Agents that reside on the server. An NDPS Manager must be created as an object in the eDirectory tree before you can create server-based Printer Agents.

The NDPS Manager object stores information used by the NetWare Loadable Module™ (NLM™), NDPSM.NLM. You can manually load this NLM at the server console.

A single NDPS Manager can control any number of Printer Agents.

A specific NDPS Manager can be loaded only on one server. If it controls a local printer, it must be loaded on the server the local printer is attached to.

While you can perform some configuration and management tasks directly through the NDPS Manager console interface, iManage is the main tool for performing these tasks.

Ensure you have at least Read, Write, Modify, and Create rights for the container where the NDPS Manager object will be reside.

- 1** In iManage, click iPrint Management > Create Print Services Manager.

- 2** Fill in the fields.

Click help for explanations about the fields.

IMPORTANT: If you move the NDPS Manager to a different server, its database will move also. As a result, local printers assigned to this NDPS Manager will no longer work. To avoid this, you can assign a DNS name to the Manager before creating Printer Agents associated to it using the `/dnsname=` startup switch. For more information, see [“NDPS Manager Startup Switches” on page 89](#).

Any printer you designate as a local printer when you are configuring Printer Agents assigned to this NDPS Manager must be directly attached to this server.

3 Click OK.

4 To autoload the NDPS Manager when you bring up the server, add the following line to your server's AUTOEXEC.NCF file:

load ndpsm *NDPS_Manager_name_and_context*

For example:

load ndpsm .sales_manager.corp.acme

To modify the Print Services Manager properties click Manage Print Services Manager, and then select the Manager you want to modify.

For a discussion of Access Control roles, see [“Setting Access Control for NDPS Manager” on page 108](#).

Creating NDPS Printers

NDPS printers can be either *public access* or *controlled access*. For an explanation of each type, see [“Understanding NDPS Printers” on page 20](#). In most cases, we recommend that you make all of your NDPS printers controlled access printers as soon as possible in order to take full advantage of the management and security benefits offered by eDirectory.

Before you can create an NDPS printer, you must first have created an NDPS Manager on your server. See [“Creating NDPS Manager” on page 61](#) for more information.

After creating an NDPS Manager, you can create NDPS printers. Some third-party gateways have server-based utilities that can be configured to search for new printers attached to the network and to automatically create Printer Agents to represent them. For more information about gateways, see [“Selecting the Correct Gateway to Use” on page 135](#).

NDPS printers added to the eDirectory tree by iManage are referred to as controlled access printers. As eDirectory objects, access to them is controlled and they are no longer available directly as public access printers. They are available to the workstation user only through the eDirectory object list instead of through the list of public access printers.

Prerequisites

- ☐ Have at least Read, Write, Modify, and Create rights for the destination container where its associated Printer object will reside
- ☐ Be designated as a Manager of the NDPS Manager that will control this Printer Agent
- ☐ Have a Broker running
- ☐ Have an NDPS Manager object created

Procedure

1 In iManage, click iPrint Management > Create Printer.

2 Fill in the fields.

Click help for explanations about the fields.

3 Click OK.

4 Select the printer driver for each client operating system.

These drivers will be automatically downloaded to users' workstations when they install this printer in the future.

If you choose a Windows 3.x driver but not a Windows 95/98/ME or Windows NT/2000 driver, a 16-bit driver will be selected. Normally this will not create problems.

Since the list of printer drivers shipped with this product is limited, you can add drivers to the Resource Management Service database. (See [“Adding or Updating Printer Drivers” on page 96](#) for more information.)

If the driver you need is not in the drivers list, rather than adding it to the RMS, you can select [None] at the top of each list. Users will then be asked to provide a disk with the appropriate driver the first time they install this printer on their workstations.

5 Click Continue.

Workstation users can now select the printer and print to it.

Configuring LPR Printers

UNIX, Macintosh, and other LPR clients can print to iPrint printers using LPR.

IMPORTANT: In order for LPR to work, the printer agent name cannot contain spaces. If it does, you will need to rename the printer agent or select a different printer.

- 1** In iManage, click iPrint Management > Manage Printer.
- 2** Browse to and select the printer you want to enable LPR printing for.
- 3** Click Client Support > LPR Support.
- 4** Check the Enable LPR/LPD Client Support check box.

The LPR Host and LPR Printer/Queue fields display information required when setting up printing for Macintosh, UNIX, or other LPR clients.

LPR Host: The server name where the Print Services Manager is running.

LPR Printer/Queue: The same as the printer agent's name. The printer agent name cannot have any spaces in its name; otherwise, LPR will not work properly.

- 5** (Optional) Enable the following options:

Filter All LF to CRLF and Append FF to Jobs: Checking this check box changes bytes in the LPR data stream of all incoming LPR print jobs from Line Feeds to Carriage Returns with Line Feeds and appends a Form Feed to the end of the print job. Typically, these changes are made at the LPR client; however, if you are sure of your users' configurations, you can implement this option.

Address Ranges: Add an address range only if you want to restrict access to this printer to LPR clients within the address range. When the list is empty, all addresses are allowed to print (default).

- 6** Click Apply or OK to update the printer settings.

Setting Up NDPS Printers to Service Legacy Queues

In many cases, you will want to continue using print queues while you make the transition to NDPS. This strategy is discussed in detail in [“Making the Transition Gradually” on page 41](#). For information on how to set up your NDPS printers to service legacy queues, see [“Supporting Queue-Based Client Workstations” on page 86](#).

Configuring Queue-Based Printers

Users can submit jobs through NDPS to printers and print systems that still require queues, such as the following:

- ♦ Printers controlled by PSERVER.NLM (either locally attached or attached directly to the network) running on servers that have not been upgraded to NDPS
- ♦ Printers attached directly to the network that are configured for queue-server mode
- ♦ Mainframe systems using NetWare HostPrint® and certain proprietary systems

The following procedure allows you to configure the Printer Agent to redirect print jobs to a NetWare queue.

HINT: While this procedure allows you to connect to queue-based printers controlled by NetWare servers in the current eDirectory tree, you might also need to create one or more bindery reference queues to provide access to printers controlled by a NetWare 3 file server and printers controlled by a NetWare 4 or NetWare 5 server in a different tree. For more information, see [“Using Bindery Reference Queues” on page 67](#).

- 1** In NetWare Administrator, select the container where you want the NDPS Printer object to reside.
- 2** From the Object menu, click Create > NDPS Printer.
- 3** Enter a name in the Printer Name field.
- 4** At the Printer Agent Source field, select Create a New Printer Agent, and then click Create.
- 5** Confirm the Printer Agent name (default is the name of the new printer you are creating) and browse to select the NDPS Manager you want to assign it to.

- 6** At the Gateway Types window, select the Novell Printer Gateway.

For more information about using gateways, see [“Selecting the Correct Gateway to Use” on page 135](#).

- 7** Configure the Novell PDS by selecting the Printer Type and Port Handler Type, and then click OK.

- 8** At the Connection Type field, select Forward Jobs to a Queue and then click Next.

The Port Type options are grayed when you select the Queue connection type.

- 9** Provide the Queue Name and Queue User Name.

Browse for the target print queue. If no queues are listed, none exist in the current context. Browse the tree to find a queue in a different context. The queue you select must exist in the current tree, or else you will need to create a bindery reference queue in your own container to allow access to the actual queue. See [“Using Bindery Reference Queues” on page 67](#).

The user you specify might need to log in to the server that this queue resides on. This user must have full rights to manage this queue.

- 10** Click Finish.

- 11** Select the printer driver for each client operating system.

These drivers will be automatically downloaded to users' workstations when they install this printer in the future. Select a driver for each operating system.

If you choose a Windows 3.x driver but not a Windows 95/98/ME or Windows NT/2000 driver, a 16-bit driver will be selected. Normally this will not create problems.

Since the list of printer drivers shipped with this product is limited, you can add drivers to the Resource Management Service database. (See [“Adding or Updating Printer Drivers” on page 96](#) for more information.)

If the driver you need is not in the drivers list, rather than adding it to the RMS, you can select [None] at the top of each list. Users will then be asked to provide a disk with the appropriate driver the first time they install this printer on their workstations.

- 12** Click Continue.

The main browser window appears with your new controlled access printer listed.

You can select it from the browser to complete the following tasks:

- ♦ “Assigning Printer Access Control Roles through NDPS Printer Objects” on page 107
- ♦ “Optimizing Event Notification” on page 82

Using Bindery Reference Queues

While we strongly urge you to upgrade all of your printers to NDPS as soon as possible, you might still want to provide your users with access to queue-based printing resources for a variety of reasons. While connecting to queue-based printers can be accomplished directly when you configure a Printer Agent, you might need to create one or more bindery reference queues to provide access to the following:

- ♦ Printers controlled by a NetWare 3 file server
- ♦ Printers controlled by a NetWare 4 or NetWare 5 server in a different tree

A bindery reference queue serves as a pointer to a real NetWare queue. After you have created a bindery reference queue, you can then configure a Printer Agent to send jobs to that queue just as you would if the queue actually resided on another server in the same tree. The following discussion explains how to accomplish this procedure using NetWare Administrator.

If a bindery reference queue already exists, you can use it with NDPS with no modification. A new reference Queue object does not need to be created in eDirectory.

Prerequisites

- ☐ The print queue you want to reference must already exist on the server you want to point to
- ☐ A bindery object of the same name as the one you are using must exist on that server and must have rights to the print queue you are referencing

Procedure

The following procedure lets you reference a bindery queue and make it available to NDPS printers.

- 1** In NetWare Administrator, select the container where you want the reference queue to reside.
- 2** From the Object menu, click Create > Print Queue.

- 3** In the Create Print Queue dialog box, select Reference a Bindery Queue.
Notice that the dialog changes when you select this option.
- 4** (Optional) If you want to assign a bindery reference queue name different from the queue's name on the legacy server, enter the reference name in the Print Queue Name field.

If you do not want to assign a reference name, leave the field blank.
- 5** Click the browser button to select a bindery server and queue.
- 6** Click List Only Attached Servers to specify 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.
- 7** Double-click the server you want to use.

If you are not attached, you must authenticate to that server.

To complete this procedure, a bindery object of the same name as the one you are using must exist on that server and must have rights to the print queue you are referencing.

If no queue names appear, no queues have been defined on that server.
- 8** Select the queue you want to create a reference for and click OK.
- 9** Click Create.
- 10** Return to [Step 9 on page 66](#) of the procedure for “[Configuring Queue-Based Printers](#)” on [page 65](#) as a controlled access printer.

Now that this queue is created, you can configure a Printer Agent to service jobs from a queue or to submit jobs to a queue.

Printing from Macintosh Workstations

Macintosh users can submit print jobs to NDPS using LPR. This entails using the Macintosh Desktop Printer Utility to set up a printer on the MacInstosh client and enabling LPR support for the printer. To enable LPR printer support, see “[Configuring LPR Printers](#)” on [page 64](#).

NOTE: When using LPR printing, printer agent names cannot include spaces.

- 1** In the Macintosh Desktop Printer Utility, select LPR Printer.
- 2** If necessary, select any appropriate PPD files.

3 Enter the printer address information.

LPR Address: Enter the DNS name or IP address of the server where the NDPS printer agent is running. This is the **LPR Host** address displayed when enabling LPR for a printer.

Queue: Enter the printer agent name. This name may not include spaces. This is the **LPR Printer/Queue** name displayed when enabling LPR for a printer.

4 Click Create and save the printer to a desired location on the Macintosh.

Setting Up LPR Clients on UNIX

The implementation of LPR printing in UNIX systems varies greatly. Typically, UNIX or LPR users will know how to set up LPR Printing (BSD-style printing) on their system. In order to complete the configuration, users will need to know the **LPR Host** and the **LPR Printer/Queue** information provided in iManage.

Preparing Client Workstations to Use NDPS

If you will not be using iPrint, you will need to install the Novell Client that accompanies NetWare. The Novell Client is required in order for NDPS features to be available on your client workstations.

The NDPS components of the Novell Client require approximately 800 KB of random access memory (RAM). If you select the Custom install option, make sure you have enabled NDPS.

The following sections will help you implement the Novell Client on users' workstations.

Installing the Novell Client

For specific instructions on installing the Novell Client, see the **Novell Client for Windows** documentation.

Enabling NDPS on a Previously Installed Client

If you have previously installed the correct version of the Novell Client on one or more Windows workstations but you did not enable NDPS at that time, you will need to add go to your network properties and add the service Novell Distributed Print Services.

On Windows 3.x workstations, you must reinstall the Client to enable NDPS.

Adding NDPS Printers

For a discussion of how to add printers automatically to your NDPS client workstations, see [“Designating Printers to Be Automatically Installed” on page 75](#).

You can install printers manually at individual workstations using the Add Printer wizard.

Removing CAPTURE Statements

Existing CAPTURE statements should be removed from your NDPS clients for NDPS to be fully enabled. These statements might exist in container or user login scripts, in batch files, or other locations. After you have tested your new system thoroughly, you can safely remove these statements.

4

Managing Printers

Although the default settings in Novell® Distributed Print Services™ (NDPS®) allow your users to print without further configuration being necessary, you will probably want to modify some of those settings so that you can manage your printing resources most effectively. While most tasks can be done in iManage, some tasks will require you to use NetWare® Administrator.

This chapter discusses the following:

- ♦ “Installing Printers on Workstations” on page 74
- ♦ “Using Remote Printer Management” on page 75
- ♦ “Setting Up Printer Configurations” on page 77
- ♦ “Creating Configurations” on page 78
- ♦ “Optimizing Event Notification” on page 82
- ♦ “Setting Print Job Spooling” on page 85
- ♦ “Supporting Queue-Based Client Workstations” on page 86

Managing Print Jobs

The following sections provide specific information about the NDPS print job management features. All of the procedures listed below can be performed either through NetWare Administrator or through the Novell Printer Manager. Users designated as Managers or Operators for a printer can perform these tasks for all jobs routed to that printer; individual job owners can only perform these tasks for their own print jobs.

Viewing Print Job Information

You can view information about individual print jobs waiting to be processed by a specific printer by using the following procedure.

- 1** In iManage, click Print Management > Manage Printer.
- 2** Browse to and select the printer the job was sent to.
- 3** Click Printer Control > Jobs.

Information about the print jobs is displayed.

Deleting Print Jobs

Administrators can delete any print job after it has been submitted if the job has not yet started printing. Users can delete only their own print jobs.

NDPS allows you to delete a print job from the jobs list by using the following procedure.

- 1** In iManage, click Print Management > Manage Printer.
- 2** Browse to and select the printer the job was sent to.
- 3** Click Printer Control > Jobs.
- 4** Check the checkbox next to the job you want to delete.
- 5** Click delete.

Changing the Order of Print Jobs

Occasionally, you might need to print a job sooner than other jobs that have already been submitted to a printer and are awaiting servicing. Administrators can move jobs up or down the list. Users can only move jobs down the list.

Administrators can reorder any print job after it has been submitted if the job has not yet started printing. Users can reorder only their own print jobs.

The following procedure explains how this is done.

- 1** In iManage, click Print Management > Manage Printer.
- 2** Browse to and select the printer the job was sent to.
- 3** Click Printer Control > Jobs.
- 4** Check the checkbox next to the job you want to modify.
- 5** Click Promote to move a print job up the list.

Moving Print Jobs

NDPS allows operators and job owners to copy or move a print job to another printer. The target printer must be running on the same server (managed by the same NDPS Manager) as the printer on which the job currently resides. Also, the target printer must be compatible with the driver that formatted the job. For example, if a job was formatted with an HP5si driver, it should not be copied or moved to an HP LaserJet* III.

Administrators can copy or move any print job after it has been submitted if the job has not yet started printing. Users can copy or move only for their own print jobs.

To move a print job using iManage, do the following.

- 1** In iManage, click Print Management > Manage Printer.
- 2** Browse to and select the printer the job was sent to.
- 3** Click Printer Control > Jobs.
- 4** Check the checkbox next to the job you want to modify.
- 5** Click Move to move the print job to another printer in the list.

Modifying Print Jobs

You can modify a print job in two ways:

- ♦ **Modifying the printer configuration**

Before the job is submitted, you can modify the printer configuration on your workstation. Then every time you send a job to that printer, those modifications will be used. For information, see [“Modifying Configurations” on page 80](#).

- ♦ **Modifying the specific job**

When a job is submitted, it inherits the properties of the installed printer's configuration. The configuration of the job can then be modified, if needed, by the job's owner or the printer's Operator.

When jobs are modified, additional configurable properties are available which are not included in the original printer configuration. For example, the job can be delayed, and advanced attributes can be viewed and modified.

Administrators can modify any print job after it has been submitted if the job has not yet started printing. Users can modify only their own print jobs.

To modify a job, do the following.

- 1** In NetWare Administrator, select the printer the job was sent to from the browser window, and then click Jobs/Job List.

If you want to see a list of jobs already processed and being retained, click the Show Retained Jobs option.
- 2** Select the job you want to modify.
- 3** Click Job Configuration > Job Options and then select Configurations from the drop-down list.
- 4** Select the properties you want and click OK.

Installing Printers on Workstations

You can install printers on NDPS workstations in either of the following ways:

- ♦ By designating printers to be automatically installed on user workstations through the Remote Printer Management feature available in iManage. See [“Using Remote Printer Management” on page 75](#) for more information.
- ♦ By allowing Windows workstation users to install printers on their workstation by using the Windows Add Printers wizard in the Windows Printers folder.

Certain drivers (mostly older drivers) will not work when the printer name/port name has a long name (32 characters or more). The port name looks something like `\\TREE_NAME\SERVER_NAME\installed_printer_name`.

To resolve this problem for NDPS, a new flag has been added to the Windows registry that will allow for printer names to be less than 31 characters in length so that old applications can still print. The key is as follows:

HKEY_LOCAL_MACHINE\Software\NDPS\RPM\TruncatePrinterNames

0 = use long names

1 = truncate the printer names

Designating Printers to Be Automatically Installed

While NDPS allows users to download and install printers on their workstations, it also allows administrators to designate printers to be downloaded and installed automatically. These printers then appear on the user's installed printers list with no action required by the user.

You can designate a printer to be installed automatically by using the Remote Printer Management feature in iManage. See [“Using Remote Printer Management” on page 75](#) for more information.

Designating a Default Printer

When you use the Remote Printer Management (RPM) feature to designate a printer for automatic installation on each user workstation, you can also designate that printer to be the default for users in the same context (container). This way, the user never has to install or configure that printer or designate it as the default. Instead, a configured default printer is installed automatically on each workstation.

The assignments made through the RPM are limited to the specific container. They do not flow down to subcontainers.

Even though you designate a printer as the default, users can specify a different default printer if they want.

Using Remote Printer Management

While NDPS allows users to download and install printer drivers on their workstations, the Remote Printer Management feature also allows administrators to designate printers to be downloaded and installed automatically. These printers then appear in the Windows Printer Folder for the user's workstation. Administrators can also use this feature to remove printers, assign a printer to be the default printer, and update printer drivers from the NDPS Resource Management Service database (RESDIR).

Remote Printer Management configures printing on workstations based on a User object, group membership, and container.

How Remote Printer Management Works

After a printer has been designated for automatic installation on a user's workstation, this information is stored on the eDirectory container object where the administrator has configured it. When a user logs in after the machine is rebooted, the workstation's client software checks the container object where the User object resides for the Remote Printer Management configuration. The client software compares time stamps stored on the workstation and in eDirectory™ to determine whether any changes have occurred. If the time stamp is different, action is taken, and the printer list on the client is automatically updated to match the printer list maintained by eDirectory on the container.

- ♦ If the client finds a printer designated for installation that has not yet been installed, it is automatically installed.
- ♦ If a currently installed printer is added to the Printers to Remove list, that printer will be uninstalled automatically.
- ♦ If you designate a different printer to be the default in the Remote Printer Management list, the change will be automatically made on each client when it logs in.
- ♦ If the Do Not Update Workstations control is checked, you can update the Remote Printer Management configuration, but no changes will occur on the workstation.

When you install a printer using Remote Printer Management, its installed name will be limited to no more than 31 characters (including the periods). The name will be broken off at a logical point from the beginning of the installed name. This will not affect the ability of the printer to service jobs.

The reason that names are limited to this length is that some applications cannot handle printer names of over 31 characters.

Accessing Remote Printer Management

Remote Printer Management can be accessed in any of the following ways using NetWare Administrator. Somewhat different functionality is available at each location.

- ♦ From the Tools menu in NetWare Administrator.

By selecting the NDPS Remote Printer Management option from this menu, you can manage printers in all containers for which you have the Supervisor right at the container object.

- ♦ From the Details page for the Container object

By pressing the NDPS Remote Printer Management button from this page, you can manage printers for this container only.
- ♦ From the Details page for a specific printer

By pressing the NDPS Remote Printer Management button from this page, you can remotely manage that printer.
- ♦ From Users and Groups

Setting Up Printer Configurations

If you use configurations wisely, they can help you manage your system more effectively. You can also create configurations that will help workstation users meet their specific printing needs efficiently and conveniently.

Configurations are properties assigned to a NDPS Printer object that specify how the printer will handle print jobs. For example, configuration properties can specify the number of copies to print, event notification, what kind of media to use, job priority, banner instructions, and whether to hold or retain a job and for how long.

NDPS automatically assigns a default configuration to all NDPS Printer objects when they are created. However, administrators can modify that configuration or create new configurations for use by workstation users.

NDPS Printer objects can have multiple configurations. When a user installs a printer on his or her workstation, that user chooses one of those configurations. Each time a job with a particular configuration is submitted, the printer will handle the job according to the instructions contained in that configuration.

When a job is submitted, it inherits the properties of the installed printer's configuration. The configuration of the job can then be modified, if needed, by the job's owner or a printer Operator. When configurations are modified at the individual job level, additional configurable properties are available which are not included in the original configuration. For example, the job can be delayed, and advanced attributes can be viewed and modified.

- ♦ [“Creating Configurations” on page 78](#)
- ♦ [“Configuration Options” on page 78](#)

- ♦ “Modifying Configurations” on page 80
- ♦ “Setting Configuration Locks” on page 81

Creating Configurations

Use the following procedure in NetWare Administrator to create a new configuration based on the current Default Configuration.

- 1** Select the NDPS Printer object that you want to create a configuration for.
- 2** Click the Configuration button.

The Printer Configurations window in that dialog lists the Default Printer Configuration and any other configurations that have been created for this printer in NetWare Administrator.

- 3** Click Create.
- 4** Enter the name you want to assign to this configuration.
- 5** Assign the configuration properties you want for print jobs.

For specific information about these tabs, see “Configuration Options” on page 78.

If you want to lock certain configuration properties so that workstation users cannot modify them, see “Setting Configuration Locks” on page 81.

- 6** Click OK in the Printer Configuration dialog box.
- 7** Click OK in the NDPS Printer Details dialog box.

Your new configuration will not be saved until you have done this.

Configuration Options

The following sections describes the configuration options available in NDPS.

General Properties

- ♦ **Copies:** The number of copies that will be printed for this configuration.
Max Copies: The maximum number of copies that a user can print using this printer.
- ♦ **Priority:** The priority assigned to jobs using this configuration.
Max Priority: The maximum priority (Low, Medium, High) set by the administrator for jobs using this printer. This setting determines when the

job will print in relation to other jobs with different priorities sent to this printer.

- ♦ **Banner:** A list of banner pages users can select from. Banner pages will be printed at the beginning of print jobs using the configuration. (If multiple copies of a document are printed, the banner page will only be printed at the beginning of the first copy.)

If your client, printer, and server are not all configured for the same language, you may experience problems with the output of your banner pages, such as the job name being corrupted. If you are working in this type of mixed environment, you should consider not using banner pages.

- ♦ **Medium:** The medium (form) on which jobs can be printed without stopping the printer to mount a different medium (form). The default on the printer is Any Medium, which allows jobs to be printed using the currently mounted medium regardless of media specified in the job data. If a medium is specified for this configuration, and a different medium (anything other than Any Medium) is mounted on the printer, this condition will cause the printer to pause for the given amount of time (default is 15 minutes) or until the new media is mounted. If this Job Wait Time expires, the job is placed on hold and returned to the spooling area.

Media are mounted by the administrator or Operator at the Printer Control/Control pull-down menu of NetWare Administrator.

Job Hold Properties

- ♦ **Operator Hold.** Jobs do not print until the Operator releases them.
- ♦ **User Hold.** Jobs do not print until the user who submitted the job releases it.
- ♦ **Delay Printing Until.** Jobs do not begin printing until the time and date specified.
- ♦ **Pause Printer on Job Start.** Force the printer to pause at the beginning of jobs submitted using this configuration. The message entered is sent to the printer Operator. Only an Operator can release the pause. (By default, the printer will resume printing after a 15-minute pause if an Operator does not intervene. This setting can be changed at the server console by changing the Configuration setting Job Wait Time.)
- ♦ **Pause Printer on Job End.** Force the printer to pause after printing each job that is submitted using this configuration. The message entered is sent to the printer Operator. Only an Operator can release the pause. (By default, the printer will resume printing after a 15-minute pause if an

Operator does not intervene. This setting can be changed at the server console by changing the Configuration setting Job Wait Time.)

- ♦ **Retain Job No Longer Than.** The maximum amount of time that jobs using this configuration can be retained after printing before being deleted (Minutes, Hours, Days, Years). By default, jobs are not retained.
- ♦ **Retain Job For.** The amount of time that a job using this configuration should be retained (regardless of when it is printed) until it is deleted (Minutes, Hours, Days, Years).

Event Notification Properties

By specifying event notification for a printer configuration, you allow job owners to receive notification of printer or job events that occur during the processing and printing of a job. Notification configured in this way is sent by pop-up message box only.

Print job notification allows you to designate the event types for which notification messages should be generated (warnings, errors, or reports). For more information, see [“Optimizing Event Notification” on page 82](#).

In NetWare Administrator, administrators can use the Access Control feature to configure event notification for interested parties, that is, non-job-owners you wish to be notified of specific events. See [“Configuring Interested-Party Notification” on page 84](#) for more information. At the workstation, individual users can use the Novell Printer Manager to configure event notification pertaining to their own jobs only. See [“Configuring Job-Owner Notification” on page 83](#) for more information.

Modifying Configurations

To modify an existing configuration, complete the following procedure.

- 1** At the main NDPS Printer Details window in NetWare Administrator, click the Configuration button.
- 2** In Printer Manager, select the printer you want to work with and then select the Printer/Configuration option.

The Printer Configurations window lists the default printer configuration and any other configurations that have been created for this printer in NetWare Administrator.

- 3** Select the configuration you want to modify and click Modify.

- 4 Assign the configuration properties you want for print jobs.

For specific information about these tabs, see “[Configuration Options](#)” on page 78.

If you want to lock certain configuration properties so that workstation users cannot modify them, see “[Setting Configuration Locks](#)” on page 81.

- 5 Click OK in the Printer Configuration dialog box.
- 6 Click OK in the NDPS Printer Details dialog box.

Your changes will not be saved until you have done this.

Setting Configuration Locks

Properties of the Default Printer Configuration can be locked by the administrator to be nonconfigurable; that is, they cannot be modified or overridden by the user. Locked properties can be either of the following:

- ♦ **Maximum limits.** Certain properties, those that specify limits, are always locked: Maximum Copies, Maximum Priority, and Retain Job No Longer Than. Even if the Manager does not specify a limit for these properties, they are grayed out and inaccessible to users who are modifying their own configurations.

These properties relate to a range in which the maximum value in that range is specified. For example, if the default configuration has a locked property limiting the maximum number of copies of a job that can be printed to five, any number of copies up to five is allowed, but a job calling for 10 copies will be rejected.

- ♦ **Individual locked properties.** Many properties are tied to a specific setting. For example, you can lock the priority of jobs to be printed using this configuration, or designate a specific banner page that must be used when jobs are submitted.

Once a default configuration property has been locked, it will be locked for all jobs submitted to that printer and for all new configurations created for that printer as well, whether that configuration has been created with NetWare Administrator or by a workstation user when creating a new configuration for an installed printer.

Any job submitted to an old configuration must conform to the new locked property or the job will be rejected.

Use the following procedure to lock one or more properties for a printer.

- 1** In iManage, click iPrint Management > Manage Printer.
- 2** Browse to and select the printer you want to lock a property on.
- 3** Click the Configuration tab.
- 4** Check the check boxes of the properties you want to lock.
- 5** Click OK.

Optimizing Event Notification

In NetWare Administrator, administrators can configure event notification for users who want to be notified of a defined printer or server event that occurs during the processing and printing of a job.

For example, the administrator for a specific printer (by default a Manager of that printer) can designate an Operator to be notified if the printer runs out of paper or if the toner is low.

Notification Types

In NetWare Administrator, administrators can configure two types of event notification:

- ♦ **Job-owner notification.** You can configure event notification for job owners only through the printer's Configuration dialog box. When notification is part of a configuration, the owner of a job submitted to a printer with that configuration will receive the notification specified. For more information, see [“Configuring Job-Owner Notification” on page 83](#).

At the workstation, individual users can use the Novell Printer Manager to configure event notification pertaining to their own jobs.

- ♦ **Interested-party notification.** You can use the Access Control Notification feature to configure notification to be sent to a printer's Managers, Operators, or other interested parties about specified events, normally those that require intervention of some kind.

Because this feature is tied to the Printer Access Control feature, it allows you to restrict the list of individuals who will be receiving this notification as much as you want. For more information, see [“Configuring Interested-Party Notification” on page 84](#).

Delivery Methods

The availability of the following delivery options are dependent on which of them you have enable. See [“Enabling Event Notification Delivery Methods” on page 97](#) for more information.

- ♦ **Pop-up notification.** Messages will pop up on the screen of individuals designated to receive them. Users designated for pop-up notification must have a default server defined in their User Environment specified in NetWare Administrator. They also must be currently authenticated to that server or they will not receive notification.
- ♦ **SMTP notification.** Messages will be sent to the recipient through SMTP (Simple Mail Transfer Protocol) in IP-based systems.
- ♦ **Log file notification.** Messages are written to a file at a designated location on a NetWare server that the recipient has rights to. This is especially useful for keeping a record of printing events for auditing purposes (such as job completions, how often the toner ran out, etc.).
- ♦ **Programmatic notification methods.** Two programmatic notification delivery methods are shipped with NDPS: SPX™ and RPC.
- ♦ **Third-party notification methods.** The open architecture of NDPS allows third parties to develop additional delivery methods.

Configuring Job-Owner Notification

Job-owner notification can be configured for specific print jobs or for printer configurations. This section provides procedures for each method.

Notification for Specific Print Jobs

Configuring notification for a specific print job can be done as follows.

- 1** From the main Printer Control view of the printer's Details page, click Jobs/Job List.
- 2** (Conditional) If you want to see a list of jobs being retained and not currently scheduled for processing, click Show Retained Jobs.
- 3** Click Options and select Configurations from the drop-down list.
- 4** Click Notification.
- 5** Select the notification methods and events you want.
- 6** Click OK.

Notification for a Configuration

The following procedure explains how to configure job-owner notification by modifying an existing configuration. You can also configure job-owner notification when creating a new configuration.

- 1** In NetWare Administrator, select the printer that you want to configure.
- 2** Click the Configuration button.

The Printer Configurations window lists the default printer configuration and any other configurations that have been created for this printer in NetWare Administrator.
- 3** Select the configuration you want to modify and click Modify.
- 4** Click the Notification tab.
- 5** Click the icon representing the method you want to use.
- 6** Select the notification methods and events you want.
- 7** Click OK.

Configuring Interested-Party Notification

The following procedure allows you to specify the users who will receive event notification for a NDPS Printer object, the method of notification, and the types of events they will receive notification for.

- 1** In NetWare Administrator, select the Printer you want to configure.
- 2** Click the Access Control button.

Three roles are available: Manager, Operator, and User.
- 3** Select the role you want to configure Access Control notification for.
- 4** Select the object you want to configure notification for and click Notification.
- 5** Click the icon representing the method you want to use.
- 6** Select the notification methods and events you want.
- 7** Click OK.

Setting Print Job Spooling

Although NDPS has eliminated the need to send print jobs through queues, jobs submitted to NDPS printers will often need to be stored somewhere when the printer is already processing other jobs or when the job is on hold or retain status. Job spooling allows you to specify where you want jobs to be stored while they await processing.

By default, the spooling area for a printer is located on the same volume as the database for the NDPS Manager supporting that printer. However, the Spooling Configuration option allows you to spool jobs to a different location through the following procedure.

Job spooling as used by NDPS offers greater simplicity and management convenience than queue-based printing. In NDPS, spooling requires only that a directory be designated where jobs can be stored while awaiting processing.

You can modify job spooling at any time, even when a job is already being processed.

The following procedure explains how to optimize job spooling.

- 1** In iManage, click iPrint Management > Manage Printer.
- 2** Browse to and select the printer you want to enable Access Control for.
- 3** Click Configuration > Spooling.
- 4** Modify the spooling information.

Spooling Location: Specify the path where print job data will be stored while waiting to be printed. By default, the spooling area for a printer will be located in the same volume as the database for the NDPS Manager supporting that printer.

Available Disk Space: The amount of disk space available on the volume.

Limit Disk Space: To limit the amount of disk space to be used for spooling, check the check box and set the limits you want.

Spooling Space: The total amount of disk space in kilobytes (KB) you want to set aside for print job spooling.

Retained Job Space: The amount of disk space in kilobytes (KB) you want to set aside for holding retained print jobs. This amount should be sufficiently less than the total spooling space to ensure that new print jobs can be processed efficiently.

There are four common job scheduling algorithms available: First In, First Out, Print Shortest Job First, Minimize Media Changes, Backward Compatibility.

5 Click OK.

Supporting Queue-Based Client Workstations

If your network includes clients like Macintosh and OS/2 that are not able to send jobs to Printer Agents directly, the backward compatibility of Novell Distributed Print Services (NDPS) allows these clients to submit jobs to the same queues they always have. Then the Printer Agent can retrieve jobs from these queues and print them.

If you want a printer to service legacy queues, here's how to set it up.

- 1** In iManage click iPrint Management > Manage Printer.
- 2** Browse to and select the printer you want to enable Access Control for.
- 3** Click Client Support > QMS Support.
- 4** Modify (add to/delete from) the Service Jobs from NetWare Queues list.
- 5** Click OK or Apply to save the settings.

5

Managing the Print Services Manager

Although the default settings in Novell® Distributed Print Services™ (NDPS®) allow your users to print without further configuration being necessary, you will probably want to modify some of those settings so that you can manage your printing resources most effectively.

This chapter discusses the following:

- ♦ “Optimizing Fault Tolerance” on page 87
- ♦ “Moving the NDPS Manager” on page 88
- ♦ “NDPS Manager Startup Switches” on page 89

Optimizing Fault Tolerance

The NDPS Manager uses a database to store information about the printers it controls. This database is backed up and replicated in eDirectory™. The database is automatically backed up, by default, once a day. You can modify the backup options or manually backup the database using server console interface for the Manager.

If the database fails to load through normal mechanisms, you can retrieve the database from eDirectory and load the NDPS Manager on any other server in the eDirectory tree.

IMPORTANT: You cannot restore a database from eDirectory to the same server that it was backed up from. In order to restore a database from eDirectory to its original source server, you must first restore it to a different server, and then back the database up to eDirectory from that server. You can then restore it to its original server.

Modifying the Database Backup Options

- 1 At the server console, go to the Available Options menu for the NDPS Manager.
- 2 Select NDPS Manager Status and Control > Database Options.
- 3 Modify the desired settings.
- 4 Escape back out to the Available Options menu.

Restoring a Database from eDirectory

- 1 At the server where you want to restore the database, enter
load ndpsm /dbvolume
See “NDPS Manager Startup Switches” on page 89 for more information.
- 2 Select the name of the NDPS Manager whose database you want to restore.

If the server with the original database is up and running, its name will appear in this menu. If the server is down, no server name will appear here. The only Source option available will be eDirectory (existing jobs will be lost).
- 3 Select the source of the backup you want to restore.

In most cases, you will be selecting eDirectory as the source.

You will be prompted to select a volume.
- 4 Select the volume where you want the database placed.

The restored database is then copied to the location you selected.

Moving the NDPS Manager

Sometimes it is necessary to move the NDPS Manager from one server to another. If you assigned a DNS name to the NDPS Manager, you should update the DNS entry with the new IP Address the Manager is running on.

- 1 If the NDPS Manager is currently running, exit the Manager.
WARNING: All printing associated with this NDPS Manager will cease and waiting print jobs will be lost.
- 2 At the other server console enter
load ndpsm

If you need to use a startup switch, see “[NDPS Manager Startup Switches](#)” on page 89.

- 3 Select the NDPS Manager object you want to load.

A specific NDPS Manager can run only once.

You will be prompted to download the database, and the Manager will start running.

NDPS Manager Startup Switches

Syntax :

```
load ndpsm NDPS_Manager_name_and_context /startup  
parameter
```

Example:

```
load ndpsm .sales_manager.corp.acme /  
dbvolume=sales_sys
```

The following table lists the startup switches you can use when loading NDPSM.NLM.

Startup Parameter	Description
nodatabase	Load the NDPS Manager without opening the database. The Database Options menu is displayed which lets you examine, backup, restore, resynchronize, and uninstall the NDPS Manager database. See “ Understanding the NDPS Manager ” on page 24 for more information about the NDPS Manager database.
noipx	The NDPS Manager will not support the IPX™ protocol.
noip	The NDPS Manager will not support the IP protocol.

Startup Parameter	Description
<i>dbvolume=full_DNS_volume_name</i>	Download the database from NDS [®] and reconnect pointers to the local server where the command is executed. This is useful for moving the NDPS Manager to a new volume.
<i>dbvolume=nocheck</i>	The NDPS Manager will not validate that the database volume is local. This is used with Clustering.
<i>setens=broker_name</i>	Set the Event Notification Service to the specified broker for all printers associated this NDPS Manager.
<i>setrms=broker_name</i>	Set the Resource Management Service to the specified broker for all printers associated this NDPS Manager.
<i>qloadbalance</i>	The NDPS Manager evenly distributes the waiting print jobs among printers that are ready. This is used when pooling printers.
<i>iprinton</i>	The IPP attribute is turned on for all printers associated with the associated NDPS Manager.
<i>dnsname=NDPSM_DNS_name</i>	This sets a DNS name to an NDPS Manager object. You will need to include the DNS information in your DNS lookup tables. If you included the DNS Name before deploying printing with this manager, then you can easily move the NDPS Manager to another server without disrupting printing. NOTE: The DNS name must be assigned before printing on the NDPS Manager is deployed.

6

Managing the Broker

Although the default settings in Novell® Distributed Print Services™ (NDPS®) allow your users to print without further configuration being necessary, you will probably want to modify some settings so that you can manage your printing resources most effectively.

This chapter discusses the following:

- ♦ “Adding or Updating Brokered Resources” on page 91
- ♦ “Adding Banner Pages” on page 92
- ♦ “Adding or Updating Printer Drivers” on page 96
- ♦ “Enabling Event Notification Delivery Methods” on page 97
- ♦ “Enabling and Disabling Brokered Services” on page 98
- ♦ “Reconfiguring an NDPS Broker” on page 99
- ♦ “Broker Startup Switches” on page 101

Adding or Updating Brokered Resources

The following procedure explains how to add banner pages, printer drivers, and printer definition (NPD) files to the resource database available through a Broker's Resource Management Service.

Resources cannot be installed from multiple diskettes. If a printer driver or other resource is shipped on more than one diskette, copy the files to a directory on a hard disk or network drive and install it from there.

To add new resources through the Resource Management Service, do the following.

- 1** Make sure the Resource Management Service is enabled either in iManage or by going to your server console and viewing the Broker status screen.
- 2** In iManage, click Manage Broker and then browse to and select the Broker you want to work with.
- 3** Click Resource Management Service and then the resource you want to work with.
- 4** Add or delete resources.
- 5** Click OK.

Adding Banner Pages

Banner pages are pages that are printed at the beginning of a print job and that normally contain job identification information. In NDPS, banner pages can be configured for PostScript*, PCL*, and text formats.

NDPS provides you with a variety of options for creating and selecting banner page designs. You can choose from several ready-to-use banner page designs, or you might create a unique design that includes your company's logo, a drawing, or even a photograph.

When you add a new banner, it will be immediately available for printer configurations. If you want a banner page to be printed, you can select which banner design you want to use at the General tab on the Configuration page. The Configuration page lists only banners available in the format your printer supports. For example, if you are using a PostScript printer, only banners in PostScript format will be available at the General configuration page.

Each banner page includes the following information in an information box at the bottom of the page: Job Name, Job Owner, Time Printed, Date Printed.

If your client, printer, and server are not all configured for the same language, you might experience problems with the output of your banner pages, such as the job name being corrupted. If you are working in this type of mixed environment, you should consider not using banner pages.

Banners are added to the resource database through the Broker's Resource Management Service.

See the following topics for information about specific tasks associated with using banners.

Adding Banners to the Resource Management Service

- 1** Make sure the Resource Management Service is enabled either in iManage or by going to your server console and viewing the Broker status screen.
- 2** In iManage, click Manage Broker and then browse to and select the Broker you want to work with.
- 3** Click Resource Management Service > Banners.
- 4** Add or delete banners.
- 5** Click OK.

What Printer Types Support What Kind of Banner

A list of supported banners is supplied by both the Novell Gateway (through the PDS) and third-party gateways. The gateway first determines which file extension (.PCL, .PS, or .TXT) is appropriate for the way the Printer object (or Printer Agent) was configured during creation. It then queries the associated Broker for a list of banner page files with that extension. For a list of formats supported by a specific NDPS printer, go to the main Printer Details page and click the Features button.

Creating Banner Files

Administrators with knowledge of printer languages can create custom banners for use with NDPS. NDPS currently supports three types of custom banners:

- ♦ **PCL** (.PCL extension). See “[Creating a PCL Banner](#)” on page 94.
- ♦ **PostScript** (.PS extension). See “[Creating a PostScript Banner](#)” on page 95.
- ♦ **Generic text** (.TXT extension). See “[Creating a Generic Text File](#)” on page 95.

All custom banners that are created should have one of these extensions. When creating custom banners, keep in mind that complex banners will increase the print time for jobs. Here are some tips for creating an efficient banner:

- ♦ Use internal/resident printer fonts instead of rasterized system fonts.
- ♦ When using graphics, use vector graphics when possible. Bitmaps take up a lot more space.
- ♦ Avoid half-toned images.

Creating a PCL Banner

A working knowledge of the Hewlett Packard* (HP*) PCL printer language is needed in order to create a custom PCL banner. The easiest way to create a PCL banner is to create the banner using an application like WordPerfect or MS Write. Be sure to leave the lower third of the custom banner page blank because NDPS will overlay the following information in a PCL banner page:

Job Name

Job Owner

Time Printed

Date Printed

- 1** After formatting the banner page, print the banner document to a file using the appropriate PCL printer definition.

The driver properties will have to be changed from printing to a port/network to printing to a file on disk. All PCL banners must have the .PCL extension.

- 2** Remove the form feed and reset commands in the file that was printed to disk.

You will need a binary editor to remove the form feed and any reset commands from the file. The form feed and reset commands will be in the overlay that NDPS provides. A form feed in PCL is a decimal 12 (hex 0C). There are several possible reset commands that need to be removed. Decimal 27, 69 (hex 1B,45) is the printer reset in PCL. The following Universal Exit Command (UEL) also needs to be removed:

Decimal 27, 37, 45, 49, 50, 51, 52, 53, 88

(Hex 1B, 25, 2D, 31, 32, 33, 34, 35, 58)

Once the form feed and reset are removed, you have a banner file that can be used with NDPS.

- 3 Add the banner to the Resource Management Service.

See “[Adding or Updating Brokered Resources](#)” on page 91 for more information.

Creating a PostScript Banner

A working knowledge of the Adobe* PostScript printer definition language is needed in order to create a custom PostScript banner. The easiest way to create a PostScript banner is to create the banner using an application like WordPerfect or MS Write. Be sure to leave the lower third of the custom banner page blank because NDPS will overlay the following information in a .ps banner page:

Job Name
Job Owner
Time Printed
Date Printed

- 1 After formatting the banner page, print the banner document to a file using the appropriate PostScript printer definition.

The driver properties will have to be changed from printing to a port/network to printing to a file on disk. All PostScript banners must have the .PS extension.

- 2 Using a text editor, remove the PostScript operator called *showpage* from the file that was printed to disk.

The driver will probably have a procedure that includes the *showpage* command. (The *showpage* command will be in the overlay that NDPS provides.) Sometimes *showpage* is embedded in another function within the driver and you will have to use care in removing it.

- 3 Add the banner to the Resource Management Service.

See “[Adding or Updating Brokered Resources](#)” on page 91 for more information.

Creating a Generic Text File

A generic text banner must have a .TXT extension. The banner can be formatted in any printer language. NDPS will not overlay any additional information on this banner page.

Adding or Updating Printer Drivers

A printer driver is a software entity that directly supports a physical printer, enabling it to carry out the functions it is intended to perform.

Hardware vendors develop printer drivers, which are specific to each printer. Most printers require different printer drivers for each operating system they interact with. NDPS allows you to view a complete list of printer drivers currently loaded in the Broker's Resource Management Service (RMS) for Windows, and to add additional printer drivers from diskettes and Windows .CAB files.

NDPS ships with only English-language drivers. To make drivers in other languages available for installation on workstations, you will first need to add those drivers to the RMS through the procedure described in this section.

While the majority of printer drivers in common use today can be used with NDPS, some cannot. A few drivers do not work on a network at all, while others might not contain an index file or have an index file that is incorrectly formatted. If you attempt to add a printer driver to the Resource Management Service from a diskette and receive an error message stating that a printer driver cannot be found, you should contact the driver's vendor.

Prerequisite

Printer drivers cannot be installed to the Resource Management Service from multiple floppy disks. If a printer driver is shipped on more than one disk, copy the files to a directory on a hard drive or network drive and install the driver from there.

Procedure

- 1** Make sure the Resource Management Service is enabled either in iManage or by going to your server console and viewing the Broker status screen.
- 2** In iManage, click Manager Broker and then select the Broker you want to work with.
- 3** Click Resource Management Service and then the type of printer driver you want to add.
- 4** Add or delete printer drivers to the list.

When adding a resource, you will need to browse to the location of the print driver's .INF file. If the file contains multiple print drivers, you will need to select the drivers you want to add to RMS.

5 Click OK or Apply to save your changes to the database.

The drivers will not be added to the database until you do this.

The process described above might not work if the driver installation .INF file uses subdirectory paths in filename designations within the copy files sections of the .INF file. This format is not currently supported by NDPS. There are two possible solutions for this problem:

- ♦ Look for an .INF file that does not use this format for filenames. Often one may exist in a subdirectory of the installation disk.
- ♦ Edit the .inf file and remove path information from filenames. Then ensure that all the files are in the same directory as the .INF file.

Enabling Event Notification Delivery Methods

The NDPS Broker provides an Event Notification Service (ENS) that allows printers to send customized notifications to users and operators about printer events and print job status. ENS supports a variety of delivery methods, including pop-up messages, log files, e-mail and programmatic. Third parties can also develop additional methods.

The Event Notification Service allows you to enable delivery methods such as e-mail and third-party methods not provided directly with NDPS. The executable files for these methods have an .ENM extension (*filename.ENM*) and must be added to the *server*\SYS:SYSTEM directory or another location in the server's search path.

For more information about Event Notification, see [“Understanding the Event Notification Service” on page 29](#).

- 1** Be sure the Event Notification Service is enabled by going to your server console and viewing the Broker status screen.
- 2** In NetWare Administrator, select the Broker you want to work with.
- 3** Select the Event Notification view.
- 4** Click the Load or Unload button.

WARNING: Do not unload the RPC and SPX™ Programmatic Notification methods. These are needed for communication between printers and the workstation Printer Manager utility to occur and for driver download to take place.

5 Specify the ENM filename for the notification method you want to load.

This ENM must be in your *server*\SYS:SYSTEM directory or in another location in your server's search path in order to be loaded.

The Broker object will load this notification method automatically in the future.

Enabling and Disabling Brokered Services

When NDPS is initially installed, the three network services provided by the NDPS Broker are automatically enabled on the Broker object. As your printing needs grow or change and you add additional Brokers to your network, you might want to disable certain services provided through a Broker on a specific server and allow them to be provided through a different Broker (to save disk space on the first server, for example), or you might want to enable services on a Broker that are currently disabled. This procedure explains how these tasks are performed.

- 1** In NetWare Administrator, select the Broker object you want to work with.
- 2** Click the button for the service you want to enable or disable.
- 3** At the *Service Status* line, select either Enable or Disable.

The service is now either enabled or disabled. If disabled, services will need to be provided by a different Broker.

Printer Agents using the services that were disabled will automatically search for another Broker on the network that will provide these services, so normally these printers should continue to be available for processing jobs.

However, if you want to specify a preferred Broker for a Printer Agent to use for these services, you must do this from each NDPS printer's Printer Control page in NetWare Administrator by selecting Features/Services.

If a Broker is unloaded and then is brought back up, Printer Agents that have designated that Broker as their preferred service provider will not be automatically reconnected to it. In order to reconnect to the preferred service provider, you must either unload each Printer Agent and bring it back up, or unload the NDPS Manager that controls the affected Printer Agents and bring it back up, thus bringing up all the Printer Agents with it.

If the Resource Management Service cannot be enabled, check for one of the following problems:

- ♦ The Broker object does not have rights to access the RMS data storage area (the default is NDPS\RESDIR\). Use NetWare Administrator to grant the Supervisor right to the Broker for that subdirectory.
- ♦ The RMS data storage area has a directory name that is longer than eight characters or includes invalid characters.

Reconfiguring an NDPS Broker

In most instances, the default configuration for the three support services it provides will result in satisfactory performance. However, in certain circumstances you might want to change that configuration. Here are a couple of examples:

- ♦ As you gain experience with your NDPS setup, you might want to reconfigure the default properties assigned to the Broker.
- ♦ If disk space on your volume is limited, you might want to move the managed resources database accessed by the Resource Management Service to a different volume on the same server or to a different server in the same eDirectory tree where more disk space is available. (The default location for the RMS resources is *server*\SYS:NDPS\RESDIR\)

Prerequisites

- ♦ To reconfigure a Broker, you must have at least Read, Write, and Modify rights for the container where the Broker resides.
- ♦ If you change the location of your Resource Management Service database, you need to have rights to the new location.
- ♦ If you change the location of your Resource Management Service database, you need to have an existing Resource Management Service database directory to point to when you specify the volume for the RMS during this process. The path you specify must point to a directory that currently exists and that already contains resources. (The RMS data storage area must not have a directory name that is longer than eight characters or includes invalid characters.) If you point to an empty directory, you will receive an error message from the server when loading

the Broker saying that the Broker cannot be enabled. (You can copy resources from another RMS to this directory if you want.)

Procedure

The following procedure explains how to reconfigure an existing Broker object or move your brokered resources to a different location.

- 1** In NetWare Administrator, select the Broker object you want to reconfigure.
- 2** If you want to change the location of your resources, complete the following:
 - 2a** Click Resource Management.
 - 2b** Enter in the resource path you want to use for storing these resources.

You might need to assign the Broker all rights (Supervisor right) to the new area.
- 3** If you want to modify the Access Control list, click Access Control and add or remove users from the Managers list.

See [“Managing the Broker” on page 91](#) for more information.
- 4** If you want to enable or disable your Service Registry, click Service Registry Service.

See [“Enabling and Disabling Brokered Services” on page 98](#) for more information.
- 5** If you want to load or unload Notification methods, click Event Notification.

See [“Enabling Event Notification Delivery Methods” on page 97](#) for more information.

Broker Startup Switches

Syntax:

```
load broker broker_name_and_context /  
startup_parameter
```

Example:

```
load broker .sales_manager.corp.acme /  
dbvolume=sales_sys
```

The following lists the startup switches you can use when loading BROKER.NLM.

Startup Parameter	Description
noui	Loads the Broker without displaying the user interface.
noipx	The NDPS Manager will not support the IPX™ protocol.
noip	The NDPS Manager will not support the IP protocol.
allowdup	The NLM™ will not check for two brokers using the same Broker object.

7

Managing Printing Security

NDPS® is designed to take full advantage of eDirectory™. You receive all the benefits of eDirectory security and the easy management provided by the industry's most advanced and robust directory service. The Access Control feature for NDPS allows you to specify the access each User, Group, or container object will have to your NDPS printing resources.

Access control roles are mutually exclusive, even though the same individual might need to perform tasks reserved for different roles. For example, only printer Managers can add or delete printer Operators or printer Users. In a similar way, Managers and Operators must also be designated as Users for a printer before they can submit print jobs to it.

In actual implementation, the NDPS defaults prevent most problems that might occur from these distinctions. For example, a printer Manager is automatically designated an Operator and User as well, while an Operator of a printer is automatically designated a User of that printer also. You cannot remove the User role from an Operator, and you cannot remove the Operator and User roles from a Manager.

The creator of an NDPS object is automatically granted privileges for all available roles for the type of object being created.

The following sections illustrate some of the security issues and features you might find useful as you plan your NDPS setup.

- ♦ [“Setting Printer Security Levels” on page 104](#)
- ♦ [“Setting Access Control for NDPS Printers” on page 105](#)
- ♦ [“Setting Access Control for NDPS Manager” on page 108](#)
- ♦ [“Setting Access Control for NDPS Brokers” on page 110](#)

Setting Printer Security Levels

Printer security levels affect how rights to a printer are determined and enforced. The default security level is Medium. With sensitive print data, you might want to set the security level to High; however, performance will be effected.

Printer Security Level	Secure Printing Enabled
Low	Security is enforced by the client applications only
Medium (default)	Security is enforced by NDPS Manager if print data integrity is involved. Otherwise, security is enforced by the client applications.
High	Security is enforced by the NDPS Manager for all operations.

To set a printer's security level, do the following:

- 1** In iManage, click iPrint Management > Manage Printer.
- 2** Browse to and select the printer you want to enable Access Control for.
- 3** Click the Access Control > Security.
- 4** Select the level of security you want for the printer.
- 5** Click OK or Apply to save your changes.

Setting Access Control for NDPS Printers

Printer security is ensured through the assignment of the Manager, Operator, and User access control roles and by the strategic placement of your printers and printer configurations.

You can assign multiple Printer objects to represent a single Printer Agent. You can then make different access control assignments to each Printer object. This can be an especially useful option if you want to allow users in different containers to use the same printer, because each group of users can be given different rights to the printer.

A physical printer cannot be a controlled access printer and a public access printer at the same time. However, if you delete all the Printer objects representing a Printer Agent, that printer will become a public access printer.

The following sections discuss security options for NDPS printers in more detail.

- ♦ [“Printer Access Control Roles” on page 105](#)
- ♦ [“Assigning Printer Access Control Roles through NDPS Printer Objects” on page 107](#)
- ♦ [“Assigning Printer Access Control Roles through User Objects” on page 107](#)
- ♦ [“Planning Your Printer Connections and Locations for Better Security” on page 108](#)

Printer Access Control Roles

Different User, Group, or Container objects can have different access rights to the same printer. For example, if you want only certain users to be able to send jobs to a particular printer, you can specify which users should have access and what access roles each will have.

The following table describes the rights and privileges associated with each of the NDPS Printer access control roles.

Role	Description
Manager	NDPS tasks performed exclusively by the Printer Manager are those that require the creation, modification, or deletion of NDPS Printer objects, as well as other eDirectory administrative functions. Printer Managers are automatically designated as printer Operators and Users as well, so they can perform all tasks assigned to the Operator role. Typical Manager functions include the following: ♦ Modifying and deleting Printer objects ♦ Adding or deleting Operators and Users for a printer ♦ Adding other Managers ♦ Configuring interested-party notification ♦ Creating, modifying, or deleting printer configurations
Operator	Printer management tasks performed by the Operator include the following: ♦ Performing all of the functions available through the Printer Control page ♦ Pausing, restarting, or reinitializing printers ♦ Reordering, moving, copying, and deleting jobs ♦ Setting printer defaults, including locked properties ♦ Configuring print job spooling Operators cannot create, modify, or delete eDirectory objects or perform other eDirectory administrative functions.
User	NDPS tasks performed by Users include the following: ♦ Submitting print jobs ♦ Managing print jobs they own (Users cannot copy, move, reorder, or remove jobs they do not own) To simplify administration, the container a printer resides in is automatically assigned as a User for that printer, so all users in that container and its subcontainers can use that printer without being added to the list. You can delete the container from the list if you want to limit access to certain users, groups, or roles.

Assigning Printer Access Control Roles through NDPS Printer Objects

Different User, Group, or container objects can have different access rights to the same printer. For example, if you want only certain users to be able to send jobs to a particular printer, you can specify which users should have access and what access roles each will be given.

- 1** In iManage, click iPrint Management > Manage Printer.
- 2** Browse to and select the printer you want to enable Access Control for.
- 3** Click the Access Control tab.
- 4** Add or delete Users, Groups, or Container objects to the different Access Control roles.
- 5** Click OK.

Assigning Printer Access Control Roles through User Objects

In addition to configuring access control through NDPS printers, you can also configure access control through User objects.

The following procedure assumes that you are modifying the attributes for an existing User. You can also adapt this procedure if you are creating a new User object.

- 1** From the NetWare Administrator browser's Object menu, select the User object you want to configure access control for, and then click NDPS Printer Access Control.

A list of available NDPS printers is displayed with icon representations of the three NDPS Access Control roles: User, Operator, and Manager.

- 2** Select the printer that you want to assign this user an access control role for.
- 3** Check the roles you want this user to be assigned for this printer.

If you check Manager, this user is automatically assigned Operator and User roles as well. Operator and User roles are assigned independently. Keep in mind that a User object must be assigned the access control role of User in order to submit print jobs to that printer.
- 4** (Optional) Click the Event Notification button to configure event notification for this user.
- 5** Click OK.

Planning Your Printer Connections and Locations for Better Security

Depending on your organization's needs, the network administrator can attach printers directly to NetWare[®] servers or to the network. Both types of setup can provide security and administrative advantages. The ideal combination for each installation is different and will change as needs change. Be sure to consider the advantages of each approach when you set up your network.

Connecting the printer to the server places the two resources in close proximity to each other. If the server is in a secure location, this means that the printer is locked up with the server. This might be an advantage. For example, your company might use that printer to print confidential documents. Having the printer in a secure location protects these documents.

Because most printers are already network-enabled, the most common type of network setup includes printers attached directly to the network. This allows the printer to be placed in a convenient location for all users, and places it away from the server for security reasons. Users who use the printer normally will not have access to the server console. Security is still maintained by requiring users to use a password to log in to the network before they can use the printer.

Setting Access Control for NDPS Manager

NDPS Manager security is ensured through the assignment of the Manager access control role.

NDPS Manager Access Control Role

The only access control role available for the NDPS Manager is that of Manager. The following table explains the tasks performed by the Manager role.

Role	Description
Manager	NDPS tasks performed exclusively by the Manager are those that require the creation, modification, or deletion of eDirectory objects, or that involve other eDirectory administrative functions. Typical Manager functions include the following: ♦ Creating Printer Agents and NDPS Manager objects ♦ Adding or deleting Operators and Users for a printer ♦ Adding other Managers ♦ Configuring interested-party notification ♦ Creating, modifying, or deleting printer configurations

Assigning the Manager Role for NDPS Managers

The following procedure explains how to make Manager assignments for your NDPS Manager objects.

- 1** In iManage, click iPrint Management > Manage Print Service Manager.
- 2** Browse to and select the Print Service Manager you want to enable Access Control for.
- 3** Click the Access Control tab.
- 4** Add or delete Users, Groups, or Containers to the Manager role.
- 5** Click OK

Setting Access Control for NDPS Brokers

Broker security is ensured through the assignment of the Manager access control role and by the optional assignment of a password to the Broker.

Broker Access Control Roles

The access control roles available to the NDPS Broker are Manager and Public Access User. The following table explains the roles

Role	Description
Manager	NDPS tasks performed exclusively by the Broker Manager are those that require the creation, modification, or deletion of Broker objects, as well as those that involve other eDirectory administrative functions. Typical Manager functions include the following: ♦ Creating, modifying, and deleting Broker objects ♦ Adding other Managers ♦ Enabling or disabling brokered services ♦ Adding resources to the Resource Management Service ♦ Assigning or changing a Broker password
Public Access User	A public access user is a role assigned to all individuals on the network who are users of printers receiving services and resources provided by the Broker. This role is assigned by default and does not require specific administrative action by the Broker Manager.

Assigning Managers for NDPS Brokers

The following procedure explains how to make Manager assignments for your NDPS Broker objects.

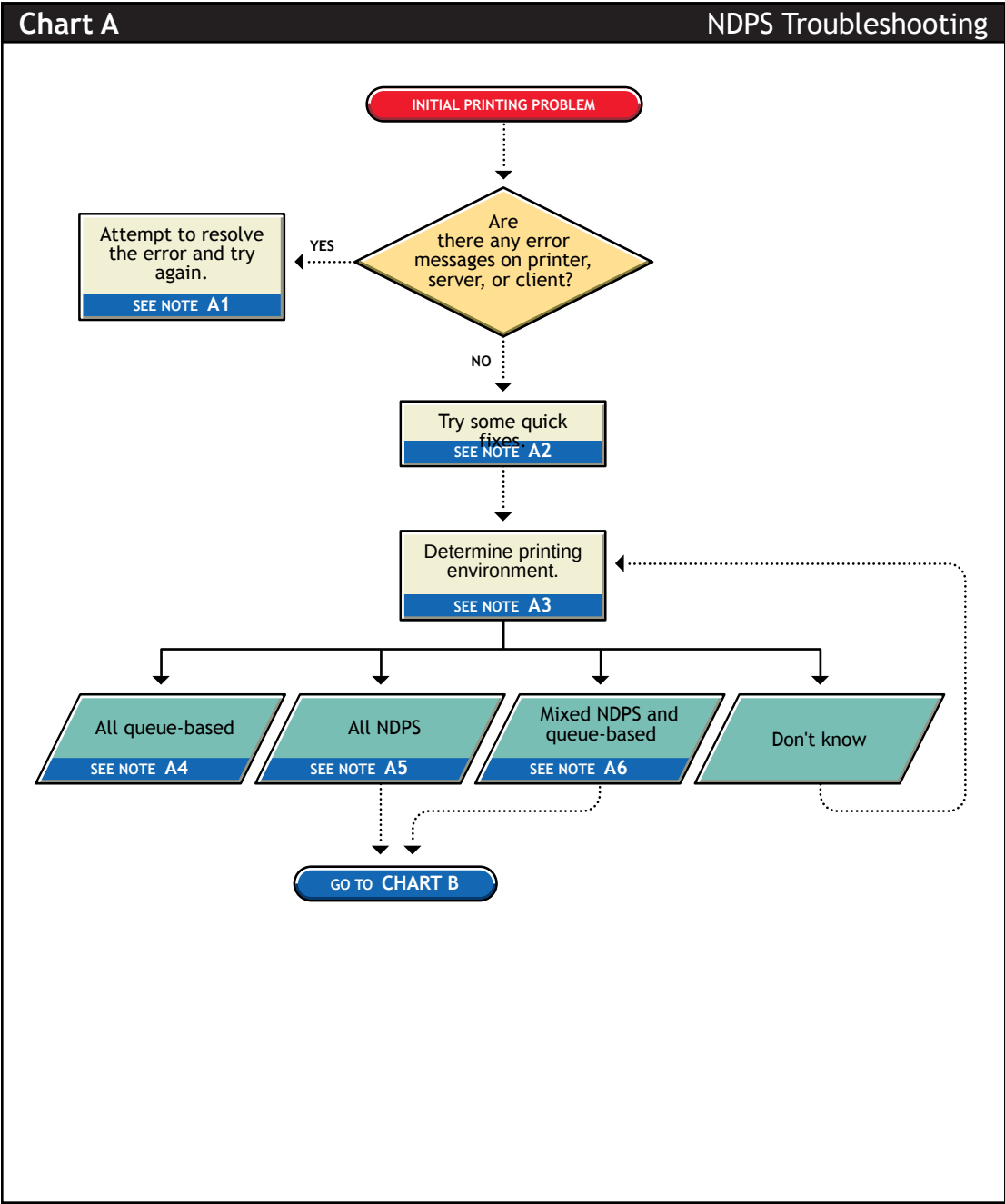
- 1** In iManage, click iPrint Management > Manage Broker.
- 2** Browse to and select the Broker you want to enable Access Control for.
- 3** Click the Access Control tab.
- 4** Add or delete Users, Groups, or Containers to the Manager role.
- 5** Click OK.

8

Troubleshooting Your Print System

This chapter focuses on troubleshooting issues that might arise with Novell® Distributed Print Services™ (NDPS®) printing. It also presents general principles that can be of value for a variety of network printer configurations, and it provides help for troubleshooting problems with the printer itself.

Initial Troubleshooting Steps



A1. Attempt to resolve the error and try again

With many printing problems, an error will be reported on the printer, the client trying to print, or the server. If an error condition exists, use the information provided to try to resolve the problem and then try again. If the error is on the printer, see your printer's operating manual.

A2. Try some quick fixes

Many times, printing problems occur due to simple or temporary conditions. The following are some common quick-fix techniques.

If the problem is limited to a single workstation client, try the following:

- ♦ Check the printer's job list to ensure the job is getting to the spooling area.
- ♦ Review what has changed since the printer was working properly.
- ♦ Check printer forms and job configurations.

If the problem is affecting other workstation clients, try the following:

- ♦ Check Printer Information in the Novell Printer Manager for NDPS error messages.
- ♦ Look for printer error conditions (such as beeps or LCD panel lights) and printing error messages.
- ♦ Turn the printer off and on.
- ♦ Check the printer's cabling.
- ♦ Look for messages on the server console.
- ♦ Check the printer's job list to ensure the job is getting to the spooling area.
- ♦ Review what has changed since the printer was working properly.
- ♦ Check printer forms and job configurations.
- ♦ Search the online Novell Support Connection™ for known issues.
- ♦ Make sure you have the most current NDPS software.

A3. Determining your printing environment

If there is no obvious solution to the problem, then you will need to begin analyzing your printing system. In order to find the problem, the printing environment being used must be identified.

NetWare provides two printing environments: the legacy queue-based printing (see “[A4. All queue-based environment](#)” on page 114) and NDPS (see “[A5. All NDPS environment](#)” on page 115). Either print system can be used alone or the two can be used together (see “[A6. Mixed NDPS and queue-based environment](#)” on page 115). Here are some ways to determine your printing environment:

- ♦ **User.** If the client platform is DOS, Macintosh, OS/2, or UNIX, these clients are not directly supported by NDPS and can only print to a network printer by submitting jobs to queues or use LPR printing. For more information, see “[Setting Up LPR Clients on UNIX](#)” on page 69.

If the client platform is Windows, then they can be using either NDPS or queues. Check the printer configuration under the Windows control panel and check its network setting. Identify the network object being printed to and determine if it is a Queue object or an NDPS Printer object.

- ♦ **Server files.** At the server console look to see if the following are loaded:
NDPSM.NLM (the server is using NDPS)
PSERVER.NLM (the server has been, or still is, using queue-based printing)
- ♦ **iManage.** Load iManage and look at printing object configurations to determine printing setup.

A4. All queue-based environment

If clients are submitting jobs to NetWare queues and the jobs are sent to the printer through the PSERVER.NLM, then you are using queue-based printing.

Printing in a queue-based system consists of submitting jobs to a queue, from which the print server sends the job to the printer based on the settings of the Printer object. In queue-based printing, a problem usually occurs in one of three general areas:

- ♦ Getting the print job into the print queue
- ♦ Transferring the job to the printer in the proper format
- ♦ Printing the job properly

For more information, see [Troubleshooting General Printing Problems \(http://www.novell.com/documentation/lg/nw51/printenu/data/hlgnavvum.html\)](http://www.novell.com/documentation/lg/nw51/printenu/data/hlgnavvum.html) in *NetWare 5.1 Queue-Based Print Services*.

A5. All NDPS environment

If you have the new client software and are submitting jobs to the printer through Printer Agents and a Print Device Subsystem, then you are using NDPS. See “**Narrowing Your Focus**” on page 116 for more information.

A6. Mixed NDPS and queue-based environment

For backward compatibility, it is possible to be using both queue-based printing and NDPS together. Here are the two ways this can happen:

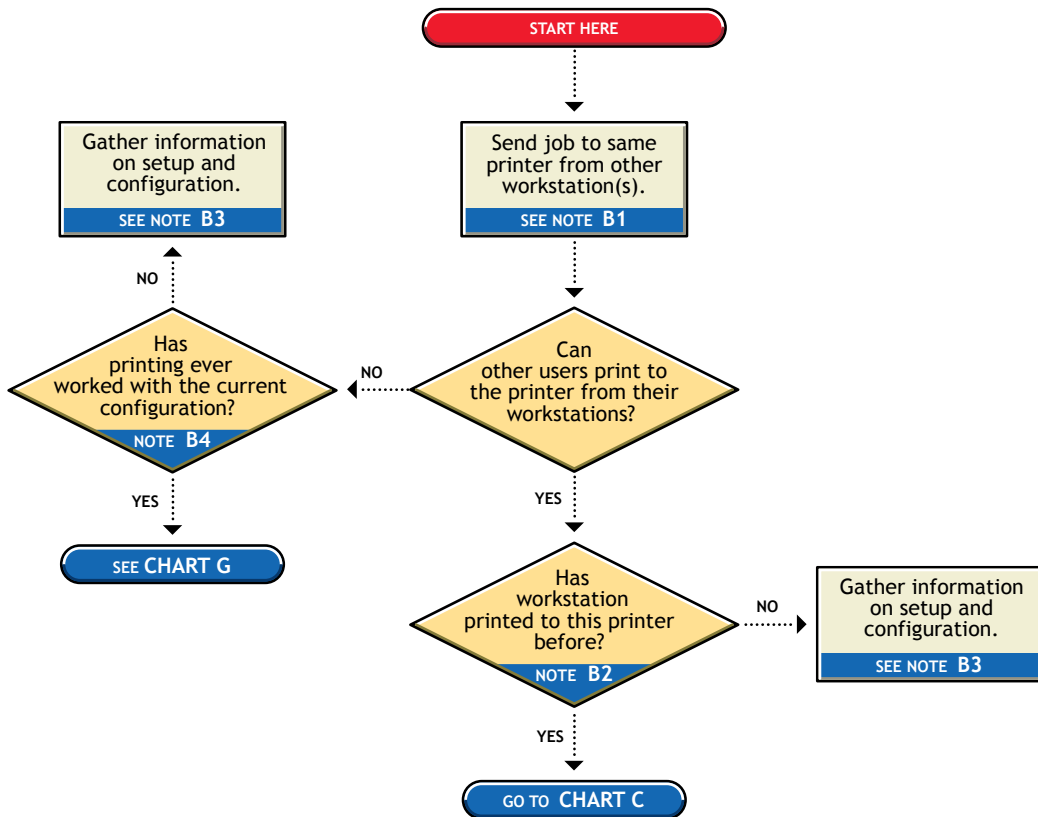
- ♦ Clients such as DOS, Macintosh, OS/2, and UNIX are unaware of NDPS and are unable to submit jobs to NDPS Printer Agents directly. The clients must therefore send jobs to a print queue. An NDPS Printer Agent can be configured to emulate a print server and service jobs from the queue to an NDPS printer.
- ♦ Some network printers can receive jobs only from a NetWare queue and print server (for example, remote printers). If a client is configured to send jobs only to a Printer Agent, the Printer Agent might be configured to transfer the job to a queue where it can be serviced by a print server.

Because two different print systems are being used, the problem could exist in either print system. See “**Narrowing Your Focus**” on page 116 to continue.

Narrowing Your Focus

Chart B

NDPS Troubleshooting



B1. Send job to same printer from other workstations

Try printing to the same printer from one or more different workstation. This will help you narrow your search to the specific workstation or to the whole printing system.

B2. Has workstation printed to this printer before?

Has this workstation submitted jobs to this printer that printed successfully? Determine the following:

- ♦ Is this a new setup?
- ♦ Is this the first time printing was attempted from this workstation since any changes were made?
- ♦ Has this setup been working before and now is not?

If this is a new setup or a new configuration, then something might not be configured.

If a job sent from this workstation has been printed successfully before, go to [“Determining Your Platform When Problem Affects Only One Workstation” on page 118](#) to further track the problem.

B3. Gather information on setup and configuration

The initial setup might have been done incorrectly. Refer to [“Creating NDPS Printers” on page 62](#) for more information.

B4. Has printing ever worked with the current configuration?

Have any users been able to print jobs from their workstations using this configuration? Determine the following:

- ♦ Is this a new setup?
- ♦ Is this the first time printing since any changes were made?
- ♦ Has this setup been working before and now is not?

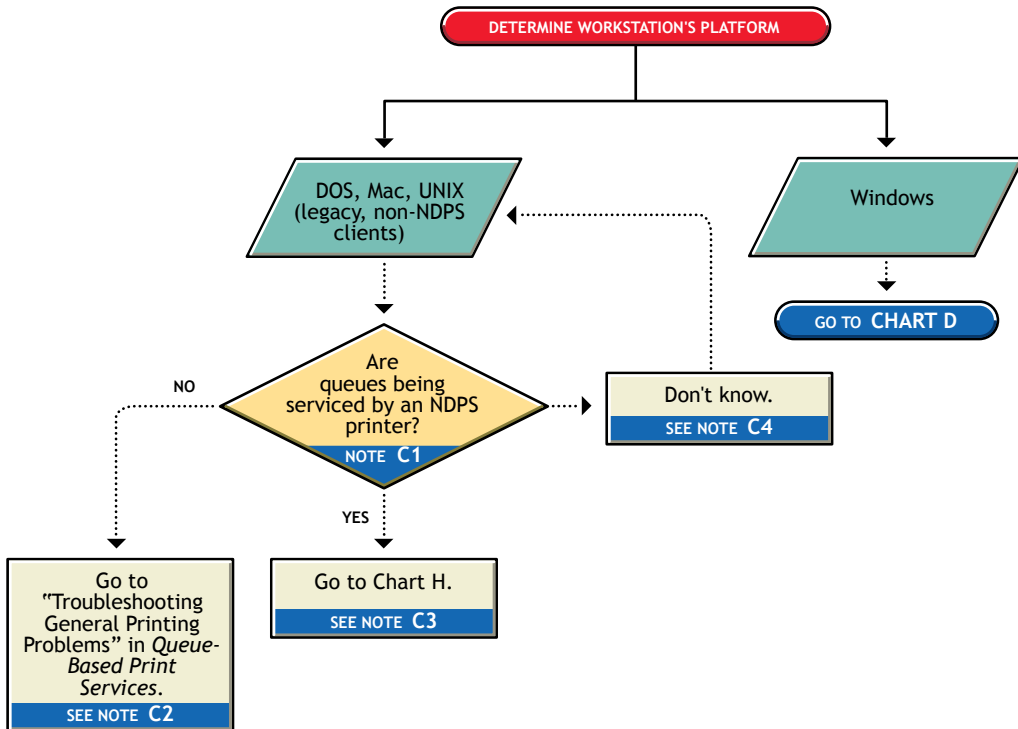
If this is a new setup, or a new configuration then something might not be configured properly.

If other users have been printing successfully, then go to [“Tracking Jobs from a Workstation” on page 123](#) to further track the problem.

Determining Your Platform When Problem Affects Only One Workstation

Chart C

NDPS Troubleshooting



C1. Are queues being serviced by an NDPS printer?

Clients running on DOS, Macintosh, OS/2, and UNIX platforms are either queue-based, meaning that they print to network printers by redirecting jobs to a queue, or set up for LPR printing. You will need to determine whether the network printer is being serviced by a queue-based print server (such as PSERVER.NLM) or if NDPS is redirecting jobs through a Printer Agent.

C2. All queue-based printing

If clients are submitting jobs to a queue that is being serviced by a print server, then the printing environment is all queue-based. For more information, see [Troubleshooting General Printing Problems \(http://www.novell.com/documentation/lg/nw51/printenu/data/hlgnavvum.html\)](http://www.novell.com/documentation/lg/nw51/printenu/data/hlgnavvum.html) in *NetWare 5.1 Queue-Based Print Services*.

C3. Queue-NDPS integration

The clients are unaware of NDPS and are unable to submit jobs to NDPS Printer Agents directly. The clients must therefore send jobs to a print queue. An NDPS Printer Agent can be configured to emulate a print server and service jobs from the queue to a NDPS printer. See “**Supporting Queue-Based Client Workstations**” on page 86 for more information. Then go to “**Printing Problems Affecting All Users**” on page 128.

C4. Look in iManage for NDPS Printer objects

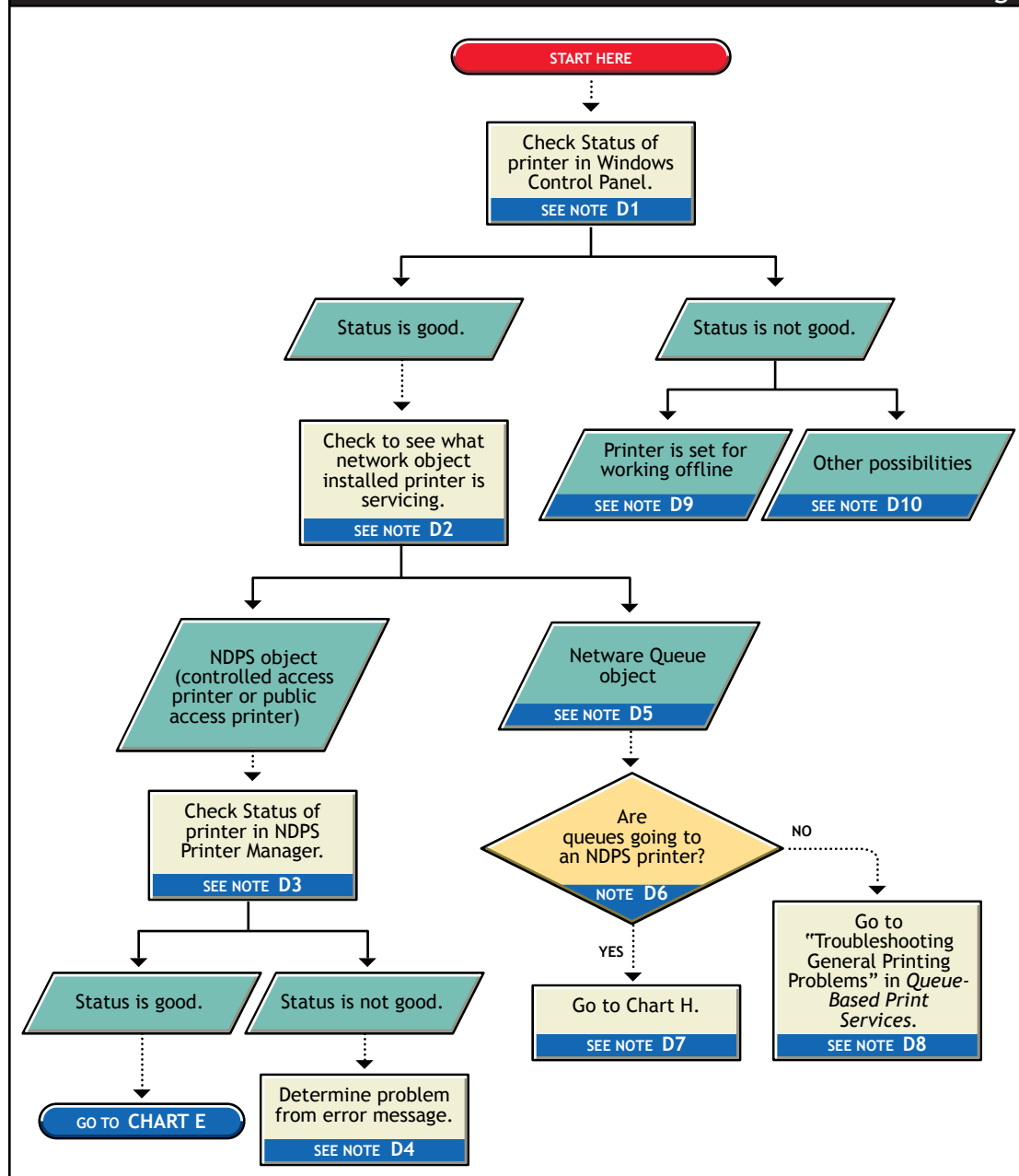
Load iManage and look to see if any NDPS Printer objects are defined.

- ♦ If no NDPS Printer objects are defined, there should be a Print Server object. Check the configuration of the print server to if the queue is configured to be serviced by it.
- ♦ If there are NDPS objects defined, look at the Printer objects to see if they are configured to emulate a print server and service jobs from a queue.

Isolating Printing Problems Affecting Only One Windows Workstation

Chart D

NDPS Troubleshooting



D1. Check status of printer in Windows Control Panel

Printing from a Windows environment introduces several complexities which might or might not be related to the network or the printer. Some problems can be found and resolved right in the Windows environment. Check the status of the printer in the Windows Control Panel to see if any problems are evident.

D2. Check to see what network object the installed printer is servicing

Determine the network object print jobs are being redirected to.

- 1** Select the Printers folder from the Windows Control Panel or the Start/Settings menu.
- 2** Select the installed printer and click File/Properties (or use the right-click Properties option).
- 3** Click the Details tab.
- 4** Look at Print to the Following Port.

Identify the network object being printed to and determine if it is a Queue object or an NDPS Printer object.

D3. Check status of printer in NDPS Manager

If the job did not appear in the job list, view information about the specific installed printer using the NDPS Health Monitor.

D4. Determine problem from error message

With many printing problems, an error will be reported on the printer, the client trying to print, or the server. If an error condition exists, use the information provided to try to resolve the problem and then try again. If the error is on the printer, see your printer's operating manual.

D5. NetWare queue object

This printer is queue-based, meaning that the print driver prints to network printers by redirecting jobs to a queue.

D6. Are queues going to an NDPS printer?

The next thing you need to know is whether the network printer is being serviced by a queue-based print server (such as PSERVER.NLM) or if NDPS is redirecting jobs through a Printer Agent. Load iManage and look to see if any NDPS Printer objects are defined.

- ♦ If no NDPS Printer objects are defined, there should be a Print Server object. Check the configuration of the print server to see if the queue is configured to be serviced by it.
- ♦ If there are NDPS objects defined, look at the Printer objects to see if they are configured to emulate a print server and service jobs from a queue.

D7. Queue-NDPS integration

The clients are submitting jobs to a print queue which is then being serviced by NDPS Printer Agents. See “[Problems Integrating with Queue-Based Components](#)” on [page 132](#) for more information.

D8. All queue-based printing

If clients are submitting jobs to a queue that are being serviced by a print server, then the printing environment is all queue-based. For more information, see [Troubleshooting General Printing Problems \(http://www.novell.com/documentation/lg/nw51/printenu/data/hlgnvum.html\)](http://www.novell.com/documentation/lg/nw51/printenu/data/hlgnvum.html) in *NetWare 5.1 Queue-Based Print Services*.

D9. Printer is set for working offline

Under certain circumstances, the printer might be set for working offline. This can happen if Windows loses communication with the network, for example. A user can also set it offline. If the printer is set to work offline, reset it to online and try to print. If you cannot set the printer to online, then Windows has lost communication with the network print system. Reboot the workstation and if the condition still exists, check the client's connection to the network.

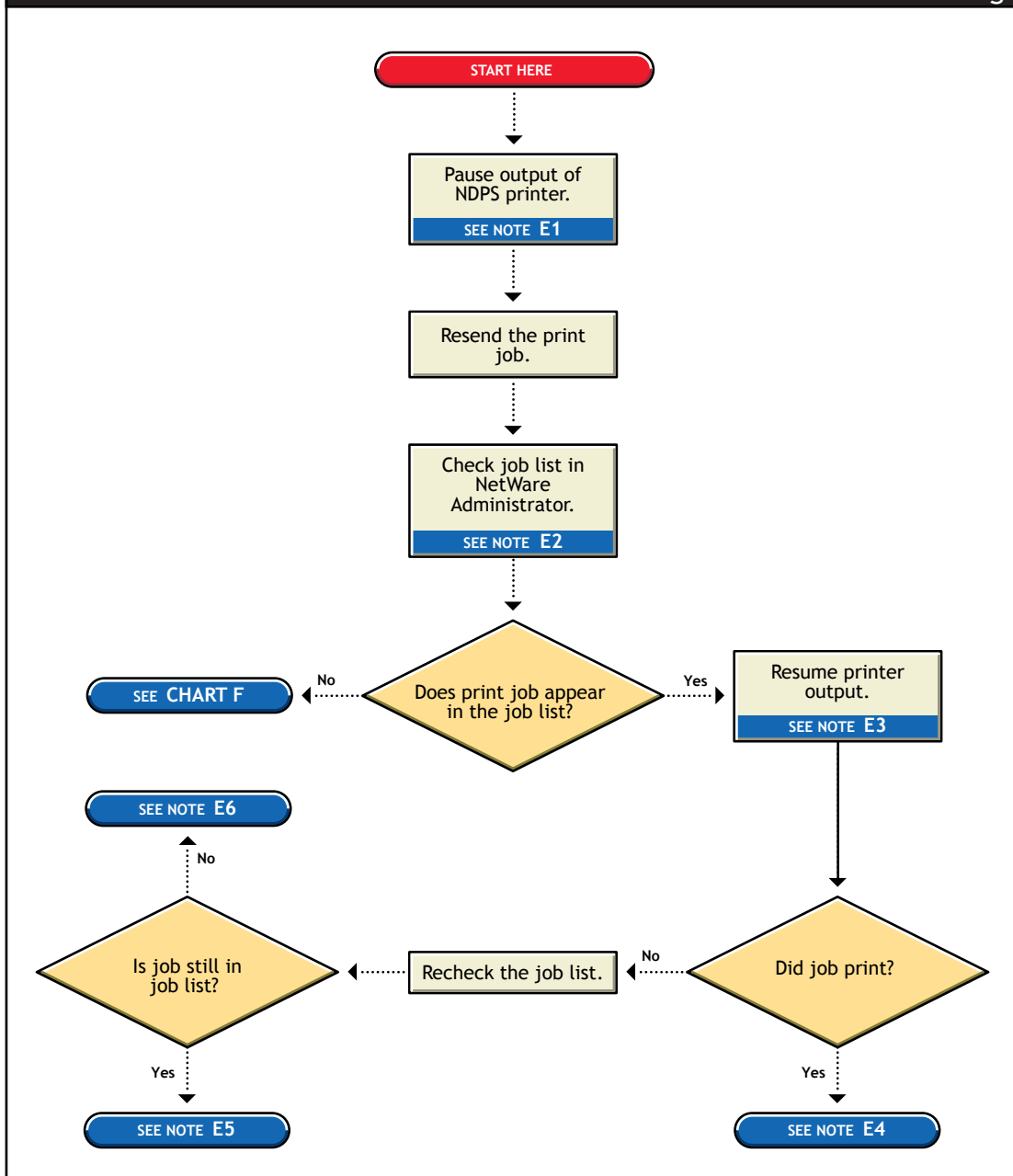
D10. Other possibilities

Other negative status flags.

Tracking Jobs from a Workstation

Chart E

NDPS Troubleshooting



E1. Pause output of NDPS printer

One method of troubleshooting is putting stops in the printing process and then resending a job and testing how far in the process the job gets. The first stop you can make is pausing the printer output.

Pausing printer output is a common technique used when troubleshooting printing; it forces NDPS to spool your print job and save it as a file. Stopping and evaluating the printing process midway helps you to identify early problems and limits your troubleshooting to a few components.

To pause printer output for a controlled access printer, do the following:

- 1** Locate the NDPS Printer object in iManage.
- 2** Double-click the NDPS Printer object to open its Details page.
- 3** Click the Pause Output button.

The Pause Output button changes to a Resume Output button.

E2. Check job list in iManager

You can view the job list for a NDPS printers from iManage, the server console, or the workstation Printer Manager. To view the job list from iManage, see [“Managing Print Jobs” on page 71](#).

The job list for a public access printer can be viewed from either the server console or the Novell Printer Manager.

E3. Resume printer output

To resume printer output for a controlled access printer, do the following:

- 1** In iManage, click Manage Printer and then select the NDPS printer you want to control.
- 2** Click the Resume Output button.

The Resume Output button changes to a Pause Output button.

E4. Job printed this time but nothing was changed

If the job printed now, there is no authoritative explanation as to why it didn't print the first time. If you followed these steps, no configurations have been changed; the job was only paused and released. Try printing the job again and see if normal printing continues. If not, try pausing the printer again and see if any other symptoms occur.

E5. Job did not print and is still in the job list

If the job does not print and is still in the job list, then check for job holds, delays, and priority settings.

E6. Job did not print but is no longer in the job list

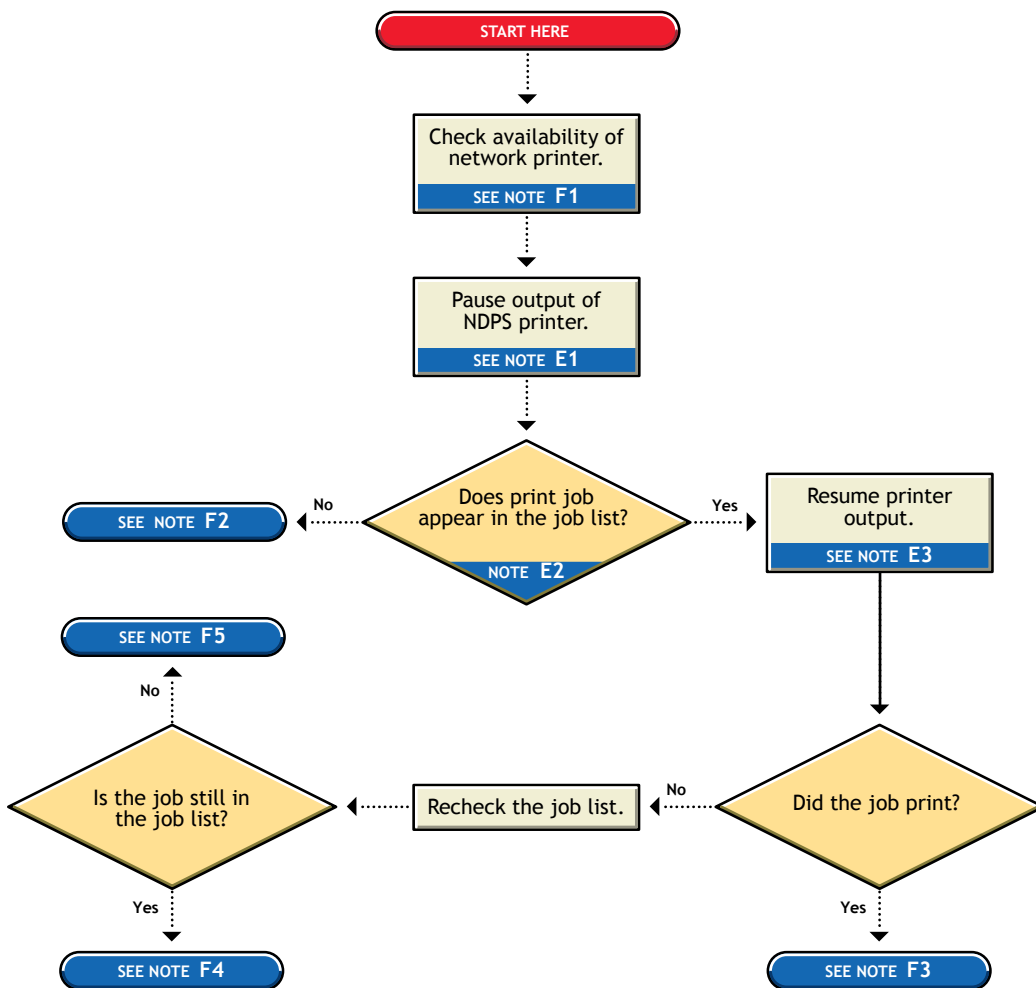
If the job did not print, but it is not in the job list, then the job was sent to the printer and no error was reported back to the system. Check these issues:

- ♦ Are you are checking the correct physical printer?
- ♦ Are you are using the correct print driver in your application?
- ♦ Are your drivers and printers talking the same language (for example Postscript or PCL)?

Checking Printer Output and Using Test Files

Chart F

NDPS Troubleshooting



F1. Check availability of network printer

Make sure that the printer is set to accept jobs. In iManage, verify that input is not paused.

F2. Check for error messages

With many printing problems, an error will be reported on the printer, the client trying to print, or the server. If an error condition exists, use the information provided to try to resolve the problem and then try again. If the error is on the printer, see your printer's operating manual.

Also confirm that your NDPS objects are configured properly.

F3. Test file prints but jobs from application do not

If the test file prints but jobs from the application do not, then there is a problem with the way the job is being formatted by the application or handled by the driver. Reinstall the current print driver provided by the printer manufacturer. Also try printing from different applications to determine whether one application works while another does not. If this is the case, the problem is related to the application itself.

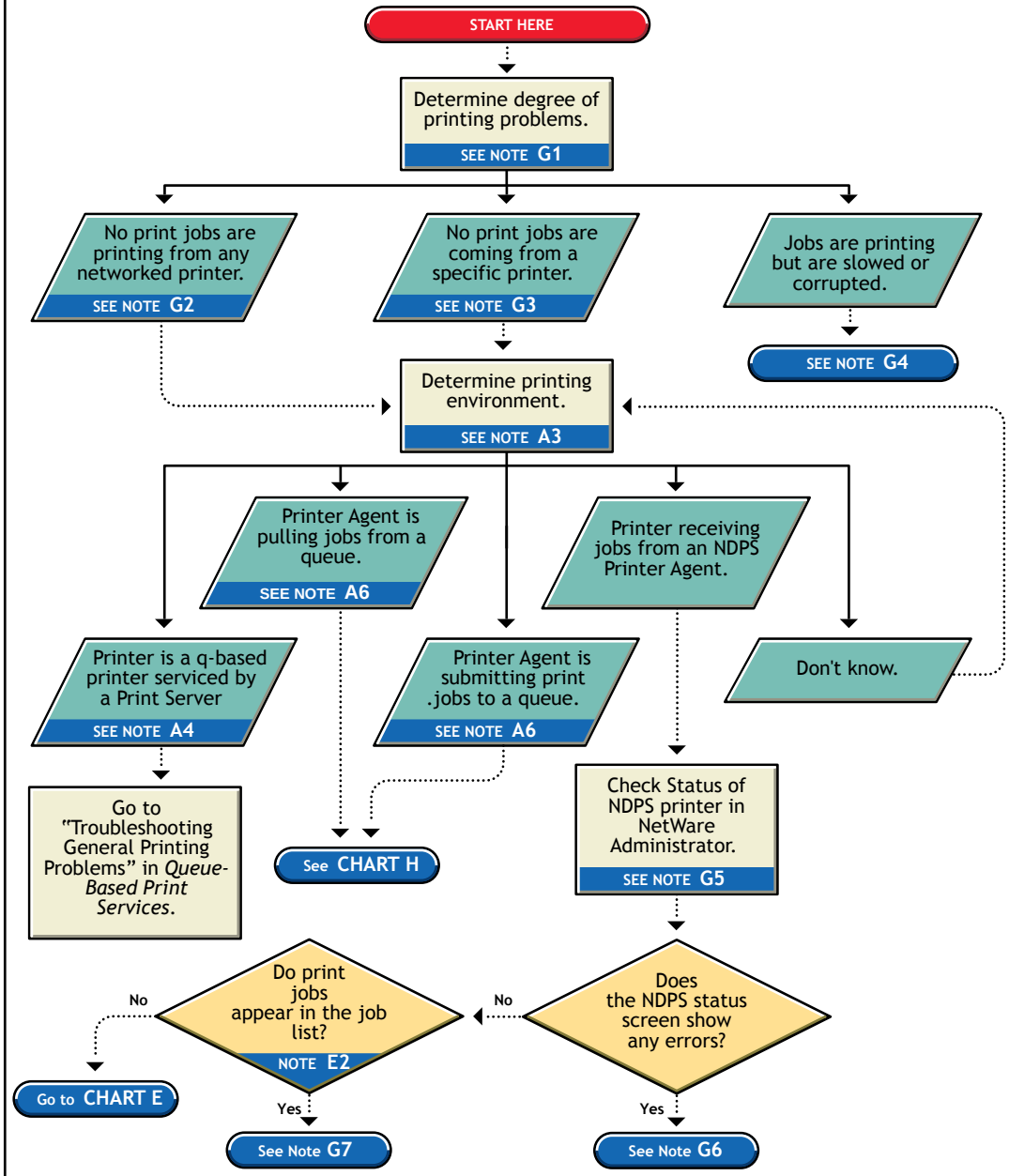
F4. Job is being held in spooler

The job is being held in the job spooler. Check for job holds, delays, and priority settings. If one of these conditions exists, change the status to print the job. If the job prints, then see **“F3. Test file prints but jobs from application do not” on page 127**.

F5. Job did not print but is no longer in the job list

If the job did not print but it is not in the job list, then the job was sent to the printer and no error was reported back to the system. Make sure you are checking the right physical printer.

Printing Problems Affecting All Users



G1. Determine severity and scope of printing problems

If printing is affecting all users, determine the degree of severity of the printing problems. Can no users print from specific printers, or are no jobs printing from any network printer? Or are jobs printing, but printing slowly?

G2. No print jobs are printing from any networked printer

If no users can print at all from any network printer, the problem is probably a universal problem such as

- ♦ The printing system is disabled or printing system files are unloaded.
- ♦ The servers are in a critical state due to problems with memory, disk space, LAN connections, etc.
- ♦ The LAN has a bottleneck or is otherwise dysfunctional.

G3. No print jobs are coming from a specific printer

If the printing problem is limited to a certain printer, then the problem is either at the printer itself or the configuration of the printer. Continue to determine which printing environment you are using.

G4. Jobs are printing slowly or are corrupted

Jobs might be printing but are either slow or appear corrupt.

Slow Printing

There are several explanations for slow printing.

If only one workstation is having problems with slow printing, the application might be generating the output for the printer. This can cause a long delay before the job is even sent to the spooler. Look at the print status of the application to determine if this is the case.

If all workstations are having the problem, one of the following conditions might exist:

- ♦ Interrupt conflicts might exist between the port and another device. Configure the printer for no interrupts (polled mode).
- ♦ The baud rate might be slow (serial printers).

- ♦ XON/XOFF might need to be enabled (serial printers).
- ♦ Your hardware (cable, port, printer) might be faulty.

Job Corruption

If jobs are printing in pieces, the printer might 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 jobs that contain large graphics.

G5. Check status of NDPS Printer in iManage

From iManager, click Manage Printer and then select the NDPS printer you want to check. View the information on the Printer Control page.

G6. A problem is identified in an error message

Try to determine problem from the status or error message and resolve it.

- ♦ Make sure that job input or output is not paused.
- ♦ Check for any details that are grayed out and not available; these might show you a problem.

G7. Jobs are getting to the job list but the printer is unable to print them

Do the following:

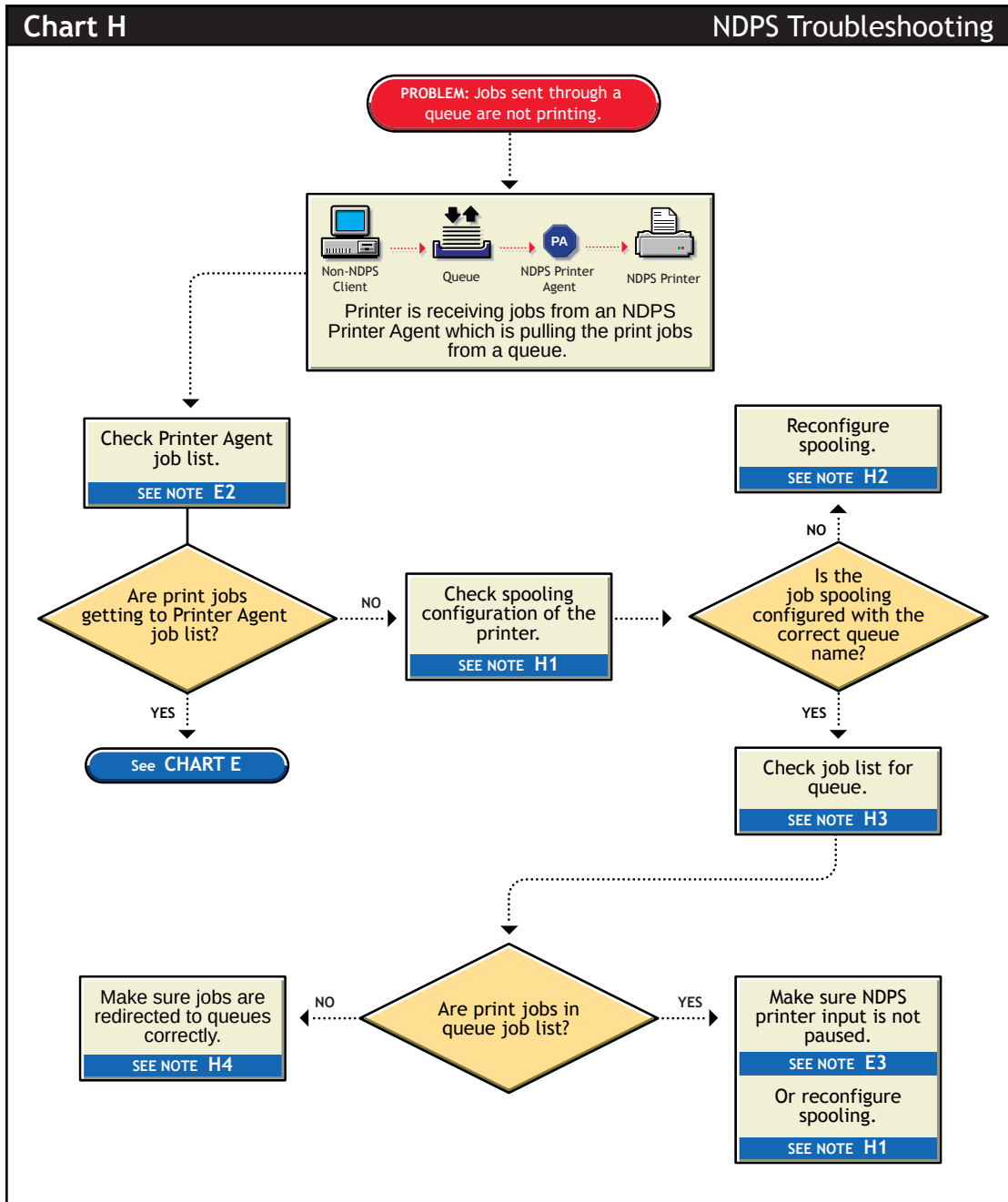
- ♦ Make sure there are no holds or delays.
- ♦ Make sure the printer is configured properly.
- ♦ Check the status of the gateway if one is being used. (A gateway is always needed unless the Printer Agent is embedded in the printer itself.)

See [“Tracking Jobs from a Workstation” on page 123](#) for more information.

Problems Integrating with Queue-Based Components

Chart H

NDPS Troubleshooting



H1. Check the printer's spooling configuration

Make sure the printer is configured to service the queue you are expecting the job to go to. See [“Setting Print Job Spooling” on page 85](#) for more information.

H2. Reconfigure spooling for this printer

The spooling configuration specifies a different queue than the one you want this printer to service. See [“Setting Print Job Spooling” on page 85](#) for information on how to configure job spooling.

H3. Check the job list for the queue

Make sure the job is actually getting to the queue.

H4. Make sure the job is being redirected to the queue properly

Many applications are not designed for network printing. CAPTURE is a command line utility that configures print job redirection from applications not designed for NetWare print services.

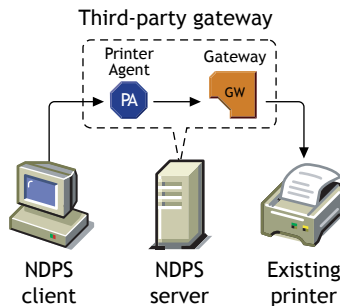
9

Selecting the Correct Gateway to Use

Gateways allow Novell® Distributed Print Services™ (NDPS®) clients to send jobs to printers that are not NDPS-aware (that is, printers that are not equipped with embedded NDPS Printer Agents). You select and configure a printer gateway when you create a new Printer Agent.

Gateways translate NDPS queries or commands to printer-specific language that the physical printer can use. This is possible because gateways are configured to know the specific type (make and model) of printer being used.

The following diagram illustrates a typical gateway configuration.



Third-party gateways are developed by printer manufacturers to support printers directly attached to the network. Because they are developed to interact with specific proprietary printers, can provide a wider array of information and offer options that are not available for the generic Novell gateway. Some third-party gateways provide utilities that can be configured to automatically create Printer Agents when one of their printers is attached to the network.

The Novell gateway supports most printers and provides support for other print systems. The gateway supports LPR/LPD printing and IPP printing. LPR is a UNIX-based printing protocol used by network-attached printers in TCP/IP environments to service jobs submitted to print queues.

Using Third-party Gateways

A number of printer vendors have created their own gateways to run with Novell Distributed Print Services. The documentation for implementing these gateways is available at the [Novell DeveloperNet Web site \(http://developer.novell.com/devres/nest/ndpsdown.htm\)](http://developer.novell.com/devres/nest/ndpsdown.htm).

A

Configuring Remote Printers

The NDPS[®] gateway allows you to configure all of your current remote printers so that they will work just as they always have, whether they are attached to a workstation or a remote file server or are directly attached to the network running in RP mode. A remote printer controlled by an NDPS Printer Agent will emulate a legacy print server (PServer Emulation) and will no longer require PSERVER.NLM.

We recommend that you reconfigure your direct-connect printers currently configured for Queue Server mode to run in RP mode so that they can take advantage of the advanced features NDPS provides.

For detailed information, see the following:

- ♦ “Configuring Remote Printers Using NPRINT[®]” on page 137
- ♦ “Configuring Remote Printers Running in RP Mode” on page 139
- ♦ “Configuring Remote Printers Running in LPR Mode” on page 140

Configuring Remote Printers Using NPRINT[®]

Use the following procedure to configure a new Novell[®] Distributed Print Services[™] (NDPS) printer attached to a workstation client or remote server that is running NPRINT.EXE or NPRINT.NLM.

- 1** In NetWare Administrator, select the container where you want the NDPS Printer object to reside.
- 2** From the Object menu, click Create > NDPS Printer.
- 3** Enter a name in the Printer Name field.

The name should distinguish it from other printers on your system.

- 4** In the Printer Agent Source field, select Create a New Printer Agent and click Create.
- 5** Confirm the Printer Agent name (default is the name of the new printer you are creating) and browse to select the NDPS Manager you want to assign it to.
- 6** In the Gateway Types window, select the Novell Printer Gateway.

For more information about using gateways, see [“Selecting the Correct Gateway to Use” on page 135](#).
- 7** Configure the PDS by selecting the Printer Type and Port Type and then click OK.
- 8** Configure the Connection Type as Remote and specify the Port Type as LPT, COM, or Other. Then click Next.
- 9** In the PServer Emulation field, modify or use the default SAP Name, specify a Printer Number, if needed, and specify any address restrictions you want to impose for this printer. Then click Next.
- 10** Configure the Controller Type and Interrupts, if needed, and then click Finish.
- 11** Select the printer driver for each client operating system.

These drivers will be automatically downloaded to users' workstations when they install this printer in the future. Select a driver for each operating system.

If you choose a Windows 3.x driver but not a Windows 95/98/ME or Windows NT/2000 driver, a 16-bit driver will be selected. Normally this will not create problems.

Since the list of printer drivers shipped with this product is limited, you can add drivers to the Resource Management Service database. (See [“Adding or Updating Printer Drivers” on page 96](#) for more information.)

If the driver you need is not in the drivers list, rather than adding it to the RMS, you can select [None] at the top of each list. Users will then be asked to provide a disk with the appropriate driver the first time they install this printer on their workstations.

- 12** Click OK.

The main browser window appears with your new controlled access printer listed.

- 13** At the workstation or remote server that this printer is attached to, run NPRINT and select the SAP name specified in Step 10.

Workstation users can now select the printer and print to it.

Configuring Remote Printers Running in RP Mode

These instructions are for configuring a printer attached directly to the network and running in RP mode, unless that printer is an HP printer.

If you are using a direct-connect printer configured for Queue-Server mode, we recommend that you reconfigure that printer to RP mode and then configure it as a NDPS printer using RP. This allows you to gain the management benefits of NDPS while eliminating a Queue object from your system.

- 1** From the browser's Object menu for the organization or organizational unit, click Create > NDPS Printer.
- 2** Enter a name in the Printer Name field.
- 3** In the Printer Agent Source field, select Create a New Printer Agent and click Create.
- 4** Confirm the Printer Agent name (default is the name of the new printer you are creating) and browse to select the NDPS Manager you want to assign it to.
- 5** In the Gateway Types window, select the gateway you want to use.

For more information about using gateways, see [“Selecting the Correct Gateway to Use” on page 135](#).
- 6** Configure the Novell PDS by selecting the Printer Type and Port Type, and then click OK.
- 7** Configure the Connection Type as Remote and specify the Port Type as LPT, COM, or Other. Then click Next.
- 8** In the PServer Emulation field, modify or use the default SAP Name, specify a Printer Number, if needed, and specify any address restrictions you want to impose for this printer. Then click Next.
- 9** Configure the Controller Type and Interrupts, as needed, then click Finish.
- 10** Select the printer driver for each client operating system.

These drivers will be automatically downloaded to users' workstations when they install this printer in the future. Select a driver for each operating system.

If you choose a Windows 3.x driver but not a Windows 95/98/ME or Windows NT/2000 driver, a 16-bit driver will be selected. Normally this will not create problems.

Since the list of printer drivers shipped with this product is limited, you can add drivers to the Resource Management Service database. (See [“Adding or Updating Printer Drivers” on page 96](#) for more information.)

If the driver you need is not in the drivers list, rather than adding it to the RMS, you can select [None] at the top of each list. Users will then be asked to provide a disk with the appropriate driver the first time they install this printer on their workstations.

11 Click Continue.

Configuring Remote Printers Running in LPR Mode

Use the following procedure to configure a remote printer running in LPR mode in TCP/IP environments, unless that printer is an HP printer.

LPR will work only if TCP/IP is configured correctly.

- 1** From the browser's Object menu for the organization or organizational unit, click Create > NDPS Printer.
- 2** Enter a name in the Printer Name field.
- 3** In the Printer Agent Source field, select Create a New Printer Agent and click Create.
- 4** Confirm the Printer Agent name (default is the name of the new printer you are creating) and browse to select the NDPS Manager you want to assign it to.
- 5** In the Gateway Types window, select the Novell gateway.
For more information about using gateways, see [“Selecting the Correct Gateway to Use” on page 135](#).
- 6** Configure the Novell PDS by selecting the Printer Type and Port Type, and then click OK.
- 7** Configure the Connection Type as Remote LPR/TCPIP and specify the Port Type as LPT, COM, or Other. Then click Next.

8 Select the printer driver for each client operating system.

These drivers will be automatically downloaded to users' workstations when they install this printer in the future. Select a driver for each operating system.

If you choose a Windows 3.x driver but not a Windows 95/98/ME or Windows NT/2000 driver, a 16-bit driver will be selected. Normally this will not create problems.

Since the list of printer drivers shipped with this product is limited, you can add drivers to the Resource Management Service database. (See [“Adding or Updating Printer Drivers” on page 96](#) for more information.)

If the driver you need is not in the drivers list, rather than adding it to the RMS, you can select [None] at the top of each list. Users will then be asked to provide a disk with the appropriate driver the first time they install this printer on their workstations.

9 Click Continue.

The main browser window appears with your new controlled access printer listed.

