

HP 9000 Computer Systems
**HP Distributed Print Service
Administration Guide**



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Conventions Used in this Manual

This manual uses the following typographic conventions:

- | | |
|-----------------|---|
| <i>Italic</i> | Italic indicates a parameter or argument that you must replace with the actual value, such as <i>ServerName</i> . |
| Computer | Computer indicates commands, attributes, files, directories, and other items whose names are predefined by the system, such as pdl s and notification-delivery-method . |
| Bold | Bold indicates words defined for the first time. |

Syntax Notation

Command syntax notation uses symbols to indicate specific conditions. Do not enter the following symbols, unless specifically instructed to do so, when actually issuing an HPDPS command:

Brackets	[]
Braces	{ }
Bar	
Ellipsis	...

These symbols have the following meanings.

- Brackets, [], around values indicate that they are optional. For example:

```
pdmod [Flags]{LocalJobId ... | GlobalJobId ... }
```

means that you do not have to enter any of the available `pdmod` flags with the `pdmod` command.

- Braces, { }, around values indicate required items that you must supply with the command. For example:

```
pdmod [Flags] {LocalJobId ... | GlobalJobId ... }
```

means that you must enter either a *LocalJobId* or a *GlobalJobId* with the `pdmod` command. Braces are also used within the `notification-profile` attribute.

- A vertical bar, |, between values indicates that you can only enter one of the values with the command. For example:

```
pdmod [Flags]{LocalJobId ... | GlobalJobId ... }
```

means that when you issue the `pdmod` command, you can specify either a *LocalJobId* or a *GlobalJobId*, but not both.

- An ellipsis, ..., indicates that you can supply more than one occurrence of a particular type of value with the command. For example:

```
pdmod [Flags]{LocalJobId ... | GlobalJobId ... }
```

Syntax Notation

means that you can supply more than one local job identifier value or more than one global job identifier value with the `pdmmod` command.

Special Characters in Syntax

Some special characters are included in commands. When colons, dashes, the equals sign, double quotation marks, single quotation marks, and braces are shown in command syntax notation, include them when you issue the command. These special characters have the following meanings:

- A colon, :, separate related values. For example:

```
pdmod -x "sides=2" Spool12:1011230045
```

1011230045 is a global job identifier on the Spool12 server.

- A dash, -, always precedes a flag. For example, -x.
- The equals sign, =, separates attribute and value pairs. For example:

```
pdmod -x "sides=2" Spool12:1011230045
```

means that 2 is the value assigned to the sides attribute.

- Double quotation marks, "", surround multiple attribute and value pairs, such as:

```
-x "sides=2 content-orientation=portrait"
```

For consistency, double quotation marks also are shown around single attribute and value pairs in all examples, although they are not required.

- Double quotation marks, "", surround text strings that contain spaces, such as:

```
-m "Down for maintenance"
```

- Single quotation marks, ', ', surround a text string that contains spaces when the text string is imbedded in a statement already enclosed in double quotation marks. An example is:

```
-x "sides=2 job-print-after='08:00:00 03/09/95'"
```

- Braces, {}, surround a value within the notification-profile attribute. An example is:

```
-x "notification-profile={delivery-method=electronic-mail}"
```

Special Characters in Syntax

- Double ampersand, `&&`, means “and” within a command. An example is:

```
pdls -U -f "user-name=*fljones && \  
printer-name-requested==LogPrt1" Spool1:
```

- Double vertical bar, `||`, means “or” within a command. An example is:

```
pdls -U -r brief,job-state-reasons -s column \  
-f "current-job-state==retained \  
|| current-job-state==timed-out" \  
Spool2:
```

- Asterisks and equal signs are used to match strings. For example:

"job-owner=*Jones"	initial string match
"job-owner==*one"	any substring match
"job-owner*=nes"	final string match

For information on writing HPDPS commands, see *HP Distributed Print Service User's Guide*.

Using Abbreviations for Attribute Names and Values

Using Abbreviations for Attribute Names and Values

In many cases, you can abbreviate attribute names and values by using the first letter of each word in the name or value. For example, you can use the abbreviation `s-m-s` for the `start-message-supported` attribute, `t` for the `true` value, and specify the attribute and value pair as `s-m-s=t`.

However, in some cases specifying only the first letter in each word can be ambiguous, as for the attributes `job-owner` and `job-originator`. In these cases, specify enough of the name so that is unique, as in `j-ow` and `j-or`. If the values are ambiguous, HPDPS rejects the command and you receive an error message. Use abbreviated attribute names and values as appropriate.

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Introducing HP Distributed Print Service

HP Distributed Print Service (HPDPS) is a sophisticated distributed print environment that allows you to give your users access to a wide variety of printers and printing functions. It also provides you with the ability to effectively and centrally manage your entire distributed print environment. This section contains introductory information and a basic description of the components, features, and functions of HPDPS.

The Benefits of HPDPS

Whether your printing environment is small with a single print server, a few printers, and a handful of users, or whether you support thousands of users and a wide array of printing hardware, HPDPS lets you make the most of your print environment by helping you:

- Manage and monitor your entire print environment from anywhere within your network, when HPDPS is executed in a DCE cell.

HPDPS gives you the ability to configure and monitor your distributed print environment from any HPDPS client in your DCE cell. You can configure and monitor printers, servers, and queues. You can also configure default settings for the jobs your users submit to HPDPS-managed printers.

- Use your existing printers, applications, and print commands.

Your users can submit jobs from their existing applications and use the same print commands they have always used by simply specifying the names of HPDPS printers as the destinations for their jobs.

- Migrate to HPDPS print environment at your own pace.

Using Abbreviations for Attribute Names and Values

There are no set minimum or maximum capacities in HPDPS; you can easily expand your system to include more clients, printers, servers, and queues.

With this flexibility, you can start with a minimum HPDPS configuration installed on just one or two systems on a local area network (LAN). Later, you can expand your print environment as needed without requiring your users to change the way they print their jobs.

- See printing-system events when they happen.

HPDPS provides asynchronous event notification that informs you, your users, and your printer operators when specific actions are required. For example, you can receive notification when jobs are backlogged in a queue and you can notify operators when the printers they are responsible for are out of paper. Your users can receive notification if HPDPS cannot schedule their jobs at the requested destination. The types of notification are highly configurable; you can ensure that the appropriate people are notified when significant events occur. Event messages also provide you with valuable information that can alert you to a problem with the print environment and help you isolate the cause of the problem.

- Implement an industry-leading printing technology.

By using the DCE security services, you can control the level of access your users have to HPDPS functions and HPDPS-managed printers.

HPDPS conforms to the *Institute of Electrical and Electronics Engineers (IEEE) Portable Operating Systems Interface (POSIX) System Administration Interface/Printing P1387.4* standard. Further, HPDPS is an object-oriented print environment based on the *International Organization for Standardization (ISO) Document Printing Application (DPA) 10175-1* standard.

The Minimum HPDPS Configuration

You can use the minimum HPDPS configuration as a starting point for a complete, functional HPDPS print environment. The following figure shows a minimum configuration with the HPDPS client, spooler, and supervisor installed on the same system.

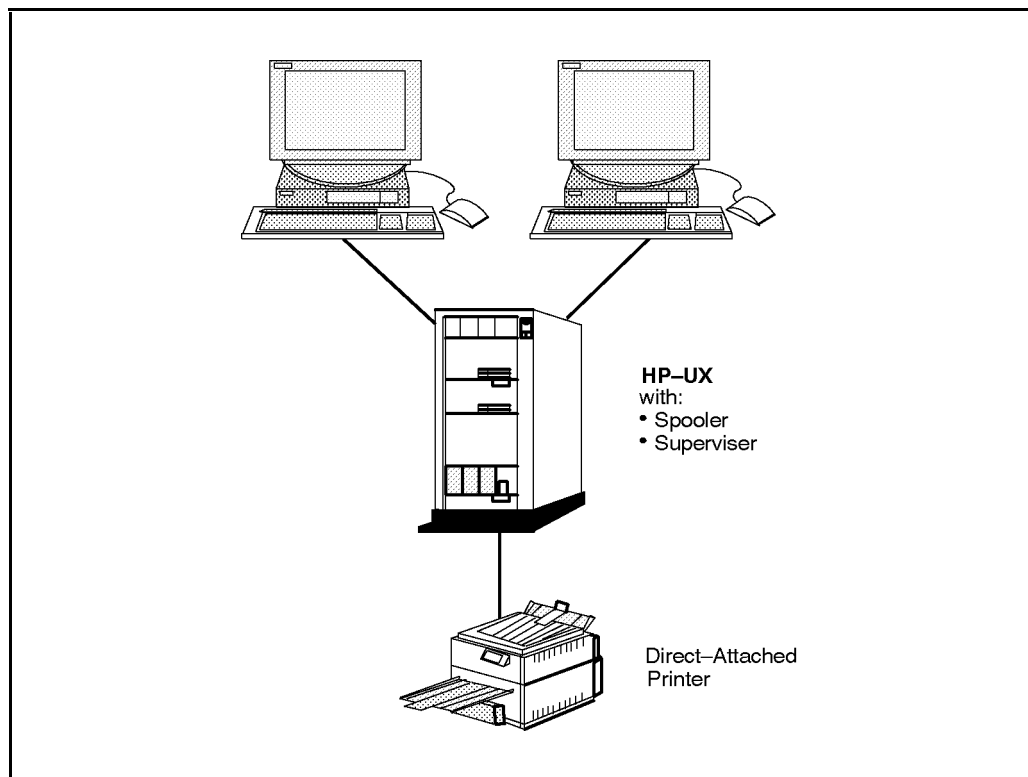


Figure 1-1. A Minimum Configuration

The HPDPS **client** processes HPDPS printing, configuration and management commands, and displays information. The client provides a command-line interface, which allows users to issue print requests and allows you to manage your distributed print environment. You can also manage your distributed print environment with SAM.

Using Abbreviations for Attribute Names and Values

The HPDPS **servers** accept print requests from the client, perform requested operations, and send responses back to the client.

HPDPS Architecture

Some of the objects that make up an HPDPS distributed print environment are shown in Figure 1-2.

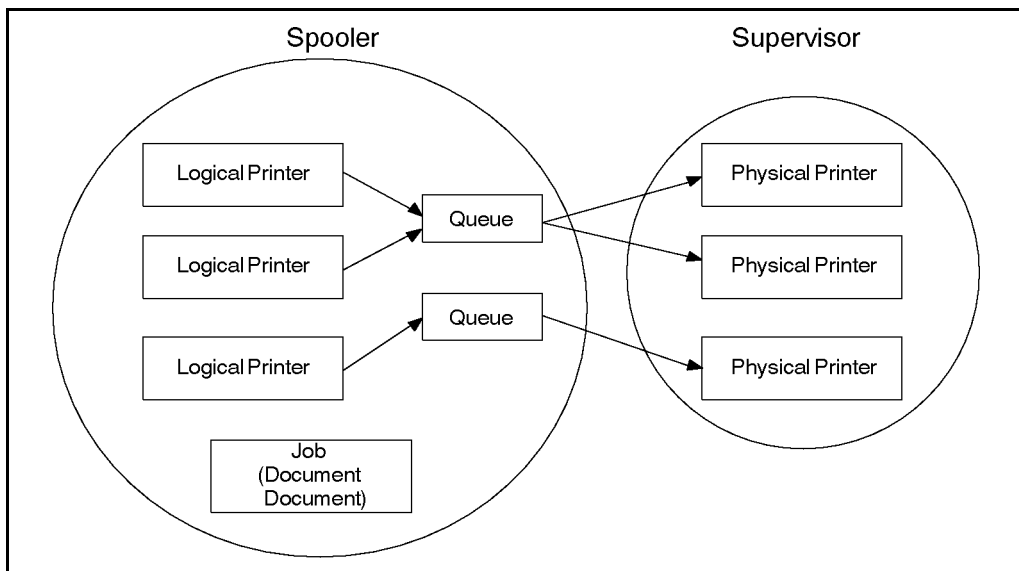


Figure 1-2. Major HPDPS Objects

Figure 1-2 shows an HPDPS client with a spooler and a supervisor. The servers contain the major objects involved with printing: jobs, documents, logical printers, physical printers, and queues. Each of these objects are described below.

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Using Abbreviations for Attribute Names and Values

What is an HPDPS Physical Printer?

An HPDPS physical printer represents an associated printer device. The term **printer device** refers to the actual printer hardware and the term **physical printer** refers to the HPDPS software representation of the printer.

You configure the attributes of the physical printer so that it reflects the features, functions and capabilities of the printer device. See “Creating and Configuring Physical Printers” in Chapter 5 for information on physical printer configuration tasks.

What Is an HPDPS Logical Printer?

An HPDPS **logical printer** represents an abstract set of job and printer capabilities, such as the types of document formats supported and the types of media supported. Your users submit their jobs to logical printers, which verify that there are physical printers capable of handling the jobs. Once verified, the logical printer sends the job to an associated queue.

You can define a default logical printer for your users, and you can configure other logical printers to restrict the access of users to printers. You might want to restrict access for reasons such as security, job management, or printer capabilities. “Creating and Configuring Logical Printers” in Chapter 6 describes the configuration tasks you can perform for HPDPS logical printers.

What Is an HPDPS Queue?

An HPDPS **queue** schedules jobs on physical printers.

One or more HPDPS logical printers can send jobs to a single HPDPS queue, and a queue can have one or more associated physical printers. See “Creating and Configuring Queues” in Chapter 6 for the configuration tasks related to HPDPS queues.

Using Abbreviations for Attribute Names and Values

What Is an HPDPS Spooler?

The HPDPS spooler is the server that controls the logical printer and the queue. The spooler does the following:

- Applies specified defaults to jobs
- Validates that jobs can be printed using the printers on the network
- Schedules jobs from queues to physical printers

What Is an HPDPS Supervisor?

The HPDPS supervisor is the server that manages and controls the physical printer. The supervisor:

- Receives jobs from the spooler
- Directs jobs to the physical printer
- Reports errors to the spooler and the client
- Reports job status

There can be several supervisors, supporting multiple physical printers, for each spooler in your system.

The Distributed Print Environment

HPDPS optionally uses Distributed Computing Environment (DCE) services to interact with a heterogeneous mix of hardware and software products as if they were a single print environment. When HPDPS interacts with DCE, the environment is called a **DCE Extended Environment**. See Chapter 8, “Managing DCE Security for HPDPS” for more information. When HPDPS is not part of DCE, the environment is called a **Basic Environment** and uses only the DCE services bundled with the HP-UX operating system.

Using Abbreviations for Attribute Names and Values

The DCE Extended Environment

In the DCE Extended Environment, HPDPS objects (such as printers and spoolers) created by any member of the DCE cell are instantly available to the entire cell. For example, if a new printer is created in a DCE Extended Environment server, the name of the new printer is visible to every client in the DCE cell, and each client can immediately issue HPDPS operations for that printer. This is possible because the entire cell shares the same namespace: the DCE Cell Directory Service, or CDS.

The Basic Environment

In the Basic Environment, only a local namespace is visible to the HPDPS. If your host is not a member of a NFS diskless cluster, only objects created on your local host are visible; if your host is a member of a NFS diskless cluster, all objects in your cluster are visible.

Objects created on one host are not instantly accessible to the other hosts in the network. You can create special logical printers, called **HPDPS Gateway Printers**, to access printers on another host. See “HPDPS Gateway Printer Considerations” in Chapter 3 for more information.

Administration is possible only for those resources that reside within the boundaries of the Basic Environment namespace. Accordingly, single-point administration is not a feature of Basic Environment.

What Are Objects and Attributes?

An HPDPS **object** is collection of **attributes** that represent a physical or logical entity in the print environment.

All the HPDPS objects (such as logical printer, physical printer, spooler, supervisor, queue, document, job) have **attributes** (or characteristics) with **values** assigned to them. For example, one of the attributes of a physical printer is the `printer-model`. This attribute could have a value assigned, such as `LaserJet4Si`.

Using Abbreviations for Attribute Names and Values

Some of the attributes have default values when you create the object. The values you associate with attributes as you configure your HPDPS print environment affect how HPDPS processes the jobs submitted by your users. Your users can specify values for attributes of jobs and documents when they submit jobs.

How HPDPS Processes Jobs

The following information describes how the HPDPS components work together to process the jobs your users submit.

1. After a user submits a job to an HPDPS logical printer, HPDPS verifies that the logical printer exists. Your users either submit their jobs to a default logical printer or specify logical printers by their names.
2. The next step is validation. HPDPS first compares the attribute values for the job with the attribute values supported by the logical printer.
 - a. If the logical printer supports all of the attributes for the job, HPDPS compares the attribute values supported by the physical printer or printers associated with the logical printer. If at least one physical printer supports the attributes of the job, HPDPS accepts the job.
 - b. If the logical printer or the physical printer only supports some of the attributes, HPDPS rejects the job.
3. After the job is accepted, HPDPS sends the job to the queue for scheduling. The queue schedules the job on the first available physical printer that supports the attributes of the job. You can specify scheduling methods for the queue that either schedule the job based on the order in which it was received, or based on the order in which it was received and the priority of the job. See “Specifying the Queue Scheduling Method” in Chapter 6 for further information.
4. When the physical printer receives the job, it prints the job, unless you intervene or a printer device problem occurs.
5. HPDPS notifies the user who submitted the job when the job completes or if problems prevented the job from completing.

Using Abbreviations for Attribute Names and Values

You can manage the job flow through HPDPS to keep your printing system running with optimal performance. See Chapter 11, “Managing Jobs and Supporting Users” for further information.

Understanding Job and Document Defaulting

Users can specify values for job and document attributes when they submit jobs. You can use `initial-value-job` and `initial-value-document` objects to assign values to attributes. The HPDPS spooler assigns values to certain job and document attributes for attributes you or your users do not specify.

The values for job and document attributes are determined as follows, by order of precedence:

1. By the user with the `pdpr` command and the `-x` flag to specify individual attributes and values.
2. By the user with the `pdpr` command and the `initial-value-job` job attribute or the `initial-value-document` document attribute. You must create the `initial-value-job` and `initial-value-document` objects for your users.
3. By you when you create an `initial-value-job` or `initial-value-document` object with the `pdcreate` command and associate the objects with HPDPS logical printers. You use the `printer-initial-value-job` and `printer-initial-value-document` logical printer attributes to make the associations.

See “Creating an Initial Value Object” in Chapter 6 for instructions on creating these HPDPS objects.

4. By HPDPS using server default values if neither your users nor you have specified attributes and values.

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Configuring HPDPS to Meet the Needs of Your Users

Deciding how many servers you need and where to locate them depends on the capacity of your system hardware, the locations of your printer devices, and the needs of your users. Once you have installed the servers in your network, they work in concert independent of their relative locations. The following topics describe the flexibility you have with your HPDPS printing network.

Balancing the Use of Printer Devices

For a physical printer that will be used by an individual or a small group, or that users will specifically request, you can create one logical printer and one queue associated with the physical printer as shown in Figure 1-3. By specifying the logical printer with their print requests, users know exactly which printer device will print their jobs. Access to the printer can be restricted to the appropriate personnel.

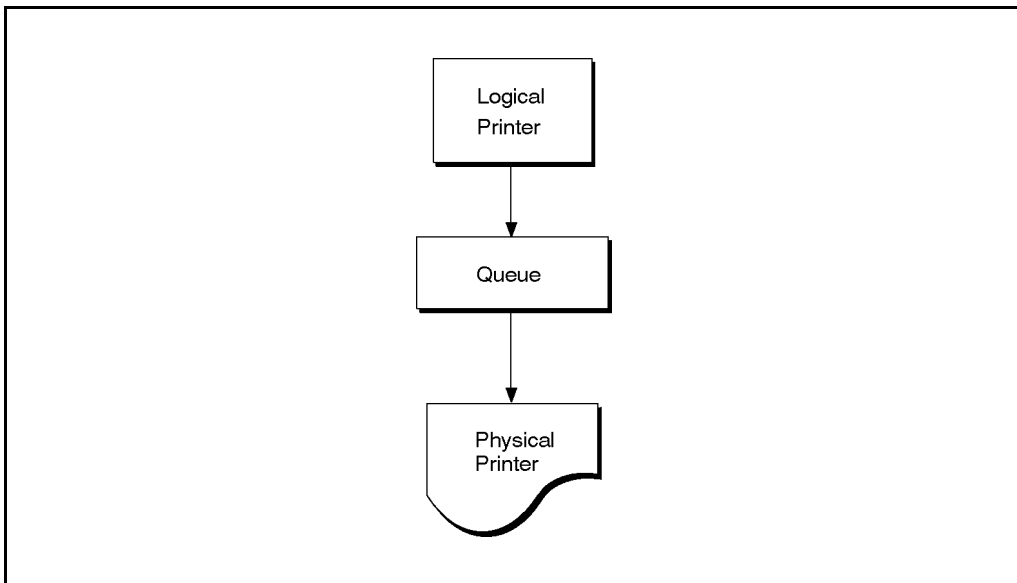


Figure 1-3. Department or Desktop Printer

Using Abbreviations for Attribute Names and Values

For large groups of users with similar needs, you might want to pool printer devices to effectively handle the workload. As shown in Figure 1-4, HPDPS allows you to associate several physical printers with the same queue. Your users specify the logical printer supporting the pool of printers as the destination for their job, and the first physical printer that becomes available and supports the job accepts the next job in the queue. This minimizes the time your users wait for their jobs to process and balances the printing workload on your system.

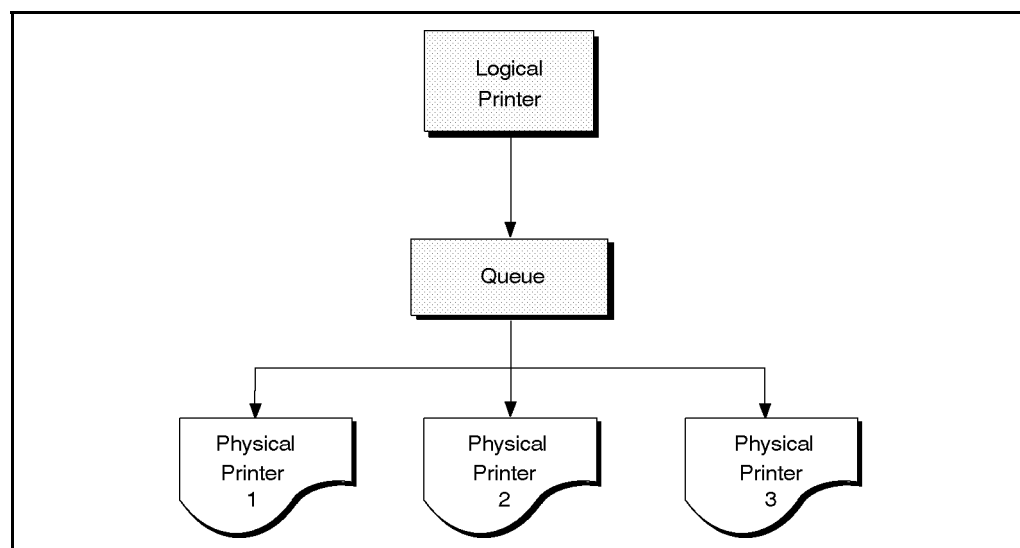


Figure 1-4. Printer Pool

You can also set up configurations so that you have many logical printers associated with a single physical printer, which is called a funnel configuration, or multiple logical printers associated with multiple physical printers in an hourglass configuration. See “Selecting Logical Configuration Models” in Chapter 3 for the different types of configurations you can set up with HPDPS.

Using Abbreviations for Attribute Names and Values

Providing Secured Access to Printer Devices

You might have some printer devices in a DCE Extended Environment to which not all users require access. As shown in Figure 1-5, HPDPS uses the security services of DCE to allow you to restrict access to printer devices. You restrict access to a physical printer through the configuration of the logical printers. You authorize access to logical printers on a user-by-user basis or by DCE user groups.

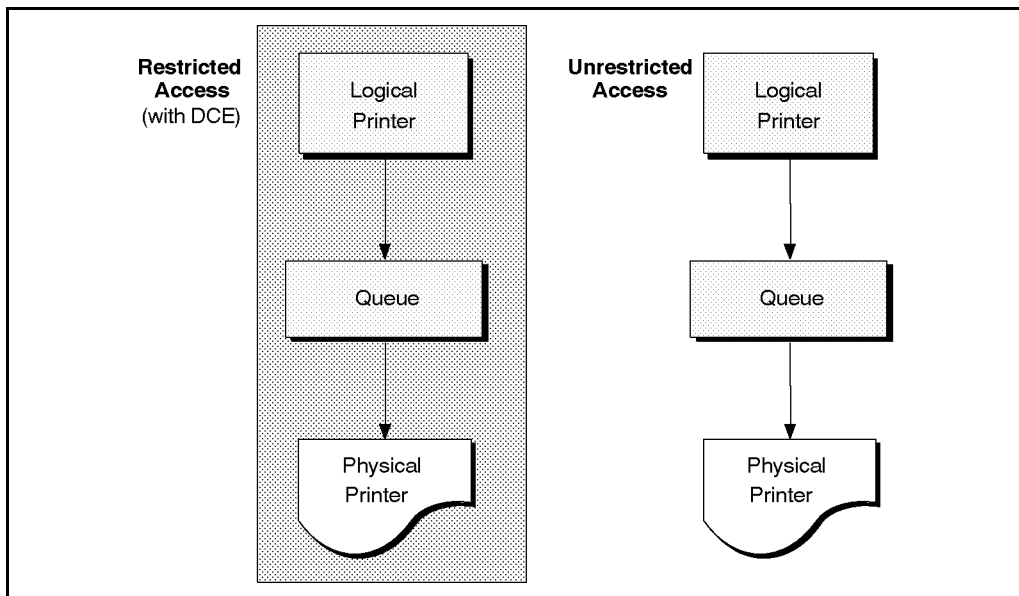


Figure 1-5. Printer Security

You can also set up your logical printer so that it does not check for authorization, making the logical printer available to all users. Because users who use LP spooler print commands are not typically logged into DCE, the printers to which they send their requests must not require authorization. See Chapter 8, “Managing DCE Security for HPDPS” for further information.

Authorizing Access to Printer Functions

In the DCE Extended Environment, you might need to give various user groups access to the same printer device or set of printer devices, but you might want to restrict some users from using certain printer capabilities. For example, you might want to keep some users from printing on a media other than letter-sized paper, or perhaps you want to limit the number of copies of a job they can print.

You could set up two logical printers and associate them with the same queue and physical printer or printers. As shown in Figure 1-6, one logical printer could restrict the usage to one copy on letter-sized paper and the other logical printer could be for most of your users who have authorization to use the unrestricted logical printer.

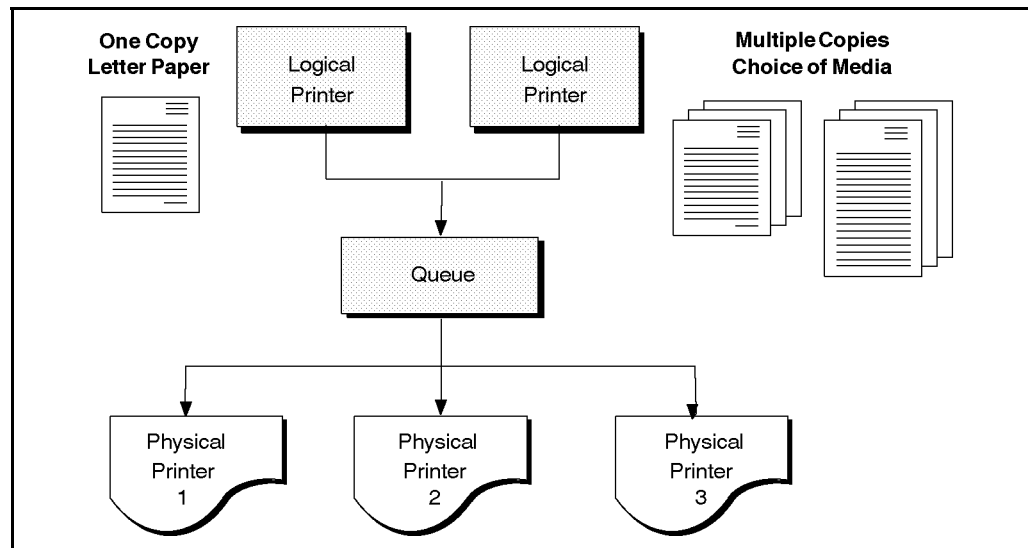


Figure 1-6. Authorizing Access to Printer Functions at the Logical Printer

You might want to restrict users from using certain capabilities of specific physical printers. It might be the policy of your company that all jobs must be printed on two sides of the page. You can set up all your page printers so they will accept only jobs that request two-sided printing. And you might want your high speed printers to accept only large jobs, your low speed printers to accept

Using Abbreviations for Attribute Names and Values

only small jobs, and your midrange printers to accept any size job. A job will wait in the queue until a printer that can accept the job becomes available. Figure 1-7 shows how you can accommodate these policies by restricting access to printer functions at the physical printer.

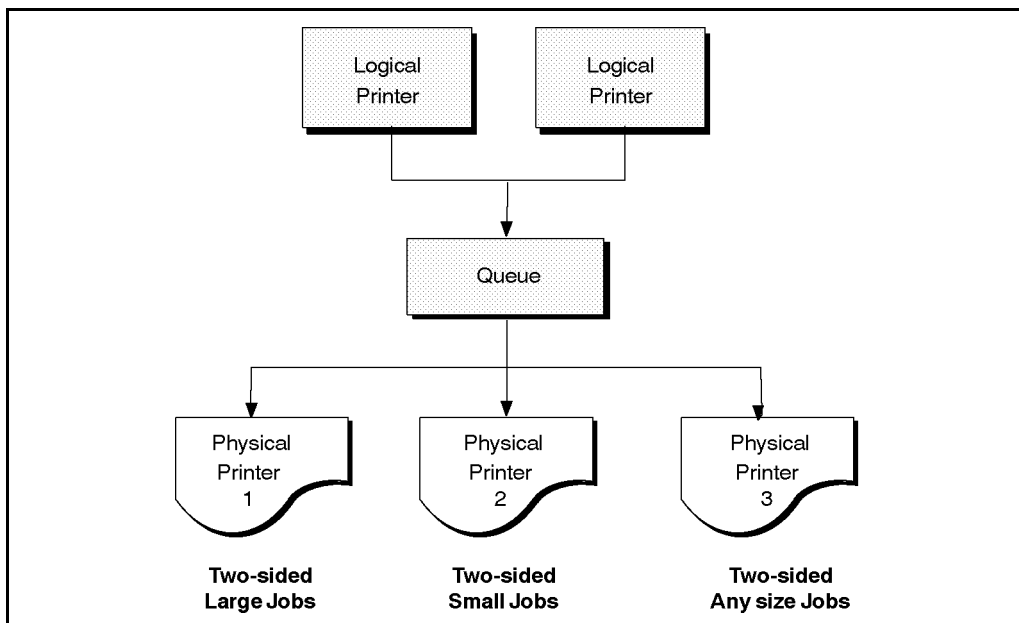


Figure 1-7. Authorizing Access to Printer Functions at the Physical Printer

Basic Environment Access to DCE Extended Environments

The DCE Extended Environment normally authorizes operations by checking a DCE Access Control List (ACL) associated with the object being operated upon. The DCE identity of the client is matched against entries in the ACL to determine the client's permissions. For more information, see Chapter 8, "Managing DCE Security for HPDPS".

Basic Environment clients do not have a DCE identity. The clients are treated as unauthenticated identities, and are thereby authorized by the "any_other" and "unauthenticated" entries of an ACL, if present. Otherwise, no access to ACL-protected objects is granted to Basic Environment clients.

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Using Abbreviations for Attribute Names and Values

Logical printer objects are authorized in a different manner. A Basic Environment host might only access DCE Extended Environment logical printers with attribute `authorize-jobs=false`. To allow access by a Basic Environment host to logical printers in a DCE Extended Environment, you must create logical printers with `authorize-jobs=false` in the DCE Extended Environment

Supporting LP Spooler Users

The majority of users will probably not have HPDPS installed on their systems, but if they are part of your TCP/IP network, they can access HPDPS printers.

Users who submit print requests from within applications, or with LP spooler print commands such as `lp` or `lpstat`, can route their jobs to HPDPS printers by specifying an HPDPS logical printer as the destination for the job. Using the standard mechanisms for setting up a remote print queue, the user can gain access to a HPDPS client. These users can access HPDPS-managed printer to use the following LP spooler commands:

- `lp` to print jobs
- `lpstat` to receive status of their jobs
- `cancel` to cancel jobs

If an HPDPS client is installed, HPDPS translates the LP spooler commands to HPDPS commands. For detailed information see Appendix B, “LP Spooler Commands Translated to HPDPS Commands” in the *HP Distributed Print Service User’s Guide*.

Using Abbreviations for Attribute Names and Values

HPDPS System Management Interfaces

You can configure and manage your system by entering commands on the command line or with the System Administration Manager (SAM). To manage HPDPS, you need an HPDPS client installed on your system to use the command line interface or SAM.

Hosts that have the LP spooler installed, but not the HPDPS client, might access the HPDPS on another host using remote printers. The administrator might configure remote printers on the LP spooler host that transfer requests to an HPDPS logical printer on the HPDPS host. The HPDPS host must have the HPDPS client installed. The target of the remote printer might be any logical printer known to the HPDPS client. Furthermore, the logical printer must not require DCE authorization if the HPDPS executes in the DCE Extended Environment on that host, that is, `authorize-jobs = false`.

HPDPS might transfer requests into an LP spooler on any host in your network. The administrator might configure a physical printer with `attachment-type = lp-spool-hp` that also names the proper LP spooler host and LP spooler destination on that host. See “Creating a Physical Printer” in Chapter 5 for more information.

Using the Command Line Interface

The command line interface is POSIX-compliant and provides complete configuration and monitoring capability. For detailed information on the commands you can use to manage your system, see *HP Distributed Print Service User's Guide* which describes the administration of HPDPS using the command line interface.

Using the System Administration Manager (SAM)

The `sam` command starts a menu-driven program that makes it much easier to manage HPDPS than using the HPDPS command line interface. Some of the advantages of using SAM are:

- Tasks are simpler to perform using SAM because you do not need to remember the details of the command line interface. Also, many of the tasks that SAM supports require the execution of multiple commands, so by using SAM you don't have to remember all of the steps in a task.

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Using Abbreviations for Attribute Names and Values

- SAM makes it easy to see the status of your entire distributed print environment. SAM understands the relationships between objects, such as logical and physical printers assigned to a queue, and provides mechanisms that make it easy for you to see these relationships. Also, SAM provides the ability to represent all objects as icons, with background colors used to highlight objects that are not in a “ready” condition.
- SAM supports all of the tasks for managing spoolers, supervisors, logical printers, physical printers and print queues. These tasks include adding, modifying, removing, enabling, disabling, pausing, resuming and removing all jobs.
- SAM supports the most common tasks for managing jobs, including pausing, resuming, resubmitting, promoting and removing.
- SAM provides extensive, context-sensitive online help. This help provides information about how to manage HPDPS using SAM and includes several tutorials that explain HPDPS concepts.

There are a few things that SAM does not currently do. They include:

- SAM does not provide any support for managing initial value objects, HPDPS logs or notification profiles. Use the command line interface to manage these objects.
- SAM is not a true monitoring tool. SAM does show you the current status of your distributed print environment, but the data SAM has does not get updated automatically when events occur in the print environment.

To use SAM, SAM must be installed on your system. If you did not originally install SAM and want to use it, refer to *Managing HP-UX Software with SD-UX*. Before starting SAM, make sure the environment variable `LANG` is set to `C`. See `sam(1M)` for details.

To start SAM, enter:

```
sam
```


Installing HP Distributed Print Service

HPDPS has a modular design giving it the flexibility to accommodate a large variety of network configurations. This modularity requires you to plan how to install HPDPS on your network. You might not want to install all of the HPDPS components on all of your networked systems. This plan must take into account the configuration of your network and the printing needs of your users. Refer to the Chapter 3, “Planning Your HPDPS Configuration” for information on planning your print environment.

The installed print environment might be as simple as a single HP-UX system containing one HPDPS client, one spooler, and one supervisor, or as complex as components shared throughout multiple networks. One of the benefits of the HPDPS modular design is the ability to install a small system initially, then build onto that system to form a more complex one.

If you later want to install additional HPDPS clients or servers, see Chapter 3, “Planning Your HPDPS Configuration”.

Prerequisites for HPDPS Installation

A list of prerequisites follows:

- HP-UX 10.20 must be installed on each HP-UX system that will contain a client or server.
- If the HPDPS is to be executed in the DCE Extended Environment, the following DCE servers must be installed and running within the DCE cell that will contain any HPDPS clients or servers:
 - HP-UX DCE Security Server
 - HP-UX DCE Cell Directory Server

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Calculating the Memory and Disk Space Requirements

The HPDPS HP-UX client and servers require 20MB of system memory on the system on which they are running. Also, there must be enough disk space available for the following purposes:

- Installation of HPDPS components
- Spooling space (for HPDPS clients and supervisors)
- Paging space

Calculate the sum of the disk space needed for each component of HPDPS that you plan to install on a workstation. See Table 2-1 for the component disk space values.

If you are installing DCE as a prerequisite for HPDPS, be sure to consider the DCE space requirements in addition to the HPDPS requirements.

Disk Space Required for HPDPS Components

Table 2-1 lists the disk space required to install each HPDPS component.

Table 2-1. Disk Space Requirements for HPDPS

Component(s)	Disk Space Required
Client	10MB
Spooler and Client	5 + 10MB
Supervisor and Client	5 + 12MB

The HPDPS components are installed in the `/opt` file system.

A `/var/opt/pd` file system is also created for spooling purposes.

2-2 Installing HP Distributed Print Service

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Disk Space Required for Spooling

Calculate the amount of disk space required for spooling based on the needs of your environment. Consider the following factors:

- The number of print jobs that will reside in a supervisor or a HPDPS client simultaneously. For supervisors, assume there will be several jobs in the “pre-processing” state for each printer. For HPDPS clients, a job resides in the client’s spooling space from the time it is submitted until it has finished printing.
- The average size of each job.
- The amount of spooling space required for logging functions. The default value is 2MB, but you can change this value using the HPDPS log configuration files.

Calculate the spooling space requirement as follows:

$$\textit{Spooling space} = 2\text{MB} + ((\# \text{ of jobs}) \times (\text{average file size in MB}))$$

For example, if you typically have 50 jobs being processed by an HPDPS client, and each one is approximately 0.2MB, calculate the spooling space as follows:

$$\textit{Spooling space} = 2\text{MB} + (50 \times 0.2\text{MB}) = 12\text{MB}$$

Disk Space Required for Paging

If your system has less than 64MB of memory, the paging space required is 128MB.

If your system has more than 64MB of memory, calculate the paging space by multiplying the installed memory by two and adding 40KB per job. Table 2-2 identifies the paging space requirements based on the number of jobs being processed by either the HPDPS client or supervisor at any point in time.

Using Abbreviations for Attribute Names and Values

**Table 2-2.
Paging Space Recommendation Based on Number of Jobs Being
Processed**

Installed Memory	Component	Less Than 500 Jobs Being Processed	500 to 1000 Jobs Being Processed	More Than 1000 Jobs Being Processed
32MB	Spooler	128MB	128MB	128MB
	Client or Supervisor	128MB	128MB	128MB
64MB	Spooler	148MB	168MB	208MB
	Client or Supervisor	128MB	128MB	128MB
128MB	Spooler	276MB	296MB	336MB
	Client or Supervisor	256MB	256MB	256MB
256MB	Spooler	532MB	552MB	592MB
	Client or Supervisor	512MB	512MB	512MB

Note: This paging space requirement is a system recommendation; it is not exclusive to the HPDPS application. Therefore, if your current system has 64MB of installed memory and you have already defined 180MB of paging space, you do not need to increase your paging space. However, if you experience performance problems because your current applications use a significant portion of your paging space, consider increasing your paging space.

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Using Abbreviations for Attribute Names and Values

Total Disk Space Required for a Distributed Print Environment

To find out how much disk space needs to be available on the system, calculate the sum of the space needed for:

- The HPDPS components
- The spooling space
- The paging space

Installing Individual HPDPS Components

You might wish to install only certain HPDPS components on a given host. For example, a host might only use the HPDPS client to access servers on other hosts, and so HPDPS servers need not be installed on that host.

The components that might be individually installed are:

- The HPDPS client
- The HPDPS spooler
- The HPDPS supervisor

To select an individual component for installation, first run `/usr/sbin/swinstall` as root on the chosen host and select your HP-UX OS media as the software source. Then perform the following:

1. Using the **View** item in the menu bar, select **Change Software View** and choose **Start with Products**.
2. In the list of products, double-click on product **DistributedPrint**.
3. Mark one or a combination of the following filesets for installation, according to the desired components:

<code>PD_CLIENT</code>	for the HPDPS client
<code>PD_SPOOLER</code>	for the HPDPS spooler
<code>PD_SUPERVISOR</code>	for the HPDPS supervisor

4. Proceed with **Install Analysis** and installation of the marked filesets.

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Configuring DCE Components

If HPDPS is to be executed in the DCE Extended Environment, the DCE Security Server and DCE Cell Directory Server must be installed and a DCE cell configured.

Use the DCE documentation to do the following:

- Check that current state of your DCE configuration is complete
- Ensure that DCE components are running
- Configure the DCE servers for the cell
- Configure the Security Server services
- Configure the Cell Directory Server (CDS)
- Configure the Distributed Time Service (DTS) Server
- Add the cell administrator password to the keytabs file
- Configure the DCE clients in the cell (if the system on which you are currently installing HPDPS will not be designated as a DCE server)

See “DCE Documentation” in Chapter 8 for a list of DCE documentation.

Configuring DCE Security

When you have configured the DCE security servers and clients, you must define the DCE HPDPS-specific security identities. Security identities are created in the following hierarchy:

1. Organizations (such as your business or department)
2. Domain Groups (operators and administrators)
3. Domain Principals (the members of the two groups)
4. Domain Accounts (particulars of each member of the two groups)

Use the `pddcesetup` command to configure DCE information in the DCE cell that executes the HPDPS. See the man page `pddcesetup(1M)` for information.

Planning Your HPDPS Configuration

This section provides information on design considerations that will help you configure your HPDPS print environment.

Planning Overview

As you begin planning your HPDPS print environment you need to consider how to optimize your resources and meet the needs of your users. Consider how you will do the following:

- Manage your printers

HPDPS gives you the ability to manage all of your printers as network resources. You can set up a configuration that gives users with common job requirements access to a particular printer or set of printers that support their jobs.

- Distribute your printer workload

In a typical networked environment some printers might be idle most of the time. Other printers in the network might have a backlog of jobs waiting to print at certain times of the day or might even be backlogged most of the day. You can set up a configuration that routes jobs to any of several printers that are capable of printing the jobs. These first two considerations are complimentary. By using each printer as a network resource and by optimizing the use of each printer, you can distribute the printing demands on your network among all of your available printers.

- Distribute the system workload

By balancing the printer workload, you can also optimize the use of the network systems that support printing. These systems can use a significant

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amount of their resources to accept, schedule, and process jobs and to manage the printers that the systems control. System resources include processing time, memory, and fixed disk capacity. If you distribute your jobs to several HPDPS servers running on a number of systems, you will distribute the printing demands of your organization more evenly among those systems.

- Control jobs and documents

You might want to use different job or document defaults for specific printers or for individual user groups. When you configure your system you should consider when and how you plan to use defaulting, and how to use it most effectively.

Meeting Your Printing and Management Needs

Analyzing the needs of the people in your organization will help you make planning decisions for your HPDPS print environment. Consider your needs in the following areas:

- Supporting users who submit jobs from an HPDPS client or who submit print requests from applications or with the LP spooler print commands such as `lp` and `lpstat`.

You will want to make planning decisions for your user groups based on their printing needs as well as the availability of hardware.

- Managing remote and local printer devices.

The management capability provided by HPDPS allows you to centrally manage all of your printer devices. You can locate printer devices closer to your users and you can monitor the printers and job flow no matter where the printers reside.

- Alerting appropriate personnel of printer problems.

The notification services HPDPS provides allow you to send printer and job event messages to the appropriate personnel as significant events occur.

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Understanding how your users are currently printing jobs, the location of your printer devices, and how you will support your print environment will help you make the transition to HPDPS more transparent.

Planning Your Physical Configuration

Understanding where to install your HPDPS components is important when you are designing your HPDPS-managed print environment.

If you need to increase the size of your HPDPS printing system, you will want to install additional clients, spoolers, and supervisors on the systems that will best support your printing needs. You will want to base the number of servers you install on the number and location of the printer devices you are supporting and on the number and size of the jobs those devices handle.

Determining How Many Clients to Install

Each host machine that executes HPDPS commands must have an HPDPS client installed.

Determining How Many Spoolers to Install

One spooler will typically support many hosts. However, you will need to consider adding more spoolers if any of the following situations occur:

- The number and size of jobs being spooled exceeds the system capacity. Chapter 2, “Installing HPDPS”, provides information to help you with this calculation.
- The user groups you support are competing for printer devices and they each need dedicated system support. Setting up individual spoolers for the groups ensures that jobs for each group are handled independently.
- The user groups you support might have very different printing requirements. For example, one group prints informally and sporadically based on the needs of individuals, and another group maintains an intense production printing environment with consistent, predictable print requirements.

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Because you can monitor the entire print environment from your HP-UX system, managing multiple spoolers requires almost no more effort than managing a single spooler.

Determining How Many Supervisors to Install

A complex print environment will typically have multiple supervisors for every spooler that is installed.

Install supervisors in your network according to the following guidelines:

- Install a supervisor on each host that has a direct-attached printer, such as a printer attached to a serial or parallel interface, that will be part of the HPDPS print environment.
- Install a supervisor on at least one host to support network-attached printers. Any supervisor on any host might be chosen to support a particular network-attached printer.
- Install a supervisor on each host that supports the ability to send HPDPS jobs to an LP spooler or to a remote spooler. No more than one supervisor should execute on a particular host. A supervisor might support more than one printer, and the printers supported might be a mix of direct-attached, network-attached, and LP gateways.

The size and number of jobs being processed determines the number of printers that the supervisor can support.

Each time you add a printer to your print environment, identify either an existing supervisor that will support the printer device or create a new supervisor according to the guidelines given above.

Migrating Your Printers to Be Managed by HPDPS

An important consideration as you plan your physical configuration is deciding which printer devices you actually want to use with HPDPS. You might have some personal printers, for example, attached to non-HP-UX systems that are being used effectively today and you see little advantage in managing them with HPDPS.

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For most of your installed printers, however, whether attached to HP-UX systems or directly to the network, you might find immediate advantages in migrating them to the control of HPDPS.

Planning Your Logical Configuration

Once you have installed HPDPS components in your network, you will want to create a logical configuration based on your printing needs. Logical configuration involves setting values for the different HPDPS attributes relating to the basic HPDPS objects. The basic HPDPS objects that you configure are the spooler, the logical printer, the queue, the supervisor, and the physical printer. You can also configure initial-value-document objects and initial-value-job objects. The functions of the different objects will help you determine how to configure your system. As your printing needs change you can change your configuration to fit the need.

Spooler Considerations

The HPDPS spooler contains the logical printers and queues for your distributed print environment. Most of your spooler configuration activities will be at the logical printer and queue level; the spooler itself has very few configurable attributes. The only requirements for the spooler are determining on which system the spooler will run and assigning a name to the spooler.

Logical Printer Considerations

The HPDPS logical printer is the object to which users submit jobs. You control the use of the features of the physical printers through the attribute values you specify for the logical printer. You can also restrict which users can submit jobs to a specific logical printer through DCE. When you create and configure a logical printer, you specify a name for the logical printer and the name of the queue to which the logical printer sends jobs.

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Queue Considerations

The queue receives jobs from a logical printer and holds the jobs until a physical printer associated with the queue is available to process the job. The scheduling method for the queue determines the order in which jobs are sent to physical printers. One or more logical printers send jobs to a queue, and one or more physical printers receive jobs from a queue. The primary attributes you configure for queues help you manage backlogs of jobs waiting in the queue for scheduling. You can also specify who receives notification regarding backlogged queues.

Supervisor Considerations

The supervisor contains physical printer objects. Most of your configuration activities will be for the physical printer object contained in the supervisor. You will need to determine the system on which the supervisor will run and to specify a name for the supervisor.

Physical Printer Considerations

The HPDPS physical printer represents a printer device. The physical printer capabilities are based on the **printer model**. The attributes you can configure depend on the capabilities of the printer model.

You can use physical printer attributes to represent how the printer is currently configured for features that can be changed, such as the media that is currently loaded or the restriction to print only double-sided jobs.

HPDPS Gateway Printer Considerations

An **HPDPS Gateway Printer** allows you to send jobs between the Basic Environment and the DCE Extended Environment and between hosts within the Basic Environment.

An HPDPS Gateway Printer is a logical printer that has two special attributes:

- the name of the host you want to access.
- the name of the logical printer you want to access on the remote host.

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Users specify the name of the HPDPS Gateway Printer logical printer and the request is sent to the logical printer in the environment, or host, that they want to access.

The HPDPS Gateway Printer is similar to a “remote printer” provided by the LP spooler. Refer to “Configuring Logical Printers as HPDPS Gateway Printers” in Chapter 6 for information on setting up a HPDPS Gateway Printer.

Selecting Logical Configuration Models

A logical configuration model shows the relationships among logical printers, initial-value-job and initial-value-document objects, queues, and physical printers. You might want to configure all of the printers that you plan to administer with HPDPS at the same time. The more typical approach might be to configure just some of them using HPDPS at first, and then slowly bring more of them under HPDPS control. This approach lets you become familiar with the capabilities and features of HPDPS gradually and minimizes the initial configuration effort. This section describes four configuration models that you can consider for your HPDPS printing system.

The Desktop Configuration Model

A desktop configuration model has a one-to-one relationship between logical printers and physical printers. This model represents the way you typically manage and use a workstation printer. The types of jobs that your users can print with this configuration model are directly controlled by the capabilities of the physical printer.

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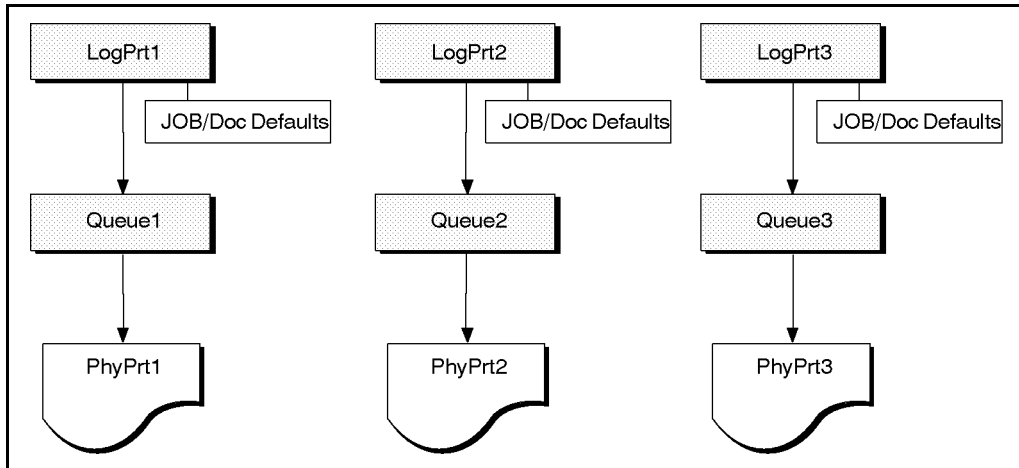


Figure 3-1. Desktop Configuration Model

The advantages and disadvantages of the desktop configuration model are:

Advantages

- Matches a traditional workstation printer configuration.
- Users have no doubt where their jobs will print.
- Allows you to specify different defaulting for each physical printer.
- The workstation printer device becomes an HPDPS printer.
- Provides good security and control of the printing activities.

Disadvantages

- No printer workload balancing.
- Complexity - you must create and manage more HPDPS objects.
- All jobs sent to the logical printer must have similar characteristics. Based on the job, HPDPS might reject it, requiring your users to submit their jobs to a different logical printer.

The desktop configuration model is easy to understand because of the one-to-one relationship between the logical and physical printers. However, if workload balancing and ease of management are important considerations for your distributed print environment, you might want to implement one of the other configuration models.

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The Printer Pool Configuration Model

A printer pool configuration model has a one-to-many relationship between a logical printer and its associated physical printers. The primary consideration for a printer pool configuration is whether you have printer devices that make sense to group together. For example, the printer pool configuration is appropriate for printer devices that are located near one another, such as in a print room. Printing occurs at the same location, providing a central point where users pick up their jobs or from where you can distribute jobs. You can also group printer devices together based on other considerations:

- Printers with similar capabilities, such as a group of high-speed production printers.
- Printers that support a particular user group.
- Printers that support similar job characteristics, such as duplexed or rotated printing.

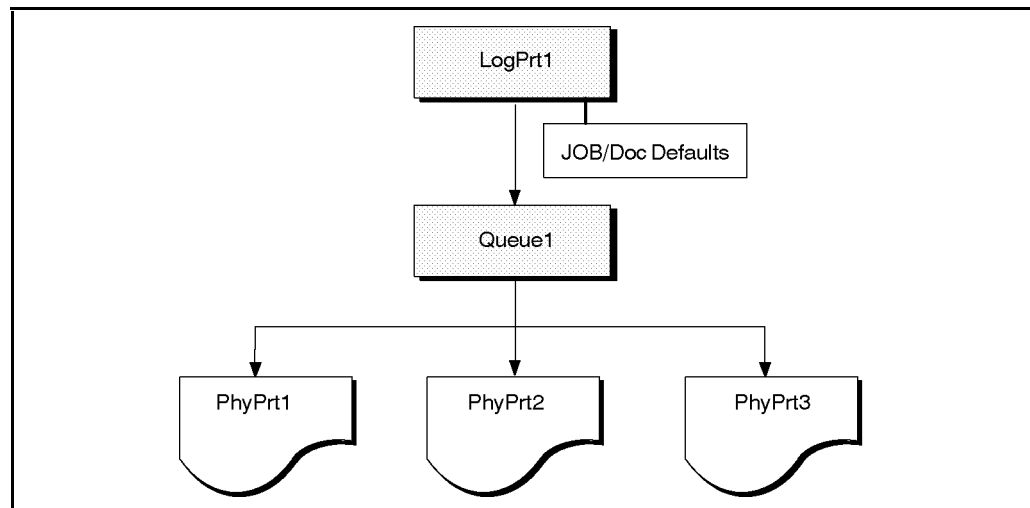


Figure 3-2. Printer Pool Configuration Model

The advantages and disadvantages of the printer pool configuration model are:

Advantages

- Simplicity - you have fewer HPDPS objects to create and manage.

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- Allows HPDPS to balance your printer workload.
- Convenient for printer devices that are in close proximity to one another.
- Convenient for printer devices with similar functions and capabilities.

Disadvantages

- Defaults must be the same for all physical printers. If the printers do not have similar capabilities and features, you have very few options for job and document default values.
- Users do not know where their jobs will print until they receive notification that the jobs have printed.
- HPDPS does much of the routing of jobs to the printers. However, if your users require a specific printer device for their jobs, they must specify a physical printer with their print request.

The greatest benefit of the printer pool configuration model is in balancing your printing workload. The greatest drawback is that your users do not know which of the printers in the pool will print their job. You can solve this problem by only pooling printers with locations in common, by telling users how to request a specific physical printer, or by using a common job delivery method. For example, you can have printer operators deliver jobs to a central location.

The Funnel Configuration Model

A funnel configuration model has a many-to-one relationship between logical printers and a physical printer. This is a flexible configuration model that provides you with the ability to more closely control types of jobs and access to logical printers. Also, the funnel configuration solves the problem of users not knowing where their jobs will print.

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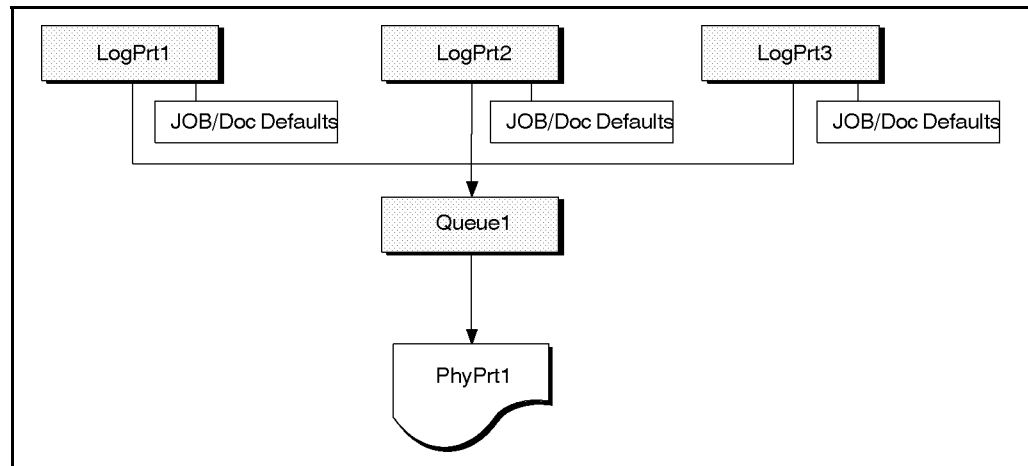


Figure 3-3. Funnel Configuration Model

The advantages and disadvantages of the funnel configuration model are:

Advantages

- Users have no doubt where their jobs will print.
- Allows you to specify different defaulting for each logical printer. Your users can submit a variety of job types.
- Allows you to control the access to both the physical printer and its features.

Disadvantages

- No printer workload balancing.
- Complexity - you must create and manage more HPDPS objects.
- Limited by the capability of the physical printer. Based on the job, HPDPS might reject it causing your users to submit the job to a logical printer outside of the funnel configuration model.

The funnel configuration model shares with the desktop model the advantage of letting your users know exactly where their jobs print. The added advantage is the flexibility of multiple logical printers with different sets of default values for jobs. For example, one logical printer defaults attributes for PostScript jobs and another logical printer defaults attributes for pcl jobs.

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The Hourglass Configuration Model

The hourglass configuration model has a many-to-many relationship between logical printers and physical printers. This model combines the printer workload balancing benefits of the printer pool model with the flexible job and document defaulting benefits provided by the funnel model. Figure 3-4 shows the hourglass configuration model.

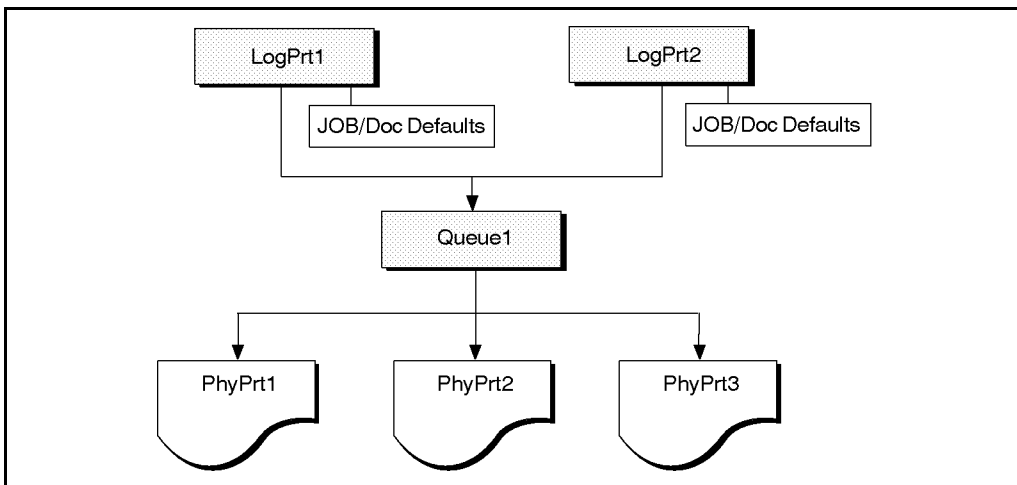


Figure 3-4. Hourglass Configuration Model

The following describes the advantages and disadvantages of the hourglass configuration model.

Advantages

- Allows HPDPS to balance your printer workload.
- Convenient for printer devices that are in close proximity to one another.
- Convenient for printer devices with similar functions and capabilities.
- Allows you to specify different defaulting for each logical printer.
- Provides good security and control of the printing activities on your distributed print environment.

Disadvantages

- Complexity - you must create and manage more HPDPS objects.

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- Users do not know where their jobs will print until they receive notification that the jobs have printed.

The hourglass configuration model is the most flexible HPDPS configuration. The control you have of the print environment balances the complexity of the configuration. Now that you understand the four configuration models, you can use them as building blocks to plan your logical configuration. A complex configuration is likely to combine some or all of these building blocks to meet your varied print environment needs.

Planning DCE Extended Environment Personnel Groups

The level of printing and administrative functions you can enable spans a wide range; you will want to plan to provide the appropriate functions to your personnel. Understanding how to group categories of personnel and provide appropriate printer and queue access and event notification helps simplify a complex print environment. HPDPS is designed to support three types of groups: users, printer operators, and administrators. After you install HPDPS in the DCE Extended Environment, you might create a **pd_operator** group and a **pd_admin** group using the **pddcesetup** command. You can define additional groups that have operator, administrator, or user levels of permission. For instance, if all of your operators have global access to all servers and printers, you might need only the default operator group, **pd_operator**. If, however, you have operators with overlapping responsibility or specialized responsibility, such as supporting printer devices used for confidential information, you might want to define additional groups.

Security Considerations

HPDPS security is based primarily on the security services of DCE, and so is available only in the DCE Extended Environment. As you define your groups, you will want to plan to use DCE authorization to control access to printers, servers, and queues. You might have certain printer devices that all users might use and other printer devices that only selected users may access. You can configure logical printers to restrict printer use to certain types of printing, such as duplexed printing. If you have more than one logical printer associated with the same queue, you can set up the security for those logical printers so

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that some users will have access to all the features of the printer devices and others can use only certain features. See Chapter 8, “Managing DCE Security for HPDPS” for detailed information.

Notification Considerations

HPDPS provides highly flexible tailoring of event notification for each of its objects. You can select event categories rather than individual events when you set up the notification for any HPDPS object. These categories correspond to the needs of each type of group as described in the following topics. See Chapter 7, “Using Notification” for detail information.

Planning User Groups

In a DCE Extended Environment, you might group your users according to their physical locations, according to the type of printing they do, according to the hours they work, the priority level of their work, or whatever is appropriate in your environment. You can restrict the use of printers for special purposes by creating a special user group when you define an HPDPS logical printer. See “Planning a Group for People Who Will Use Restricted Printers” in Chapter 8 for more information about setting up restricted printers. By default, the person who submits a job receives notification of selected printing events associated with the job. If, however, you need to make sure others are notified about print events, you can modify the notification profile for the job.

Planning Printer Operator Groups

Printer operators perform activities that keep the printer hardware up and running. An operator might repair or replace malfunctioning parts, add toner, or perform preventative maintenance. You might only need one default operator group to support the monitoring of printers across your site. The `pddcsetup` command creates a default operator group, **pd_operator**, for your use in a DCE Extended Environment. This group has read and write access to the HPDPS objects to which the group is assigned. Alternatively, you might have different types of support, such as departmental support, for which you want to define additional operator groups. Printer operators can receive messages that indicate printer devices requiring intervention, or, they can monitor routine messages associated with other HPDPS objects, such as spoolers and queues. By default, only the person who creates a given

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object receives notification on that object. You can modify the notification profile for each object to support notifying other people. Selecting the `class-physical-printer-attention` category of events ensures that the printer operator will receive all event messages related to problems at the printer.

Planning System Operator Groups

Another group you will want to integrate into your print environment is for people who are responsible for managing the flow of jobs through the system. As long as users are sending a balanced number and consistent types of jobs to the printers, and the printer devices are on-line and working well, the job flow requires little attention. However, many sites find that a heavy job flow with a broad mix of small and large jobs, high and low priority jobs, and printers that are occasionally off-line, requires the day-to-day intervention by a print environment operator who can address queue backlog, promote jobs in the queues, and monitor the job flow to ensure jobs are running smoothly.

You can create individual groups for your print environment operators depending on which sets of queues they manage, or you might find that the default `pd_operator` group meets your needs in this area. This group has read and write access to the HPDPS objects to which it is assigned. Print environment operators might want to receive all attention messages that indicate an HPDPS object requires intervention. And, they might want to monitor routine status messages when troubleshooting job flow problems. Selecting the `attention` category of event messages for queues, spoolers, or jobs ensures that the print environment operator receives information about problems with job flow.

Planning Administrator Groups

A significant role in the increasingly complex client-server printing area is performed by the person who defines the logical and physical configuration of the print environment, creates the objects needed, and makes real-time adjustments to the configuration as it develops to match the printing needs of the site. The administrator performs this role. Consider grouping your administrators according to the servers or DCE cells they manage. You might find that the default `pd_admin` group created by the `pddcesetup` command meets your needs. The `pd_admin` group has DCE read, write, and delete

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capability on the system. This enables the administrator not only to monitor the system, but also to configure the system, adding and deleting objects as needed to improve the effectiveness of the print environment.

Getting Started with HPDPS

This chapter discusses the following topics:

- Logging in
- Starting HPDPS components
- Verifying that HPDPS processes are running
- Verifying and setting environment variables
- Understanding system shutdown
- Backing up and restoring directories

HPDPS Administration Login

To perform HPDPS administrative tasks, you must be able to log in as root on HP-UX in the Basic Environment.

In the DCE Extended Environment, log in to Distributed Computing Environment (DCE) as `cell_admin` or being a principal in the `pd_admin` group

The following topics and procedures describe how to log in to DCE.

Logging in to DCE

To perform HPDPS administration functions in the DCE Extended Environment, DCE requires that you have `cell_admin` or `pd_admin` group authority.

- To log in as `cell_admin`, enter the DCE command:

```
dce_login cell_admin
```

The system prompts you for your password.

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- The `pddcesetup` utility adds a principal to the group `pd_admin` called `adm_user`.

To log in as `adm_user`, enter the DCE command:

```
dce_login adm_user
```

The system prompts you for the password.

Initially Starting HPDPS Components

To initially start HPDPS do the following:

- Login as root
- Start the HPDPS client daemon:

```
pdstartclient
```

- Start a spooler:

```
pdstartspl SpoolerName
```

where *SpoolerName* is the name of the spooler that you want to start. For additional information, see “Creating or Starting the Spooler” in Chapter 6.

- Start a new supervisor:

```
pdstartsuv SupervisorName
```

where *SupervisorName* is the name of the supervisor that you want to start. For additional information, see “Creating or Starting the Supervisor” in Chapter 5.

Startup Log File

Standard output and standard error of each HPDPS component started up by the system startup process is redirected to the file:

```
/var/opt/pd/Component/startup.log
```

where *Component* is the spooler or supervisor name, or `pdclientd` for the client daemon. This log file, in addition to

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`/var/opt/pd/Component/error.log`, contains diagnostics on why a component failed to start up.

Verifying That HPDPS Processes Are Running

Using SAM to Verify HPDPS Processes

When you select any of the HPDPS subareas in SAM, the following occurs:

- If you use the DCE Extended Environment, SAM checks if you are logged into DCE, and if not displays a dialog that allows you to log in to DCE.
- SAM determines if the HPDPS client daemon is running. If not, SAM starts it.
- SAM collects information about spoolers, supervisors, logical printers, physical printers, print queues, and jobs. You can see the status (or attributes) of these objects by selecting the appropriate icon.

Verifying That the HPDPS Client Daemon Is Running

HPDPS requires that the client daemon process, called `pdclientd`, is running.

To verify that the daemon is running, enter:

```
pdstartclient -q
```

If the HPDPS client daemon is running, you will receive the following message:

```
5010-315 The HPDPS daemon is already running.
```

If the HPDPS daemon is not running, you will not receive any feedback.

Verifying That the Supervisor Is Running

To verify that an HPDPS supervisor is running, enter:

```
pdls -c server SupervisorName
```

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where *SupervisorName* is the name of the supervisor you want to check. In the DCE Extended Environment, this checks the complete cell for the requested supervisor. If the supervisor is running, HPDPS displays information similar to the following:

```
Server          State  Type
-----
SupervisorName ready  supervisor
```

If the supervisor exists but is not running, you will receive this message:

```
5010-414 Cannot communicate with the server.
```

If the supervisor does not exist, you will receive this message:

```
5010-065 Cannot find the object SupervisorName.
```

Checking on Multiple Supervisors

If you have multiple supervisors, you can verify which supervisors are running by entering the command:

```
pdls -c server -f "server-type==supervisor" \*:
```

Including the backslash before the global character prevents HPDPS from issuing an error message and terminating the query should a file exist with a name that ends in a colon.

Verifying That the Spooler Is Running

To verify that an HPDPS spooler is running, enter:

```
pdls -c server SpoolerName
```

where *SpoolerName* is the name of the spooler that you want to check. In the DCE Extended Environment, this checks the complete cell for the requested spooler.

If the spooler is running, HPDPS displays information similar to the following:

```
Server          State  Type
-----
SpoolerName    ready  spooler
```

If the spooler exists, but is not running, you will receive this message:

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5010-414 Cannot communicate with the server.

If the spooler does not exist, you will receive this message:

5010-065 Cannot find the object *SpoolerName*.

Checking on Multiple Spoolers

If you have multiple spoolers, you can verify which spoolers are running by entering the command:

```
pdls -c server -f "server-type==spooler" \*:
```

Automatically Starting HPDPS

To automatically start HPDPS during system start up, modify the start up configuration file `/etc/rc.config.d/pd`. If any HPDPS components have been started prior to modifying this file, shut down and restart the components.

The start up configuration file contains the following configuration information:

- List of servers to start on this host.
- Whether to start components in the Basic or DCE Extended Environment.
- The definition of `$PDPRNPATH` for locating printer model info.

Modify the environment variables appropriately:

`PD_ENV` defines the HPDPS print environment.

Set to “basic” to execute in the Basic Environment. Choose this environment if your host is not a member of a DCE cell.

Set to “extended” to execute in the DCE Extended Environment. Your host must be configured in a DCE cell to execute in this environment.

The default setting chooses the Basic Environment:

```
PD_ENV=basic
```

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- PDPRNPATH** defines the colon-separated list of paths in which HPDPS printer model files appear. The supervisor will look for the model files in these directories. The default setting is:
- ```
PDPRNPATH=/opt/pd/lib/model:/var/opt/pd/lib/model
```
- PD\_CLIENT** chooses whether this host runs the client daemon.
- Set to 1 to start the HPDPS client daemon on this host.  
Set to 0 if the HPDPS client daemon should not be started.
- The default does not start the client daemon:
- ```
PD_CLIENT=0
```
- PD_SPOOLERS** defines the list of spooler names to start on this host. This list names each spooler whose HP-UX process executes on this host. Enter each spooler name on a separate line, after the **PD_SPOOLERS=** command and before the terminating double quote (") that ends the list. For example, to start two spoolers **Spool1** and **Spool2**, enter:
- ```
PD_SPOOLERS="
Spool1
Spool2
"
```
- The default does not start any spoolers:
- ```
PD_SPOOLERS=""
```
- PD_SUPERVISORS** defines the list of supervisor names to start on this host. This list names each supervisor whose HP-UX process executes on this host. Enter each supervisor name on a separate line, after the **PD_SUPERVISORS** command and before the terminating double quote that ends the list. For example to start **Super1** and **Super2**, enter:
- ```
PD_SUPERVISORS="
Super1
Super2
```

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"

The default does not start any supervisors:

```
PD_SUPERVISORS=""
"
```

## Starting HPDPS

To start up all the HPDPS components, log in as `root` and enter:

```
/sbin/init.d/pd start
```

This string executes the configuration file, `/etc/rc.config.d/pd` with the `start` argument.

## Stopping HPDPS Components

To quickly shut down all HPDPS components on your host, enter:

```
/sbin/init.d/pd stop
```

This string executes the configuration file, `/etc/rc.config.d/pd` with the `stop` argument.

---

## Verifying and Setting Environment Variables

The following procedures allow you to verify the setting of or to set HPDPS-related environment variables:

- `PATH`
- `PD_CONFIRM_DELETE`
- `PDPRINTER`

## Using Abbreviations for Attribute Names and Values

### Verifying the Setting of the PATH Environment Variable

During the installation process, HPDPS updates the HP-UX `PATH` environment variable definition in the `/etc/PATH` file to include the directory location of the HPDPS executable files; HPDPS appends `:/opt/pd/bin` to the paths already specified.

Your users can use the following format for their path value to append the paths specified in the `/etc/PATH` file.

```
PATH=$PATH:/path1:/path2
```

### Setting the PD\_CONFIRM\_DELETE Environment Variable

The `PD_CONFIRM_DELETE` environment variable enables or disables a confirmation message for the `pdclean`, `pddelete`, and `pdrm` commands. Possible values are `no` and `yes`. The default value is `yes`; HPDPS displays a confirmation message before processing a delete request. No confirmation messages display if you set the value to `no`. Under normal conditions, you will not want to change the default value for this environment variable.

To set the value of the `PD_CONFIRM_DELETE` environment variable to `no`, edit your `.profile` file and add the line:

```
export PD_CONFIRM_DELETE=no
```

You will not receive confirmation messages for any delete requests until you change the value of this HPDPS environment variable.

To set the value of the `PD_CONFIRM_DELETE` environment variable for the duration of your login session, enter the command:

```
export PD_CONFIRM_DELETE=no
```

### Setting the PDPRINTER Environment Variable

The `PDPRINTER` environment variable identifies the default logical printer. Defining a default logical printer allows your users to submit jobs without specifying a logical printer name. Defining a default logical printer also allows you to perform certain configuration tasks without specifying the logical printer name. For example, to set the value of the `PDPRINTER` environment variable to `LogPrt1`, edit the system-wide `/etc/.profile` file and add the line:

## 4-8 Getting Started with HPDPS



## Using Abbreviations for Attribute Names and Values

```
export PDPRINTER=LogPrt1
```

Logical printer `LogPrt1` is the default logical printer until you change the value of this HPDPS environment variable.

Users can also set a default logical printer in their individual `.profile` file by editing the file and adding the line:

```
export PDPRINTER=LogPrt4
```

---

## Understanding How System Shutdown Affects HPDPS

The system `shutdown` process will do the equivalent of a `pdshutdown -w now` for any HPDPS server or client daemon. The `pdshutdown` command will shut down an individual server anywhere on the network. Therefore, no special set-up or processing is necessary for HPDPS servers to shut down properly during system shutdown.

---

## Backing Up and Restoring HPDPS Directories

This section provides some information concerning the need to back up HPDPS directories and files and how to restore the information later on.

### Backing up Your HPDPS Directories and Files

Once you have HPDPS in use, your next consideration should be backing up the file systems, directories, and files. Files and directories represent a significant investment of time and effort. At the same time, all computer files are potentially easy to change or erase, either intentionally or by accident. If you take a careful and methodical approach to backing up your file systems, you should always be able to restore recent versions of files or file systems with little difficulty.

## Using Abbreviations for Attribute Names and Values

---

**Note** When a hard disk crashes, the information contained on that disk is destroyed. The only way to recover the destroyed data is to retrieve the information from your backup copy.

---

There are several methods of backing up files. You should use the method that you are presently using for your system. For HPDPS you should at least backup the directories in `/var/opt/pd`.

## Restoring Data

Once data has been properly backed up, there are several methods of restoring the data based upon the type of backup command you used with your system.

You need to know how your backup or archive copy was created in order to restore the data properly. Once again, refer to the documentation for your system for more information.

---

## Further Tuning of HPDPS

Every persistent object (such as a printer, spooler, or supervisor) requires two file descriptors. Also each job in the spooler requires two file descriptors.

The total number of open files allowed by your system is determined by the `nfile` kernel configuration parameter. Your HP-UX kernel might be configured to a lower value. If you have many processes or if you want to create many persistent objects and submit many jobs, you might need to increase the `nfile` limit. Use SAM to do this:

- Use SAM to select Kernel Configuration
- Select Configuration Parameters
- Choose `nfile`
- Pull down the Action menu and select Modify Configurable Parameter
- In the Formula/Value box, enter a new `nfile` number and press OK

## 4-10 Getting Started with HPDPS

# 5

## Creating/Configuring Supervisors and Physical Printers

---

You can use SAM to create supervisors and physical printers.

The procedures in this section describe how to complete initial configuration activities for HPDPS supervisors and the physical printers using the command line.

The supervisor is the server that runs under HP-UX and manages the printing process. The supervisor manages and controls physical printers, which you configure to represent your printer devices. You install the HPDPS supervisor on the system to which the printer devices are locally (serial or parallel) attached. A network printer can be managed by any supervisor.

Note: In the DCE Extended Environment, you must have DCE read, write, and delete permissions for the supervisor to use the `pdcreate` command as described in this section. You must have DCE read and write permissions for the objects to use the `pdset` and `pdenable` commands. See Chapter 8, “Managing DCE Security for HPDPS” for further information.

In the Basic Environment, you must be logged in as root to perform these tasks. For more information see “The Basic Environment” in Chapter 1.

## Using Abbreviations for Attribute Names and Values

---

### Creating and Configuring Supervisors

You can create and start a supervisor from SAM or from the command line. With Sam, you can create a supervisor or when you add a physical printer, a supervisor can be created.

From the command line, you can use the `pdstartsuv` command and the `pdset` command to create, start, and configure HPDPS supervisors. HPDPS does not support remote starting of servers; you must log on to the system on which you want to create or start a supervisor.

Note: To simplify the security configuration for supervisors and the objects they contain, configure DCE security for the supervisors before you actually create them. See “Setting the Default Permissions Granted by a Server and All Its Objects” in Chapter 8 for instructions and procedures.

### Creating or Starting the Supervisor

To create or start a supervisor from the command line, use the `pdstartsuv` command and specify a supervisor name.

For example, to start the supervisor `Super1`, enter:

```
pdstartsuv Super1
```

Naming Convention:

- The characters in the name you specify for the supervisor can include any uppercase letter A through Z, any lowercase letter a through z, numbers 0-9, a hyphen, an underscore, or a period. This naming convention applies to all HPDPS object names. You should not start the supervisor name or any other HPDPS object name with a hyphen.
- You must start the HPDPS supervisor before you can configure supervisor attributes or attributes for physical printers controlled by the supervisor.

There are three possible results:

- If the supervisor does not exist, HPDPS displays a confirmation message asking if you want to create a new server.
- If the supervisor exists but is not currently running, HPDPS restarts it.

## 5-2 Creating/Configuring Supervisors and Physical Printers

## Using Abbreviations for Attribute Names and Values

- If the supervisor exists and is already running, HPDPS kills the existing supervisor and starts a new one of the same name.

### Configuring Supervisors

The supervisor does not have any required attributes. However, you can specify optional attributes with the `pdset` command. Refer to the manpage `pd_att_supervisor(5)` for a list of optional attributes. The `descriptor`, `list-of-managers`, and `notification-profile` attributes are discussed here.

#### Specifying a Description for the Supervisor

The `descriptor` attribute specifies a text string of up to 4095 characters in length describing the supervisor. While the use of this attribute is optional, a detailed description is useful if you have a large number of supervisors or if you have many people managing your distributed print environment. For example you can specify the user groups using the supervisor and its contained objects:

```
pdset -c server -x "descriptor='This supervisor contains \
physical printers used by Accounting.'" Super1
```

If you do not specify a value for the `descriptor` attribute, HPDPS does not provide a default.

#### Specifying Key Contacts for the Supervisor

The `list-of-managers` attribute specifies one or more text strings, up to 255 characters in length each, that describe the key people in your organization who are responsible for managing the supervisor. For example you can include the name of a person, a telephone number and office location:

```
pdset -c server -x "list-of-managers='Ken Donnell, ext. 5-7007, \
office C1-7' 'Ron Rourke, ext. 5-9007, office B1-4'" Super1
```

If you do not specify a value for the `list-of-managers` attribute, HPDPS does not provide a default.

#### Receiving Supervisor Notification Messages

The notification profile determines the messages you receive informing you of events related to the supervisor.

## Using Abbreviations for Attribute Names and Values

The default `event-identifiers` component of the `notification-profile` attribute determines the messages you receive. They are:

```
internal-server-error
object-cleaned
object-deleted
server-shutdown-complete
```

The `delivery-address` component of the attribute defaults to the `UserName@HostName` of the administrator who created the supervisor and the `delivery-method` component defaults to `electronic-mail`.

See Chapter 7, “Using Notification” for descriptions of events and event classes, and procedures for configuring the `notification-profile` attribute.

---

## Creating and Configuring Physical Printers

You can create and configure HPDPS physical printers from SAM or from the command line. From the command line, you can create and configure a physical printer with the `pdcreate` command.

After you create the physical printer you can use the `pdset` command to further configure the physical printer.

When you have completed your physical printer configuration activities, you use the `pdenable` command to enable the physical printer to accept jobs.

### Creating a Physical Printer

When you configure a new printer device, you must know the following:

- The printer model

The value of the `printer-model` attribute determines the default attributes of the printer based on the printer capabilities.

To obtain a list of printer models that your server supports, enter:

```
pdls -c server -r printer-models-supported ServerName
```

- How the printer is connected to the system

## 5-4 Creating/Configuring Supervisors and Physical Printers

## Using Abbreviations for Attribute Names and Values

The value of the `attachment-type` attribute identifies how the supervisor connects to your printer. When you create the physical printer, you specify attributes according to the attachment type. The attachment types and their required attributes follow in Table 5-1.

**Table 5-1.**  
**Summary of Key Attributes According to attachment-type**

| Attachment-Type           | Required Attributes                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| serial, parallel          | <input type="checkbox"/> printer-model<br><input type="checkbox"/> device-name                                                              |
| tcpip                     | <input type="checkbox"/> printer-model<br><input type="checkbox"/> internet-address                                                         |
| tcpip-bsd                 | <input type="checkbox"/> printer-model<br><input type="checkbox"/> internet-address<br><input type="checkbox"/> print-queue-name            |
| lp-spool-hp, lp-spool-bsd | <input type="checkbox"/> printer-model (optional)<br><input type="checkbox"/> internet-address<br><input type="checkbox"/> print-queue-name |

You use the following attributes to create a physical printer. Other attributes are defined by the printer attribute file.

| Attribute                     | Description                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>associated-queue</code> | This attribute identifies the queue that schedules the jobs to the physical printer. You can specify the <code>associated-queue</code> attribute when you create the physical printer or use the <code>pdset</code> command to set the value after you create the physical printer. See “Creating and Configuring Queues” in Chapter 6 for instructions to create the queue. |
| <code>attachment-type</code>  | This attribute identifies the type of interface between the printer and the supervisor. The following values are valid: <ul style="list-style-type: none"><li>■ serial (RS-232)</li></ul>                                                                                                                                                                                    |

## Using Abbreviations for Attribute Names and Values

- parallel
- tcpip (Jet-Direct Card TCP port 9100, 9101, or 9102)
- tcpip-bsd (Network Printer with RFC1179 protocol)
- lp-spool-hp (HP-UX LP spooler)
- lp-spool-bsd (non-HP-UX spooler)

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>device-name</b>            | This attribute is required if the value of the <b>attachment-type</b> attribute is serial or parallel. This single-valued attribute specifies the name of the device file name associated with the physical printer. For example, <code>/dev/c1d14_ip</code> . If the device file name does not include <code>/dev</code> , then <code>/dev</code> is assumed. That is, if the device name is not specified as an absolute pathname, HPDPS adds <code>/dev</code> to the device name. The device names for serial or parallel attachment types are system dependent. Use the HP-UX <code>mksf</code> command to create the device file if the device file does not exist. You can use SAM to create the physical printer and the device file will be created automatically. |
| <b>internet-address</b>       | This attribute is required if the value of <b>attachment-type</b> attribute is tcpip, tcpip-bsd, lp-spool-hp, or lp-spool-bsd. This attribute identifies the IP address of the physical printer or of the remote system where the remote spooler resides.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>print-queue-name</b>       | This attribute is required if the value of <b>attachment-type</b> is tcpip-bsd, lp-spool-hp or lp-spool-bsd. It specifies which remote queue is associated with a physical printer. The value identifies the name of the HP-UX LP spooler destination or remote spooler queue associated with the physical printer.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>printer-community-name</b> | This is an optional attribute that can be given if the value of <b>attachment-type</b> is tcpip. This attribute identifies the SNMP community name which is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## 5-6 Creating/Configuring Supervisors and Physical Printers



## Using Abbreviations for Attribute Names and Values

used to obtain printer information. The default is “internal”.

`printer-model`

This attribute is required unless the `attachment-type` is either `lp-spool-hp` or `lp-spool-bsd`. This single-valued attribute indicates the make and model of the printer device represented by the physical printer.

The value you specify must match the name of a printer model supported by the supervisor. For example, HP supports a printer model named `LaserJet4Si`. Therefore, for a `LaserJet4Si` printer, you would specify a value of `LaserJet4Si`.

If a user specifies a value for the attribute `printer-models-requested` when submitting a job, HPDPS looks for a physical printer with a matching value for its `printer-model` attribute during job validation and scheduling.

To obtain a list of supported printer models, enter:

```
pdls -c server -r printer-models-supported ServerName
```

`tcpip-port-number`

This optional attribute can be given if the value of `attachment-type` is `tcpip`. It is used for sending jobs to a physical printer that uses a Jet Direct card. The default value is 9100. If your card specifies 9101 or 9102, then you must specify that number. Consult your Jet Direct manual.

To create a physical printer, specify the printer name at the end of the `pdcreate` command following the supervisor name, such as `Super1:PhyPrt1`. The name you specify can be up to 255 characters in length. HPDPS compares the value of the job attribute `physical-printers-requested`, if the user specifies a value, to the physical printer name during job validation and scheduling.

The following examples illustrate creating printers according to their attachment types.

## Using Abbreviations for Attribute Names and Values

To create a physical printer using a serial interface, enter:

```
pdcreate -c printer -x "attachment-type=serial \
printer-model=LaserJet4Si device-name=/dev/c1d14_ip \
associated-queue=my_queue" \
Super1:PhyPrt2
```

To create a physical printer using a parallel interface, enter:

```
pdcreate -c printer -x "attachment-type=parallel \
printer-model=LaserJet4Si device-name=/dev/c1t0d0_lp" \
Super1:PhyPrt1
```

To create a physical printer on a LAN using a Jet-Direct card, enter:

```
pdcreate -c printer -x "attachment-type=tcpip \
printer-model=Cannon internet-address=15.164.144.01" \
Super1:PhyPrt1
```

To create a physical printer on a LAN using RFC1179 protocol, enter:

```
pdcreate -c printer -x "attachment-type=tcpip-bsd \
printer-model=LaserJet4Si internet-address=15.164.144.02 \
print-queue-name=RemoteQueue1" \
Super1:PhyPrt1
```

To create a physical printer LP spooler, enter:

```
pdcreate -c printer -x attachment-type=lp-spool-hp \
internet-address=15.164.144.03 print-queue-name=RemoteQueue2" \
Super1:PhyPrt1
```

To create a physical printer for a non-HP-UX spooler, enter:

```
pdcreate -c printer -x "attachment-type=lp-spool-bsd \
internet-address=15.164.144.04 print-queue-name=RemoteQueue3" \
Super1:PhyPrt1
```

If the same attribute is specified both on the command line (using the `-x` flag) and in the default attributes for the printer model, HPDPS uses the attribute value specified on the command line.

## 5-8 Creating/Configuring Supervisors and Physical Printers

## Using Abbreviations for Attribute Names and Values

### Adding A Printer Model

You can create your own printer model. Your printer model must be set up like the HPDPS-supplied printer model directory. Perform the following steps:

- Create a directory representing your printer model name in the following directory:

```
/var/opt/pd/lib/model/YourModelName
```

Note: The model name cannot be the same name as found in the default model directory `/opt/pd/lib/model`.

- Your directory must contain the following four files:

**attribute** This text file contains default attributes for your printer.

**driver** This file is the printer driver. The **driver** file must have a symbolic link pointing to:

```
/opt/pd/lib/libfcrm0.sl
```

**ipmap** This interface program map contains the conversion table to map between HPDPS and LP spooler.

**ip** This interface program file, which is based on PCL5 interface program file for LP spooler, is intended for use by HPDPS supervisor. It maps the attribute value pairs and the interface program file supported options.

These files are similar to those located in the `/opt/pd/lib/model` directory.

- Create a physical printer with your customized printer model. For example, to create a physical printer `MyPtr1` using the `MJModel`, enter:

```
pdcreate -c printer -x "printer-model=MJModel \
attachment-type=tcpip internet-address=11.0.23.34" \
Super1:MyPtr1
```

## Using Abbreviations for Attribute Names and Values

### Configuring Physical Printers

Use the `pdset` command to add or modify attributes and values after you have initially created the physical printer. The default class for the `pdset` command is `printer`. Therefore, you do not have to use `-c printer` with the `pdset` command when modifying attributes of a physical printer.

#### Descriptive Attributes

You can use the following attributes to provide information about the physical printer. None of these attributes have default values.

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>descriptor</code>        | This single-valued attribute describes the printer device represented by the physical printer. You can specify a text string up to 4095 characters in length. The type of information you can specify initially in the description includes the location of and usage information for the printer.                                                                                                                |
| <code>list-of-managers</code>  | This multi-valued attribute lists information about the people in your organization who are responsible for the printer device that the physical printer represents. You can specify a text string up to 255 characters in length for each value.                                                                                                                                                                 |
| <code>printer-locations</code> | This multi-valued attribute describes the location of the printer device. You can specify a description up to 4095 characters in length for each value. Specifying this attribute allows users to request a specific location at which their jobs will be printed. HPDPS compares the value of the job attribute <code>printer-locations-requested</code> to this attribute during job validation and scheduling. |

#### Determining Attributes of a Physical Printer

To determine the value of attributes for a particular printer, you can use the SAM “View/Modify” task, or with the command line, use the requested attribute flag, `-r`.

## 5-10 Creating/Configuring Supervisors and Physical Printers

## Using Abbreviations for Attribute Names and Values

For example, to determine the document formats supported by the physical printer `PhyPrt1` whose printer model you specified as a `LaserJet4Si`, enter:

```
pdls -c printer -r document-formats-supported PhyPrt1
```

HPDPS displays information similar to the following:

```
PhyPrt1: document-formats-supported = ascii
 hpgl2
 passthru
 pcl
 pjl
 postscript
```

If you want to change or limit the document formats, use the `pdset` command. For example, to limit the document formats supported by physical printer `PhyPrt1` to `ascii` and `postscript`, enter:

```
pdset -x "document-formats-supported=ascii postscript" PhyPrt1
```

## Enabling a Physical Printer

If you use SAM to add a physical printer, SAM enables the printer.

On the command line, use the `pdenable` command after you have created and configured a physical printer. Enabling the printer allows it to accept jobs after you have completed the configuration tasks for the other HPDPS components.

---

**Note** You must set the value of the physical printer `associated-queue` attribute as previously described in this section and create the queue before you can enable the physical printer. See “Creating and Configuring Queues” in Chapter 6 for instructions on creating the queue.

---

For example, to enable the physical printer `PhyPrt1`, enter:

```
pdenable PhyPrt1
```



## Configuring Spoolers, Queues, and Logical Printers

---

The procedures in this section describe how to complete initial configuration activities for HPDPS spoolers, queues, and logical printers using the command line. To control defaulting for your HPDPS print environment, use the `initial-value-job` and `initial-value-document` objects.

The spooler manages jobs before they are sent to physical printers. The spooler also manages and controls logical printers and queues. The spooler validates the attributes of a job against the attributes of the logical printer to which the job was submitted. The spooler then ensures that there is a physical printer associated with the queue that is capable of printing the job. The spooler schedules jobs for printing on physical printers based on the requirements of the jobs.

In addition to queues and logical printers, you can create and configure `initial-value-job` and `initial-value-document` objects in the spooler and associate them with logical printers to control job and document defaulting. An initial value object also can be referenced by a user during print submission for job and document defaulting.

Note: In the DCE Extended Environment you must have DCE read, write, and delete permissions to use the `pdcreate` command as described in this section. You must have DCE read and write permissions to use the `pdset` and `pdenable` commands.

In the Basic Environment you must be logged in as root to perform these tasks.

## Using Abbreviations for Attribute Names and Values

---

### Creating and Configuring HPDPS Spoolers

You can create and start a spooler using SAM or the command line. With SAM, you can create a spooler or a spooler can be created as part of the tasks to add a physical printer, logical printer and print queue.

From the command line, you can use the `pdstartspl` command and the `pdset` commands to create, start, and configure HPDPS spoolers.

Note: To simplify the security configuration work for spoolers and the objects they contain, you can configure DCE security for the spoolers before you actually create the spoolers. See “Setting the Default Permissions Granted by a Server and All Its Objects” in Chapter 8 for instructions and procedures.

### Creating or Starting the Spooler

To create or start a spooler from the command line use the `pdstartspl` command and specify a spooler name. If the spooler name you specify with the command does not exist, HPDPS creates the spooler on the system from which you issue the command and then starts the new spooler.

For example, to start the spooler `Spool1`, enter:

```
pdstartspl Spool1
```

Naming Convention:

- The characters in the name you specify for the spooler can include any uppercase letter A through Z, any lowercase letter a through z, numbers 0-9, a hyphen, an underscore, or a period. This naming convention applies to all HPDPS object names. You should not start the spooler name or any other HPDPS object name with a hyphen.
- You must start the HPDPS spooler before you can configure spooler attributes or attributes for logical printers controlled by the spooler.

There are three possible results:

- If the spooler does not exist, HPDPS displays a confirmation message asking if you want to create the new spooler.
- If the spooler exists but is not currently running, HPDPS displays status information and issues a message when it has successfully started the spooler.

## 6-2 Configuring Spoolers, Queues, and Logical Printers



## Using Abbreviations for Attribute Names and Values

Notes:

1. You must start the HPDPS spooler before you can configure spooler attributes or attributes for logical printers and queues controlled by the spooler.
2. When you restart a spooler, the logical printers and queues it contains return to the state they were in when the spooler was shut down with the `pdshutdown` command. If the logical printers were enabled, they will now accept jobs. If the queues were ready and their associated physical printers were enabled, the spooler will schedule jobs to them after the physical printers re-register with the spooler.

### Configuring Spoolers

The spooler does not have any required attributes. However, you can specify optional attributes with the `pdset` command. Refer to the manpage `pd_att_spooler(5)` for a list of optional attributes. The `descriptor`, `list-of-managers`, and `notification-profile` attributes are discussed here.

### Receiving Spooler Notification Messages

You receive messages about events associated with a spooler through the notification profile for the spooler. The `notification-profile` spooler attribute determines which messages you will receive.

The default `event-identifiers` component of the notification profile determine the messages you receive. They are:

- `internal-server-error`
- `object-cleaned`
- `object-deleted`
- `server-shutdown-complete`

The `delivery-address` component of this attribute defaults to the `UserName@HostName` of the machine where the queue was created. and the `delivery-method` component defaults to `electronic-mail`. You will want to change the value or the `delivery-address` component if the person who manages the spooler is someone other than the administrator who created it.

See Chapter 7, “Using Notification”, for descriptions of events and event classes, and procedures for configuring the `notification-profile` attribute.

## Using Abbreviations for Attribute Names and Values

### Specifying Key Contacts for the Spooler

Use the `list-of-managers` attribute to specify one or more text strings, up to 255 characters in length each, that describe the key people in your organization who are responsible for managing the spooler. The type of information that you can include with the name of the person is a telephone number and an office location. If you do not specify the `list-of-managers` attribute, HPDPS does not provide a default.

For example, to set a contact list for the spooler `Spool1`, enter:

```
pdset -c server -x "list-of-managers='Ken Donnell, ext. 5-7007, \
office C1-7' 'Ron Rourke, ext. 5-9007, office B1-4'" Spool1
```

### Specifying a Description for the Spooler

Use the `descriptor` attribute to specify a text string up to 4095 characters in length that describes the spooler. While the use of this attribute is optional, a detailed description is useful if you have a large number of spoolers or if you have many people managing your network printing system. The type of information you can specify initially in the description of the spooler includes:

- The purpose of the spooler; which users, user groups, or departments will use the objects contained in this spooler
- Which HPDPS supervisor or supervisors contain the physical printers that receive jobs from the queue or queues contained in this spooler
- Any other information that is unique to your company or organization

If you do not set a value for the `descriptor` attribute, HPDPS does not provide a default.

For example, to set a description for the spooler `Spool1`, enter:

```
pdset -c server -x "descriptor='This is the spooler for the \
XYZ Division. It sends jobs to physical printers in the Super3 \
and Super5 supervisors.'" Spool1
```

## 6-4 Configuring Spoolers, Queues, and Logical Printers

## Creating and Configuring Queues

HPDPS queues receive jobs from the spooler and manage the jobs until the spooler schedules them to physical printers. Use the following procedures to create and configure queues.

You can create and start a queue from SAM or from the command line.

### Creating a Queue

To create the queue `Queue1` contained in spooler `Spool1`, enter:

```
pdcreate -c queue Spool1:Queue1
```

### Specifying the Queue Scheduling Method

HPDPS determines the position of jobs in the queue by the order that the jobs were submitted and the scheduling method of the queue. When jobs print depends on their position in the queue relative to other jobs; for configurations with multiple physical printers it also depends on when a particular printer becomes available. Supported values for the scheduling method are `fifo` and `priority-fifo`. The default value for the `scheduler-ready` attribute is `priority-fifo`.

To change the queue scheduling method for the queue `Queue1` to `fifo`, enter:

```
pdset -c queue -x scheduler-ready=fifo Queue1
```

Alternatively, you can set the queue scheduling method when you create the queue:

```
pdcreate -c queue -x scheduler-ready=fifo Spool1:Queue1
```

## Using Abbreviations for Attribute Names and Values

### About the First-In-First-Out (FIFO) Scheduling Method

The first-in-first-out (fifo) scheduling method means that if several jobs are waiting in the queue and all of the jobs can be scheduled to only one physical printer associated with the queue, the spooler schedules the jobs in the order in which the queue received the jobs.

Figure 6-1 illustrates the fifo scheduling method. The number in parenthesis under each job identifies the physical printer to which the spooler can schedule the job; physical printer `PhyPrt1` can accept jobs A, B, and C, and physical printer `PhyPrt2` can accept jobs X, Y, and Z. Job A was the first job received by the queue and job Z was the last. The spooler will schedule the jobs in the order shown at the bottom of the figure.

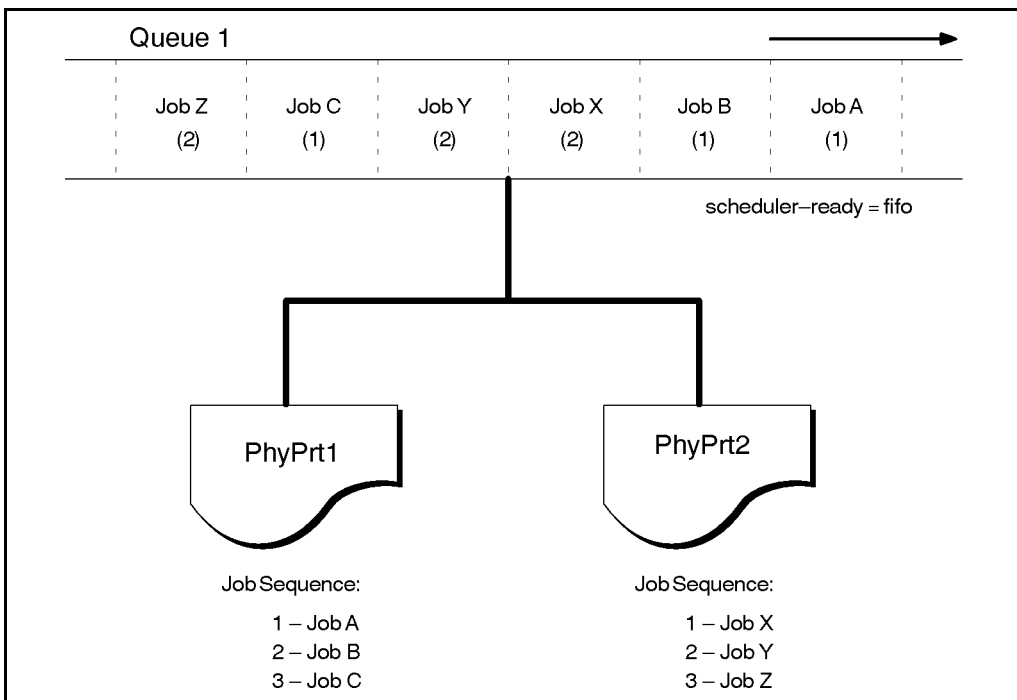


Figure 6-1. Fifo Queue Feeding Two Physical Printers

## 6-6 Configuring Spoolers, Queues, and Logical Printers

## Using Abbreviations for Attribute Names and Values

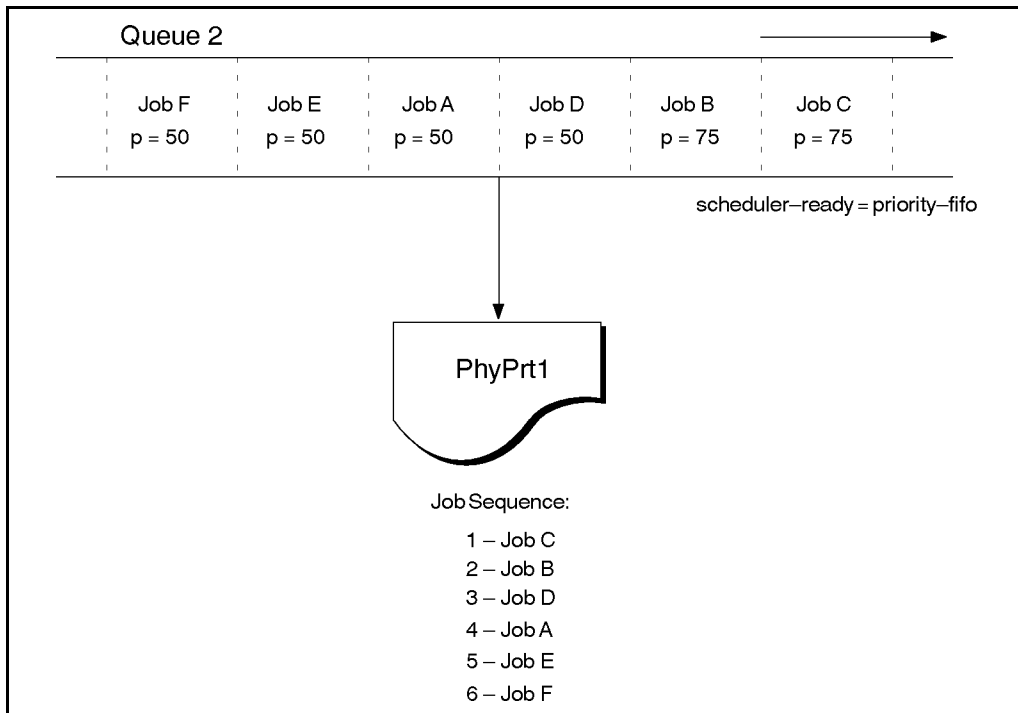
If any job in a queue can be scheduled to more than one physical printer, the order in which jobs print will vary based on the physical printer that becomes available first. For example, if job B can be scheduled to either `PhyPrt1` or `PhyPrt2`, but job A can be scheduled only to `PhyPrt1`, job B will print before job A if `PhyPrt2` becomes available first. This is true regardless of the scheduling method.

### About the Priority-FIFO Scheduling Method

Spoolers using the priority-fifo scheduling method use both the order in which jobs were received by the queue and the priority of the job as specified by the `job-priority` job attribute to schedule jobs. The larger the value of the `job-priority` attribute, the higher the priority is for the job. The spooler places jobs with higher priorities in the queue ahead of other jobs with lower priorities that are already in the queue. The spooler places jobs of equal priority in the queue in the order in which they were submitted.

Figure 6-2 illustrates the priority-fifo scheduling method. The physical printer associated with the queue is capable of printing all of the jobs. The priority of each job is listed under the job and the jobs were submitted in the order of job A first, followed by job B, job C, and so on. Job C has the highest priority and HPDPS positions it at the head of the queue where it will be the first job scheduled to print. Jobs B and D are equal in priority but are of higher priority than jobs A, E, and F. HPDPS positions jobs B and D in the queue in the order in which they were submitted. The same is true for jobs A, E, and F; they are equal in priority and positioned in the queue based on the order they were submitted. The spooler will schedule the jobs in the order shown at the bottom of the figure.

## Using Abbreviations for Attribute Names and Values



**Figure 6-2. Priority-FIFO Queue Feeding One Physical Printer**

The default value for the `job-priority` job attribute is 50. Users can specify a value less than 50 when they submit jobs or change the value to a lesser value after they have submitted a job by using the `pdmod` command. You, as an administrator, can set the value of the attribute for a job to any value between 0 to 100. You can also use an `initial-value-job` object associated with a logical printer to set the `job-priority` initial-value-job attribute to any valid value. Then all jobs submitted to the logical printer will receive that priority. See “Increasing the Priority of a User Job” in Chapter 11 for more information about using the `job-priority` attribute to manage jobs.

## 6-8 Configuring Spoolers, Queues, and Logical Printers

## Using Abbreviations for Attribute Names and Values

### Configuring the Queue Backlog Attributes

Queue backlog is the condition when many jobs or large jobs are waiting in a queue, causing users to wait a longer amount of time than usual to receive their printed output. The value of the non-settable queue attribute `queue-backlog` represents the estimated amount of time HPDPS requires to process all jobs in the queue.

Note: **Non-settable attributes** are attributes for which you cannot explicitly set a value; HPDPS assigns values to non-settable attributes based on other information.

The value of the non-settable queue attribute `backlogged` specifies whether a queue is backlogged. You configure the following queue attributes to specify the amount of time that represents a queue backlog condition. The values you specify either use or effect the values of the `queue-backlog`.

`backlog-upper-bound` This single-valued attribute specifies the amount of processing time, in hours and minutes, that constitutes a backlogged queue. When the calculated value of the `queue-backlog` attribute is greater than the value of the `backlog-upper-bound` attribute, HPDPS changes the value of the `backlogged` attribute to `true`. There is no default value for the `backlog-upper-bound` attribute. If this attribute does not have a value, HPDPS does not calculate the value of the `queue-backlog` attribute and cannot notify you about backlogged queues.

`backlog-lower-bound` This single-valued attribute specifies the amount of processing time, in hours and minutes, that indicates the queue is no longer backlogged. When the value of the `queue-backlog` attribute is less than the value of the `backlog-lower-bound` attribute, HPDPS changes the value of the `backlogged` attribute to `false` if the value is currently `true`. The value you specify for the `backlog-lower-bound` attribute must be equal to or less than the value you specify for the `backlog-upper-bound` attribute. There is no default value for the `backlog-lower-bound` attribute.

## Using Abbreviations for Attribute Names and Values

`back-log-update-interval` This single-valued attribute specifies the interval, in hours and minutes, at which HPDPS calculates the value of the non-settable `queue-backlog` attribute. The value you specify must be equal to or less than the value of the `backlog-upper-bound` attribute. The default value for this attribute is the value of the `backlog-upper-bound` attribute divided by 30, with a minimum value of one minute. You can disable backlog calculations by setting the value of the `backlog-update-interval` attribute to 0.

Note: The smaller the interval you specify, the larger the chance for detection of a backlogged queue. If the `queue-backlogged` event is specified by the notification profile for the queue, in general, if you specify a small value for the interval, specify a wider gap in the values for the upper and lower boundaries. Conversely, increase the interval value if you set the two boundaries fairly close together.

To set the upper bound at 45 minutes, the lower bound at 30 minutes, and the calculation interval at 10 minutes for the queue `Queue1`, enter:

```
pdset -c queue -x "backlog-upper-bound=00:45\
backlog-lower-bound=00:30\
backlog-update-interval=00:10" Queue1
```

## About Controlling Queue Backlog Processing

HPDPS sends notification messages based on the value of the `queue-backlog` attribute if the `queue-backlogged` event is specified in the notification profile for a queue. This event is specified in the default notification profile for a queue.

The spooler calculates the value of the `queue-backlog` attribute by determining how fast the physical printer or printers associated with the queue have processed previous jobs. The spooler uses the value of the `total-job-octets` job attribute to determine job size and the value of the `processing-time` job attribute to determine how long the physical printer took to process the job. The spooler then analyzes the jobs currently in the

## 6-10 Configuring Spoolers, Queues, and Logical Printers

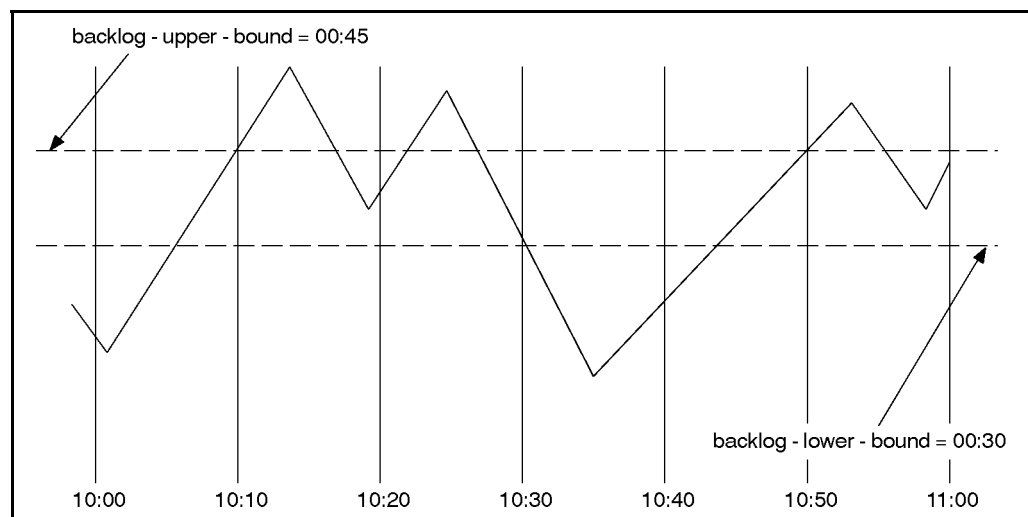


## Using Abbreviations for Attribute Names and Values

queue and calculates the estimated amount of time required to process those jobs.

If you configure the queue backlog attributes, HPDPS can alert you to various problems with your print environment. A queue can be backlogged because it is receiving a higher number of jobs than normal, or the problem might be with the printer device. If the printer device is out of service for a problem such as a paper jam, it cannot accept and process jobs.

Figure 6-3 shows how the values you set for the `backlog-upper-bound` and `backlog-lower-bound` attributes alert you to a queue backlog condition. The solid line in the figure shows the value of the `queue-backlog` attribute over time.



**Figure 6-3. Queue Backlog Upper and Lower Bounds**

Based on the values for 45 minutes for the upper boundary and 30 minutes for the lower boundary, the queue becomes backlogged at 10:10, is no longer backlogged at 10:30, and becomes backlogged again at 10:50. This example also illustrates the benefits of specifying different values for the upper and lower boundaries. If both specified the same value, the queue would change between the backlogged and non-backlogged states any time the value for `queue-backlog` exceeded or became less than the common boundary. This

## Using Abbreviations for Attribute Names and Values

could happen with the addition of one job to the queue or when a job in the queue sent to a physical printer finishes printing. In figure Figure 6-3, if the values for the upper and lower boundaries were both 45 minutes, the backlog state would change six times instead of three times. See Chapter 9, “Managing the Spooler, Logical Printers, and Queues”, for the procedures you can use to alleviate a backlogged queue.

## Receiving Queue Notification Messages

You receive notification messages about events associated with the queue through the notification profile for the queue. The `notification-profile` queue attribute determines which messages you receive.

The default events for the queue `notification-profile` attribute are:

- `object-cleaned`
- `object-deleted`
- `queue-backlogged`

The `delivery-address` component of this attribute defaults to the machine where the queue is created, and the `delivery-method` component defaults to `electronic-mail`. You will want to change the user identified by the `delivery-address` component if the operator who manages the queue is someone other than the administrator who created it.

See Chapter 7, “Using Notification”, for descriptions of events and event classes, and procedures for configuring the `notification-profile` attribute.

## Specifying Who Receives Messages From Users

The `job-message-to-operator` job attribute allows a job submitter to specify a text message; HPDPS sends the message to an operator when the spooler adds the job to the queue. Use the `notify-operator` queue attribute to specify who receives any messages sent by users with this job attribute for jobs in a particular queue. The message can include questions about or processing requirements for the job. `notify-operator` is a multi-valued complex attribute with two components: `delivery method` and `delivery-address`.

`delivery-method`      This single-valued component specifies how the person specified by the `delivery-address` component receives messages. Possible values are `electronic-mail`,

## 6-12 Configuring Spoolers, Queues, and Logical Printers

## Using Abbreviations for Attribute Names and Values

`message`, and `none`. The default value for this component is `electronic-mail`.

`delivery-address` This single-valued component specifies the *UserName* of the operator who will receive the user messages. If the `delivery-method` is `electronic-mail`, the value is the *UserName* and system address, such as *UserName@HostName*. The default for this component is the *UserName* and *HostName* of the machine where the queue was created.

If the `delivery-method` is `message`, the value is the *UserName*.

For example, to add three people to the list of people who receive messages from users for queue `Queue1`, enter:

```
pdset -c queue -x "notify-operator+=message:White \
message:Jones electronic-mail:Smith@Olds" Queue1
```

The order in which you specify the components must be the delivery method first, followed by the delivery address.

## Specifying a Description for the Queue

Use the `descriptor` attribute to specify a text string up to 4095 characters in length that describes the queue. While the use of this attribute is optional, a description is useful if you have a large number of queues or if you have many people managing your distributed print environment. The type of information you can specify initially in the description of the queue includes:

- The name of the department or the account number of the users of the queue
- Any other information that is unique to your company or organization

If you do not set a value for the `descriptor` attribute, HPDPS does not provide a default.

To set a description for the queue `Queue1`, enter:

```
pdset -c queue -x "descriptor='Queue1 supports the software \
information developers.'" Queue1
```

## Using Abbreviations for Attribute Names and Values

Note: You can also set up a list of key contacts for the queue by setting the `list-of-managers` attribute. See “Specifying Key Contacts for the Spooler” for an example of specifying values for this attribute.

---

## Creating and Configuring Initial-Value-Job and Initial-Value-Document Objects

You can use initial-value-job and initial-value-document objects to assign default values to job and document attributes. You can associate the initial value objects with a logical printer to which the users submit their jobs or users reference the initial value object directly at the job submission.

This section describes the basic steps for creating initial-value-job and initial-value-document objects and associating them with logical printers. “Configuring Logical Printers for Defaulting and Restriction”, describes how to configure logical printers with initial value objects that provide job and document attribute values. Initial value objects also are sometimes required with logical printers that are set up to restrict access to particular physical printer capabilities. See “Using Logical Printers to Restrict the Use of Printer Capabilities” for an example configuration that uses initial value objects to enforce restrictions.

Job and document attribute values are derived from other sources in addition to initial value objects. Users can specify the values for job and document attributes when they submit jobs. The spooler assigns default values to certain job and document attributes if users or initial value objects do not specify values for the attributes. Refer to “About Job Defaulting and Validation” for a description of job and document defaulting and job validation.

### What Attributes Can You Specify for Initial Value Objects?

The attributes for initial-value-document objects include all of the settable document and job attributes. For each type of initial-value-job and document object, there are additional attributes that pertain to the object itself, such as `initial-value-job-identifier`. This attribute specifies the name of the object and identifies the object within the spooler. See the `pd_att_ivjob(5)` and

## Using Abbreviations for Attribute Names and Values

`pd_att_ivdocument(5)` manpages for a complete listing of the attributes for initial value objects.

### Creating an Initial Value Object

Use the following commands to create initial value objects:

- To create an initial-value-document object named `LP3ivd` that is contained in spooler `Spool1`, enter:

```
pdcreate -c initial-value-document -x "copy-count=1 \
sides=1 descriptor='IVD for LogPrt3'" Spool1:LP3ivd
```

- To create an initial-value-job object named `Smith_ivj2` that is contained in spooler `Spool1`, enter:

```
pdcreate -c initial-value-job\
-x "printer-locations-requested='1st Floor/South'\
job-retention-period=2:00\
results-profile='Hold for Jack Smith':1:"\
Spool1:Smith_ivj2
```

### Associating an Initial Value Object with a Logical Printer

Use the following commands to associate initial value objects with logical printers.

- To associate the initial-value-document object `LP3ivd` with the logical printer `LogPrt3`, enter:

```
pdset -x "printer-initial-value-document=LP3ivd" LogPrt3
```

- To associate the initial-value-job object `Smith_ivj2` with the logical printer `LogPrt3`, enter:

```
pdset -x "printer-initial-value-job=Smith_ivj2" LogPrt3
```

Note:

- You do not have to specify a class (or use the `-c` flag) with the `pdset` command when performing configuration tasks for logical printers. Printer is the default class for the `pdset` command.

## Using Abbreviations for Attribute Names and Values

- If the logical printer with which you want to associate the initial value object is enabled, you must disable it with the `pddisable` command to set the association.
- The `initial-value-job` object or `initial-value-document` object must exist before you can enable the logical printer.
- The attribute values of the `initial-value-job` object or `initial value document` object must be supported by the logical printer you associate with the object. For example, if an `initial-value-document` object specifies a value of `landscape` for the `content-orientation` attribute, then either `landscape` must be one of the values for the `content-orientations-supported` logical printer attribute or the value for `content-orientations-supported` must be blank, specifying no restrictions.

If the initial value object does not exist or the values of an initial value object are not supported, the request to enable the logical printer will fail and you will receive an error message.

---

## Creating and Configuring Logical Printers

You use logical printers to set up the flow of jobs in your system. The basic steps of configuring the logical printers for your system, and using them for such purposes as providing job and document defaulting and restricting access to and use of physical printers, in effect sets up the flow of jobs in your system.

You can create logical printers using SAM or the command line.

### Creating the Logical Printer

After you have created the queue for the logical printer, create and configure an HPDPS logical printer managed by a specific HPDPS spooler. When you have completed your logical printer configuration activities, you use the `pdenable` command to enable the logical printer to accept jobs.

For example:

1. Create the queue, `Queue1`:

```
pdcreate -c queue Spool1:Queue1
```

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## Using Abbreviations for Attribute Names and Values

For more information on creating queues, see “Creating and Configuring Queues”.

2. Create the logical printer, `LogPrt1` in spooler `Spool1`:

```
pdcreate -x "associated-queue=Queue1"\
LogPrt1:Spool1
```

3. Enable the logical printer associated with the queue:

```
pdenable -c queue Queue1
```

For more information on enabling the logical printer, see “Enabling a Logical Printer”.

The number of logical printers that you need and the characteristics and purpose for each logical printer depends on the following considerations:

- The number of physical printers you have and their capabilities
- The number of users and their printing needs
- The types of printing supported; a large number of small, on-demand jobs versus a small number of large, production jobs, or some combination of the two
- Print management concerns such as printer workload balancing or restricting printer usage for security and other reasons
- Other needs of your company, organization, and printing environment

“Selecting Logical Configuration Models” in Chapter 3 introduces the logical printer configuration models that you can use based on these considerations.

## Configuring the Logical Printer

Because logical printers perform so many important functions, how you configure logical printers is a large part of configuring your system.

Refer to the following topics later in this chapter that describe how you configure logical printers:

- “Configuring Logical Printers for Defaulting and Restriction”
- “Configuring Logical Printers for Workload Balancing”
- “Configuring Logical Printers with DCE Security”
- “Configuring Logical Printers as HPDPS Gateway Printers”

## Using Abbreviations for Attribute Names and Values

You must understand job and document defaulting and job validation to understand many of the steps you need to take while configuring your system using logical printers.

## About Job Defaulting and Validation

Job validation is the process of ensuring that there is a physical printer with the capability to process the job and the documents in the job. The job and document requirements are determined by the values of the job and document attributes. Job and document attribute values are determined by the user, initial value objects, and server defaults for certain attribute values not specified by either the user or by initial value objects.

Refer to Figure 6-4 for an illustration of the steps in job defaulting and validation. The steps are:

1. Determining the job and document attribute values.
2. Validating the job against the logical printer to which the job was submitted.

Values specified for logical printer attributes represent a restriction to the use of a physical printer function or some other use of a physical printer. Refer to “Validation at the Logical Printer” for more information.

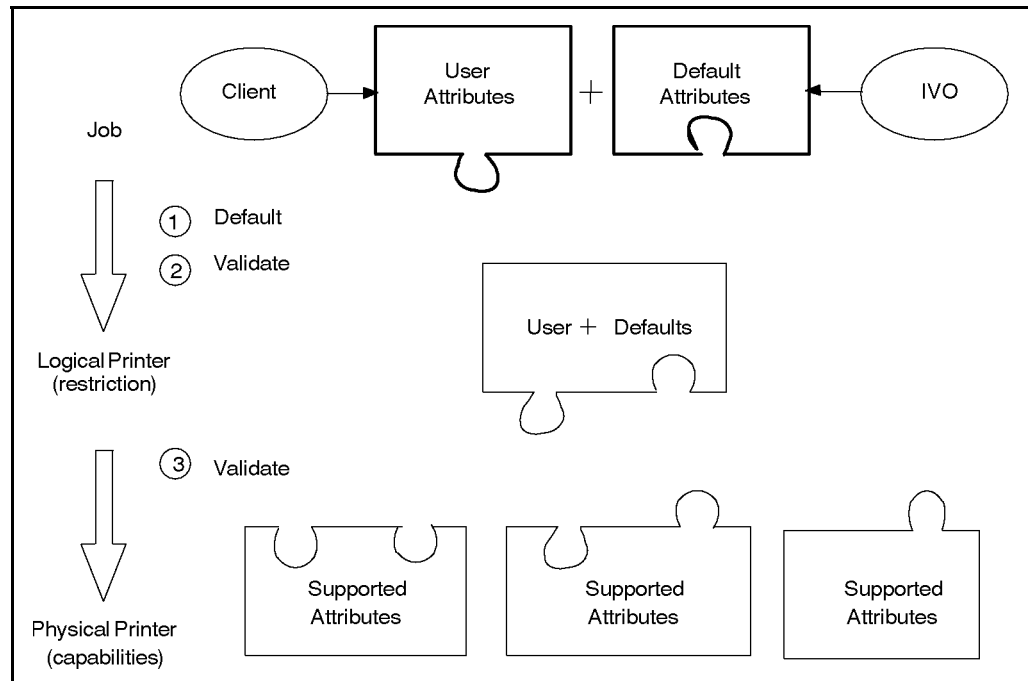
3. Validating the job against the physical printer or printers associated with the logical printer through the queue.

Values specified for physical printer attributes represent the features, capacity, or configuration of a physical printer. The attributes that reflect the capacity of a printer can be used to impose a restriction on its use. See “Validation at the Physical Printer” for more information.

If the logical printer validation or all of the physical printer validations fail, HPDPS rejects the job and you receive an error message informing you of which job or document attributes or attribute values are not supported.



## Using Abbreviations for Attribute Names and Values



**Figure 6-4. Job Defaulting and Validation**

The values for job and document attributes are derived from the following, by order of precedence:

1. Specific values assigned by the user with the `pdpr` command and the `-x` flag.
2. The values contained in an initial-value-job object specified by the `initial-value-job` job attribute or the values contained in an initial-value-document object specified by the `initial-value-document` document attribute. These values override those specified by an initial-value-job or initial-value-document object associated with a logical printer if both specify values for the same attribute. Otherwise, the values are used in addition to those specified by initial value objects associated with the logical printer to which the job was submitted.
3. The values contained in an initial-value-job object specified by the `printer-initial-value-job` logical printer attribute or the values contained in an

## Using Abbreviations for Attribute Names and Values

initial-value-document specified by the `printer-initial-value-document` logical printer attribute.

4. Server defaults for certain attribute values not specified with any of the previous methods.

The spooler validates jobs submitted to its logical printers and then, if validation succeeds, places the jobs in the queue associated with the logical printer. The spooler schedules the jobs in the queue and sends them to a physical printer that has the capabilities required to print the job.

### Validation at the Logical Printer

The purpose of job validation at the logical printer is to restrict, control, or limit job submission to associated physical printers. Based on the logical printer attributes and its associated initial value object attributes, you can:

- Control physical printer selection and access
- Restrict use of the capabilities or functions of a physical printer

During logical printer validation, the spooler verifies that the job and document attribute values are supported by the logical printer. It compares the job and document attribute values to the `xxx-supported` attributes of the logical printer.

The absence of a value for a logical printer attribute means no restriction by the logical printer. If the logical printer attribute has a value or values, the values of the corresponding job or document attribute, if they have a value, must be supported.

A discrete value, such as `landscape` for the `content-orientation` attribute, must match. A numeric value, such as `total-job-octets`, must be under a limit or within a range of values. If the values are not supported, the validation fails.

The tables beginning with Table 6-1 identify the logical and physical printer attributes that HPDPS uses for validation and the corresponding document or job attributes.

### Validation at the Physical Printer

The purpose of job validation at the physical printer is to identify a physical printer that has the capabilities to print a job. Values are assigned to the

## 6-20 Configuring Spoolers, Queues, and Logical Printers

## Using Abbreviations for Attribute Names and Values

physical printer attributes to represent the ability of the corresponding printer device to support a function or capability. The value of a job or document attribute that corresponds to a physical printer attribute must be blank or have a specific value. The job or document value must be supported by the value of the printer attribute of one of the physical printers that is associated with the queue. The physical printer attribute can have one or more discrete values, or can be a numeric value that is a limit or a range of values. If the values are not supported by at least one physical printer, the validation fails.

HPDPS uses the following types of job validation at the physical printer:

- Job and document values are compared to those used and supported by the physical printer.

For example if the user submits a job specifying the document attribute `content-orientation=landscape`, then the `landscape` value is compared to physical printer attribute `content-orientations-supported`.

- Job attributes that request a particular type of printer, such as `printer-models-requested`.

HPDPS compares the values of the job attributes to the values of the physical printer attributes of the particular `printer-model`.

See “Creating and Configuring Physical Printers” in Chapter 5 for further information on physical printer configuration.

See the manpages `pd_att_phy_ptr(5)` and `pd_att_log_prt(5)` for a list of attributes for the physical and logical printers.

## Job/Document Attributes Requiring Initial Value Objects to Restrict

Many document attributes do not have default values. If you want to restrict the printer capability that corresponds to a document attribute that has no default value, you must create an initial-value-document object and associate it with the logical printer to ensure that the intended restriction is enforced. There are also some job attributes that do not have default values that you might want to restrict. You must create an initial-value-job object in order to enforce the restriction.

Note: For the document attributes that do not have default values, when the job is actually printed, the printer device still performs processing that

## Using Abbreviations for Attribute Names and Values

corresponds to each of the document attributes. For example, it prints on either one side or both sides of the medium, regardless of whether **sides-supported** is set. Each printer has default processing for each document attribute.

See “Using Initial Value Objects to Ensure Restriction” for more information and see “Using Logical Printers to Restrict the Use of Printer Capabilities” for an example configuration that uses an initial-value-job and an initial-value-document object to enforce restrictions imposed by logical printers.

Table 6-1 shows the document attributes, their defaults, and the corresponding printer attributes and supported values. The **plex** and **sides** document attributes do not have default values. If you use either of the corresponding logical printer attributes for restriction, you must create an initial-value-document object to provide a default value.

For complete information on document, job and printer attributes, see the *pd\_att\_document(5)*, *pd\_att\_job(5)*, and *pd\_att\_phy\_ptr(5)* manpages.

## Using Abbreviations for Attribute Names and Values

**Table 6-1.**  
**Common Document Attributes Validated by Printer Attributes**

| Document Attribute Name                                                                                                                                                                                                                                                     | Default    | Printer Attribute Name         | Supported Values                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------|-----------------------------------------------------------------|
| copy-count                                                                                                                                                                                                                                                                  | 1          | maximum-copies-supported       | 1..2147483647                                                   |
| Note: HPDPS compares the product of the <code>copy-count</code> document attribute times the total value of all of the <code>job-copies</code> components of the <code>results-profile.job</code> attribute to <code>maximum-copies-supported</code> during job validation. |            |                                |                                                                 |
| plex                                                                                                                                                                                                                                                                        | No default | plexes-supported               | simplex<br>duplex                                               |
| sides                                                                                                                                                                                                                                                                       | No default | sides-supported                | 1..2                                                            |
| content-orientation                                                                                                                                                                                                                                                         | portrait   | content-orientations-supported | landscape<br>portrait                                           |
| default-input-tray                                                                                                                                                                                                                                                          | No default | input-trays-supported          | top<br>middle<br>bottom<br>envelope<br>manual<br>large-capacity |
| default-medium                                                                                                                                                                                                                                                              | No default | media-supported                | see<br><i>pd_att_document(5)</i><br>manpage                     |

## Using Abbreviations for Attribute Names and Values

**Table 6-1.**  
**Common Document Attributes Validated by Printer Attributes**  
**(continued)**

| Document Attribute Name      | Default                                                                                                     | Printer Attribute Name                  | Supported Values                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------|
| <code>document-format</code> | HPDPS attempts to determine the document format. If it cannot, the attribute defaults to <code>ascii</code> | <code>document-formats-supported</code> | see <i>pd_att_phy_ptr(5)</i> manpage |
| <code>document-type</code>   | <code>printable</code>                                                                                      | <code>document-types-supported</code>   | <code>printable</code>               |

## Physical Printer Selection Attributes

There are a number of job attributes that enable users to request that their jobs should be sent to a specific physical printer or to a certain type of physical printer. These attributes are only useful for configurations with a queue that sends jobs to more than one printer. They request a particular printer or type of printer in the printer pool.

You can create an initial-value-job object and associate it with a logical printer so that all of the jobs submitted to the logical printer are sent to a particular physical printer, printer model, or printer location.

The job attributes that request specific physical printers are:

`physical-printers-requested` This multiple-valued attribute identifies the physical printers that have been requested to print the job. This attribute has no default value.

HPDPS compares the values of this attribute to the physical printer `printer-name` attribute for validation and scheduling. If more than one physical printer is requested,

## Using Abbreviations for Attribute Names and Values

the job will print on the first one that becomes available that can print the job.

`printer-locations-requested` This multiple-valued attribute identifies the locations where the job has been requested to be printed. This attribute has no default value.

HPDPS compares the values of this attribute to the physical and logical printer `printer-locations` attributes for validation and to the physical printer `printer-locations` attribute for scheduling. The job attribute is multi-valued and the printer attribute is single-valued.

Notes:

- Any individual value specified for this attribute can select more than one physical printer. For example, the printers could all be in the same location, such as a printer room.
- The values for both the job and printer attributes must match exactly for validation to occur.

`printer-models-requested` This multiple-valued attribute identifies the printer models of the printer devices requested to print the job. This attribute has no default value.

HPDPS compares the values of this attribute to the physical and logical printer `printer-model` attributes for validation and to the physical printer `printer-model` attribute for scheduling. The job attribute is multi-valued and the printer attribute is single-valued.

Notes:

## Using Abbreviations for Attribute Names and Values

- Any individual value specified for this attribute can select more than one physical printer. A queue can send jobs to multiple physical printers that represent the same model printer device.
- The job attribute and printer attribute values must match exactly for validation to occur.

---

## Configuring Logical Printers for Defaulting and Restriction

This section describes how to configure logical printers to provide default values for jobs and documents. It provides example logical printer configurations with initial value objects that provide the default values, and gives example commands to create the logical printers, initial-value-job, and initial-value-document objects. It also shows how to use logical printers and initial value objects to restrict access to physical printer capabilities:

- You can provide default values for jobs and documents using initial value objects in association with logical printers.

See “Using an Initial Value Object for Job and Document Defaulting” for an example of using an initial-value-document object to provide some values for a document in a job.

- You can modify a logical printer configuration after setting it up.

For example, you can add a new logical printer to provide different job or document defaults for a particular user or user group. “Adding Logical Printers to a Desktop Configuration” shows an example of transferring from a desktop configuration model to a funnel configuration model by adding additional logical printers. This section provides additional examples of providing job and document default values using an initial-value-document and an initial-value-job object.

- You use logical printers to restrict access to functions of the physical printer or printers that can receive jobs from the logical printer.

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## Using Abbreviations for Attribute Names and Values

Logical printers have a number of attributes that correspond to physical printer attributes; these attributes all default to no value when you create a logical printer. You restrict access to a physical printer function or capability by assigning a value or values to this type of attribute.

See “Using Logical Printers to Restrict the Use of Printer Capabilities” for an example of using logical printers to restrict access to a physical printer that receives jobs from a Funnel configuration model.

Because many job and document attributes do not have default values, you often have to use initial value objects to ensure the restriction. “Using Initial Value Objects to Ensure Restriction” describes why and how this is done.

## Using an Initial Value Object for Job and Document Defaulting

This section describes how to create a logical printer and an initial-value-document object associated with the logical printer. The initial-value-document object provides default values for documents of jobs submitted to the logical printer. The example uses the desktop configuration model.

Refer to Figure 6-5. This figure shows some of the attributes and values of `PhyPrt1`. The logical printer has no values assigned to its attributes; `IVD1` assigns default values to the document attributes for jobs submitted to the logical printer.

To create the logical printer and initial-value-document, perform the following steps:

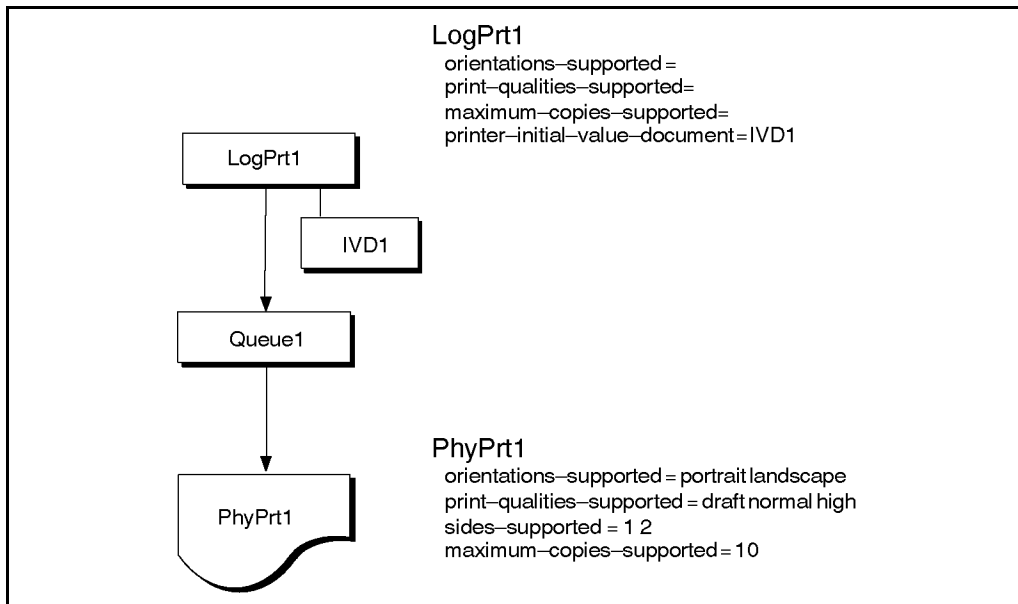
1. To create the logical printer `LogPrt1`, enter:

```
pdcreate -x "printer-initial-value-document=IVD1 \
associated-queue=Queue1" Spool1:LogPrt1
```

2. To create the initial-value-document object `IVD1`, enter:

```
pdcreate -c initial-value-document \
-x "content-orientation=landscape \
sides=1" Spool1:IVD1
```

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**Figure 6-5. Using Initial Value Objects for Job and Document Defaulting**

In this configuration, because the logical printer attributes do not have values, HPDPS only validates against the values of the physical printer attributes. The initial-value-document object IVD1 assigns default values to all jobs submitted to **LogPrt1**, which can be overridden by values assigned by the job submitter.

Notes:

- You must specify the name of the spooler when you create a logical printer with the **pdcreate** command. You do not need to specify the spooler name when you modify values for logical printers with the **pdset** command.
- Because the specified server is a spooler, HPDPS automatically creates a logical printer. HPDPS sets the value of the **printer-realization** attribute to **logical**.
- It does not matter in which order that you create the logical printer and initial-value-document object. However, an initial-value-document object associated with a logical printer must exist before you can enable the logical printer.

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### Adding Logical Printers to a Desktop Configuration

This section describes how to make the transition from a desktop configuration to a funnel configuration by adding a logical printer or printers to the former model. It starts with the example given in “Using an Initial Value Object for Job and Document Defaulting”. The new configuration, shown in Figure 6-6, adds `LogPrt2` with no associated initial value object, and `LogPrt3` with an associated initial-value-job and initial-value-document object.

The example shown in “Using an Initial Value Object for Job and Document Defaulting” illustrates the possible limitation of using job or document defaulting with a configuration that only has one logical printer. You might not want the same defaults for all users. All jobs submitted will have the same defaults, and the default values usually represent only some of the capabilities of the associated physical printer. The user must provide attribute values that replace those provided by the initial value object in order to use the other capabilities. To print a two-sided job with with `portrait` orientation to `LogPrt1`, enter:

```
pdpr -p LogPrt1 -x "content-orientation=portrait \
sides=2" File1.txt
```

To create a logical printer associated with `Queue1` without any values for the logical printer attributes and without any associated initial value object, enter:

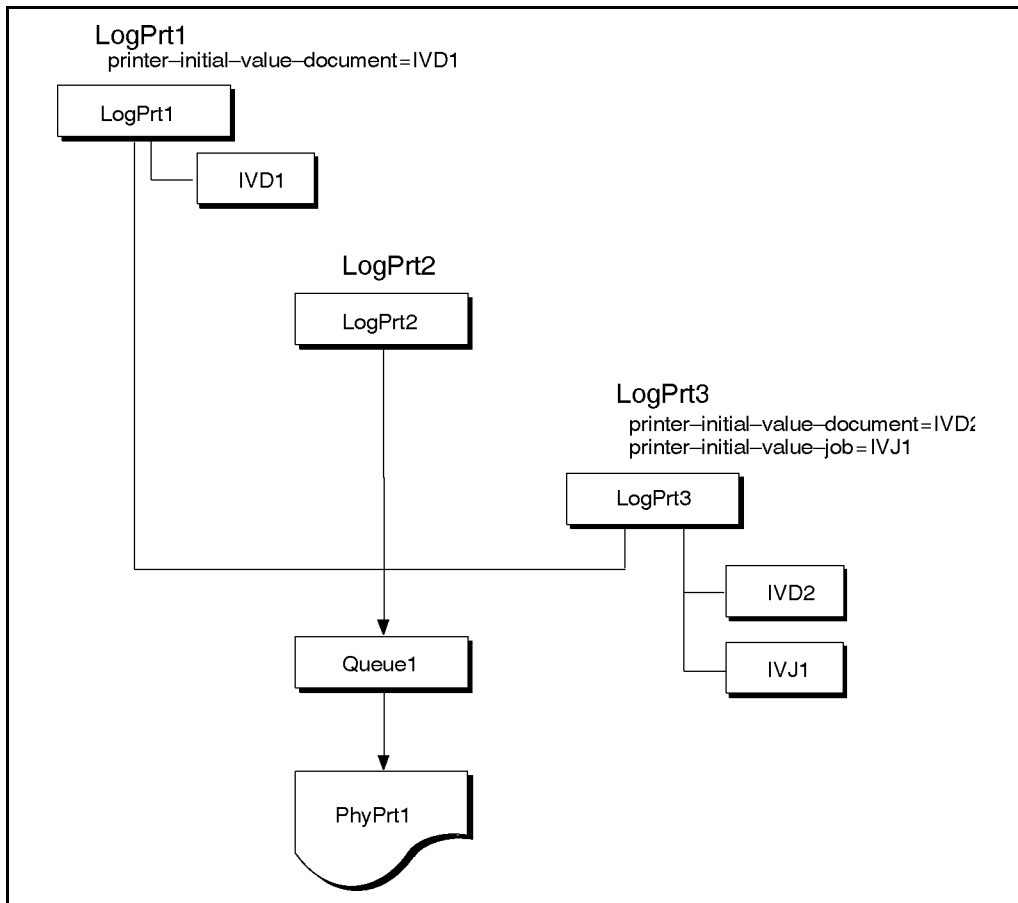
```
pdcreate -x "associated-queue=Queue1" Spool1:LogPrt2
```

Jobs submitted to `LogPrt2` will not have any job or document defaults provided by initial value objects. The following print submission:

```
pdpr -p LogPrt2 File1.txt
```

creates a job for which many document attributes do not have any value; the default is for most document attributes to not have values. When the job is actually printed the printer device must perform processing that corresponds to each of the document attributes. For example, it must print on either one side or both sides of the medium. The physical printer has default processing for each document attribute.

## Using Abbreviations for Attribute Names and Values



**Figure 6-6. Adding Logical Printers to a Desktop Configuration**

To create a logical printer associated with `Queue1` with an initial-value-job object for job defaulting and an initial-value-document object for document defaulting, perform the following steps:

1. To create the initial-value-job object `IVJ1`, enter:

```
pdcreate -c initial-value-job \
-x "printer-location-requested=bld47 job-priority=80" \
Spool1:IVJ1
```

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## Using Abbreviations for Attribute Names and Values

2. To create the initial-value-document object IVD2, enter:

```
pdcreate -c initial-value-document \
-x "content-orientation=portrait sides=2" Spool1:IVD2
```

3. To create the logical printer LogPrt3, enter:

```
pdcreate -x "printer-initial-value-document=IVD2 \
printer-initial-value-job=IVJ1 \
associated-queue=Queue1" Spool1:LogPrt3
```

Jobs submitted to LogPrt3 will have some job attribute values provided by IVJ1 and will have some document attribute values provided by IVD2. Some of the other document attributes have default values; for instance, `copy-count` defaults to 1. Some of the other job attributes and some of the document attributes will default to have no default value.

## Using Logical Printers to Restrict the Use of Printer Capabilities

When you create a physical printer, the *xxx-supported* attributes represent a capability of the printer device. For example, if the `sides-supported` attribute is equal to “1 2”, the printer can print on either one side or both sides of the paper.

Users submit jobs to logical printers. Logical printers also have *xxx-supported* attributes, but these attributes default to no value when you create a logical printer. When you create a logical printer and assign values to this type of attribute, the logical printer represents an abstract set of physical printer capabilities. Several logical printers can represent a single physical printer, with each representing some or all of the capabilities of the physical printer. Refer to Figure 6-7. Each logical printer represents a subset of the capabilities of PhyPrt2.

You use the values for the logical printer *xxx-supported* attributes, such as `maximum-copies-supported` and `sides-supported`, to restrict the availability of capabilities and features. When a user submits a job, the spooler validates the values of the job and document attributes against the values of the logical printer supported attributes. If a job or document attribute has a specific, non-blank value, the value must be supported by the value, or one of the values, of the corresponding logical printer attribute, if the corresponding logical printer attribute has a value or values. Discrete values must match and

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numeric values must satisfy some type of limit or range. By default, none of the logical printer *xxx-supported* attributes have values, which means that no restrictions apply. Because many job and document attributes do not have default values, for this kind of attribute you must use initial value objects to ensure the restriction. See “Using Initial Value Objects to Ensure Restriction” for details.

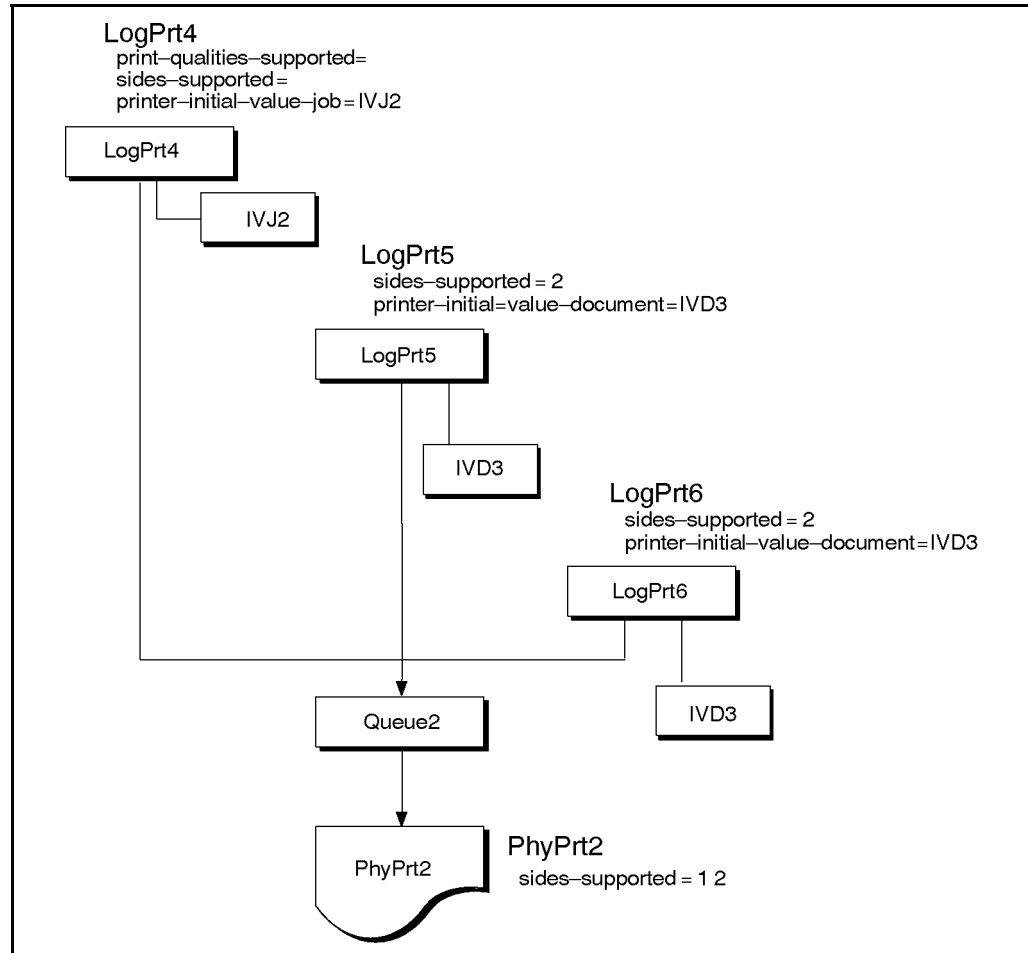
All logical printers use the same *xxx-supported* attributes. However, the supported attributes for physical printers differ between printer models.

For logical printer attributes that are used for restriction that do not require an initial value object, such as *document-formats-supported*, you can combine attribute values that are only supported by one printer model.

You can also combine document attributes that are unique to a printer model, if they do not require an initial value object to enforce the restriction.

See “Creating and Configuring Initial-Value-Job and Initial-Value-Document Objects” for more information about the prohibition against combining these in an initial-value-document object.

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**Figure 6-7. Using Logical Printers to Restrict Printer Capabilities**

This section provides examples of commands to configure logical printers for the funnel configuration model. It shows how to create the logical printers and initial value objects shown in Figure 6-7.

The funnel configuration model has a many-to-one relationship between logical printers and a physical printer. Each logical printer usually represents a subset of the capabilities of the physical printer; you use these logical printers to

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restrict the types of jobs that users can submit to a physical printer through a given logical printer.

To create and configure the three logical printers, initial-value-job, and initial-value-document objects shown in Figure 6-7, enter the following commands.

- To create logical printer LogPrt4, enter:

```
pdcreate -x "associated-queue=Queue2 \
printer-initial-value-job=IVJ2" \
Spool1:LogPrt4
```

- To create the initial-value-job object IVJ2, enter:

```
pdcreate -c initial-value-job \
-x "sides=2" Spool1:IVJ2
```

The initial-value-job object IVJ2 enforces the use of two-sided printing.

- To create logical printer LogPrt5, enter:

```
pdcreate -x "associated-queue=Queue2 \
printer-initial-value-document=IVD3 \
sides-supported=2" Spool1:LogPrt5
```

- To create the initial-value-document object IVD3, enter:

```
pdcreate -c initial-value-document \
-x "sides=2" Spool1:IVD3
```

- To create logical printer LogPrt6, enter:

```
pdcreate -x "associated-queue=Queue2 \
printer-initial-value-document=IVD3 \
sides-supp=2" Spool1:LogPrt6
```

The initial-value-document object IVD3 is associated with both LogPrt5 and LogPrt6 to enforce the restrictions imposed by these logical printers with the `sides-supported` attributes.

All of the initial value objects in this configuration are used to enforce the restrictions imposed by the logical printers. It could also include initial-value-job or initial-value-document objects used only for defaulting, but does not do so. For example, you could associate an initial-value-document

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## Using Abbreviations for Attribute Names and Values

object with `LogPrt4` just to assign default values for jobs submitted to that logical printer.

## Using Initial Value Objects to Ensure Restriction

Most job and document attributes do not have default values, that is, they are assigned 'no value'. For example, the job attribute `print-after` has no default values. To restrict the printer capability that corresponds to a job or document attribute that has no default, you must create an initial-value-job or initial-value-document object and associate it with the logical printer to ensure that the intended restriction is enforced.

For example, refer to `LogPrt6` in the configuration shown in Figure 6-7. This logical printer is intended to limit the job submitter to two-sided printing (`sides-supported=2`). The document attribute `sides` defaults to no value. If a user submits a job to this logical printer, the document attribute `sides` defaults to no value and passes validation at the logical printer level. Validation fails only if a specific job or document attribute value is not supported by a specific logical printer attribute value. When the job actually prints, the printer device could default to print the job on one side of the paper. The intended restriction fails.

Therefore, the initial-value-document object `IVD3` is associated with `LogPrt6` to assign a value of "2" to the `sides` attribute to all documents in jobs submitted to the logical printer. If the user overrides the initial-value-document object and requests one-sided printing, validation fails. The user cannot override the initial-value-document object by attempting to request no value or the default value for the job or document attribute with a print submission. If a user enters either of the following print submissions to attempt to get around the restriction imposed by this configuration:

```
pdpr -p LogPrt6 -x "sides= " File3.txt
```

```
pdpr -p LogPrt6 -r "sides==" File3.txt
```

the request fails. This syntax is not valid and the user receives an error message. The job still requests two-sided printing because only a specific value that a user supplies during a job submission will override a default value provided by an initial value object. This job uses the value for `sides` supplied by `IVD3`.

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See “Job/Document Attributes Requiring Initial Value Objects to Restrict”. This section provides tables that list the job and document attributes that require an initial value object to ensure a restriction for a logical printer.

---

## Configuring Logical Printers for Workload Balancing

This section describes how to create the logical printer for a printer pool configuration of logical printers, queues, and physical printers.

The sample configuration in this section illustrates how to:

- Balance the printing workload of your system by configuring a queue to send jobs to multiple physical printers.

This is one of the major benefits of HPDPS.

- Restrict use of some physical printer capabilities at the physical printer level instead of with logical printers.

The example in this section shows how to restrict the size of jobs at the physical printer. You also can restrict with other attributes, such as `maximum-copies-supported`.

A printer pool configuration has a one-to-many relationship between a logical printer and physical printers as shown in Figure 6-8. The main advantage of the printer pool configuration is that it balances the workload of jobs submitted to the system. Jobs in `Queue3` that can print on both physical printers will print on the printer that becomes available first. If `PhyPrt4` is busy for a long time processing a large job, some medium size jobs do not have to wait but can print on `PhyPrt3`.

For example, to create the logical printer `LogPrt7`, shown in Figure 6-8, enter:

```
pdcreate -x associated-queue=Queue3 Spool1:LogPrt7
```

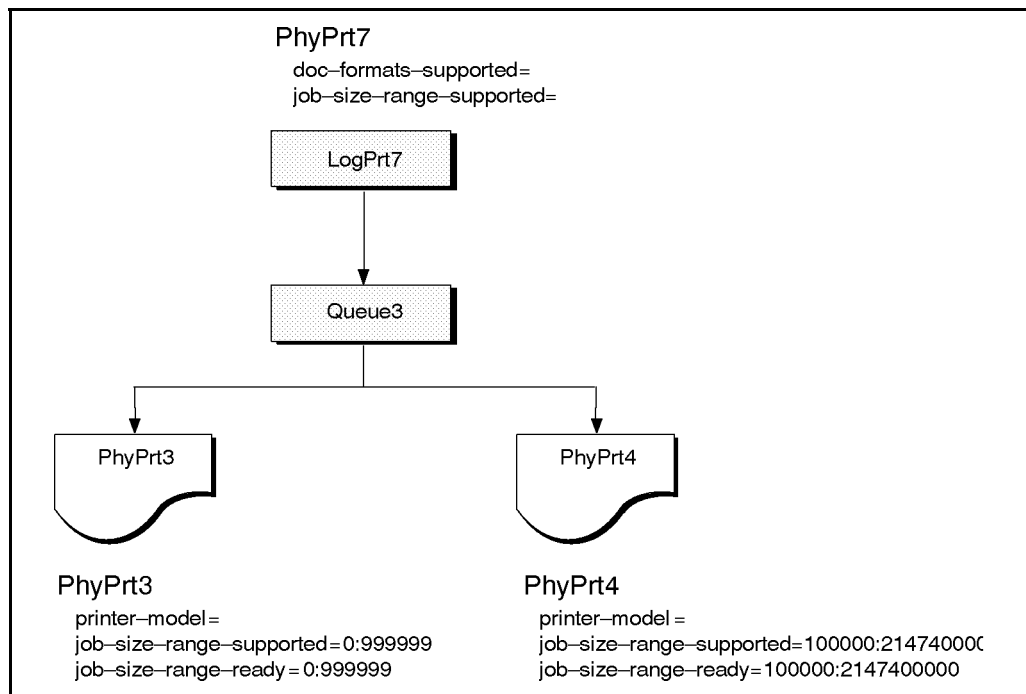
This logical printer does not implement any restriction to the use of the capabilities of the two physical printers associated with the logical printer.

This example shows how you can handle printer management based on capabilities at the physical printer level. `PhyPrt4` is a high-speed printer compared to `PhyPrt3`. Because the `job-size-range-supported` logical printer

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attribute has no value, logical printer `LogPrt7` accepts jobs of any size. The spooler sends jobs that are relatively small to `PhyPrt3` and sends only large jobs to the high-speed physical printer `PhyPrt4`. Notice that there is some overlap in the range of the sizes of jobs that the physical printers accept. Based on job size, some jobs can be sent to either physical printer, depending on which physical printer becomes available first.



**Figure 6-8. One Logical Printer for Multiple Physical Printers**

The `document-formats-supported` logical printer attribute does not have a value and, therefore, can accept documents with formats supported by both physical printers.

## Configuring Logical Printers with DCE Security

This feature is available in the DCE Extended Environment only. This section describes how to use DCE security to restrict access to physical printers in the DCE Extended Environment. It describes how you can:

- Use DCE in association with configurations with one logical printer to restrict access to physical printers.

Refer to “Using DCE to Restrict Access with One Logical Printer” for an example of using DCE to restrict access to one physical printer configured using the desktop configuration model.

- Use DCE in association with configurations with more than one logical printer to restrict access to physical printers.

If you have multiple logical printers that send jobs to one or more physical printers that require restricted access, you need to use DCE to restrict access to all of the logical printers. See “Using DCE to Restrict Access with Multiple Logical Printers” for an example of using DCE to restrict all of the logical printers in a configuration.

- Use a logical printer or printers to restrict the use of physical printer features or capabilities and then use DCE to restrict which users can submit jobs to the logical printer or printers.

In addition to using logical printers to restrict the use of certain physical printer capabilities, you can use the DCE security feature of logical printers to limit which users can submit jobs to these logical printers.

Refer to “Using Logical Printers and DCE to Restrict Capabilities” for an example of such a configuration.

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### Using DCE to Restrict Access with One Logical Printer

This section describes how to configure a logical printer for the desktop configuration model and how to restrict the use of the logical printer using DCE security.

You can use the security feature of DCE to restrict which users can submit jobs to physical printers. You must, however, restrict at the logical printer level.

You use the following logical printer attribute to specify whether the logical printer requires authorization:

**authorize-jobs**      This single-value attribute indicates whether the user must have DCE authorization in order to submit jobs to the logical printer. Possible values are: **true** or **false**. The default is **false**.

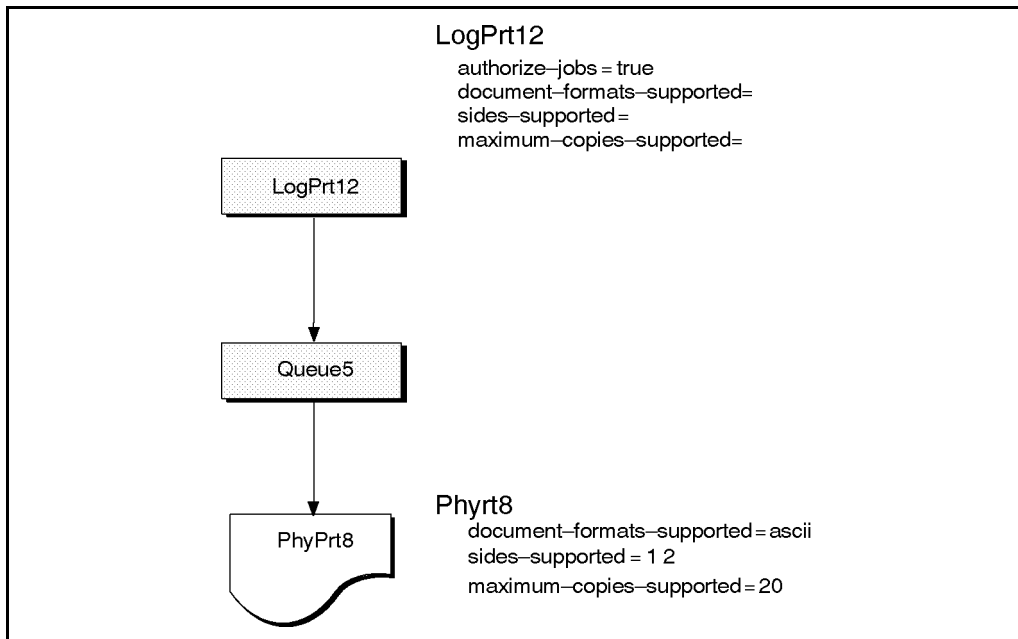
Refer to the Chapter 8, “Managing DCE Security for HPDPS”, for a description of DCE security. If you set **authorize-jobs** to **true** to restrict the use of the logical printer, you must then do the following:

1. Create a DCE group for the logical printer and give the group **read** permission to the logical printer
2. Give each person who will use the logical printer an account in the group

When DCE-logged in, members of the group can submit jobs to that logical printer. See “Planning a Group for People Who Will Use Restricted Printers” in Chapter 8 for more information about using DCE with logical printers. For information on setting up DCE groups and accounts see the appropriate DCE documentation listed in “DCE Documentation” in Chapter 8.

A desktop configuration model has a one-to-one relationship between a logical printer and a physical printer as shown in Figure 6-9.

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**Figure 6-9. Using DCE to Restrict Access to a Physical Printer**

To create the logical printer LogPrt12 contained in spooler Spool1 and configure it to only accept jobs from authorized users, enter:

```
pdcreate -x "authorize-jobs=true associated-queue=Queue5" \
Spool1:LogPrt12
```

The logical printer in this configuration does not impose any restrictions to the use of the physical printer. HPDPS performs job validation at the physical printer level only.

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### Using DCE to Restrict Access with Multiple Logical Printers

This section shows how to use DCE to restrict access to a physical printer that receives jobs from more than one logical printer through its associated queue. The example configuration in this section has one physical printer, but the same principle applies to a configuration with more than one physical printer. If one or more physical printers that receive jobs from a queue needs restricted access using DCE, each logical printer that sends jobs to the queue must be DCE restricted. That is, `authorize-jobs` must be set to `true` and a DCE user group must be created for each logical printer.

Figure 6-10 shows two logical printers that send jobs to one physical printer that require DCE security. One logical printer has default values provided by an initial value object and the other one does not.

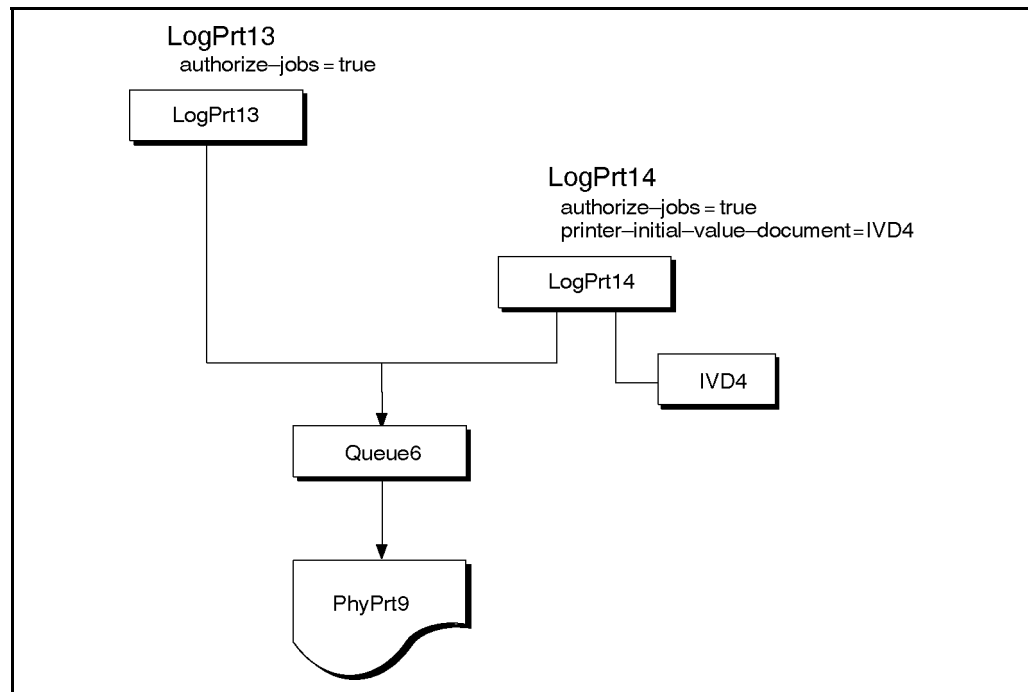


Figure 6-10. Using DCE to Restrict Access with Multiple Logical Printers

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Perform the following steps to create the logical printers shown in Figure 6-10:

- To create the logical printer LogPrt13 enter:

```
pdcreate -x "authorize-jobs=true associated-queue=Queue6" \
Spool1:LogPrt13
```

- To create the logical printer LogPrt14 enter:

```
pdcreate -x "authorize-jobs=true \
printer-initial-value-document=IVD4 \
associated-queue=Queue6" Spool1:LogPrt14
```

The command to create IVD4 is not provided.

You must set up a DCE user for each of these logical printers.



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### Using Logical Printers and DCE to Restrict Capabilities

This section describes how to use DCE to restrict access to physical printers in combination with logical printers that restrict the use of physical printer capabilities.

The example configuration in this section has one logical printer that does not restrict the use of physical printer capabilities but does require DCE authorization in order for users to submit jobs to it. The other logical printers do not require DCE authorization, but restrict the use of certain physical printer capabilities. Alternatively, you could use DCE to restrict who can submit jobs to all of the logical printers in the configuration.

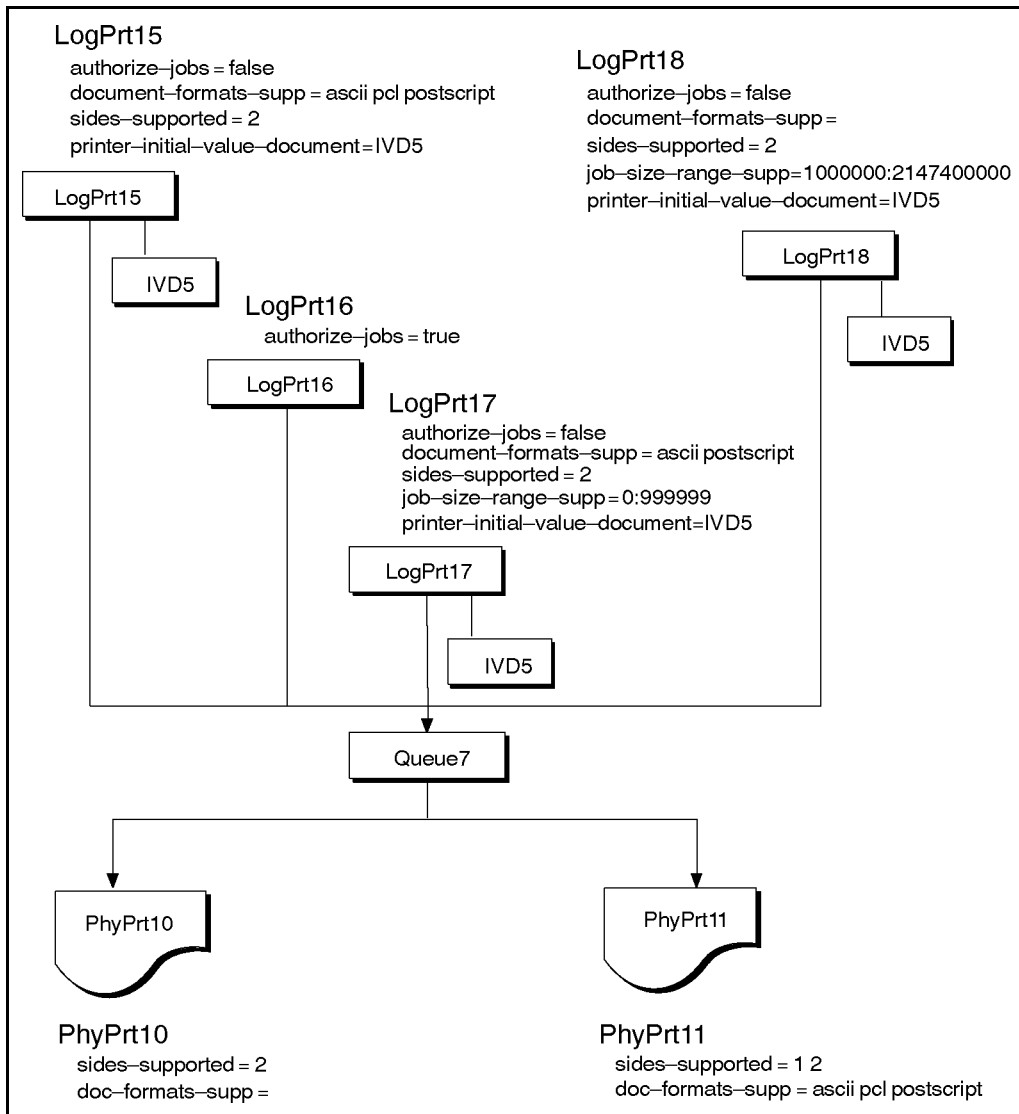
This example configuration uses the hourglass configuration model. An hourglass configuration model has a many-to-many relationship between logical printers and physical printers as shown in Figure 6-11. An hourglass configuration has the advantages of the printer pool configuration model, in that it lets you balance the workload of jobs in your system.

The concepts illustrated by this example also apply to the funnel configuration model, which has a many-to-one relationship between logical printers and a physical printer.

In the configuration shown in Figure 6-11, logical printers `LogPrt15`, `LogPrt17`, and `LogPrt18` restrict access to the capabilities of the physical printers associated with `Queue7`, but do not require DCE authorization to print to them. Logical printer `LogPrt16` does not impose restrictions to capabilities, but does require DCE authorization. Users must be members of a DCE user group to print to this logical printer.

This configuration has two physical printers receiving jobs from the same queue. The two printers both support the same document formats. This example also illustrates restricting the size of jobs at the logical printer level. Typically you will implement this type of restriction at the physical printer level.

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**Figure 6-11. Using Logical Printers and DCE to Restrict Capabilities**

To create the four logical printers shown in Figure 6-11, do the following:

- To create logical printer LogPrt15, enter:

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```
pdcreate -x "document-formats-supported=ascii pcl postscript \
printer-initial-value-document=IVD5 \
associated-queue=Queue7 \
sides-supported=2" Spool1:LogPrt15
```

- To create logical printer LogPrt16, enter:

```
pdcreate -x "authorize-jobs=true associated-queue=Queue7" \
Spool1:LogPrt16
```

- To create logical printer LogPrt17, enter:

```
pdcreate -x "document-formats-supported=ascii postscript \
job-size-range-supported=0:999999 \
authorize-jobs=true \
printer-initial-value-document=IVD5 \
associated-queue=Queue7 \
sides-supported=2" Spool1:LogPrt17
```

- To create logical printer LogPrt18, enter:

```
pdcreate -x "job-size-range-supported=1000000:2147400000 \
printer-initial-value-document=IVD5 \
associated-queue=Queue7 \
sides-supported=2" Spool1:LogPrt18
```

- To create the initial-value-document object IVD5, enter:

```
pdcreate -c initial-value-document -x "sides=2" Spool1:IVD5
```

This initial-value-document object enforces the restriction of two-sided printing imposed by LogPrt15, LogPrt17, and LogPrt18.

In this example, four logical printers send jobs to two physical printers through a single queue. Three user groups, each with similar printing needs, will submit jobs to one each of the three logical printers; these logical printers impose restrictions to the capabilities of the physical printers. The fourth logical printer is not for a particular user group and does not impose any restrictions. This logical printer is for users, such as managers, who might need to have access to all of the features of the physical printers. Therefore it requires DCE authorization to use.

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In this configuration, each user group could submit jobs to all of the logical printers except `LogPrt16`. If you wanted to strictly limit which logical printer a user group could submit jobs to, you would have to request DCE security for each logical printer, that is, set `authorize-jobs` to `true`, and set up a DCE user group for each one.

- `LogPrt15` users can only print jobs with document formats of `ascii`, `pcl`, or `postscript`. They are restricted to two-sided printing. Their jobs can be directed to either of the physical printers and they can use all other capabilities of `PhyPrt10` and `PhyPrt11`.
- `LogPrt17` users can only print jobs with document formats of `ascii` and `postscript`. The users are restricted to the size of jobs that they can submit. Users can only print relatively small, two-sided jobs.
- `LogPrt18` users can print jobs with any supported document format. Therefore, all jobs submitted to this logical printer are sent to `PhyPrt10`. The users are restricted to the size of jobs that they can submit. Users can only print large, two-sided jobs.

---

## Configuring Logical Printers as HPDPS Gateway Printers

To access a foreign environment, you must create an HPDPS Gateway Printer in the local environment for a logical printer in the foreign environment. You use the `pdcreate` command to create a logical printer in the spooler, but you specify a special set of attributes.

```
pdcreate -c printer -x "pd-gway-foreign-host=ForeignHost
pd-gway-foreign-printer=ForeignPrinter"
LocalSpooler: HPDPSGatewayPrinterName
```

where:

- |                                   |                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <code>pd-gway-foreign-host</code> | This attribute identifies the foreign host where the foreign printer resides and must execute the HPDPS client daemon. |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|
- If the foreign environment is a DCE Extended Environment, then enter the name of any host in the DCE cell that executes a HPDPS client

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daemon, and that is not a NFS diskless cluster client.

- If the foreign environment is a Basic Environment, and the foreign environment is a NFS diskless cluster, then enter the name of the NFS diskless cluster server.
- If the foreign environment is a Basic Environment, and the foreign environment is not an NFS diskless cluster, then enter the name of the standalone host.

`pd-gway-foreign-printer` This attribute identifies the foreign printer. This name is defaulted to the name by which the printer is known locally.

*LocalSpooler*

This is an existing spooler in the local environment where the HPDPS Gateway Printer is to be added.

*HPDPS Gateway  
PrinterName*

This is the name by which the printer is known locally. This name must not conflict with an existing logical printer name or an existing spooler name in the local environment.

When an HPDPS Gateway Printer target is added, deleted, or moved to a new host, then every HPDPS Gateway Printer in your network that references that target must be updated accordingly.

HPDPS Gateway Printers can be “chained” together, that is, an environment can define an HPDPS Gateway Printer whose target is another HPDPS Gateway Printer in the foreign environment.

To create an HPDPS Gateway Printer named `GPrt` in the local spooler `Spool1`, with foreign printer name `LogPtrX` in the foreign host `HostX`, enter:

```
pdcreate -c printer -x "pd-gway-foreign-host=HostX \
pd-gway-foreign-printer=LogPtrX" \
Spool1:GPrt
```

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To list the attributes of the above HPDPS Gateway Printer, enter:

```
pdls -c printer GPrt \
-r pd-gway-foreign-host,pd-gway-foreign-printer \
-x "pd-gway-indirection=false"
```

When `pd-gway-indirection=true`, the `pdls` command lists the local HPDPS Gateway Printer (the default); when the value is `false`, the foreign printer is listed.

HPDPS displays information similar to the following:

```
GPrt: pd-gway-foreign-host=HostX
GPrt: pd-gway-foreign-printer=LogPtrX
```

A HPDPS Gateway Printer supports the following operations performed to a foreign environment:

- A job can be submitted to a foreign printer using `pdpr`.
- The attributes of a foreign printer can be listed using `pdls`.
- A job previously sent to a foreign printer can be modified using `pdmod`.
- A job previously sent to a foreign printer can be listed using `pdq` or `pdls`.
- A job previously sent to a foreign printer can be cancelled using `pdrm`.
- A job previously sent to a foreign printer can be resubmitted to another printer, local or foreign, using `pdresubmit`. A job previously sent to a local printer can also be resubmitted to a foreign printer.
- The attributes of the spooler for a foreign printer can be listed using `pdls`. The attributes of any initial-value-document, initial value job, job, log, logical printer, and queue objects contained in that spooler can also be listed.

The following operations cannot be performed on the foreign environment via a HPDPS Gateway Printer:

- All jobs cannot be cleaned from a foreign printer or server via `pdclean`.
- Objects cannot be created or deleted in the foreign server via `pdcreate/pddelete`.
- Foreign printers cannot be enabled or disabled via `pdenable/pddisable`.

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- Foreign jobs, printers, queues, and servers cannot be paused or resumed via `pdpause/pdresume`.
- Foreign objects cannot be modified via `pdset`.
- Foreign servers cannot be shutdown via `pdshutdown`.

The following operations can be performed on the HPDPS Gateway Printer logical printer:

- An HPDPS Gateway Printer can be created via `pdcreate`.
- An HPDPS Gateway Printer can be deleted via `pddelete`.
- The attributes of an HPDPS Gateway Printer can be listed via `pdls`.
- The attributes of an HPDPS Gateway Printer can be modified via `pdset`.
- An HPDPS Gateway Printer can be enabled or disabled via `pdenable/pddisable`. This does not disable or enable the target logical printer, nor is the ability to submit jobs to the target affected by the enabled or disabled status of the HPDPS Gateway Printer. A HPDPS Gateway Printer can be disabled simply to allow a `pdset` operation to be performed on the HPDPS Gateway Printer.

---

## Other Logical Printer Configuration Tasks

This section describes some miscellaneous tasks you need to perform when you create logical printers.

### Specifying a Description for the Logical Printer

Use the `descriptor` attribute to specify a text string up to 4095 characters in length that describes the logical printer. While the use of this attribute is optional, a description is useful if you have a large number of logical printers or if you have many people managing your distributed print environment. The type of information you can specify initially in the description of the logical printer includes:

- The name of the department or the account number of the users who use the logical printer

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- Usage information, such as whether the logical printer provides default values for jobs or restricts usage of physical printer capabilities

If you do not specify a value for the `descriptor` attribute, HPDPS does not provide a default.

For example, to set a description for the logical printer `LogPrt1`, enter:

```
pdset -x "descriptor='Accounting Dept. sends jobs to this \
logicalprinter. It restricts some document attributes.'" LogPrt1
```

Note:

- You can also set up a list of key contacts for the logical printer by setting the `list-of-managers` attribute with the `pdset` command. See “Specifying Key Contacts for the Spooler” for an example of specifying values for this attribute.

## Receiving Logical Printer Notification Messages

You receive notification messages about events associated with the logical printer through the notification profile for the logical printer. The `notification-profile` logical printer attribute determines which messages you receive.

The default events for the logical printer `notification-profile` attribute are:

- `object-cleaned`
- `object-deleted`

The `delivery-address` component of this attribute defaults to the *UserName* of the administrator who created the logical printer, and the `delivery-method` component defaults to `electronic-mail`. You will want to change the user identified by the `delivery-address` component if the operator who manages the logical printer is someone other than the administrator who created it.

See Chapter 7, “Using Notification”, for descriptions of events and event classes, and procedures for configuring the `notification-profile` attribute.



## Using Abbreviations for Attribute Names and Values

### Enabling a Logical Printer

Use the `pdenable` command after you have created and configured a logical printer to enable the printer. Enabling the logical printer allows it to accept jobs after you have completed the configuration tasks for the other HPDPS components.

For example, to enable the logical printer `LogPrt1`, enter:

```
pdenable LogPrt1
```

Before you can enable the logical printer, these conditions must be met:

- A queue must be referenced by the `associated-queue` attribute and must exist.
- Any initial value objects referenced by the logical printer must exist.
- If the logical printer references any initial value objects, the job or document attributes specified by the initial value object must be supported by the logical printer.

See “Associating an Initial Value Object with a Logical Printer” for more information on the last prerequisite.

You can enable logical printers one at a time or specify the queue with the `pdenable` command and all the logical printers associated with the queue will be enabled.

After you create and enable a logical printer, you can submit a test job to it to verify that it and its associated queue and physical printer or printers are correctly configured.



## Using Notification

---

HP Distributed Print Service (HPDPS) provides notification that you can tailor depending on the needs of users, operators, and administrators. For example, users can receive information about their own jobs, operators can receive attention information on HPDPS objects, and administrators can receive HPDPS configuration information.

---

### What Is Notification?

Notification is the detection of events as they occur and the automatic generation and delivery of notification messages relating to those events. HPDPS sends notification messages related to objects to one or more users based on the `notification-profile` attribute of these objects. The person who manages a queue can be notified of all jobs that cannot be scheduled. Individual users can receive the same notification about their own jobs.

---

### Understanding the notification-profile Attribute

You use the `notification-profile` attribute to configure notification profiles of specific HPDPS objects for specific HPDPS events pertaining to the object. You can create or modify a notification profile by using the `pdcreate`, `pdmod`, `pdpr`, or `pdset` command depending on the object. You can create notification profiles for the following objects:

- jobs
- initial-value-job
- logical printer

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- physical printer
- queue
- spooler
- supervisor

A notification profile can have multiple values:

- Each value for this complex attribute begins and ends with the brace characters (`{ }`). For example:

```
notification-profile= \
{event-identifiers=class-error delivery-method=message \
delivery-address=mary event-comment='fix problem' locale=C}
```

Each notification value has up to five components:

- event-identifiers
  - delivery-method
  - delivery-address
  - event-comment
  - locale
- Each component has a name and associated values.
  - Each value must have a unique combination of delivery-method and delivery-address component values.
  - All objects, except the initial-value-job object, have default notification profiles.
  - The sequence in which the components are entered is not important.

### event-identifiers Component

This component specifies the events for which the user receives messages. This component is the only component that can have multiple values within a `notification-profile` attribute value. HPDPS uses default values if you do not specify values.

Table 7-1 lists the individual events, provides descriptions of each event, and identifies which objects are used for notification. Table 7-2 lists the different HPDPS notification event classes and identifies the individual events contained in each class.

## 7-2 Using Notification

## Using Abbreviations for Attribute Names and Values

The values that you specify for the `event-identifiers` component can be:

- Individual events
- One or more event-class names that represent groups of events
- Or a combination of event-class names and individual events.

### Events Specified for Servers (Spoolers and Supervisors)

Servers contain other objects that have their own notification profiles. Spoolers contain logical printers and queues and supervisors contain physical printers. If an event occurs in a server that affects an object contained in it, then HPDPS sends notification for those objects. For example, the event `object-deleted` in a spooler notification profile causes HPDPS to send a notification message for contained logical printers or queues.

Also, some events that occur in the contained objects of a server cause HPDPS to send a notification message to other objects contained within the server. For example, the event `queue-backlogged` on a spooler notification profile causes a message to be sent for any queue contained within that spooler. This is not true of all events. For example, `queue-state-changed` will cause a message to be sent only for the queue involved. See Table 7-3 for a list of the default events for each object.

### Events Specified in any Notification Profile

If you name two objects in a notification profile with the same event identifier, `delivery-method`, and `delivery-address` in a notification profile for another object, the person identified in the `delivery-address` will receive two notification messages for the same event.

If you specify an event-identifier that is not supported for the object for which you are creating the `notification-profile` attribute value, such as `queue-state-change` on a spooler or `object-deleted` on a job, no error is identified. HPDPS accepts this but never provides any messages for that event because the event will never occur for that type of object.

## Using Abbreviations for Attribute Names and Values

### delivery-method and delivery-address Components

**delivery-method** This component specifies the method by which the person receives the event messages. HPDPS uses a default value of **electronic-mail** if you do not specify a delivery method value.

**delivery-address** This component specifies the address (*UserName@HostName*) of the person who receives the event messages. If the **delivery-address** is not specified, the order of the default values is:

- The *UserName@HostName* of the person who created the object and the notification profile when the object was created.
- The *UserName@HostName* of the person who set the **notification-profile** attribute after the object had been created.
- The *UserName@HostName* of the person who added the value to the notification profile.

The **delivery-method** and **delivery-address** are key components. They are used with the **+=** operator to add or replace values and with the **-=** operator to delete a value. The combination of the two components must be unique within the values for that **notification-profile**.

You can use both key components together to add, replace, or delete **notification-profile** attribute values with either your *UserName* or other users' *UserName*. The other components will be set to their default values. For example:

```
pdset -c queue -x "notification-profile+= \
{delivery-method=e-mail \
delivery-address=dave@sys1.com}" Queue1
```

will add a **notification-profile** attribute value containing the default values for the other components or replace an existing value that has the user delivery-address value of **dave@sys1.com** and a delivery-method value of **e-mail**.

If you want to retain the existing component values within a notification profile value, you must specify them. You cannot use the add (**+=**) operator of the **pdset** command when changing the component values within a

## 7-4 Using Notification

## Using Abbreviations for Attribute Names and Values

`notification-profile` value. However, you can add, replace, or delete a total value from the `notification-profile` by using the `+=` or `-=` operators and only specifying the `delivery-method` and `delivery-address` components. See “Adding an Event to an Existing Value” and “Specifying Who Receives Notification” for examples using these components and operators.

### event-comment Component

This component is optional. The value of this component is usually textual information that you want added to the normal event message. When you enter this value and it contains spaces, you must enclose the value in single-quotation marks. There is no default for this component.

### locale Component

This component is used to set the language and coded character set in which HPDPS sends the message. If you do not specify a value for this component, HPDPS uses a default value equal to the `LANG` environment variable value of the person creating or setting the value. This component is case sensitive.

---

## List of Notification Event Identifiers

The following table alphabetically lists the names of individual events that you can specify as values for the `event-identifiers` component of the `notification-profile` attribute. The information for each event includes the event class or classes to which the event belongs, the HPDPS objects that support the notification of the event, a description, and the text of the notification message that HPDPS generates for the event. For more information about event classes see “List of Notification Event Classes”.

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values**

| Event                                                                                                                                                                                                                                                    | Event Class                                               | Objects Supported                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------|
| <b>checkpoint-taken</b>                                                                                                                                                                                                                                  | class-job-status<br>class-report                          | Job                                   |
| <p><i>Description:</i> The server saved checkpoint information (where this job could be restarted if necessary) for this job.</p> <p><i>Message:</i> The server saved checkpoint information for job 1 (Super1:1234567890).</p>                          |                                                           |                                       |
| <b>close-to-discard-time</b>                                                                                                                                                                                                                             | class-job-attention<br>class-warning                      | Job<br>Spooler                        |
| <p><i>Description:</i> The date and time specified by the <b>job-discard-time</b> attribute is approaching. The job will be deleted at the discard time.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) is close to being discarded.</p>               |                                                           |                                       |
| <b>detailed-messages</b>                                                                                                                                                                                                                                 | class-job-attention<br>class-report                       | Job<br>Physical Printer<br>Supervisor |
| <p><i>Description:</i> The printer backend has a message. Processing continues, unless the printer backend message indicates otherwise.</p> <p><i>Message:</i> Message from the printer backend program: Printer Printer1 has encountered a problem.</p> |                                                           |                                       |
| <b>document-aborted-by-printer</b>                                                                                                                                                                                                                       | class-aborted<br>class-job-attention<br>class-job-default | Job<br>Physical Printer<br>Supervisor |
| <p><i>Description:</i> The supervisor or printer aborted the document, errors were encountered during processing.</p> <p><i>Message:</i> Document 1 (myfile.txt) in job 1 (Super1:1234567890) was aborted by the printer.</p>                            |                                                           |                                       |

## 7-6 Using Notification



## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                        | Event Class                                                   | Objects Supported                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------|
| <b>document-aborted-by-server</b>                                                                                                                                            | class-aborted<br>class-job-attention<br>class-job-default     | Job<br>Physical Printer<br>Supervisor |
| <i>Description:</i> The supervisor aborted this document. The document has been deleted from the spooler.                                                                    |                                                               |                                       |
| <i>Message:</i> Document 1 (myfile.txt) in job 1 (Super1:1234567890) was aborted by the server.                                                                              |                                                               |                                       |
| <b>document-cancelled-at-printer</b>                                                                                                                                         | class-aborted<br>class-job-attention<br>class-job-default     | Physical Printer<br>Supervisor        |
| <i>Description:</i> The document was cancelled at the printer.                                                                                                               |                                                               |                                       |
| <i>Message:</i> The Document 1 (myfile.txt) in job 1 (Super1:1234567890) was cancelled at the printer.                                                                       |                                                               |                                       |
| <b>document-content</b>                                                                                                                                                      | class-error<br>class-job-problem                              | Physical Printer<br>Supervisor        |
| <i>Description:</i> The supervisor detected an error in the content of this file during printing. For example, a syntactic error in the file's page description language.    |                                                               |                                       |
| <i>Message:</i> An error was detected in document 1 (myfile.txt) of job 1 (Super1:1234567890) during printing.                                                               |                                                               |                                       |
| <b>file-transferred</b>                                                                                                                                                      | class-job-status<br>class-report                              | Job                                   |
| <i>Description:</i> A file transfer was successfully completed. The file can now be modified without affecting the printed output. The document is being processed by HPDPS. |                                                               |                                       |
| <i>Message:</i> Server Spool1 completed the transfer of document 1 (myfile.txt) in job 1 (Super1:1234567890).                                                                |                                                               |                                       |
| <b>internal-server-error</b>                                                                                                                                                 | class-error<br>class-server-attention<br>class-server-default | Spooler<br>Supervisor                 |
| <i>Description:</i> A server error occurred. The process failed.                                                                                                             |                                                               |                                       |
| <i>Message:</i> An internal error was detected in server Spool1.                                                                                                             |                                                               |                                       |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                   | Event Class                                               | Objects Supported                                         |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| <b>job-aborted-by-server</b>                                                                            | class-aborted<br>class-job-attention<br>class-job-default | Job<br>Physical Printer<br>Spooler<br>Supervisor          |
| <i>Description:</i> The server aborted this job because job or printer errors occurred during printing. |                                                           |                                                           |
| <i>Message:</i> Job 1 (Spool1:1234567890) stopped printing due to job or printer errors.                |                                                           |                                                           |
| <b>job-assigned-to-queue</b>                                                                            | class-job-status<br>class-report                          | Job<br>Queue<br>Spooler                                   |
| <i>Description:</i> The job was assigned to a queue. The job continues to process.                      |                                                           |                                                           |
| <i>Message:</i> The job 1 (Spool1:1234567890) is assigned to queue Spool1:Queue1.                       |                                                           |                                                           |
| <b>job-cancelled-by-operator</b>                                                                        | class-aborted<br>class-job-attention<br>class-job-default | Job<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <i>Description:</i> The operator or administrator deleted the job.                                      |                                                           |                                                           |
| <i>Message:</i> Job 1 (Spool1:1234567890) was cancelled by the operator or administrator.               |                                                           |                                                           |

## 7-8 Using Notification

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                                                                                                                                                               | Event Class                                               | Objects Supported                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| <b>job-cancelled-by-user</b>                                                                                                                                                                                                                                                                                                                                                                                        | class-aborted<br>class-job-attention                      | Job<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <p><i>Description:</i> The user deleted their job.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) was cancelled by the user.</p>                                                                                                                                                                                                                                                                                  |                                                           |                                                           |
| <b>job-cannot-be-scheduled</b>                                                                                                                                                                                                                                                                                                                                                                                      | class-job-attention<br>class-job-default<br>class-warning | Job<br>Queue<br>Spooler                                   |
| <p><i>Description:</i> There are no longer any physical printers available that can support the job's attributes. The physical printer that supported the job's attributes at submission is no longer available. The job remains in the queue. Resubmit the job to a logical printer that supports the job's attributes.</p> <p><i>Message:</i> The job 1 (Spool1:1234567890) cannot be scheduled to a printer.</p> |                                                           |                                                           |
| <b>job-completed</b>                                                                                                                                                                                                                                                                                                                                                                                                | class-job-default<br>class-job-status<br>class-report     | Job<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <p><i>Description:</i> The job completed processing. It might or might not have printed successfully. Check the printed output.</p> <p><i>Message:</i> Job name /etc/motd with id 1 (Spool1:1234567890) has completed printing on PhyPrt1.</p>                                                                                                                                                                      |                                                           |                                                           |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                                                           | Event Class                                              | Objects Supported       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------|
| <b>job-discarded</b>                                                                                                                                                                                                                                                                                            | class-job-default<br>class-job-attention<br>class-report | Job<br>Queue<br>Spooler |
| <p><i>Description:</i> The date and time specified by the <b>job-discard-time</b> or the <b>job-retention-period</b> attribute has passed, and the job was deleted. The job printed before it was discarded.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) was discarded by the server after it printed.</p> |                                                          |                         |
| <b>job-modified</b>                                                                                                                                                                                                                                                                                             | class-job-status<br>class-warning                        | Job                     |
| <p><i>Description:</i> The job was modified. The job continues to process.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) was modified.</p>                                                                                                                                                                   |                                                          |                         |
| <b>job-paused</b>                                                                                                                                                                                                                                                                                               | class-job-attention<br>class-warning                     | Job                     |
| <p><i>Description:</i> The job was paused. If the job state was processing, it stopped printing. The job will not be available to be scheduled until it is resumed.</p> <p><i>Message:</i> Job (Spool1:1234567890) was paused.</p>                                                                              |                                                          |                         |
| <b>job-promoted</b>                                                                                                                                                                                                                                                                                             | class-job-status<br>class-report                         | Job<br>Queue<br>Spooler |
| <p><i>Description:</i> The job was promoted.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) was promoted.</p>                                                                                                                                                                                                 |                                                          |                         |
| <b>job-requeued</b>                                                                                                                                                                                                                                                                                             | class-job-status<br>class-warning                        | Job                     |
| <p><i>Description:</i> The job has been added to the queue to be scheduled again because the physical printer that accepted the job can no longer print the job.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) is added to the queue to be scheduled again.</p>                                              |                                                          |                         |

## 7-10 Using Notification

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Event Class                             | Objects Supported       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------|
| <b>job-resubmitted</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | class-job-status<br>class-report        | Job<br>Queue Spooler    |
| <p><i>Description:</i> The job was successfully resubmitted to a different logical printer. The logical printer validates the job.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) was resubmitted to logical printer Spool1:LogPrt1 from queue Spool1:Queue1.</p>                                                                                                                                                                                                                                                                    |                                         |                         |
| <b>job-resumed</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | class-job-status<br>class-report        | Job<br>Queue<br>Spooler |
| <p><i>Description:</i> The job was resumed.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) was resumed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |                         |
| <b>job-state-changed</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | class-job-status<br>class-state-changed | Job                     |
| <p><i>Description:</i> The state of the job has changed. Job processing continues.</p> <p><i>Message:</i> The state of job 1 (Spool1:1234567890) changed to <i>pending</i>.</p>                                                                                                                                                                                                                                                                                                                                                        |                                         |                         |
| <b>job-submission-not-complete</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | class-error<br>class-job-problem        | Job<br>Spooler          |
| <p><i>Description:</i> The spooler waited for the amount of time specified in its <b>job-submission-timer</b> attribute to receive an indication that all of the document objects in a job have been sent. It did not receive that indication. The spooler will process the documents it has received as a complete job.</p> <p><i>Message:</i> The final document indication for job 1 (Spool1:1234567890) was not received by the server within the server's <b>job-submission-timer</b> interval. Job processing will continue.</p> |                                         |                         |
| <b>job-timed-out</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | class-job-attention<br>class-warning    | Job<br>Spooler          |
| <p><i>Description:</i> The spooler cannot communicate with the printer and cannot obtain any information about this job. The job might or might not have printed.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) is now in the timed-out state.</p>                                                                                                                                                                                                                                                                                  |                                         |                         |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                                                               | Event Class                                                                                                                                                                                                                                               | Objects Supported                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>no-document</b>                                                                                                                                                                                                                                                                                                  | class-error<br>class-job-problem                                                                                                                                                                                                                          | Job<br>Physical Printer<br>Supervisor                                 |
| <p><i>Description:</i> The document could not be accessed by the server. The document and possibly the entire job have been aborted. Check the error log for messages related to this failure.</p> <p><i>Message:</i> Document 1 (myfile.txt) in job 1 (Spool1:1234567890) could not be accessed by the server.</p> |                                                                                                                                                                                                                                                           |                                                                       |
| <b>no-resource</b>                                                                                                                                                                                                                                                                                                  | class-error<br>class-job-problem                                                                                                                                                                                                                          | Physical Printer<br>Supervisor                                        |
| <p><i>Description:</i> A resource needed by this job was not available. The job was aborted. Check the error log for messages related to this failure.</p> <p><i>Message:</i> The resource Res12 needed by job 1 (Super:1234567890) was not available.</p>                                                          |                                                                                                                                                                                                                                                           |                                                                       |
| <b>object-cleaned</b>                                                                                                                                                                                                                                                                                               | class-logical-printer-<br>default<br>class-logical-printer-status<br>class-physical-printer-<br>default<br>class-physical-printer-<br>status<br>class-queue-default<br>class-queue-status<br>class-server-default<br>class-server-status<br>class-warning | Logical Printer<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <p><i>Description:</i> Jobs have been deleted from this object. Processing continues.</p> <p><i>Message:</i> Successfully cleaned object queue Spool1:Queue1.</p>                                                                                                                                                   |                                                                                                                                                                                                                                                           |                                                                       |

## 7-12 Using Notification

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                              | Event Class                                                                                                                                                                                                                                                              | Objects Supported                                                     |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>object-created</b>                                              | class-logical-printer-configuration<br>class-physical-printer-configuration<br>class-queue-configuration<br>class-report                                                                                                                                                 | Logical Printer<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <i>Description:</i> The object is created.                         |                                                                                                                                                                                                                                                                          |                                                                       |
| <i>Message:</i> Successfully created object queue Spool1:Queue1.   |                                                                                                                                                                                                                                                                          |                                                                       |
| <b>object-deleted</b>                                              | class-logical-printer-configuration<br>class-logical-printer-default<br>class-physical-printer-configuration<br>class-physical-printer-default<br>class-queue-configuration<br>class-queue-default<br>class-server-configuration<br>class-server-default<br>class-report | Logical Printer<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <i>Description:</i> The object is deleted.                         |                                                                                                                                                                                                                                                                          |                                                                       |
| <i>Message:</i> Successfully deleted object printer Spool1:LogPrt1 |                                                                                                                                                                                                                                                                          |                                                                       |
| <b>object-modified</b>                                             | class-logical-printer-configuration<br>class-physical-printer-configuration<br>class-queue-configuration<br>class-server-configuration<br>class-warning                                                                                                                  | Logical Printer<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <i>Description:</i> This object has been modified.                 |                                                                                                                                                                                                                                                                          |                                                                       |
| <i>Message:</i> Successfully modified object queue Spool1:Queue1.  |                                                                                                                                                                                                                                                                          |                                                                       |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                       | Event Class                                                                | Objects Supported                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>object-paused</b>                                                                                                                                                                                                        | class-physical-printer-attention<br>class-queue-attention<br>class-warning | Job<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <i>Description:</i> A printer or queue was paused and cannot process jobs.                                                                                                                                                  |                                                                            |                                                           |
| <i>Message:</i> Successfully paused object queue Spool1:Queue1.                                                                                                                                                             |                                                                            |                                                           |
| <b>object-resumed</b>                                                                                                                                                                                                       | class-physical-printer-status<br>class-queue-status<br>class-report        | Job<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <i>Description:</i> A printer or queue is resumed.                                                                                                                                                                          |                                                                            |                                                           |
| <i>Message:</i> Successfully resumed printer Super1:PhyPrt1.                                                                                                                                                                |                                                                            |                                                           |
| <b>other-error</b>                                                                                                                                                                                                          | class-error<br>class-server-attention                                      | Physical Printer<br>Supervisor                            |
| <i>Description:</i> An error occurred for this object and cannot be described by any other message. Check the error log for messages related to this failure.                                                               |                                                                            |                                                           |
| <i>Message:</i> Server Super1 encountered an error.                                                                                                                                                                         |                                                                            |                                                           |
| <b>other-warning</b>                                                                                                                                                                                                        | class-server-attention<br>class-warning                                    | Physical Printer<br>Supervisor                            |
| <i>Description:</i> The object has encountered a warning condition that could not be described by any other event. This warning condition might precede an error. Check the error log for messages related to this failure. |                                                                            |                                                           |
| <i>Message:</i> Server Super1 has encountered a warning condition.                                                                                                                                                          |                                                                            |                                                           |

## 7-14 Using Notification



## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                      | Event Class                                                                          | Objects Supported                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>past-discard-time</b>                                                                                                                                                                                                                                                   | class-error<br>class-job-attention                                                   | Job<br>Queue<br>Spooler                                               |
| <p><i>Description:</i> The date and time specified by the <b>job-discard-time</b> job attribute passed before the job printed and the job was discarded.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) was discarded before it printed.</p>                             |                                                                                      |                                                                       |
| <b>printer-disabled</b>                                                                                                                                                                                                                                                    | class-logical-printer-attention<br>class-physical-printer-attention<br>class-warning | Logical Printer<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <p><i>Description:</i> A logical or physical printer was disabled and does not accept new jobs.</p> <p><i>Message:</i> Successfully disabled printer Super1:PhyPrt1.</p>                                                                                                   |                                                                                      |                                                                       |
| <b>printer-enabled</b>                                                                                                                                                                                                                                                     | class-logical-printer-status<br>class-physical-printer-status<br>class-report        | Logical Printer<br>Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <p><i>Description:</i> A logical or physical printer is enabled and now accepts jobs.</p> <p><i>Message:</i> Successfully enabled printer Super1:PhyPrt1.</p>                                                                                                              |                                                                                      |                                                                       |
| <b>printer-function-unavailable</b>                                                                                                                                                                                                                                        | class-job-attention<br>class-physical-printer-status<br>class-warning                | Physical Printer<br>Supervisor                                        |
| <p><i>Description:</i> The printer requires a printer function, such as duplex or offset stacking, that is not available. The function is disabled, but printing continues.</p> <p><i>Message:</i> The printer Super1:PhyPrt1 requires a function that is unavailable.</p> |                                                                                      |                                                                       |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                         | Event Class                                                                                                                     | Objects Supported                     |
|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>printer-needs-administrator</b>                                                                                            | class-job-attention<br>class-physical-printer-attention<br>class-physical-printer-default<br>class-warning                      | Physical Printer<br>Supervisor        |
| <i>Description:</i> The supervisor or printer detected a condition requiring administrator intervention.                      |                                                                                                                                 |                                       |
| <i>Message:</i> The printer Super1:PhyPrt1 needs administrator attention.                                                     |                                                                                                                                 |                                       |
| <b>printer-needs-attention</b>                                                                                                | class-job-attention<br>class-job-default<br>class-physical-printer-attention<br>class-physical-printer-default<br>class-warning | Job<br>Physical Printer<br>Supervisor |
| <i>Description:</i> The physical printer needs attention from a person, not necessarily the operator.                         |                                                                                                                                 |                                       |
| <i>Message:</i> Physical printer Super1:PhyPrt1 needs attention.                                                              |                                                                                                                                 |                                       |
| <b>printer-needs-operator</b>                                                                                                 | class-job-attention<br>class-job-default<br>class-physical-printer-attention<br>class-physical-printer-default<br>class-warning | Job<br>Physical Printer<br>Supervisor |
| <i>Description:</i> A physical printer needs operator attention. The printer cannot process jobs until it receives attention. |                                                                                                                                 |                                       |
| <i>Message:</i> Physical printer Super1:PhyPrt1 needs operator attention.                                                     |                                                                                                                                 |                                       |

## 7-16 Using Notification

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                | Event Class                                                                                                                     | Objects Supported                     |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>printer-paper-jam</b>                                                             | class-job-attention<br>class-job-default<br>class-physical-printer-attention<br>class-physical-printer-default<br>class-warning | Job<br>Physical Printer<br>Supervisor |
| <i>Description:</i> The physical printer has a paper jam.                            |                                                                                                                                 |                                       |
| <i>Message:</i> Physical Printer Super1:PhyPrt1 paper jam. Spool1:Queue1.            |                                                                                                                                 |                                       |
| <b>printer-paper-out</b>                                                             | class-job-attention<br>class-job-default<br>class-physical-printer-attention<br>class-physical-printer-default<br>class-warning | Job<br>Physical Printer<br>Supervisor |
| <i>Description:</i> The physical printer is out of paper.                            |                                                                                                                                 |                                       |
| <i>Message:</i> Physical Printer Super1:PhyPrt1 paper out. Spool1:Queue1.            |                                                                                                                                 |                                       |
| <b>printer-paper-output-problem</b>                                                  | class-job-attention<br>class-job-default<br>class-physical-printer-attention<br>class-physical-printer-default<br>class-warning | Job<br>Physical Printer<br>Supervisor |
| <i>Description:</i> The physical printer has a paper output problem.                 |                                                                                                                                 |                                       |
| <i>Message:</i> Physical Printer Super1:PhyPrt1 paper output problem. Spool1:Queue1. |                                                                                                                                 |                                       |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                                                         | Event Class                                                                  | Objects Supported                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|
| <b>printer-registered</b>                                                                                                                                                                                                                                                                                     | class-physical-printer-<br>status<br>class-report                            | Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <p><i>Description:</i> A physical printer has registered with a spooler. The queue can now schedule jobs to this printer.</p> <p><i>Message:</i> Printer Super:PhyPrt1 registered with Spool1:Queue1.</p>                                                                                                     |                                                                              |                                                    |
| <b>printer-shutdown-<br/>job-requeued</b>                                                                                                                                                                                                                                                                     | class-job-attention<br>class-physical-printer-<br>attention<br>class-warning | Job<br>Physical Printer<br>Supervisor              |
| <p><i>Description:</i> The printer shut down after this job started processing. The job was re-queued and will be scheduled again or the job was deleted and will have to be resubmitted.</p> <p><i>Message:</i> Printer Super1:PhyPrt1 was shut down after job 1 (Spool1:1234567890) started processing.</p> |                                                                              |                                                    |
| <b>printer-state-<br/>changed</b>                                                                                                                                                                                                                                                                             | class-physical-printer-<br>status<br>class-state-changed                     | Physical Printer<br>x                              |
| <p><i>Description:</i> The printer state changed. Processing continues.</p> <p><i>Message:</i> The state of printer Super1:PhyPrt1 changed to paused.</p>                                                                                                                                                     |                                                                              |                                                    |

## 7-18 Using Notification

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Event Class                                                                                                                     | Objects Supported                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>printer-timed-out</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | class-physical-printer-attention<br>class-physical-printer-default<br>class-warning                                             | Physical Printer<br>Supervisor                     |
| <p><i>Description:</i> The physical printer did not connect or get a response from the printer device in the time specified by the <b>printer-timeout-period</b> printer attribute. The printer device is being used by another application. The physical printer continues its attempts to connect to the printer device. The printer cannot process jobs until it connects to the device. Check the server error log for additional information.</p> <p><i>Message:</i> Physical printer Super1:PhyPrt1 has timed out.</p> |                                                                                                                                 |                                                    |
| <b>printer-toner-low</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | class-job-attention<br>class-job-default<br>class-physical-printer-attention<br>class-physical-printer-default<br>class-warning | Job<br>Physical Printer<br>Supervisor              |
| <p><i>Description:</i> The physical printer has a low toner condition.</p> <p><i>Message:</i> Physical Printer Super1:PhyPrt1 toner low. Spool1:Queue1.</p>                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                 |                                                    |
| <b>printer-unregistered</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | class-physical-printer-status<br>class-warning                                                                                  | Physical Printer<br>Queue<br>Spooler<br>Supervisor |
| <p><i>Description:</i> A physical printer is no longer registered with a spooler and jobs can no longer be scheduled to print on the printer.</p> <p><i>Message:</i> Printer Super1:PhyPrt1 is no longer registered with Spool1:Queue1.</p>                                                                                                                                                                                                                                                                                  |                                                                                                                                 |                                                    |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                                                                                                                                               | Event Class                                                   | Objects Supported                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| <b>processing-started</b>                                                                                                                                                                                                                                                                                                                           | class-job-status<br>class-report                              | Job<br>Queue<br>Physical Printer<br>Spooler<br>Supervisor |
| <p><i>Description:</i> The server has begun to process the job. The job has been scheduled to print on a physical printer.</p> <p><i>Message:</i> Job 1 (Spool1:1234567890) is processing.</p>                                                                                                                                                      |                                                               |                                                           |
| <b>queue-backlogged</b>                                                                                                                                                                                                                                                                                                                             | class-queue-attention<br>class-queue-default<br>class-warning | Job<br>Queue<br>Spooler                                   |
| <p><i>Description:</i> HPDPS calculates that there are too many jobs in this queue for all jobs to print within the amount of time specified for the <b>queue-backlog-upper-bound</b> attribute. The queue continues to accept jobs, but there will be a delay before they print.</p> <p><i>Message:</i> The queue Spool1:Queue1 is backlogged.</p> |                                                               |                                                           |
| <b>queue-no-longer-backlogged</b>                                                                                                                                                                                                                                                                                                                   | class-queue-status<br>class-report                            | Jobs<br>Queue<br>Spooler                                  |
| <p><i>Description:</i> The queue is no longer backlogged. HPDPS calculates that the jobs currently in the queue will print within the amount of time specified for the <b>queue-backlog-lower-bound</b> attribute.</p> <p><i>Message:</i> The queue Spool1:Queue1 is no longer backlogged.</p>                                                      |                                                               |                                                           |

## 7-20 Using Notification

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                         | Event Class                                                    | Objects Supported              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------|
| <b>queue-state-changed</b>                                                                                                                                                    | class-queue-status<br>class-state-changed                      | Queue                          |
| <i>Description:</i> The queue state changed. Processing continues.                                                                                                            |                                                                |                                |
| <i>Message:</i> The state of queue Spool1:Queue1 changed to ready.                                                                                                            |                                                                |                                |
| <b>resource-needs-attention</b>                                                                                                                                               | class-physical-printer-attention<br>class-warning              | Physical Printer<br>Supervisor |
| <i>Description:</i> This resource needs attention by a person, not necessarily the operator. Jobs requiring that resource cannot be processed until the problem is corrected. |                                                                |                                |
| <i>Message:</i> Resource Res22 on printer Super1:PhyPrt1 needs attention.                                                                                                     |                                                                |                                |
| <b>resource-needs-operator</b>                                                                                                                                                | class-physical-printer-attention<br>class-warning              | Physical Printer<br>Supervisor |
| <i>Description:</i> This resource needs attention from an operator. Jobs requiring this resource cannot be processed until the problem is corrected.                          |                                                                |                                |
| <i>Message:</i> Resource Res1 on printer Super1:PhyPrt1 needs operator attention.                                                                                             |                                                                |                                |
| <b>server-shutdown-complete</b>                                                                                                                                               | class-server-attention<br>class-server-default<br>class-report | Spooler<br>Supervisor          |
| <i>Description:</i> This server has shut down. The server is no longer available.                                                                                             |                                                                |                                |
| <i>Message:</i> Successfully shut down supervisor Super1.                                                                                                                     |                                                                |                                |
| <b>server-shutdown-started</b>                                                                                                                                                | class-server-attention<br>class-warning                        | Spooler<br>Supervisor          |
| <i>Description:</i> This server has begun to shut down. Jobs are not accepted by this server.                                                                                 |                                                                |                                |
| <i>Message:</i> The spooler Spool1 is shutting down.                                                                                                                          |                                                                |                                |

## Using Abbreviations for Attribute Names and Values

**Table 7-1. Description of Event Identifier Values (continued)**

| Event                                                                                                                                                                                                                         | Event Class                                | Objects Supported              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------|
| <b>server-startup-complete</b>                                                                                                                                                                                                | class-report<br>class-server-configuration | Spooler<br>Supervisor          |
| <i>Description:</i> This server is started.                                                                                                                                                                                   |                                            |                                |
| <i>Message:</i> Successfully started spooler Spool1.                                                                                                                                                                          |                                            |                                |
| <b>server-state-changed</b>                                                                                                                                                                                                   | class-server-status<br>class-state-changed | Spooler<br>Supervisor          |
| <i>Description:</i> The state of the server has changed.                                                                                                                                                                      |                                            |                                |
| <i>Message:</i> The state of server Spool1 changed to ready.                                                                                                                                                                  |                                            |                                |
| <b>unable-to-register</b>                                                                                                                                                                                                     | class-warning                              | Physical Printer<br>Supervisor |
| <i>Description:</i> The physical printer could not register with the queue within the amount of time specified for the <b>printer-register-threshold</b> physical printer attribute. Jobs cannot be scheduled to the printer. |                                            |                                |
| <i>Message:</i> The printer Super1:PhyPrt1 cannot register with the queue Queue1.                                                                                                                                             |                                            |                                |
| <b>unrecognized-resource</b>                                                                                                                                                                                                  | class-error<br>class-job-problem           | Physical Printer<br>Supervisor |
| <i>Description:</i> A resource required for this job is not known to the server. The job was aborted. Check the server error log for messages related to this failure.                                                        |                                            |                                |
| <i>Message:</i> Resource Res6 that is required for job 1 (Super1:1234567890) is not known to the server.                                                                                                                      |                                            |                                |

## 7-22 Using Notification



## List of Notification Event Classes

A class is an easy way to include multiple events in a value. Events are grouped in event classes based on the functions for which they provide notification. For example, some classes are specific to configuration tasks while other classes provide information about the status of HPDPS objects. Each event class name begins with `class`.

An event identifier can occur in more than one class. For example, `object-cleaned` occurs in the following classes:

```
class-logical-printer-default
class-logical-printer-status
class-physical-printer-default
class-physical-printer-status
class-queue-default
class-queue-status
class-server-default
class-server-status
class-warning
```

If any of these event classes are listed in notification profile values, and a logical printer, physical printer, queue, spooler or supervisor is cleaned, a message will be sent to the person identified in that value.

## Using Abbreviations for Attribute Names and Values

**Table 7-2. Event Classes**

| Event Class         | Individual Events Description                                                                                                                                                                                                                              |                                                                                                                                                                                                                      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| class-aborted       | document-aborted-by-printer<br>document-aborted-by-server<br>document-cancelled-at-printer                                                                                                                                                                 | job-aborted-by-server<br>job-cancelled-by-operator<br>job-cancelled-by-user                                                                                                                                          |
| class-error         | document-content<br>internal-server-error<br>job-submission-not-complete<br>no-document                                                                                                                                                                    | no-resource<br>other-error<br>past-discard-time<br>unrecognized-resource                                                                                                                                             |
| class-job-attention | close-to-discard-time<br>detailed-messages<br>document-aborted-by-printer<br>document-aborted-by-server<br>document-cancelled-at-printer<br><br>job-aborted-by-server<br><br>job-cancelled-by-operator<br>job-cancelled-by-user<br>job-cannot-be-scheduled | job-discarded<br>job-paused<br>job-timed-out<br>past-discard-time<br>printer-function-unavailable<br>printer-needs-administrator<br>printer-needs-attention<br>printer-needs-operator<br>printer-shutdown-job-queued |
| class-job-default   | document-aborted-by-printer<br>document-aborted-by-server<br>document-cancelled-at-printer<br>job-aborted-by-server<br>job-cancelled-by-operator                                                                                                           | job-cannot-be-scheduled<br>job-completed<br>job-discarded<br>printer-needs-attention<br>printer-needs-operator                                                                                                       |
|                     | This is the default event class for jobs.                                                                                                                                                                                                                  |                                                                                                                                                                                                                      |

## 7-24 Using Notification

## Using Abbreviations for Attribute Names and Values

**Table 7-2. Event Classes (continued)**

| Event Class                         | Individual Events Description                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| class-job-problem                   | document-content                      no-resource<br>job-submission-not-complete unrecognized-resource<br>no-document<br><br>These are events in which the job has encountered a problem but will attempt to proceed.                                                                                                                                                                                                                                           |
| class-job-status                    | checkpoint-taken                      job-queued<br>file-transferred                      job-resubmitted<br>job-assigned-to-queue                      job-resumed<br>job-completed                      job-state-changed<br>job-modified                      processing-started<br>job-promoted<br><br>This event class includes events that give detailed status about the job. These changes in status are often routine and do not require intervention. |
| class-logical-printer-attention     | printer-disabled<br><br>These events indicate that a problem exists with the logical printer and they usually require intervention by an operator or administrator.                                                                                                                                                                                                                                                                                             |
| class-logical-printer-configuration | object-created                      object-modified<br>object-deleted<br><br>These events have to do with the creation or deletion of a logical printer, or with modification of the attributes of a logical printer.                                                                                                                                                                                                                                           |
| class-logical-printer-default       | object-cleaned<br>object-deleted<br><br>This is the default event class for logical printers.                                                                                                                                                                                                                                                                                                                                                                   |
| class-logical-printer-status        | object-cleaned<br>printer-enabled<br><br>This event class includes events that give detailed status about the logical printer. These changes in status are often routine and do not require intervention.                                                                                                                                                                                                                                                       |

## Using Abbreviations for Attribute Names and Values

**Table 7-2. Event Classes (continued)**

| Event Class                          | Individual Events Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| class-physical-printer-attention     | <p>object-paused                      printer-shutdown-job-<br/>requeued</p> <p>printer-disabled                      printer-timed-out</p> <p>printer-needs-administrator      resource-needs-attention</p> <p>printer-needs-attention              resource-needs-operator</p> <p>printer-needs-operator</p> <p>These events indicate that a problem exists with the physical printer and they usually require intervention by an operator or administrator.</p>                                                                                      |
| class-physical-printer-configuration | <p>object-created                      printer-needs-attention</p> <p>object-deleted                      printer-needs-operator</p> <p>object-modified                      printer-timed-out</p> <p>printer-disabled                      printer-shutdown</p> <p>printer-enabled                      resource-needs-attention</p> <p>printer-needs-administrator      resource-needs-operator</p> <p>These events have to do with the creation or deletion of a physical printer, or with modification of the attributes of a physical printer.</p> |
| class-physical-printer-default       | <p>object-cleaned                      printer-needs-attention</p> <p>object-deleted                      printer-needs-operator</p> <p>printer-needs-administrator      printer-timed-out</p> <p>This is the default event class for physical printers.</p>                                                                                                                                                                                                                                                                                            |
| class-physical-printer-status        | <p>object-cleaned                      printer-registered</p> <p>object-resumed                      printer-state-changed</p> <p>printer-enabled                      printer-unregistered</p> <p>printer-function-unavailable      server-state-changed</p> <p>This event class includes events that give detailed status about the physical printer. These changes in status are often routine and do not require intervention.</p>                                                                                                                  |

**Using Abbreviations for Attribute Names and Values**

**Table 7-2. Event Classes (continued)**

| Event Class               | Individual Events Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| class-queue-attention     | object-paused<br>queue-backlogged<br><br>These events indicate that a problem exists with the queue and they usually require intervention by an operator or administrator.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| class-queue-configuration | object-created                      object-modified<br>object-deleted<br><br>These events have to do with the creation or deletion of a queue, or with the modification of the attributes of a queue.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| class-queue-default       | object-cleaned                      queue-backlogged<br>object-deleted<br><br>This is the default event class for queues.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| class-queue-status        | object-cleaned                      queue-no-longer-backlogged<br>object-resumed                      queue-state-changed<br>queue-backlogged<br><br>This event class includes events that give detailed status about the queue. These changes in status are often routine and do not require intervention.                                                                                                                                                                                                                                                                                                                          |
| class-report              | checkpoint-taken                      object-created<br>detailed-messages                      object-deleted<br>file-transferred                      objected-resumed<br>job-assigned-to-queue                      printer-enabled<br>job-completed                      printer-registered<br>job-discarded                      processing-started<br>job-promoted                      queue-no-longer-backlogged<br>job-resubmitted                      server-shutdown-complete<br>job-resumed                      server-startup-complete<br><br>A report event occurs whenever a significant point in processing occurs. |

## Using Abbreviations for Attribute Names and Values

**Table 7-2. Event Classes (continued)**

| Event Class                | Individual Events Description                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| class-state-changed        | job-state-changed            queue-state-changed<br>printer-state-changed       server-state-changed<br><br>A state-change event occurs whenever the state of a job, queue, printer, or server object changes.                                                 |
| class-server-attention     | internal-server-error        server-shutdown-started<br>other-error                    server-shutdown-complete<br>other-warning<br><br>These events indicate that a problem exists with the server and they usually require intervention by an administrator. |
| class-server-configuration | object-deleted                server-startup-complete<br>object-modified<br><br>These events have to do with the creation or deletion of a spooler or supervisor, or with modification of the attributes for a server.                                         |
| class-server-default       | internal-server-error        object-deleted<br>object-cleaned                server-shutdown-complete<br><br>This is the default event class for supervisors and spoolers.                                                                                     |
| class-server-status        | object-cleaned<br>server-state-changed<br><br>This event class includes events that give detailed status about the supervisor or the spooler. These changes in status are often routine and do not require intervention.                                       |

## Using Abbreviations for Attribute Names and Values

**Table 7-2. Event Classes (continued)**

| Event Class                  | Individual Events Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------|-------------------------|-------------------------|--------------|------------------------|------------|-----------------------------------|--------------|-------------------|---------------|----------------------|----------------|------------------|-----------------|--------------------------|---------------|-------------------------|---------------|-------------------------|------------------|--------------------|------------------------------|--|
| class-warning                | <table><tbody><tr><td>close-to-discard-time</td><td>printer-needs-administrator</td></tr><tr><td>job-cannot-be-scheduled</td><td>printer-needs-attention</td></tr><tr><td>job-modified</td><td>printer-needs-operator</td></tr><tr><td>job-paused</td><td>printer-shutdown-job-<br/>requeued</td></tr><tr><td>job-requeued</td><td>printer-timed-out</td></tr><tr><td>job-timed-out</td><td>printer-unregistered</td></tr><tr><td>object-cleaned</td><td>queue-backlogged</td></tr><tr><td>object-modified</td><td>resource-needs-attention</td></tr><tr><td>object-paused</td><td>resource-needs-operator</td></tr><tr><td>other-warning</td><td>server-shutdown-started</td></tr><tr><td>printer-disabled</td><td>unable-to-register</td></tr><tr><td>printer-function-unavailable</td><td></td></tr></tbody></table> <p>A warning event occurs whenever a condition arises which affects processing. Generally, a warning event signals a condition that does not prevent completion of the processing, but might indicate that some action is required on the part of the operator or user.</p> | close-to-discard-time | printer-needs-administrator | job-cannot-be-scheduled | printer-needs-attention | job-modified | printer-needs-operator | job-paused | printer-shutdown-job-<br>requeued | job-requeued | printer-timed-out | job-timed-out | printer-unregistered | object-cleaned | queue-backlogged | object-modified | resource-needs-attention | object-paused | resource-needs-operator | other-warning | server-shutdown-started | printer-disabled | unable-to-register | printer-function-unavailable |  |
| close-to-discard-time        | printer-needs-administrator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| job-cannot-be-scheduled      | printer-needs-attention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| job-modified                 | printer-needs-operator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| job-paused                   | printer-shutdown-job-<br>requeued                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| job-requeued                 | printer-timed-out                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| job-timed-out                | printer-unregistered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| object-cleaned               | queue-backlogged                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| object-modified              | resource-needs-attention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| object-paused                | resource-needs-operator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| other-warning                | server-shutdown-started                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| printer-disabled             | unable-to-register                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |
| printer-function-unavailable |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                             |                         |                         |              |                        |            |                                   |              |                   |               |                      |                |                  |                 |                          |               |                         |               |                         |                  |                    |                              |  |

---

## Understanding Default Notification

By default, the person who creates an object, such as a server, receives the notification messages for that object. The notification messages for the default events provide information on topics such as status conditions, error conditions, or configuration changes. Some of these events require intervention by the person managing the object, such as when a printer device requires attention for a paper jam. Determining how much notification administrators, operators, and users require will take some planning and, as you familiarize yourself with HPDPS, you will discover when more or less notification is needed. You can start by using the defaults provided by HPDPS to see how much information HPDPS generates.

The default events set for each object are as follows:

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**Table 7-3. Default Events for Objects**

| Object            | Default Events                                                                                                                                   |                                                                                                                  |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| initial-value-job | No default                                                                                                                                       |                                                                                                                  |
| job               | document-aborted-by-printer<br>document-aborted-by-server<br>document-cancelled-at-printer<br>job-aborted-by-server<br>job-cancelled-by-operator | job-cannot-be-scheduled<br>job-completed<br>job-discarded<br>printer-needs-attention<br>printer-needs-operator   |
| logical printer   | object-cleaned    object-deleted                                                                                                                 |                                                                                                                  |
| physical printer  | object-cleaned<br>object-deleted<br>printer-needs-administrator<br>printer-needs-attention<br><br>printer-needs-operator                         | printer-timed-out<br>printer-paper-jam<br>printer-paper-out<br>printer-paper-output-problem<br>printer-toner-low |
| queue             | object-deleted<br>object-cleaned                                                                                                                 | queue-backlogged                                                                                                 |
| spooler           | internal-server-error<br>object-cleaned                                                                                                          | object-deleted<br>server-shutdown-complete                                                                       |
| supervisor        | internal-server-error<br>object-cleaned                                                                                                          | object-deleted<br>server-shutdown-complete                                                                       |

Table 7-1 provides descriptions for each event listed.

An example of setting the delivery address and letting the other components be set to their defaults is:

```
pdset -c queue -x "notification-profile= \
{delivery-address=tom@hope}" Queue1
```

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## Adding, Replacing, or Deleting Values from Notification Profiles

This section contains the following examples:

- Displaying the contents of a notification profile
- Modifying the notification profiles for HPDPS objects and customizing the lists of events

You can customize notification profiles to specify who receives notification messages for a specific object. You can also configure the notification profile so that different people receive notification messages for different events relating to the same object.

When you first create an object and do not specify a notification profile, HPDPS provides a default notification profile. The default notification profile contains:

|                                |                                                                                                                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>event identifiers</code> | The ones that are identified in the <code>class-object-default</code> item from the notification event classes. The <i>object</i> can be job, logical printer, physical printer, queue, or server. See Table 7-2 for the events within default classes. |
| <code>delivery-method</code>   | electronic-mail                                                                                                                                                                                                                                         |
| <code>delivery-address</code>  | Your <i>UserName</i> and <i>HostName</i>                                                                                                                                                                                                                |
| <code>locale</code>            | Your locale setting based on your <code>LANG</code> environment variable                                                                                                                                                                                |

If the person who will be responsible for the object is someone else, the notification profile should be modified right away.

One of the restrictions for a notification profile is that the `event-identifiers` component is the only component that can have multiple values. Therefore, it is necessary to have more than one notification profile value if more than one person is to receive messages about that object or the creator wants two delivery methods set.

You must use the `+=` and `-=` operators when you are updating a notification profile using the `pdset` command if you want to keep the rest of the notification profile. If you do not, HPDPS replaces the entire notification profile with what you enter (which might be exactly what you want). See

## Using Abbreviations for Attribute Names and Values

“delivery-method and delivery-address Components” and “Sending Different People Messages for the Same Object” for more information on the use of these operators.

You can have many events for a given person in one notification profile value or you can have two values for the same person but with different delivery methods for the same or different events. However, you cannot have the same person with the same delivery-method in more than one value. You can have the same events for different people; each person requires a separate notification profile value.

---

**Note** You can set up attributes files with different combinations of notification events, delivery-methods, delivery-addresses, or locales. Then you can quickly modify the notification profile for an object by issuing a `pdset` command using the `-X` flag to specify the correct attributes file.

---

If you frequently add and delete a common group of people from notification profiles for a specific HPDPS object, you can create attributes files that contain information similar to the following:

```
notification-profile=
{delivery-address=kathyw@sys1.com}
{delivery-address=joang@sys1.com}
{delivery-address=tonys@sys1.com}
```

You can then use the attributes file to quickly make changes to the notification profile. See “Creating a Notification Profile Attributes File” for details.

## Displaying the Contents of a Notification Profile

Use the `-c` flag, `-g`, and `-r notification-profile` with the `pdls` command to display the values without headings for the notification profile of a specific HPDPS object. Displaying the contents of the notification profile is useful if you do not remember what the events are for a given object.

For example, to display the values for the queue `Queue1`, enter:

```
pdls -c queue -g -r notification-profile Queue1
```

HPDPS displays information similar to the following:

```
Queue1:notification-profile=
{event-identifiers=object-deleted object-cleaned
delivery-method=electronic-mail delivery-address
="lisah@sys1.com" locale=C}
{event-identifiers=queue-backlogged class-queue-status
delivery-method=message delivery-address="kathyw"
locale = C}
```

---

## Creating a Notification Profile

An example of creating a notification profile with one value and every component specified for a queue is:

```
pdset -c queue -x "notification-profile= \
{event-identifiers=job-modified queue-state-changed \
delivery-method=e-mail delivery-address=dave@cowboy \
event-comment='This is a job modification or status event' \
locale=C}" Queue1
```

## Using Abbreviations for Attribute Names and Values

### Adding a Value to a Notification Profile

An example of adding a value to the notification profile created in the previous example by using the += operator of the `pdset` command and specifying one of the key components is:

```
pdset -c queue -x "notification-profile+= \
{delivery-address=mary@cowboy}" Queue1
```

Now the notification profile has two values.

```
notification-profile={event-identifiers=job-modified
queue-state-changed
delivery-method=e-mail
event-comment='This is a job modification or status event'
delivery-address=dave@cowboy locale=C}

{event-identifiers=object-deleted object-cleaned
queue-backlogged
delivery-address=mary@cowboy locale=C}
```

The second one contains default values except for the `delivery-address`. If you want values other than defaults, you must specify them.

### Adding an Event to an Existing Value

Assume that the following value is part of a notification profile set for physical printer `PhyPrt1`.

```
{event-identifiers=class-physical-printer-attention
delivery-method=message delivery-address=jjones locale=C}
```

The event-identifier `class-physical-printer-attention` does not contain the event `printer-shutdown` and the user `jjones` wants to know any time that `PhyPrt1` is shutdown. To add the event to the existing events, enter:

```
pdset -x "notification-profile+= \
{event-identifiers=printer-shutdown-job-requeued \
class-physical-printer-attention delivery-method=message \
delivery-address=jjones locale=C}" PhyPrt1
```

## Using Abbreviations for Attribute Names and Values

This causes the value with a `delivery-method` value of `message` and a `delivery-address` of `jjones` to be replaced (use of the `+=` operator) with this new value which contains the desired additional event.

## Specifying Who Receives Notification

The following information provides examples of using the `delivery-method` and the `delivery-address` components to add, replace, and delete values.

## Sending Different People Messages for the Same Object

Because the `notification-profile` attribute is multiple-valued, you can specify that different people are to receive notification messages about the same or different events for the same HPDPS object.

For example, to specify that `joang@sys1.com` and `kathyw@sys1.com` receive notification about the status of queue `Queue1`, enter:

```
pdset -c queue -x "notification-profile= \
{event-identifiers=class-queue-status \
delivery-method=electronic-mail \
delivery-address=joang@sys1.com} \
{event-identifiers=class-queue-attention \
delivery-method=electronic-mail \
delivery-address=kathyw@sys1.com}" Queue1
```

## Setting Two Values for the Same Person

Within a single notification profile, each person (delivery address) can have, at most, two values (one for each delivery method).

## Setting Two Values for Someone Other Than Yourself

Assume that you are creating objects and setting up notification profile for those objects. You want John Jones to receive a notification message concerning any of the default events for queue `Queue1` contained in spooler `Spool1`.

## Using Abbreviations for Attribute Names and Values

Assumptions for this example:

- You want him to receive the message whether he is logged on or off. Because of this, `jjones` will receive some duplicate messages when logged on; one set on the display and the other set using electronic mail.
- You do not want to delete any other values you might have set or were set for you when you created this queue.
- John Jones *UserName* is `jjones` and has the same *locale* as you.

Enter:

```
pdset -c queue -x "notification-profile+= \
{delivery-address=jjones@mmco.com} \
{delivery-method=message delivery-address=jjones}" Queue1
```

You have taken advantage of the defaulting conditions of the notification profile.

- Both values will be added to the existing values; the first added value will have a delivery method of electronic mail (e-mail) and the second will have a delivery method of message (the default).
- Both will have the default set of events for a queue and the default of your *locale*.

If you check the values by using the command:

```
pdls -c queue -g -r notification-profile Queue1
```

You would see two values similar to these among the others:

```
{event-identifiers=object-deleted object-cleaned
queue-backlogged delivery-method=electronic-mail
delivery-address=jjones@mmco.com
locale = C}
{event-identifiers=object-deleted object-cleaned
queue-backlogged
delivery-method=message
delivery-address=jjones locale=C}
```

Assumptions for this example:

- You want to keep the value set when you created the queue.
- You want also to know if queue `Queue1` becomes backlogged any time when you are not logged on.

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## Using Abbreviations for Attribute Names and Values

Enter:

```
pdset -c queue -x "notification-profile+= \
{event-identifier=queue-backlogged delivery-method=e-mail}" \
Queue1
```

You have taken advantage of the defaulting conditions of the notification profile.

- One value will be added to the existing values.
- The added value will have one event (queue-backlogged) and a delivery method of electronic mail.
- The added value will have the default of your locale and your delivery address.

If you check the values by using the command:

```
pdls -c queue -g -r notification-profile Queue1
```

You would see two values similar to these among any others:

```
{event-identifiers=queue-backlogged
delivery-method=electronic-mail
delivery-address=user@mmco.com locale=C}
{event-identifiers=object-deleted object-cleaned
queue-backlogged delivery-method=message
delivery-address=username locale=C}
```

### Using Just the delivery-method Component

If you just use the component `delivery-method`, you can add, replace, or delete a notification profile value that contains your delivery address value and the correct delivery method value (one you specify).

- To add a `notification-profile` value containing the default values for the other components or replace an existing value that has your delivery address and a delivery value of electronic mail, enter:

```
pdset -c queue -x "notification-profile+= \
{delivery-method=e-mail}" Queue1
```

- To delete a `notification-profile` value containing your delivery address and a delivery value of message, enter:

## Using Abbreviations for Attribute Names and Values

```
pdset -c queue -x "notification-profile-= \
{delivery-method=message}" Queue1
```

## Using Just the delivery-address Component

If you just use the component `delivery-address`, you can add or remove values that have a delivery method of `e-mail` for a specific HPDPS object. You can also use it to replace an existing value with one that contains the default values for the components of the specified object. The person you specify will receive notification messages for the default class of events for the object; you do not have to include any of the other components unless you want items other than the default values. For example:

- To add the user `kathyw@sys1.com`, to the notification profile for the queue `Queue1`, enter the command:

```
pdset -c queue -x "notification-profile+= \
{delivery-address=kathyw@sys1.com}" Queue1
```

This adds a value to the notification profile for user `kathyw` with the other component values set to the defaults values for a queue. If a value already exists for this user with a delivery method of `e-mail`, this will replace the existing value.

- To delete the user `kathyw@sys1.com` from the notification profile for the queue `Queue1`, enter:

```
pdset -c queue -x "notification-profile-= \
{delivery-address=kathyw@sys1.com}" Queue1
```

This will delete the notification profile value for user `kathyw` with a `delivery-method` of `e-mail`. If there was another value for the same user but with a `delivery-method` of `message`, that value would not be deleted.



## Creating a Notification Profile Attributes File

You can set values for a `notification-profile` attribute by entering attribute information on the command line. This requires an excessive amount of typing, however, and leaves room for error. You might find using an attributes file to specify events for the `notification-profile` attribute to be more efficient. Also, you cannot add or delete individual events from an existing notification profile value by using the `+=` and `-=` operators with the `notification-profile` attribute. You must specify the complete list of events you want each time a change to a value is required. If you use an attributes file, you can quickly add to or delete from the list of events for a value.

Use the following procedure to create and modify an attributes file for use with the `pdset` command.

1. Use the `pdls` command to redirect the contents of a notification profile to a file with a name of your selection. For example, to redirect the notification profile for the queue `Queue1` to a file named `Queue1.notif`, enter:

```
pdls -c queue -g -r notification-profile Queue1 > Queue1.notif
```

The new file you created contains information similar to the following:

```
Queue1:notification-profile= \
{event-identifiers=object-deleted object-cleaned \
delivery-method=message delivery-address= \
"lisah" locale=C} \
{event-identifiers=queue-backlogged class-queue-status \
delivery-method=electronic-mail \
delivery-address="kathyw@sys1.com" locale=C}
```

2. Use an HP-UX text editor to modify the file you created.

Modify and add information as required. For example, you might want user `kathyw` to know if there are jobs in the queue close to their discard time. You would add the event `close-to-discard-time` to the list of event identifiers for the value for `kathyw`.

3. Save the changes in plain text format and exit from the editor.

The file would look like this now:

```
Queue1:notification-profile= \
{event-identifiers=object-deleted object-cleaned \
close-to-discard-time delivery-method=message delivery-address= \
"lisah" locale=C} \
{event-identifiers=queue-backlogged class-queue-status \
delivery-method=electronic-mail \
delivery-address="kathyw@sys1.com" locale=C}
```

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```
{event-identifiers=object-deleted object-cleaned \
delivery-method=message delivery-address="lisah" locale=C} \
{event-identifiers=queue-backlogged class-queue-status \
close-to-discard-time delivery-method=electronic-mail \
delivery-address="kathyw@sys1.com" locale=C}
```

## Setting Notification Profile Values Using an Attributes File

Use the `-c` and `-X` flags with the `pdset` command to modify the notification profile for a specific HPDPS object using values contained in an attributes file. You must specify the class of the object (unless it is a printer) and the object name.

For example, to modify the notification profile for the queue `Queue1` and to use the values specified in the attributes file `Queue1.notif`, enter:

```
pdset -c queue -X Queue1.notif Queue1
```

## Resetting a Notification Profile to the Original Default Values

Use the `-c` flag and `-x notification-profile==` to return the notification profile for a specific HPDPS object to the values it contained when the object was created. After you modified a notification profile you might find that you no longer need the modifications you made. But remember, if you did not create the object, the `delivery-address` value is reset to the address of the person that did create the object.

Assume that you created and are responsible for some spoolers and queues. You have returned from vacation but before you left you changed the notification profiles so another person received the messages. You now want to reset the profiles so you will receive the messages.

To reset the `notification-profile` values for the queue `Queue1` contained in spooler `Spool1` to the default values, enter the command:

```
pdset -c queue -x "notification-profile==" Queue1
```

You will have to do the same with the other notification profiles you changed.

## Notification Profile Examples by HPDPS Object Type

This section shows examples of notification profiles. In some of the examples, the events specified apply to both the main object, such as a spooler, and objects contained within the object, such as a queue.

### Spooler Notification Profile Examples

These examples show how you can set up a notification profile for a spooler.

Assumptions, Example 1:

- The person (Jake Jones) who will be responsible for the spooler wants to know about any event that occurs in the spooler `Spool3` only when he is at work and logged on.

Jake would enter this command:

```
pdset -c server -x "notification-profile \
={event-identifiers=class-server-attention \
class-server-configuration \
class-server-status}" Spool3
```

Notes:

- Jake used the class event items so he would not have to list each event identifier. The notification profile causes messages to be issued for these events:
  - `internal-server-error`
  - `object-cleaned`
  - `object-deleted`
  - `server-shutdown-complete`
- Jake will receive a message for any logical printer or queue contained in the `Spool3` if it is cleaned, deleted, or modified.
- Jake does not have to enter the other components and their values because `delivery-method` defaults to `electronic-mail`, `delivery-address` defaults to his *UserName* and *HostName*, and `locale` defaults to his `LANG` environment variable setting.

The following example shows how you can set up a notification profile for a spooler and also specify events that apply to the logical printers and queues contained in the spooler.

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The spooler contains multiple logical printers and queues.

Assumptions, Example 2:

- The primary operator (**adgreen**) is responsible for managing the spooler.
- The backup operator (**fgbrown**) is to be notified for the same set of events.

The primary and backup operator are to receive messages for all spooler events contained in the default, attention, and configuration classes.

- The primary operator is to receive the notifications using messages and electronic mail when logged on and using electronic mail when logged off.

Using electronic-mail ensures that all messages are received whether logged on or not. In this case, the primary operator will receive duplicate messages when logged on.

- The backup operator is to receive the same messages using electronic mail.
- The operators need to know if
  - A queue is or has been backlogged.
  - A queue or logical printer has been cleaned, created, modified, or deleted within that server.
- The administrator who created the spooler, **jswhite**, only monitors the default class of events for the spooler **Spool1** and objects contained in the spooler by electronic mail.

To set the notification profile for spooler **Spool1**, enter:

```
pdset -c server -x "notification-profile= \
{event-identifiers=class-server-attention \
class-server-configuration \
object-cleaned \
object-created \
object-deleted \
object-modified \
queue-backlogged \
delivery-method=electronic-mail \
delivery-address=adgreen@poplar.xyz.com} \

event-identifiers=class-server-attention \
class-server-configuration \
object-cleaned \
object-created \

```

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## Using Abbreviations for Attribute Names and Values

```
object-deleted \
object-modified \
queue-backlogged \
delivery-method=message \
delivery-address=adgreen} \

event-identifiers=class-server-attention \
class-server-configuration \
object-cleaned \
object-created \
object-deleted \
object-modified \
queue-backlogged \
delivery-method=message \
delivery-address=fgbrown} \

event-identifiers=internal-server-error \
object-cleaned \
object-deleted \
server-shutdown-complete \
delivery-method=e-mail \
delivery-address=jswhite@poplar.xyz.com}" \
Spool1
```

Notes:

- This notification profile could be created in an attributes file and set from the command line. You would create a file that contained just the `notification-profile` attribute and its values. Then you would use that file (possibly named `spool1.np`) from the command line by entering the command:  

```
pdset -c server -X spool1.np Spool1
```
- You would want to modify all the logical printer and queue notification profiles so that the operators do not have the same events identified in two notification profiles. If this is not done, the operators might receive duplicate messages for some events because both the spooler and the other object notification profiles are active.

## Using Abbreviations for Attribute Names and Values

### Logical Printer Notification Profile Examples

These examples show how you can set up notification profiles for logical printers.

Assumptions, Example 1:

- An operator (`fpjones`) is responsible for managing any event that requires intervention of the logical printer operation.
- The administrator (`lbjohnson`) wants to know about any configuration events that occur on this logical printer.

To satisfy these conditions this notification profile can be entered from the command line using either the `-x` flag or the `-X` flag if the notification profile is contained in an attributes file. To set the notification profile for `LogPrt3`, enter:

```
pdset -x "notification-profile= \
{event-identifiers=class-logical-printer-configuration \
delivery-method=electronic-mail \
delivery-address=lbjohnson@willow.xyz.com} \
{event-identifiers=class-logical-printer-attention \
delivery-method=electronic-mail \
delivery-address=fpjones@poplar.xyz.com}" LogPrt3
```

Assumptions, Example 2:

- The operator (`fpjones`) from Example 1 has taken a new job and the new operator is named `majones`.
- The value for `lbjohnson` is to be kept, the value for `fpjones` is to be deleted, and a value is to be added for `majones`.

One way to make these changes is to enter these two commands:

```
pdset -x "notification-profile-= \
{delivery-address=fpjones@poplar.xyz.com}" LogPrt3

pdset -x "notification-profile+= \
{event-identifiers=class-printer-attention \
delivery-method=message \
delivery-address=majones}" LogPrt3
```

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## Using Abbreviations for Attribute Names and Values

---

**Note** The deletion of the value for `fpjones` works because the `delivery-method` had been `e-mail` and this command defaults to `electronic-mail`. To ensure that the value deleted is the one you want, specify both the `delivery-method` and value and `delivery-address` and value.

---

### Queue Notification Profile Example

This example shows how you can set up a notification profile for a queue, including assigning job-related events for the queue.

Assumptions:

- One operator (`jhpong`) is responsible for managing a single queue (`Queue2` in `Spool2`) and wants notification for certain events concerning the queue and jobs within the queue.
- The queue receives jobs from multiple logical printers.

The operator (`jhpong`) sets the notification profile for `Queue2` by entering the command:

```
pdset -c queue -x "notification-profile= \
{delivery-method=message event-identifiers=class-queue-attention \
class-queue-configuration object-cleaned job-aborted-by-server \
job-cannot-be-scheduled close-to-discard-time job-discarded}" \
Queue2
```

which results in this notification profile:

```
notification-profile=
{event-identifiers=class-queue-attention
class-queue-configuration object-cleaned job-aborted-by-server
job-cannot-be-scheduled close-to-discard-time job-discarded
delivery-method=message delivery-address=jhpong} locale=C
```

Notes:

- The events contained in the `class-queue-attention`, `class-queue-configuration` and the `object-cleaned` event apply to the queue itself.

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- The following events apply to all jobs sent to the queue by all of the logical printers associated with the queue:
  - job-aborted-by-server
  - close-to-discard-time
  - job-cannot-be-scheduled
  - job-discarded

## Supervisor Notification Profile Examples

The following example shows a supervisor notification profile. This notification profile also specifies events that apply to the physical printers contained in the supervisor.

Assumptions, Example 1:

- The administrator (`jswhite`) who created the supervisor is also responsible for managing the supervisor (`Super1`).
- He wants more feedback than the default values will give.
- He wants to know if something has happened even when he is logged off.

---

**Note**            The example shown here uses an attributes file to specify the new notification profile. The text of the attributes file follows the command.

---

To modify the default notification profile when the supervisor was created and to receive certain notification even when logged out, the administrator (`jswhite`) would enter the command:

```
pdset -c server -X Extra.notif Super1
```

where the file `Extra.notif` contains:

```
notification-profile= \
{event-identifiers=class-server-configuration \
class-physical-printer-configuration \
delivery-method=electronic-mail} \
{event-identifiers=class-server-attention \
printer-needs-administrator}
```



## Using Abbreviations for Attribute Names and Values

The resulting notification profile for supervisor Super1 is:

```
notification-profile=
{event-identifiers=class-server-configuration
class-physical-printer-configuration
delivery-method=electronic-mail
delivery-address=jswhite@poplar.xyz.com locale=C}
{event-identifiers=class-server-attention
printer-needs-administrator delivery-method=message
delivery-address=jswhite locale=C}
```

jswhite will receive messages for:

```
internal-server-error
other-error
other-warning
server-shutdown-started
server-shutdown-complete
```

when logged on, and

```
object-deleted (server)
object-modified (server)
server-startup-complete
object-created (physical printer)
object-deleted (physical printer)
object-modified (physical printer)
```

when logged on or logged off.

### Physical Printer Notification Profile Examples

The following examples show a possible notification profile where the operator monitors the activity of the supervisor and the physical printers for the administrator.

Assumptions, Example 1:

- There are two people responsible for the supervisor:
  - The administrator, lbjohnson, who created the supervisor and controls the management of the supervisor.

## Using Abbreviations for Attribute Names and Values

- An operator, `fpjones`, who is responsible for monitoring the every-day operation of the supervisor and the physical printers contained in it. `fpjones` never logs off while at work.

In this way the operator can notify the administrator of needed actions should the administrator be logged off or busy with other activities and the operator cannot handle the event.

---

**Note**            The example shown here uses an attributes file to specify the new notification profile. The text of the attributes file follows the command.

---

To modify the `notification-profile` attribute of the supervisor `Super2` to reflect the responsibilities of administrator and operator, the administrator, `lbjohnson` would enter the command:

```
pdset -c server -X SuperAdmOper.notif Super2
```

where the file `SuperAdmOper.notif` contains:

```
notification-profile= \
{delivery-method=electronic-mail} \
{event-identifiers=class-server-attention \
class-physical-printer-configuration \
delivery-address=fpjones@poplar.xyz.com}
```

The resulting notification profile for supervisor `Super2` is:

```
notification-profile=
{event-identifiers=internal-server-error object-cleaned
object-deleted server-shutdown-complete
delivery-method=electronic-mail
delivery-address=lbjohnson@willow.xyz.com locale=C}
{event-identifiers=class-server-attention
class-physical-printer-configuration
delivery-method=message
delivery-address=fpjones locale=C}
```

Notes:

## Using Abbreviations for Attribute Names and Values

- The printer events, contained in the `class-physical-printer-configuration`, specified for the operator `fpjones`, applies to all of the physical printers in the supervisor.
- The following events specified for the administrator, `lbjohnson`, also apply to all of the physical printers in the supervisor:
  - `object-cleaned`
  - `object-deleted`

The notification profile in the following example can be set when creating the physical printer with the `pdcreate` command or with the `pdset` command using the `-x` flag or using an attributes file with the `-X` flag.

Assumptions, Example 2:

- One operator per shift is responsible for managing the physical printer `PhyPrt2` contained in spooler `Super2`.
- A common mail box has been setup for the operators called `OPER`.
- Because the `PhyPrt2` is a three-shift operational printer, the operators want to keep a daily log of events. In this way any operator can find out what occurred on the other shifts.

A notification profile to satisfy these conditions could be set using the command:

```
pdset -x "notification-profile= \
{event-identifiers=class-physical-printer-attention \
class-printer-configuration class-printer-status \
delivery-method=e-mail \
delivery-address=OPER@walnut.xyz.com}" LogPrt2
```

## Initial-Value-Job Notification Profile Examples

---

|             |                                                                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | You must enter all components and values for an initial-value-job notification profile except for the <code>delivery-method</code> of message. |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------|

---

This example shows a possible notification profile for an initial-value-job object.

Assumptions:

## Using Abbreviations for Attribute Names and Values

- For select jobs, you want your assistant, Todd, to receive messages on the display that indicate problems such as the printer needs paper and a message when the job is complete, so the job can be picked up.
- You want to receive messages concerning all events covered by the class `class-job-default` by message.

You would enter the command:

```
pdcreate -c initial-value-job -x "notification-profile= \
{event-identifiers=class-job-attention \
job-complete delivery-address=toddp \
locale=C} \
{event-identifiers=class-job-default delivery-method=message \
delivery-address="toddp" \
locale=C}" Spool1:myivj1
```

This will create an `initial-value-job` object named `myivj1` in spooler `Spool1` with a notification profile of:

```
notification profile=
{event-identifiers=class-job-attention job-complete
delivery-method=message delivery-address="toddp"
locale=C}
{event-identifiers=class-job-default delivery-method=message
delivery-address="toddp" locale=C}
```

When you want to use this `initial-value-job` object with one of your jobs, you would enter the command:

```
pdpr -x "initial-value-job=myivj1" filename
```

This example shows you how to create an `initial-value-job` object to be associated with logical printer `LogPrt2` to support a user group.

```
pdcreate -c initial-value-job -x "notification-profile= \
{event-identifiers=class-job-default \
close-to-discard-time past-discard-time job-timed-out \
delivery-method=message locale=C}" Spool3:IVJGrp1

pdset -x "printer-initial-value-job=IVJGrp1" Spool3:LogPrt2
```

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## Using Abbreviations for Attribute Names and Values

This creates the initial-value-job object `IVJGrp1` and associates it with logical printer `LogPrt2` in spooler `Spool3`. The notification profile contains:

```
notification-profile=
{event-identifiers=class-job-default close-to-discard-time
past-discard-time job-timed-out delivery-method=message
locale=C}
```

Note that the `delivery-address` component is missing. When a user submits a job to this logical printer, the `delivery-address` for the messages is set to the *UserName*, therefore that user will receive the messages.

### Job Notification Profile Example

When you submit a job, you can use the default notification profile, a modified version of the default notification, or your own notification profile.

There are several ways to set notification for your jobs:

- Default Notification

If you do not specify your own values for the `notification-profile` attribute when you submit a job, HPDPS uses the default notification profile. For the vast majority of users, the default notification profile gives adequate results. See Table 7-2 for a list of the events contained in the `class-job-default` class.

- Default Notification by e-mail

You can receive the default events for your job by submitting a job with the `-N` flag value set to `e-mail`. By doing this, you cause a notification profile to be set for that job that uses the default events, your address and locale, and sends the email.

- Using an Initial-Value-Job Object

You can submit your job to a logical printer that has an initial-value-job object associated with it and receive the messages for the events defined in that initial-value-job object.

You can submit your job and identify the initial-value-job object you want by using the `-x` flag.

- Using an Attributes File

## Using Abbreviations for Attribute Names and Values

You can submit your job and use the `-X` flag to bring in an attributes file that contains the notification profile you want to use.

---

## Getting Help for Notification Messages

Use the `pdmsg` command and specify the message number to display help for notification messages you receive.

For example, you receive notification messages similar to the following regarding the backlogged status of `Queue1` contained in the spooler `Spool1`.

```
To: syoussef@hope.bpc.datacom.com
Subject: 5010-192 Message from HPDPS server: Spool1

[05/23/95 07:26:381] 5010-304 The queue
Spool1:Queue1 is backlogged.
```

To receive help for message 5010-304, enter:

```
pdmsg 5010-304
```

HPDPS displays information similar to the following:

```
5010-304 The queue is backlogged.
5010-304
EXPLANATION: HPDPS calculates that there are too many jobs
in this queue for all the jobs to print within the time
specified by the queue-backlog-upper-bound value.
A notification-profile value requested that you be notified
of the event queue-backlogged.
SYSTEM ACTION: The queue continues to accept jobs, but there will
be a delay before they print.
RESPONSE: Alleviate the backlog by moving some of the
jobs to a different queue or by adding physical printers to
this queue.
```

## Summary Tables for the notification-profile Attribute

Table 7-4 provides information on the commands used to set the components for a `notification-profile` attribute for the different objects as well as syntax definition.

## Using Abbreviations for Attribute Names and Values

**Table 7-4. Notification Profile Attribute Summary**

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------|-------|-------------------------------------------------------------------------|---------|-----------------------------------------------|------------|-----------------------------------------------|
| Purpose                          | Designates which persons are to be notified of specific events relating to a given object, and how the persons are to be notified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| commands to set by object class: | <table> <tr> <td>initial-value-job</td> <td>Settable with the <code>pdcreate</code> or <code>pdset</code> commands.</td> </tr> <tr> <td>job</td> <td>Settable with the <code>pdpr</code>, <code>pdset</code> or <code>pdmod</code> commands.</td> </tr> <tr> <td>logical-printer</td> <td>Settable with the <code>pdcreate</code> or <code>pdset</code> commands.</td> </tr> <tr> <td>physical-printer</td> <td>Settable with the <code>pdcreate</code> or <code>pdset</code> commands.</td> </tr> <tr> <td>queue</td> <td>Settable with the <code>pdcreate</code> or <code>pdset</code> commands.</td> </tr> <tr> <td>spooler</td> <td>Settable with the <code>pdset</code> command.</td> </tr> <tr> <td>supervisor</td> <td>Settable with the <code>pdset</code> command.</td> </tr> </table> | initial-value-job | Settable with the <code>pdcreate</code> or <code>pdset</code> commands. | job | Settable with the <code>pdpr</code> , <code>pdset</code> or <code>pdmod</code> commands. | logical-printer | Settable with the <code>pdcreate</code> or <code>pdset</code> commands. | physical-printer | Settable with the <code>pdcreate</code> or <code>pdset</code> commands. | queue | Settable with the <code>pdcreate</code> or <code>pdset</code> commands. | spooler | Settable with the <code>pdset</code> command. | supervisor | Settable with the <code>pdset</code> command. |
| initial-value-job                | Settable with the <code>pdcreate</code> or <code>pdset</code> commands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| job                              | Settable with the <code>pdpr</code> , <code>pdset</code> or <code>pdmod</code> commands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| logical-printer                  | Settable with the <code>pdcreate</code> or <code>pdset</code> commands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| physical-printer                 | Settable with the <code>pdcreate</code> or <code>pdset</code> commands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| queue                            | Settable with the <code>pdcreate</code> or <code>pdset</code> commands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| spooler                          | Settable with the <code>pdset</code> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| supervisor                       | Settable with the <code>pdset</code> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| Value contains:                  | <p>This is a complex attribute, which has the following components:</p> <pre> event-identifiers delivery-address delivery-method event-comment (optional) locale </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |
| syntax:                          | <pre> -x "notification-profile= {event-identifiers=values delivery-address=value delivery-method=value event-comment='text' locale=value}" </pre> <p>For example:</p> <pre> -x "notification-profile= {event-identifiers=class-error delivery-address=mary@travel delivery-method=electronic-mail event-comment='fix problem' locale=C}" </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |                                                                         |     |                                                                                          |                 |                                                                         |                  |                                                                         |       |                                                                         |         |                                               |            |                                               |



## Using Abbreviations for Attribute Names and Values

Following is a summary of the notification profile components.

**Table 7-5. Notification Profile Component Descriptions**

|                          |                                                                                                             |                              |
|--------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>event-identifiers</b> |                                                                                                             |                              |
| ■                        | Explanation: Specifies the events for which the user is to receive messages.                                |                              |
| ■                        | Value Type: Multiple values.                                                                                |                              |
| ■                        | Values: A text string up to 4095 characters that lists any of the events listed in Table 7-3 and Table 7-2. |                              |
| ■                        | Default: Table 7-3 provides descriptions for each event.                                                    |                              |
| initial-value-job        | No default                                                                                                  |                              |
| job                      | document-aborted-by-printer                                                                                 | job-cannot-be scheduled      |
|                          | document-aborted-by-server                                                                                  | job-completed                |
|                          | document-cancelled-at-printer                                                                               | job-discarded                |
|                          | job-aborted-by-server                                                                                       | printer-needs-attention      |
| logical-printer          | job-cancelled-by-operator                                                                                   | printer-needs-operator       |
|                          | object-cleaned                                                                                              |                              |
| physical-printer         | object-deleted                                                                                              |                              |
|                          | object-cleaned                                                                                              | printer-needs-attention      |
|                          | object-deleted                                                                                              | printer-needs-operator       |
|                          | printer-needs-administrator                                                                                 | printer-paper-jam            |
|                          | printer-paper-out                                                                                           | printer-paper-output-problem |
| queue                    | printer-timed-out                                                                                           | printer-toner-low            |
|                          | object-deleted                                                                                              | queue-backlogged             |
|                          | object-cleaned                                                                                              |                              |
| spooler                  | internal-server-error                                                                                       | object-deleted               |
|                          | object-cleaned                                                                                              | server-shutdown-complete     |
| supervisor               | internal-server-error                                                                                       | object-deleted               |
|                          | object-cleaned                                                                                              | server-shutdown-complete     |

## Using Abbreviations for Attribute Names and Values

**Table 7-5.**  
**Notification Profile Component Descriptions (continued)**

| <p><b>delivery-method</b></p> <ul style="list-style-type: none"><li>■ Explanation: The method by which the person is to receive the event messages.<br/><br/>You can use this component to add, replace, or delete values in a notification profile. For more information see “delivery-method and delivery-address Components”.</li><li>■ Value Type: Single value.</li><li>■ Values: One of the following fixed values:<br/><table border="0"><thead><tr><th><b>Fixed Value</b></th><th><b>Input Synonym</b></th></tr></thead><tbody><tr><td>electronic-mail</td><td>e-mail,email</td></tr><tr><td>message</td><td></td></tr><tr><td>none</td><td></td></tr></tbody></table></li><li>■ Default: <b>e-mail</b></li></ul> <p>Notes:</p> <ol style="list-style-type: none"><li>1. The <b>delivery-address</b> for <b>message</b> is the user name (no hostname). The message is sent locally to the user’s display. If the user, operator, or administrator specified by the <b>delivery-address</b> component is logged off, that person will not receive notification messages.</li><li>2. A value of <b>electronic-mail</b> causes the message to be sent to the mail box of the person who is to receive the message. Good for “off hour” monitoring or generating a log.</li></ol> | <b>Fixed Value</b>   | <b>Input Synonym</b> | electronic-mail | e-mail,email | message |  | none |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|-----------------|--------------|---------|--|------|--|
| <b>Fixed Value</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Input Synonym</b> |                      |                 |              |         |  |      |  |
| electronic-mail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | e-mail,email         |                      |                 |              |         |  |      |  |
| message                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                      |                 |              |         |  |      |  |
| none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                      |                 |              |         |  |      |  |

## Using Abbreviations for Attribute Names and Values

**Table 7-5.**  
**Notification Profile Component Descriptions (continued)**

|                         |                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>delivery-address</b> |                                                                                                                                                                     |
| ■ Explanation:          | The address of the person to receive the event messages.                                                                                                            |
|                         | You can use this component to add, replace, or delete values in a notification profile. For more information see “delivery-method and delivery-address Components”. |
| ■ Value Type:           | Single value.                                                                                                                                                       |
| ■ Values:               | A text string that contains the name and hostname (if using e-mail) of the person that is to receive notification.                                                  |
| ■ Default:              |                                                                                                                                                                     |
| initial-value-job       | No default                                                                                                                                                          |
| job                     | The <i>UserName</i> of the user that submitted the job using the <b>pdpr</b> command.                                                                               |
| logical-printer         | The <i>UserName</i> of the user that created this logical-printer.                                                                                                  |
| physical-printer        | The <i>UserName</i> of the user that created this physical-printer.                                                                                                 |
| queue                   | The <i>UserName</i> of the user that created this queue.                                                                                                            |
| spooler                 | The <i>UserName</i> of the user that created this spooler.                                                                                                          |
| supervisor              | The <i>UserName</i> of the user that created this supervisor.                                                                                                       |

## Using Abbreviations for Attribute Names and Values

**Table 7-5.**  
**Notification Profile Component Descriptions (continued)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>event-comment</b></p> <p>This is an optional component.</p> <ul style="list-style-type: none"><li>■ Explanation: Supplies textual information that is appended to the event message.</li><li>■ Value Type: Single value.</li><li>■ Values: A text string up to 4095 characters that supplies additional information concerning the event.</li><li>■ Default: No value.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>locale</b></p> <p>The locale value is based on the <b>LANG</b> environment variable. This component is character case-sensitive. Ensure that you enter it correctly on the command line or in an attributes file if you do specify it.</p> <ul style="list-style-type: none"><li>■ Explanation: Identifies the locale of the user that is to receive the messages.</li><li>■ Value Type: Single value.</li><li>■ Values: A text string that identifies the locale to be used. This is used to determine the language and coded character set in which the message is to be sent.</li><li>■ Default:<ul style="list-style-type: none"><li>initial-value-job    The locale of the user that created this initial-value-job.</li><li>job                    The locale of the user that submitted the job with the <b>pdpr</b> command.</li><li>logical-printer      The locale of the user that created this logical-printer.</li><li>physical-printer    The locale of the user that created this physical-printer.</li><li>queue                 The locale of the user that created this queue.</li><li>spooler               The locale of the user that created this spooler.</li><li>supervisor            The locale of the user that created this supervisor.</li></ul></li></ul> |

## Managing DCE Security for HPDPS

---

Distributed Computing Environment (DCE) is an application that allows the secure use and administration of distributed applications such as HP Distributed Print Service (HPDPS). HPDPS optionally uses DCE for security services when executing in a DCE cell. HPDPS must be configured to execute in the DCE Extended Environment to use DCE security services.

Managing DCE security is similar to managing UNIX security. As an administrator of DCE, you create groups, which have certain permissions in relation to HPDPS objects. Each user who has an account with a group has the permissions for the group when the user is logged in to DCE. A DCE group that has **read**, **write** and **delete** permission for an HPDPS object, such as a spooler or a queue, is similar to a UNIX group that has **read**, **write**, and **execute** permission for a UNIX directory or file. Unlike UNIX **write** permission, DCE **write** permission allows you to modify, but not delete, an object.

## Using Abbreviations for Attribute Names and Values

### DCE Documentation

Table 8-1 lists the books available from Prentice-Hall.

**Table 8-1. List of DCE Documentation**

| HP Part Number | Title                                                                      | ISBN#               |
|----------------|----------------------------------------------------------------------------|---------------------|
| B3190-90052    | <i>Planning and Configuring HP DCE</i>                                     | None                |
| B3190-90037    | <i>OSF DCE Application Development Reference</i>                           | ISBN# 0-13-185869-6 |
| B3190-90038    | <i>OSF DCE Application Developers Guide Vol 1: Intro &amp; Style Guide</i> | ISBN# 0-13-185877-7 |
| B3190-90039    | <i>OSF DCE Application Developers Guide Vol 2: Core Components</i>         | ISBN# 0-13-185885-8 |
| B3190-90040    | <i>OSF DCE Application Developers Guide Vol 3: Directory Services</i>      | ISBN# 0-13-185893-9 |
| B3190-90046    | <i>Introduction to OSF DCE</i>                                             | ISBN# 0-13-185810-6 |
| B3190-90047    | <i>OSF DCE Command Reference</i>                                           | ISBN# 0-13-185851-3 |
| B3190-90048    | <i>OSF DCE Administration Guide Vol 2: Core Components</i>                 | ISBN# 0-13-185844-0 |
| B3190-90049    | <i>OSF DCE DFS Administration Guide and Reference</i>                      | ISBN# 0-13-185828-9 |
| B3190-90050    | <i>OSF DCE GDS Admin Guide and Reference</i>                               | ISBN# 0-13-185901-3 |

## 8-2 Managing DCE Security for HPDPS

## Determining Appropriate DCE Permissions for HPDPS User Groups

This section discusses examples of four different categories of users who need different kinds of permission for HPDPS objects. In the examples, you will see how to give each category the minimum permissions necessary to do a given job.

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Administrators    | This group needs to be able to create, delete, and modify the objects for which they are responsible in the printing network. To do this, they must have <b>read</b> , <b>write</b> and <b>delete</b> permission for the objects. The default <b>pd_admin</b> group, which is created by the <b>pddcesetup</b> command, already has these permissions for all HPDPS objects. See “Deciding Which Groups Your Organization Needs” for an explanation of how the default groups were created and how they received their permissions.                                                                                                                                                                                                                                                                                                       |
| HPDPS Operators   | This group needs to be able to manage jobs and assist users. The operator must have <b>read</b> and <b>write</b> permission for the physical printer. If the operator will be assisting with jobs that are retained in the spooler, the operator must have <b>read</b> and <b>write</b> permission for the spooler. The default <b>pd_operator</b> group, which is created by the <b>pddcesetup</b> command, already has <b>read</b> and <b>write</b> permission for all HPDPS objects in your system, including all queues, physical printers, and spoolers.                                                                                                                                                                                                                                                                             |
| Printer Operators | This group loads media and other supplies into the printer devices they support. To make a physical printer accurately reflect the state of its printer device, a printer operator needs to be able to set the physical printer attribute such as <b>job-size-range-ready</b> . To set these physical printer attributes, the operator must have <b>read</b> and <b>write</b> permission for the physical printer. The default <b>pd_operator</b> group, which is created by the <b>pddcesetup</b> command, already has <b>read</b> and <b>write</b> permission for all HPDPS objects in your system, including all physical printers. See “Planning a Printer Operator Group” for instructions on creating a new Printer Operator group with appropriate permissions. The steps for planning and creating a new HPDPS Operator group are |

## Using Abbreviations for Attribute Names and Values

similar, except that they apply to queues and spoolers. The steps for planning and creating a new Administrator group also are similar.

**End Users** This group needs to be able to print jobs, modify their own jobs, cancel their own jobs, and query HPDPS objects. If most printers will be available to all users, and if all printer functions will be available to all users, then users do not need to log in to DCE. When you do not restrict a printer, a user does not have to log in to DCE to submit, modify, query, and cancel jobs. Users who print from other platforms, such as Windows, cannot print to restricted printers. However, if you restrict a logical printer and assign a group to it with **read** permission, a user must be a member of that group to submit jobs to the logical printer. For instructions on creating a group for users of restricted printers, see “Planning a Group for People Who Will Use Restricted Printers”. When you have created the appropriate groups, refer to the DCE documentation to add users to the groups. Refer to “DCE Documentation”.

---

## Deciding Which Groups Your Organization Needs

When you execute the `pddcesetup` command, the command creates two DCE groups: `pd_admin` and `pd_operator`. By default, these groups have permissions for every object in every HPDPS system you create. This includes spoolers, supervisors, queues, logical and physical printers, and other objects. The `pd_admin` group has **read**, **write**, and **delete** permission, and the `pd_operator` group has **read** and **write** permission. The `pd_admin` and `pd_operator` groups might be sufficient for your needs. Members of these two groups can do all of the administrative and operational work for your system. See “Giving Your DCE Groups Permissions to HPDPS Objects” for an explanation of how DCE permissions work and for instructions on how to give DCE groups permissions for HPDPS objects.

However, your organization might require different kinds of permissions than are provided by these two groups. For example, you can create groups that

### 8-4 Managing DCE Security for HPDPS



## Using Abbreviations for Attribute Names and Values

have some of the same permissions that these have, but to fewer servers or other objects. Or you can give some individuals permissions for specific HPDPS objects. In this way, you can allow people to do certain tasks, such as modifying physical printers or using restricted printers, without allowing those people to modify or use all of the objects in the system. For instructions on how to create additional DCE groups, see “Creating Additional Groups”. For instructions on how to give a person an account with a DCE group, see the appropriate DCE documentation.

---

## Creating Additional Groups

This section gives examples of different groups you can create to supplement the two default groups, `pd_admin` and `pd_operator`. This section discusses two examples:

- The printer operator group
- The group for users of restricted printers

You also can create additional groups for HPDPS Operators and Administrators.

### Planning a Printer Operator Group

A printer operator is a person who is responsible for supporting and maintaining printer devices. This entails such tasks as putting new toner in the printers, loading various media into the printers, and making the printers available for large and small jobs at different times of the day.

The permissions needs of a printer operator who manages physical printers are far less than those that the default `pd_operator` group has. Members of the `pd_operator` group have `read` and `write` permission for all HPDPS objects in your distributed print environment. This means that they can modify all the HPDPS objects. A printer operator group only needs `read` and `write` permission for the physical printers under the care of the group.

When you plan printer operator groups, first decide for which printers each different group needs `read` and `write` permission. For example, suppose that your organization has two printer rooms, and each room has a number of

## Using Abbreviations for Attribute Names and Values

different printer devices, but as yet, none of those printer devices are managed by HPDPS. The easiest way to set up your permissions is to have all the printer devices in each room managed by physical printers in a dedicated set of supervisors. This creates a correspondence between the physical organization of the hardware and the logical organization of the hardware management.

There are other ways to group physical printers together for DCE security management purposes. For example, you might want to group together all of the desktop printers used by a particular user group. Following is a set of overall guidelines you can follow to create physical printers that allow the correct permissions to your printer operator groups.

1. First, decide which supervisors will contain the physical printers representing printer devices in a particular printer room. You will probably want to create new, dedicated supervisors using the `pdstartsuv` command.
2. Next, after creating the supervisors but before creating the physical printers contained in the supervisors, create the printer operator group for the room.
3. Give the group `read` and `write` permission for the DCE `printer` directory of each supervisor for the room. See “Giving Your DCE Groups Permissions to HPDPS Objects” for instructions.
4. Create the physical printers in the supervisors. Create one physical printer for each printer device in the room. Because you already gave the printer operator group `read` and `write` permission for the DCE `printer` directory of each supervisor for the room, the printer operator group automatically gets `read` and `write` permission for each newly created physical printer.
5. Give each person who is a printer operator for the room membership in the printer-operator group for the room. See the appropriate DCE documentation for instructions on how to do this.

If you have already created the supervisors and the physical printers representing the printer devices in the room, you can do the following tasks:

1. Archive the physical printers (see “Creating Archive Files for Supervisors and Supervisor Objects” in Chapter 10 for information on how to archive an HPDPS object).
2. Delete the physical printers.
3. Modify the configuration of the security for the supervisors in the room.

## 8-6 Managing DCE Security for HPDPS

## Using Abbreviations for Attribute Names and Values

4. In the supervisors, use the physical printer archives to create physical printers equivalent to those you deleted.

If you have already created physical printers and do not want to delete them and create them again, you can give the group permission for each of the physical printers individually. See “Giving Your DCE Groups Permissions to HPDPS Objects” for an explanation of how to do this.

## Planning a Group for People Who Will Use Restricted Printers

This section discusses two ways you can use DCE to restrict printers. You can:

- Restrict all use of a particular printer device to a special group of users, such as managers who need to print confidential employee information
- Restrict certain functions of a printer device, such as one-sided printing, to certain users

Together, HPDPS and DCE provide considerable flexibility in ways you can restrict access to physical printers and their features.

## Restricting Access to a Printer Device

Use this section to restrict all use of a printer device to a particular group of users.

1. Restrict each logical printer sending jobs to the physical printer representing the device so that it only accepts print requests from those users who are logged in to DCE. To do this, use the `pdset` command to set the value of the `authorize-jobs` attribute for each logical printer to `yes`. Now users who are not logged in to DCE or print from other platforms, cannot submit jobs to the logical printer or printer.
2. Restrict each logical printer so that it only accepts print requests from those users who are both logged in to DCE and belong to a DCE group with explicit `read` permission for the logical printer. To do this:
  - a. Use the `acl_edit` command to remove `any_other` and `unauthenticated` from the access control list (ACL) for the logical printer. This prevents all users who are simply logged in to DCE from having `read` permission for the logical printer.

## Using Abbreviations for Attribute Names and Values

- b. If you wish, you can also remove the permissions that the logical printer grants by default to the `pd_admin` and `pd_operator` groups. If you do so, be sure to add one or more new groups to take the place of these two default groups. For instructions on removing an entry from an object ACL, see “Taking Away All Permissions That any“other and unauthenticated Have to an HPDPS Object”.
3. Create a DCE group and give the group `read` permission for the logical printer.
4. Give an account to each person who will use the logical printer and add them to the group. When logged in to DCE, members of the group can submit jobs to that logical printer.

## Restricting Functions of a Printer Device

Use this section to allow one group of users use of all the functions of a printer device, and allow everyone else use of only a selection of functions.

1. Configure your system so that only restricted logical printers sending output to the device support all of the printer-device functions.
  - a. To restrict the logical printers that will support all the functions, use the `pdset` command to set the value of the `authorize-jobs` attribute for each logical printer to `yes`. This restricts a logical printer so that it only accepts print requests from those users who are logged in to DCE.
  - b. Then you can restrict the logical printers so that they only accept print requests from those users who are both logged in to DCE and belong to a DCE group with explicit `read` permission for the logical printer. To do this, use the `acl_edit` command to remove `any_other` and `unauthenticated` from the ACL for the logical printer. This prevents all users who are simply logged in to DCE from having `read` permission for the logical printer. For instructions on removing an entry from an object ACL, see “Taking Away All Permissions That any“other and unauthenticated Have to an HPDPS Object”.
  - c. You can also remove the permissions that the logical printer grants by default to the `pd_admin` and `pd_operator` groups. If you do so, be sure to add one or more new groups to take the place of these two default groups.

## 8-8 Managing DCE Security for HPDPS

## Using Abbreviations for Attribute Names and Values

2. When a logical printer is restricted, to allow a person to use it, create a DCE group and give the group `read` permission for the logical printer. Then give an account to each person who will use the printer and add them to the group. When logged in to DCE, members of the group can submit jobs to that logical printer.
3. On the unrestricted logical printers that are available to everyone, use the `pdset` command to set the `xxx-supported` attributes, such as `sides-supported` and `document-formats-supported`, to only the values you want available to everyone. This in effect restricts users of these logical printers; they only are allowed to submit jobs whose attribute values are supported by a given logical printer. For some attributes you have to create an initial value object and associate it with the logical printer to enforce the restriction. See “Using Initial Value Objects to Ensure Restriction” in Chapter 6 for more information. For example, you might set the `sides-supported` attribute to 2. This allows everyone to print double-sided on the printer device or printer devices fed by these logical printers. Only those who can use one of the restricted logical printers can print single-sided jobs on the printer devices fed by these logical printers.

When you have accomplished these steps, a person who can log in to DCE and use the restricted logical printers can request any of the printer functions. Everyone else can use only the functions supported by the unrestricted logical printers.

---

## Giving Your DCE Groups Permissions to HPDPS Objects

When you have set up groups of users according to your organizational requirements, you need to give the groups appropriate permissions to your HPDPS objects.

## Using Abbreviations for Attribute Names and Values

### Understanding Where HPDPS Security Information is Stored

Part of DCE is a directory tree called the DCE *namespace*.

One branch of this directory tree is created by the `pddcesetup` command and is dedicated to storing HPDPS security information. This is your HPDPS cell directory structure. One branch of your HPDPS cell directory structure is dedicated to storing the permissions that each HPDPS object grants to each DCE group or principal. This is the `././subsys/pd/servers/srvr_objs` directory. This section refers to this directory as the “security directory”.

To make administering HPDPS security easier, HPDPS also provides a soft link, or alias, which you can use to set permissions to both the security directory as a whole, and to namespace entries contained within the security directory. The soft link is `././pdsec`. For example, compare:

```
././subsys/pd/servers/srvr_objs/Super203/printer/PhysPrt1
```

with

```
././pdsec/Super203/printer/PhysPrt1
```

These each refer to the same entry in the security directory, the entry for the physical printer `PhysPrt1`. Examples in this section use the `pdsec` soft link, rather than the full path of the security directory. Note that the `PhysPrt1` entry listed here also references the entry in the security directory for the supervisor in which `PhysPrt1` is contained, `Super203`. The entry for the supervisor object `Super203` is itself a directory, which contains the `printer` directory.

A `printer` directory is created automatically for every supervisor when the supervisor is created. For every physical printer object contained in the `Super203` supervisor there is a corresponding entry in the `././pdsec/Super203/printer` directory. A `log` directory and an `other` directory also are created automatically for every supervisor when it is created. A `printer` directory (for logical printers) is created automatically for every spooler when the spooler is created. A `queue` directory, `other` directory, and `log` directory also are created automatically for every spooler when it is created.

There is one very important difference between the way that DCE permissions and UNIX permissions work. With DCE, you can choose not only to set the

## 8-10 Managing DCE Security for HPDPS

## Using Abbreviations for Attribute Names and Values

permissions for a given object entry, but also to set the permissions for all the objects that an entry will eventually contain, if the entry will contain objects. The permissions propagate downward.

### Understanding How DCE Permissions Propagate Downward

Before an HPDPS object exists, you can set the initial, or default, permissions that it will grant after it has been created. Depending on which type of HPDPS objects you are setting permissions for, and how much of your HPDPS system already exists, you will set permissions either at the `././pdsec` directory or at the sub-directories and files contained within this directory.

For example, suppose that you want to set permissions for all of the physical printers in the supervisor `Super203`. Rather than setting the permissions of each physical printer individually, you can set them all at one time by setting the initial object (IO) permissions of the `././pdsec/Super203/printer` directory. When you have done this, any physical printers that you subsequently create in the supervisor `Super203` will grant the new permissions.

Propagation only works on objects and directories that have not yet been created. To make an effective change, you must set permissions at the lowest directory level in existence for the objects with which you are working.

Consider the physical printer `PhysPrt1` shown previously in “Understanding Where HPDPS Security Information is Stored”. The DCE namespace entry for this physical printer is:

```
././pdsec/Super203/printer/PhysPrt1
```

This namespace entry for the physical printer came into existence at the moment you created the printer. Since the namespace entry exists, if you now set permissions on the `././pdsec/Super203/printer` directory, `PhysPrt1` cannot inherit and will not grant the new permissions. There are two ways to make `PhysPrt1` grant the new permissions:

- You can set the new permissions on the `PhysPrt1` entry individually.
- You can delete `PhysPrt1`, grant the new permissions to the `printer` directory, and then create `PhysPrt1` again. Its entry in the security directory will then inherit the new permissions from the `././pdsec/Super203/printer` directory.

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As you can see, DCE permissions can only be made to propagate downward if the entries you want to affect have not yet been created; they are created when their corresponding HPDPS object is created. For this reason, before you go on to create any more objects, decide to which groups the objects should grant permissions. Then you can choose at which level in the security directory to manipulate permissions.

## Setting the Default Permissions Granted by a Server and All Its Objects

The fastest way to create default permissions for one or more servers and every object contained in the servers is to set permissions at the initial object (IO) and initial container (IC) access control list (ACL) of the `././pdsec` directory before you create the servers. The ACLs of the servers that you subsequently create will inherit these permissions.

The word “container” in the IC permissions refers to the entries in the DCE namespace that can contain other entries. The `././pdsec` directory is a container. Each server entry (that is, subdirectory) is a container and the `printer` and `queue` entries also are containers. The last entry in the directory for the HPDPS printer object `PhysPrt1` is not a container.

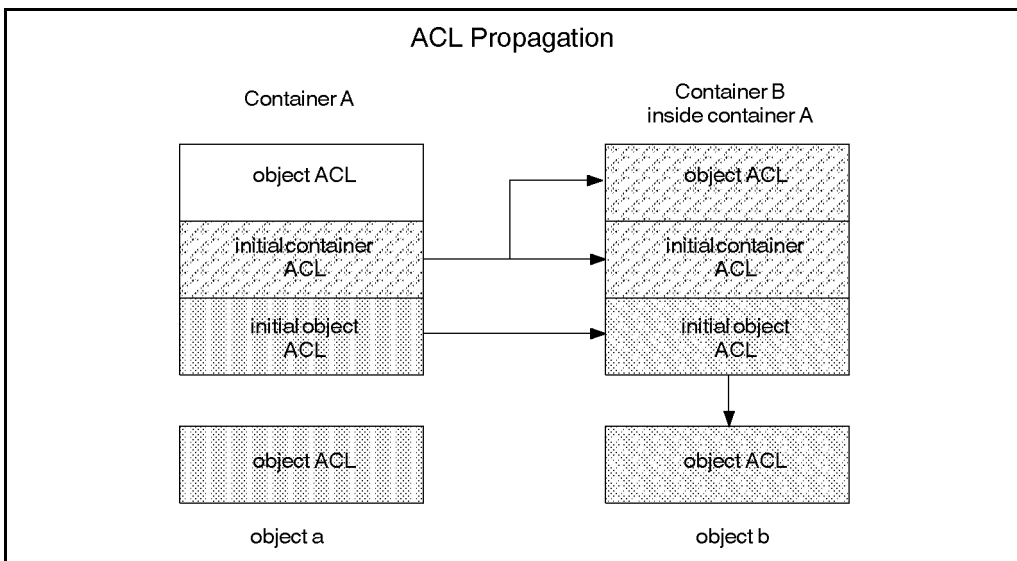


Figure 8-1. Propagation of DCE Permissions



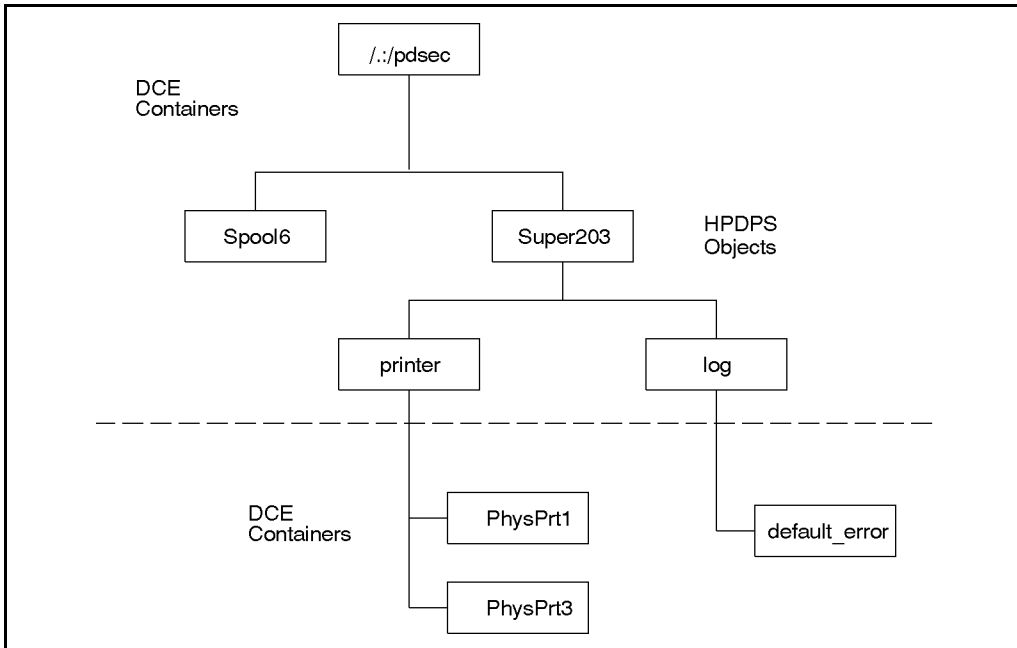
## Using Abbreviations for Attribute Names and Values

Each DCE container has an initial object (IO) ACL and an initial container (IC) ACL. Setting the initial object ACL and the initial container ACL of a container affects subsequently created entries within the container in this way:

- For subsequently created child entries that are themselves containers:
  - The parent container IC ACL becomes both the IC ACL and the object ACL of the child container. Referring to Figure 8-1, the IC ACL and object ACL of Container B are inherited from the IC ACL of Container A. For example, the IC ACL and the object ACL of a `server` are inherited from the IC ACL of the `/.:/pdsec` directory.
  - The parent container IO ACL becomes the IO ACL of the child container. Referring to Figure 8-1, the IO ACL of Container B is inherited from the IO ACL of Container A. For example, the IO ACL of a `server` entry and a `printer` entry are inherited from the IO ACL of the `/.:/pdsec` directory.
- For subsequently created child entries that are not containers:
  - The parent container IO ACL becomes the object ACL of the child entry. The parent container IC ACL has no effect. Referring to Figure 8-1, the object ACL of object `b` is inherited from the IO ACL of Container B. For example, the object ACL for a logical or physical printer is inherited from the IO ACL of the `printer` directory of the server containing that printer. The permissions are propagated from the IO ACL of the `/.:/pdsec` directory through the `supervisor` and `printer` containers.

Figure 8-2 illustrates how DCE permissions are used by HPDPS. The `/.:/pdsec`, `Super203`, `printer`, `log`, and `other` entries are DCE containers. You might think of them as branches of a tree. The entry for the supervisor also represents an HPDPS server object. The object ACL of the supervisor is inherited from the IC ACL of the `/.:/pdsec` branch; this object ACL determines the DCE permissions for the supervisor object.

## Using Abbreviations for Attribute Names and Values



**Figure 8-2. DCE Permissions, Servers and Objects**

The other entries, such as `PhysPrt1` are DCE objects that represent HPDPS objects. You might think of them as leaves on a branch. The object ACLs for these objects are inherited from the IO ACLs of their containers and are propagated from the `./pdsec` branch through the intermediary containers. The `log` directory contains the entry for the `default_error` log object, which represents the error log for the supervisor.

The `Spool6` entry also is a DCE container that contains the `queue` container in addition to the other containers for supervisor entries (none are shown). The `printer` directory contains the entries for the logical printer objects contained in the spooler, and the `queue` directory contains the entries for the queue objects. The `log` directory contains the entry for the `default_error` log object, which represent the error log for the spooler. The `other` directory contains the entries for the initial value job and initial value document objects contained in the spooler. The object ACLs for these objects are inherited from the IO ACLs of their containers and are propagated from the `./pdsec` branch through the intermediary containers.

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## Using Abbreviations for Attribute Names and Values

Because HPDPS creates the containers inside a server entry at the same moment that you create a server, to set default permissions for all the objects in a server at one time you must work at the level of the `./:/pdsec` directory before you create the server.

Edit the `./:/pdsec` directory IO and IC permissions, then create the servers. After you have created all the servers that will grant that particular set of permissions, remove those permissions from the IO and IC ACLs of the `./:/pdsec` directory. This prevents servers created at a later time from also granting those same permissions.

For example, suppose in your organization there are several distinct groups of people who use different printers and have different support needs. In this case, rather than using the `pd_operator` group for all your HPDPS operators, you might want to have several different HPDPS operator groups. Each different HPDPS operator group could work with a defined set of queues, logical printers, physical printers and so on, to support the needs of the people who are the most common users of that set of objects.

Suppose you want the `Dept_6_0Ps` HPDPS operator group to have `read` and `write` permission for all the objects in the spooler `Spool6`, and the supervisors `Super201`, `Super202`, and `Super203`. Remember, you have not yet created any of these servers. Accomplish this task by setting IO and IC permissions in the security directory.

---

**Note** The following procedure modifies the IC ACL of the `./:/pdsec` directory, which propagates to the object ACL of all of the HPDPS servers. It also modifies the IO ACL of the `./:/pdsec` directory, which propagates to the object ACLs of all of the HPDPS objects contained in the servers. Depending on what you want to accomplish, you can modify either one or the other, but not both.

---

### Giving a Group Permission to the Security Directory IO and IC ACLs

Give the `Dept_6_0Ps` group `read` and `write` permission for the IO and IC ACLs of the security directory. Follow these steps:

1. If you have not already done so, log in to DCE as the cell administrator.  
Enter the command:

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```
dce_login cell_admin
```

When prompted, enter the cell administrator password.

2. Use the `acl_edit` command to give the `Dept_6_0Ps` group `read` and `write` permission for the IO ACL of the security directory.
  - a. Use the `pdsec` soft link
  - b. Use the `-io` flag to specify the IO ACL
  - c. Use the `-m` flag to modify the ACL. For example, enter:

```
acl_edit /./pdsec -io -m group:Dept_6_0Ps:rw
```

3. Give the `Dept_6_0Ps` group `read` and `write` permission for the IC ACL of the security directory. For example, enter:

```
acl_edit /./pdsec -ic -m group:Dept_6_0Ps:rw
```

The `Dept_6_0Ps` group now has `read` and `write` permission for both the IC and IO ACLs of the security directory.

Use the `acl_edit` command to view the changes you have made. For example, to view the IO permissions of the `/./pdsec` directory, use these commands:

1. Specify the IO ACL. For example, enter:

```
acl_edit /./pdsec -io
```

2. List the ACL. For example enter:

```
list
```

3. These commands return a display similar to this:

```
Initial SEC_ACL for objects created under: /./pdsec :
Default cell = / ... /pda_cell.your_organization.com
unauthenticated:r--t---
group:subsys/dce/cds-admin:rwdtc--
group:subsys/dce/cds-server:rwdtc--
group:pd_admin:rwd----
group:pd_operator:rw-----
any_other:r--t---
group:Dept_6_0Ps:rw-----
```

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4. To end the `acl_edit` session, enter:

```
exit
```

Use these same steps to view the IO ACL permissions by substituting `-ic` for `-io` in the `acl_edit` command. To view the object permissions, for example, if you wanted to view the permissions that a server or printer grants to users, do not use either of these flags.

You have set the security directory IO and IC ACLs to give certain permissions to certain groups. Now that you have done this, create all the servers that will grant those permissions to those groups. Use the `pdstartspl` command to create the spooler `Spool6`, and the `pdstartsv` command to create the supervisors `Super201`, `Super202`, and `Super203`. Each of these servers, and every object that is or will be contained in each of them, grants `read` and `write` permission for the `Dept_6_0Ps` group.

When you have created the servers, edit the IO ACL and IC ACL of the security directory again. Use the procedure in “Giving a Group Permission to the Security Directory IO and IC ACLs”. This time, remove the group from the IO and IC ACLs of the security directory. This prevents servers created at a later time and their objects from granting these same permissions.

### Removing a Group from the Security Directory IO and IC ACLs

To remove the `Dept_6_0Ps` group `read` and `write` permission from the IO ACL of the security directory, use the `acl_edit` command with the `/./pdsec` soft link.

1. Use the `-d` flag to delete the permissions the group has to the object. For example, enter:

```
acl_edit /./pdsec -io -d group:Dept_6_0Ps:
```

2. Remove the `Dept_6_0Ps` group `read` and `write` permissions for the IC ACL of the security directory. For example, enter:

```
acl_edit /./pdsec -ic -d group:Dept_6_0Ps:
```

The security directory IO and IC ACLs no longer contain entries for the `Dept_6_0Ps` group. Any servers now created will not give this group any permissions. Remember, if you delete and recreate any of the servers that give

## Using Abbreviations for Attribute Names and Values

the `Dept_6_OPs` group permissions, the newly created server will once again inherit the permissions of the *current* security directory IO and IC ACLs.

## Setting the Default Permissions Granted by All Physical Printers in a Supervisor

If you have created the supervisor, but have not yet created any physical printers in the supervisor, the easiest way to make all physical printers in a given supervisor grant a set of permissions is to edit the IO ACL of the `printer` subdirectory of that supervisor.

For example, if the supervisor is called `Super203`, edit the IO ACL of the `././pdsec/Super203/printer` directory.

If you have already created physical printers in the supervisor, you can set the permissions for these printers in one of two ways:

- Delete the printers, set the IO ACL of the `printer` subdirectory, and create the printers again
- Set the ACL for each physical printer separately, as explained in “Setting the Permissions Granted by One HPDPS Object”

Following is an example of setting the default permissions for printers in the supervisor `Super203`. The example shows how to make the example printer operator group `203_operators` by default have `read` and `write` permission for all the physical printers that are subsequently created in the supervisor `Super203`. Use these steps:

1. If you have not already done so, log in to DCE as the cell administrator. Enter the command:

```
dce_login cell_admin
```

When prompted, enter the cell administrator password.

2. Use the `acl_edit` command to give the `203_operators` group `read` and `write` permission for the IO ACL of the `././pdsec/Super203/printer` directory.
  - a. Use the `-io` flag to specify the IO ACL
  - b. Use the `-m` flag to modify the ACL

## 8-18 Managing DCE Security for HPDPS

## Using Abbreviations for Attribute Names and Values

For example, enter:

```
acl_edit /./pdsec/Super203/printer -io \
-m group:203_operators:rw
```

From now on, each physical printer created in the supervisor Super203 grants the 203\_operators group read and write permission.

## Setting the Permissions Granted by One HPDPS Object

To make an individual HPDPS object, such as a spooler, physical printer, logical printer, queue, or so on, grant a set of permissions, edit the ACL for the object.

When you specify the individual object of which you want to edit the ACL, you must specify the full security directory path to the object.

1. First type in the `pdsec` soft link that is `/./pdsec/`, to specify the security directory.
2. Next, add the name of the server in which the object resides. If the object is a server, stop here.
3. Next, add the subdirectory in which the type of object you are affecting resides. For example:
  - a. If the object is a printer, add `printer`. If the object is a log add `log`.
  - b. If the object is a queue add `queue`.
  - c. If the object is anything else, such as initial value object, add `other`.
4. Finally, add the name of the object.

## Examples of Specifying Different Kinds of Objects

- To change the permissions granted by the spooler `Spool1`, edit the ... `/srvr_objs/Spool1` ACL for the object.
- To change the permissions granted by the queue `Queue1`, contained in the spooler `Spool1`, edit the ... `/srvr_objs/Spool1/queue/Queue1` ACL for the object.

## Using Abbreviations for Attribute Names and Values

- To change the permissions granted by the restricted logical printer `LogPrt1Restrict`, contained in the spooler `Spool1`, edit the ...  
`/srvr_objs/Spool1/printer/LogPrtRestrict` ACL for the object.
- To change the permissions granted by the physical printer `PhyPrt1`, contained in the supervisor `Super1`, edit the ...  
`/srvr_objs/Super1/printer/PhyPrt1` ACL for the object.

**Giving a DCE Group Permission to an Individual HPDPS Object.** To give the `203_Operators` group `read` and `write` permission for the physical printer `PhyPrt1` contained by the supervisor `Super1`, use the following steps:

1. If you have not already done so, log in to DCE as the cell administrator.  
For example, if the cell administrator DCE login is `cell_admin`, enter:

```
dce_login cell_admin
```

When prompted, enter the cell administrator password.

2. Use the `acl_edit` command to modify the ACL.
  - a. Use the `-e` flag because you are modifying an object ACL rather than an initial object or initial container ACL.
  - b. Use the `pdsec` soft link. Use the `-m` flag to modify the ACL.

For example, enter:

```
acl_edit -e /./pdsec/Super1/printer/PhyPrt1 \
-m group:203_Operators:rw
```

The physical printer `PhyPrt1` now grants the `203_Operators` group `read` and `write` permission.

You can use this same method to set the permissions that any HPDPS object grants.

## Taking Away All Permissions That a Group Has to an Individual

**HPDPS Object** There might be times when you want to remove the permissions that a group has to an HPDPS object. For example, you might decide to remove the `pd_operator` group permissions from a server that you want to be supported exclusively by a different group.



## Using Abbreviations for Attribute Names and Values

To remove the permissions that a group has to an HPDPS object, use the following steps:

1. If you have not already done so, log in to DCE as the cell administrator. For example, if the cell administrator login is `cell_admin`, enter:

```
dce_login cell_admin
```

When prompted, enter the cell administrator password.

2. Use the `acl_edit` command to remove permissions for `pd_operator`.
  - a. Use the `-e` flag because you are modifying an object ACL rather than an initial object or initial container ACL.
  - b. Use the `pdsec` soft link.
  - c. Use the `-d` flag to delete an entry from the ACL. For example, enter:

```
acl_edit -e /./pdsec/Spool1 -d group:pd_operator:
```

The `pd_operator` group no longer has any permissions to the spooler `Spool1`. Use this same command, specifying the different objects individually, to remove the `pd_operator` group permissions from the ACLs of any objects contained in the spooler. For example, to remove a group from the permissions granted by the logical printer `LogPrt1`, which resides in `Spool1`, specify `/./pdsec/Spool1/printer/LogPrt1` in your `acl_edit` command.

## Taking Away All Permissions That any\_other and unauthenticated Have to an HPDPS Object

To remove the `read` permission granted by the restricted logical printer `LogPrt1Restrict` to `unauthenticated` and `any_other`, use the following steps:

1. If you have not already done so, log in to DCE as the cell administrator. For example, if the cell administrator DCE login is `cell_admin`, enter:

```
dce_login cell_admin
```

When prompted, enter the cell administrator password.

2. Use the `acl_edit` command to remove permissions for `unauthenticated`.
  - a. Use the `-e` flag because you are modifying an object ACL rather than an initial object or initial container ACL.

### Using Abbreviations for Attribute Names and Values

- b. Use the `pdsec` soft link.
- c. Use the `-d` flag to delete an entry from the ACL. For example, enter:

```
acl_edit -e /./pdsec/Spool1/printer/LogPrt1Restrict -d
unauthenticated:
```

#### 3. Remove permissions for `any_other`.

- a. Use the `acl_edit` command. Use the `-e` flag because you are modifying an object ACL rather than an initial object or initial container ACL.
- b. Use the `pdsec` soft link. Use the `-d` flag to delete an entry from the ACL.

For example, enter:

```
acl_edit -e /./pdsec/Spool1/printer/LogPrt1Restrict
-d any_other:
```

The logical printer `LogPrt1Restrict` now no longer has access to `unauthenticated` or `any_other`.

---

**Note** You can also use the `/opt/dcelbin/cdsbrowser` tool to examine and modify security. However, in `cdbrowser` you specify the full path instead of the soft link.

---

## Managing the Spooler, Logical Printers, and Queues

---

This section describes tasks for managing spoolers, logical printers, and queues. These tasks include:

- Making policy decisions on how to use certain attributes for spoolers and objects contained in spoolers
- Creating archive files for spoolers, queues, logical printers, and initial value objects
- Querying for spooler, logical printer, and queue status
- Performing job-related management tasks for spoolers, logical printers, and queues
- Shutting down and deleting a spooler, and deleting logical printers, queues, and initial value objects

---

### Monitoring Spooler, Logical Printer, and Queue Configurations

The tasks in this section involve making decisions on how to track changes made to spooler, logical printer, and queue configurations by:

- Defining when and how to use the `message` attribute
- Creating archive files for spoolers, logical printers, queues, and initial value objects

## Using Abbreviations for Attribute Names and Values

### Setting the Message Attribute for Spoolers and Spooler Objects

Use the `-m` flag with any command that modifies a spooler, logical printer, queue, or initial value object to set the text of the `message` attribute for that object. You can specify a text string up to 4095 characters in length that describes the modifications you are making.

For example, to set a message for logical printer `LogPrt1` describing why you are disabling the logical printer, enter:

```
pddisable -c printer -m "Disabling LogPrt1 - limiting the \
number of copies you can print to 1. Submit jobs after \
2:00 p.m. 6/12" LogPrt1
```

After you issue this command, users and other administrators can query the logical printer for information about why the logical printer no longer accepts jobs. For example, they could enter:

```
pdls -c printer -r message LogPrt1
```

You need to set a policy of how and when administrators and operators will use the `-m` flag to set the `message` attribute. You might decide to never use the flag or to always use it. Alternatively, you can use this flag whenever you change the state of a spooler, logical printer, or queue for a significant period of time. You can specify a message when you disable a logical printer or pause a queue for more than an hour, but not if you disable or pause them for only a few minutes.

You can also have a policy to use the `-m` flag whenever you modify an object with the `pdset` command. You can specify why the values for an attribute or attributes were changed, who changed them, and when the changes were made.

---

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | If you modify an object and use the <code>-m</code> flag, then modify the object again and omit the <code>-m</code> flag, the <code>message</code> attribute still contains the text that you entered when you made the first modification. This can cause users querying for the message text to receive incorrect information. If you decide to use the <code>-m</code> flag, you should use it consistently to prevent this problem. |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

## Using Abbreviations for Attribute Names and Values

### Creating Archive Files for Spoolers and Spooler Objects

Use `-r archive` with the `pdls` command to create an archive file for the spooler, logical printer, queue, initial-value-job, or initial-value-document. The archive file contains all settable and specifiable attributes and their values, including attributes with no values. If you need to re-create any of the objects contained in the spooler, you can use the archive file as an attributes file to quickly re-create the object. If you do so, you must either assign values to attributes or delete any attributes without values. HPDPS issues an error message if an attributes file contains an attribute with no value.

You can also use the archive file to make modifications to attributes and values for an object or to create new objects that are similar to objects that you already have created. You can copy an archive file and edit it to assign different values to any attribute or attributes as necessary. Then use the archive file as an attributes file to create a similar object.

Use the following commands to create archive files:

- To create an archive file named `Spool1.archive` in the directory `/attr` for the spooler `Spool1`, enter:

```
pdls -c server -r archive Spool1 > /attr/Spool1.archive
```

Note: You cannot use an archive file to create a spooler. You can use the file to make modifications.

- To create an archive file for the queue `Queue1`, enter:

```
pdls -c queue -r archive Queue1 > /attr/Queue1.archive
```

- To create an archive file for the logical printer `LogPrt1`, enter the command:

```
pdls -c printer -r archive LogPrt1 > /attr/LogPrt1.archive
```

- To create an archive file for the initial-value-job `IVJob1`, enter:

```
pdls -c initial-value-job -r archive IVJob1 > \
/attr/IVJob1.archive
```

- To create an archive file for the initial-value-document `IVDoc1`, enter:

```
pdls -c initial-value-document -r archive IVDoc1 > \
/attr/IVDoc1.archive
```

## Using Abbreviations for Attribute Names and Values

You might or might not want to create archive files for logical printers, depending on how many you have and how difficult it is to re-create them. For example, you might configure a logical printer to restrict the usage of certain physical printer capabilities. This type of logical printer will have values assigned to several of its attributes and you would want to create an archive file to re-create the logical printer if necessary.

On the other hand, you might be using your logical printer only to restrict access to DCE users or to provide default values for jobs through an associated initial-value-job or initial-value-document. This type of logical printer might have few or no attributes with assigned values and would be fairly easy to re-create. You would not need an archive file for this type of logical printer.

---

## Querying for Spooler Information

This section describes how to query the values of attributes that reflect the state of the spooler and the associations between the spooler and other HPDPS objects.

### Querying for the State of a Specific Spooler

Use `-c server` with the `pdls` command to query the state of a spooler. The value of the non-settable `server-state` spooler attribute indicates the state of the spooler. You can query the state of a spooler if you receive a notification message about a problem in the spooler or a message that indicates the spooler has started to terminate. You might want to query the status of spoolers once or twice during the day to ensure that the processes are running without problems.

To query the state of the spooler `Spool1`, enter:

```
pdls -c server Spool1:
```

HPDPS displays information similar to the following:

```
Server State Type
----- -
Spool1 ready spooler
```

## 9-4 Managing the Spooler, Logical Printers, and Queues

## Using Abbreviations for Attribute Names and Values

Notes:

- If the spooler is not running, HPDPS issues a message that it cannot communicate with the server. See “Restarting the Spooler after It Has Been Shut Down”.
- The `server-state` attribute is one of the predefined attributes of the `brief` option of the `-r` flag for the `pdls` command. `brief` is the default for the `-r` flag.

Therefore, the command you entered in this example is equivalent to entering:

```
pdls -c server -r brief Spool1:
```

### Spooler States

The possible states of the spooler are:

| State                     | Description                                                                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>initializing</code> | The spooler process is initializing.                                                                                                                     |
| <code>ready</code>        | The spooler has finished initializing and its logical printers can accept jobs if they are enabled.                                                      |
| <code>terminating</code>  | The spooler is shutting down. The logical printers contained in the spooler will not accept new jobs, and existing jobs might or might not be scheduled. |

### Querying for the States of All HPDPS Spoolers

Use `-c server` and `-f server-type==spooler` with the `pdls` command to query the state of all HPDPS spoolers. You use the an asterisk to specify that you are querying all spoolers. Enter:

```
pdls -c server -f server-type==spooler *:
```

## Using Abbreviations for Attribute Names and Values

### Querying for the Verbose Set of Spooler Attributes

This is a good way of viewing your configuration and determining whether the physical printers are registered with (supported by) the spooler.

To query the verbose set of attributes for the spooler `Spool3`, enter:

```
pdls -c server -r verbose Spool3:
```

HPDPS displays information similar to the following:

| Server | State | Logical<br>Printers Supported | Physical<br>Printers Supported | Type    | Queues |
|--------|-------|-------------------------------|--------------------------------|---------|--------|
| Spool3 | ready | LogPrt1                       | PhyPrt1                        | spooler | Queue1 |
|        |       | LogPrt2                       | PhyPrt2                        |         | Queue3 |
|        |       | LogPrt3                       | PhyPrt3                        |         |        |

### Querying for Job and Document Attributes Supported by the Spooler

HPDPS uses the values of the job and document attributes during job validation.

Use the following commands to query job and document attributes supported by spooler `Spool1`:

- To display the job attributes supported by the spooler `Spool1`, enter the command:

```
pdls -c server -r job-attributes-supported Spool1:
```

- To display the document attributes supported by the spooler `Spool1`, enter:

```
pdls -c server -r document-attributes-supported Spool1:
```

Note: When a physical printer registers with the spooler, HPDPS updates the `document-attributes-supported` spooler attribute to include the document attributes specified by the `document-attributes-supported` attribute of the physical printer. HPDPS updates the `job-attributes-supported` spooler attribute in the same manner.

The spooler attribute reflects the job and document attributes supported by all of the physical printers currently registered with the spooler.

## 9-6 Managing the Spooler, Logical Printers, and Queues



## Using Abbreviations for Attribute Names and Values

### Querying for Enabled Logical Printers Contained in the Spooler

You would query for this information if not all of the logical printers in a spooler are accepting jobs.

To query enabled logical printers contained in spooler `Spool2`, enter:

```
pdls -c printer Spool2:
```

HPDPS displays information similar to the following:

| Printer | Realization | Enabled | Queue  |
|---------|-------------|---------|--------|
| -----   | -----       | -----   | -----  |
| LogPrt5 | logical     | true    | Queue5 |
| LogPrt6 | logical     | true    | Queue6 |
| LogPrt7 | logical     | false   | Queue7 |

This information indicates that logical printer `LogPrt7` is not enabled. Note: You can request information about all objects within a server of a given class by using the *ServerName:* argument. For example, to find out about all printers within spooler `Spool2`, enter:

```
pdls -c printer Spool2:
```

Entering the *ServerName* followed only by a colon (:) lets HPDPS know that you want to obtain data about all objects within the specified class contained within that server. Whereas entering the command:

```
pdls -c printer Spool2:LogPrt5
```

provides information only about the logical printer `LogPrt5`.

### Querying for Physical Printers Registered with the Spooler

If not all physical printers to which the spooler schedules jobs are accepting jobs, enter this query.

To query enabled physical printers registered with spooler `Spool2`, enter:

```
pdls -c server -s column \
-r brief,physical-printers-supported,physical-printers-ready \
Spool2:
```

## Using Abbreviations for Attribute Names and Values

This command returns the names of physical printers that are enabled and that have a printer state of `printing`, `idle`, or `connecting-to-printer`.

HPDPS displays information similar to the following:

| Server | State | Type    | Physical Printers Supported   | Physical Printers Ready |
|--------|-------|---------|-------------------------------|-------------------------|
| Spool2 | ready | spooler | PhyPrt4<br>PhyPrt5<br>PhyPrt6 | PhyPrt4<br>PhyPrt6      |

This information indicates that physical printer `PhyPrt5` is not enabled or is in a printer state other than `printing`, `idle`, or `connecting-to-printer`. Use the procedure in “Querying for the State of a Physical Printer” in Chapter 10 to determine the printer state.

---

## Querying for Logical Printer Information

This section describes how to query the values of attributes that reflect the status of the logical printer and whether there are associated physical printers that are ready and enabled to receive jobs from the logical printer.

### Querying for the Status of a Logical Printer

Unlike spoolers, logical printers do not have different states; logical printers are either enabled or disabled. The value of the non-settable `enabled` logical printer attribute indicates the status of the logical printer.

To query the status of the logical printer `LogPrt1`, enter:

```
pdls -c printer LogPrt1
```

HPDPS displays information similar to the following:

| Printer | Realization | Enabled | Queue  |
|---------|-------------|---------|--------|
| LogPrt1 | logical     | true    | Queue1 |

## 9-8 Managing the Spooler, Logical Printers, and Queues

## Using Abbreviations for Attribute Names and Values

The command in this example also displays the queue that receives jobs from the logical printer. A logical printer cannot be enabled unless it is associated with a queue.

Note: The `enabled` attribute is one of the predefined attributes of the `brief` option of the `-r` flag for the `pdls` command. `brief` is the default for the `-r` flag. Therefore, the command in this example is equivalent to entering:

```
pdls -c printer -r brief LogPrt1
```

## Querying for the Verbose Set of Logical Printer Attributes

To query the verbose set of attributes for the logical printer `LogPrt2`, enter:

```
pdls -c printer -r verbose LogPrt2
```

HPDPS displays information similar to the following:

| Printer | Realization | Server | Locations        | Printers<br>Associated | Enabled | Queue  |
|---------|-------------|--------|------------------|------------------------|---------|--------|
| -----   | -----       | -----  | -----            | -----                  | -----   | -----  |
| LogPrt2 | logical     | Spool2 | B7-12/2<br>PRM-3 | PhyPrt2<br>PhyPrt1     | true    | Queue2 |

Note: HPDPS does not determine the location information automatically. The location information is the list of text strings that were entered as the values of the `printer-locations` logical printer attribute, if any. If a location changes and you do not update the attribute, the information will not be accurate for your users.

## Querying for Ready Physical Printers Associated with the Logical Printer

A physical printer is ready if it is enabled and its state is `connecting-to-printer`, `idle`, or `printing`. This query also provides you with the name of the queue through which the logical and physical printers are associated.

To query ready physical printers associated with the logical printer `LogPrt2`, enter:

```
pdls -c printer -s column \
-r brief,printer-associated-printers,printers-ready LogPrt2
```

## Using Abbreviations for Attribute Names and Values

HPDPS displays information similar to the following:

| Printer | Realization | Enabled | Queue  | Printers<br>Associated | Printers<br>Ready |
|---------|-------------|---------|--------|------------------------|-------------------|
| -----   | -----       | -----   | -----  | -----                  | -----             |
| LogPrt2 | logical     | true    | Queue2 | PhyPrt2<br>PhyPrt3     | PhyPrt3           |

This information indicates that physical printer `PhyPrt2` is not ready.

---

## Querying for Queue Information

This section describes how to query the values of attributes that reflect the state of the queue and the associations between the queue and other HPDPS objects.

### Querying for the Status of a Queue

You can query the state of the queue if there is a problem with the queue, such as the queue being backlogged, or if jobs in the queue are not being scheduled to the physical printer or printers associated with the queue.

To query the state of the queue `Queue1`, enter:

```
pdls -c queue Queue1
```

HPDPS displays information similar to the following:

| Queue  | State | Scheduler<br>Ready | Server |
|--------|-------|--------------------|--------|
| -----  | ----- | -----              | -----  |
| Queue1 | ready | priority FIFO      | Spool1 |

Note: The `queue-state` attribute is one of the predefined attributes of the `brief` option of the `-r` flag for the `pdls` command. `brief` is the default for the `-r` flag. Therefore, the command you entered in this example is equivalent to entering:

```
pdls -c queue -r brief Queue1
```

## 9-10 Managing the Spooler, Logical Printers, and Queues

## Using Abbreviations for Attribute Names and Values

### Queue States

The possible states of the queue are:

| State  | Description                                                                                            |
|--------|--------------------------------------------------------------------------------------------------------|
| ready  | Jobs in the queue can be scheduled to the physical printer or printers associated with the queue.      |
| paused | Jobs in the queue will not be scheduled to the physical printer or printers associated with the queue. |

You pause a queue with the `pdpause` command and change the state back to ready with the `pdresume` command. A queue will receive jobs from its associated logical printer or printers if it is in a ready state. Jobs in a paused queue will not be scheduled. You must disable the logical printer or printers associated with the queue to stop them from sending jobs to the queue.

### Querying for the Verbose Set of Queue Attributes

To query the verbose set of attributes for the queue `Queue2`, enter:

```
pdls -c queue -r verbose Queue2
```

HPDPS displays information similar to the following:

| Queue  | State | Scheduler<br>Ready | Server | Logical<br>Printers Assigned | Physical<br>Printers Assigned |
|--------|-------|--------------------|--------|------------------------------|-------------------------------|
| -----  | ----- | -----              | -----  | -----                        | -----                         |
| Queue2 | ready | priority FIFO      | Spool2 | LogPrt2<br>LogPrt3           | PhyPrt2<br>PhyPrt3<br>PhyPrt4 |

### Querying for Backlogged Queues

The attributes `queue-backlog` and `backlogged` indicate a backlogged condition:

| Attribute                  | Description                                                                                                                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>queue-backlog</code> | This attribute indicates the amount of time, in hours and minutes, that HPDPS estimates it will take to finish printing all of the jobs in the queue. |

## Using Abbreviations for Attribute Names and Values

**backlogged** This attribute indicates whether the value of the `queue-backlog` attribute has exceeded the value of the `queue` attribute `backlog-upper-bound`. This attribute can have one of two values: `true` or `false`.

HPDPS changes the value of the `backlogged` attribute to `false` when the value of `queue-backlog` becomes less than the value of the `queue` attribute `backlog-lower-bound`. See “Configuring the Queue Backlog Attributes” in Chapter 6 for more information.

To determine if queue `Queue1` is backlogged, enter:

```
pdls -c queue -s column -r brief,backlogged,queue-backlog \
Queue1
```

HPDPS displays information similar to the following:

| Queue  | State | Scheduler<br>Ready | Server | Backlogged | Queue<br>Backlog |
|--------|-------|--------------------|--------|------------|------------------|
| Queue1 | ready | priority FIFO      | Spool1 | true       | 0:19             |

Note: The default class of events for a queue notification profile includes an event that automatically generates a notification message when a queue becomes backlogged. See Chapter 7, “Using Notification”, for further information.

## Querying for Queue Backlog Boundaries

To display whether queue `Queue3` is backlogged and the values that determine a backlogged condition, enter:

```
pdls -c queue -s column -r backlogged,queue-backlog,\
backlog-upper-bound,backlog-lower-bound,\
backlog-update-interval Queue3
```

HPDPS displays information similar to the following:

| Backlogged | Queue<br>Backlog | Backlog<br>Upper Bound | Backlog<br>Lower Bound | Backlog<br>Interval |
|------------|------------------|------------------------|------------------------|---------------------|
| true       | 0:27             | 0:20                   | 0:15                   | 0:05                |

## 9-12 Managing the Spooler, Logical Printers, and Queues

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If you need to change the backlog boundaries or the backlog interval because you are receiving too few or too many notification messages for backlogged queues, see “Configuring the Queue Backlog Attributes” in Chapter 6.

### Querying for Enabled Logical Printers Associated with the Queue

To query enabled logical printers that are enabled and ready to send jobs associated with the queue `Queue6`, enter:

```
pdls -c queue -s column -r brief,logical-printers-assigned,\
logical-printers-ready Queue6
```

HPDPS displays information similar to the following:

| Queue  | State | Scheduler<br>Ready | Server | Logical<br>Printers Assigned | Logical<br>Printers Ready |
|--------|-------|--------------------|--------|------------------------------|---------------------------|
| -----  | ----- | -----              | -----  | -----                        | -----                     |
| Queue6 | ready | priority FIFO      | Spool3 | LogPrt5<br>LogPrt6           | LogPrt6                   |

This information indicates that logical printer `LogPrt6` is enabled and `LogPrt5` is not enabled.

For more information about enabling and disabling logical printers, see “About Enabling Logical Printers”.

### Querying for Ready Physical Printers Associated with the Queue

A physical printer is ready if it is enabled and its state is `connecting-to-printer`, `idle`, or `printing`.

To query ready physical printers that are enabled and ready to receive jobs associated with the queue `Queue7`, enter:

```
pdls -c queue -s column -r brief,physical-printers-assigned,\
physical-printers-ready Queue7
```

HPDPS displays information similar to the following:

| Queue  | State | Scheduler<br>Ready | Server | Physical<br>Printers Assigned | Physical<br>Printers Ready |
|--------|-------|--------------------|--------|-------------------------------|----------------------------|
| -----  | ----- | -----              | -----  | -----                         | -----                      |
| Queue7 | ready | priority FIFO      | Spool4 | PhyPrt9<br>PhyPrt10           | PhyPrt9                    |

This information indicates that physical printer `PhyPrt10` is not ready.

## Using Abbreviations for Attribute Names and Values

---

### Managing Jobs in Queues and Spoolers

You might need to perform job-management tasks for the following circumstances:

- One or more of the physical printers associated with the queue are unable to receive jobs from the queue. A physical printer might not currently be registered with the spooler containing the queue.
- The queue is paused and unable to send jobs to a physical printer.
- Jobs are paused or are held for resources.

Note: Administrators can pause jobs with the `pdpause` command, which changes the state of the job to `paused`. HPDPS changes the state of a job to `held` if the job requires resources and the resources are either not ready or are not supported. Users can also submit jobs with the value of the `job-hold` attribute set to `true`, which also causes a job state of `held`.

In these cases, you often want to do something with the jobs in the queue that are waiting to be scheduled. Otherwise, they will stay in the queue indefinitely.

There are other times you need to manage jobs in a queue, such as when:

- The queue is backlogged and you want to resubmit some of the jobs to another queue. Refer to “Responding to Queue Backlog” for more information on managing jobs in a queue when the queue is backlogged.
- You want to do something with an individual job in a queue or several jobs in the queue based on the needs of the job owner or for some other reason. Refer to Chapter 11, “Managing Jobs and Supporting Users”, for more information on managing individual jobs.

For any of the reasons described above, you might want to do the following:

- Delete or resubmit one or more jobs in a queue. See “Deleting Jobs from Queues and from the Spooler”.
- Resubmit all of the jobs to a specific logical printer. See “Resubmitting Jobs to Different Logical Printers”.



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### Querying for Jobs in the Queue

Use the `pdq` command to query jobs in a specific queue. You can query jobs in a queue by querying any logical printer that sends jobs to that queue. Sometimes you need to determine which jobs are in a queue; you might be responding to a backlogged queue, or you might be planning to disable a physical printer or printers associated with the queue for a long time. Or you might need to pause the queue for a while. After you disable the physical printer or pause the queue, HPDPS does not schedule any jobs in the queue with a state of **pending**. Jobs in the **pending**, **paused**, and **held** states remain in those states indefinitely and do not print. You can use the `pdrm` command to remove the job or resubmit the job with the `pdresubmit` command.

Use the following procedure to determine which jobs are currently in a queue.

- If you do not know already, determine which logical printer or printers are associated with the queue. For example, to determine the logical printers associated with the queue `Queue3`, enter:

```
pdls -c queue -r logical-printers-assigned Queue3
```

HPDPS displays information similar to the following:

```
Queue3: logical-printers-assigned = LogPrt5
 LogPrt6
```

- Use the `-U` and `-p` flags with the `pdq` command to query the jobs. The `-U` flag indicates that you are querying for all jobs, regardless of the users who sent them. Use the `-p` flag to specify the name of a logical printer sending jobs to the queue.

For example, to query all jobs in the queue `Queue3`, enter:

```
pdq -U -p LogPrt5
```

HPDPS displays information similar to the following:

| Job | ID                | Name      | Current State | Jobs | Printer Requested | Printers Assigned |
|-----|-------------------|-----------|---------------|------|-------------------|-------------------|
| 10  | Spool2:4629300046 | pallstart | pending       | 0    | LogPrt5           |                   |
| 14  | Spool2:4629300057 | smit.log  | processing    | 1    | LogPrt5           | PhyPrt2           |
| 15  | Spool2:4629300075 | cobby.txt | held          | 2    | LogPrt6           |                   |

## Using Abbreviations for Attribute Names and Values

### Querying for Timed-Out and Retained Jobs in the Spooler

Use the `-U`, `-r`, and `-f` flags with the `pdls` command to query timed-out or retained jobs in a specific spooler.

To determine which jobs are currently in a spooler in either the `timed-out` or `retained` state, enter:

```
pdls -U -r brief,job-state-reasons -s column \
-f "current-job-state==retained \
|| current-job-state==timed-out" \
Spool2:
```

HPDPS displays information similar to the following:

| Job ID | Name             | Current State | Inter Jobs | Printer Requested | Printers Assigned | Reasons                |
|--------|------------------|---------------|------------|-------------------|-------------------|------------------------|
| 10     | Spool2:462900046 | callstart     | retained   | LogPrt5           | PhyPrt3           | completed successfully |
| 14     | Spool2:462900057 | err.log       | retained   | LogPrt6           | PhyPrt2           | completed successfully |
| 15     | Spool2:462900075 | cobby.txt     | timed-out  | LogPrt5           | PhyPrt3           |                        |

Note: When specifying a job with HPDPS administration commands, such as `pddelete`, refer to the job by the global job identifier that is shown in the `ID` column.

### Pausing a Queue

Pausing a queue prevents the spooler from scheduling jobs in the queue to physical printers. A paused queue, however, still receives jobs from logical printers. Pausing a queue does not affect the state of jobs in the queue; jobs can still be modified with the `pdmod` or `pdset` commands, or can be affected by the other commands that apply to jobs.

Note: To help clarify the difference between pausing a queue and disabling a queue, remember the following rule. Pausing any HPDPS object, such as a queue, prevents *output from* the object. Disabling an HPDPS object prevents *input to* the object.

To pause a queue or queues, enter the following commands:

- To pause the queue `Queue1`, enter:

```
pdpause -c queue Queue1
```

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## Using Abbreviations for Attribute Names and Values

- To pause the queues Queue2 and Queue3, enter:

```
pdpause -c queue Queue2 Queue3
```

The queue state (reflected by the `queue-state` attribute) changes to `paused`. No more jobs will be scheduled to the physical printer or printers associated with the queue, but the queue will still receive jobs from its associated logical printer or printers if they are enabled.

While you seldom need to pause a queue, you might want to pause a queue to modify a job or jobs in the queue before they are scheduled to physical printers. For example, you can resubmit the job to another queue or give it a retention period. If you don't pause the queue, the spooler might schedule the job before your command takes effect.

It is a good idea to pause a queue that contains jobs if you have to shut down the spooler. Do the following:

1. Pause the queue.
2. Shut down the spooler.
3. Do whatever needs to be done while the spooler is shut down.
4. Restart the spooler.
5. Resume the queue.

If you do not pause the queue, HPDPS tries to schedule the jobs after you restart the spooler, but will not be able to until the physical printers have registered with the spooler. HPDPS generates notification messages stating that jobs cannot be scheduled.

If you pause the queue, HPDPS does not try to schedule the jobs until you resume the queue. HPDPS will not issue the notification messages after you restart the spooler indicating that it cannot schedule the jobs.

You can also keep the queue from sending jobs to a particular physical printer because of problems with the physical printer. In this case, disabling the physical printer is a better solution than pausing the queue. This prevents the physical printer from accepting additional jobs, but any jobs already scheduled will finish printing.

If the queue sends jobs to more than one physical printer, disabling the physical printer with the problem allows the other physical printers to continue undisturbed. See “Disabling a Physical Printer” in Chapter 10 for further information.

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### Resuming a Paused Queue

Resuming a paused queue allows the spooler to schedule jobs in the queue to physical printers. You can resume one or more queues with a single command.

To resume queues `Queue1` and `Queue2`, enter:

```
pdresume -c queue Queue1 Queue2
```

The queue states change to `ready`, and HPDPS schedules jobs in the queues to the physical printers associated with the queues.

### Deleting Jobs from Queues and from the Spooler

You can delete any job whose state is not `unknown` or `terminating`. Use the following procedures to delete jobs.

#### Deleting Pending, Paused, or Held Jobs from the Queue

To delete jobs in a queue that are in either the `pending`, `paused`, or `held` states, perform the following steps:

Note: Deleting paused or held jobs might not always be appropriate. You might want to determine the reason the job is paused or held and, if necessary, perform tasks so that the job will print. See “Deleting a Queue that Contains Held or Paused Jobs” for further information.

1. Pause the queue. For example:

```
pdpause -c queue Queue3
```

You pause the queue so that any jobs that you want to delete will not be scheduled for printing.

2. Determine which jobs are in the queue.

Refer to “Querying for Jobs in the Queue” for a description of how to find out which jobs are in a queue.

3. Use either the `pdrm` or the `pddelete` command to delete a job or jobs in the queue. Identify the jobs with their global job identifier numbers.

To delete two jobs contained in a queue in spooler `Spool3`, enter:

```
pdrm Spool3:4628700042 Spool3:4628700035
```

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Note: If the job has a retention period, as specified by the `job-retention-period` job attribute, you must set the value of the attribute to zero (0) with the `-r` flag before you can delete the job from both the queue and the spooler. If you do not, HPDPS deletes the job from the queue but the job remains in the spooler until the retention period expires.

For example, enter:

```
pdrm -r 0 Spool3:4628700042
```

4. When you are finished deleting jobs, resume the queue. For example:

```
pdresume -c queue Queue3
```

### Deleting Jobs from the Queue and Retaining Them in the Spooler

At times you might want to delete a job in a queue but retain it in the spooler. If you retain a job, you can resubmit it later to the same queue or to a different queue.

To delete a job in a queue but retain it in the spooler for one hour, enter:

```
pdrm -r 1:00 Spool3:4628700035
```

Note: Instead of deleting a job from a queue, you can resubmit it to another queue. Refer to “Resubmitting Jobs to Different Logical Printers” for a description of how to resubmit some or all of the jobs in a queue.

### Deleting Timed-Out or Retained Jobs from the Spooler

To delete jobs in a spooler that are in the `retained` or `timed-out` states, perform the following steps:

1. Determine which jobs are in the spooler.

Refer to “Querying for Timed-Out and Retained Jobs in the Spooler” for a description of how to find out which jobs are in a spooler.

2. Delete a job or jobs in the spooler that are in the `retained` state by entering the command:

```
pdrm -r 0 Spool2:4629300046 Spool2:4628700057
```

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As this example shows, you must set the value of the `job-retention-period` job attribute to zero (0) with the `-r` flag before you can delete the job.

3. Delete a job or jobs in the spooler that are in the `timed-out` state by entering the command:

```
pdrm -r 0 Spool12:4629300075
```

## Deleting Jobs with the `pdclean` Command

You also have the option of deleting all of the jobs in a queue or all of the jobs in a spooler with the `pdclean` command. Use the `-c` flag to specify whether you are deleting jobs from the queue or from the spooler.

- To delete all of the jobs in a queue, regardless of their state, enter:

```
pdclean -c queue Queue4
```

If any job has a retention period, HPDPS retains the job in the spooler until the retention period expires.

- To delete all of the jobs in the spooler, including all of the jobs in all of the queues contained in a spooler and regardless of their state, enter:

```
pdclean -c server Spool4
```

If any job has a retention period, HPDPS does not wait until the retention period expires; HPDPS deletes the job immediately.

## Resubmitting Jobs to Different Logical Printers

Use the `pdresubmit` command to resubmit a job to a different logical printer. You identify the job by its global job identifier number. You can resubmit a pending or held job contained in a queue, or a retained or timed-out job contained in a spooler. You cannot resubmit a job that is in any of the following states:

- `pre-processing`
- `paused`
- `processing`
- `terminating`
- `unknown`

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When you resubmit a job, the job includes all of the attributes specified by the user or specified by initial value objects associated with the original logical printer to which the job was submitted. If the logical printer to which you resubmit the job has associated initial value objects, HPDPS applies any additional attributes specified by those objects to the job. HPDPS validates the job again against this logical printer and against the physical printer or printers that are associated with the logical printer. If the job fails validation, the job remains in either the queue or the spooler that contained the job when you issued the `pdresubmit` command.

You can resubmit a single job, all of the jobs in a queue regardless of the logical printer that sent the job, or all of the jobs in a queue that were sent to the queue by the same logical printer.

Use the following commands to resubmit jobs to a different logical printer:

- To resubmit one or more jobs to the logical printer `LogPrt4`, enter:

```
pdresubmit LogPrt4 Spool12:4629300046 Spool12:4628700057
```

- To resubmit all of the jobs in the queue `Queue3` to the logical printer `LogPrt4`, enter:

```
pdresubmit LogPrt4 -c queue Queue3
```

In this example, all of the jobs in `Queue3`, regardless of which logical printer sent the jobs to `Queue3`, are resubmitted to logical printer `LogPrt4` and are validated again. Some jobs might be rejected on the basis of their attributes.

- To resubmit all of the jobs in the queue that were originally sent by logical printer `LogPrt2` to logical printer `LogPrt4`, enter:

```
pdresubmit LogPrt4 -c printer LogPrt2
```

In this example, the jobs still in the queue that were submitted to `LogPrt2` are resubmitted to `LogPrt4` and validated again. Based on the attributes of the jobs, some jobs might be rejected.

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### Receiving Messages Related to Production Jobs

Users can send you messages about their jobs using the `job-message-to-operator` job attribute. The message text specified in this attribute is sent to the operator or operators specified in the `notify-operator` queue attribute of the queue that receives the job. Most users do not typically use the `job-message-to-operator` attribute. It is often only used by users who are engaged in production printing or other specialized types of printing. When sending messages to the operator, users can also set the value of the `job-hold` attribute to `true` so that the job will not print before the operator can respond to the message.

HPDPS sends the message when it sends the job to the queue. The message could alert the operator to something special about the job, such as that it requires special media. See “Specifying Who Receives Messages From Users” in Chapter 6 for instructions on setting up the `notify-operator` queue attribute.

### Disabling Messages Related to Production Jobs

Specify a value of `none` for the `delivery-method` component of the `notify-operator` queue attribute to disable the delivery of messages from users. Under normal conditions, you will receive few messages from users and will not want to disable the messaging capability.

For example, to disable the delivery of messages for jobs sent to the queue `Queue3`, enter:

```
pdset -c queue -x "notify-operator=none:rob@cowboy" Queue3
```



## Performing Other Spooler-Related Tasks

This section describes the following routine tasks:

- managing and responding to queue backlogs
- enabling and disabling logical printers
- modifying logical printer attributes
- modifying the initial value object attributes
- modifying the printer-register-threshold attribute

### About Managing Queue Backlog

Queue backlog is the condition where many jobs or extremely large jobs are waiting in the queue, causing users to wait a longer amount of time than usual to receive their printed output. By configuring queue backlog attributes, you specify amounts of time that represent the upper boundary and lower boundary for a backlogged queue.

This section describes how you can manage queue backlog once it occurs; see “Configuring the Queue Backlog Attributes” in Chapter 6 for configuration information.

### About the Queue Upper Backlog Boundary

The upper backlog boundary represents when you consider the queue backlogged. You usually base the upper backlog boundary on the expectations of users regarding how long it takes their jobs to print and how long they are willing to wait for their jobs during the busiest times of the day. Most users understand that:

- The demand on the printer devices, that is, the number of jobs that need to be printed, varies during the day
- Other people use the printers and some jobs can be large
- Large jobs take longer to print than small jobs

Set the upper boundary so that it is somewhat greater than the amount of time that users are willing to wait, but less than the amount of time that causes users to contact you because they are waiting too long for jobs. For example, if your users are usually willing to wait 10 minutes for their jobs, try setting

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the upper boundary at 20 minutes. If they are willing to wait 30 minutes, you could set the upper boundary at 45 minutes.

## About the Queue Lower Backlog Boundary

You set the lower backlog boundary in relation to the upper boundary. The lower boundary affects the number of notification messages you receive for backlogged queues. If the lower boundary is too close to the upper boundary, the addition or subtraction of just a few jobs in the queue can cause the queue to change either into or out of the backlogged state. The state might change so often that you are unable to identify when a significant change in the number of jobs occurs.

If the lower boundary is too far from the upper boundary, it might take too long for the queue to change out of the backlogged state. The queue backlog could decrease and then increase significantly without a change in the state. If the state does not change, you are not notified when significant changes occur.

## About the Queue Backlog Update Interval

The backlog update interval is the amount of time that HPDPS waits until it calculates the time required to print all jobs in the queue. As a starting point, you might want to set the backlog update interval to a value that is ten percent of the upper backlog boundary. For example, if the upper boundary is 60 minutes, start with an backlog interval of six minutes.

The following describes the general effects of either increasing or decreasing the backlog interval.

### 1. If the interval is larger

A larger interval generally results in smaller increases and decreases in the value of the `queue-backlog` attribute because there is more time for jobs to be added and subtracted from the queue. Also, the addition or subtraction of a single large job has less of an effect with a larger interval because the calculated value is averaged out by the greater possible number of smaller jobs added to or subtracted from the queue.

If the interval is larger, the queue backlog might exceed the upper boundary and then fall below it before HPDPS calculates the related values. Or, the queue backlog might go below the lower boundary and then rise above

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it before the calculation occurs. In either case, you will not receive a notification message.

### 2. If the interval is smaller

A smaller interval generally results in larger increases and decreases in the value of the `queue-backlog` attribute. The smaller the interval, the less likely that jobs are added to or subtracted from the queue with equal frequency. Also, the addition or subtraction of a single large job will have more of an effect with a smaller interval because the calculated value is not averaged out by the greater possible number of smaller jobs added to or subtracted from the queue. The greater the change in the queue backlog value, the greater the chance that the value will cross the upper or lower backlog boundaries. If the value crosses one of the boundaries, the backlog state changes and you can receive a notification message, depending on how you have set the notification profile for the queue or the spooler.

Note: Calculating the backlog value requires spooler processing time. You should specify a backlog interval value that provides you with adequate notification and that does not place too much demand on the spooler.

## Responding to Queue Backlog

When HPDPS notifies you of a backlogged queue, you must decide how to respond. First you will want to determine the severity of the backlog with respect to the backlog limit. Then you will want to determine the size and states of the jobs in the queue, and whether jobs are assigned to physical printers.

Use the following procedure to determine the severity of the backlog and to view information about jobs in the queue.

1. To determine the severity of the backlog, query the values of all of the queue attributes that reflect whether the queue is backlogged and that HPDPS uses to calculate the backlogged status.

For example, to query the queue backlog attributes of the queue `Queue3`, enter:

```
pdls -c queue -s column -r queue-name,queue-state,\
backlogged, queue-backlog,backlog-upper-bound,\
backlog-lower-bound, backlog-update-interval Queue3
```

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HPDPS displays information similar to the following:

| Queue  | State | Backlogged | Queue Backlog | Backlog Upper Bound | Backlog Lower Bound | Backlog Interval |
|--------|-------|------------|---------------|---------------------|---------------------|------------------|
| Queue3 | ready | true       | 0:30          | 0:10                | 0:05                | 0:05             |

In this example, the backlog is three times the upper backlog boundary.

2. Query the logical printer or printers that send jobs to the queue. To query the logical printers sending jobs to queue Queue3, enter:

```
pdls -c queue -r logical-printers-assigned Queue3
```

HPDPS displays information similar to the following:

```
Queue3: logical-printers-assigned = LogPrt4
 LogPrt5
```

You will query one of these logical printers to see job information for all jobs in Queue3.

3. Query for the brief set of attributes and the `total-job-octets` attribute to determine the number and states of jobs in the queue. One job octet is equivalent to one byte. Use any logical printer that sends jobs to the queue as the object of your query.

To determine the jobs and their sizes for all jobs in the queue Queue3, enter:

```
pdq -U -r brief,total-job-octets -s column -p LogPrt5
```

HPDPS displays information similar to the following:

| Job ID | Name              | Current State | Inter Jobs | Printer Requested | Printers Assigned | Job Octets |         |
|--------|-------------------|---------------|------------|-------------------|-------------------|------------|---------|
| 10     | Spool3:4628721232 | pallstart     | processing | 0                 | LogPrt5           | PhyPrt5    | 32566   |
| 11     | Spool3:4628774561 | dataerr.log   | pending    | 1                 | LogPrt5           |            | 2882    |
| 2      | Spool3:4628767896 | todolist      | paused     | 2                 | LogPrt5           |            | 301789  |
| 14     | Spool3:4628759877 | fifel.txt     | pending    | 4                 | LogPrt5           |            | 134450  |
| 22     | Spool3:4628787887 | larry         | held       | 5                 | LogPrt5           |            | 301789  |
| 11     | Spool3:4628732213 | memo.asc      | pending    | 6                 | LogPrt4           |            | 45277   |
| 3      | Spool3:4628733214 | chap1.txt     | held       | 7                 | LogPrt5           |            | 5876301 |

In this example, only one job has been assigned to a physical printer.

Several jobs are pending, meaning that they have not been scheduled, and several jobs are held. You will use this type of information about the jobs to

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determine the cause of the backlog and to perform the appropriate tasks to address the backlogged condition.

### Determining the Cause of the Queue Backlog

After you have determined the severity of the backlog and the types of the jobs in the backlogged queue, check that the backlog is not caused by one of the following conditions:

- Check for a paused queue.

A paused queue still accepts jobs but cannot send jobs to physical printers. Use the procedure in “Querying for the Status of a Queue” to determine if the queue has been paused.

- Check for a physical printer that is not enabled or paused.

A physical printer that is not enabled cannot receive jobs from its associated queue. Use the procedure in “Querying for Ready Physical Printers Associated with the Queue” to determine if the physical printer or printers associated with the queue are enabled.

- Check for a physical printer that needs attention.

A physical printer that needs attention represents a printer device that requires intervention, such as for a paper jam. Depending on who created the physical printer and the notification profile for the printer, you might not have received a notification message for a printer problem. To determine whether the physical printer needs attention, follow the procedure in “Querying for the State of a Physical Printer” in Chapter 10.

If none of these conditions are causing the queue backlog, the cause is related to the numbers and types of jobs in the queue. Continue with “Managing Job-Related Queue Backlogs”.

### Managing Job-Related Queue Backlogs

The following describes actions you can take for queue backlogs that are caused by the numbers, states, or sizes of jobs.

- Do nothing to alleviate the backlog, but continue to monitor the backlogged queue. If the queue backlog is minor, you might want to wait and see if the queue becomes less backlogged over time as HPDPS processes the jobs

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in the queue. A queue backlog is minor if the backlog value is not much greater than the upper backlog boundary. Perhaps one or two large jobs were submitted or jobs were submitted that requested printing after a certain time later in the day; after HPDPS processes these jobs, the degree of the queue backlog will decrease automatically.

- Check for jobs that are held. See “Deleting a Queue that Contains Held or Paused Jobs” for further information on determining why jobs are held and the tasks you can perform for held jobs.
- Resubmit one or more of the jobs in the queue to a different queue that sends output to different physical printers

If the backlog is moderate, you might want to resubmit one or more jobs to another queue that is associated with a different physical printer or set of physical printers. This will reduce the amount of time that the users who sent the jobs you resubmit wait for their printed output. Refer to the procedure in “Resubmitting Jobs to Different Logical Printers”.

Note: If you resubmit the jobs, you have to be sure that the users will be able to find the printed output or that the output can be delivered to them. The user will still receive a notification message regarding which physical printer printed the job, but the user might not be aware of the location of the printer device.

- Promote or increase the priority of specific jobs in the queue

If the queue is backlogged and you have specific users who need their jobs more quickly than other users with jobs waiting in the queue, you can promote or increase the priority of specific jobs. Promoting a job or increasing the priority of a job so that it has a higher priority than other jobs in queue causes HPDPS to process that job next. See “Increasing the Priority of a User Job” in Chapter 11 and “Promoting a User Job” in Chapter 11 for the procedures.

- Change your configuration to improve efficiency

If most of the jobs sent to the queue are small and the queue backlog is consistently caused by the addition of a few large jobs, you might want to limit the size of jobs accepted by the logical printer or printers that send output to the queue. You use the `job-size-range-supported` logical printer attribute to control the size of jobs accepted. You could then set up a

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separate logical printer, queue, and physical printer configuration for large jobs. See “Using Logical Printers to Restrict the Use of Printer Capabilities” in Chapter 6.

If more than one physical printer receives jobs from the queue and some of the printer devices print faster than others, you can use the `job-size-range-supported` physical printer attribute to direct large jobs to the faster printer devices.

### About Enabling Logical Printers

After a logical printer has been created, the following associations must exist before you can enable a logical printer:

1. The logical printer must be associated with a queue using the `associated-queue` attribute, and the queue must exist.
2. If the logical printer is associated with an initial-value-job with the `printer-initial-value-job` attribute, the initial-value-job object must exist.

Any values specified by the attributes of the initial-value-job must be supported by the logical printer. Note that if the corresponding logical printer attribute has no value, it is considered supported.

3. If the logical printer is associated with an initial-value-document with the `printer-initial-value-document` attribute, the initial-value-document object must exist.

Any values specified by the attributes of the initial-value-document must be supported by the logical printer. A logical printer attribute with no value is considered supported.

If you modify any of the attributes of a logical printer, you must consider if this affects any initial-value-job or initial-value-document associated with the logical printer. The values specified for initial-value-job attributes and initial-value-documents attributes must be supported by the corresponding attributes of a logical printer with which they are associated, if the corresponding logical printer attribute has any value or values assigned.

When you try to enable the logical printer, if the new value or values are not supported by the logical printer, HPDPS does not enable the printer. You

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receive an error message that identifies the attribute and the non-supported attribute value or values.

## Disabling a Logical Printer

If you want to modify the values of the logical printer attributes, you will need to disable the logical printer.

If you are planning to disable the logical printer for a significant amount of time, you can use the **message** attribute to notify users or other operators of this fact, and perhaps inform them of how long the logical printer will be disabled. You could also provide them with the name of an alternate logical printer to use.

To disable the logical printer `LogPrt3` and `LogPrt4` and include a message, enter:

```
pddisable -m "Logical printers LogPrt3 and LogPrt4 disabled \
until 06:30PM" LogPrt3 LogPrt4
```

The value of the logical printer attribute `enabled` changes to `false` and HPDPS updates the value of the `message` logical printer attribute with the text you supplied.

## Disabling All Logical Printers Associated with a Queue

You can disable all of the logical printers associated with a queue with one command.

To disable all logical printers associated with the queue `Queue2`, enter:

```
pddisable -c queue -m "Logical printer disabled until 06:30PM" \
Queue2
```

The value of the logical printer attribute `enabled` changes to `false` for all logical printers associated with the queue. HPDPS modifies the values of the `message` attributes for the logical printers with the text you supplied. HPDPS does not modify the `message` attribute of the queue.

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### Enabling a Disabled Logical Printer

Use the `pdenable` command to enable a disabled logical printer. You can enable a single logical printer or multiple logical printers with the same command.

- To enable a single logical printer, enter:

```
pdenable -m "Logical printer LogPrt3 will now accept jobs." \
LogPrt3
```

- To enable all logical printers associated with `Queue2`, enter:

```
pdenable -c queue -m "Logical printer will now accept jobs." \
Queue2
```

The value of the logical printer attribute `enabled` changes to `true` and HPDPS modifies the `message` attribute for all of the logical printers associated with the queue.

### Modifying Logical Printer Attributes

After you have created a logical printer and set the initial values of the attributes, as described in Chapter 6, “Configuring the Spooler, Logical Printers, and Queues”, you can change some of the values based on actual usage. You can also specify values for any attributes that you did not set when you initially created the logical printer.

When you modify the attributes of a logical printer, you have three choices:

- Assign values to an attribute that previously had no value
- Change the value of an attribute that previously had a value
- Set the value of an attribute that previously had a value to no value

You must disable a logical printer before you can change the attributes of the logical printer.

To modify the attributes of a logical printer, perform the following steps:

1. Disable the logical printer with the `pddisable` command. For example, to disable the logical printer `LogPrt1`, enter:

```
pddisable LogPrt1
```

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2. Modify the logical printer attribute values with the `pdset` command.

- a. To change or assign the value of a single-valued attribute, use the `-x` and an *AttributeValuePair*. For example:

```
pdset -x "maximum-copies-supported=15" LogPrt1
```

- b. To add or replace a value to a multi-valued attribute, use `-x` and an *AttributeValuePair* with `+=`. For example:

```
pdset -x "content-orientations-supported+=landscape" \
LogPrt2
```

- c. To subtract a value from a multi-valued attribute, use `-x` and an *AttributeValuePair* with `-=`. For example:

```
pdset -x "content-orientations-supported-=landscape" LogPrt1
```

- d. To set the values of either a single-valued attribute or a multi-valued attribute to no value, which is the default for logical printers, enter:

```
pdset -x "plexes-supported==" LogPrt2
```

Note: You do not have to specify `-c printer` with the `pdset` command. `Printer` is the default class.

3. Enable the logical printer with the `pdenable` command. To enable logical printer `LogPrt1`, enter:

```
pdenable LogPrt1
```

## Modifying Initial Value Objects

When you configure your queues and logical printers, you can create either an initial-value-job object, an initial-value-document object, or both and associate them with a logical printer. “Creating and Configuring Initial-Value-Job and Initial-Value-Document Objects” in Chapter 6 describes the procedures for creating and associating initial value objects. You use these to provide job defaults for all jobs submitted to the logical printer based on the typical printing needs of the users. Later, based on actual usage, you might need to modify the attribute values of the initial value objects.

Use the following procedure to modify an initial value object that is already associated with a logical printer.

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Note: The procedure uses an initial-value-job as the example. Use `-c initial-value-document` to modify attributes of an initial-value-document.

1. Disable the logical printer associated with the initial-value-job. You must disable the logical printer before you can modify the attributes of any associated initial value object.

To disable LogPrt6, enter:

```
pddisable LogPrt6
```

2. Modify the attributes of the initial value object with the `pdset` command.

To specify a job retention period for the initial-value-job IVJDept5G enter:

```
pdset -c initial-value-job -x "job-retention-period=30" \
IVJDept5G
```

3. Enable the logical printer.

To enable logical printer LogPrt6, enter:

```
pdenable LogPrt6
```

HPDPS checks the logical printer for consistency for any attribute value of the initial value object that corresponds to an attribute of the logical printer. If they are not consistent, HPDPS does not enable the logical printer and you receive an error message.

## Modifying the printer-register-threshold Spooler Attribute

The `printer-register-threshold` attribute specifies the amount of time, in minutes, the spooler waits after losing communication with a supervisor before it changes the state of a job from the `unknown` state to the `timed-out` state. The default value for this attribute is 10 minutes.

When HPDPS schedules a job to a physical printer from the queue, the value of the `current-job-state` job attribute changes from `pending` to `processing`. If the spooler becomes aware that it has lost communication with the supervisor containing the physical printer to which the job was scheduled, it does not know the status of the job. Therefore, it changes the job state to `unknown`. This condition can happen if you shut down and then restart the spooler. If the physical printer does not re-register with the spooler within the time period specified by `printer-register-threshold`, the spooler changes

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the job state to `timed-out` and the job remains in the spooler. You will receive a notification message when a job times out if you specify the `job-timed-out` event in the notification profile for the spooler.

Note: Timed-out jobs require intervention from either you or the user because the spooler is not able to determine what has happened to the job. Depending on whether the job printed, either use the `pdrm` command to remove the job from the spooler or resubmit the job with the `pdresubmit` command.

To specify 15 minutes as the amount of time that a spooler waits after losing communication with a supervisor before it changes the state of a job to `timed-out`, enter:

```
pdset -c server -x "printer-register-threshold=15" Spool1
```

## About Server Communications

Understanding the basics of communications between the HPDPS spooler and supervisor and the communications by the objects contained in the servers will help you understand more about the communication process. The following information describes the different types of communications that occur.

1. Using the DCE or Basic Environment namespace, the physical printer uses the value you supply for the `associated-queue` attribute to determine the spooler containing the queue.
2. The next step depends on whether the spooler is running.
  - a. If the spooler is running, the physical printer registers with the spooler and HPDPS sets the value of the `registered-with-spooler` physical printer attribute to `true`.
  - b. If the spooler is not running, the physical printer continues trying to register with the spooler at the interval specified by its `printer-register-threshold` attribute.
3. After you have created and configured all HPDPS objects and HPDPS is ready for use, communications occur as follows:
  - a. The supervisor periodically signals the spooler to verify server communications, and signals when jobs complete.

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- b. The spooler sends requests to the physical printer during job submissions, job queries, and when a job is cancelled or paused.
4. The servers become aware that they have lost communications in one of two ways: when the supervisor does not receive a response to its periodic signaling or when the spooler does not receive a response to its requests.
5. Also, shutting down a server has the following effects on communications:
  - a. When you shut down the supervisor, the supervisor notifies all spoolers containing queues that send jobs to the physical printers of the supervisor.
  - b. When you shut down the spooler, the spooler does not notify the supervisor. The supervisor becomes aware that communications with the spooler have been lost the next time it signals the spooler.

---

## Deleting Objects Contained in Spoolers

This section describes how to delete the logical printers, queues, and initial value objects contained in a spooler.

### Deleting a Logical Printer

Disable the logical printer before you delete it. Disabling the logical printer prevents it from accepting new jobs; modifications to jobs that the logical printer has sent to the queue can still be made as necessary. See “Disabling a Logical Printer” for the command used to disable a logical printer.

To delete the logical printer `LogPrt3`, enter:

```
pdelete LogPrt3
```

HPDPS displays a confirmation message. After you respond to the confirmation message, HPDPS deletes the logical printer.

Notes:

- If you do not allow jobs sent to the queue by the logical printer to complete processing before you delete the logical printer, you and the users who submitted the jobs cannot make modifications to the jobs in the queue

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after you delete the logical printer. You must resubmit the jobs to a different logical printer or remove the jobs from the queue before they can be modified. See “Resubmitting Jobs to Different Logical Printers” and “Deleting Jobs from Queues and from the Spooler” for further information.

- If the value of the `PD_CONFIRM_DELETE` environment variable is `no`, you will not receive a confirmation message. See “Setting the `PD_CONFIRM_DELETE` Environment Variable” in Chapter 4.

## Deleting a Queue

Before you can delete a queue, the following conditions must be met:

- The queue cannot contain any jobs.

You must allow the jobs to complete processing, remove the jobs, or resubmit the jobs before you can delete the queue. See “Deleting Jobs from Queues and from the Spooler” and “Resubmitting Jobs to Different Logical Printers” for the commands to use.

- All logical printers associated with the queue must be disabled.

Use the `pddisable` command to disable the logical printers associated with the queue.

To delete the queue `Queue1`, enter:

```
pddelete -c queue Queue1
```

## Deleting a Queue that Contains Pending Jobs

If all of the jobs in the queue are `pending`, perform the following steps to let the jobs print and then delete the queue:

1. Determine the states of the jobs in the queue that receives jobs from logical printers. For example:

```
pdq -U -p LogPrt3
```

If all jobs are in the `pending` state, continue with this procedure. If the queue contains jobs in the `held` or `paused` state, continue with step 2 of “Deleting a Queue that Contains Held or Paused Jobs”.

## Using Abbreviations for Attribute Names and Values

2. Disable all of the logical printers associated with the queue. For example:

```
pddisable -c queue Queue3
```

All of the logical printers associated with `Queue3` are disabled and do not accept new jobs.

3. Wait until all jobs in the queue are scheduled and have been sent to physical printers.

4. Delete the queue. For example:

```
pddelete -c queue Queue3
```

### Deleting a Queue that Contains Held or Paused Jobs

For jobs in the queue that are in the `held` or `paused` state, you must perform other tasks so that the jobs will print before you delete the queue. For example, if the job is paused, resume the job with the `pdresume` command. If the job is held, determine the reason the job is held and perform any actions required. For example, the job might be held because it requires resources that are not available. Or the user might have submitted the job with `job-hold=true` and sent a message that the job has special requirements, such as blue paper. After performing the required actions, use the `pdmod` command to release the hold on the job.

Perform the following steps to clear jobs from the queue and then delete the queue.

1. Determine the states of the jobs in a queue by querying one of the logical printers that sends jobs to the queue. For example, if the queue `Queue4` receives jobs from logical printer `LogPrt4`, enter:

```
pdq -U -p LogPrt4
```

2. Disable all of the logical printers associated with the queue to prevent the queue from receiving new jobs. For example, to disable all logical printers associated with the queue `Queue4`, enter:

```
pddisable -c queue Queue4
```

3. For paused jobs, use the `pdresume` command to resume processing of the job by HPDPS. For example, to resume the job with a global job identifier of `Spool14:4628700042`, enter:

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```
pdresume Spool4:4628700042
```

Note: Depending on the requirements of the job, a job you resume could go into a **held** state. You can check the state of resumed jobs to see if they are in a **pending** or **processing** state, and not in a held state. For held jobs:

- a. Determine the reasons that jobs are held by querying one of the logical printers that sends jobs to the queue. For example, to determine the reasons for all held jobs in **Queue4** contained in spooler **Spool4**, enter:

```
pdq -U -f job-state=held -r job-state-reasons -p LogPrt4
```

- b. If the reason is **job-hold-set**, query for the value of the **job-message-to-operator** attribute for the job to determine if the user has special requirements for the job. After responding to the message, or if there is no message, use the **pdmod** command to release the job hold.

To release the job with the global job identifier number of **Spool4:4628700042**, enter:

```
pdmod -x "job-hold=false" Spool4:4628700042
```

- c. If the reason is **job-print-after-specified**, use the **pdmod** command to specify a time earlier than the current time.

For example, if the current time is 10:30 in the morning, enter:

```
pdmod -x "job-print-after=9:00:00" Spool4:4628700042
```

- d. If the reason is **required-resources-not-ready** or **required-resources-not-supported**, a change to or a problem with the physical printer or printers that could print the job when it was first submitted has occurred. There is no longer a physical printer that supports all of the attributes of the job. The most likely cause of this problem is that the physical printer is no longer ready. See “Querying for the State of a Physical Printer” in Chapter 10.
- e. Delete the queue:

```
pddelete -c queue Queue4
```



## Deleting an Initial Value Object

Use `-c initial-value-document` or `-c initial-value-job` with the `pddelete` command to delete an initial value object.

If the initial value object is associated with one or more enabled logical printers, you must disable the logical printers before you can delete the initial value object. After you delete the initial value object you should update and enable the logical printers.

To delete an `initial-value-job` or `initial-value-document` that is associated with an enabled logical printer, perform the following steps:

Note: This procedure uses an `initial-value-job` as an example. The procedure for an `initial-value-document` is the same.

1. Query for enabled logical printers associated with the initial value object.

To query for enabled logical printers associated with `initial-value-job IVJ1` contained in spooler `Spool1`, enter:

```
pdls -c initial-value-job -r logical-printers-ready Spool1:IVJ1
```

HPDPS displays information similar to the following:

```
IVJ1: logical-printers-ready = LogPrt5
```

2. Disable the logical printer associated with the initial value object.

To disable logical printer `LogPrt5`, enter:

```
pddisable LogPrt5
```

3. Delete the `initial-value-job`.

To delete the `initial-value-job` object `IVJ1` contained in spooler `Spool1`, enter:

```
pddelete -c initial-value-job Spool1:IVJ1
```

4. Modify the logical printer so that it no longer references the initial value object:

```
pdset -x "printer-initial-value-job==" LogPrt5
```

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This command sets the value for the attribute back to its default value, which is no value. You could also specify the name of another initial value object:

```
pdset -x "printer-initial-value-job=IVJob1A" LogPrt5
```

5. Enable the logical printer. For example:

```
pdenable LogPrt5
```

---

## Shutting Down and Restarting the Spooler

This section describes how to shut down the spooler. You have the following options:

- Shutting down the spooler immediately
- Shutting down the spooler after all of the jobs in the queues contained in the spooler have been scheduled and printed

### Shutting Down the Spooler Immediately

Use the `pdshutdown` command to immediately shut down a spooler process. Under normal conditions there is no reason to shut down a spooler. The only reasons to shut down a spooler would be for a condition requiring re-initialization of the system on which the spooler is installed or a condition requiring you to issue the HP-UX `shutdown` command. Issuing the HP-UX `shutdown` command also shuts down HPDPS spoolers and supervisors.

To shut down spooler `Spool1` immediately, enter:

```
pdshutdown Spool1
```

The value of the non-settable `server-state` server attribute changes to `terminating` and the spooler accepts no commands other than `pdl`s commands. The logical printers contained in the spooler no longer accept jobs and jobs in the queues contained in the spooler are not scheduled. Jobs sent to physical printers by the spooler will finish printing after the spooler has shut down, but there is no way for you or the users to find out about job status or to receive notification messages for the jobs until the spooler is running again.

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You will receive notification messages if the physical printer handling the job needs attention.

Notes:

- The `-w` flag of the `pdshutdown` command determines the manner in which the spooler shuts down. The default option for this flag is `after-current`, specifying that the spooler shuts down immediately, even if there are jobs in the queues contained in the spooler. Therefore, the command you entered in this example is equivalent to the command:

```
pdshutdown -w after-current Spool1:
```

- Also, the `now` option for the `-w` flag works the same as `after-current`. The following command also has the same results:

```
pdshutdown -w now Spool1:
```

- The `after-current` and `now` options work differently for HPDPS supervisors. See “Shutting Down the Supervisor Immediately” in Chapter 10 for further information.

## Shutting Down the Spooler after All Jobs Have Printed

Use `-w after-all` with the `pdshutdown` command to shut down the spooler after all of the jobs in the queues contained in the spooler have been scheduled to physical printers and printed. Using the `after-all` option provides you with more control of the jobs when you shut down the spooler.

Use the following command to shut down the spooler `Spool1` after all jobs have printed. The command also includes a message describing the reason for shutting down the spooler.

```
pdshutdown -m "Shutting down spooler Spool1 for \
host maintenance." -w after-all Spool1:
```

The value of the non-settable `server-state` spooler attribute changes to `terminating` and all of the pending jobs in the queues contained in the spooler are scheduled and sent to physical printers. The logical printers contained in the spooler no longer accept jobs, but the spooler continues to accept commands.

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Note: If there are any held or paused jobs in any of the queues, the spooler will not shut down until you take the appropriate actions to print these jobs. See “Deleting a Queue that Contains Held or Paused Jobs”.

## Restarting the Spooler after It Has Been Shut Down

Use the `pdstartspl` command to restart a spooler that has been shut down. The HPDPS print database stores permanent information about the spooler and the objects it contains in files located in the directory `/var/opt/pd`. You can log on to the system directly or through the HP-UX `rlogin` command.

To restart the spooler `Spool1`, enter:

```
pdstartspl Spool1
```

When the spooler restarts, its logical printers and queues return to the state they were in when the spooler was shut down. If the logical printers were enabled, they can now accept jobs. If the queues were ready and their associated physical printer or printers were enabled, HPDPS can begin to schedule jobs to the physical printers after the physical printers have re-registered with the spooler.

If you disabled any logical printers before you shut down the spooler, you must enable them before they can accept jobs after you restart the spooler. Resume any queues that were paused after you restart the spooler.

Note: The DCE user and user group entries for the spooler control which people can issue HPDPS commands that affect the spooler and the objects it contains. The person issuing the `pdstartspl` command must be root.

## Deleting the Spooler

Use `-c server` with the `pdelete` command to permanently delete the spooler. The spooler and any of its queues cannot contain jobs; you must allow the jobs to print or explicitly delete jobs from the spooler and its queues using the `pdrm`, `pdelete`, or `pdclean` commands.

Deleting a spooler deletes all of the objects it contains, such as queues or initial-value-jobs, from the HPDPS database. You can create archive files for the spooler and the objects it contains before you delete the spooler. See “Creating Archive Files for Spoolers and Spooler Objects” for a description of how to create these files.

To delete the spooler `Spool1`, enter:

```
pdelete -c server Spool1
```



## Managing Supervisors and Physical Printers

---

This section describes tasks for managing supervisors and physical printers. These tasks include:

- Monitoring and tracking configuration changes made to supervisors and physical printers
- Making policy decisions on how to use certain attributes for supervisors and physical printers, including media usage
- Querying for supervisor and physical printer status
- Responding to physical printer problems
- Performing job-related management tasks for physical printers
- Routine tasks
- Modifying supervisor and physical printer tuning attributes
- Shutting down and deleting a supervisor, and deleting physical printers

---

### Monitoring Supervisor and Physical Printer Configurations

The tasks in this section involve tracking changes made to supervisors and physical printers by:

- Defining how and when to use the message attribute
- Creating archive files for supervisors and supervisor objects

### Setting the message Attribute for Supervisors and Supervisor Objects

Use the `-m` flag with any command that modifies a supervisor or physical printer to set the text of the `message` attribute for that object. You can specify

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a text string up to 4095 characters in length that describes the modifications you are making.

For example, to set a message for physical printer `PhyPrt1`, enter the command:

```
pddisable -c printer -m "Disabling PhyPrt1 - \
changing the media. Submit jobs after \
2:00 p.m. 7/24" PhyPrt1
```

After you issue this command, users and other administrators can query for information relating to why the physical printer is not accepting jobs. For example, they can enter the command:

```
pdls -c printer -r message PhyPrt1
```

You need to set a policy of how and when administrators and operators will use the `-m` flag to set the `message` attribute. You might decide to never use the flag or to always use it. An alternate decision would be to use this flag whenever you change the state of a supervisor or physical printer for a significant period of time. Or you might elect to use the `-m` flag whenever you modify an object with the `pdset` command. This allows you to record why the values for an attribute or attributes were changed, who changed them, and when the changes were made.

---

**Note** If you modify an object and use the `-m` flag, then modify the object again and omit the `-m` flag, the message attribute still contains the message text that you entered when you made the first modification. This can cause anyone querying for the message text to receive incorrect information. If you decide to use the `-m` flag, you should use it consistently to prevent this problem.

---

## Creating Archive Files for Supervisors and Supervisor Objects

An archive file contains the settable and specifiable attributes and their values, including attributes with no values. If you need to re-create any of the objects contained in the supervisor, you can use the archive file as an attributes file to quickly re-create the object. You must either assign values to or delete any

### 10-2 Managing Supervisors and Physical Printers



## Using Abbreviations for Attribute Names and Values

attributes in the file that have no values. HPDPS issues an error message if an attributes file contains an attribute with no value.

You can also use the archive file to make modifications to attributes and values for an object or to create new objects that are similar to objects that you have already created. You can copy an archive file and edit it to assign different values to any attribute or attributes as necessary. Then you can specify the archive file as an attributes file with the `pdcreate` command and the `-X` flag to create a similar object.

Use the following commands to create archive files:

To create an archive file named `Super1.archive` in the directory `/attr` for the supervisor `Super1`, enter the command:

```
pdls -c server -r archive Super1 > /attr/Super1.archive
```

---

**Note** You cannot use an archive file to create a supervisor. You can use the file to make modifications.

---

To create an archive file named `PhyPrt1.archive` in the directory `/attr` for the physical printer `PhyPrt1`, enter the command:

```
pdls -c printer -r archive PhyPrt1 > /attr/PhyPrt1.archive
```

## Setting Policy for Job-Size Physical Printer Attributes

You can set a policy on how you plan to use the following physical printer attributes:

- `maximum-copies-supported`
- `job-size-range-supported`
- `job-size-range-ready`

You can use these attributes to control the number of copies users can request and the sizes of jobs they can submit. Controlling these attributes can directly affect printing workload and reduce the usage of supplies such as paper and toner. Depending on the volume of jobs generated by your organization, you need to determine whether you should control jobs based on their size and the number of copies requested.

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The following sections describe how you can modify the values for these attributes. You must disable the physical printer before you can modify the attributes.

### Using the `maximum-copies-supported` Attribute

Use `-x maximum-copies-supported` with the `pdset` command to control the numbers of document copies that users can request when submitting a job. Remember that a job can consist of one or more documents. HPDPS calculates the number of document copies based on the values the user supplies for the following:

1. The value of the `copy-count` document attribute.
2. The value or values of the `job-copies` component of the `results-profile` job attribute. See “Setting Up the Job Results Profile” in Chapter 11 for further information on the `results-profile` attribute.

HPDPS multiplies the two values and compares the calculated value to the value of the `maximum-copies-supported` attribute during validation and scheduling.

For example, if a user submits a job with the command:

```
pdpr -x "copy-count=2 results-profile=:::2:" \
File1.txt File2.txt
```

the user is requesting four copies of each document in the job. If the value of the `maximum-copies-supported` attribute is four or greater, HPDPS accepts the job.

If you decide to use the `maximum-copies-supported` attribute to restrict how many document copies can be requested, you can do so based on the printer device. You might want to allow multiple copies on a high-speed printer that has high-capacity input and output bins but restrict a low-capacity printer to one or two copies of a document.

To restrict the number of document copies that the user can request for jobs scheduled to physical printer `PhyPrt4`, enter:

```
pdset -x "maximum-copies-supported=10" PhyPrt4
```

## 10-4 Managing Supervisors and Physical Printers

## Using Abbreviations for Attribute Names and Values

---

**Note** The value of the `maximum-copies-supported` physical printer attribute does not restrict the number of documents allowed in a single job, only the number of copies of each document in the job.

---

### Controlling the Sizes of Jobs Accepted by the Physical Printer

Use the multi-valued `job-size-range-supported` and `job-size-range-ready` physical printer attributes to restrict the size of jobs that users can submit. The component values of these attributes specify the lower limit followed by the upper limit to the size of the job. Specify the values for these attributes in octets and separate the values with a colon. One octet is equal to one byte.

HPDPS compares the value of the `total-job-octets` job attribute to the `job-size-range-supported` physical printer attribute during job validation. HPDPS compares the `total-job-octets` job attribute to the `job-size-range-ready` physical printer attribute for job scheduling. By default, the values for these attributes allow any size job to be scheduled to the physical printer. You can set the values of these attributes to a smaller maximum size for low-capacity, desktop printers. While any printer can print any size job, printer limitations, such as the number of sheets printed per minute or the capacity of the input trays, impose a practical limit on the size of jobs that it is reasonable to send to a printer.

To restrict the size of jobs that can be submitted to the physical printer `PhyPrt2`, enter:

```
pdset -x "job-size-range-supported=0:10000 \
job-size-range-ready=0:10000" PhyPrt2
```

Most of the time you will set the values for the two attributes to the same value range, as in the example. However, you also can use these attributes to defer the printing of large jobs by setting the value of `job-size-range-ready` to a value less than the value for `job-size-range-supported`. HPDPS accepts jobs based on the `xxx-supported` attribute, but only prints smaller jobs based on the `xxx-ready` attribute. HPDPS holds the large jobs in the queue associated with the physical printer in a job state of `held` and with a `job-state-reason` of `required-resource-not-ready`. You can increase the value for `job-size-range-ready` to a larger value at a later time to print the

## Using Abbreviations for Attribute Names and Values

large jobs. You might increase the value at the end of the day or at night so that large jobs will print when the printer is not busy printing smaller jobs.

## Determining Which Physical Printers Require Authorization

When you create a physical printer you need to decide whether the associated printer device requires authorization for a user or user group to use. You can group physical printers that require authorization into a printer pool that receives jobs from the same queue.

Authorization cannot be set for the physical printer, but must be set up for the logical printer or printers that send jobs to the associated queue. Therefore, if a physical printer or printers require authorization, this restriction must be set for all the logical printers that support the physical printers. See “Restricting Access to a Printer Device” in Chapter 8 for further information.

## Supporting Special Media

You need to decide which types of media that users in your organization need and how you plan to support these needs.

The values of the `media-ready` physical printer attribute specify which media are currently loaded in the printer device, or the types of media that are available through an input source such as a manual envelope feeder. A printer might be able to use other types of media, such as different sizes of paper, transparencies, or multi-part forms. The `media-supported` physical printer attribute specifies all of the types of media that the physical printer supports.

The `media-supported` and `media-ready` attributes have default values, depending on the model of printer device. You need to decide whether to leave the values for these attributes as they are, or whether to modify them to reflect only the types of media that you actually use and need to support.

If all users of the physical printer always use either `na-letter-white` or `na-legal-white` media, you could set the `media-supported` attribute to only specify those two values.

Although many printer devices can handle many types of media, setting the `media-supported` attribute to reflect what you actually support more clearly defines how you are currently using this physical printer. This approach also

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prevents HPDPS from accepting jobs that request a type of media that you do not use or do not intend to load in the printer device.

Another consideration is whether there is an operator available to change the media loaded in the printer device when a user needs a non-standard medium. That operator must be able to receive messages from users requesting specific media or must be available to:

- Determine if there are held jobs
- Determine why the jobs are held
- Load the appropriate media in the printer device, for held jobs requiring resources
- Update the corresponding physical printer attributes to reflect the media currently supported and ready

If there is no such operator available, you need to develop procedures for your organization to support users requiring special media. For example, configure separate logical printers, queues, and physical printers for non-standard media and ensure that the associated printer devices always have the correct media loaded.

## Sending Media-Related Messages to Operators

If you support a special media, but that media is not always loaded in a particular printer device, you can instruct your users to submit their jobs with a message. The message goes to the operator specified by the `notify-operator` queue attribute. See “Specifying Who Receives Messages From Users” in Chapter 6 for information on configuring this attribute.

For example, a user with a job requiring the `iso-a4-colored` medium could issue the command:

```
pdpr -p LogPrt7-x "job-message-to-operator='Please load \
yellow iso-a4 in the printer for this job.'" File1.txt
```

You need to ensure that the correct person is specified by the `notify-operator` attribute; see “Specifying Who Receives Messages From Users” in Chapter 6 for information on setting up this attribute.

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---

### Querying for Supervisor Information

This section describes how to query for the values of attributes that reflect the state of and information about HPDPS supervisors and the associations between the supervisor and other HPDPS objects.

You can query for supervisor information in response to notification messages that indicate a problem with either the supervisor or a physical printer. Because the supervisor controls the physical printer, problems with a physical printer can be caused by problems with the supervisor in which the physical printer resides.

### Querying for the State of a Specific Supervisor

The value of the non-settable `server-state` supervisor attribute indicates the state of the supervisor. You can query the state of the supervisor if you receive a notification message about a problem in the supervisor or a message that indicates the supervisor has started to terminate. You can query the supervisor if jobs are being rejected because no physical printers are available to support the jobs; the supervisor could be down and the spooler can no longer communicate with it.

For example, to query for the state of the supervisor `Super1`, enter:

```
pdls -c server Super1
```

HPDPS displays information similar to the following:

```
Server State Type
----- ---- -
Super1 ready supervisor
```

The `server-state` attribute is one of the predefined attributes of the `brief` option of the `-r` flag for the `pdls` command. The default for the `-r` flag is `brief`; therefore, the command you entered in this example is equivalent to entering:

```
pdls -c server -r brief Super1
```

If the supervisor is not running, HPDPS issues a message that it cannot communicate with the server. See “Restarting the Supervisor After it has been Shut Down”.

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### Supervisor States

The possible states of the supervisor are:

| State        | Description                                                                                                                                                      |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| initializing | The supervisor process is initializing.                                                                                                                          |
| ready        | The supervisor has finished initializing and its physical printers can accept jobs if they are ready.                                                            |
| terminating  | The supervisor is shutting down. The physical printers contained in the supervisor do not accept new jobs, and existing jobs might or might not finish printing. |

### Querying for the States of All HPDPS Supervisors

To query for the states of all supervisors, use the global character, an asterisk, to specify that you are querying all of the supervisors that are currently running:

```
pdls -c server -f server-type==supervisor *:
```

### Querying for the Verbose Set of Supervisor Attributes

To query for the verbose set of attributes for supervisor Super1, enter:

```
pdls -c server -r verbose Super1
```

HPDPS displays information similar to the following:

| Server | State | Physical Printers Supported | Type       |
|--------|-------|-----------------------------|------------|
| Super1 | ready | PhyPrt4<br>PhyPrt5          | supervisor |

## Using Abbreviations for Attribute Names and Values

### Querying for Ready Physical Printers Contained in the Supervisor

A physical printer is ready if it is enabled and if it is in either the `connecting-to-printer`, `idle`, or `printing` states. This query also provides you with the name of the queue from which the physical printers receive jobs.

To query for enabled and ready physical printers contained in supervisor `Super1`, enter:

```
pdls -c printer Super1:
```

HPDPS displays information similar to the following:

| Printer | Realization | State  | Enabled | Queue  |
|---------|-------------|--------|---------|--------|
| PhyPrt2 | physical    | idle   | true    | Queue4 |
| PhyPrt5 | physical    | paused | true    | Queue5 |

This information indicates that `PhyPrt5` is not ready.

Note: You can request information about all objects within a server of a given class by using the *ServerName:* argument. To find out about all physical printers within supervisor `Super1` enter the following command:

```
pdls -c printer Super1:
```

Entering the *ServerName* followed by only a colon (:) lets HPDPS know that you want to obtain data about all objects within the specified class contained within that server. Whereas entering the command:

```
pdls -c printer Super1:PhyPrt5
```

only provides information about physical printer `PhyPrt5`.



## Querying for Physical Printer Information

This section describes how to query for the values of attributes that reflect the status of physical printers.

### Querying for the State of a Physical Printer

The results of this query also indicate whether the physical printer is enabled. You can query the state of the physical printer if it is not accepting and printing jobs. Depending on the notification profile for the physical printer, you might receive notification messages informing you of problems. Certain printer states indicate a problem with the physical printer, while others indicate that the physical printer is working correctly.

To query for the state of physical printer `PhyPrt4` and to determine whether it is enabled, enter:

```
pdls -c printer PhyPrt4
```

HPDPS displays information similar to the following:

| Printer | Realization | State | Enabled | Queue  |
|---------|-------------|-------|---------|--------|
| PhyPrt4 | physical    | idle  | true    | Queue3 |

This indicates that the physical printer is enabled. If it were not, the value shown in the `Enabled` column would be `false`.

### Physical Printer States

The possible states of the physical printer are:

|                                     |                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>connect-ing-to-printer</code> | The physical printer has received a job and is trying to connect to its printer device. After it connects to the device, the physical printer locks the printer device until it finishes processing the job so that another print system cannot use the device. This applies to the <code>tcpip</code> attachment type. |
| <code>idle</code>                   | The physical printer is waiting for a job.                                                                                                                                                                                                                                                                              |
| <code>needs-key-operator</code>     | This state occurs when there is a serious problem with the printer device. Either the physical printer                                                                                                                                                                                                                  |

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|           |                                                                                                                                                                                                                                                                                                            |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | cannot connect to the printer device or there is some other problem. HPDPS automatically disables the physical printer when the physical printer enters this state.                                                                                                                                        |
| paused    | The physical printer has been paused with the <code>pdpause</code> command.                                                                                                                                                                                                                                |
| printing  | The physical printer is processing a job.                                                                                                                                                                                                                                                                  |
| timed-out | The physical printer received a job, but the physical printer could not connect to the printer device in the time specified by the <code>printer-timeout-period</code> physical printer attribute. The supervisor continues to try to connect to the printer. You will receive notification of this state. |

Refer to “Responding to Physical Printer State Problems” for more information on these states.

## Determining Whether a Physical Printer is Registered

The value of the `registered-with-spooler` attribute indicates whether the physical printer is communicating with the spooler that contains the queue from which the physical printer receives jobs.

To determine whether physical printer `PhyPrt4` is registered, enter:

```
pdls -c printer -s column -r brief,registered-with-spooler \
PhyPrt4
```

HPDPS displays information similar to the following:

| Printer  | Realization | State | Enabled | Queue   | Registered<br>with Spooler |
|----------|-------------|-------|---------|---------|----------------------------|
| -----    | -----       | ----- | -----   | -----   | -----                      |
| idsuv-pp | physical    | idle  | true    | idspl-q | true                       |

Under some circumstances there might be a period when the physical printer indicates that it is registered with the spooler when it is not. For example, the supervisor and spooler have lost communications but the supervisor does not identify this condition until the next time it signals the spooler. The state of the physical printer is `idle` and the value of the `registered-with-spooler`

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## Using Abbreviations for Attribute Names and Values

attribute is `true`, indicating that it is registered. In this situation, you can determine whether the physical printer can still communicate with the spooler by issuing the `pddisable` command followed by the `pdenable` command to enable the physical printer again. When you enable a physical printer, it tries to contact the appropriate spooler to indicate that it is ready for a job. HPDPS issues an error message if the physical printer cannot communicate with the spooler.

---

## Responding to Physical Printer State Problems

The following describes the normal sequence of printer states for an enabled and ready printer as it waits for, receives, and completes jobs.

1. The physical printer state is `idle` and the physical printer is ready to accept a job.
2. The physical printer receives a job and the printer state changes to `connecting-to-printer` while the physical printers tries to lock the printer device.
3. The physical printer successfully locks the printer device within the amount of time specified by its `printer-timeout-period` attribute. The printer state changes to `printing` while job prints.
4. The printer device finishes the job and the physical printer state returns to `idle`. The physical printer is ready for a new job.

The following physical printer states indicate problems with the physical printer device:

- `needs-key-operator`
- `timed-out`

### Printer needs-key-operator Problem

A physical printer enters the `needs-key-operator` state when it locks the printer device but cannot print because it encounters an error. In this case HPDPS automatically disables the physical printer and requeues the job to the spooler. After you fix the printer problem, you must enable the physical printer

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with the `pdenable` command. This causes the physical printer to return to the `idle` state and allows it to accept jobs again.

HPDPS notifies you when the physical printer enters the `needs-key-operator` state if the notification profile for the printer specifies you are to receive notification messages for the `printer-needs-administrator` event.

You can query the `printer-state`, `enabled`, and `printer-needs-key-operator-attention-time` physical printer attributes. The values of these attributes will confirm the state of the physical printer, whether it is disabled, and indicate how long the physical printer has been in the problem state. The brief set of physical printer attributes includes the `printer-state` and `enabled` attributes.

To query these attributes, enter:

```
pdls -c printer -s column \
-r brief,printer-needs-key-operator-attention-time PhyPrt4
```

HPDPS displays information similar to the following:

| Printer | Realization | State              | Enabled | Queue  | Needs Key<br>Operator Time |
|---------|-------------|--------------------|---------|--------|----------------------------|
| -----   | -----       | -----              | -----   | -----  | -----                      |
| PhyPrt4 | physical    | needs-key-operator | false   | Queue4 | 23:44                      |

After verifying the physical printer state, see “Physical Printer State is needs-key-operator” in Chapter 13 for the procedures you use to correct the problem.

## Printer has timed-out Problem

A physical printer enters the `timed-out` state when it cannot lock the network printer device within the amount of time specified by the physical printer `printer-timeout-period` attribute. This happens when the printer device is already locked. The physical printer continues trying to connect to the device. When it is successful, the physical printer state changes to `printing`. When the job completes, the physical printer state changes to `idle`.

HPDPS notifies you when the physical printer enters the `timed-out` state if the notification profile for the printer specifies you are to receive notification messages for the `printer-timed-out` event.

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## Using Abbreviations for Attribute Names and Values

You can query the `printer-state` physical printer attribute to ensure that the physical printer is actually in the `timed-out` state. Query the `enabled` attribute to check that the physical printer is still enabled. The printer should remain enabled even when it is in the `timed-out` state.

To query these attributes, enter:

```
pdls -c printer PhyPrt4
```

HPDPS displays information similar to the following:

| Printer | Realization | State     | Enabled | Queue  |
|---------|-------------|-----------|---------|--------|
| -----   | -----       | -----     | -----   | -----  |
| PhyPrt4 | physical    | timed-out | true    | Queue4 |

After verifying the physical printer state, see “Physical Printer State is Timed-Out” in Chapter 13 for the procedures you use to correct the problem.

---

## Message-Related Tasks for Physical Printer Management

This section describes physical printer tasks related to managing jobs scheduled to a physical printer for processing. These tasks include:

- Setting up the `notify-operator` physical printer attribute to route job start and end messages
- Responding to job start and end messages
- Disabling job start and end messages

### Specifying Who Receives Job Start and End Messages

Use `-c printer` and `-x notify-operator` with the `pdset` command to specify who receives messages from users.

The `notify-operator` attribute is a multi-valued attribute with the following two components:

|                              |                                                                                                                                                                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>delivery-method</code> | This component specifies how the operator receives the job message. Possible values are <code>electronic-mail</code> , <code>message</code> , and <code>none</code> . The default delivery method is <code>electronic-mail</code> . |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Using Abbreviations for Attribute Names and Values

**delivery-address** This component specifies the address of the operator who will receive the job message. The default value is the address of the administrator who created the physical printer.

You can modify the **notify-operator** attribute if the physical printer is managed by an operator and not by the administrator who created the physical printer. Also, the physical printer might be managed by different operators on different shifts. You might want to notify some operators either with a message or by electronic mail, or by both delivery methods.

The following example shows how to set up the **notify-operator** attribute for two operators who manage the printer. The first operator receives start and end messages from users as messages and the second operator receives the messages by electronic mail.

To modify the **notify-operator** attribute for the physical printer **PhyPrt2**, enter:

```
pdset -c printer -x "notify-operator=message:White@Caddy \
electronic-mail:Jones@Chevy.xyz.com" PhyPrt2
```

## About Controlling Job Start and End Messages

How you set the **start-message-supported** and **end-message-supported** physical printer attributes determines whether users can send messages.

**start-message-supported** This single-valued attribute specifies whether the physical printer supports the **job-start-message** job attribute. The default value for this attribute is **true**.

When the value of this attribute is **true**, users can specify message text with the **job-start-message** attribute when they submit the job. HPDPS sends the message to the operator or operators specified by the **notify-operator** physical printer attribute. HPDPS sends the start message when the job starts printing. The message can alert the operator to something special about the job, for example, that the job prints confidential pages.

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Sending a start message does not stop the job from printing; normally the job prints without operator intervention.

Sending a start message is particularly useful for printer devices that have manual forms feed capabilities. The user can send a message alerting the operator to load a special type of paper. After the operator loads the paper, the job starts printing.

`end-message-supported` This single-valued attribute specifies whether the physical printer supports the `job-end-message` job attribute. The default value for this attribute is `true`.

When the value of this attribute is `true`, users can specify message text with the `job-end-message` attribute when they submit the job. HPDPS sends the message to the operator or operators specified by the `notify-operator` physical printer attribute. HPDPS sends the end message when the job finishes printing. The message can give instructions for handling the printed job. The user might specify a location to where the job should be delivered, such as a specific office or building.

## Disabling Job Start and End Messages

Specify a value of `none` for the `delivery-method` component of the `notify-operator` physical printer attribute to disable the delivery of start and end messages from users. Under normal conditions, you will not want to disable the messaging capabilities.

For example, to disable the delivery of start and end messages for jobs processed by the physical printer `PhyPrt1`, enter:

```
pdset -x "notify-operator=none:rob@cowboy" PhyPrt1
```

## Using Abbreviations for Attribute Names and Values

---

### Job-Related Tasks for Physical Printer Management

This section describes job-related procedures for managing physical printers. If you need to disable or pause a physical printer and the physical printer has a job or jobs scheduled to it, you have to decide what to do with the jobs. This section also contains the procedures for disabling, pausing, and and resuming physical printers.

#### Determining Which Jobs Are Scheduled to a Physical Printer

To determine which jobs are scheduled to the physical printer `PhyPrt4` contained in supervisor `Super1`, enter:

```
pdls -U -f printers-assigned==PhyPrt4 Super1:
```

The `-U` flag specifies that you are querying for all jobs, not just jobs that you have submitted. You specify both the physical printer name and supervisor name with the command. You do not have to specify the `-c` flag with the command; the default class for the `pdls` command is `job`.

HPDPS displays information similar to the following:

| Job | ID                | Name      | Current State | Intervening Jobs | Printer Requested | Printers Assigned |
|-----|-------------------|-----------|---------------|------------------|-------------------|-------------------|
| 15  | Spoo12:5969346789 | File1.txt | processing    |                  | LogPrt4           | PhyPrt4           |
| 16  | Spoo12:5969355101 | File4.txt | processing    |                  | LogPrt10          | PhyPrt4           |
| 17  | Spoo12:5969363111 | File6.txt | processing    |                  | LogPrt10          | PhyPrt4           |

#### Cancelling Processing Jobs

Use the `pdrm` command to cancel a processing job. Use the global job identifier to identify the job or jobs you want to cancel. For example, you might want to cancel a processing job when a user has submitted the wrong job and the job is very large. Instead of waiting for the job to finish printing and then discarding the output, you can cancel the job. HPDPS stops processing the job and you only receive partial output instead of the entire job.

You can also cancel a processing job and retain it. An example of when you might want to do this is when a large job is printing on a slow printer and many smaller jobs are waiting to print. You can cancel and retain the job,

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then either send it to a faster printer or print it at a time when the printing workload is minimal.

Use the following examples to cancel processing jobs.

- To cancel two processing jobs, enter:

```
pdrm Spool1:1234500034 Spool1:1234500047
```

- To cancel a job and retain it for four hours, enter:

```
pdrm -x "job-retention-period=4:00" Spool1:1234500047
```

HPDPS cancels the job in the physical printer and retains the job in the spooler. See “Resubmitting Jobs to Different Logical Printers” in Chapter 9 for information on resubmitting retained jobs.

## Pausing Processing Jobs

To pause a processing job whose global job identifier is `Spool1:1234500034`, enter:

```
pdpause -c job Spool1:1234500034
```

HPDPS pauses the job at the next pausable point. This point is the result-set boundary when more than one `results-profile` has been specified. HPDPS returns paused jobs to the queue until you resume or cancel the jobs.

## About Pausing and Disabling Physical Printers

Based on the task that requires you to make a physical printer unavailable, you might need to decide whether to pause or disable the physical printer. You can generally determine this based on how long the physical printer will be unavailable.

- Pause the physical printer if you plan to have it unavailable for a short time. For example, if the printer needs more toner, you can pause the printer, add toner, and then resume the printer.

When you pause the physical printer, you in effect pause all of the jobs that have been sent to the printer. However, the state of the jobs remains `processing` and they will continue printing when you resume the physical printer. If the physical printer can accept multiple jobs, additional jobs could

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be sent to the printer. You could also disable the printer to prevent this, but most of the time this is not necessary.

- Disable the physical printer if it must be unavailable for a longer period of time. For example, if the printer device needs to be out of service for one or two hours for routine maintenance, you should disable it.

When you disable the physical printer, no more jobs will be sent to it. However, all jobs currently received by the physical printer continue processing. Under most circumstances you will let jobs sent to the physical printer finish printing.

When you disable or pause a physical printer, you have to decide what to do with the jobs already scheduled to the physical printer. Most of the time you will not modify the jobs. However, for individual jobs you have the capability of:

- Cancelling them
- Cancelling them with a retention period and resubmitting them to the same printer later
- Cancelling them with a retention period and resubmitting them to a different logical printer, queue, and physical printer

Also, when you pause or disable a physical printer, there could be jobs in the queue associated with the physical printer that are waiting to be scheduled; this might be the only physical printer that supports those particular jobs. If the physical printer is going to be disabled and out of service for a long time, you have to decide how to manage these jobs. If the printer will be unavailable for a substantial amount of time, you can update the `message` attribute to alert other users.

See “Managing Jobs in Queues and Spoolers” in Chapter 11 for information on managing jobs in queues.

### Disabling a Physical Printer

When you disable a physical printer, it will not accept any additional jobs. The job or jobs currently sent to the printer will finish printing.

To disable the physical printer `PhyPrt3`, enter:

```
pddisable PhyPrt3
```

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## Using Abbreviations for Attribute Names and Values

To disable physical printer `PhyPrt3` and include a message, enter:

```
pddisable -m "PhyPrt3 is unavailable until 15:30 because of \
required maintenance" PhyPrt3
```

You can now complete the tasks that required you to disable the physical printer. For example, if you are changing the type of media loaded in the printer, you can load the new media and update the physical printer attribute that reflects which media is loaded.

### Enabling a Disabled Physical Printer

To enable the physical printer, enter:

```
pdenable PhyPrt3
```

### Pausing a Physical Printer

To pause a physical printer `Phyprt4`, enter:

```
pdpause PhyPrt4
```

HPDPS submits each document in a job to the printer device as a separate print request. Pausing an HP-UX physical printer pauses the printer when the printer buffer is exhausted.

### Resuming a Paused Physical Printer

To resume physical printer `PhyPrt4`, enter:

```
pdresume PhyPrt4
```

When you resume the physical printer, all jobs that were previously scheduled to the physical printer resume printing at the place that they stopped printing. The physical printer continues sending print output to the printer device at the point where it left off.

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---

### Performing Routine Physical Printer Tasks

This section describes the tasks of changing the media loaded in a printer device and performing preventive maintenance for a printer.

#### Changing the Media in Printers

In the following example, the printer device currently has yellow paper loaded and you are changing that to white paper.

1. Disable the physical printer representing the printer device in which you will load a new media. Enter:

```
pddisable PhyPrt2
```

2. Replace the yellow paper with the new media. Enter:

```
pdset -x "media-ready=iso-a4-white" Phyprt2
```

3. Enable the physical printer with the following command:

```
pdenable PhyPrt2
```

Jobs can now be scheduled to the physical printer.

#### Performing Preventative Maintenance on the Printer Device

If you are taking the printer device off line for maintenance, for example to add supplies or to perform scheduled service, first disable the physical printer. Alternatively, if the physical printer that you are maintaining is the only physical printer associated with the queue, you can disable the logical printer or printers that send jobs to the queue. Then, you can let all the jobs in the queue finish printing on the physical printer before you disable it. Disabling the logical printer also prevents new jobs from being queued while you perform printer maintenance.

You can use the **message** attribute of one or more logical printers that send jobs to the physical printer to notify the users that the physical printer is out of service. To do this, enter:

```
pddisable -x "message='Physical printer PhyPrt5 not available \\
because of maintenance.'" LogPrt4 LogPrt5
```

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## Using Abbreviations for Attribute Names and Values

If you are going to disable the physical printer for a long time and if jobs are in the queue, you can resubmit them to another queue. Refer to “Resubmitting Jobs to Different Logical Printers” in Chapter 9 for instructions on how to resubmit jobs. Then disable the physical printer and perform maintenance.

If you need to do short-term maintenance such as adding paper, toner, or supplies, you can just pause the physical printer and then resume the printer when the maintenance is complete. See “Pausing a Physical Printer”. Disable a physical printer if it needs long-term maintenance.

---

## Modifying Supervisor and Physical Printer Tuning Attributes

Supervisors and physical printers have some attributes that affect performance. These attributes all have default values which ensure good performance under most circumstances. Therefore, the examples in Chapter 5, “Creating/Configuring Supervisors and Physical Printers” that describe how to create physical printers do not specify values for these attributes. The physical printers have default values for these tuning attributes after you create them.

This section describes conditions when you might want to change the following attributes:

- Supervisor attributes
  - `job-submission-timer`
- Physical printer attributes
  - `printer-register-threshold`
  - `printer attributes`

### Setting the `job-submission-timer` Supervisor Attribute

The `job-submission-timer` attribute specifies the amount of time, in minutes, the supervisor waits to receive all of the information about the document objects in a job. If the supervisor does not receive all of the information about the document objects of the job in that amount of time, it cancels the job. You receive a notification message if the notification profile for the physical

## Using Abbreviations for Attribute Names and Values

printer specifies you for the `job-aborted-by-server` event. This is the only supervisor attribute that relates to performance. When you create a supervisor with the `pdstartsuv` command, you cannot specify values for any of the supervisor attributes. Therefore, the value of the `job-submission-timer` attribute always has the default value of 30 minutes initially. The default value should be adequate for most jobs. You would only increase the value if a user needs to submit an exceptionally large job, with the document transfer method of `with-request`, that cannot be successfully transmitted in 30 minutes.

To increase the job-submission time for the supervisor `Super1` to one hour, enter:

```
pdset -c server -x "job-submission-timer=1:00" Super1
```

---

### Note

The transfer method for jobs sent to the supervisor influences your usage of the `job-submission-timer` attribute. The `transfer-method` document attribute specifies the method. The default method, `dce-pipe-pull`, transfers files more efficiently than the `with-request` method. The `with-request` transfer method sends the contents of the document along with the document object. Therefore, you are very unlikely to need to increase the value for the `job-submission-timer` physical printer attribute when using the default transfer method.

---

## Setting the `printer-register-threshold` Physical Printer Attribute

The `printer-register-threshold` attribute specifies the amount of time, in minutes, that the physical printer waits between attempts to register with the spooler containing the queue that sends jobs to the physical printer. This attribute affects performance since attempting too often will slow down the system, while attempting too infrequently will cause inconvenient delays in printing jobs. The default value for this attribute is 10 minutes.

A physical printer attempts to register with its spooler when you create the physical printer, when you restart the supervisor containing the physical printer, and when the servers lose communication. After successful registration, HPDPS sets the value of the `registered-with-spooler` physical printer attribute to `true`. Refer to “About Server Communications” in Chapter 9 for

## Using Abbreviations for Attribute Names and Values

a description of how the supervisor and spooler and the objects they contain communicate.

When the printer determines that it is no longer registered, it attempts to register with the spooler again at intervals in the amount of time specified by the `printer-register-threshold` physical printer attribute. The `registered-with-spooler` attribute changes to `false`. The physical printer continues to attempt to register at the end of the time period specified by this attribute until it is successful.

HPDPS notifies you when a physical printer is no longer registered if the notification profile for either the physical printer or supervisor specifies you are to receive notification messages for the `printer-unregistered` event.

To set the value of the `printer-register-threshold` attribute to 5 minutes, enter:

```
pdset -x "printer-register-threshold=5" PhyPrt1
```

Usually the default value is adequate.

## Setting the printer-timeout-period Physical Printer Attribute

The `printer-timeout-period` attribute specifies how long, in seconds, that the supervisor tries to connect to a printer device when one of its physical printers receives a job. The default for this attribute is 60 seconds.

A physical printer enters the `timed-out` state when it cannot lock the printer device within the amount of time specified. This happens when the printer device is already locked. You receive a notification message if the notification profile for either the physical printer or the supervisor specifies you for the `printer-timed-out` event.

To set the value of `printer-timeout-period` to 90 seconds, enter:

```
pdset -x "printer-timeout-period=90" PhyPrt2
```

Refer to “Responding to Physical Printer State Problems” for more information on how this attribute affects the printer state and job processing.

The value of the `printer-timeout-period` attribute also determines how long a physical printer takes to enter the `needs-attention` state; the physical

## Using Abbreviations for Attribute Names and Values

printer enters this state when it runs out of paper or goes off-line for some reason.

---

## Deleting a Physical Printer

If the printer is enabled, issuing the `pdelete` command automatically disables it. You can disable the physical printer with the `pddisable` command before you delete it. Disabling the physical printer prevents HPDPS from scheduling any new jobs to the physical printer. In most cases, you will disable the physical printer and wait for all scheduled jobs to finish printing before you delete the physical printer. If you cannot wait and need to cancel processing jobs, see “Cancelling Processing Jobs”.

If you are deleting the physical printer because you are moving the printer device to a different system, you can create an archive file so that you can re-create the physical printer. See “Creating Archive Files for Supervisors and Supervisor Objects”.

To delete the physical printer `PhyPrt3`, enter:

```
pdelete PhyPrt3
```

HPDPS displays a confirmation message. After you respond to the message, HPDPS deletes the physical printer.

If the value of the `PD_CONFIRM_DELETE` environment variable is `no`, you will not receive a confirmation message.



## Shutting Down and Restarting the Supervisor

You have the following options:

- Shutting down the supervisor immediately
- Shutting down the supervisor after all of the jobs scheduled to physical printers have printed

This section also contains a procedure for shutting down the supervisor when the HPDPS client daemon is not running.

### Shutting Down the Supervisor Immediately

Under normal conditions there is no reason to shut down the supervisor. The only reasons to shut down a supervisor would be for a condition requiring re-initialization of the system on which the supervisor is installed or a condition requiring you to issue the HP-UX `shutdown` command. Issuing the HP-UX `shutdown` command also shuts down HPDPS supervisors and spoolers. Using the `pdshutdown` command without any flags causes the supervisor to shut down after all jobs scheduled to the physical printers in the supervisor when they have finished printing.

To shut down the supervisor `Super1`, enter:

```
pdshutdown Super1
```

The `-w` flag of the `pdshutdown` command determines the manner in which the supervisor shuts down. The default for this flag is `after-current`, specifying that the supervisor shuts down after jobs in its physical printers have finished printing. Therefore, the command you entered in this example is equivalent to the command:

```
pdshutdown -w after-current Super1
```

Also, the `after-all` value for the `-w` flag works the same as `after-current`. The following command also has the same results:

```
pdshutdown -w after-all Super1
```

## Using Abbreviations for Attribute Names and Values

### Canceling Jobs and Shutting Down the Supervisor

Use `-w now` with the `pdshutdown` command to cancel and requeue, if possible, all jobs scheduled to the physical printers of the supervisor and to shut down the supervisor. If the spooler that sent jobs to the physical printers of this supervisor supplies jobs to physical printers contained in other supervisors, the spooler will reschedule the cancelled jobs if possible.

To shut down the supervisor `Super1`, cancelling all jobs scheduled to its physical printers and requeuing them to the spooler, enter:

```
pdshutdown -w now Super1
```

### Shutting Down the Supervisor when the HPDPS Client is not Running

Use the HP-UX `kill` command to shut down an HPDPS supervisor when the HPDPS client daemon is not running. If the HPDPS client is not running, you cannot use the HPDPS `pdshutdown` command to shut down a supervisor.

Use the following procedure to shut down the supervisor `Super`.

1. To display information about the supervisor process, including its process identifier, enter:

```
ps -ef | grep Super1
```

HP-UX displays information similar to the following:

```
root 22359 1 0 13:59:56 - 0:05 supervisor Super1
root 46789 52611 0 15:26:41 - 0:05 grep supervisor
```

The number `22359` is the process identifier for the supervisor.

2. To stop the supervisor process, use the HP-UX `kill` command with the process identifier for the supervisor. For example:

```
kill 22359
```

HPDPS issues a notification message when the supervisor has been successfully shut down.

## 10-28 Managing Supervisors and Physical Printers

## Using Abbreviations for Attribute Names and Values

### Restarting the Supervisor After it has been Shut Down

Use the `pdstartsuv` command to restart a supervisor that has been shut down. The HPDPS print database stores permanent information about the supervisor and the objects it contains in files located in the directory `/var/opt/pd`.

You must be logged on to the system on which the supervisor runs to start the supervisor. You can log on to the system directly or through the HP-UX `rlogin` command.

To restart the supervisor `Super1`, enter:

```
pdstartsuv Super1
```

HPDPS displays status information and issues a message when it has successfully started the supervisor.

When you restart a supervisor, the physical printers it contains will return to the state that they were in when the supervisor was shut down. If the physical printers were enabled, they will be enabled when you restart the supervisor. If you disabled the physical printers before you shut down the supervisor, they will be disabled when you restart the supervisor.

---

### Deleting the Supervisor

The physical printers contained in the supervisor cannot be processing jobs. You must allow the jobs to print or explicitly delete the jobs using the `pdrm`, `pddelete`, or `pdclean` commands.

Deleting a supervisor permanently deletes all of the objects it contains, such as physical printers, from the HPDPS system. You can create archive files for the supervisor and its objects before you delete the supervisor.

To delete the supervisor `Super1`, enter:

```
pddelete -c server Super1
```



## Managing Jobs and Supporting Users

---

This chapter describes tasks related to managing jobs that users submit to HP Distributed Print Service (HPDPS). These tasks include:

- Finding jobs and understanding the attributes that identify and describe jobs
- Managing jobs in queues and spoolers
- Understanding results profiles for jobs
- Understanding when you can pause and cancel jobs
- Determining job states and job status

---

### Finding and Identifying Jobs

When users contact you for help with their jobs, you need to be able to determine the global job identifier for the job and locate the job. All commands that effect jobs require the job identifier. A user could contact you to promote a job or to identify and fix a problem with a job. Table 11-1 lists the attributes that identify and describe a job.

## Using Abbreviations for Attribute Names and Values

**Table 11-1. Job Identification Attributes**

| Attribute                                                                    | Description                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>job-client-id</code>                                                   | A job identification number, such as 159, that is unique to a user. Used by users to manage their own jobs.                                                                                                                                                                                                                                         |
| <code>job-identifier</code>                                                  | A global job identifier, such as <code>Spool1:2414600001</code> , that uniquely identifies the job in the distributed print environment. Consists of a spooler name followed by a colon and a number. Used by the administrator for job management.                                                                                                 |
| The following attributes identify the user or users responsible for the job. |                                                                                                                                                                                                                                                                                                                                                     |
| <code>user-name</code>                                                       | The user name and hostname of the user who submitted the job, in the form <i>UserName@HostName</i> . The value of this attribute is the default filter, as specified by the <code>-f</code> flag, for the <code>pdq</code> and <code>pdls</code> commands.                                                                                          |
| <code>job-originator</code>                                                  | The name of the user who submitted the job. This attribute defaults to the value of the <code>user-name</code> attribute. The job submitter can specify another person by using <code>job-originator</code> attribute with the <code>pdpr</code> command. In that case, the value of <code>job-originator</code> is the value supplied by the user. |
| <code>job-owner</code>                                                       | The name of the user who is responsible for the job. This attribute defaults to the value of the <code>user-name</code> attribute unless the job submitter specified a different value for the <code>job-originator</code> attribute. HPDPS prints the value of the <code>job-owner</code> attribute on the start sheet for the job.                |
| The following attributes provide additional information about the job.       |                                                                                                                                                                                                                                                                                                                                                     |
| <code>job-name</code>                                                        | The name of the job. This attribute defaults to the name of the first document specified in the job. The user can specify a different name by using the <code>-t</code> flag of the <code>pdpr</code> command. The job name might print on the start sheet, depending on the printer model, and helps to identify the job.                          |
| <code>job-comment</code>                                                     | A text string specified by the user during job submission. The text can describe the job in some way, or provide special information about the job.                                                                                                                                                                                                 |

## 11-2 Managing Jobs and Supporting Users

## Using Abbreviations for Attribute Names and Values

### Understanding Job Identifiers

When a user submits a job, HPDPS assigns a local job identifier. The `job-client-id` job attribute identifies this value. Because the local job identifier is assigned a unique value for the submitting user, independent of the values assigned to other users, many jobs can be assigned the same number. For instance, the local job identifiers for two jobs submitted by different users could both be 17. Each job has a local job identifier and a global job identifier. HPDPS recognizes and keeps track of the job by the global job identifier, but the job submitter normally uses the local job identifier. As the administrator, you perform tasks for the jobs of other users by using the global job identifier; the local job identifier only applies to jobs that you submit. The users can use the global job identifiers for their own jobs.

Note: HPDPS determines the value of the local job identifier by the *UserName* of the user. If the user signs on to more than one system, the values of the `job-client-id` are unique for each system. In this case, it is possible for the same user name to have more than one job with the same local job identifier. However, the global job identifier for each job is unique. The *HostName* portion of the `user-name` attribute for the job specifies the different hosts in this situation.

### Understanding the user-name, job-originator, and job-owner Attributes

When a user submits a job, the following job attributes default to the same value:

- `user-name`
- `job-originator`
- `job-owner`

HPDPS derives these values from the *UserName* of the user who submitted the job; the values are in the form of *UserName@HostName*. Most often, users will let these attributes have their default values. The user might occasionally specify a value for the `job-owner` attribute if the printed output is to go to another person. This value might print on the start sheet, depending on the printer model. The user can also use the `delivery-address` component of the `results-profile` job attribute to specify the name or names of the

## Using Abbreviations for Attribute Names and Values

recipients of printed output. See “Setting Up the Job Results Profile” for more information about the `results-profile` attribute.

## Understanding the job-name Attribute

The `job-name` attribute is specifiable and settable by the user. If the user does not specify a value, the value of the attribute defaults to the name of the first document in the job. The job name, in the form of a text string, might be printed on the start sheet of the job and will help to identify the job. The value of the `job-name` attribute also displays in the `Name` column when you perform job queries.

## Finding Jobs Submitted by Other Users

If a user contacts you and does not know the global job identifier for their job, you can use the `-U` and `-f` flags with the `pdq` and `pdls` commands to determine the global job identifier and other information about the job. You often already know the logical printer or printers to which the user submits jobs; if not, the user should be able to identify the logical printer to which they sent the job. You might also know the spooler that contains the logical printer.

You can use the following commands to determine the global job identifiers for jobs submitted by other users.

- Filter for the `user-name` and `printer-name-requested` attributes to determine job information, including the global job identifier, for jobs sent to a specific logical printer. Because the hostname can be long and the user could have submitted jobs from more than one sign-on session, use the comparison operator (`=*`) when specifying the user name. This filters for all instances of the user name that you specify.

To query for jobs submitted by `fljones@cowboy` to logical printer `LogPrt1`, enter:

```
pdls -U -f "user-name=*fljones && \
printer-name-requested==LogPrt1" Spool1:
```

## 11-4 Managing Jobs and Supporting Users



## Using Abbreviations for Attribute Names and Values

HPDPS displays information similar to the following:

| Job | ID                | Name  | Current State | Intervening Jobs | Printer Requested | Printers Assigned |
|-----|-------------------|-------|---------------|------------------|-------------------|-------------------|
| 3   | Spool1:2934700005 | file1 | held          | 4                | LogPrt1           |                   |
| 7   | Spool1:2934700011 | file2 | retained      |                  | LogPrt1           | PhyPrt1           |

Use the `-U` flag with either the `pdq` or `pdl`s commands to turn off the default filtering for these commands, which is based on the `user-name` attribute with a value of your user name.

Note: You can request information about all objects within a server of a given class by using the `ServerName:` argument. To find out about all jobs within spooler `Spool12`, enter:

```
pdls -U Spool12:
```

Entering the `ServerName` followed by a colon (`:`) lets HPDPS know that you want to obtain data about all objects within the specified class contained within that server, whereas entering the command:

```
pdls -U Spool12:2934700005
```

only provides information about the specified job `Spool12:2934700005`.

- If you want to find a job or jobs sent by a user to any logical printer in a specific spooler, you can query the spooler with the `pdl`s command.

To query jobs submitted by `fljones` that are contained in the spooler `Spool12`, enter:

```
pdls -U -f user-name=*fljones Spool12:
```

This command returns all of the jobs submitted by `fljones` that are in any queue in spooler `Spool12`, or that are contained in `Spool12` in either the `retained` or `timed-out` states. HPDPS displays information similar to the following:

| Job | ID                 | Name  | Current State | Intervening Jobs | Printer Requested | Printers Assigned |
|-----|--------------------|-------|---------------|------------------|-------------------|-------------------|
| 3   | Spool12:2934700005 | file1 | retained      |                  | LogPrt2           |                   |
| 9   | Spool12:2934700011 | file2 | processing    | 0                | LogPrt4           | PhyPrt4           |

## Using Abbreviations for Attribute Names and Values

- If you want to find the job or jobs sent by a user, but you do not know whether the job has printed, or to which logical printer, queue, or spooler the job was submitted, you can query all spoolers in the cell.

Enter the following command.

```
pdls -U -f user-name=*fljones *:
```

Including the backslash before the global character (the asterisk) prevents HPDPS from terminating the query, resulting in an error message, should a file exist with a name that ends in a colon.

---

## Managing Jobs in Queues and Spoolers

This section describes how to manage jobs in the queue that are waiting to be scheduled, and how to manage jobs contained in a spooler that are either in the **retained** or **timed-out** states. These job-management tasks include:

- Promoting jobs in queues
- Increasing the priority of jobs in queues
- Resubmitting jobs to different logical printers
- Holding and releasing jobs in queues
- Assigning a retention period to a job
- Assigning a discard time to a job
- Assigning a print-after time to a job

### Attributes That Control Scheduling, Retaining, and Discarding Jobs

Table 11-2 describes the job attributes that control job scheduling and that determine whether HPDPS discards or retains the job after the job prints. The table also describes some of the attributes that reflect the status of pending and processing jobs.

## Using Abbreviations for Attribute Names and Values

**Table 11-2. Job Control and Scheduling Attributes**

| Attribute                                                          | Description                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The following attributes determine when HPDPS schedules jobs.      |                                                                                                                                                                                                                                                                                                                                                                                 |
| <code>job-hold</code>                                              | Specifies whether the job can be scheduled for printing. This attribute can have one of two values: <b>yes</b> or <b>no</b> . If the value for this attribute is <b>yes</b> , the job state is <b>held</b> . A job can be in the <b>held</b> state for reasons other than this attribute being set to <b>yes</b> .                                                              |
| <code>job-print-after</code>                                       | Specifies the calendar date and time after which the job can scheduled. If a value is specified for this attribute, the job remains in the queue in the <b>held</b> state until the time specified by the attribute. HPDPS then schedules the job (unless it is held for other reasons).                                                                                        |
| <code>job-discard-time</code>                                      | Specifies the calendar date and time at which the job will be discarded, whether or not it has printed. If the job is retained in the spooler, the job will be discarded at the specified time even if the retention period has not expired.                                                                                                                                    |
| <code>job-retention-period</code>                                  | Specifies the amount of time following job completion that the job is retained in the spooler before it is discarded. After HPDPS processes the job, the job is contained in the spooler in the <b>retained</b> state. If this attribute has a value, it must be set to zero before the job can be deleted with either the <code>pdrm</code> or <code>pddelete</code> commands. |
| The following attributes affect when HPDPS schedules pending jobs. |                                                                                                                                                                                                                                                                                                                                                                                 |
| <code>intervening-jobs</code>                                      | Specifies the number of jobs in the queue ahead of this job. The value of this attribute is zero if the job is processing; the attribute has no value for jobs in the <b>retained</b> and <b>timed-out</b> states.                                                                                                                                                              |
| <code>job-priority</code>                                          | Specifies a number representing the scheduling priority for the job. Queues that use the priority-based scheduling method use the value of this attribute. Users can assign a value up to 50, which is the default, and administrators can assign a value up to 100. A higher value signifies a higher priority.                                                                |

## Using Abbreviations for Attribute Names and Values

**Table 11-2. Job Control and Scheduling Attributes (continued)**

| Attribute                                                                  | Description                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>total-job-octets</code>                                              | Specifies the total size of the job in octets (bytes). Determined by the size of all of the printable documents in the job, the number of document copies in the job as specified by the <code>copy-count</code> attribute, and the number of job copies as specified by the <code>job-copies</code> component of the <code>results-profile</code> attribute.     |
| The following attributes identify the printers and queue handling the job. |                                                                                                                                                                                                                                                                                                                                                                   |
| <code>printer-name-requested</code>                                        | The name of the logical printer to which the job was submitted. The value of this attribute changes if the job is resubmitted to a different logical printer.                                                                                                                                                                                                     |
| <code>queue-assigned</code>                                                | The name of the queue which contains the job. This attribute has a value if the job is in a queue in the <code>pending</code> , <code>held</code> , or <code>paused</code> states, or if the job state is <code>processing</code> . This attribute has no value if the job is in the spooler in either the <code>retained</code> or <code>timed-out</code> state. |
| <code>printers-assigned</code>                                             | The name of the physical printer to which the job was scheduled. This attribute has no value until HPDPS schedules and sends the job to a physical printer. Jobs in the <code>retained</code> and <code>timed-out</code> states have values for their <code>printers-assigned</code> attributes.                                                                  |

### Promoting a User Job

Generally, HPDPS schedules the job in the first position ahead of other jobs in the queue.

Sometimes users will contact you because they need a job printed right away.

To promote the job `Spool5:3872300278`, enter:

```
pdpromote Spool5:3872300278
```

## 11-8 Managing Jobs and Supporting Users

## Using Abbreviations for Attribute Names and Values

Note: If the queue sends jobs to more than one physical printer, the first job in the queue might not be the next job to print. This can happen if the next available physical printer is not capable of printing the job based on the job attributes.

### Increasing the Priority of a User Job

Use `-x job-priority` with the `pdmod` command to increase the priority of a job when the queue containing the job uses the `priority-fifo` scheduling method. You can set the value of the `job-priority` attribute to any integer between 1 and 100; the default value is 50. The job owner can set this attribute to any value between 1 and 50, but, because of the default value, the only option for the job owner is to decrease the value of this attribute. Decreasing the value allows other jobs in the queue using the default priority value to be scheduled ahead of a job with lower priority.

To increase the priority of job `Spool3:3987600005`, enter:

```
pdmod -x "job-priority=75" Spool3:3987600005
```

HPDPS schedules this job ahead of other jobs in the queue that have a priority less than 75.

You can also, in effect, use the `job-priority` attribute to promote a job to be the first job in the queue by setting the priority for the job to 100. For example:

```
pdmod -x "job-priority=100" Spool3:3987600005
```

If all other jobs in the queue have a priority less than 100, `Spool3:3987600005` becomes the first job in the queue because it has the highest priority of all of the jobs in the queue.

### Resubmitting Jobs for Users

You can decrease the amount of time needed to print a pending job if you resubmit it to a different logical printer that has one or more idle physical printers that can support the job. Users can resubmit their own jobs, but they might not know which other physical printer or printers can support the job. Therefore, they do not know the name of the logical printer or printers associated with the physical printer to which they can resubmit their jobs.

## Using Abbreviations for Attribute Names and Values

You can resubmit a job if it is in any of the following states:

- pending
- held
- retained
- timed-out

In the following example, you already know the global job identifier of the job and the name of a logical printer with an associated physical printer that supports the attributes of the job.

To resubmit job `Spool4:3987100076` to logical printer `LogPrt7`, enter:

```
pdresubmit LogPrt7 Spool4:3987100076
```

HPDPS validates the job again against the logical printer and the physical printer or printers associated with the logical printer. If job validation fails, you receive an error message and the job remains in the original queue or spooler. If job validation is successful and the logical printer to which you resubmitted the job is in different spooler, HPDPS assigns a new identifier to the job.

For more information about resubmitting jobs, refer to “Resubmitting Jobs to Different Logical Printers” in Chapter 9.

## Holding a Job

You can hold a job to prevent it from printing for a period of time. An example might be if a job was submitted and then an error was discovered in the job. If the `-l` flag was used with the `pdpr` command when the job was submitted, you could hold the job, make the correction to the source file, and then release the job. Another example would be if someone needed to be at the printer device when the job printed; the job might contain confidential information. Held jobs advance in the queue. When the appropriate person is at the printer device and the held job is first in the queue, you can release the hold and HPDPS prints the job.

To hold job `Spool13:3957400034`, enter:

```
pdmod -x "job-hold=yes" Spool13:3957400034
```

## 11-10 Managing Jobs and Supporting Users

## Using Abbreviations for Attribute Names and Values

The value for the `current-job-state` job attribute changes to `held` and the reason, as specified by the `job-state-reasons` attribute, is `job-hold-set`. Refer to Table 11-3 for a description of these job status attributes.

A held job remains in the queue indefinitely until the value of the `job-hold` is set back to `no`. The only exception is if the job has a value specified for the `job-discard-time` attribute. If this attribute has a value, HPDPS discards the job at the specified time, even if the job is held.

### Releasing a Held Job

Releasing the hold allows HPDPS to schedule the job for printing.

To release the hold on job `Spool13:3957400034`, enter:

```
pdmod -x "job-hold=no" Spool13:3957400034
```

### Assigning a Retention Period for a Job

A user might request that you retain a job in the spooler. They might want to check the printed output and, if the output is correct, resubmit the job and specify several copies.

To assign a retention period of two hours for the job `Spool12:3947600212`, enter:

```
pdmod -x "job-retention-period=2:00" Spool12:3947600212
```

After the job prints, HPDPS retains the job in the spooler for the amount of time specified. You and the user who submitted the job can make modifications to the attributes of the job while it is retained. For example, you might want to modify the `results-profile` attribute of the job to print copies for different people. Refer to “Setting Up the Job Results Profile” for an explanation of this attribute. You can then resubmit the job to the same logical printer or to a different logical printer.

Note: You might get different results than you expect if you specify a value for the `job-retention-period` attribute and for the `job-discard-time` attribute. Normally you would only specify a value for one of the two attributes. If the discard time is earlier than the end of the retention period, HPDPS discards the job before the retention period expires.

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### Determining When Retained Jobs Will Be Discarded

The `completion-time` job attribute reports when the job completed and the `job-retention-period` attribute specifies the amount of time, in hours and minutes, that HPDPS retains the job before discarding it. The retention period begins after the job completes.

To determine when HPDPS will discard job `Spool2:3947600212`, enter:

```
pdls -U -r brief,completion-time,job-retention-period \
-s column Spool2:3947600212
```

HPDPS displays information similar to the following:

| Job ID | Name              | Current State | Intervening Jobs | Printer Requested | Printers Assigned |
|--------|-------------------|---------------|------------------|-------------------|-------------------|
| 168    | Spool2:3947600212 | file1.txt     | retained         | LogPrt1           | PhyPrt1           |

| Completion Time     | Retention Period | Document Number | File Format | File Name |
|---------------------|------------------|-----------------|-------------|-----------|
| '12:15:00 08/05/95' | 2:00             | 1               | ascii       | file1.txt |

In this example, HPDPS will discard the job at 2:15 in the afternoon.

### Assigning a job-discard-time for a Job

A user might request that you assign a discard time to a job so that, if a job has not printed by a certain time, HPDPS discards the job. For example, the job might contain confidential information that needs to be secured after printing, but the job owner is only available until 5:00 p.m. to pick up the job. Therefore, the user wants HPDPS to discard the job if it has not printed by 5:00 p.m. HPDPS ignores the discard time once the document starts printing, so a job that requires two hours to print could start printing at 4:59 p.m.

To assign a discard time of 5:00 p.m. of the current day, enter:

```
pdmod -x "job-discard-time=5:00:00 PM" Spool3:3957400034
```

If you specify a time that is earlier than the present time, the job modification fails and you receive an error message. You can also supply a date following the time value in the format `'mm/dd/yy'`, such as `'05:00:00 PM 08/09/95'`. Enclose the time and date string in single-quotation marks. If you do not specify a date, HPDPS uses the current date.

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Notes:

- The time and date format shown is for C locale. If your system uses a format other than C local, enter the time and date in the format supported by your system.
- You might get different results than you expect if you specify a value for the `job-discard-time` attribute and for the `job-retention-time` attribute. Normally you would only specify a value for one of the two attributes. If the discard time is earlier than the end of the retention period, HPDPS discards the job before the retention period expires.

### Assigning a job-print-after Time for a Job

A user might request that you prevent a job from printing until after a given time. For example, the user might have a meeting scheduled for later in the day in a different building and needs a confidential job for the meeting. The job could be routed to a printer close to the meeting room with a time that is a little earlier than the meeting time. The user could be at the printer to receive the printed output, and the job would complete before the meeting begins. If you do not specify a value for the `job-print-after` attribute, the attribute has no default value. HPDPS schedules the job on the next available physical printer that supports the job.

To assign a print-after time of 12:45 p.m. on August 5th, enter:

```
pdmod -x "job-print-after='12:45:00 \
08/05/96'"Spool12:4857700125
```

If you also specify a time (and date) for the `job-discard-time` attribute, it should be after the time (and date) for this attribute. Otherwise, HPDPS discards the job before it prints; HPDPS does not compare these two attributes to prevent this situation.

### About Modifying Other Job and Document Attributes

You can also modify any other settable job or document attribute, unless the job is in the `processing` state. The following restrictions apply to certain attributes for job and document modification:

## Using Abbreviations for Attribute Names and Values

- You can modify any job or document attribute only if the corresponding logical and physical printer attributes support the value. When you modify a job, HPDPS validates the job again. For example, if you modify a job to specify `content-orientation=reverse-landscape`, the values for the `content-orientations-supported` logical and physical printer attributes must allow a value of `reverse-landscape`.
- You can modify the `copy-count` document attribute or the `job-copies` component of the `results-profile` job attribute only if the resulting number of requested copies is less than the limit imposed by the logical or physical printer attribute `maximum-copies-allowed`. If the queue in which the job resides sends jobs to more than one physical printer, increasing the values of these two attributes can restrict the job to fewer printers. Decreasing the values can make more printers available that can print the job.
- You can modify the value of the `default-medium` document attribute to any value supported by the physical printer or printers associated with the queue. If the value specified is only supported by the `media-supported` attribute of a physical printer and not by the `media-ready` attribute, HPDPS cannot schedule the job until the appropriate media is loaded in the physical printer and the `media-ready` attribute is updated.

If the `media-ready` attribute does not support the media specified for the job, the following occurs :

- HPDPS notifies the user
- HPDPS changes the value of the `current-job-state` job attribute to `held`
- HPDPS changes the value of the `job-state-reasons` to `required-resources-not-ready`

Refer to “About Jobs That Cannot Be Scheduled Because of Resources” later in this chapter for more information about this job state.

## Setting Up a Logical Printer for High-Priority Jobs

Depending on the size of your organization and the numbers of jobs submitted, you might want to set up a logical printer specifically for high-priority jobs. You could associate this logical printer with one or more existing physical printers and restrict the use of the new logical printer to administrators or to a specific group of users. By setting up the logical printer so that any job submitted to it has a value of 100 for its `job-priority` attribute, the job becomes the first job in the queue.

Perform the following steps to set up a logical printer for high-priority jobs. In this procedure, the queue `Queue6` and the physical printer `PhyPrt6` already exist. `PhyPrt6` is a high-speed printer that is in a pool of printers and is capable of printing almost any type of job. The queue resides in spooler `Spool6`.

1. Create a new logical printer that requires job authorization and associate it with `Queue6`. Enter the command:

```
pdcreate -x "associated-queue=Queue6 authorize-jobs=true" \
Spool6:HPLogPrt
```

2. Restrict access to the logical printer to one or more administrators or a specific group of users; use DCE to restrict the access. Follow the procedure in “Restricting Access to a Printer Device” in Chapter 8.
3. Create an initial-value-job object that assigns a value of 100 to the `job-priority` attribute and requests `PhyPrt6` with the `physical-printers-requested` attribute. Enter the command:

```
pdcreate -c initial-value-job -x "job-priority=100 \
physical-printers-requested=PhyPrt6" Spool6:HPInvj
```

4. Associate the initial-value-job object with the logical printer. Enter the command:

```
pdset -x "printer-initial-value-job=HPInvj" HPLogPrt
```

5. Enable the logical printer.

```
pdenable HPLogPrt
```

## Using Abbreviations for Attribute Names and Values

Now, if you get a request to print a high-priority job, you can simply submit or resubmit the job to the new logical printer. Because the job priority is 100, HPDPS positions the job as the first job in the queue after it validates the job.

This same procedure can be used to set up logical printers for jobs with other priority levels.

---

## Setting Up the Job Results Profile

You can specify the values of the `results-profile` attribute when creating an initial-value-job object with the `pdcreate` command. You can also set the values with the `pdset` command.

The `results-profile` attribute allows you to specify the following job components, referred to as a result-set:

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>delivery-method</code>    | This single-valued component specifies how the person is to receive this result-set of the job. The only valid value for this component is currently <code>pickup</code> , which is the default.                                                                                                                                                                                                                                                                                          |
| <code>result-set-comment</code> | This single-valued component specifies a text string that describes the result-set value. The information might be printed on the start sheet. Currently, no printers will print the information on the start sheet. The default value for this component is “no value”.                                                                                                                                                                                                                  |
| <code>delivery-address</code>   | This single-valued component specifies the address, that is, the location, of the person who should receive the result-set. If you do not specify a value for this component, HPDPS uses the user name and hostname of the person submitting the job as the default value. For example, <code>rob@cowboy</code> . Currently, the value is not used in any way. You need to explicitly specify the <code>delivery-address</code> component for each value to specify multiple result-sets. |

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|                         |                                                                                                                                                                                      |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>job-copies</code> | This single-valued component specifies how many copies of the job HPDPS prints for the result-set recipient. The value for this component is an integer, and the default value is 1. |
| <code>output-bin</code> | This single-valued component specifies the output bin for the result-set.                                                                                                            |

The components for the `results-profile` attribute are separated by colons and must be specified in this order:

```
results-profile=DeliveryMethod:ResultSetComment:
DeliveryAddress:JobCopies:OutputBin
```

## Specifying the results-profile Attribute with a Job

Requesting multiple job copies with the `results-profile` attribute is useful for jobs consisting of multiple documents when the order in which the documents print is important.

For example, to obtain two copies of a job containing three documents, enter:

```
pdpr -x "results-profile=:::2" document1 document2 document3
```

The result-set order in which the job prints is:

```
Banner Page
First Job Copy
 document1
 document2
 document3
Second Job Copy
 document1
 document2
 document3
```

In the above example, no values are specified for the first three components. The colons (:) are required as place holders, up to the last component specified.

A banner page (auxilliary start sheet) is included for each result-set.

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### Specifying copy-count and job-copies

To obtain multiple copies of documents, use the document attribute `copy-count`. Using the example above, to obtain four copies of each document, enter:

```
pdpr -x "copy-count=4 results-profile=:::2" \
document1 document2 document3
```

The result-set order in which the job prints is:

```
Banner Page
First Job Copy
document1 document1 document1 document1
document2 document2 document2 document2
document3 document3 document3 document3
Second Job Copy
document1 document1 document1 document1
document2 document2 document2 document2
document3 document3 document3 document3
```

### Changing the Default Order of Documents

To change the default order of the documents, you can change the value of the `interface-program-method` attribute with the `pdpr`, `pdset` or `pdmod` commands.

Using the example above, suppose you want your documents to print in this order:

```
Banner Page
First Job Copy
document1 document2 document3
document1 document2 document3
document1 document2 document3
document1 document2 document3
Banner Page
Second Job Copy
document1 document2 document3
document1 document2 document3
document1 document2 document3
document1 document2 document3
```

## Using Abbreviations for Attribute Names and Values

You enter the same command, but set the `interface-program-method` job attribute to `lp`:

```
pdpr -x "interface-program-method=lp results-profile=:::2" \
document1 document2 document3
```

A banner page (auxilliary start sheet) is included for each job copy.

The default value for the `interface-program-method` is `hpdps`. For more information on the `interface-program-attribute-method`, see the *pd\_att\_job(5)* manpage.

### Specifying Multiple Values for the results-profile Attribute

The `results-profile` attribute is a multi-valued attribute; each value represents a result-set. To specify multiple values, you need to explicitly specify the `delivery-address` component for each result-set.

In the following example, the `results-profile` attribute has three values:

```
-x "results-profile=::address_1:2: ::address_2:3: ::address_3:2:"
```

Each result-set has one or more job-copies specified by the fourth component of the value.

When you use the `pdpause` command, the pause point is between the result-sets.

### Setting Up a Results Profile with an Initial-Value-Job

You can create an `initial-value-job` object that sets values for the `results-profile` attribute. This can be useful if you have specific jobs that must be routinely printed, such as a monthly report, and that have the same recipients. Following is an example of how to specify a value for the `results-profile` of an `initial-value-job` object:

```
pdcreate -c initial-value-job -x "results-profile= \
'Bldg.10-2, Rm. C-55':::2:'Copies for Bob' \
'Bldg.3-3, Rm. F-04':::3:'Copies for Sylvia'" \
Spool3:IVJMary2
```

You usually do not associate this type of `initial-value-job` object with a logical printer; you could make it available for use by users when they submit

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their jobs. Instruct the users to specify this initial value object with the `initial-value-job` job attribute.

---

## About Pausing and Cancelling Jobs

Cancelling jobs sent to a physical printer depends on the associated printer device and how much buffer memory the printer device has available. You can only pause and cancel jobs that have not been completely transferred to the printer device.

You can potentially pause or cancel a job sent to a physical printer when the state of the job is **processing**. However, most of the time HPDPS prints some portion of the job you pause or cancel. Jobs can be paused between multiple result profiles. Based on the characteristics of the printer device, you might not be able to pause or cancel a processing job. When you use the `pdpause` command, the pause point is between the result-sets.

Refer to the following topics for the actual procedures you use to pause and cancel jobs:

- “Deleting Jobs from Queues and from the Spooler” in Chapter 9
- “Deleting Pending, Paused, or Held Jobs from the Queue” in Chapter 9
- “Deleting Jobs from the Queue and Retaining Them in the Spooler” in Chapter 9
- “Deleting Timed-Out or Retained Jobs from the Spooler” in Chapter 9
- “Cancelling Processing Jobs” in Chapter 10



## Determining Job States and Job Status

This section describes the jobs states and other job attributes that reflect the status of jobs. It describes how to query jobs to determine their state and status.

You can obtain job status before and while the job prints. You can obtain job status after the job finishes processing if the job is retained.

Table 11-3 describes job attributes that reflect the state and status of jobs. These attributes are non-settable, which means their values are set and updated by HPDPS as it processes the job.

The following job attributes also reflect the status of pending jobs or affect when the HPDPS schedules the job:

- `intervening-jobs`
- `job-priority`
- `total-job-octets`

The following job attributes report the printers, both logical and physical, and queue to which HPDPS assigns the job:

- `printer-name-requested`
- `queue-assigned`
- `printers-assigned`

See Table 11-2 for descriptions of these six attributes.

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**Table 11-3. Job Status Attributes**

| Attribute                                                            | Description                                                                                                                                                               |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The following are job-state attributes.                              |                                                                                                                                                                           |
| <code>current-job-state</code>                                       | Describes the current state of the job, such as <code>pending</code> .                                                                                                    |
| <code>previous-job-state</code>                                      | Describes the previous state of the job.                                                                                                                                  |
| <code>job-state-reasons</code>                                       | Describes why the job is in the <code>current-job-state</code> .                                                                                                          |
| The following are time-related status attributes.                    |                                                                                                                                                                           |
| <code>submission-time</code>                                         | Reports the time the job was added to the queue.                                                                                                                          |
| <code>job-submission-complete</code>                                 | Indicates whether all documents of the job have been submitted to the spooler; if <code>true</code> , HPDPS can schedule the job.                                         |
| <code>started-printing-time</code>                                   | Reports the time the job was sent to the physical printer.                                                                                                                |
| <code>completion-time</code>                                         | Reports the time the job completed processing (printing) on the physical printer.                                                                                         |
| <code>modification-time</code>                                       | If the job has been modified, this attribute reports the time the job was modified. This attribute has no value if the job was not modified or cancelled.                 |
| HPDPS might update the following attributes as it processes the job. |                                                                                                                                                                           |
| <code>octets-completed</code>                                        | Reports the number of octets (bytes) in the job that have been printed.                                                                                                   |
| <code>pages-completed</code>                                         | Reports the number of pages in the job that have been printed.                                                                                                            |
| <code>processing-time</code>                                         | Reports the amount of time that the job has been printing on the printer. If printing has completed, the value is the total amount of time that it took the job to print. |
| <code>job-copies-completed</code>                                    | Reports the number of copies of the particular job that have been printed.                                                                                                |
| Other status attributes.                                             |                                                                                                                                                                           |
| <code>name-of-last-accessor</code>                                   | Reports the name of the user or the name of the program that last performed an action on the job. This attribute has no value if the job was not modified.                |

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## Using Abbreviations for Attribute Names and Values

### Querying for the Status of Jobs

You can query for sets of attributes or for specific attributes that provide information about the status of a job.

### Querying for the Brief Set of Job Attributes

To query the status of a job and to receive the values of the job attributes defined for the default `brief` option of the `-r` flag of the `pdq` command, enter:

```
pdq -U Spool12:0900700003
```

HPDPS displays information similar to the following:

| Job ID | Name               | Current State | Intervening Jobs | Printer Requested | Printers Assigned |
|--------|--------------------|---------------|------------------|-------------------|-------------------|
| 5      | Spool12:0900700003 | cmds.v1       | pending          | 7                 | LogPrt3           |

| Document Number | Format | File Name |
|-----------------|--------|-----------|
| 1               | ascii  | file1.txt |

This output reports the value of the `current-job-state` attribute. It also tells you how many jobs are ahead of this job in the queue, as indicated in the `Intervening Jobs` column. The `Printer Requested` column shows the logical printer to which the job was submitted. If HPDPS has scheduled the job, the `Printers Assigned` column identifies the physical printer processing the job. If the values in the `Name` and `File Name` columns are different, as in this example, the person submitting the job specified a value for the `job-name` attribute. The value in the `Name` column is the value specified by the user, the value in the `File Name` column is the actual name of file that the user submitted. If the job contains multiple documents, HPDPS uses the file name of the first document in the job as the job name.

### Querying for the Verbose Set of Job Attributes

For jobs, the `verbose` option of the `-r` flag returns additional values for the `job-state-reasons` attribute and for the size of the job, as reported by the `total-job-octets` attribute.

To query the state of a job and to receive the values of the job attributes defined for the `verbose` option, enter the command:

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```
pdq -U -r verbose Spool2:0900700003
```

HPDPS displays information similar to the following:

| Job | ID                | Name     | Current State | Intervening Jobs | Printer Requested |
|-----|-------------------|----------|---------------|------------------|-------------------|
| 5   | Spool2:0900700003 | file.txt | pending       | 7                | LogPrt3           |

| Printers Total Assigned | Octets | Owner                | Document Number | Format | File Name |
|-------------------------|--------|----------------------|-----------------|--------|-----------|
| 2479                    |        | jones@poplar.xyz.com | 1               | ascii  | file.txt  |

If there is any problem with a job, such as it is taking a long time to print, often you can determine everything you need to know about the job by either requesting the `brief` or `verbose` attributes with the `pdq` command. The `verbose` option includes the `current-job-state` attribute, whose values are described in “About Current and Previous Job States”, and the `job-state-reason` attribute, whose values are described in Table 11-5. The `verbose` option also includes the `UserName` and the `HostName` of the person submitting the job as shown in the `Owner` column.

## Querying for Specific Job-Status Attributes

Sometimes the previous job state, as reported by the `previous-job-state` attribute, can also be helpful as shown in Table 11-4.

You will notice that there are no job-state reasons for the first two current-job states of the first job. The `job-state-reasons` attribute only has a value for particular circumstances, such as the job was submitted but held, or when there is some problem with the job, such as the job cannot be scheduled.

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**Table 11-4. Normal Job States**

| Current Job State                                                                                                            | Previous Job State | Job State Reason                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------|
| Example 1: Job with a retention period successfully printed.<br><code>pdpr -x "retention-period=10" file1.txt</code>         |                    |                                                                                                              |
| pending                                                                                                                      | preprocessing      |                                                                                                              |
| processing                                                                                                                   | pending            |                                                                                                              |
| retained                                                                                                                     | processing         | <ul style="list-style-type: none"> <li>■ completed-with-errors</li> <li>■ completed-with-warnings</li> </ul> |
| Example 2: Job submitted with job-hold set to true.<br><code>pdpr -x "job-hold=true" file1.txt</code>                        |                    |                                                                                                              |
| held                                                                                                                         | preprocessing      | job-hold-set                                                                                                 |
| Example 3: Job submitted with a job print-after time specified.<br><code>pdpr -x "job-print-after=15:30:00" file1.txt</code> |                    |                                                                                                              |
| held                                                                                                                         | preprocessing      | job-print-after-specified                                                                                    |
| Example 4: Job cancelled and given a retention period.<br><code>pdrm -r 1:00 10</code>                                       |                    |                                                                                                              |
| retained                                                                                                                     | terminating        | <ul style="list-style-type: none"> <li>■ cancelled-by-user</li> <li>■ cancelled-by-operator</li> </ul>       |

To query the status of a job and to receive the values for all three of the job state attributes, enter:

```
pdq -U -r brief,previous-job-state,job-state-reasons -s column \
Spool3:3459400023
```

HPDPS displays information similar to the following:

```

Job ID Name Current Intervening Printer Printers
--- ----- --- --- --- ---
172 Spool3:3459400023 file1.txt held 1 LogPrt1

Previous Document File
State Reasons Number Format Name
----- ----- ----- ----- -----
preprocessing hold set 1 ascii file.txt

```

## Using Abbreviations for Attribute Names and Values

### About Current and Previous Job States

The following states are valid for the current job state, which is reported by the `current-job-state` attribute, and the previous job state, which is reported by the `previous-job-state` attribute.

| <b>Job State</b> | <b>Reason</b>                                                                                                                                                                                                                                                             |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cancelled        | The job has been cancelled by the job submitter or by an operator. The <code>job-state-reasons</code> attribute provides the reason.                                                                                                                                      |
| held             | The job is in a queue and cannot be scheduled. The <code>job-hold</code> attribute might be set to <code>true</code> or the job might be held for some other reason, such as resources not being ready. The <code>job-state-reasons</code> attribute provides the reason. |
| paused           | The job has been paused with the <code>pdpause</code> command.                                                                                                                                                                                                            |
| pending          | The job is in a queue and is waiting to be scheduled and sent to a physical printer.                                                                                                                                                                                      |
| pre-processing   | The job has been created, but it is in the process of being validated.                                                                                                                                                                                                    |
| processing       | The job has been sent to a physical printer and is being processed and printed. Depending on the printer device, this can indicate that at least one document in the job has been sent to the printer device.                                                             |
| retained         | The job has been retained in the spooler after it has finished printing or after it has been cancelled. The value of the <code>job-retention-period</code> attribute for the job is greater than zero.                                                                    |
| terminating      | The job is terminating, either because it has finished processing or because it has been aborted. The <code>job-state-reasons</code> attribute provides the reason.                                                                                                       |

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`timed-out`

The job was sent to a physical printer, but the spooler lost communication with the physical printer and does not know whether the job is still processing, has finished printing, or has terminated because of an error.

This job state occurs after the spooler has been unable to obtain a response from the physical printer; the physical printer has not re-registered with the spooler in the amount of time specified by the `printer-register-threshold` spooler attribute.

`unknown`

The spooler does not know the state of the job because it has lost communication with the physical printer to which the job was sent. If communication is not re-established, the job state eventually becomes `timed-out`.

Notes:

- Jobs are in the job states `cancelled`, `preprocessing`, and `terminating` for only a very short time. You will almost never see them as values for the `current-job-state` attribute. You might see them as values for the `previous-job-state` attribute.
- Refer to “About Server Communications” in Chapter 9 for a description of how the spooler and supervisor communicate. The `unknown` and `timed-out` job states are related to communication problems between the two servers.

## Using Abbreviations for Attribute Names and Values

### Job-State Reasons

Table 11-5 describes the values for the `job-state-reasons` attribute that report the reason for the current state of the job.

**Table 11-5. Descriptions of Job-State Reasons**

| Job-State Reasons                             | Description                                                                                                                                                                                                         |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>aborted-by-system</code>                | The server aborted the job.                                                                                                                                                                                         |
| <code>cancelled-by-operator</code>            | An operator or system administrator cancelled the job.                                                                                                                                                              |
| <code>cancelled-by-user</code>                | The person who submitted the job cancelled the job.                                                                                                                                                                 |
| <code>completed-with-errors</code>            | The job printed with errors.                                                                                                                                                                                        |
| <code>completed-with-warnings</code>          | The job printed with warnings.                                                                                                                                                                                      |
| <code>job-hold-set</code>                     | The job is in a queue and the <code>job-hold</code> attribute of the job is set to <code>true</code> .                                                                                                              |
| <code>job-print-after-specified</code>        | The job is in a queue and the <code>job-print-after</code> attribute has been set to a time that has not yet occurred.                                                                                              |
| <code>required-resources-not-ready</code>     | The job is in a queue but cannot be scheduled because one or more of the resources required by the job (such as media, fonts, and so on) are not ready on any of the physical printers that can accept the job.     |
| <code>required-resources-not-supported</code> | The job is in a queue but cannot be scheduled because one or more of the resources required by the job (such as media, fonts, and so on) are not supported by any of the physical printers that can accept the job. |



## Using Abbreviations for Attribute Names and Values

### About Jobs That Cannot Be Scheduled Because of Resources

You need to understand how HPDPS schedules jobs to understand the following two job-state reasons:

- `required-resources-not-ready`
- `required-resources-not-supported`

HPDPS schedules a job to a physical printer based on the physical printers that are registered and ready when the job is next in line to print. Both of the job-state reasons for required resources occur when none of the available physical printers can print the job.

HPDPS validates a job based on the `xxx-supported` physical printer attributes, such as `media-supported`. However, for some attributes, HPDPS schedules a job based on the `xxx-ready` printer attribute, such as `media-ready`. HPDPS holds a job in a queue in the `held` job state and with a job-state reason of `required-resources-not-ready` when it has validated the job but cannot schedule the job because a `xxx-ready` printer attribute does not have the value required by the job. This means no available physical printers can process the job. For example, the printer operator might need to load a specific media into the printer and update the appropriate physical printer attribute.

For more information on job scheduling refer to “Specifying the Queue Scheduling Method” in Chapter 6.

The following conditions can prevent HPDPS from scheduling a validated job:

- A given physical printer is no longer registered with the spooler.
- The value or values for one or more physical printer attributes have been modified.

HPDPS can schedule the job when one of the following occurs:

- A particular physical printer re-registers with the spooler and queue.
- You modify a physical printer attribute and assign a value that corresponds to the value specified by a job attribute.
- You or the user modify the job and assign a job attribute value that corresponds to the value specified by a physical printer attribute.

## Using Abbreviations for Attribute Names and Values

The job stays in the queue indefinitely until one of these things occur, unless there is a value specified for the `job-discard-time` attribute. The job could be discarded before the problem preventing it from being scheduled has been corrected.

## Querying Job Status for Large Jobs

You or a user might want to find out the status of a large job while it is processing, that is, printing on a physical printer and in the `processing` job state. Most jobs are small enough that they will finish printing before you could become concerned about how long they will take to print. However, if you have a large job, you might want to query it so that you can estimate how long it will take the job to finish printing.

HPDPS updates the following job attributes as the job processes:

|                                   |                                                                                                                                                                                                                                                                                               |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>octets-completed</code>     | Reports the number of octets (bytes) in the job that have been printed. Compare this value with the value of the job attribute <code>total-job-octets</code> .<br><br>This attribute is updated when the job is queried or after each document copy completes.                                |
| <code>pages-completed</code>      | Reports the number of pages in the job that have been printed.<br><br>This attribute is updated when the job is queried or after each document copy completes.                                                                                                                                |
| <code>job-copies-completed</code> | Reports the number of copies of the particular job that have been printed.<br><br>This attribute is updated after each job copy completes.                                                                                                                                                    |
| <code>processing-time</code>      | Reports the amount of time that the job has been printing on the printer. This attribute is updated when a user queries the job with the <code>pdls</code> command. The value is calculated by comparing the value of the <code>started-printing-time</code> attribute with the current time. |

## Using Abbreviations for Attribute Names and Values

If the job is retained, you can also query the job after it has finished printing and find out this information.

### Querying for the Number of Octets Completed for a Processing Job

To compare the number of octets (bytes) completed to the size of the job for Spool3, enter:

```
pdq -U -s column -r total-job-octets,octets-completed \
Spool3:3459400062
```

Include the `-U` flag if you did not submit the job you are querying and use `-s column` to specify a column format for the information.

HPDPS displays information similar to the following:

```
Total Octets
Octets Completed
----- -
113889 66944
```

In this example, HPDPS has completed a little more than half of the job.

### Querying for the Number of Job Copies Completed for a Processing Job

To query for the number of job copies completed for a large job specifying multiple copies for Spool3, enter:

```
pdq -U -s column -r "job-copies-completed, results-profile" \
Spool3:3459400062
```

HPDPS displays information similar to the following:

```
Copies Results
Completed Profile
----- -
1 pickup::rob@cowboy:3:
```

The fourth component of the `results-profile` attribute specifies the number of copies.

In this example, HPDPS has completed one copy of the three copies requested.

## Using Abbreviations for Attribute Names and Values

### Querying for the Processing Time Required by a Job

This can be useful if you print a large job on a regular basis, such as a monthly report. If you retain the job when you print it, you can determine the amount of time required to process the job after the job completes. Then, you would know how much time to allow for printing future versions of the job.

In the following example, job `Spool13:3459400062` has completed and has been retained in the spooler. To query for the amount of time that was required to process the job, enter:

```
pdq -U -r processing-time Spool13:3459400062
```

HPDPS displays information similar to the following:

```
Spool13:3459400062 processing-time = 22:04
```

This indicates that HPDPS took 22 minutes and four seconds to process the job.

## Using HPDPS Error Logs

---

This section contains general information on HPDPS error logs. This includes topics such as:

- Finding and viewing the right error log
- Using the messages in an error log
- Changing the attribute values of server error logs

HPDPS creates a subdirectory in the directory `/var/opt/pd` for each HPDPS client and each server and places the error logs for the client and servers in that directory. HPDPS automatically creates these logs when the client or server is initialized. You cannot create nor delete a log, but you can disable or enable a log to stop or start message logging.

---

### Finding and Viewing a Client Error Log

The error log for an HPDPS client is the file:

```
/var/opt/pd/pdclientd/error.log
```

## Using Abbreviations for Attribute Names and Values

---

### Changing Server Error Log Attribute Values

Server error log attributes that you can modify are:

- log-severity** The value of this attribute determines which of the server messages the server error log records. See “Available Values for the log-severity Attribute” for a list of available **log-severity** attribute values.
- log-size** The value of this attribute determines the maximum size to which a log can grow.
- log-wrap** The value of this attribute determines whether a log overwrites itself or stops logging when it reaches the maximum size.

You can either change the attribute values of a single log temporarily using the **pdset** command, or you can change the values for all spoolers or supervisors on that system by editing a file. Changes made with the editor will not take effect for any server until you shut down and restart the server or until you re-boot the system.

### Changing the Attribute Values of a Server Error Log Temporarily

Use the **pdset** command to temporarily change the values of server error log attributes. The changes you make in this way persist until you shut down the server or until you change them again. When the server starts again, the server error log attributes return to the values obtained from the configuration file.

For example, to temporarily set the **log-severity** error log attribute value to **debug**, use these steps, substituting the name of your server for *ServerName*:

1. Disable the server error log:

```
pddisable -c log ServerName:default_error
```

---

**Note** While the log is disabled, it will not log any messages.

---

2. Change the log severity setting:

```
pdset -c log -x "log-severity=debug" ServerName:default_error
```

## 12-2 Using HPDPS Error Logs

## Using Abbreviations for Attribute Names and Values

3. Enable the log:

```
pdenable -c log ServerName:default_error
```

The server error log attribute `log-severity` now has a value of `debug`.

Using this same process you can temporarily change the error log attribute values of other servers.

## Using Configuration Files to Set Attribute Values for Server Error Logs on Restart

When a server starts up, it looks in the `/var/opt/pd` directory for either the `spl_error.cfg` file or the `suv_error.cfg` file, depending on whether the server is a spooler or a supervisor. These two files are basically attributes files (their format is that used for any HPDPS attributes file) for the error logs of the servers.

The following example shows the text of the `spl_error.cfg` file in the `/var/opt/pd` directory.

```
#
ErrorLog Configuration File
#
Log size (units = KBytes)
log-size = 1024
Wrap On?
log-wrap = true
Severity?
log-severity = audit
```

To change the error log attribute values of all spoolers, edit the `/var/opt/pd/spl_error.cfg` file. To change the error log attribute values of all supervisors, edit the `suv_error.cfg` file in the `/var/opt/pd` directory.

For example, suppose you want to change the spooler error log attribute values. You need to:

- Increase the maximum size from one to two megabytes.
- Turn wrapping off so that when the log file grows to two megabytes, logging stops.

## Using Abbreviations for Attribute Names and Values

- Change the log severity from audit to debug.

Use a text editor to edit the `/var/opt/pd/spl_error.cfg` file so that it looks like this:

```
#
ErrorLog Configuration File
#
Log size (units = KBytes)
log-size = 2000
Wrap On?
log-wrap = false
Severity?
log-severity = debug
```

When you have made the changes and saved the file, the error log for each spooler will use these settings after the spooler is shut down and restarted or the system is re-booted.

To make the changes take effect on the error log of an active spooler, shut the spooler down and then start it again.

The next time the server is shut down and started again, it will use the values set in the configuration file. If you prefer not to shut the spooler down, use the process described in “Changing the Attribute Values of a Server Error Log Temporarily” to set these values temporarily.

## Available Values for the log-severity Attribute

The supported values for the `log-severity` attribute are as follows:

|                |                                                                                                                                                                                                                                                                              |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>error</b>   | This setting produces a minimum of logging. Only error messages are logged. An error referencing a job signals a condition that might prevent the job from completing successfully, depending on the setting of other parameters. The letter <b>E</b> precedes each message. |
| <b>warning</b> | Both error and warning messages are logged. A warning referencing a job signals a condition that will not prevent completion of the job, but might indicate that some action is needed on part of the user or operator. The letter <b>W</b> precedes each warning message.   |

### 12-4 Using HPDPS Error Logs



## Using Abbreviations for Attribute Names and Values

|                    |                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>audit</code> | This is the default log severity setting. Error, warning, and audit messages are logged. The letter <b>A</b> precedes each audit message.                                                                                                                                                                                                       |
| <code>debug</code> | This setting logs error, warning, audit, and debug messages. Servers generate debug messages when they begin processing each command and when they communicate with other servers. Debug messages are useful for helping to track what command a server was processing when an error occurred. The letter <b>D</b> precedes each debug message. |
| <code>info</code>  | This setting logs error, warning, audit, debug, and informational messages. Servers generate informational messages when potentially normal situations occur, such as when a server is unable to deliver a notification message to a user because the user is logged off. The letter <b>I</b> precedes each informational message.              |

---

## How HPDPS Backs Up Server Error Logs

What HPDPS backs up is different for a server that is shut down than for one that is deleted.

### Error Log Backup After a Server is Shutdown

Backups of server error logs occur as follows:

1. The first time the server is shut down and then restarted, HPDPS renames the present error log for the server from *ServerName/error.log* to *ServerName/error.log.BAK*, where *ServerName* is the name of the server.
2. Then the next time that server is shut down and restarted, HPDPS renames the `error.log.BAK` file to `error.log.BAK.YearDateTime`, where `YearDateTime` is the current year, date, and time. For example, `error.log.BAK.19950624010807` is one such file.
3. Then HPDPS renames the `error.log` file to `error.log.BAK`, and creates a new `error.log` file. HPDPS does this each time you shut down and restart a server.

## Using Abbreviations for Attribute Names and Values

### Error Log Backup After a Server is Deleted

If you use the `pddelete` command to delete a server:

- HPDPS modifies the intact server `/var/opt/pd` directory entry and renames it from *ServerName* to *ServerName.BAK*, where *ServerName* is the name of the server.
- If you use the `pdstartspl` or `pdstartsuv` utilities to start a new server with the same name, HPDPS creates a new `/var/opt/pd` directory entry named after the server.
- If you then use the `pddelete` command again to delete the new server, HPDPS deletes the present *ServerName.BAK* directory.
- Then HPDPS renames the present directory entry for the server from *ServerName* to *ServerName.BAK*.

HPDPS does this each time you delete or create a server. HPDPS only keeps the most recent `.BAK` directory.

### Finding and Viewing Server (Spooler and Supervisor) Error Logs

Each server error log contains a record of the messages that are generated by the server and the objects it contains.

If you are experiencing a problem or unexpected behavior, often the best course of action is to look in the error log of the server. To do this, you must be logged on to the system where the server is running and then you use a text editor to open and view the log file:

```
vi /var/opt/pd/Spool1/error.log
```

This will display the error log for server `Spool1`. Find the entry you are looking for and if you want to find more about the message, see “Using the Messages in Error Logs”.

## Finding Messages in an Old Error Log

To find messages in an old error log, do the following:

1. Change to the directory where the error log files reside. Enter a command similar to the following:

```
cd /var/opt/pd/Spool1/
```

2. Enter `ls`.

The system will respond with a list of directory and file names contained in that directory. Among them there might be several files starting with `error.log` such as:

```
error.log
error.log.BAK
error.log.BAK.19950804174858
```

3. Find two time-stamp files where the period of time you are interested in falls between.
4. Look in the file with the later time-stamp of these two files.

---

**Note** If the time period you are looking for is later than the last time-stamp file, look in the `error.log.BAK` file.

---

5. Find the file you believe the log entry you are looking for is in. Use an editor to look at the file by entering a command similar to the following:

```
vi error.log.BAK.19950804174858
```

This will display the error log.

6. Browse the file for messages of interest. If you want to find more about the message, see “Using the Messages in Error Logs”.

## Using Abbreviations for Attribute Names and Values

### Removing Error Log Backup Files and Directories

HPDPS does not delete these backups automatically. You might periodically want to use the `rm` command to delete backup error logs and server directories or you can automate this cleanup by running a script in your `crontab`.

#### Using the `rm` Command to Delete an Error Log File

For example, to delete the error log file `error.log.BAK.19950620193012`, change to the subdirectory containing the file and enter:

```
rm error.log.BAK.19950620193012
```

#### Using the `rm` Command to Delete an Error Log Directory

To delete the server directory `/var/opt/pd/Spool1.BAK.19950624010807`, change to the `/var/opt/pd` directory and enter:

```
rm -rf Spool1.BAK.19950624010807
```

### Using the Messages in Error Logs

Once you are viewing an `error.log` file, browse the file for the messages of interest to you. You might look for message severity, time-of-day, user ID, printer name, and so on. For example, you might look for message severity of **error**. Identify these by the letter **E** that is the first character in the message. When you find an error message, use the `pdmsg` command to view the full message description, as explained in “Getting Full Descriptions for HPDPS Error and Notification Messages” in Chapter 13.

Here are some sample messages:

```
A 07/31/95 10:24:42 [205fdf28 jjones->;Spool1] 5010-363
The list request for server objects is complete.
```

```
E 07/31/95 10:47:33 [205fdf28 jjones->Spool1,LogPrt3] 5010-550
Cannot print this job. No physical printers are associated with logical
printer LogPrt3
```

```
A 07/31/95 10:47:33 [205fdf28 jjones->Spool1,LogPrt3] 5010-528
Cannot create job 2 (Spool1:0233600000).
```

## 12-8 Using HPDPS Error Logs

### Using Abbreviations for Attribute Names and Values

The second message in this sample is preceded by **E**, for **error**, rather than **A** for **audit**. Your next step might be to use the `pdmsg` command to view the full description of message number 5010-550 along with suggested actions.

To make it easier to track which commands generate error messages, you can temporarily or permanently change a server error log `log-severity` attribute value to `debug`. This makes the log record the message that the server produces when the server starts working on a command. In this way, you can identify what the server was doing when the error occurred. It also logs server to server requests which can be helpful.

See “Available Values for the log-severity Attribute” earlier in this chapter for a list and explanation of the supported values for the `log-severity` attribute.



## Troubleshooting

---

If you or a user receives an error message, try to resolve the problem by following the suggested course of action in the message help text, as explained in “Getting Full Descriptions for HPDPS Error and Notification Messages” below.

This troubleshooting section includes specific diagnostic procedures for problems with:

- Physical printers. See “Problems with Physical Printers”.
- Jobs. See “Problems with Jobs”.
- Client daemons. See “Problems with the HPDPS Client Daemon”.
- Servers. See “Problems with Servers”.

---

### Getting Full Descriptions for HPDPS Error and Notification Messages

When you or a user receive an HPDPS error message or notification message, use the `pdmsg` command to display more information. The information about the message includes an explanation, a system action, and a response. The response suggests things you can do to correct the problem.

For example, suppose a user entered a `pdpr` command that specified `content-orientation=landscape` and the command resulted in the following error message.

```
pdpr: 5010-606 The value landscape that was specified
or defaulted for attribute content-orientation is not
supported by the logical printer or by any of its
associated physical printers.
```

## Using Abbreviations for Attribute Names and Values

- To view the help information for message number 5010-606, enter:

```
pdmsg 5010-606
```

HPDPS displays information similar to the following:

```
5010-606 The value AttributeValue that was specified or defaulted for
attribute AttributeName is not supported by the logical printer or
by any of its associated physical printers.
```

```
EXPLANATION: This value was specified or defaulted when the
job was submitted. Neither the logical printer nor any of its
associated physical printers support this value.
```

```
SYSTEM ACTION: HPDPS could not process the request.
```

```
RESPONSE: If submitting or resubmitting a job, modify the print
request or select a printer that supports the values. If
modifying a previously submitted job, resubmit the job to a
printer that can support the values and then modify the job.
```

As suggested in the RESPONSE field, either:

- Have the user submit the job again, not specifying content-orientation=landscape, or
- Have the user submit the job to a different logical printer, one that supports the value landscape for the job attribute content-orientation.

If there are no error or notification messages, or they do not sufficiently help you diagnose the problem, browse the topics that follow to find the topic that corresponds to the particular problem.



---

## Problems with Physical Printers

If you or a user receive any error or notification messages, before going any further with this section use the suggested action described in “Getting Full Descriptions for HPDPS Error and Notification Messages”. If you have done this and you need more information, or if there are no error or notification messages associated with the problem, use this section.

| Problem                                            | See the following section:                    |
|----------------------------------------------------|-----------------------------------------------|
| If some jobs in a queue are not moving forward     | “Checking the Physical Printers for a Queue”  |
| If a printer device is not printing                | “The Printer Device is Not Printing”          |
| If you cannot print to an enabled physical printer | “Cannot Print to an Enabled Physical Printer” |

### Checking the Physical Printers for a Queue

Use this section if some jobs in a queue are not moving forward. This might indicate that the physical printers capable of supporting those jobs are busy or not available. It might also indicate that the jobs are held, are no longer printable, or are paused. If you suspect that this is more likely, see “Problems with Jobs”.

If the physical printers are merely busy, there is nothing wrong. This section tells you how to verify that all the physical printers for a given queue are enabled.

To make sure that all the physical printers for the queue are able to print, use the `pdls` command to compare the queue’s assigned physical printers with the queue’s ready physical printers. To make the comparison easier, request the output using `-s column`.

For example, if the name of the queue is `Queue1`, enter:

```
pdls -c queue -s column -r physical-printers-assigned,\
physical-printers-ready Queue1
```

There are two possible results from this command:

## Using Abbreviations for Attribute Names and Values

- In the first possible result, you see that all of the physical printers assigned to the queue are also ready.

| Physical<br>Printers Assigned | Physical<br>Printers Ready |
|-------------------------------|----------------------------|
| -----                         | -----                      |
| PhysPrt1                      | PhysPrt1                   |
| PhysPrt2                      | PhysPrt2                   |
| PhysPrt3                      | PhysPrt3                   |
| PhysPrt4                      | PhysPrt4                   |

If you have a result like this, all of your physical printers are working.

- In the second possible result, you see that not all of the assigned physical printers are ready. In the following example, the physical printer **PhysPrt3** is not in the **Physical Printers Ready** column.

| Physical<br>Printers Assigned | Physical<br>Printers Ready |
|-------------------------------|----------------------------|
| -----                         | -----                      |
| PhysPrt1                      | PhysPrt1                   |
| PhysPrt2                      | PhysPrt2                   |
| PhysPrt3                      | PhysPrt4                   |
| PhysPrt4                      |                            |

If you have a similar result, see the following section for assistance with diagnosing physical printer problems.

## Using Abbreviations for Attribute Names and Values

### The Printer Device is Not Printing

Verify that the problem is with the physical printer by issuing a `pdls` command against the printer. Note the following:

- `printer-state` attribute
- `enabled` attribute
- `message` attribute

For example, if the printer is `PhysPrt3`, enter:

```
pdls -c printer -r printer-state,enabled,message PhysPrt3
```

HPDPS displays information similar to the following:

```
PhysPrt3: printer-state = paused
PhysPrt3: enabled = true
PhysPrt3: message = "Pauseded for maintenance.-jbird"
```

If there is no useful information in the `message` value, use Table 13-1 to determine what your next action should be, based on the combination of values for `printer-state` and `enabled`.

## Using Abbreviations for Attribute Names and Values

**Table 13-1.**  
**Physical Printer Attribute Values: printer-state and enabled**

| printer-state | enabled | Your next action to resume and enable the printer:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| paused        | true    | Use the <code>pdresume</code> command to resume the printer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| paused        | false   | Use the <code>pdresume</code> and <code>pdenable</code> commands to resume and enable the printer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| idle          | false   | Use the <code>pdenable</code> command to enable the printer. If the printer cannot register with the queue, either the queue or its spooler is the source of the problem or there is a DCE or network problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| idle          | true    | <ol style="list-style-type: none"> <li>1. Use the <code>pdls</code> command to see if the queue is paused.</li> <li>2. Use the <code>pddisable</code> command followed by the <code>pdenable</code> command to make the physical printer register with the queue's spooler.</li> <li>3. Check to see if the job was at fault by sending a test job requesting this physical printer.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| printing      | true    | <ol style="list-style-type: none"> <li>1. Look at the printer device fed by this physical printer to see if the device is printing.</li> <li>2. If the printer device is not printing, it might be processing large or complex data. Wait to see if it successfully produces output.</li> <li>3. If the printer device does not successfully produce output, clear the printer device if possible, or wait until it has cleared itself.</li> </ol> <p>Send a test job requesting this physical printer. Use the <code>physical-printer-requested</code> attribute to specify this physical printer.</p> <p>If this test job prints successfully, consider that the unsuccessful job might have requested an incorrect document format.</p> <ol style="list-style-type: none"> <li>4. If the device is not printing, or if the test job is also unsuccessful, see "Cannot Print to an Enabled Physical Printer".</li> <li>5. If you are not having DCE or network problems, call service for the printer device.</li> </ol> |

## Using Abbreviations for Attribute Names and Values

**Table 13-1.**  
**Physical Printer Attribute Values: printer-state and enabled**  
**(continued)**

| printer-state         | enabled             | Your next action to resume and enable the printer:                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| needs-key-operator    | true<br>or<br>false | <ul style="list-style-type: none"><li>■ Check that the printer is configured correctly, is turned on, and is connected.</li><li>■ If the printer device is TCP/IP-attached, use your local troubleshooting procedures to see if you are having network problems.</li></ul> HPDPS might not be able to communicate with the printer device. For detailed instructions, see “Physical Printer State is needs-key-operator” below. |
| connecting-to-printer | true<br>or<br>false | Wait to see if the state changes as the physical printer successfully connects to the printer device. If the physical printer cannot connect to the printer device within the time specified by the <code>printer-timeout-period</code> physical printer attribute, this state changes to <code>timed-out</code> .                                                                                                              |
| timed-out             | true<br>or<br>false | See “Physical Printer State is Timed-Out” for instructions.                                                                                                                                                                                                                                                                                                                                                                     |

### Physical Printer State is needs-key-operator

If the `pdls` command returns a printer state of `needs-key-operator`, HPDPS might not be able to communicate with the printer device. Check that the printer is configured correctly, is turned on and is connected. If the printer device is TCP/IP-attached, use your local troubleshooting procedures to see if you are having network problems. Use the `pdls` command to list the attribute values you should check to verify that the printer is configured correctly. The attributes that should be checked depend on the `attachment-type` and `printer-model`.

If you do not find anything wrong with the printer device, find the error and notification messages for the physical printer and its associated printer device. Once you find an error or notification message relating to the problem, use the

## Using Abbreviations for Attribute Names and Values

`pdmsg` command on the message number, and perform the suggested response action.

To find error and notification messages:

- Look in the spooler and supervisor error logs. See “Finding and Viewing Server (Spooler and Supervisor) Error Logs” in Chapter 12 for instructions.
- Look at the administrator’s and operator’s screens.
- Look at the administrator’s and operator’s electronic mail.

Some possible problems that would not show up in error messages include:

- The device driver was removed or altered by an administrator.
- The device name specified by the physical printer `device-name` attribute is not correct.

## Physical Printer State is Timed-Out

If your `pdl`s command used to display information about a physical printer displays a printer state of `timed-out`, the physical printer was not able to connect to its printer device within the physical printer’s time-out period. The time-out period is specified by the value for the `printer-timeout-period` physical printer attribute value.

The physical printer is not able to connect to the printer device because a second HPDPS physical printer or print queue is also sending output to the same printer device. The second HPDPS physical printer or print queue already had a job in the device when your physical printer tried to connect. This prevented your physical printer from connecting.

In many cases, your physical printer will connect to the device when the other printer is done and will recover from its timed-out state. Nevertheless, it is not recommended to have an HPDPS-managed printer device fed by a second physical printer or print queue.

The recommended solution if your physical printer is timed-out is to delete all but one of the physical printers that is sending output to this printer device. To do that, you must find all the physical printers sending output to this printer device.

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## Using Abbreviations for Attribute Names and Values

First, find the device name using the `pdls` command on the affected physical printer. For example, if the physical printer name is `PhysPrt1`, enter:

```
pdls -c printer -r device-name PhysPrt1
```

Assume the command returns this display:

```
PhysPrt1: device-name = dev1
```

You see that `dev1` is the name of the device. To find all the physical printers sending output to device `dev1`, use the `pdls` command to do a global query of all the servers in your system, filtering for printers that send output to the device in question. For example, enter:

```
pdls -c printer -f "device-name==dev1" *:
```

The results of this `pdls` command list multiple printers or a single printer.

Including the backslash before the global character (\*) prevents HPDPS from issuing an error message and terminating the query should a file exist with a name that ends in a colon.

### When Multiple Printers are Listed

If there are two physical printers sending output to the device, the display looks like this:

| Printer  | Realization | State     | Enabled | Queue  |
|----------|-------------|-----------|---------|--------|
| -----    | -----       | -----     | -----   | -----  |
| PhysPrt1 | physical    | timed-out | true    | Queue1 |
| PPBob    | physical    | printing  | true    | QBob   |

This display reveals that in addition to `PhysPrt1`, which is the timed-out physical printer, there is a second HPDPS physical printer, `PPBob`, sending output to device `dev1`.

In this case, you must make a policy decision about which physical printer to delete. Before deleting a physical printer, use the `pddisable` command to prevent any more jobs from being scheduled to it. Use the `pdelete` command to delete the physical printer.

Once you have deleted one of the physical printers, make sure that the jobs in the queue that formerly fed that physical printer are still able to print on the remaining physical printer. It might be necessary to resubmit some or all of

## Using Abbreviations for Attribute Names and Values

these jobs to the logical printer that sends output to the remaining physical printer or to another logical printer that sends output to other physical printers capable of printing the jobs.

### When a Single Printer is Listed

If there is only one physical printer, the display looks like this:

| Printer  | Realization | State     | Enabled | Queue  |
|----------|-------------|-----------|---------|--------|
| -----    | -----       | -----     | -----   | -----  |
| PhysPrt1 | physical    | timed-out | true    | Queue1 |

Because `PhysPrt1` is the only HPDPS physical printer sending output to device `dev1` and it is in the timed-out state, one or more print queues are also sending output to `dev1`. In this case, you have a choice. You can:

- Use the `pdelete` command to delete the HPDPS physical printer `PhysPrt1`. See chapter 10, “Managing Supervisors and Physical Printers”, for instructions on how to do this. Before deleting a physical printer, use the `pdisable` command to prevent HPDPS from scheduling any more jobs to it. Use the `pdelete` command to delete the physical printer.

Once you have deleted the physical printer, you should also make sure that all the jobs in the queue that fed that physical printer are still able to print. It might be necessary to resubmit some or all of these jobs.

- Find which print queues are sending output to the device, and change or delete them so that they no longer send output to the device in question.

### Cannot Print to an Enabled Physical Printer

If a physical printer shows an `enabled` value of `true`, and yet you still cannot print to that physical printer, the physical printer is probably not registered with a queue. This might happen if the spooler containing the queue or the supervisor containing the physical printer was recently started or if there are DCE or network problems. Use the `pdls` command to check the name of the associated queue and see if the printer has registered with the spooler.

For example, for `PhysPtr1`, enter:

```
pdls -c printer -r registered-with-spooler PhysPtr1
```

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## Using Abbreviations for Attribute Names and Values

Use the `pddisable` command and then the `pdenable` command to make the physical printer try to register with the spooler's queue. If the physical printer cannot register, you receive an error message and the physical printer's `enabled` attribute value changes to `false`.

Use the `pdmsg` command and complete the suggested actions. For additional information related to this problem, also look in the supervisor and spooler error logs.

---

## Problems with Jobs

If you or a user receive any error or notification messages, before going any further with this section use the actions suggested in "Getting Full Descriptions for HPDPS Error and Notification Messages". If you have done this and you need more information, or if there are no error or notification messages associated with the problem, use this section.

| <b>Problem</b>                                                                                                     | <b>See this section:</b>                                               |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| If the print command immediately displays an error message                                                         | "Error Message Returns with pdpr Command Instead of Creating a Job"    |
| If the print command is accepted, but the job is taking longer than it should to print                             | "The Job Is Not Printing"                                              |
| If the user receives a notification message stating that the job could not be scheduled                            | "The Job Could Not Be Scheduled for Printing"                          |
| If the user receives a notification message stating that the job completed, but the user could not find a printout | "The User Received a job-complete Message, But Cannot Find a Printout" |

## Using Abbreviations for Attribute Names and Values

### Error Message Returns with `pdpr` Command Instead of Creating a Job

Use this section if a `pdpr` command results in an error message indicating a problem with the job. Any of the following reasons might be responsible for this situation:

- HPDPS cannot find one of the objects specified in the print command. You know that this is the problem when the user receives an error message from the `pdpr` command saying that some object necessary for printing the job, such as a file or a printer, is not found, is not available, or cannot be opened. In this case, see “HPDPS Cannot Find or Open a File or Object Your Job Needs”.
- One of the attributes or attribute values specified in the print command, in an initial value object, or by default is not supported by any one or more of the following:
  - The logical printer to which the user submitted the job
  - Any of the physical printers associated with the logical printer
  - HPDPS

You know that this is the problem when the user receives an error message regarding an attribute from the `pdpr` command. In this case, see “There Is a Problem with the Attributes or Values the User Specified”.

- The user is not authorized to use the specified logical printer. You know that this is the problem when the user receives an error message from the `pdpr` command stating “you must be authorized.” In this case, see “The User Is Not Authorized to Use the Logical Printer”.

### HPDPS Cannot Find or Open a File or Object Your Job Needs

Use this section when the user receives an error message from the `pdpr` command stating that some file or object necessary for printing the job, such as a file or a printer, is not found, is not available, or cannot be opened.

## Using Abbreviations for Attribute Names and Values

The following examples describe three possible situations.

- HPDPS cannot find or cannot open the user's specified attributes file or document file. For example, the user specified the file `File1` and received the error message:

```
5010-140 Cannot open file File1.
```

In this case, have the user check the command he or she entered for the following items and then try the command again.

- Check the spelling of the file name
- Unless the user is issuing the command from within the directory in which the file is stored, have the user specify the full directory path of the file
- Make sure the user has read permission to the file

If the user still receives the error message, use your local troubleshooting procedures to check for network problems.

- HPDPS cannot find the logical printer that the user specified. For example, the user specified the logical printer `LogPrt1`, and received the error message:

```
pdpr: 5010-065 Cannot find the object LogPrt1.
```

In this case, have the user check the spelling of the object and try the command again. If the command still fails, look at the error logs for the server that contains the object. See chapter 12, "Using HPDPS Error Logs", for information on how to find and use server error logs. If the object was never deleted or shut down, and yet HPDPS commands cannot find it, suspect a network or DCE problem.

- HPDPS cannot find any physical printers associated with the requested logical printer. For example, the user specified the logical printer `LogPrt1` and received the error message:

```
pdpr: 5010-550 Cannot print this job. No physical printers
are associated with LogPrt1.
```

If this is the case, follow these steps:

1. If you do not know what queue the logical printer is associated with, use the `pdls` command to list the logical printer's `associated-queue` attribute.

## Using Abbreviations for Attribute Names and Values

For example, enter:

```
pdls -c printer -r associated-queue LogPrt1
```

2. Use the `pdls` command to see if the supervisors containing the physical printers associated with that queue are running.

For example, if supervisor `Super1` contains the physical printers associated with the queue, enter:

```
pdls -c server Super1
```

3. If the supervisor is not running, use the `pdstartsuv` command to start the supervisor.
4. If the supervisor's state is ready, use the `pdls` command to see if its physical printers are associated with the queue and are registered with its spooler.

For example, enter:

```
pdls -c printer -r associated-queue,registered-with-spooler \
Super1:
```

In the `pdls` response, look for the physical printers that should be associated with the queue. Check that the `associated-queue` value is spelled correctly. If the associated queue is correct, but the physical printer is not registered with the spooler, HPDPS might be attempting to register the printer with the spooler. Use the `pddisable` command and the `pdenable` command to force HPDPS to register the physical printer.

## There Is a Problem with the Attributes or Values the User Specified

Use this section if the user receives an error message from his or her `pdpr` command regarding an attribute. Here are three such situations:

- Suppose the user specified an attribute `Attribute1`, either on the command line or in an attributes file, and the user received the message:

```
pdpr: 5010-625 Cannot recognize attribute Attribute1.
```

Verify the spelling of the attribute name and have the user try the command again. Refer to the manpage `pd_att_job(5)` to verify the attribute name.

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## Using Abbreviations for Attribute Names and Values

- Suppose the user specified an attribute `Attribute1` for a job, and the user received the message:

```
pdpr: 5010-068 The object class job does not accept the
attribute Attribute1.
```

Verify that the attribute the user specified is valid for jobs. Refer to the manpage `pd_att_job(5)` to confirm that the user is specifying a job attribute, rather than the equivalent printer attribute.

- Suppose the user specified an attribute `Attribute1` and value `Value1` and the user received the message:

```
pdpr: 5010-606 The value Value1 that was specified or
defaulted for attribute Attribute1 is not supported by the
logical printer or by any of its associated physical printers.
```

Consider these possibilities:

- The logical printer and its associated physical printers actually do support the attribute value, but the user did not spell the value in a way that HPDPS recognizes. Check the spelling and abbreviation of the values; some values cannot be abbreviated. Refer to the manpage `pd_att_job(5)` to verify how the value should be spelled.
- The user spelled the value correctly, but the one physical printer on the queue that supports the value is not registered or is not up.  
  
See the *HP Distributed Print Service User's Guide* for instructions on finding a logical printer that supports an attribute value.
- The attribute is not supported by the printer requested. The user must decide if the attribute is correct and is necessary for the job. If so, the job should be submitted to another printer that supports this attribute.

If the user did not knowingly specify the attribute value, consider that the attribute value might have been specified in:

- An attributes file that the user specified
- An initial value object that the user specified

## Using Abbreviations for Attribute Names and Values

- An initial value object that is associated with the logical printer. In this case, the initial value object conflicts with the values supported by the physical printers fed by that logical printer.

## The User Is Not Authorized to Use the Logical Printer

Use this section when the user receives an error message from his or her `pdpr` command stating “you must be authorized.” For example, use this section if the user submitted a job to logical printer `LogPrt2` and received the following error message.

```
pdpr: 5010-612 You must be authorized to perform this
operation on object Spooler1:LogPrt2.
```

This error message indicates that the logical printer to which the user submitted the job is restricted by DCE security.

- If the user cannot, or does not, log into DCE, he or she must select a logical printer that is not restricted by DCE. The logical printer must have attribute `authorize-jobs=false`.
- If the user believes that he or she should be able to print to this logical printer, it might be that one or more of the following are true:
  - The user forgot to log in to DCE. Have the user log in to DCE and enter the command again.
  - The user’s DCE authorization ticket expired. Have the user log in to DCE and enter the command again.
  - The user does not have permission to use that logical printer. See “List the DCE Permissions Granted by an HPDPS Object” for instructions on listing the permissions granted by an object.
  - The user is not in the group that has `read` permission to the logical printer. See “List the Members of a DCE Group” for instructions on listing the members of a group.

**List the DCE Permissions Granted by an HPDPS Object.** Use the DCE `acl_edit` command to make sure that the logical printer grants the correct permissions to the user’s DCE group. For example, assume that the logical printer to which the user submitted the job is `LogPrtRestrict`, contained in the spooler `Spool1`. The user is a member of the `Confidential_Printing`

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## Using Abbreviations for Attribute Names and Values

DCE group, which you believe should have read permission to the logical printer `LogPrtrRestrict`. To view the permissions granted by `LogPrtrRestrict`, use the following steps:

1. Use the `acl_edit` command on the logical printer. For example, enter:

```
acl_edit -e /./pdsec/Spool1/printer/LogPrtrRestrict
```

This displays warning messages if you are not DCE logged in, and displays the `acl_edit` prompt.

2. Use the `list` command. For example, enter:

```
list
```

This displays the permissions granted by `LogPrtrRestrict`. For example, a display such as:

```
SEC_ACL for /./pdsec/Spool1/printer/LogPrtrRestrict
Default cell = /.../pda_cell
unauthenticated:-----
user:pd_server:rwdtc
group:subsys/dce/cds-admin:rwdtc
group:subsys/dce/cds-server:rwdtc
group:pd_admin:rwd--
group:pd_operator:rw---
any_other:-----
group:Full_Function_Printing:r----
```

This display shows that the logical printer grants the `Full_Function_Printing` group read permission, but not the `Confidential_Printing` group. See “Setting the Permissions Granted by One HPDPS Object” in Chapter 8 for instructions on how to add a group to an object access control list.

3. Exit from `acl_edit`:

```
exit
```

**List the Members of a DCE Group.** If the group already has read permission to the logical printer, perhaps the user is not a member of the group. If the user is not listed, you might want to add the user to the group. To list the members of a DCE group, do the following:

## Using Abbreviations for Attribute Names and Values

- Execute the DCE control program. Enter:

```
dcecp
```

- Enter the `group list` command for the group you are interested in. For example:

```
group list confidential_printing
```

- The command prints a list of the members of the group.

## The Job Is Not Printing

Use this section when the logical printer accepted the job, but the job is not scheduled for printing. Follow the steps in this section to resolve the problem.

1. Did the user receive a notification message stating that the job could not be scheduled? If so, see “The Job Could Not Be Scheduled for Printing”.
2. Did the user receive any other notification or error messages? If so, enter the `pdmsg` command with the message number. This displays the full message explanation, and a suggestion as to how you should respond.
3. If the user did not receive any notification messages, or if you used the `pdmsg` command and need more information, use the `pdls` command on the job. List the following job attributes:

```
current-job-state
previous-job-state
job-state-reasons
intervening-jobs
name-of-last-accessor
```

For example, if the global job identifier is `Spooler1:1000000015`, enter:

```
pdls -U -r current-job-state,previous-job-state, \
job-state-reasons,intervening-jobs,name-of-last-accessor \
Spooler1:1000000015
```

Your next action depends on all the information you have about the job, including the results the `pdls` command displays. Table 13-2 is a guide for interpreting the information about the job.

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## Using Abbreviations for Attribute Names and Values

**Table 13-2. Guide to Your Next Step**

| Current job state:                          | Additional job information:                                                                                             | Your next step:                                                              |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Any state other than pending or processing. | The job state reason.                                                                                                   | See “The Job’s Current State is Neither Pending Nor Processing”.             |
| pending                                     | The number of intervening jobs is large.                                                                                | See “The Job Is Behind Many Others in the Queue”.                            |
| pending                                     | You have queried the job several times and the job is not moving forward in the queue.                                  | See “The Current State Is “Pending” but the Job Is Not Moving in the Queue”. |
| processing                                  | The physical printer to which the queue assigned the job sends output to a printer device that is not producing output. | See “The Job’s Current State Is “Processing”, But There Is No Printout”.     |

### The Job Is Behind Many Others in the Queue

If the `intervening-jobs` value is large, then the job is taking a long time to print simply because there are many jobs before it in the queue.

Either wait for the job to move to the head of the queue and print, or:

- Use the `pdpromote` command to move the job to the head of the queue so it will print sooner.

For example, if the global job identifier is `Spooler1:1000000015`, enter:

```
pdpromote Spooler1:1000000015
```

- Use the `pdresubmit` command to submit the job to a logical printer to send output to a queue with fewer jobs.

For example, if the name of the alternative logical printer is `LogPrt3` and the global job identifier is `Spooler1:1000000015`, enter:

```
pdresubmit LogPrt3 Spooler1:1000000015
```

## Using Abbreviations for Attribute Names and Values

### The Current State Is “Pending” but the Job Is Not Moving in the Queue

Use this section if the job’s `current-job-state` attribute value is `pending`, but the job is taking longer than you think it should to move to the head of the queue and print. If the `current-job-state` attribute value is other than `pending` or `processing`, see “The Job’s Current State is Neither Pending Nor Processing”.

If other jobs print but the job with which you are concerned does not move forward in the queue, this means that the physical printers on the queue that are capable of printing the job are busy or not available. Until one of these printers becomes available, the job will not move up in the queue.

Suppose the user’s job is the first job in the queue. If jobs behind the user’s job are being scheduled for printing, then the physical printer capable of printing your user’s job might not be enabled and working.

If you want to make sure that all the physical printers assigned to the queue are enabled and working, see “Checking the Physical Printers for a Queue”.

To make sure that the job is first to print when a physical printer that can print it does become available, move the job to the front of the queue. Use the `pdpromote` command. For example, if the global job identifier is `Spooler1:1000000015`, enter:

```
pdpromote Spooler1:1000000015
```

If you choose to submit the job to an alternative logical printer, one that sends output to some different physical printers, use the `pdresubmit` command. For example, if the name of the alternative logical printer is `LogPrt3` and the global job identifier is `Spooler1:1000000015`, enter:

```
pdresubmit LogPrt3 Spooler1:1000000015
```

### The Job’s Current State Is “Processing”, But There Is No Printout

If the job’s `current-job-state` attribute value is `processing`, but the printer device is not generating output, the printer might be paused or need attention. See “The Printer Device is Not Printing” for instructions. If you cannot obtain any information about the physical printer, the supervisor is shut down. If this is the case, use the `pdstartsuv` command to start the supervisor again.

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## Using Abbreviations for Attribute Names and Values

### The Job's Current State is Neither Pending Nor Processing

In Table 13-3 find the listed combination of job attribute values that matches the `pdls` command results, then take the suggested action.

**Table 13-3. Job Attribute Values**

| current-job-state | job-state-reasons | Your Next Action:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| paused            |                   | <p>Use the <code>pdls</code> command to view the <code>name-of-last-accessor</code> job attribute. For example, if the global job identifier is <code>Spool1:1000000015</code>, enter:</p> <pre>pdls -U -r name-of-last-accessor Spool1:1000000015</pre> <p>Contact the person listed there to find out why he or she paused the job. Use <code>-c job</code> with the <code>pdresume</code> command to resume the job. For example, if the global job identifier is <code>Spooler1:1000000015</code>, enter:</p> <pre>pdresume -c job Spooler1:1000000015</pre>                                                                                                                                                                                                                                                                                                        |
| held              | job-hold is set   | <p>Did the user set the <code>job-hold</code> attribute to <code>yes</code> with the <code>pdpr</code> command? Consider that an initial value object or an attributes file might have set the <code>job-hold</code> attribute to <code>yes</code>. If the <code>job-hold</code> attribute was not set with the <code>pdpr</code> command, use the <code>pdls</code> command to view the <code>name-of-last-accessor</code> job attribute. For example, if the global job identifier is <code>Spooler1:1000000015</code>, enter:</p> <pre>pdls -U -r name-of-last-accessor Spooler1:1000000015</pre> <p>Contact the person listed there to find out why he or she held the job. If you choose, use the <code>pdmod</code> command to set the <code>job-hold</code> attribute to <code>no</code>. For example:</p> <pre>pdmod -x "job-hold=no" Spooler1:1000000015</pre> |

## Using Abbreviations for Attribute Names and Values

**Table 13-3. Job Attribute Values (continued)**

| current-job-state | job-state-reasons                | Your Next Action:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| held              | required-resources-not-ready     | See “The Printer Resources that the Job Requires Are Not Ready”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| held              | required-resources-not-supported | See “The Printer Resources that the Job Requires Are Not Supported”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| held              | job-print-after                  | <p>Did the user set the <code>job-print-after</code> attribute with the <code>pdpr</code> command? The <code>job-print-after</code> attribute could have been set in an initial value object or in an attributes file. If the <code>job-print-after</code> attribute was not set with the <code>pdpr</code> command, use the <code>pdls</code> command to view the <code>name-of-last-accessor</code> job attribute. For example, if the global job identifier is <code>Spooler1:1000000015</code>, enter:</p> <pre>pdls -U -r name-of-last-accessor Spooler1:1000000015</pre> <p>Contact the person listed there to find out why he or she set the <code>job-print-after</code> attribute. If you choose, use the <code>pdmod</code> command to set this attribute to its default of no value. For example, if the job identifier is <code>Spooler1:1000000015</code>, enter:</p> <pre>pdmod -x "job-print-after==" Spooler1:1000000015</pre> |

## Using Abbreviations for Attribute Names and Values

**Table 13-3. Job Attribute Values (continued)**

| current-job-state | job-state-reasons                          | Your Next Action:                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| retained          | completed-successfully                     | <p>The job successfully completed processing and might or might not have completed with errors. The <code>job-retention-period</code> is non-zero.</p> <p>You can query the job's <code>printers-assigned</code> value to see what physical printer printed the job. To discard the retained job, use the <code>pdrm</code> command, setting the <code>job-retention-period</code> attribute value to zero. To print the job again, use the <code>pdresubmit</code> command.</p> |
| retained          | cancelled-by-operator or cancelled-by-user | <p>The job was cancelled by the operator or user. The <code>job-retention-period</code> is non-zero.</p> <p>You can query the job's <code>printers-assigned</code> value to see if any physical printer printed the job. To discard the retained job, use the <code>pdrm</code> command, setting the <code>job-retention-period</code> attribute value to zero. To print the job again, use the <code>pdresubmit</code> command.</p>                                             |
| unknown           |                                            | <p>The <code>unknown</code> value indicates that the spooler has lost contact with the physical printer that was printing the job. Wait a few minutes and enter the <code>pdl</code>s command again to see if the spooler regains contact with the physical printer. If the problem is not corrected, the state will change to <code>timed-out</code>.</p>                                                                                                                       |

## Using Abbreviations for Attribute Names and Values

**Table 13-3. Job Attribute Values (continued)**

| current-job-state | job-state-reasons | Your Next Action:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| timed-out         |                   | <p>The <code>timed-out</code> value indicates that the spooler has lost contact with the physical printer that was printing the job and contact was not re-established within the period specified in the <code>printer-register-threshold</code> of the spooler.</p> <ul style="list-style-type: none"><li>■ Use the <code>pdls</code> command to look at the job's <code>printers-assigned</code> attribute value. This will tell you which physical printer was printing the job.</li><li>■ Use the <code>pdls</code> to see if the physical printer is registered with a spooler. Refer to “Cannot Print to an Enabled Physical Printer” for more information about the physical printer registering with the spooler.</li><li>■ If the <code>pdls</code> of the physical printer results in an error message, the supervisor might have shut down. If this happens, use the <code>pdstartsuv</code> command to start the supervisor again.</li><li>■ Tell the user what physical printer was assigned to print the job, so they can see if the job finished printing. If it has not, use the <code>pdresubmit</code> command to submit the job again.</li></ul> |

### The Job Could Not Be Scheduled for Printing

If the user receives a notification message stating that the job could not be scheduled, use the `pdls` command to list job attributes that will help you discover why.

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## Using Abbreviations for Attribute Names and Values

These attributes are:

- `current-job-state`
- `job-state-reasons`

For example, if the global job identifier is `Spooler1:1000000015`, enter:

```
pdls -U -r current-job-state,\
job-state-reasons Spooler1:1000000015
```

Your next action depends on the combination of values the `pdls` command returns. Find the listed combination that matches your results. Then see the referred-to section for instructions.

**Table 13-4. Job Attribute Value Held**

| <code>current-job-state</code> | <code>job-state-reasons</code>                | See this section:                                                |
|--------------------------------|-----------------------------------------------|------------------------------------------------------------------|
| held                           | <code>required-resources-not-ready</code>     | “The Printer Resources that the Job Requires Are Not Ready”.     |
| held                           | <code>required-resources-not-supported</code> | “The Printer Resources that the Job Requires Are Not Supported”. |

If the `current-job-state` is either pending or processing, you need do nothing more. The job has corrected itself.

If the job is in a state not mentioned here, see “The Job’s Current State is Neither Pending Nor Processing”.

### The Printer Resources that the Job Requires Are Not Ready

Use this section if the job’s `job-state-reasons` attribute value is `required-resources-not-ready`.

Before the job can be scheduled to print, its `default-medium` attribute value must match some physical printer’s `media-ready` attribute value, and its `total-job-octets` attribute value must fit within the range specified by that same physical printer’s `job-size-range-ready` attribute value.

## Using Abbreviations for Attribute Names and Values

If the physical printer that supports both of these job attributes is not ready for them, the job can be accepted, but the job temporarily cannot be scheduled. Use the `pdls` command to list the job's `default-medium`, and `total-job-octets` attributes.

For example, if the global job identifier is `Spooler1:1000000015`, enter:

```
pdls -U -r default-medium,total-job-octets \
Spooler1:1000000015
```

Suppose the command returns this display:

```
1000000015: total-job-octets=48000000
```

In this example, the job size is 48 million octets, and the document in the job uses the `default-medium` attribute to request the medium `iso-a4-transparent`.

Next, find all the physical printers that are associated with the queue the job is in or with the logical printer to which the job was submitted, and that support the necessary attribute values.

**Finding the Printers that Support the Job's Attribute Values.** Use the `pdls` command with the `-f FilterCriteria` flag to find only the physical printers:

- That are associated with the queue containing the job
- That support the `default-medium` attribute value that the job requests

On the command, use the `-s` style flag and the `-r` requested-attributes flag to request columnar display of the following attributes:

```
printer-name
printer-state
enabled
media-ready
job-size-range-supported
job-size-range-ready
```

For example, if the queue is `Queue1` and the job uses the `default-medium` attribute to select `iso-a4-transparent`, enter:

```
pdls -c printer -s column \
-f "associated-queue==Queue1 && media-supported \
**iso-a4-transparent" -r printer-name,printer-state, \

```

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## Using Abbreviations for Attribute Names and Values

```
enabled,media-ready,job-size-range-supported, \
job-size-range-ready *:
```

HPDPS displays information similar to the following:

| Printer  | State    | Enabled | Media Ready                           | Job Size Supported    | Job Size Ready |
|----------|----------|---------|---------------------------------------|-----------------------|----------------|
| PhysPrt1 | printing | true    | na-letter-white<br>iso-a4-transparent | 0:9223372036854775800 | 3000:1000000   |
| PhysPrt2 | printing | true    | na-letter-white                       | 0:9223372036854775800 | 0:50000000     |

This display shows two physical printers that support the job. The physical printer `PhysPrt1` does not have the right job size range ready for the job, and the physical printer `PhysPrt2` does not have the `iso-a4-transparent` media ready for the job.

If in your display one of the printers has both the media and the job size range ready, note if the printer has an `enabled` attribute of `false` or a `state` attribute of `paused` or some other value that is keeping the printer from receiving jobs. If not, use the `pddisable` command and the `pdenable` command on the printer to make sure that the printer is registered with the queue. If so, see “The Printer Device is Not Printing” for instructions on diagnosing and fixing printer problems.

In the example display, neither printer is ready for a job such as the example job, that requests `iso-a4-transparent` media and is greater in size than one million octets. To allow the 48 million octet, `iso-a4-transparent` example job to print on one of the two physical printers shown in the example display, modify one of the printers.

To make `PhysPrt1` ready for the example job, increase the `job-size-range-ready` attribute value, such that the upper limit is greater than 48,000,000. Before increasing the `job-size-range-ready` attribute value of a physical printer in your system, consider that you might want to wait until a time when there are not many jobs on the system. By waiting, you keep large jobs from tying up the printer during busy times. For instructions on changing the `job-size-range-ready` attribute value, see “Modifying the job-size-range-ready Attribute Value”.

To make `PhysPrt2` ready for the example job, put transparencies in one of the input trays, and then add `iso-a4-transparent` to `media-ready` attribute for `PhysPrt2`. For instructions, see “Modifying the media-ready Attribute Value”.

## Using Abbreviations for Attribute Names and Values

**Modifying the job-size-range-ready Attribute Value.** Use the `pddisable` command to disable the printer, the `pdset` command to change the printer's `job-size-range-ready` attribute value, and the `pdenable` command to enable the printer.

For example, to make `PhysPrt1` ready to print jobs ranging in size from 3,000 to 48,015,000 octets, do the following:

1. Disable the printer:

```
pddisable PhysPrt1
```

2. Increase the supported job size range:

```
pdset -x "job-size-range-ready=3000:48015000" PhysPrt1
```

The `job-size-range-ready` attribute of `PhysPrt1` now has a value of `3000:48015000`. You might also choose to specify only the upper limit. If you do so, the lower limit defaults to zero.

3. Enable the printer:

```
pdenable PhysPrt1
```

The job is now able to be scheduled. Its current state changes to `pending` or `processing`.

**Modifying the media-ready Attribute Value.** To modify the `media-ready` attribute, put the desired media in one of the printer device input trays. Then use the following commands:

1. Disable the printer:

```
pddisable PhysPrt2
```

2. Modify the `media-ready` attribute:

```
pdset -x "media-ready=iso-a4-transparent" PhysPrt2
```

3. Enable the printer:

```
pdenable PhysPrt2
```

The job can now be scheduled. Its current state changes to `pending` or `processing`.

## 13-28 Troubleshooting

## Using Abbreviations for Attribute Names and Values

### The Printer Resources that the Job Requires Are Not Supported

Use this section if the job's `job-state-reasons` attribute value is `required-resources-not-supported`.

1. Wait a few minutes and enter the `pdls` command on the job again. The job state might return to `pending`. This happens because when a spooler or supervisor first starts up, it takes a few moments for the physical printers to register with the queue. During those few moments, there are no physical printers to print jobs. After the physical printers register with the queue, the job returns to `pending`.
2. If the job state does not return to `pending`, either the supervisor is not operating, or an administrator has modified some of the physical printers. Any physical printers that once supported the job's attributes no longer do so. To see which attributes are no longer supported, submit the job again to the same logical printer using the `pdresubmit` command.

For example, if the logical printer to which the user originally submitted the jobs is `LogPrt2` and the global job identifier is `Spooler1:1000000015`, enter:

```
pdresubmit LogPrt2 Spooler1:1000000015
```

This command results in job validation failure, and the error message that you receive tells you which attributes are not supported.

When you know which are the affected attributes, choose between the following courses of action:

- a. Use the `pdresubmit` command to submit the job to an alternate logical printer
- b. Use the `pdmod` command to change the original job so that it no longer requests the attribute or attribute value that is not supported
- c. Use the `pdset` command to change a physical printer so that it supports the attribute or attribute value

## Using Abbreviations for Attribute Names and Values

### The User Received a job-complete Message, But Cannot Find a Printout

If the user receives notification that the job is complete, the job might or might not have completed successfully. Here are possible actions:

- Wait for the printer device to finish printing. The printer device might be storing the job in its buffer before printing it.
- Check the error logs for entries relating to the job or the printers used to print the job. See chapter 12, “Using HPDPS Error Logs”, for information about the error logs. The job might have encountered an error which prevented printing the job.
- Check that the HPDPS client daemon is running. Check the error log for entries relating to the HPDPS client. If the `transfer-method` of `dce-pipe-pull` was specified or defaulted, the HPDPS client daemon must be running so it can transfer the file contents to the physical printer.

### The Job Printed with an Incorrect Document Format

Use this section if the job printed using the wrong document format and the output contains random characters or control characters. For example, use this section if a PostScript job printed as ASCII characters.

- Did the user specify a document format with the print command? If so, have the user submit the job again. This time, tell the user not to specify a value for the `document-format` attribute. This allows HPDPS to determine the document format. For example, have the user submit the PostScript document file `File1.ps` to the logical printer `LogPrtPS`, using the command:

```
pdpr -p LogPrtPS File1.ps
```

- Did the user *not* specify a document format with the print command? Check to see if an initial value object associated with the logical printer is specifying a `document-format`. If so, have the user specify a logical printer that does not use an initial value object.

If the `document-format` does not default, have the user submit the job again. This time, tell the user to set the `document-format` attribute to specify the document format that the user believes to be correct for the job. For

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## Using Abbreviations for Attribute Names and Values

example, have the user submit the postscript document file `File1` to the logical printer `LogPrtPS`, using the command:

```
pdpr -p LogPrtPS -x "document-format=postscript" File1
```

## The Job Attributes Are Incorrect

Use this section to correct the attributes for a job before the job prints.

If the job will print soon, first set the `job-hold` attribute to `yes`. This prevents the job from printing before you can modify it. For example, if the global job identifier is `Spooler1:1000000015`, enter:

```
pdmod -x "job-hold=yes" Spooler1:1000000015
```

Before further modifying the job, you can query its current attribute values. You can choose to list specific attributes, or to request a `brief`, `verbose`, or `all list`. You can also request any combination of these.

For example, if you want a `brief` listing, and also want to know the value of the `copy-count` attribute and the `job-hold` attribute, enter:

```
pdls -U -r brief,copy-count,job-hold Spooler1:1000000015
```

HPDPS displays information similar to the following:

```
1000000015: job-client-id = 15
1000000015: job-identifier = Spooler1:1000000015
1000000015: job-name = File1
1000000015: current-job-state = held
1000000015: intervening-jobs = 4
1000000015: printer-name-requested = LogPrt3
1000000015: printers-assigned =
1000000015: job-hold = true
1000000015.1: document-sequence-number = 1
1000000015.1: document-format = ascii
1000000015.1: document-file-name = File1
1000000015.1: copy-count = 5
```

This display shows you the `brief` listing of the job and document attributes, and additionally shows you that the `copy-count` attribute value is 5 and the `job-hold` attribute value is `true`.

## Using Abbreviations for Attribute Names and Values

Suppose you want to change the `copy-count` attribute value from 5 to 2, and then allow the job to print. Enter the command:

```
pdmod -x "job-hold=no copy-count=2" Spooler1:1000000015
```

The job is now in a pending state again and will print two document copies.

---

## Problems with the HPDPS Client Daemon

Use this section if you receive an error message about the HPDPS client daemon, such as:

```
5010-168 Cannot communicate with HPDPS daemon. Use your local
problem-reporting procedure to report this message.
```

If you or a user receive a message like this, use the `pdstartclient` command to start the HPDPS client again. To use this command, you must be logged in as the root user.

Look at the HPDPS client error log for information about what happened to the HPDPS client daemon. The error log for an HPDPS client is in the file `/var/opt/pd/pdclientd/error.log`. Use the `pdmsg` command to get more information about any messages in this error log.

---

## Problems with Servers

If you suspect a problem with a server, even if you have not received an error message, you might want to look in the error logs for messages pertaining to your problem.

This section contains information for a server problem that you might experience.

## Using Abbreviations for Attribute Names and Values

### The Active Servers Are Not Listening for Requests

Use this section when you try to do normal HPDPS commands on running servers or their contained objects and receive the error message:

```
5010-414 Cannot communicate with the server.
```

This message usually indicates that either the server does not exist at all, or an administrator has shut the server down. However, if the server process is active, and the last entry in the server error log does not say that the server was shut down, the problem is not with the server, but with the HPDPS client daemon.

In order to fix this problem, use the `pdstopd` and `pdstartclient` utilities to stop and then start the HPDPS client. The servers will once again respond normally.

This problem occurs when an administrator recycles the DCE daemons. The new DCE daemons and the old HPDPS client daemon are unable to communicate. After you recycle DCE daemons, always shut down and then start the HPDPS client as well.





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