z/OS
2.5

*Infoprint Server Operation and
Administration*

IBM

Note

Before using this information and the product it supports, read the information in "Notices" on page 531.

Contents

vii

Figures

Tables

About this publication

This publication helps you operate and administer Infoprint Server. It describes how to:

- Start and stop Infoprint Server
- Use Infoprint Central
- Manage the IP PrintWay basic mode transmission queue
- Use SDSF and JES commands to work with output data sets on the JES spool
- View Infoprint Server messages
- Create entries in the Printer Inventory by using ISPF panels or Printer Inventory Definition Utility (PIDU) program
- Define NetSpool printer logical units (LUs) to VTAM®
- Use information in SMF type 6 accounting records

It also contains reference information, including:

- Attributes that you can specify with PIDU
- Options that IP PrintWay transmits to remote PSF print servers
- Sample ISPF panels
- Sample printer definitions

In this publication:

- *VTAM* refers to the Communications Server SNA Services element of z/OS.
- *TCP/IP* refers to the Communications Server IP Services element of z/OS.
- *PSF* refers to PSF for z/OS and to the AFP Download Plus feature of PSF.

Who should read this publication

This publication is for these audiences:

- System operators who need to start and stop Infoprint Server daemons, NetSpool, and IP PrintWay basic mode
- Help desk operators who need to work with Infoprint Central or with the IP PrintWay basic mode transmission queue
- Administrators who need to create entries in the Infoprint Server Printer Inventory and define NetSpool printer logical units to VTAM

You must be familiar with z/OS UNIX System Services, TCP/IP, VTAM, the job entry subsystem (JES), and Print Services Facility (PSF) for z/OS if you use it.

How to read syntax diagrams

The general notations that this document uses in syntax diagrams are explained here. For ease of reading, this document breaks some examples into several lines. However, when you enter a command, enter it all on one line. Do not press **Enter** until you type the entire command.

			For example:	
This notation:	**Means:**	**You enter:**	**This document shows:**	**You enter:**
Apostrophes	String	As shown	`SEND '123'`	`SEND '123'`
Bold	Keyword	As shown	`CLASS`	`CLASS`
Braces	List of items	The braces and one or more items from the list	`{GT10 GT12}`	`{GT10 GT12}`
Brackets	Optional item	One item or no items	`aopstop [now]`	`aopstop`
Comma	Separator	As shown	`DISPLAY C,K`	`DISPLAY C,K`
Ellipsis	Repeatable item	One or more items	`filename ...`	`file1 file2`
Lowercase	Item the system defines	As shown, in lowercase	`lp`	`lp`
Lowercase italics	Variable item	A value for the item	`MOUNT devnum`	`MOUNT A30`
Parentheses	List of items	The parentheses and one or more items from the list	`(GT10,GT12)`	`(GT10,GT12)`
Special characters	Various symbols	As shown	`%filter-options`	`%filter-options`
Underline	Default	The item, or you can omit it	`K T REF`	`K T`
Uppercase	Item the system defines	As shown, in uppercase	`PRMODE`	`PRMODE`
Vertical bar	UNIX pipe (the output of the first is input to the second)	As shown	`ls | lp`	`ls | lp`
Vertical bar in braces	Required choice	One item	`{NOW|FOREVER}`	`FOREVER`
Vertical bar in brackets	Optional choice	One item or no items	`[PORTNO| PRTQUEUE]`	`PORTNO`

Table 1. Syntax notation

Where to find more information

The following information describes where to find information that is related to z/OS and Infoprint Server.

Preventive Service Planning information

Before you install Infoprint Server, review the current Preventive Service Planning (PSP) information, also called the *PSP bucket*. The PSP upgrade ID depends on your z/OS operating system; for example, ZOSV2R5. The subset for Infoprint Server is INFOPRINT.

To obtain the current PSP bucket, contact the IBM® Support Center or use z/OS SoftwareXcel (IBMLink). If you obtained z/OS as part of a CBPDO, HOLDDATA and PSP information is included on the CBPDO tape.

However, this information might not be current if the CBPDO tape was delivered several weeks before installation.

Infoprint Server migration information

This table lists documents that can help you upgrade from previous releases of z/OS and migrate from IP PrintWay basic mode to IP PrintWay extended mode.

Document	Form number	Description
z/OS Upgrade Workflow	GA32-0889	Describes the tasks that are required to upgrade to z/OS V2R5. Includes the migration tasks for Infoprint Server.
z/OS Release Upgrade Reference Summary	SA23-2300	Describes new and changed messages and interfaces in z/OS V2R5. Includes the messages and interfaces for Infoprint Server.
z/OS Infoprint Server Customization	SA38-0691	Describes the tasks that are required to migrate to IP PrintWay extended mode from IP PrintWay basic mode. Also, describes the tasks that are required to use the new functions that are introduced in z/OS V2R5.

Documents

These tables list related documents that can help you use Infoprint Server and transform products. For documents for all z/OS products, see *z/OS Information Roadmap*.

Table 2. Documents for Infoprint Server		
Document	**Form number**	**Description**
z/OS Infoprint Server Introduction	SA38-0692	Introduces Infoprint Server. This document contains printing scenarios that show how you can use Infoprint Server in your installation.
z/OS Infoprint Server Customization	SA38-0691	Describes customization tasks for Infoprint Server. This document describes Infoprint Server environment variables, configuration files, startup procedures, how to write exit routines and filter programs, and how to use the Infoprint Server API.
z/OS Infoprint Server Operation and Administration	SA38-0693	Describes operator procedures and administrative tasks for Infoprint Server. This document describes how to start and stop Infoprint Server and how operators can use Infoprint Central. It describes how administrators can create entries in the Printer Inventory by using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program and define NetSpool printer LUs to VTAM.
z/OS Infoprint Server Printer Inventory for PSF	SA38-0694	Describes the Printer Inventory for PSF for PSF customers who do not purchase an Infoprint Server license. It describes the tasks that are required to customize Infoprint Server, start and stop Infoprint Server, create PSF FSS and FSA definitions in the Printer Inventory, and diagnose problems in Infoprint Server.

Table 2. Documents for Infoprint Server (continued)		
Document	**Form number**	**Description**
z/OS Infoprint Server User's Guide	SA38-0695	Describes user tasks for Infoprint Server. This document describes how to submit print jobs from remote systems (including Windows systems), the local z/OS system, and Virtual Telecommunications Access Method (VTAM) applications. It describes z/OS UNIX commands; the AOPPRINT JCL procedure; the AOPBATCH program; DD and OUTPUT JCL parameters that Infoprint Server supports; and how to download and install the Infoprint Port Monitor for Windows.
z/OS Infoprint Server Messages and Diagnosis	GA32-0927	Describes messages from Infoprint Server. This document also describes how to use Infoprint Server tracing facilities to diagnose and report errors.

Table 3. Documents for IBM transform products		
Document	**Form number**	**Description**
IBM Infoprint Transforms to AFP for z/OS	G550-0443	Describes IBM Infoprint Transforms to AFP for z/OS (5655-N60)
IBM Print Transforms from AFP for Infoprint Server for z/OS	G325-2634	Describes these products: • IBM Print Transform from AFP to PCL for Infoprint Server for z/OS (5655-TF2) • IBM Print Transform from AFP to PDF for Infoprint Server for z/OS (5655-TF1) • IBM Print Transform from AFP to PostScript for Infoprint Server for z/OS (5655-TF3)
IBM Infoprint XT for z/OS	GI11-9492	Describes IBM Infoprint XT for z/OS (5655-O15)

Table 4. Documents for Ricoh products	
Ricoh Document	**Description**
Ricoh InfoPrint Manager for AIX, Linux, and Windows: Transform Feature **in Ricoh Software Information Center (help.ricohsoftware.com/ swinfocenter)**	Describes InfoPrint Transform Manager and provides configuration information about the product
Ricoh InfoPrint Manager for AIX, Linux, and Windows: Installing InfoPrint Manager Transform Feature **in Ricoh Software Information Center (help.ricohsoftware.com/swinfocenter)**	Provides installation information for InfoPrint Transform Manager
InfoPrint Manager AFP2PDF Transform Feature: Installing and Using **in Ricoh Software Information Center (help.ricohsoftware.com/swinfocenter)**	Describes the InfoPrint Transform Manager AFP to PDF transform

Infoprint Server online help

The Infoprint Server ISPF panels contain integrated online help for each panel and field. To view the help, place your cursor on a panel or in a field on a panel and press the Help function key (F1).

Infoprint Central contains an integrated online help system. To view the general help system and help for individual web pages, select the question mark (?) on the title bar.

The **man** command provides online help for z/OS UNIX commands. The syntax is:

```
man command_name
```

TSO/E provides online help for the AOPCMND command. The syntax is:

```
HELP AOPCMND
```

How to send your comments to IBM

We invite you to submit comments about the z/OS product documentation. Your valuable feedback helps to ensure accurate and high-quality information.

Important: If your comment regards a technical question or problem, see instead "If you have a technical problem" on page xxiii.

Submit your feedback by using the appropriate method for your type of comment or question:

Feedback on z/OS function
> If your comment or question is about z/OS itself, submit a request through the IBM RFE Community (ibm.com.developerworks/rfe) .

Feedback on IBM Documentation function
> If your comment or question is about the IBM Documentation functionality, for example search capabilities or how to arrange the browser view, send a detailed email to IBM Documentation Support at ibmdoc@us.ibm.com.

Feedback on the z/OS product documentation and content
> If your comment is about the information that is provided in the z/OS product documentation library, send a detailed email to mhvrcfs@us.ibm.com. We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information.
>
> To help us better process your submission, include the following information:
>
> - Your name, company/university/institution name, and email address
> - The following deliverable title and order number: *z/OS Infoprint Server Operation and Administration*, SA38-0693
> - The section title of the specific information to which your comment relates
> - The text of your comment.

When you send comments to IBM, you grant IBM a nonexclusive authority to use or distribute the comments in any way appropriate without incurring any obligation to you.

IBM or any other organizations use the personal information that you supply to contact you only about the issues that you submit.

If you have a technical problem

If you have a technical problem or question, do not use the feedback methods that are provided for sending documentation comments. Instead, take one or more of the following actions:

- Go to the IBM Support Portal (support.ibm.com).
- Contact your IBM service representative.
- Call IBM technical support.

Summary of changes

This information includes terminology, maintenance, and editorial changes.

z/OS Version 2 Release 5 (V2R5)

The following content is new, changed, or no longer included in z/OS Version 2 Release 5.

Changed (August 2022)

- APAR OA63231:
  - A guideline is added to Chapter 1, "Starting and stopping Infoprint Server daemons," on page 1.
  - In "Retaining data sets on the JES spool (basic and extended mode)" on page 170, a sentence is added to the guideline for IP PrintWay extended mode.

New (February 2022)

- Updates for APAR OA62221 (sendmail enhancements):
  - These attributes and the corresponding ISPF panel fields are new:
    - "mail-from-address" on page 453 (From address)
    - "mail-use-reply-addr-as-from-addr" on page 458 (Use reply address as from address)

Changed (February 2022)

- Updates for APAR OA62221 (sendmail enhancements):
  - These topics are updated with the "mail-from-address" on page 453 and "mail-use-reply-addr-as-from-addr" on page 458 attributes:
    - "Selecting the email protocol (basic and extended mode)" on page 144
    - Table 49 on page 269
    - "Attributes for the protocol object class" on page 445
  - These topics are updated with the From address and Use reply address as from address fields:
    - "Selecting the email protocol (basic and extended mode)" on page 144
    - "Procedure for specifying email protocol attributes " on page 151
    - "Printer attributes used by IP PrintWay" on page 484
    - "Email Protocol panel" on page 495
    - "Protocol component" on page 495
    - "Creating an IP PrintWay printer definition for the email protocol" on page 523

New (September 2021)

- Updates for TCP/IP 64K buffer support:
  - Table 49 on page 269 and "Attributes for the fsa object class" on page 333 are updated with the "tcpip-64k-buffer-support" on page 374 attribute.
  - "ISPF panel for a PSF FSA definition for a TCP/IP-attached printer" on page 500 is updated with the TCP/IP 64K buffer support field.

- Updates for above the bar storage:
  - Table 49 on page 269 is updated with the "above-the-bar-storage" on page 334 attribute.
  - "ISPF panel for a PSF FSA definition for a channel-attached printer" on page 498, "ISPF panel for a PSF FSA definition for a TCP/IP-attached printer" on page 500, "ISPF panel for a PSF FSA definition for an SNA-attached printer" on page 502, and "ISPF panel for a PSF FSA definition for AFP Download Plus" on page 504 are updated with the Above the bar storage field.
- Updates for blank truncation:
  - Table 49 on page 269 is updated with the "blank-truncation" on page 465 and "restore-blanks-classes" on page 467 attributes.
  - "ISPF panel for a PSF FSS definition" on page 498 is updated with the Blank truncation and Restore blanks classes fields.

Changed (September 2021)

- "Stopping Infoprint Server with JCL procedures or the MVS STOP command" on page 4 is updated with a new title and note about using the MVS™ STOP command to stop AOPD.
- "Environment variables" on page 9 for the **aopstart** command is edited for clarity.
- "Environment variables" on page 13 is updated with a new value for the JAVA_HOME environment variable.
- "Listing all transmission-queue entries (basic mode)" on page 38 is updated with an explanation of how to tell if the transmission queue is damaged.
- "Customizing your web browser" on page 52 is updated with new requirements for earliest browser level and using responsive design.
- The title of Chapter 6, "Using the TSO/E AOPCMND command to start and stop IP PrintWay printers (extended mode)," on page 55 is edited for clarity.
- In "Selecting the email protocol (basic and extended mode)" on page 144, the description of the **Sender** field is updated.
- "Setting timeout values" on page 165 is updated with a new default value for the LIMMSG statement.
- Table 45 on page 242 is edited for clarity.
- The example in "Force-creating the system configuration definition" on page 246 is updated.
- The allowed values in "aopippd-max-thread-tasks" on page 317 are corrected.
- "mailer-options" on page 327 is updated with a reference to documentation of options supported by the sendmail bridge.
- In "mail-from-name" on page 454, the description of the **mail-from-name** protocol attribute is updated.
- "tracedirectory" on page 471 is updated with a note that distinguishes the **tracedirectory** attribute from the **Trace directory name** field on the ISPF System Configuration panel.
- The titles of these topics are edited to specify that they apply to both IP PrintWay basic mode and IP PrintWay extended mode:
  - "Selecting the LPR protocol (basic and extended mode)" on page 136
  - "Selecting the direct sockets protocol (basic and extended mode)" on page 140
  - "Selecting the IPP protocol (basic and extended mode)" on page 142
  - "Selecting the email protocol (basic and extended mode)" on page 144
  - "Specifying a printer definition name, description, and location (basic and extended mode)" on page 158
  - "Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)" on page 159
  - "Specifying allocation parameters for IP PrintWay (basic and extended mode)" on page 163

- "Handling unsuccessful data transmissions (basic and extended mode)" on page 165
- "Retaining data sets on the JES spool (basic and extended mode)" on page 170
- "Converting line data to a text data stream (basic and extended mode)" on page 177
- "Using an FCB to format data (basic and extended mode)" on page 179
- "Transmitting multiple data sets in a JES output group (basic and extended mode)" on page 181
- "Sending commands to the printer (basic and extended mode)" on page 183
- "Validating that data sets can print as requested (basic and extended mode)" on page 186
- "Printing with a remote PSF print server (basic and extended mode)" on page 188
- "Creating an IP PrintWay default printer definition (basic and extended mode)" on page 189
- "Creating components for the PRTOPTNS JCL parameter (basic and extended mode)" on page 190
- "Using an installation-provided filter (basic and extended mode)" on page 192

Deleted (September 2021)

- References to z/OS V2R2 are deleted because it is no longer in service.
- References to Windows 7 are deleted because it is no longer in service.
- References to Internet Explorer are deleted because it is no longer in service.
- References to Java 7.1 are deleted because it is no longer in service.
- A reference to a specific message that is issued only in specific circumstances is removed from the general discussion of messages in "aopstop command" on page 16.

z/OS Version 2 Release 4 (V2R4)

The following content is new, changed, or no longer included in z/OS Version 2 Release 4.

New

- Updates for a predictable user ID for the Java virtual machine:
  - Table 49 on page 269 and "Attributes for the configuration object class" on page 316 are updated with the "use-http-userid" on page 332 attribute.
  - The **Use Apache HTTP server user ID** field is added to "ISPF panel for the system configuration definition" on page 506.
- Updates for accessible and signed PDFs:
  - Table 49 on page 269 and "Attributes for the printer object class" on page 387 are updated with attributes for accessible and signed PDFs.
  - These sections are new:
    - "pdf-author" on page 393
    - "pdf-digital-certificate-name" on page 394
    - "pdf-keywords" on page 394
    - "pdf-signature-contact" on page 394
    - "pdf-signature-location" on page 395
    - "pdf-signature-name" on page 395
    - "pdf-signature-reason" on page 395
    - "pdf-subject" on page 396
    - "pdf-title" on page 396
    - "pdf-user-accessibility-control-file" on page 396

- New ISPF fields and values are added to "ISPF panel for the Processing section or component" on page 489, "Processing component for PostScript and PCL printers" on page 514, "Creating an IP PrintWay printer definition for the LPR protocol" on page 517, and "Creating an IP PrintWay printer definition for the email protocol" on page 523.
- Updates for APAR OA54204:
  - Table 49 on page 269 and "Attributes for the fsa object class" on page 333 are updated with the "resource-deletion-ratio" on page 367 attribute.
  - The **Resource deletion ratio** field is added to "ISPF panel for a PSF FSA definition for a channel-attached printer" on page 498, "ISPF panel for a PSF FSA definition for a TCP/IP-attached printer" on page 500, and "ISPF panel for a PSF FSA definition for an SNA-attached printer" on page 502.
- For the use of the document OUTDISP value, the **Use output disposition** field is added to "ISPF panel for the system configuration definition" on page 506.
- Because you can now disable the Secure Sockets Layer (SSL) for Infoprint Central, these updates are added:
  - Table 49 on page 269 and "Attributes for the configuration object class" on page 316 are updated with the "use-unencrypted-connection" on page 333 attribute.
  - The **Use unencrypted connection** field is added to "ISPF panel for the system configuration definition" on page 506.

Changed

- The system configuration definition is no longer created automatically. You must use either the ISPF panels or the PIDU `force-create` command to create it. See "Starting the ISPF session and configuring the panels" on page 221, "Creating or editing the system configuration definition" on page 222, "PIDU commands" on page 242, and "create and force-create—create an object" on page 245.

Deleted

- Because you must now create the system configuration definition, references to automatic creation of the system configuration definition are deleted.
- Because dynamic configuration is now always enabled:
  - References to situations where Infoprint Server behaves differently depending on whether dynamic configuration is enabled are deleted.
  - The **Dynamic configuration** field is deleted from the "ISPF panel for the system configuration definition" on page 506.
- Because the **Use output disposition** field is added to "ISPF panel for the system configuration definition" on page 506, instructions for specifying `use-output-disposition` in the **Other** field are deleted. See "use-output-disposition" on page 332.
- References to z/OS V2R1 are deleted because it is no longer in service.
- Because the Distributed File System/Server Message Block (DFS/SMB) protocol is no longer supported, references to it are deleted. IBM recommends that you use the Network File System (NFS) protocol instead.
- References to Ricoh InfoPrint Manager and Ricoh ProcessDirector are deleted.

z/OS Version 2 Release 3 (V2R3)

The following content is new, changed, or no longer included in z/OS Version 2 Release 3.

New

- Updates for dynamic tracing:

- – "Environment variables" on page 9 for the **aopstart** command and "Environment variables" on page 13 for the **aopdemon** command are updated with a note about dynamic tracing.
- – These items are updated with the **trace-parameters** object class for dynamic tracing:

  - Table 46 on page 243
  - "create and force-create—create an object" on page 245
  - "delete—delete an object" on page 256
  - "display—show attributes of an object" on page 257
  - "modify—change attributes of an object" on page 264
  - "rename—rename an object" on page 265
  - Table 48 on page 268

- – Table 49 on page 269 is updated with dynamic tracing attributes.
- – These sections are new for dynamic tracing:

  - "Attributes for the trace-parameters object class" on page 469
  - "tracedata" on page 471
  - "tracedirectory" on page 471
  - "traceexit" on page 472
  - "tracefiles" on page 472
  - "tracefilter" on page 472
  - "tracemegabytes" on page 473
  - "tracemsg" on page 473
  - "traceon" on page 474

- – New ISPF fields are added to "ISPF panel for the system configuration definition" on page 506 for dynamic tracing.

- • Updates for IP PrintWay backup printer:

  - – Table 26 on page 132 is updated with the **Backup printer** field.
  - – "Procedure for specifying a backup printer" on page 169 is a new section.
  - – Table 49 on page 269 is updated with the **backup-printer-definition-name** attribute.
  - – "backup-printer-definition-name" on page 407 is a new **printway-options** and **printer** object class section.
  - – Table 60 on page 484.
  - – The **Backup printer** field is added to the "ISPF panel for the IP PrintWay Options section or component" on page 492. See also these samples: "IP PrintWay Options component" on page 516, "Creating an IP PrintWay printer definition for the LPR protocol" on page 517, and "Creating an IP PrintWay printer definition for the email protocol" on page 523.

- • These PIDU attributes are added in Chapter 18 and Table 49 on page 269:

  - – "use-output-disposition" on page 332
  - – "message-files-read-access" on page 356
  - – "snmp-enabled" on page 373
  - – "trace-user-data" on page 375

- • These ISPF fields are added to these panels for PSF FSA definitions:

  - – **Trace user data**; see:

    - "ISPF panel for a PSF FSA definition for a channel-attached printer" on page 498
    - "ISPF panel for a PSF FSA definition for a TCP/IP-attached printer" on page 500
    - "ISPF panel for a PSF FSA definition for AFP Download Plus" on page 504

- **SNMP enabled**; see "ISPF panel for a PSF FSA definition for a TCP/IP-attached printer" on page 500.
  - **Message files read access**; see "ISPF panel for a PSF FSA definition for AFP Download Plus" on page 504.

Changed

- The z/OS UNIX sendmail program that IP PrintWay uses is changed to use the sendmail to Communications Server SMTP (CSSMTP) bridge as the mail transport. These changes are made for the new sendmail bridge:
  - AOPMAILER and AOPMAILER_OPTIONS in "Environment variables" on page 9 for the **aopstart** command and "Environment variables" on page 13 for the **aopdemon** command.
  - "z/OS UNIX sendmail" and "sendmail" are changed to "sendmail bridge" in:
    - "Selecting the email protocol (basic and extended mode)" on page 144
    - "Procedure for specifying email protocol attributes " on page 151
    - Table 33 on page 171
    - "mailer-options" on page 327
    - "mailer-path-name" on page 328
    - "successful-retention-period" on page 420
    - "printer-codepage" on page 435
    - "mail-bcc-addresses" on page 451
    - "mail-cc-addresses" on page 452
    - "mail-reply-address" on page 457
    - "mail-to-addresses" on page 457

    Also, "z/OS UNIX sendmail" is removed from "Setting retry values" on page 167.
  - The section "Defining aliases to z/OS UNIX sendmail" is updated and changed to "Using the email address list in an alias file" on page 150 because you cannot create new alias files to be used with the sendmail bridge.
  - "z/OS UNIX sendmail alias name" is changed to "sendmail alias name" in "Creating an IP PrintWay printer definition for the email protocol" on page 252.
- The AOP134E message in "aopstop command" on page 16 is removed from the list of messages you might see.
- "aopsend command" on page 18 is updated with commands for tracing Infoprint Server daemons.
- The Release print jobs action is updated in "Infoprint Central actions compared to JES commands" on page 50 with a note about the **use-output-disposition** attribute.
- "Customizing your web browser" on page 52 is updated with supported web browsers for Infoprint Central.
- MVS Message Service must be activated to use the AOPCMND command. See Chapter 6, "Using the TSO/E AOPCMND command to start and stop IP PrintWay printers (extended mode)," on page 55.
- Infoprint Coaxial Printer Support is no longer supported in z/OS V2R3. A note is added to:
  - "Selecting the type of printer definition" on page 73
  - Chapter 12, "Planning printer definitions for IP PrintWay," on page 129
  - "Changing the type of a printer definition or the IP PrintWay protocol type" on page 227
  - "Attributes for the protocol object class" on page 445
  - "ISPF panels for the Protocol section or component" on page 493
  - "VTAM Protocol panel" on page 494
- Infoprint Server operates with z/OS 2.2 or later product functions when the z202 value is set for the operating mode. See "ipsmode" on page 323.

- These PIDU attributes are updated:
  - "auxiliary-files-modca-level" on page 336
  - "printer-ip-address" on page 363 for fsa object class
  - "print-queue-name" on page 462 for protocol and printer object class
  - "printer-ip-address" on page 462 for protocol and printer object class
  - "unicode-enabled" on page 469
- The **BPF match** value is added to the **Auxiliary files MO:DCA level** field on the ISPF panels for PSF FSA definitions. See:
  - "ISPF panel for a PSF FSA definition for a channel-attached printer" on page 498
  - "ISPF panel for a PSF FSA definition for a TCP/IP-attached printer" on page 500
  - "ISPF panel for a PSF FSA definition for an SNA-attached printer" on page 502
  - "ISPF panel for a PSF FSA definition for AFP Download Plus" on page 504

Deleted

- _BPX_SHAREAS is removed from **aopstart** "Environment variables" on page 9.
- Any references to the IP PrintWay VTAM protocol in the Printer Inventory and VTAM services that IP PrintWay uses to transmit data to printers in an SNA network are removed. For example, see "Using an FCB to format data (basic and extended mode)" on page 179.
- PSF V4R5 or later for z/OS is required to use printer information in the Printer Inventory and to write messages in the common message log. Therefore, any references to "PSF V4R4" and "PSF V4R5" are removed because the information applies to all releases in service and does not need qualification.
- These sections are removed:
  - The chapter called "Starting sendmail" is deleted.
  - "Viewing z/OS UNIX sendmail messages" in Chapter 8, "Viewing messages," on page 63.
  - "Selecting the VTAM protocol", "Creating VTAM resource definitions for VTAM controlled printers", "Procedure for specifying VTAM protocol attributes", "Specifying SCS controls for VTAM controlled printers", and "Converting line data to an SCS or DSC/DSE data stream (basic mode)" in Chapter 12, "Planning printer definitions for IP PrintWay," on page 129.
  - "Creating an IP PrintWay printer definition for an SCS printer with VTAM protocol" in "Examples— create and force-create" on page 246.
  - "applid" in "Attributes for the configuration object class" on page 316 and "Attributes for the printway-fss object class" on page 400.
  - "printer-logmode", "printer-luname", "vtam-checkpoint-pages", and "vtam-send-as-transparent" in "Attributes for the protocol object class" on page 445.
  - "Processing component for VTAM controlled printers" and "Creating an IP PrintWay printer definition for the VTAM protocol" in Appendix D, "Sample IP PrintWay printer definitions," on page 513.

Chapter 1. Starting and stopping Infoprint Server daemons

You can start and stop these Infoprint Server daemons:

- **aopd**, a Printer Inventory Manager daemon

  This daemon manages the Printer Inventory.

- **aopippd**, the IPP Server daemon

  This daemon supports printing from remote clients that use the Internet Printing Protocol (IPP).

- **aoplpd**, the line printer daemon (LPD)

  This daemon supports printing from remote clients that use the TCP/IP line printer requester (LPR) protocol.

- **aopnetd**, the NetSpool daemon

  This daemon, together with the NetSpool task, supports printing from VTAM applications such as CICS® and IMS.

- **aopoutd** and **aopwsmd**, the IP PrintWay extended mode daemons

  These daemons select output data sets from the JES spool and send them to remote printers in an Internet Protocol network.

- **aopsapd**, the SAP Callback daemon

  This daemon handles callback notification for the SAP Output Management System (OMS). It starts automatically when a print request is received from SAP R/3.

- **aopssid**, an Infoprint Central daemon

  This daemon communicates with JES to display information and do actions on output groups (print jobs) and PSF printers.

- **aopsubd**, the Print Interface subsystem daemon

  This daemon processes output data sets that specify the Print Interface subsystem on the SUBSYS parameter of the DD statement.

- **aopxfd**, the Infoprint Server Transform Manager daemon

  This daemon manages other transform daemons, which transform data from one format to another. The Infoprint Server Transform Manager daemon starts and stops transform daemons that are configured in the `aopxfd.conf` configuration file.

To start and stop Infoprint Server daemons, you can use one of these methods:

- JCL startup and shutdown procedures
- Start and stop commands from the z/OS UNIX command line

The JCL procedures and commands you use to start and stop Infoprint Server daemons depend upon what the **Operating mode** field is set to on the ISPF System Configuration panel. For more information about how **Operating mode** determines which JCL procedures and commands to use, see *z/OS Infoprint Server Customization*.

Guidelines:

1. IBM strongly suggests that you use the JCL startup procedures to start Infoprint Server instead of running the start command directly from the z/OS UNIX command line for these reasons:

   - With a JCL startup procedure, you can associate one user ID with the JCL procedure. That user can be the sole member of the AOPOPER group and can access the required RACF® profiles.

- If you run a start command directly from the z/OS UNIX command line, Infoprint Server can inherit undesirable limits, such as the maximum CPU time limit, from the user ID that runs the command. For information about system limits, see *z/OS UNIX System Services Planning*.

2. When **aopwsmd** first starts or restarts, it must handle all existing jobs in the Infoprint Server inventory before selecting any new jobs. For example, it must tell JES not to give Infoprint Server jobs that JES is already handling as new jobs.

To display the status of Infoprint Server daemons, you can use one of these methods:

- Infoprint Central (see Chapter 5, "Using Infoprint Central," on page 45)
- JCL procedure (see "AOPSTAT JCL procedure" on page 21)
- Status command from the z/OS UNIX command line

The following information describes how to start, stop, and display the status of Infoprint Server daemons:

- "Starting Infoprint Server with JCL startup procedures" on page 2
- "Stopping Infoprint Server with JCL procedures or the MVS STOP command" on page 4
- "Starting Infoprint Server with z/OS UNIX commands" on page 7
- "Stopping Infoprint Server with z/OS UNIX commands" on page 16
- "Displaying the status of Infoprint Server daemons" on page 21

Tip: You can use MVS automation tools to start Infoprint Server daemons automatically during system initialization. For more information, see *z/OS Infoprint Server Customization*.

Starting Infoprint Server with JCL startup procedures

These JCL procedures start Infoprint Server daemons:

AOPSTART
    Starts one or multiple daemons. See "AOPSTART JCL procedure" on page 3.

AOPDEMON
    Starts one daemon. See "AOPDEMON JCL procedure" on page 3.

AOPSTAR2
    Starts one or multiple daemons. See "AOPSTAR2 JCL procedure" on page 4.

AOPDEMON and AOPSTAR2 are used only when the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel. You can use the AOPSTAR2 procedure to start all daemons in the same way you use the AOPSTART procedure.

Guidelines:

1. If you specify a z/OS UNIX file or an MVS data set in a DD statement in the AOPSTART or AOPDEMON procedure, the user ID associated with the startup procedure must be authorized to:

   - Read the data set or file specified in the STDENV or VARFILE DD statement, if used.
   - Read and write to the data set or file specified in the STDOUT and STDERR DD statements (not required if these DD statements point to SYSOUT).

2. Make sure that TCP/IP finished initialization before you start the LPD (**aoplpd**), the IPP server daemon (**aopippd**), or the IP PrintWay extended mode daemons (**aopoutd** and **aopwsmd**). You do not have to start TCP/IP to start other daemons.

3. Start the Printer Inventory Manager daemon, AOPD, before you start IP PrintWay basic mode or the NetSpool task. Also, start the Printer Inventory Manager daemon before you start PSF (if PSF uses the Printer Inventory), or any other Infoprint Server daemons.

4. To request that Infoprint Server validate internal databases, set the AOPVALIDATEDB environment variable to any value (for example, AOPVALIDATEDB=1). IBM suggests that you validate internal databases if Infoprint Server ended abnormally or if you specified the **force** option when you stopped Infoprint Server daemons. The AOPVALIDATEDB environment variable applies only when the Printer

Inventory Manager daemon starts. When you specify the AOPVALIDATEDB environment variable, Infoprint Server takes a few extra minutes to start.

5. The startup procedure can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. Your installation can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

AOPSTART JCL procedure

The AOPSTART procedure invokes the **`aopstart`** command to start Infoprint Server daemons. If a daemon is already running, AOPSTART does not stop and restart that daemon.

The AOPSTART procedure always starts daemon **aopd**, unless it is already running. The AOPSTART procedure also starts the optional daemons that are specified in the **`start-daemons`** attribute in the Infoprint Server system configuration definition and stops any optional daemons that are no longer specified in the **`start-daemons`** attribute.

Tips:

1. You can use AOPSTART only when the **Operating mode** field is set to `z/OS 2.1` on the ISPF System Configuration panel. Otherwise, you must use the AOPDEMON or AOPSTAR2 procedure.

2. Before you run the AOPSTART procedure, your installation might need to customize the **`aopstart`** EXEC and the AOPSTART procedure. For information, see *z/OS Infoprint Server Customization*.

To start Infoprint Server daemons with the AOPSTART JCL procedure, enter this MVS START command:

```
START AOPSTART
```

After you run the AOPSTART procedure, you see one or more messages in the STDOUT or STDERR data set, or in the console log. The messages can include:

```
AOP075I Daemon daemon was started successfully.
AOP076E Start of daemon daemon failed.
AOP077I Daemon daemon is already started.
```

AOPDEMON JCL procedure

The AOPDEMON procedure starts one Infoprint Server daemon. You can use the procedure only when the **Operating mode** field is set to `z/OS 2.2` on the ISPF System Configuration panel.

Tip: Before you run the AOPDEMON procedure, your installation might need to customize the AOPDEMON procedure. For information, see *z/OS Infoprint Server Customization*.

To start an Infoprint Server daemon with the AOPDEMON JCL procedure, enter this MVS START command:

```
START AOPDEMON,TYPE=type
```

type
  Specifies the daemon to start. You can specify one of these values:

  AOP
    Starts the Printer Inventory daemon, **aopd**.

  IPP
    Starts the Internet Printing Protocol daemon, **aopippd**.

  LPD
    Starts the line printer daemon, **aoplpd**.

  NET
    Starts the NetSpool daemon, **aopnetd**.

  OUT
    Starts the IP PrintWay extended mode daemon, **aopoutd**.

SSI
> Starts the Infoprint Central daemon, **aopssid**.

SUB
> Starts the Print Interface subsystem daemon, **aopsubd**.

WSM
> Starts the IP PrintWay extended mode daemon, **aopwsmd**.

XFD
> Starts the Infoprint Server Transform Manager daemon, **aopxfd**.

> **Rule:** The Printer Inventory daemon (**aopd**) must be running before you start any other daemons.

After you run the AOPDEMON procedure, you see one or more messages in the console log. The messages can include:

```
AOP075I Daemon daemon was started successfully.
AOP076E Start of daemon daemon failed.
AOP077I Daemon daemon is already started.
```

AOPSTAR2 JCL procedure

The AOPSTAR2 JCL procedure invokes the AOPDEMON JCL procedure one or more times to individually start one or more Infoprint Server daemons. You can use the procedure only when the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel. You can use the AOPSTAR2 procedure to start all daemons in the same way you use the AOPSTART procedure or you can edit the procedure to comment out those daemons that you do not want to run.

Tip: Before you run the AOPSTAR2 procedure, your installation might need to customize the AOPSTAR2 procedure. For information, see *z/OS Infoprint Server Customization*.

To start Infoprint Server daemons with the AOPSTAR2 JCL procedure, enter this MVS START command:

```
START AOPSTAR2
```

After you run the AOPSTAR2 procedure, you see one or more messages in the console log. The messages can include:

```
AOP075I Daemon daemon was started successfully.
AOP076E Start of daemon daemon failed.
AOP077I Daemon daemon is already started.
```

Stopping Infoprint Server with JCL procedures or the MVS STOP command

These JCL procedures stop Infoprint Server daemons:

AOPSTOP
> Stops all daemons or specified daemons. See "AOPSTOP JCL procedure" on page 5. You can use AOPSTOP only when the **Operating mode** field is set to z/OS 2.1 on the ISPF System Configuration panel.

AOPSTOP2
> Stops one or all daemons. AOPSTOP2 must be used when the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel; otherwise, AOPSTOP is used. You can use the AOPSTOP2 procedure to stop all daemons in the same way that you use the AOPSTOP procedure. See "AOPSTOP2 JCL procedure" on page 6.

Guidelines:

1. If you specify an MVS data set or z/OS UNIX file in a DD statement in the AOPSTOP or AOPSTOP2 procedure, the user ID associated with the shutdown procedure must be authorized to:

   • Read the data set or file specified in the STDENV DD statement (AOPSTOP only).

- Read and write to the data set or file specified in the STDOUT and STDERR DD statements (not required if these DD statements point to SYSOUT).

2. Before you stop all daemons, stop other programs that are using the Printer Inventory, such as NetSpool, IP PrintWay basic mode, and PSF.

3. Before you stop Infoprint Server, back up the Printer Inventory if you made changes to it since the last backup. For information about how to back up the Printer Inventory, see *z/OS Infoprint Server Customization*.

4. The stop procedure can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. You can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

5. You can also enter this MVS STOP command to stop an Infoprint Server daemon instead of using AOPSTOP or AOPSTOP2:

```
STOP jobname_id
```

jobname_id
> The descriptive name of an Infoprint Server daemon. You can use the AOPSTAT JCL procedure or **aopstat** command from the UNIX command line to list the job IDs for the daemons.

For more information about the MVS STOP command, see *z/OS MVS System Commands*.

Note: If you use the MVS STOP command to stop the AOPD daemon:

- If the **Operating mode** field is set to z/OS 2.1 on the ISPF System Configuration panel, the MVS STOP command stops all daemons in the correct order.
- If the **Operating mode** field is set to z/OS 2.2, the MVS STOP command stops only the **aopd** daemon. You must stop all other daemons first.

AOPSTOP JCL procedure

The AOPSTOP procedure invokes the **aopstop** command to stop all Infoprint Server daemons or only the specified daemons.

Tips:

1. You can use AOPSTOP only when the **Operating mode** field is set to z/OS 2.1 on the ISPF System Configuration panel. Otherwise, you must use the AOPSTOP2 procedure.

2. Before you run the AOPSTOP procedure, your installation might need to customize it. For information, see *z/OS Infoprint Server Customization*.

To stop Infoprint Server daemons with the AOPSTOP JCL procedure, enter this MVS START command:

```
START AOPSTOP[,OPTIONS='-d daemon... [now] [force]']
```

-d daemon
> Specifies the daemon to stop. If you omit this option, all active daemons are stopped. You can specify one of these values:
>
> **ippd**
> > Stops the Internet Printing Protocol daemon, **aopippd**.
>
> **lpd**
> > Stops the line printer daemon, **aoplpd**.
>
> **netd**
> > Stops the NetSpool daemon, **aopnetd**.
>
> **outd**
> > Stops the IP PrintWay extended mode daemons, **aopoutd** and **aopwsmd**. When you start IP PrintWay again, any IP PrintWay printers that were stopped return to the started state, and any printers that were redirected to other printers are no longer redirected.
>
> **ssid**
> > Stops the Infoprint Central daemon, **aopssid**.

subd
>   Stops the Print Interface subsystem daemon, **aopsubd**.

xfd
>   Stops the Infoprint Server Transform Manager daemon, **aopxfd**.

now
> Stops the daemons immediately. If work is in progress, incorrect output or data loss might result. If this option is not specified, the daemons stop after current activity completes.

force
> Stops the daemons immediately by using a "destructive" shutdown. If work is in progress, incorrect output or data loss might result. For daemons that manage a database, such as **aopd**, the database might be corrupted. If this option is not specified, the daemons stop after current activity completes.

> **Notes:**
>
> 1. Use the **now** and **force** options of this command with extreme caution.
> 2. Before you use this command, use the **export** command to back up the Printer Inventory (if Infoprint Server is running).
> 3. After you stop daemons by using this option, specify the AOPVALIDATEDB environment variable to validate internal databases when you start Infoprint Server daemons again. You can specify AOPVALIDATEDB=1 either in the **aopstart** EXEC or in the AOPSTART STDENV data set. If databases are corrupted, you might need to restore the Printer Inventory and the search databases.

After you run the AOPSTOP procedure, you see one or more messages in the STDOUT or STDERR data set, or in the console log. The messages can include:

```
AOP044I Shutdown complete. (program:daemon)
AOP078W Daemon daemon is not running.
AOP079I A shutdown of daemon daemon has been initiated.
AOP135I An abrupt shutdown of daemon daemon has been initiated.
AOP136I A destructive shutdown of daemon daemon has been initiated.
```

Examples:

1. To stop all daemons after current activity ends, enter this MVS START command. The Print Interface component of Infoprint Server stops accepting new print requests and completes all work in progress before it shuts down.

   ```
   START AOPSTOP
   ```

2. To stop the Infoprint Server Transform Manager and line printer daemons, enter this MVS START command:

   ```
   START AOPSTOP,OPTIONS='-d xfd -d lpd'
   ```

3. To stop all daemons immediately, enter this MVS START command. Documents that are being processed might be lost.

   ```
   START AOPSTOP,OPTIONS='now'
   ```

4. To stop all daemons immediately by using a "destructive" shutdown, enter this MVS START command. Documents that are being processed might be lost. For daemons that manage a database, such as **aopd**, the database might be corrupted. Use this command with extreme caution.

   ```
   START AOPSTOP,OPTIONS='force'
   ```

AOPSTOP2 JCL procedure

The AOPSTOP2 procedure invokes the **aopsend** command to stop one or all Infoprint Server daemons. When the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel, you must use AOPSTOP2 instead of the AOPSTOP procedure.

To stop Infoprint Server daemons with the AOPSTOP2 JCL procedure, enter this MVS START command:

```
START AOPSTOP2[,MEMB=daemon]
```

daemon
> Specifies the daemon to stop. If you omit this option, all daemons that are in a Ready state are stopped. You can specify one of these values:
>
> **all**
> > Stops all daemons that are in a Ready state (default).
>
> **member_name**
> > A cross-system coupling facility (XCF) member name for a daemon. Use the AOPSTAT JCL procedure to list the XCF member names for the daemons.
> >
> > **Rule:** Do not stop the Printer Inventory Manager daemon while other Infoprint Server daemons are still running.

After you run the AOPSTOP2 procedure, you see one or more messages in the STDOUT or STDERR data set, or in the console log. The messages can include:

```
AOP044I Shutdown complete. (program:daemon)
AOP078W Daemon daemon is not running.
AOP079I A shutdown of daemon daemon has been initiated.
```

Examples:

1. To stop all daemons after current activity ends, enter this MVS START command. The Print Interface component of Infoprint Server stops accepting new print requests and completes all work in progress before it shuts down.

   ```
   START AOPSTOP2
   ```

2. To stop the Infoprint Server Transform Manager, enter this MVS START command:

   ```
   START AOPSTOP2,MEMB=XFDIBM00
   ```

Guidelines:

1. Before you run the AOPSTOP2 procedure, your installation might need to customize it. For information, see *z/OS Infoprint Server Customization*.
2. Before you stop all daemons, stop other programs that are using the Printer Inventory, such as NetSpool, IP PrintWay basic mode, and PSF.
3. Before you stop Infoprint Server, back up the Printer Inventory if you made changes to it since the last backup. For information about how to back up the Printer Inventory, see *z/OS Infoprint Server Customization*.
4. The AOPSTOP2 procedure can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. You can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

Starting Infoprint Server with z/OS UNIX commands

These z/OS UNIX commands start Infoprint Server daemons:

aopstart
> Starts all daemons. **aopstart** is used only when the **Operating mode** field is set to z/OS 2.1 on the ISPF System Configuration panel. See .

aopdemon
> Starts one daemon. **aopdemon** is used only when the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel. See .

aopstart command

The **aopstart** command starts all Infoprint Server daemons.

Tip: You can use the **aopstart** command only when the **Operating mode** field is set to z/OS 2.1 on the ISPF System Configuration panel. Otherwise, you must use the **aopdemon** command.

Format

aopstart

Description

The **aopstart** command starts Infoprint Server daemons. If a daemon is already running, **aopstart** does not stop and restart that daemon.

The **aopstart** command always starts the **aopd** daemon. The **aopstart** command also starts the optional daemons that are specified in the **start-daemons** attribute in the Infoprint Server aopd.conf file and stops any optional daemons that are no longer specified in the **start-daemons** attribute.

Result: After you enter the **aopstart** command, you see one or more messages. Some messages might be written only in the console log. The messages can include:

```
AOP075I Daemon daemon was started successfully.
AOP076E Start of daemon daemon failed.
AOP077I Daemon daemon is already started.
```

When all Infoprint Server daemons are started, you see this message:

```
AOP075I Daemon aopd was started successfully.
```

Usage notes

1. IBM strongly suggests that you use the AOPSTART JCL procedure to start daemons instead of entering the **aopstart** command. For more information about this guideline, see Chapter 1, "Starting and stopping Infoprint Server daemons," on page 1.
2. Before you use the **aopstart** command, your installation might need to customize the **aopstart** EXEC. For information, see *z/OS Infoprint Server Customization*.
3. To use the **aopstart** command, you must either be a member of the AOPOPER group or have an effective UID of 0.
4. Start the Printer Inventory Manager daemon before you start IP PrintWay basic mode or a NetSpool task. Also, start the Printer Inventory Manager daemon before you start PSF if PSF uses the Printer Inventory.
5. Make sure that TCP/IP finished initialization before you start the LPD (**aoplpd**), the IPP Server daemon (**aopippd**), or the IP PrintWay extended mode daemons (**aopoutd** and **aopwsmd**). You do not have to start TCP/IP to start other daemons.
6. From ISPF, you can use the TSO **oshell** or **omvs** command to run the **aopstart** command. On the ISPF Command Shell panel (ISPF option 6), type one of these commands:
   - oshell aopstart
   - omvs

     Then, on the OMVS command line, type aopstart.
7. Before you start Infoprint Server daemons, you might need to increase the maximum size of memory that is available. Table 5 on page 9 shows the minimum storage that is required by Infoprint Server daemons.

Table 5. Minimum storage that Infoprint Server daemons require	
Daemon	**Minimum MB**
PostScript to AFP and PDF to AFP transform	42 MB (256 MB is suggested)
IPP Server	200 MB

To make sure that sufficient memory is available, either set the MAXASSIZE parameter in the BPXPRMxx member of SYS1.PARMLIB or enter the SETOMVS command from the console. For example, to set the maximum size to 256 MB, enter:

```
SETOMVS MAXASSIZE=268435456
```

For more information about setting the MAXASSIZE parameter in the BPXPRMxx member, see *z/OS Infoprint Server Customization*.

The security administrator might specify a maximum region size for your user ID in the RACF ASSIZEMAX parameter. The ASSIZEMAX parameter overrides the MAXASSIZE parameter.

If you start Infoprint Server daemons from the OMVS shell under TSO, the SIZE parameter on your TSO/E logon determines the amount of memory available. If you use data stream transforms, set SIZE=42000 or larger. IBM suggests that you set SIZE=256000 (or larger) so that you can transform large or complex data streams. If you start the IPP Server daemon, set SIZE=200000 (or larger).

8. To request that Infoprint Server validate internal databases, set the AOPVALIDATEDB environment variable to any value (for example, AOPVALIDATEDB=1). IBM suggests that you validate internal databases if Infoprint Server ended abnormally or if you specified the **force** option when you stopped Infoprint Server daemons. The AOPVALIDATEDB environment variable applies only when the Printer Inventory Manager daemon starts. When you specify the AOPVALIDATEDB environment variable, Infoprint Server takes a few extra minutes to start.

9. The **aopstart** command can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. Your installation can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

Environment variables

Infoprint Server uses the following environment variables, which you can set in the environment or in the **aopstart** EXEC. Variables in the **aopstart** EXEC take precedence over variables in the environment.

Note: You can set dynamic tracing values in the Printer Inventory **trace-parameters** object that are equivalent to the environment variables for tracing, such as AOPTRACEON. When an Infoprint Server daemon is started, it uses the environment variables for tracing. However, if any of the Printer Inventory tracing parameters are set for a daemon, after that daemon is initialized, it ignores the tracing environment variables and uses only the tracing parameters in the Printer Inventory, such as **traceon**. See "Attributes for the trace-parameters object class" on page 469 and "ISPF panel for the system configuration definition" on page 506 for more information.

AOPDUMPON
　　Creates a full memory dump for internal errors.

AOPTRACEBYTES
　　The maximum size of a trace file.

AOPTRACEMAXFILES
　　The number of trace files to produce.

AOPTRACEON
　　Turns on tracing.

AOPTRACEON_DATA, AOPTRACEON_EXITMAP, AOPTRACEON_FILTER, AOPTRACEON_MSGLOG
　　When AOPTRACEON is specified, these variables optionally add data to the trace:

　　AOPTRACEON_DATA
　　　　Socket data is included in the trace.

AOPTRACEON_EXITMAP
IP PrintWay extended mode exit data is included in the trace.

AOPTRACEON_FILTER
IP PrintWay extended mode filter data is included in the trace.

AOPTRACEON_MSGLOG
Message logging data is included in the trace.

AOPVALIDATEDB
Causes Infoprint Server to check internal databases for validity before it starts.

LANG
The language that is used for messages.

LC_ALL
The locale that is used to format date and time information in common log messages.

LC_CTYPE
The locale that is used to determine the code page for validating attributes.

LC_TIME
The locale that is used to format date and time information in common log messages.

TZ
The time zone that is displayed in the trace output.

Infoprint Server uses the following environment variables, which you can set only in the **aopstart** EXEC:

_BPX_UNLIMITED_OUTPUT
Infoprint Server daemons write an unlimited amount of data to the JES spool without ending abnormally.

_BPXK_SETIBMOPT_TRANSPORT
The TCP/IP job name that is associated with the TCP/IP stack you want to use.

AOP_SAP2AFP_RESOURCES
The directory that contains all of the SAP to AFP transform resources.

AOPCONF
The name of the Infoprint Server configuration file. The file that is named in this variable takes precedence over configuration file `/etc/Printsrv/aopd.conf`.

AOPRESUBMITUSER
The job submitter's z/OS user ID that is used for RACF authorization checks during the resubmit for filtering function.

AOPRXF_CONF
The name of the remote transform configuration file. The file that is named in this variable takes precedence over configuration file `/etc/Printsrv/aoprxf.conf`.

AOPSAPD_CONF
The name of the SAP Callback daemon configuration file. The file that is named in this variable takes precedence over configuration file `/etc/Printsrv/aopsapd.conf`.

AOPXFD_CONF
The name of the transform configuration file. The file that is named in this variable takes precedence over configuration file `/etc/Printsrv/aopxfd.conf`.

CLASSPATH
The full path names of the Java™ Archive (JAR) files that the Infoprint Server IPP Server uses.

JAVA_HOME
The directory where Java files that the Infoprint Server IPP Server uses are located.

LIBPATH
The path that is used to locate dynamic link libraries (DLL), including DLLs for Infoprint Server and SAP remote function calls.

NLSPATH
The directory paths where the Infoprint Server message catalogs are located.

PATH

The directory where Infoprint Server daemons are located.

STEPLIB

The name of the libraries that are not in the system LNKLST, including the IP PrintWay extended mode exit library, the FCB image library (SYS1.IMAGELIB), and Language Environment® and C++ runtime libraries.

Files

/etc/Printsrv/aopd.conf

The default Infoprint Server configuration file. This file is required. The file that is named in the AOPCONF environment variable takes precedence over this file.

/etc/Printsrv/aoprxf.conf

The default remote configuration file. This file is required if you use InfoPrint Transform Manager for Linux®. The file that is named in the AOPRXF_CONF environment variable takes precedence over this file.

/etc/Printsrv/aopsapd.conf

The default SAP Callback daemon configuration file. This file is required if the SAP Callback daemon receives a print request from SAP R/3. The file that is named in the AOPSAPD_CONF environment variable takes precedence over this file.

/etc/Printsrv/aopxfd.conf

The default Transform Manager configuration file. This file is required if you start the Transform Manager daemon. The file that is named in the AOPXFD_CONF environment variable takes precedence over this file.

Exit values

0

Successful completion.

>0

An error that prevented one or more daemons from being started.

Related information

For more information about the AOPOPER group, environment variables, configuration files, and the **aopstart** EXEC, see *z/OS Infoprint Server Customization*.

aopdemon command

The **aopdemon** command starts one Infoprint Server daemon.

Tip: You can use the **aopdemon** command when the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel; otherwise, use the **aopstart** command.

Format

aopdemon -t *type* [*envar*]

Description

The **aopdemon** command starts an Infoprint Server daemon.

Result: After you enter the **aopdemon** command, you see one or more messages. Some messages might be written only in the console log. The messages can include:

```
AOP075I Daemon daemon was started successfully.
AOP076E Start of daemon daemon failed.
AOP077I Daemon daemon is already started.
```

Options

-t *type*
> Specifies the daemon to start. This option is required. You can specify one of these values:

> **aop**
>> Starts the Printer Inventory daemon, **aopd**.

> **ipp**
>> Starts the Internet Printing Protocol daemon, **aopippd**.

> **lpd**
>> Starts the line printer daemon, **aoplpd**.

> **net**
>> Starts the NetSpool daemon, **aopnetd**.

> **out**
>> Starts the IP PrintWay extended mode daemon, **aopoutd**.

> **ssi**
>> Starts the Infoprint Central daemon, **aopssid**.

> **sub**
>> Starts the Print Interface subsystem daemon, **aopsubd**.

> **wsm**
>> Starts the IP PrintWay extended mode daemon, **aopwsmd**.

> **xfd**
>> Starts the Infoprint Server Transform Manager daemon, **aopxfd**.

envar
> Specifies an optional user-defined z/OS UNIX file or MVS data set that lists environment variables. When you use the **aopdemon** command to start an Infoprint Server daemon, the daemon uses default environment variables. You can use the *envar* file to change the default value or define other environment variables for a daemon. The values are:

> *variable=value*
>> Specify one environment variable per line or record, starting in column 1. For example:

>> ```
>> AOPTRACEON=1
>> ```

>> **Rules:**

>> 1. These items are not allowed:
>>   - Leading or embedded blanks
>>   - Continued lines
>>   - Symbol substitutions
>>   - Quotation marks around text strings
>> 2. Trailing blanks are discarded.
>> 3. Characters are case-sensitive.
>> 4. If the records are 80 bytes and the last eight columns are numeric, those columns are discarded as sequence numbers.
>> 5. All data between the first "#" and the end of the line is ignored.
>> 6. Lines without an "=" are ignored.

Usage notes

1. IBM strongly suggests that you use the AOPDEMON or AOPSTAR2 procedure to start daemons instead of entering the **aopdemon** command. For more information about this guideline, see Chapter 1, "Starting and stopping Infoprint Server daemons," on page 1.

Tip: If **aopdemon** is run from the AOPDEMON procedure, use the VARFILE DD statement to specify the *envar* file.

2. Before you use the **aopdemon** command, your installation might need to customize the *envar* file. For information, see *z/OS Infoprint Server Customization*.

3. To use the **aopdemon** command, you must either be a member of the AOPOPER group or have an effective UID of 0.

4. Start the Printer Inventory Manager daemon (**aopd**) before you start IP PrintWay basic mode, a NetSpool task, any other Infoprint Server daemons, and PSF if PSF uses the Printer Inventory.

5. Make sure that TCP/IP finished initialization before you start the LPD (**aoplpd**), the IPP Server daemon (**aopippd**), or the IP PrintWay extended mode daemons (**aopoutd** and **aopwsmd**). You do not have to start TCP/IP to start other daemons.

6. From ISPF, you can use the TSO **oshell** or **omvs** command to run the **aopdemon** command. On the ISPF Command Shell panel (ISPF option 6), type one of these commands:

   - `oshell aopdemon -t aop`

   - `omvs`

     Then, on the OMVS command line, type `aopdemon -t aop`.

7. Before you start an Infoprint Server daemon, you might need to increase the maximum size of memory that is available. Table 5 on page 9 shows the minimum storage that is required by Infoprint Server daemons.

Table 6. Minimum storage that Infoprint Server daemons require	
Daemon	**Minimum MB**
PostScript to AFP and PDF to AFP transform	42 MB (256 MB is suggested)
IPP Server	200 MB

To make sure that sufficient memory is available, either set the MAXASSIZE parameter in the BPXPRMxx member of SYS1.PARMLIB or enter the SETOMVS command from the console. For example, to set the maximum size to 256 MB, enter:

```
SETOMVS MAXASSIZE=268435456
```

For more information about setting the MAXASSIZE parameter in the BPXPRMxx member, see *z/OS Infoprint Server Customization*.

The security administrator might specify a maximum region size for your user ID in the RACF ASSIZEMAX parameter. The ASSIZEMAX parameter overrides the MAXASSIZE parameter.

If you start Infoprint Server daemons from the OMVS shell under TSO, the SIZE parameter on your TSO/E logon determines the amount of memory available. If you use data stream transforms, set SIZE=42000 or larger. IBM suggests that you set SIZE=256000 (or larger) so that you can transform large or complex data streams. If you start the IPP Server daemon, set SIZE=200000 (or larger).

8. To request that Infoprint Server validate internal databases, set the AOPVALIDATEDB environment variable to any value (for example, AOPVALIDATEDB=1). IBM suggests that you validate internal databases if Infoprint Server ended abnormally. The AOPVALIDATEDB environment variable applies only when the Printer Inventory Manager daemon starts. When you specify the AOPVALIDATEDB environment variable, Infoprint Server takes a few extra minutes to start.

9. The **aopdemon** command can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. Your installation can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

Environment variables

Infoprint Server uses the following default environment variables with the **aopdemon** command. You can change default values in the *envar* file, which then takes precedence.

Note: You can set dynamic tracing values in the Printer Inventory **trace-parameters** object that are equivalent to the environment variables for tracing. When an Infoprint Server daemon is started, it uses the environment variables for tracing. However, if any of the Printer Inventory tracing parameters are set for a daemon, Infoprint Server then ignores the tracing environment variables and uses only the tracing parameters in the Printer Inventory. See "Attributes for the trace-parameters object class" on page 469 and "ISPF panel for the system configuration definition" on page 506 for more information.

_BPX_UNLIMITED_OUTPUT=YES
    Indicates that Infoprint Server daemons write an unlimited amount of data to the JES spool without ending abnormally.

AOPCONF=/etc/Printsrv/aopd.conf
    The name of the Infoprint Server configuration file.

AOPRXF_CONF=/etc/Printsrv/aoprxf.conf
    The name of the remote transform configuration file.

AOPTRACEDIR=/var/Printsrv/trace
    The name of the directory where trace files are written.

    Note: If any of the Printer Inventory tracing parameters are set for a daemon, Infoprint Server ignores the AOPTRACEDIR environment variable and uses the **tracedirectory** parameter in the Printer Inventory.

AOPXFD_CONF=/etc/Printsrv/aopxfd.conf
    The name of the transform configuration file.

CLASSPATH=/usr/lpp/Printsrv/classes/ipp.jar:/usr/lpp/Printsrv/classes/ippserver.jar:/usr/lpp/Printsrv/classes/ippreal.jar
    The full path names of the Java Archive (JAR) files that the Infoprint Server IPP Server uses.

JAVA_HOME=/usr/lpp/java/J8.0
    The directory where Java files that the Infoprint Server IPP Server uses are located.

NLSPATH=/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv/En_US/%N:/usr/lib/nls/msg/%L/%N
    The directory paths where the Infoprint Server message catalogs are located.

LIBPATH=/usr/lpp/Printsrv/lib
    The path that is used to locate dynamic link libraries (DLL), including DLLs for Infoprint Server and SAP remote function calls.

PATH=/usr/lpp/Printsrv/bin:/bin
    The directory where Infoprint Server daemons are located.

Infoprint Server uses the following environment variables, which you can set in the environment or in the *envar* file. Variables in the *envar* file take precedence over variables in the environment.

Note: If any of the Printer Inventory tracing parameters are set for a daemon, Infoprint Server uses the tracing environment variables, such as AOPTRACEON, only when the demon is starting. After initialization, it uses only the tracing parameters in the Printer Inventory, such as **traceon**.

AOPDUMPON
    Creates a full memory dump for internal errors.

AOPTRACEBYTES
    The maximum size of a trace file.

AOPTRACEMAXFILES
    The maximum number of trace files to produce.

AOPTRACEON
    Turns on tracing.

AOPTRACEON_DATA, AOPTRACEON_EXITMAP, AOPTRACEON_FILTER, AOPTRACEON_MSGLOG
    When AOPTRACEON is specified, these variables optionally add data to the trace:

    AOPTRACEON_DATA
        Socket data is included in the trace.

AOPTRACEON_EXITMAP
> IP PrintWay extended mode exit data is included in the trace.

AOPTRACEON_FILTER
> IP PrintWay extended mode filter data is included in the trace.

AOPTRACEON_MSGLOG
> Message logging data is included in the trace.

AOPVALIDATEDB
> Causes Infoprint Server to check internal databases for validity before it starts.

LANG
> The language that is used for messages.

LC_ALL
> The locale that is used to format date and time information in common log messages.

LC_CTYPE
> The locale that is used to determine the code page for validating attributes.

LC_TIME
> The locale that is used to format date and time information in common log messages.

TZ
> The time zone that is displayed in trace output.

Infoprint Server uses the following environment variables, which you can set only in the *envar file*:

_BPXK_SETIBMOPT_TRANSPORT
> The TCP/IP job name that is associated with the TCP/IP stack you want to use.

AOP_SAP2AFP_RESOURCES
> The directory that contains all of the SAP to AFP transform resources.

AOPRESUBMITUSER
> The job submitter's z/OS user ID that is used for RACF authorization checks during the resubmit for filtering function.

AOPSAPD_CONF
> The name of the SAP Callback daemon configuration file. The file that is named in this variable takes precedence over configuration file `/etc/Printsrv/aopsapd.conf`.

STEPLIB
> The name of the libraries that are not in the system LNKLST, including the IP PrintWay extended mode exit library, the FCB image library (SYS1.IMAGELIB), and Language Environment and C++ runtime libraries.

Files

/etc/Printsrv/aopd.conf
> The default Infoprint Server configuration file. This file is required. The file that is named in the AOPCONF environment variable takes precedence over this file.

/etc/Printsrv/aoprxf.conf
> The default remote configuration file. This file is required if you use Ricoh InfoPrint Transform Manager for Linux. The file that is named in the AOPRXF_CONF environment variable takes precedence over this file.

/etc/Printsrv/aopsapd.conf
> The default SAP Callback daemon configuration file. This file is required if the SAP Callback daemon receives a print request from SAP R/3. The file that is named in the AOPSAPD_CONF environment variable takes precedence over this file.

/etc/Printsrv/aopxfd.conf
> The default Transform Manager configuration file. This file is required if you start the Transform Manager daemon. The file that is named in the AOPXFD_CONF environment variable takes precedence over this file.

Exit values

0

Successful completion.

>0

An error that prevented the daemon from starting.

Related information

For more information about the AOPOPER group, environment variables, configuration files, and the *envar* file, see *z/OS Infoprint Server Customization*.

Stopping Infoprint Server with z/OS UNIX commands

These z/OS UNIX commands stop Infoprint Server daemons:

aopstop

Stops all daemons or specified daemons. **aopstop** is used only when the **Operating mode** field is set to z/OS 2.1 on the ISPF System Configuration panel. See "aopstop command" on page 16.

aopsend

Stops one or all daemons. When the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel, you must use **aopsend** instead of **aopstop**. See "aopsend command" on page 18.

aopstop command

The **aopstop** command stops all Infoprint Server daemons or the specified daemons.

Tip: You can use the **aopstop** command only when the **Operating mode** field is set to z/OS 2.1 on the ISPF System Configuration panel. Otherwise, you must use the **aopsend** command.

Format

```
aopstop [-d daemon]... [now] [force]
```

Description

The **aopstop** command stops all Infoprint Server daemons or only the specified daemons. Unless you specify the **now** or the **force** option, the daemons stop after current activity completes.

Result: After you enter the **aopstop** command, you see one or more messages. Some messages might be written only in the console log. The messages can include:

```
AOP044I Shutdown complete. (program:daemon)
AOP078W Daemon daemon is not running.
AOP079I A shutdown of daemon daemon has been initiated.
AOP135I An abrupt shutdown of daemon daemon has been initiated.
AOP136I A destructive shutdown of daemon daemon has been initiated.
```

When you issue the **aopstop** command to stop all daemons and no daemons are running, you see this message:

```
AOP078W Daemon aopd is not running. (program:aopstop)
```

Options

-d *daemon*

Specifies the daemon to stop. If you omit this option, all active daemons are stopped. You can specify one of these values:

ippd

Stops the Internet Printing Protocol daemon, **aopippd**.

lpd
Stops the line printer daemon, **aoplpd**.

netd
Stops the NetSpool daemon, **aopnetd**.

outd
Stops the IP PrintWay extended mode daemons, **aopoutd** and **aopwsmd**. When you start IP PrintWay again, any IP PrintWay printers that were stopped return to the started state, and any printers that were redirected to other printers are no longer redirected.

ssid
Stops the Infoprint Central daemon, **aopssid**.

subd
Stops the Print Interface subsystem daemon, **aopsubd**.

xfd
Stops the Transform Manager daemon, **aopxfd**.

now
Stops the daemons immediately. If work is in progress, incorrect output or data loss might result. If this option is not specified, the daemons stop after current activity completes.

force
Stops the daemons immediately by using a "destructive" shutdown. If work is in progress, incorrect output or data loss might result. For daemons that manage a database, such as **aopd**, the database might be corrupted. If this option is not specified, the daemons stop after current activity completes.

Notes:

1. Use this option with extreme caution.
2. Before you use this option, use the Printer Inventory Definition Utility (PIDU) **export** command to back up the Printer Inventory if Infoprint Server is running.
3. After you stop daemons by using this option, specify the AOPVALIDATEDB environment variable to validate internal databases when you start Infoprint Server daemons again. You can specify AOPVALIDATEDB=1 either in the **aopstart** EXEC or in the environment. If databases are corrupted, you might need to restore the Printer Inventory and the search databases.

Usage notes

1. To use the **aopstop** command, you must either be a member of the AOPOPER group or have an effective UID of 0.
2. To stop all Infoprint Server daemons, enter the **aopstop** command without specifying any daemon names.
3. Before you stop all daemons, stop other programs that are using the Printer Inventory, such as NetSpool, IP PrintWay basic mode, and PSF.
4. Before you stop Infoprint Server, back up the Printer Inventory if you changed it since the last backup. For information about how to back up the Printer Inventory, see *z/OS Infoprint Server Customization*.
5. Before you restart Infoprint Server, wait for the daemon or daemons that you stopped to end.
6. The **aopstop** command can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. You can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

Examples

1. To stop all active daemons (including the Printer Inventory Manager daemon) after current activity ends, use this command. The Print Interface component of Infoprint Server stops accepting new print requests and completes all work in progress before it shuts down.

   ```
   aopstop
   ```

2. To stop the Transform Manager and line printer daemons, use this command:

```
aopstop -d xfd -d lpd
```

3. To stop all daemons immediately, use one of these commands. Documents that are being processed might be lost.

```
aopstop now
aopstop force
```

Environment variables

Infoprint Server uses these environment variables:

AOPCONF
Names the Infoprint Server configuration file. The file that is named in this variable takes precedence over configuration file /etc/Printsrv/aopd.conf.

LANG
The language that is used for messages.

NLSPATH
The directory where the Infoprint Server message catalogs are located.

Files

/etc/Printsrv/aopd.conf
The default Infoprint Server configuration file. This file is required. The file that is named in the AOPCONF environment variable takes precedence over this file.

Exit values

0

Stopping of the daemons was successfully initiated.

>0

An error occurred that prevented the daemons from stopping.

Related information

For more information about the AOPOPER group, environment variables, and configuration files, see *z/OS Infoprint Server Customization*.

aopsend command

The **aopsend** command issues a command to one or all Infoprint Server daemons.

Format

```
aopsend -c command -m member_name [-h] [-i inventory]
        [-g group_qualifier]
```

Description

The **aopsend** command issues a command to one or all Infoprint Server daemons that can stop daemons, create a memory dump, turn a trace on or off, or update trace parameters from the Printer Inventory.

Tip: If you want to stop Infoprint Server daemons and the **Operating mode** field is set to z/OS 2.2 on the ISPF System Configuration panel, you must use **aopsend** instead of the **aopstop** command.

Result: After you enter the **aopsend** command, you see one or more messages. Some messages might be written only in the console log. The messages can include:

```
AOP044I Shutdown complete. (program:daemon)
AOP078W Daemon daemon is not running.
AOP079I A shutdown of daemon daemon has been initiated.
```

Options

-c *command*

Specifies an action to be done on Infoprint Server daemons. This option is required. You can specify one of these values:

dump

Generates a memory dump, which is a copy of the contents of storage on a daemon. You can use the memory dump to analyze problems or determine whether a program is functioning as intended.

stop

Stops a daemon after current activity ends.

stopnow

Stops a daemon immediately. If work is in progress, incorrect output or data loss might result.

traceoff

Turns all tracing off (**traceon**, **tracedata**, **traceexit**, **tracefilter**, and **tracemsg** Printer Inventory parameters).

traceon

Turns on a general trace the same as AOPTRACEON=YES environment variable or **traceon=yes** Printer Inventory parameter.

updatetrace

The daemon updates its trace parameters from the Printer Inventory. If PIDU was used to update the trace parameters, either this value or restarting the daemon is the only way to make the changes effective.

-m *member_name*

Specifies one or all daemons that the command action is done on. This option is required. You can specify one of these values:

all

The command action is done on all daemons that are currently running.

member_name

The cross-system coupling facility (XCF) member name of a daemon. Use the **aopstat** command to list the XCF member names for the daemons. The member names are:

aopibm00

The Printer Inventory Manager daemon, **aopd**.

ippibm00

The Internet Printing Protocol (IPP) Server daemon, **aopippd**.

lpdibm00

The line printer daemon (LPD), **aoplpd**.

netibm00

The NetSpool daemon, **aopnetd**.

outibm00

The IP PrintWay extended mode daemon, **aopoutd**.

ssiibm00

The Infoprint Central daemon, **aopssid**.

subibm00

The Print Interface subsystem daemon, **aopsubd**.

wsmibm00
> The IP PrintWay extended mode daemon, **aopwsmd**.

xfdibm00
> The Infoprint Server Transform Manager daemon, **aopxfd**.

-h
> Displays syntax help for the **aopsend** command. This option is optional, but when it is specified, all other actions are ignored.

-i *inventory*
> Specifies the Printer Inventory name that is used to build the XCF group name. The name must be a Printer Inventory that is running; for example, AOP1. If you omit this option, **aopsend** obtains the name from aopd.conf.

-g *group_qualifier*
> Specifies the one-character alphanumeric XCF group qualifier name that is used to build the XCF group name. If you omit this option, the name is either:
>
> - Blank if **-i** is specified.
> - The value from aopd.conf.

Usage notes

1. To use the **aopsend** command, you must either be a member of the AOPOPER group or have an effective UID of 0.
2. Do not stop the Printer Inventory Manager daemon while other Infoprint Server daemons are still running.
3. Before you stop all daemons, stop other programs that are using the Printer Inventory, such as NetSpool, IP PrintWay basic mode, and PSF.
4. Before you stop Infoprint Server, back up the Printer Inventory if you changed it since the last backup. For information about how to back up the Printer Inventory, see *z/OS Infoprint Server Customization*.
5. The **aopsend** command can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. You can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

Examples

1. To stop all active daemons after current activity ends, use the following command. The Print Interface component of Infoprint Server stops accepting new print requests and completes all work in progress before it shuts down.

   ```
   aopsend -c stop -m all
   ```

2. To stop the Transform Manager daemon immediately, use this command:

   ```
   aopsend -c stopnow -m xfdibm00
   ```

3. To turn on tracing for the Transform Manager daemon, use this command:

   ```
   aopsend -c traceon -m xfdibm00
   ```

Environment variables

Infoprint Server uses these environment variables:

AOPCONF
> Identifies the Infoprint Server configuration file. The file that is named in this variable takes precedence over configuration file /etc/Printsrv/aopd.conf.

LANG
> The language that is used for messages.

NLSPATH
>   The directory where the Infoprint Server message catalogs are located.

Files

/etc/Printsrv/aopd.conf
>   The default Infoprint Server configuration file. This file is required. The file that is named in the AOPCONF environment variable takes precedence over this file.

Exit values

0
>   Stopping of the daemons was successfully initiated.

>0
>   An error occurred that prevented the daemons from stopping.

Related information

For more information about the AOPOPER group, environment variables, and configuration files, see *z/OS Infoprint Server Customization*.

Displaying the status of Infoprint Server daemons

You can use one of these methods to display the status of Infoprint Server daemons:

AOPSTAT JCL procedure

The AOPSTAT procedure invokes the `aopstat` command to display the status of Infoprint Server daemons.

Tip: Before you run the AOPSTAT procedure, your installation might need to customize it. For information, see *z/OS Infoprint Server Customization*.

To display the status of Infoprint Server daemons with the AOPSTAT JCL procedure, enter this MVS START command:

```
START AOPSTAT
```

AOPSTAT displays this information for each daemon or task:

Member
>   A unique cross-system coupling facility (XCF) member name for the daemon.

Job ID
>   The MVS job name that is assigned to the daemon.

System
>   The name of the MVS system where the daemon is running.

Status
>   The status of the daemon or task. The values are:
>
>   **ACTIVE**
>   >   The daemon or task is operational.
>
>   **FAILED**
>   >   The daemon or task encountered an error that caused it to stop abnormally.

State
>   When Status is ACTIVE, the state a daemon or task is in after it is started.

Ready
    The daemon or task is ready to receive jobs.

Starting
    The daemon or task is in the process of starting.

Waiting
    The daemon or task is waiting to proceed.

You might also see a group member with a state of **Transient**. This group member is a command that joins the group, runs, and then leaves the group.

Example:

This is sample output from the AOPSTAT procedure:

```
start aopstat
BPXF024I (AOPSTC) Member    Job ID    System    Status State
BPXF024I (AOPSTC) -------- -------- -------- ------ ---------
BPXF024I (AOPSTC) AOPIBM00 AOPD      DEVJ      ACTIVE Ready
BPXF024I (AOPSTC) XFDIBM00 AOPXFD    DEVJ      ACTIVE Ready
BPXF024I (AOPSTC) LPDIBM00 AOPLPD    DEVJ      ACTIVE Ready
BPXF024I (AOPSTC) SUBIBM00 AOPSUBD   DEVJ      ACTIVE Ready
BPXF024I (AOPSTC) NETIBM00 AOPNETD   DEVJ      ACTIVE Ready
BPXF024I (AOPSTC) SSIIBM00 AOPSSID   DEVJ      ACTIVE Ready
BPXF024I (AOPSTC) WSMIBM00 AOPWSMD   DEVJ      ACTIVE Ready
BPXF024I (AOPSTC) OUTIBM00 AOPOUTD   DEVJ      ACTIVE Ready
AOPSTAT    1 STARTING STEP0001 AOPBATCH  R0000
AOPSTAT                                  EOJ
```

aopstat command

The **aopstat** command displays the status of Infoprint Server daemons.

Format

aopstat [-c] [-i *inventory*] [-g *group_qualifier*] [-l *level*] [-m *member_name*]

Description

The **aopstat** command displays the status for all Infoprint Server daemons.

Result: After you enter the **aopstat** command, the status is written by default to standard output (stdout). You see a status display similar to:

```
>aopstat
Member          Job ID    System    Status    State
--------------- -------- -------- -------- ------------------
AOPIBM00        AOPD      DEVJ      ACTIVE    Ready
XFDIBM00        AOPXFD    DEVJ      ACTIVE    Ready
LPDIBM00        AOPLPD    DEVJ      ACTIVE    Ready
SUBIBM00        AOPSUBD   DEVJ      ACTIVE    Ready
NETIBM00        AOPNETD   DEVJ      ACTIVE    Ready
SSIIBM00        AOPSSID   DEVJ      ACTIVE    Ready
WSMIBM00        AOPWSMD   DEVJ      ACTIVE    Ready
OUTIBM00        AOPOUTD   DEVJ      ACTIVE    Ready
```

aopstat displays this information for each daemon or task:

Member
    A unique cross-system coupling facility (XCF) member name for the daemon.

Job ID
    The MVS job name that is assigned to the daemon.

System
    The name of the MVS system where the daemon is running.

Status
    The status of the daemon or task. The values are:

ACTIVE

The daemon or task is operational.

FAILED

The daemon or task encountered an error that caused it to stop abnormally.

State

When Status is ACTIVE, the state a daemon or task is in after it is started.

Ready

The daemon or task is ready to receive jobs.

Starting

The daemon or task is in the process of starting.

Waiting

The daemon or task is waiting to proceed.

You might also see a group member with a state of **Transient**. This group member is a command that joins the group, runs, and then leaves the group.

Options

-c

Specifies that the status is written to `/dev/console` instead of `stdout`. This option is optional.

-i *inventory*

Specifies the Printer Inventory name that is used to build the XCF group name. The name must be a Printer Inventory that is running; for example, AOP1. If you omit this option, **aopstat** obtains the name from `aopd.conf`.

-g *group_qualifier*

Specifies the one-character alphanumeric XCF group qualifier name that is used to build the XCF group name. If you omit this option, the name is either:

- Blank if **-i** is specified.
- The value from `aopd.conf`.

-l *level*

Indicates the level of groups or members that are displayed. This option is optional. The values include:

g

All members in an XCF group are displayed. If **-i**, **-g**, or both are not specified, **aopstat** obtains the group name from `aopd.conf`. This value is the **-l** default.

m

The member that is defined with the **-m** option is displayed.

s

All groups in the system are displayed.

-m *member_name*

Specifies the cross-system coupling facility (XCF) member name of a daemon. This option is required when **-l m** is specified.

Usage notes

1. When you specify the -c option, you can suppress the MVS prefix information and BPXF024I message IDs by marking **aopstat** setuid-zero.

Examples

1. To list all groups in the system, enter this command:

```
aopstat -l s
```

You see a status similar to:

```
>aopstat -ls
Group SYSXCF   has 1 members
Group SYSGRS   has 1 members
Group SYSIGW01 has 1 members
Group SYSIGW00 has 2 members
Group SYSMCS   has 6 members
Group SYSWLM   has 1 members
Group SYSMCS2  has 6 members
Group SYSCNZMG has 1 members
Group SYSENF   has 1 members
Group SYSIEFTS has 1 members
Group SYSIKJBC has 1 members
Group SYSTTRC  has 1 members
Group SYSDAE   has 2 members
Group SYSIOS01 has 1 members
Group SYSIOSPX has 1 members
Group SYSBPX   has 1 members
Group SYSJES   has 1 members
Group SYSATB01 has 2 members
Group EZBTCPCS has 1 members
Group AOPAOP1  has 8 members
```

2. To display the status of the Infoprint Central daemon, use this command:

```
aopstat -l m -m ssiibm00
```

You see a status similar to:

```
Member   Job ID   System   Status   State
-------- -------- -------- -------- --------
SSIIBM00 AOPSSID  DEVB     ACTIVE   Ready
```

Chapter 2. Starting and stopping the NetSpool task and NetSpool LUs

The following information describes how to start and stop the NetSpool task and how to control NetSpool printer logical units (LUs) from the system console:

- Starting the NetSpool task
- Entering NetSpool commands
- Stopping the NetSpool task
- Starting NetSpool printer LUs
- Stopping NetSpool printer LUs
- Displaying the status of NetSpool printer LUs

Tip: You can start, stop, and display the status of NetSpool LUs from Infoprint Central. For more information, see Chapter 5, "Using Infoprint Central," on page 45. Also, see the Infoprint Central online help system.

Starting the NetSpool task

Each NetSpool started task runs in its own system address space and processes data sets for different classes of NetSpool printer LUs. When a NetSpool task starts, it attempts to start any printer LUs defined in the Printer Inventory and assigned to one of the started LU classes that are specified in the NetSpool startup procedure. If the administrator defines a new printer LU in the Printer Inventory after you start the NetSpool task, NetSpool automatically starts that printer LU if it is in one of the started LU classes.

Before you begin:

1. Make sure that the Printer Inventory Manager and NetSpool are customized. See *z/OS Infoprint Server Customization*.
2. Start the Printer Inventory Manager daemon (**aopd**) and the NetSpool daemon (**aopnetd**). See Chapter 1, "Starting and stopping Infoprint Server daemons," on page 1.

These administrative tasks can be done before or after you start the NetSpool task:

- Define NetSpool printer LUs in the Printer Inventory. See Chapter 11, "Planning printer and printer pool definitions for NetSpool," on page 103.
- Define NetSpool printer LUs to VTAM. See Chapter 15, "Defining NetSpool printer LUs to VTAM," on page 217.

Steps to start the NetSpool task:

1. Make sure that VTAM is started, and then activate any printer LUs defined in the Printer Inventory in the LU classes NetSpool processes. Use the VTAM VARY ACT command to activate the printer LUs.

   If NetSpool cannot start a printer LU because the printer LU is inactive in VTAM or because it is started by another NetSpool started task, NetSpool starts the printer LU automatically when the printer LU becomes available.

2. Run the NetSpool startup procedure. Use this MVS START command:

   ```
   START procedure_name[,JOBNAME=jobname]
   ```

   For example, if the NetSpool startup procedure is a member that is named APIJPJCL in the SYS1.PROCLIB library, enter this command:

   ```
   START APIJPJCL
   ```

(Optional) You can specify a job name for each NetSpool task that you start. With a job name, you can easily distinguish between different NetSpool started tasks. To specify a job name of NETSPOOL, enter this command:

```
START APIJPJCL,JOBNAME=NETSPOOL
```

Result: After you start NetSpool, use either Infoprint Central or the NetSpool DISPLAY SELECTED command to display the status of the printer LUs that NetSpool started or attempted to start (see "Displaying the status of NetSpool printer LUs" on page 30). You cannot use Infoprint Central to display LU status if your installation starts more than one NetSpool task.

Entering NetSpool commands

To control NetSpool printer LUs, you can use the MVS MODIFY command to direct NetSpool commands to NetSpool. You can also use the MVS STOP command to stop a NetSpool started task.

The MVS MODIFY and STOP commands use the job name and identifier values to direct the command to the appropriate NetSpool task. If only one NetSpool task is started on a system, or if you specified a different job name for each started task on the JOBNAME parameter of the START command, specify only the job name in the command. However, if you started multiple NetSpool tasks with the same job name, use the identifier field to distinguish between them. For more information about how to specify the job name and identifier for your installation, see *z/OS MVS System Commands*.

The format of the MODIFY command is:

Syntax

```
{F | MODIFY} jobname[.id],NetSpool_command
```

F | MODIFY
　　The MODIFY command name. You can enter either F or MODIFY.

jobname
　　The job name of the NetSpool startup procedure. This value can be the member name (for example, APIJPJCL) or the name you specified on the JOBNAME parameter of the START command.

id
　　A number that identifies the NetSpool startup procedure to which you want the NetSpool command directed. If only one NetSpool startup procedure is running on a system, or you specified different job names in the JOBNAME parameter on the START command, you do not need to specify this field. However, if you started more than one NetSpool task by using the same NetSpool startup procedure, and you did not specify the JOBNAME parameter on the START command, you must specify the identifier to distinguish among them.

NetSpool_command
　　The NetSpool command, for example, LUNAME=LUPRT001,ADD. The following information describes NetSpool commands.

Stopping the NetSpool task

You can enter one of several NetSpool operator commands to stop a NetSpool started task, depending on how quickly you want to stop NetSpool. You can stop NetSpool:

- After all VTAM sessions end normally.
- Immediately, after NetSpool ends all VTAM sessions.
- Immediately, without ending VTAM sessions. Use this method only if other methods fail.

The VTAM HALT command also can cause sessions with NetSpool printer LUs to end or can stop the NetSpool task.

Tip: To stop NetSpool processing, you do not need to stop the NetSpool daemon (**aopnetd**). When you stop the NetSpool task, NetSpool processing ends. You can restart the NetSpool task without restarting the NetSpool daemon.

Stopping NetSpool after current sessions end normally

Use the QUIT command to stop the NetSpool started task after all current sessions end normally. The QUIT command prevents new sessions from starting. Each current session ends only when the VTAM application that established the session ends it. Thus, a long delay might occur before NetSpool stops and returns to the operating system.

The format of the QUIT command is:

```
F jobname[.id],QUIT
```

Stopping NetSpool immediately

Use the QUIT FORCE command to stop the NetSpool started task after all current sessions are immediately ended. Because NetSpool ends all current sessions immediately, some output data sets might be incomplete. NetSpool creates data sets with all data received.

The format of the QUIT FORCE command is:

```
F jobname[.id],QUIT FORCE
```

Stopping NetSpool abnormally

Use the KILL or MVS STOP command to stop the NetSpool started task immediately, without ending any VTAM sessions or creating output data sets. Data already sent to NetSpool is lost.

Attention: Use the KILL and STOP commands only when a hang condition prevents completion of a QUIT FORCE command.

The format of the KILL command is:

```
F jobname[.id],KILL
```

The MVS STOP command provides the same function as the KILL command. The format of the STOP command is:

```
STOP jobname[.id]
```

Using VTAM HALT commands

When you enter a VTAM HALT command, NetSpool does one of these actions, depending on the type of HALT command you entered:

- Standard HALT

  The HALT command causes all VTAM sessions to end normally. New sessions are not allowed to start. No data is lost. NetSpool creates output data sets with all received data. NetSpool places all started printer LUs in the WAITING state, periodically (every 60 seconds) attempting to restart the printers.

- HALT QUICK

  The HALT QUICK command causes all VTAM sessions to end immediately. New sessions are not allowed to start. No data is lost. NetSpool creates output data sets with all received data. NetSpool places all started printer LUs in the WAITING state, periodically (every 60 seconds) attempting to restart the printers.

- HALT CANCEL

The HALT CANCEL command causes all VTAM sessions to end immediately. New sessions are not allowed to start. No data is lost. NetSpool creates output data sets with all received data. The NetSpool started task stops, returning to the operating system.

Starting NetSpool printer LUs

When you start NetSpool, the NetSpool printer LUs that are assigned to the LU classes specified on the EXEC statement in the NetSpool startup procedure are started. After NetSpool is started, you can use either Infoprint Central or the VTAM VARY ACT and LUNAME ADD commands to start an LU. You might want to start an LU that is assigned to a NetSpool LU class that is not started, or to restart an LU that you stopped.

The VTAM VARY ACT and LUNAME ADD commands are described here. The Infoprint Central action to start a NetSpool LU is equivalent to entering both the VTAM VARY ACT and LUNAME ADD commands. For information about how to use Infoprint Central, see the Infoprint Central online help system.

Limitation: You cannot use Infoprint Central to start, stop, or display the status of NetSpool LUs if you start more than one NetSpool task. However, you can use Infoprint Central to do other functions.

Tips:

1. If you specify a printer LU name in a printer definition after NetSpool is started, NetSpool automatically tries to start the LU if it is assigned to one of the LU classes that NetSpool already started. This action means that you do not need to start the LU with the NetSpool ADD command. However, you must still activate it in VTAM by using either Infoprint Central or the VARY ACT command.

2. After NetSpoolstarts, if you want to start all printers in another LU class, you can start another NetSpool task and specify the LU class on the EXEC statement. This action eliminates the need to enter the LUNAME ADD command numerous times to start many printer LUs. However, if you start more than one NetSpool task, you cannot use Infoprint Central to work with NetSpool LUs.

Before you begin: The LU to be started must be defined in a printer definition in the Printer Inventory and also must be defined to VTAM with an APPL statement. For more information about APPL statements, see "Creating APPL statements for NetSpool printer LUs" on page 218.

Steps to start an LU with the VTAM VARY and LUNAME ADD commands:

1. If the printer LU is not active in VTAM, activate it using the VTAM VARY ACT command.
2. Add the printer LU to NetSpool by using the LUNAME ADD command.

The format of the LUNAME ADD command is:

```
F jobname[.id],LUNAME=lu-name,ADD
```

lu-name
    Specifies the name of the printer LU. The name must match the LU name in a printer definition in the Printer Inventory.

If NetSpool cannot start a printer LU because it is not active in VTAM or because it started in another NetSpool started task, NetSpool starts the printer LU automatically later, when the printer LU becomes available. If you display printer LUs by using the DISPLAY command or Infoprint Central, the printer LU is in the WAITING state.

Example: In this example, printer LU LUPRT003 is varied active in VTAM and then is added to NetSpool.

```
VARY NET,ACT,ID=LUPRT003
F jobname.id,LUNAME=LUPRT003,ADD
```

Stopping NetSpool printer LUs

While NetSpool is running, you can use one of these:

• Infoprint Central

- LUNAME PURGE command
- VTAM VARY INACT and LUNAME DEL commands to deactivate the VTAM session with a printer and to stop NetSpool from processing any more print requests for the printer LU

The VTAM VARY INACT, LUNAME DEL, and LUNAME PURGE commands are described here. The Infoprint Central action to stop a NetSpool LU is equivalent to entering the LUNAME PURGE command. For information about how to use Infoprint Central, see the Infoprint Central online help system.

Infoprint Central and the LUNAME PURGE command provide a fast way to stop a printer LU because the VTAM session ends immediately and no more data is sent to the printer LU. The printer LU finishes processing data that it has already received so no data is lost. With the LUNAME DEL command, you can stop a printer LU after the VTAM session ends normally.

Limitation: You cannot use Infoprint Central to start, stop, or display the status of NetSpool LUs if you start more than one NetSpool task. However, you can use Infoprint Central to do other functions.

Tip: If you remove a printer LU name from a printer definition after NetSpool is started, NetSpool automatically stops the printer LU after the VTAM application ends the session. Therefore, you do not need to use stop the printer LU in this case.

Steps to stop an LU with the VTAM VARY and LUNAME DEL commands:

1. If the printer is started, deactivate the printer LU in VTAM, by using the VTAM VARY INACT command. The type of VARY command you choose depends on how quickly you want the VTAM session to end. In either case, NetSpool creates an output data set with all data received. Therefore, no data is lost.
   - Specify the TYPE=IMMED option to end the VTAM session immediately.
   - Specify no TYPE option to wait until the VTAM application that is sending the data ends the session normally. A long delay might occur until the session ends.

   When you deactivate the printer LU in VTAM, the printer is placed in the WAITING state, meaning that NetSpool automatically restarts the printer LU when you reactivate the printer LU in VTAM.

   Tip: If a printer LU is already in the WAITING state because NetSpool cannot start it, you do not need to first deactivate the printer in VTAM.

2. Delete the printer LU from NetSpool by using the LUNAME DEL command. This command frees resources for the printer LU and prevents NetSpool from restarting it when you reactivate the printer LU with VTAM. After you enter the LUNAME DEL command, the printer LU will be in a PENDING CLOSE state until NetSpool creates an output data set with data received before the LUNAME DEL command.

   Tip: Wait for the printer to become inactive in VTAM before you enter this command.

The format of the LUNAME DEL command is:

```
F jobname[.id],LUNAME=lu-name,DEL
```

lu-name
   Specifies the name of the printer LU. The name must match the LU name in a printer definition in the Printer Inventory.

Examples:

1. In this example, printer LU LUPRT003 is deactivated in VTAM after the VTAM session for printer LU LUPRT003 ends immediately. The LUNAME DEL command, entered after the printer is inactive in VTAM, causes NetSpool to delete LUPRT003 from its list of selected printers LUs.

```
VARY NET,INACT,ID=LUPRT003,TYPE=IMMED
```

```
F jobname.id,LUNAME=LUPRT003,DEL
```

2. In this example, NetSpool deletes printer LU LUPRT003 from its list of selected printers. Use the LUNAME DEL command without preceding it with a VARY INACT command only when the printer LU is not successfully started. That is, the printer LU is in the WAITING state.

```
F jobname.id,LUNAME=LUPRT003,DEL
```

Stopping an LU with the LUNAME PURGE command:

The LUNAME PURGE command deactivates the printer LU in VTAM immediately and closes the printer LU, deleting it from NetSpool's list of selected printers. NetSpool creates an output data set with any data that is received from VTAM before you enter the LUNAME PURGE command. However, the VTAM session is ended as soon as the command is entered, and the printer LU does not receive any new data from VTAM.

Tip: The LUNAME PURGE command is useful when, because of a significant error with the printer LU, you want processing to stop immediately for that printer LU and you do not want to allow any more data to be sent to it.

The format of the LUNAME PURGE command is:

```
F jobname[.id],LUNAME=lu-name,PURGE
```

lu-name
> Specifies the name of the printer LU. The name must match the LU name in a printer definition in the Printer Inventory.

Example: In this example, the VTAM session with printer LU LUPRT003 ends immediately. LUPRT003 is in a PENDING CLOSE state while NetSpool creates an output data set for any data it received. NetSpool deletes LUPRT003 from its list of selected printers.

```
F jobname.id,LUNAME=LUPRT003,PURGE
```

Displaying the status of NetSpool printer LUs

Use either Infoprint Central or the DISPLAY command to display the status of printer LUs.

Limitation: You cannot use Infoprint Central to start, stop, or display the status of NetSpool LUs if you start more than one NetSpool task. However, you can use Infoprint Central to do other functions.

The DISPLAY command returns these states:

- STARTED

  NetSpool selected this printer LU for processing. The printer LU is either in a session with a VTAM application or is ready to accept a request from a VTAM application to establish a session.

- WAITING

  NetSpool selected the printer LU for processing, but is unable to start the printer LU because it is not available. NetSpool periodically (every 60 seconds) attempts to start the printer, automatically starting it when it becomes available. You do not receive a message on the console when NetSpool automatically starts a printer LU later.

  Because NetSpool periodically attempts to start printer LUs in the WAITING state, you might want to either start or stop a printer LU that is in the WAITING state.

  – To start a printer LU that is not active in VTAM, activate the printer LU with the VTAM VARY ACT command. When the printer becomes active, NetSpool automatically starts the printer LU.

  – To stop a printer LU, enter the LUNAME DEL command. Because NetSpool has not successfully started the printer LU, you do not need to first vary the printer inactive in VTAM.

  – To start a printer LU that is started by another NetSpool task, first stop the printer in the other NetSpool started task with the VTAM VARY INACT command and the LUNAME DEL command. Then, activate the printer LU in VTAM. This NetSpool task automatically starts it.

- PENDING CLOSE

NetSpool selected this printer LU for stopping because you entered the LUNAME DEL or LUNAME PURGE command. NetSpool will stop the printer LU after NetSpool creates an output data set with all data received before the LUNAME DEL or LUNAME PURGE command was entered.

After the printer LU stops, it no longer is displayed when you enter the DISPLAY command for this NetSpool started task. At that point, you can restart the printer LU by activating the printer LU with the VTAM VARY ACT command and then adding the printer LU to NetSpool with the LUNAME ADD command.

Tip: The status that is displayed is the status for this NetSpool started task only. For example, a printer LU might not display as STARTED, WAITING, or PENDING CLOSE, but it might be started in another NetSpool task.

The format of the DISPLAY command is:

```
F jobname.id,DISPLAY {LUNAME=luname | SELECTED | STARTED | WAITING | TRACE}
```

LUNAME=*luname*

Requests that NetSpool display the status for the printer LU. You see a message like one of these:

- *luname* IS NOT SELECTED.
- *luname* IS STARTED SESSION=ACTIVE PRINTERNAME=MYPRINTER LUTYPE=1 PLU=IMS001 EOFRULE=EB.
- *luname* IS WAITING.
- *luname* IS PENDING CLOSE.

SELECTED

Requests that NetSpool display the printer LUs that are selected for processing. The status of the printers is STARTED, WAITING, or PENDING CLOSE. The minimum abbreviation that is allowed is SEL.

STARTED

Requests that NetSpool display all printer LUs in the STARTED state. The minimum abbreviation that is allowed is STA.

WAITING

Requests that NetSpool display all printer LUs in the WAITING state. The minimum abbreviation that is allowed is WAI.

TRACE

Requests that NetSpool display all printer LUs that are being traced and whether internal tracing is active. For more information about tracing printer LUs, see *z/OS Infoprint Server Messages and Diagnosis*. The minimum abbreviation that is allowed is TRA.

Additonal information for STARTED status:

When you use the DISPLAY command with LUNAME, SELECTED, or STARTED, you see additional information that can help you diagnose problems with NetSpool LUs, VTAM definitions, and VTAM application programs. The information can include:

- SESSION=*status*

  The indicator of whether the VTAM session with NetSpool is established (ACTIVE) or not established (INACTIVE). The session status can help you diagnose problems when you are not sure if a primary logical unit (PLU) established a session with the NetSpool printer LU.

- PRINTERNAME=*printer-definition-name* or POOLNAME=*printer-pool-definition-name*

  The name of the printer definition or printer pool definition for this LU. The printer definition name can help you diagnose problems when you need to determine which printer definition contains the NetSpool items that are associated with the LU, such as end-of-file rules and formatting options.

- LUTYPE=*lu-type*

  The type of LU (0, 1, or 3). For active sessions, you see the current LU type. For inactive sessions, you see the LU type of the previous session. If a session is not established, you do not see this information. The LU type can help you diagnose problems when you see a NetSpool data stream message or when

you are trying to change the page format. NetSpool does not control page formatting for 3270 data streams (LU0 and LU3) or when **netspool-formatting=none**.

- PLU=*plu-name*

  The name of the primary logical unit. For active sessions, you see the current PLU name. For inactive sessions, you see the PLU name of the previous session. If a session is not established, you do not see this information. The PLU name can help you diagnose problems when more than one VTAM application prints on the LU and a print request is in error.

- EOFRULE=*rule*

  The End of File rule that NetSpool is using (End-of-bracket (EB), End-of-chain (EC), End-of-session (ES), String, or Timer). The EOF rule can help you diagnose problems when jobs do not close on the spool or when print requests are separated into several jobs.

Example: In this example, NetSpool lists the status of all printer LUs selected for processing.

```
F jobname.id,DISPLAY SELECTED
```

This is sample output from the DISPLAY command:

```
API1008I Display of SELECTED LUs.
API1002I LUPRT002 -- LU IS STARTED SESSION=ACTIVE PRINTERNAME=MYPRINTER
         LUTYPE=1 PLU=IMS001 EOFRULE=EB.
API1050I LUPRT000 -- LU IS PENDING CLOSE.
API1002I LUPRT001 -- LU IS STARTED SESSION=INACTIVE PRINTERNAME=YOURPRINTER
         LUTYPE=0 PLU=IMS002 EOFRULE=TIMER.
API1003I LUPRT003 -- LU IS WAITING.
```

Chapter 3. Starting and stopping IP PrintWay FSAs (basic mode)

The following information describes how to start and stop IP PrintWay basic mode functional subsystem applications (FSAs). The information does not apply to IP PrintWay extended mode.

Related information: For more information about the JES2 and JES3 commands, see one of these:

- *z/OS JES2 Commands*
- *z/OS JES3 Commands*

For more information about the MVS commands, see *z/OS MVS System Commands*.

Starting an IP PrintWay functional subsystem (basic mode)

IP PrintWay basic mode operates as a JES functional subsystem (FSS), an extension of JES that runs in its own system address space. Before you start an IP PrintWay functional subsystem (FSS) and the functional subsystem applications (FSAs) under its control, your installation must:

- Customize the Printer Inventory Manager.
- Define an IP PrintWay FSS and one or more FSAs under control of the FSS to JES.
- Customize IP PrintWay and create a cataloged start procedure for each FSS.
- Create an FSS definition for some or all IP PrintWay FSSs in the Printer Inventory.
- Create an FSA definition for some or all IP PrintWay FSAs in the Printer Inventory.

These tasks are described in *z/OS Infoprint Server Customization*.

IP PrintWay uses the configuration information that is specified in the FSS and FSA definitions when the FSS and each FSA starts. FSS and FSA definitions are optional. If an FSS or FSA definition does not exist in the Printer Inventory, IP PrintWay uses default configuration information.

After these tasks are done, you can enter commands at the operator console to start each IP PrintWay FSA. You do not need to enter a command to start the FSS because JES starts the FSS automatically when you start the first FSA under control of that FSS.

Notes:

1. If you change either the IP PrintWay startup JCL procedure or the IP PrintWay FSS definition after IP PrintWay is already started, you must stop and restart the IP PrintWay FSS to pick up the changes.
2. If you change the IP PrintWay FSA definition after IP PrintWay is already started, you must stop and restart the IP PrintWay FSA to pick up the changes.
3. You do not need to stop and restart IP PrintWay FSAs if you restart TCP/IP. IP PrintWay automatically reestablishes connection with TCP/IP.

If an FSA is defined with the START=YES parameter on the JES2 PRT*nnnnn* statement, JES2 automatically starts the FSA when you start the z/OS system. JES3 does not support the automatic start option.

To start an IP PrintWay basic mode FSA:

1. Make sure that TCP/IP is started on the z/OS system.
2. Make sure that the Printer Inventory Manager daemon is started. See Chapter 1, "Starting and stopping Infoprint Server daemons," on page 1.
3. Verify that the printers and print servers are online or started. You can start the printers and print servers after you start the IP PrintWay FSA. However, they must be started before the FSA attempts to transmit data to the printer or server. Otherwise, a TCP/IP error occurs.
4. Start the IP PrintWay FSA and the FSS by entering this JES2 or JES3 start command:

JES2

```
$Sfsa_name[,fsa_name … ]
```

JES3

```
*CALL WTR,OUT=fsa_name
```

Replace *fsa_name* with one of these:

- In JES2, the name of the JES PRT*nnnn* statement. For example: PRT0001.
- In JES3, the name in the JNAME parameter of the JES DEVICE statement.

Note: If your installation created an FSA definition for the IP PrintWay FSA, make sure that the name in the FSA definition matches the name that you specify to JES when you start the FSA. If the names do not match, IP PrintWay does not use the information in the FSA definition when the FSA starts.

Stopping an IP PrintWay functional subsystem (basic mode)

To stop an IP PrintWay basic mode functional subsystem (FSS), you first stop all FSAs under its control.

Stopping an FSA (basic mode)

Use JES2 or JES3 commands to stop an IP PrintWay FSA. The FSA stops after it transmits the current data set and data sets already selected for transmission.

JES2

```
$Pfsa_name[,fsa_name … ]
```

JES3

```
*VARY,fsa_name[,fsa_name … ],OFFLINE
*CANCEL,fsa_name
```

Replace *fsa_name* with one of these:

- In JES2, the name of the JES PRT*nnnnn* statement. For example, PRT123.
- In JES3, the name in the JNAME parameter of the JES DEVICE statement.

The *VARY command makes the FSA unavailable for transmitting data sets but lets the current data set finish. The *CANCEL command stops the FSA.

Note: IP PrintWay does not support the JES2 Cancel command ($C).

Processing of data sets retained on JES spool or waiting to be retransmitted (basic mode)

When you stop an FSA, IP PrintWay releases to JES all data sets that are retained after successful or unsuccessful transmission to the printer and all data sets that are waiting to be retransmitted. These data sets can be processed by another IP PrintWay FSA or can be reselected by the same IP PrintWay FSA when the FSA is restarted.

IP PrintWay saves routing, retransmission, and retention information when it releases a data set to JES. When IP PrintWay reselects a data set that is already processed, IP PrintWay uses the saved information to resume processing at the correct point. IP PrintWay retransmits the data set if the retry limit is not yet reached and deletes the data set from the JES spool if the retention time is expired.

After an IP PrintWay FSA stops and releases data sets to JES, you can use JES commands and other spool management products (such as SDSF) to modify the output class, form name, and destination of the released data sets. IP PrintWay, however, does not use the new class, form name, or destination to locate a new printer definition. Instead, IP PrintWay uses the saved routing information.

Tip: After IP PrintWay releases a data set to JES, IP PrintWay ignores any changes you make to the host name, IP address, URL, LU name, print queue name, port number, logmode, retry and retention parameters, and name of Inventory components that contain print options.

Stopping an FSS (basic mode)

Before you stop an FSS, you **must** stop all FSAs under its control. If the FSS was configured with the AUTOSTOP=YES option on the JES2 FSS(*fss_name*) statement, JES2 stops the FSS automatically after you stop all FSAs. In a JES3 environment, JES automatically stops the FSS after you stop all FSAs under its control.

If JES does not automatically stop the FSS, use this MVS operator command to stop the FSS **after** you stop all FSAs under its control:

```
C fss_name
```

Replace *fss_name* with one of these:

- In JES2, the name on the JES FSS(*fss_name*) statement
- In JES3, the name in FSSNAME parameter of the JES FSSDEF statement

Ending an FSA (basic mode)

If you are not able to stop an FSA with the commands described in , in both JES2 and JES3, you can use the MODIFY command with the FORCE parameter. The syntax of this command is:

```
{MODIFY | F} fss_name,FORCE,fsa_name
```

fss_name
Specifies the name of the FSS that manages the FSA. The *fss_name* parameter must match the FSSNAME parameter of the JES FSSDEF statement for the FSS.

FORCE
Specifies that the FSA is to be stopped.

fsa_name
Specifies the FSA to be stopped.

Tip: IP PrintWay writes message ANFM027I when the FORCE parameter is processed. If the FSA is tracing to an external trace data set when the FORCE parameter is used, an abend might occur when the FSS address space ends.

If the MODIFY command is unsuccessful on JES3 systems, enter this JES3 command:

```
*FAIL,fsa_name
```

Chapter 4. Using the IP PrintWay transmission queue (basic mode)

The following information applies only to IP PrintWay basic mode. IP PrintWay extended mode does not use the same transmission queue as IP PrintWay basic mode. If you run IP PrintWay extended mode, use Infoprint Central, JES commands, and other spool management products (such as SDSF) to manage print jobs that IP PrintWay selected from the JES spool. You might want to use Infoprint Central because you can do more actions on IP PrintWay print jobs and printers. See Chapter 5, "Using Infoprint Central," on page 45.

The IP PrintWay basic mode transmission queue contains an entry for each data set that IP PrintWay basic mode selected from the JES spool to process. Each entry contains the status of the transmission of the data set, routing information, and transmission options.

After IP PrintWay basic mode selects a data set from the JES spool for transmission, you cannot use JES commands and other spool management products (such as SDSF) to manage the data set. You must use Infoprint Server ISPF panels to monitor, reroute, retransmit, and delete data sets that IP PrintWay selected.

IP PrintWay initially creates a queue entry for each data set to be transmitted. IP PrintWay retains the queue entry until either IP PrintWay deletes the data set from the JES spool or the IP PrintWay FSA processing the data set ends normally or abnormally and releases the data sets it is processing back to JES so that another IP PrintWay FSA can process them.

Under usual circumstances, you do not need to maintain the IP PrintWay transmission queue because IP PrintWay retains queue entries and deletes queue entries automatically. IP PrintWay retains and deletes entries that are based on retry and retention parameters that are specified either in the printer definition or in the JCL for each data set:

- If the transmission of a data set is successful, IP PrintWay retains the queue entry until the retention period specified for successful transmissions expires and then automatically deletes the queue entry.
- If the transmission of a data set fails (the transmission is still unsuccessful after it is retransmitted the requested number of times), IP PrintWay retains the queue entry until the retention period specified for failed transmissions expires and then automatically deletes the queue entry.

If all IP PrintWay FSAs stop processing, the transmission-queue is typically empty. If any entries do remain, delete the entries or reallocate the data set before you restart IP PrintWay. If you reallocate the data set, you must also reinitialize it, as described in *z/OS Infoprint Server Customization*.

If your installation has used RACF or a similar product to protect the IP PrintWay transmission-queue data set, you might not be authorized to do some or all of these functions. If, for example, you have read-only access to the IP PrintWay transmission-queue data set, you are allowed to list and browse entries but not hold, reset, modify, or delete them. The Infoprint Server ISPF panels show only those functions that you are allowed to do.

Note: Do not use VSAM editing functions to change any records in the IP PrintWay transmission-queue data set.

Starting an Infoprint Server ISPF session (basic mode)

To maintain the IP PrintWay transmission queue by using ISPF panels, you must first start an Infoprint Server ISPF session. For information, see "Starting the ISPF session and configuring the panels" on page 221. Online help is available for each panel, input field, and message. To obtain help, press the HELP function key.

Listing transmission-queue entries (basic mode)

You must display a list of transmission-queue entries before you can do other functions, such as browsing or modifying an individual entry. You can either list all transmission-queue entries, or you can select the entries that you want to list.

Listing all transmission-queue entries (basic mode)

To display a list of all entries on the IP PrintWay transmission queue:

1. On the Infoprint Server Printer Inventory Manager panel, select **5 PrintWay Queue** and press **Enter**.
2. On the IP PrintWay Transmission Queue Selection panel:

   a. Change the name of the transmission-queue data set, if necessary. The name of the transmission-queue data set represents the data set that IP PrintWay uses when it displays and updates entries.

   During an ISPF session, you can work with multiple transmission-queue data sets. For example, if your installation defined multiple IP PrintWay FSSs, you might need to access the transmission-queue data set for each FSS. To change the name of the data set during your ISPF session, change the name on the IP PrintWay Transmission Queue Selection panel.

   If you do not change the name of this data set, IP PrintWay uses name ANF.QUEUE.

   b. Leave all other selection fields blank.

   c. Press **Enter** to display the IP PrintWay Transmission Queue panel.
3. On the IP PrintWay Transmission Queue panel:

   a. Press **Enter** at any time to obtain a current list.

   b. Press the END function key to exit the list.

If the IP PrintWay Basic FSS and all FSAs are shut down, the transmission queue should be empty. If it is not empty, the transmission queue is damaged. Use ANFDEAL and ANFQINIT to recreate it. For more information, see *z/OS Infoprint Server Customization*.

Listing selected transmission-queue entries (basic mode)

You can select entries that are based on one or more of these characteristics of queue entries:

- Printer definition name
- Class, form, and destination name
- Job name
- Date the data set arrived on the IP PrintWay transmission queue
- Time the data set arrived on the IP PrintWay transmission queue
- Status of the transmission
- Port number of the socket
- Name of the print queue
- VTAM logmode
- Host name, IP address, URL, or VTAM LU name of the printer or print server
- Email addresses

To display a list of selected queue entries:

1. On the Infoprint Server Printer Inventory Manager panel, select **5 PrintWay Queue** and press **Enter**.
2. On the IP PrintWay Transmission Queue Selection panel:

   a. Change the name of the transmission-queue data set, if necessary. If your installation defined multiple transmission-queue data sets, use this panel several times to list entries in all transmission-queue data sets.

b. Type values in one or more fields to specify selection criteria. To be listed, transmission-queue entries must meet all of the criteria you specify. Leave blank any fields that you do not want IP PrintWay to consider in selecting entries.

You can use an asterisk (*) in these ways:

- By itself to mean any value
- At the start of a string (*ABC matches values that end with ABC)
- At the end of a string (ABC* matches values that start with ABC)
- As a part of the date or time field, for example: */03/* or 9:*:*

Tip: You cannot use an asterisk as a wildcard in the **Port Number** field.

If you enter a value in the **Print Queue/Logmode** or **Host Name/IP Address/URL/LUName/e-mail** field, use the same lowercase and uppercase characters that are specified in the transmission-queue entry. Although these fields can contain up to 255 characters, you can only enter 185 characters. If necessary, use the asterisk (*) to select longer names. The **Host Name/IP Address/URL/LUName/e-mail** field contains only the first 255 characters of the email address.

c. Press **Enter**.

3. On the IP PrintWay Transmission Queue panel:

a. A hyphen (-) in front of the name in the **Route Name** field indicates that the entry represents a single data set. The data set grouping specified in the printer definition is either **None** or **Job**. An asterisk (*) in front of the name indicates that the entry represents one or more data sets that belong to a concatenation. The data set grouping specified in the printer definition is **Concatenate Job**. For more information about grouping data sets, see "Transmitting multiple data sets in a JES output group (basic and extended mode)" on page 181.

b. Press **Enter** at any time to obtain a current list.

c. Press the END function key to exit the list.

Browsing a transmission-queue entry (basic mode)

When you browse an entry on the IP PrintWay transmission queue, you can view fields, but you cannot change any of them. If a field in an entry is blank when you browse it, it means that IP PrintWay uses a default value for the field.

When the name in the **Route Name** field is preceded by an asterisk, the data that is displayed is from the first data set of the concatenation.

To browse the entry:

1. List the entry or entries that you want to browse, as described in "Listing transmission-queue entries (basic mode)" on page 38.

2. On the IP PrintWay Transmission Queue panel, type B in the **Action** column in front of the entries you want to browse, and press **Enter**.

3. On the IP PrintWay Transmission Queue Entry panel, press the END function key when you want to exit the panel.

Holding a transmission-queue entry (basic mode)

To prevent IP PrintWay from transmitting or automatically deleting a data set on the IP PrintWay transmission queue, you can hold the queue entry. However, you cannot hold the queue entry for a data set that IP PrintWay is currently transmitting to its destination.

When you hold an entry, IP PrintWay retains the data set on the JES spool and changes the status to H (hold). When an entry is in the hold status (H), you can delete, modify, or reset it.

You can hold an entry for an individual data set, all entries for a selected list of data sets, or all entries with a certain name on a selected list. When you hold an entry whose name in the **Route Name** field is preceded by an asterisk, all data sets in the concatenation are held.

To restore a queue entry to its original status, hold the entry again. IP PrintWay restores the original status of any entry that is already in the hold status.

Holding a queue entry (basic mode)

To hold one or more individual queue entries:

1. List the entry or entries that you want to hold, as described in "Listing transmission-queue entries (basic mode)" on page 38.
2. On the IP PrintWay Transmission Queue panel, type H in the **Action** column in front of the entries you want to hold, and press **Enter**.

Holding all transmission-queue entries in a list (basic mode)

You can hold a list of transmission-queue entries, selected based on criteria such as printer definition name, status, or address of the printer. You can also hold only those entries in the list that have a specified route name. The route name is displayed in the **Route Name** field and contains either the printer definition name or the CLASS, FORM, and DEST values that are specified in the printer definition.

To hold a list of queue entries:

1. List the entries that you want to hold, as described in "Listing transmission-queue entries (basic mode)" on page 38.
2. On the IP PrintWay Transmission Queue panel, enter one of these values on the command line:
   a. HOLD to hold all entries in the list
   b. HOLD *routename* to hold all entries in the list with the specified name in the **Route Name** field
3. To exit the panel, press the END function key.

Resetting a transmission-queue entry (basic mode)

To retransmit a data set on the IP PrintWay transmission queue, you can reset its queue entry. However, you cannot reset the queue entry for a data set that IP PrintWay is currently transmitting to its destination.

When you reset a queue entry, IP PrintWay retransmits the data set as soon as possible as if it was the first transmission attempt. Before you reset a queue entry, you can modify the entry and change routing information, formatting options, and translation options. For information, see "Modifying a transmission-queue entry (basic mode)" on page 41.

You can reset an entry for one data set or you can reset entries for a list of data sets. When you reset an entry whose name in the **Route Name** field is preceded by an asterisk, all data sets in the concatenation are reset.

When you reset an entry, IP PrintWay automatically changes these fields:

- The **Transmission Status** field is set to Z (queued for first attempt).
- The **Next Activity** field is set to the current date and time.
- The **Retries** field is set to 0.

Resetting a queue entry (basic mode)

To reset one or more queue entries:

1. List the entry or entries that you want to reset, as described in "Listing transmission-queue entries (basic mode)" on page 38.

2. On the IP PrintWay Transmission Queue panel:

   a. If you want to change routing or options information in the entry before you reset it, type E in the **Action** column in front of the entries you want to edit and press **Enter**. Edit the entries and then press the END function key.

   b. Type R in the **Action** column in front of the entries you want to reset, and press **Enter**.

Resetting all queue entries in a list (basic mode)

You can reset an entire list of queue entries, selected based on criteria such as printer definition name, status, or address of the printer. You can also reset only those data sets in the list that have a specified route name. The route name is displayed in the **Route Name** field and contains either the printer definition name or the CLASS, FORM, and DEST values that are specified in the printer definition.

To reset a list of queue entries:

1. List the entries that you want to reset, as described in "Listing transmission-queue entries (basic mode)" on page 38.

2. On the IP PrintWay Transmission Queue panel, enter one of these values on the command line:

   • RESET to reset all entries in the list

   • RESET *routename* to reset all entries in the list with the specified name in the **Route Name** field

3. To exit the panel, press the END function key.

Modifying a transmission-queue entry (basic mode)

You can edit fields in a transmission-queue entry only if IP PrintWay is not currently transmitting the data set to its destination. That is, the status of the entry cannot be A (active). When you edit a field, the change takes effect immediately. If, for example, you change the address of the printer, IP PrintWay uses the new address when it next transmits the data set.

When you modify an entry whose name in the **Route Name** field is preceded by an asterisk, the asterisk indicates that the entry contains data for the first data set of the concatenation. Except for LPR options, changes you make to this entry affect all data sets in the concatenation. For example, if you change the retry time for an entry, the retry time is changed for all the data sets in the concatenation because all the data sets are sent together. Because IP PrintWay allows different LPR options for individual data sets of a concatenation, changes you make to the LPR options field apply only to the first data set of the concatenation.

⚠️ **Attention:** While you are editing a queue entry, IP PrintWay does not transmit the data set or any other data sets scheduled for transmission to the same address. Therefore, make your changes and press the END function key as quickly as possible. If you take longer than 12 minutes, IP PrintWay proceeds with transmission of data sets to the destination.

You can do these tasks by modifying a queue entry:

• Reroute a data set to a different print queue.

• Retain the data sets on the JES spool for a shorter or longer time.

• Expedite or delay the next retransmission attempt.

• Increase or decrease the number of retransmission attempts.

• Change the maximum document size and response timeout.

• Change formatting options for the next transmission of the data set.

• Change translation options for the next transmission of the data set.

To modify an entry:

1. List the entries to modify, as described in "Listing transmission-queue entries (basic mode)" on page 38.

2. On the IP PrintWay Transmission Queue panel, type E in the **Action** column in front of the entries you want to edit, and press **Enter**.

3. On the IP PrintWay Transmission Queue Entry panel:

   a. Edit the fields as necessary. Press **Enter** to validate the fields.

   b. To save the queue entry, but maintain the panel on the screen, enter SAVE on the command line. You can now continue editing the entry:

      • To save the options entry and exit the panel, press the END function key.

      • To exit the panel without saving your changes, enter CANCEL on the command line.

Rerouting a data set (basic mode)

To reroute a data set to another destination, change the routing information in these fields:

• If the transmission protocol is LPR, specify the **Host/IP Address/URL/LUName** and **Print Queue/ Logmode** fields.

• If the transmission protocol is SOCKET, specify the **Host/IP Address/URL/LUName** and **Port Number** fields.

• If the transmission protocol is IPP, specify the **Host/IP Address/URL/LUName** field.

• If the transmission protocol is email, specify the **Host/IP Address/URL/LUName/e-mail** field.

If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the entry after you change the routing information. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see .

If the status of the queue entry is Z (queued for first attempt) or R (queued for retry), do not reset the entry after you change the routing information.

Changing retention periods (basic mode)

To retain a queue entry with a status of Z (queued for first attempt) or R (queued for retry) for a longer or shorter time, change the **Retain Time: Success** or **Retain Time: Failure** fields. Type FOREVER in the **Retain Time** field if you want IP PrintWay to retain the queue entry forever.

To retain a queue entry with a status of S (succeeded) or F (failed) for a longer or shorter time, change the date and time in the **Next Activity** field. Type NEVER in the **Next Activity Date** and **Next Activity Time** fields if you want IP PrintWay to retain the queue entry forever.

Changing the time between retries (basic mode)

To increase or decrease the time between retries of a queue entry with a status of Z (queued for first attempt) or R (queued for retry), change the time in the **Retry: Time** field. The new retry time takes effect after the next transmission.

To retransmit the data set immediately, reset the queue entry, as described in .

Changing the retry limit (basic mode)

To increase or decrease the retry limit for a queue entry with a status of Z (queued for first attempt) or R (queued for retry), change the retry limit in the **Retries** field. To stop retransmission attempts, change the retry limit in the **Retries** field to 0.

To retry a failed transmission (status F), increase the retry limit in the **Retries** field. Also, change the date and time in the **Next Activity** field to the time you want for the next retransmission attempt.

Tip: You can also retry a failed transmission by resetting the queue entry, as described in .

Changing the maximum document size and response timeout value (basic mode)

To increase or decrease the maximum number of bytes that IP PrintWay can transmit to the printer, specify the number of bytes in the **Maximum document size** field. IP PrintWay uses the new size when it retransmits the data set.

To increase or decrease the number of seconds that IP PrintWay waits for a response from the printer, change the value in the **Response timeout** field. This field does not apply when the email protocol is used. IP PrintWay uses the new value when it retransmits the data set.

If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the queue entry after you change the values. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see "Resetting a transmission-queue entry (basic mode)" on page 40.

If the status of the queue entry is Z (queued for first attempt) or R (queued for retry), do not reset the entry after you change the values.

Changing formatting options (basic mode)

To change the formatting options and formatting rules of a data set, select **Change Formatting Options** and press **Enter**. Edit the fields in the Formatting Options Entry panel. IP PrintWay uses the new formatting options and formatting rules when it retransmits the data set.

If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the queue entry after you change the formatting options and rules. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see "Resetting a transmission-queue entry (basic mode)" on page 40.

If the status of the queue entry is Z (queued for first attempt) or R (queued for retry), do not reset the entry after you change the formatting options and rules.

Changing translation options (basic mode)

To change the translation options of a data set, select **Change Translation Options** and press **Enter**. Edit the fields in the translation Options Entry panel. IP PrintWay uses the new translation options when it retransmits the data set.

If the status of the queue entry is S (succeeded), F (failed), or H (entry held), you must reset the queue entry after you change the translation options. Resetting the entry causes IP PrintWay to retransmit the data set. For information, see "Resetting a transmission-queue entry (basic mode)" on page 40.

If the status of the queue entry is Z (queued for first attempt) or R (queued for retry), do not reset the entry after you change the translation options.

Deleting a transmission-queue entry (basic mode)

Under usual circumstances, you do not need to delete queue entries. IP PrintWay automatically deletes a transmission-queue entry after it retries an unsuccessful transmission the specified number of times and after the retain time that is specified for the data set, if any, expires.

Under some circumstances, you might need to delete a specific queue entry. For example, if the RETAINF or RETAINS JCL parameter or the printer definition specifies a retention time of **FOREVER**, you need to delete the queue entry manually.

To delete a queue entry:

1. List the entries you want to delete, as described in "Listing transmission-queue entries (basic mode)" on page 38.
2. On the IP PrintWay Transmission Queue panel, type D in the **Action** column in front of the queue entries you want to delete, and press **Enter**.

3. On the Delete Confirmation panel, press **Enter** to delete the entry. Press the END function key to cancel the delete request.

When you delete a transmission-queue entry, IP PrintWay also removes the data set from the JES spool.

Querying the status of a print queue (basic mode)

If a data set did not successfully print and a data set entry still remains on the transmission queue, you might want to query the status of the printer's queue. You can query the status of the printer's queue only if IP PrintWay used the LPR protocol to transmit the data set to the printer.

To query the status of the printer's queue:

1. List entries for the printer you want to query, as described in "Listing transmission-queue entries (basic mode)" on page 38.
2. On the IP PrintWay Transmission Queue panel, type S (for short queue status) or L (for long queue status) in the **Action** column in front of the queue entry for the data set, and press **Enter**.

Results:

- If IP PrintWay was able to establish a connection with the printer:

```
Queue State for
    PASS
On remote host:
    9.99.176.81

2 entries
0-port busy. No info
```

- If IP PrintWay was not able to establish a connection with the printer:

```
CONNECT ERROR
```

Chapter 5. Using Infoprint Central

Infoprint Central is a print management application that runs on the web. It is primarily used by help desk operators. However, other authorized users and job submitters can also use Infoprint Central. The following information gives you an overview of how you can use Infoprint Central and describe tasks to get started:

Tips:

1. If you run IP PrintWay extended mode, use Infoprint Central because you can work with IP PrintWay extended mode printers. You can also work with output data sets that IP PrintWay extended mode is currently processing, and display the status of output data sets, including whether IP PrintWay retained them.

2. If you run IP PrintWay basic mode, you cannot use Infoprint Central to work with jobs that are submitted to IP PrintWay basic mode or work with IP PrintWay printers. However, you can use Infoprint Central to do other functions.

With Infoprint Central you can do these actions:

- **Work with print jobs**: You can find and work with groups of output data sets (called *print jobs*) that are on the JES spool. You can see more information about print jobs that Infoprint Server or PSF for z/OS processes. For example, you can see whether an Infoprint Server print job completed successfully and where it printed – even if the print job is no longer on the JES spool.

  You can use search criteria such as job name and owner to find print jobs. After you find a print job, you can delete, hold, release, move, and change the priority of the print job. And, you can see all messages from Infoprint Server for that one print job without having to search through message logs.

  Tips:

  1. A print job consists of one or more output data sets that JES grouped together. In JES2, a print job is called an *output group*.

  2. Infoprint Central does not display some print jobs. See Limitations.

- **Work with printers**: You can find and work with printers that are defined in the Printer Inventory – including AFP printers that are controlled by PSF (called *PSF printers*), and printers to which IP PrintWay can send print jobs (called *IP PrintWay printers*).

  You can also work with PSF AFP Download Plus senders as if they were PSF printers. An AFP Download Plus sender sends print jobs to a receiver on another system for printing, emailing, faxing, or archiving.

  You can use search criteria such as printer name and location to find printers. After you find a printer, you can see its status, the printer's job queue, and view other properties of the printer. For example, you can see whether the printer is processing, idle, or offline, and you can see the level of paper and toner. You can also do these printer actions:

  – PSF printers: Start, stop, interrupt, pause (JES2 only), ping, repeat, space, turn online, turn offline, and reset. Also, you can change forms and other job selection criteria, you can see all messages from PSF, and you can link to the web pages of some printers. If the PSF printer is an AFP Download Plus sender, you can do a limited set of PSF printer actions.

- IP PrintWay printers: Start, stop, redirect, restore, ping, turn online, turn offline, and reset. Also, you can see all the messages from Infoprint Server for that one printer, and you can link to the web pages of some printers.

Tips:

1. Some status information and printer actions (ping, turn online, turn offline, reset, display web page) are available only for TCP/IP-attached printers.

2. If multiple printer definitions in the Printer Inventory have the same printer IP address or host name, Infoprint Central displays only one IP PrintWay printer. However, if the printer definitions have different queue names or port numbers, Infoprint Central displays a separate IP PrintWay printer for each queue name or port number.

- **Work with NetSpool logical units**: You can work with any NetSpool logical units (LUs) that are defined to NetSpool in the Printer Inventory and also defined to VTAM.

  You can find LUs by name. After you find a NetSpool LU, you can start and stop it. When you start an LU, that LU is started in both Infoprint Server and VTAM. Likewise, when you stop an LU, that LU is stopped in both Infoprint Server and VTAM. You can also display information about the current VTAM session that is established with a NetSpool LU.

- **Display printer definitions**: You can display the properties of any printer definition in the Printer Inventory. You can use search criteria, such as the printer definition name and the printer's location, to find printer definitions. This action can help you find the name of a printer in your area.

- **Work with job selection rules**: You can display the job selection rules that are defined in the Printer Inventory. IP PrintWay selects only print jobs whose properties match all of the criteria in a started job selection rule. In addition, you can start and stop IP PrintWay job selection rules to change which print jobs IP PrintWay processes.

- **Check system status**: You can see the status of all Infoprint Server daemons and tasks. This action can help you determine the cause of a printing problem.

- **View Infoprint Central logs**: You can view the Infoprint Central message logs to find out who used Infoprint Central to do an action on a print job, printer, or NetSpool LU. For example, you can find out who deleted a print job or who redirected a printer.

Limitations:

1. You can work only with objects to which your security administrator gives you RACF authorization. For information about the authorization that is required to work with different objects, see *z/OS Infoprint Server Customization*.

2. You can work only with printers to which either PSF or IP PrintWay extended mode can print.

3. You cannot work with NetSpool LUs if more than one NetSpool task is running. Instead, you must use NetSpool commands and VTAM commands as described in .

4. Infoprint Central does not display these types of print jobs because they are numerous and users typically do not print them:

   - Held print jobs with only documents that have these DD names: JESJCL, JESMSGLG, JESYSMSG, SYSPRINT, and SYSTSPRT

   - Print jobs with job name BPXAS

5. Infoprint Central does not display print jobs that are routed to another JES node.

Infoprint Central actions

You can use Infoprint Central to do the actions that are listed in the following tables. For a complete description of each action, see the online help for Infoprint Central. The images that are shown are from Infoprint Central.

Table 7. Infoprint Central actions for Infoprint Server print jobs

Infoprint Central action	Brief description
Change priority	Change the priority of print jobs.
Delete	Delete print jobs.
Hold	Hold print jobs.
Move	Move print jobs to another printer.
Release	Release print jobs for processing.
View log	View messages for print jobs.
View properties	View all properties of print jobs.

Table 8. Infoprint Central actions for JES print jobs

Infoprint Central action	Brief description
Change priority	Change priority of print jobs.
Delete	Delete print jobs.
Hold	Hold print jobs.
Release	Release print jobs for processing.
View log	View messages for print jobs.
View properties	View all properties of print jobs.

Table 9. Infoprint Central actions for IP PrintWay printers	
Infoprint Central action	**Brief description**
Ping	Ping IP PrintWay printers.
Redirect	Redirect print jobs to an alternative IP PrintWay printer.
Reset	Reset TCP/IP-connected IP PrintWay printers.
Restore	Stop redirecting print jobs to alternative printers.
Start	Resume printing to IP PrintWay printers.
Stop	Stop printing to IP PrintWay printers.
Turn offline	Turn TCP/IP-connected IP PrintWay printers offline.
Turn online	Turn TCP/IP-connected IP PrintWay printers online.
View log	View messages for IP PrintWay printers.

Table 10. Infoprint Central actions for PSF printers	
Infoprint Central action	**Brief description**
Change forms	Change forms that are loaded on PSF printers.
Change job selection	Change the job selection criteria (also called work selection criteria) for PSF printers.
Interrupt	Interrupt the current print job on PSF printers.
Pause	Pause the current print jobs (JES2 only).
Ping	Ping PSF printers.

Table 10. Infoprint Central actions for PSF printers (continued)

Infoprint Central action	Brief description
Repeat	Repeat current print jobs on PSF printers
Reset	Reset TCP/IP-connected PSF printers.
Space	Backward space or forward space PSF printers.
Start	Start printing to PSF printers.
Stop	Stop printing to PSF printers.
Turn offline	Turn TCP/IP-connected PSF printers offline.
Turn online	Turn TCP/IP-connected PSF printers online.
View log	View messages for PSF printers.
View properties	View properties of PSF printers.

Table 11. Infoprint Central actions for IP PrintWay job selection rules

Infoprint Central action	Brief description
Start	Start selecting print jobs from the JES spool using with the criteria in the IP PrintWay job selection rule.
Stop	Stop selecting print jobs from the JES spool with the criteria in the IP PrintWay job selection rule.

Table 12. Infoprint Central actions for NetSpool logical units (LUs)

Infoprint Central action	Brief description
Start	Vary NetSpool logical units online and start receiving print requests.
Stop	Vary NetSpool logical units offline and stop receiving print requests.

Table 13. Infoprint Central actions for printer definitions	
Infoprint Central action	**Brief description**
View properties	View properties of printer definitions. (You cannot change any properties.)

Table 14. Infoprint Central actions for system	
Infoprint Central action	**Brief description**
Check system status	View status of all Infoprint Server daemons and the NetSpool started task.

Infoprint Central actions compared to JES commands

You can use Infoprint Central to do some of the same tasks you can do with JES commands. shows Infoprint Central actions that you can do and the comparable JES commands.

Table 15. Infoprint Central actions compared to JES commands		
Infoprint Central action	**JES2 commands**	**JES3 commands**
Display print jobs	$D O JOB *jobno*	*INQUIRY,J=*jobno*
Hold print jobs	$T O JOB *jobno*,OUTGRP=*groupid*, NDISP=HOLD	*MODIFY,U,J=*jobno*,NQ=HOLD
Release print jobs (See **"use-output-disposition" on page 332** to determine whether Infoprint Central uses the document OUTDISP value when it releases print jobs from the JES2 spool.)	$T O JOB *jobno*,OUTGRP=*groupid*, NDISP=WRITE,REL=ALL	*MODIFY,U,J=*jobno*,Q=HOLD,NQ=WTR, NH=N
Delete print jobs	$C O JOB *jobno*,OUTGRP=*groupid*	*MODIFY,U,J=*jobno*,C
Change priority of print jobs	$T O JOB *jobno*,OUTGRP=*groupid*, PRIORITY=*nnn*	*MODIFY,U,J=*jobno*,NP=priority
Display printers	$D PRT*nnnn*	*INQUIRY,D,D=*devname*
Stop PSF printers	$P PRT*nnnn*	*RESTART,*devname*,T
Stop PSF printers, delete current print jobs	$P PRT*nnnn* $C PRT*nnnn*	*CANCEL,*devname*
Start PSF printers	$S PRT*nnnn*	[*VARY,*devname*,ONLINE] *CALL,WTR,OUT=*devname* *S,*devname*

Table 15. Infoprint Central actions compared to JES commands (continued)

Infoprint Central action	JES2 commands	JES3 commands
Pause PSF printers	$Z PRT*nnnn*	N/A
Interrupt PSF printers	$I PRT*nnnn*	*RESTART,*devname*,HOLD

Change PSF printers' job selection criteria	$T PRT*nnnn*[,F=*form*][,CL=*classes*] [,PLIM=*pagelimits*][,PRM=*prmode*] [,CR=*creator*][,W=*writer*][,R=dest]	One of these commands:
		• *RESTART,*devname* [F=*form*] [WC=*classes*] [PG=*pagelimits*] [PM=*prmode*]
		• [*VARY,*devname*,ONLINE]
		  *CALL,WTR,OUT=*devname* [F=*form*] [WC=*classes*] [PG=*pagelimits*] [PM=*prmode*]
		  *S,*devname*

Change forms on PSF printers	$T PRT*nnnn*,F=*form*	One of these commands:
		• *RESTART,*devname* F=*form*
		• [*VARY,*devname*,ONLINE]
		  *CALL,WTR,OUT=*devname* F=*form*
		  *S,*devname*

Space PSF printers	One of these commands: • $B PRT*nnnn*[,D][,C][,*pages*] • $F PRT*nnnn*[,D][,C][,*pages*]	*RESTART,*devname*, R=[0] [-*pages*] [+*pages*] [P] [,C]
Repeat current print jobs on PSF printers	$N PRT*nnnn*	*RESTART,*devname*,J

Infoprint Central actions compared to VTAM and NetSpool commands

You can use Infoprint Central to do some of the same tasks you can do with NetSpool and VTAM commands. shows Infoprint Central actions and comparable NetSpool and VTAM commands.

Table 16. Infoprint Central actions compared to VTAM and NetSpool commands

Infoprint Central action	NetSpool and VTAM commands
Display NetSpool LUs	NetSpool: DISPLAY command
Start NetSpool LUs	NetSpool: LUNAME ADD VTAM: VARY NET,ACT
Stop NetSpool LUs	NetSpool: LUNAME PURGE

Infoprint Central actions compared to IP PrintWay basic mode ISPF panels

You can use Infoprint Central to do some of the same tasks for IP PrintWay extended mode that you can do for IP PrintWay basic mode with IP PrintWay basic mode ISPF panels. Table 17 on page 52 shows Infoprint Central actions and comparable IP PrintWay basic mode ISPF panels.

Table 17. Infoprint Central actions compared to IP PrintWay basic mode ISPF panels

Infoprint Central action	IP PrintWay basic mode ISPF panel
View messages	IP PrintWay Message panel
Display print jobs that are processing or retained on IP PrintWay printers	**B** (Browse) action on IP PrintWay Transmission Queue panel
Hold print jobs that are processing or retained on IP PrintWay printers	**H** (Hold) action on IP PrintWay Queue panel
Release print jobs for printing that are waiting for retry or retained on IP PrintWay printers	**R** (Reset) action on IP PrintWay Transmission Queue panel
Move print jobs that are processing, waiting for retry, or retained on IP PrintWay printers	**E** (Edit) action on IP PrintWay Transmission Queue panel
Delete print jobs that are processing, waiting for retry, or retained on IP PrintWay printers	**D** (Delete) action on IP PrintWay Transmission Queue panel

Infoprint Central actions compared to TSO/E commands

You can use Infoprint Central to do some of the same tasks that you can do by using the TSO/E AOPCMND command. Table 18 on page 52 shows Infoprint Central actions and the comparable TSO/E command.

Table 18. Infoprint Central actions compared to TSO/E commands

Infoprint Central action	TSO/E commands
Start IP PrintWay printers	AOPCMND PRINTER '*printer_definition_name*' START [INVENTORY(*inventory*)] [XCFQUALIFIER(*group_qualifier*)]
Stop IP PrintWay printers	AOPCMND PRINTER '*printer_definition_name*' STOP [(COMPLETE | HOLD | DELETE)] [INVENTORY(*inventory*)] [XCFQUALIFIER(*group_qualifier*)]

Customizing your web browser

Infoprint Central supports the following web browsers on workstations with these tested operating systems:

Windows 8.1, and Windows Server 2012

- Google Chrome Version 81.0.4044.122 (Official Build) or later (64-bit)
- Mozilla Firefox 71.0 or later (64-bit)

Windows 10

- Google Chrome Version 81.0.4044.122 (Official Build) or later (64-bit)
- Microsoft Edge Version 80.0.0361.54 or later
- Mozilla Firefox 71.0 or later (64-bit)

Notes:

1. Other browsers might work with Infoprint Central, but have not been tested. Using untested browsers might result in some Infoprint Central functions being unavailable.

2. Some Infoprint Central functions might fail when Infoprint Central uses an SSL (HTTPS) connection to connect with the browser. If this happens, ask your system programmer to grant you READ access to the CSF1SKD and CSF1SKE RACF profiles in the CSFSERV class.

Use these internet settings for your browser.

Required settings:

- Enable JavaScript.
- Enable stylesheets.
- To use responsive design, which lets you zoom the browser window to a maximum of 400% and change the orientation of the browser window, and automatically adjusts the page layout to fit the screen size and orientation, the browser window must be at least 1280 pixels wide.

Suggested settings:

- Do not block or disable all cookies. Infoprint Central stores cookies on your system to save your search values.
- Do not disable the meta refresh security option. Infoprint Central uses the meta refresh function to display your search results automatically.
- For better performance, set your browser to cache files.

Logging on and off Infoprint Central from the web

To use Infoprint Central, you must log on with an authorized user ID and password. When you are done, you can log off of Infoprint Central.

Important: In z/OS V2R2 and later, only the IBM HTTP Server—Powered by Apache, a base element of z/OS, is supported. You must now use the Apache 31-bit IBM HTTP Server with Infoprint Central. For information about configuring the IBM HTTP Server—Powered by Apache, see *z/OS Infoprint Server Customization*.

To start using Infoprint Central:

1. Enter a URL in the browser:
    - For the English version:

        ```
        http://hostname:port/Infoprint/En_US/IPS.html
        ```

        If the IBM HTTP Server—Powered by Apache uses Secure Sockets Layer (SSL):

        ```
        https://hostname:port/Infoprint/En_US/IPS.html
        ```

    - For the Japanese version:

        ```
        http://hostname:port/Infoprint/Ja_JP/IPS.html
        ```

If the IBM HTTP Server—Powered by Apache uses Secure Sockets Layer (SSL):

```
https://hostname:port/Infoprint/Ja_JP/IPS.html
```

hostname
    The address of the z/OS system where the IBM HTTP Server - Powered by Apache is running.
port
    The port where the IBM HTTP Server—Powered by Apache receives requests. If the HTTP server receives requests at the default port, you can omit the port number. The default port number depends on whether you customized the HTTP server to use Secure sockets layer (SSL):

- The SSL default port is 443.
- Otherwise, the default port is 80.

Example: If the HTTP server receives requests at the default port, you can enter:

```
http://hostname/Infoprint/En_US/IPS.html
```

or

```
https://hostname/Infoprint/En_US/IPS.html
```

2. Log on to Infoprint Central with your user name and password.

Tip: When you log on to Infoprint Central, you can log on to only one z/OS system. You can see all the Infoprint Server print jobs, printer queues, and Infoprint Server messages for that one z/OS system only. Therefore, if you configure IP PrintWay extended mode to print on the same printers from different z/OS systems, you must open separate instances of your web browser so that you can see all print jobs on a printer's queue and all messages from IP PrintWay about a printer.

To stop using Infoprint Central:

1. Select your user name on the title bar.
2. Select **Sign Out**.

Chapter 6. Using the TSO/E AOPCMND command to start and stop IP PrintWay printers (extended mode)

The AOPCMND TSO/E command starts and stops IP PrintWay extended mode printers from TSO instead of from Infoprint Central.

Tip: To use the AOPCMND command, you must activate MVS Message Service.

Format

```
AOPCMND PRINTER 'printer_definition_name'
                {START | STOP [(COMPLETE | HOLD | DELETE)] }
                [INVENTORY(inventory_name)]
                [XCFQUALIFIER(group_qualifier)]
```

Description

You can use the TSO/E command, AOPCMND, to start and stop IP PrintWay extended mode printers from TSO instead of from Infoprint Central.

Result: After you enter the AOPCMND command, you see one or more messages. The messages can include:

```
AOP078W Daemon daemon is not running.
AOP197I Request to action target has been sent to daemon in XCF group group.
AOP198E AOPCMND failed with diagnostic_data.
AOP3504I IP PrintWay started the printer as requested by user_ID.
AOP3505I IP PrintWay stopped the printer as requested by user_ID.
AOP3506I The printer was already started.
AOP3507I The printer was already stopped.
```

Options

PRINTER '*printer_definition_name*'

Specifies the printer definition name of the printer that you want to start or stop. This option is required.

Rules:

1. Enclose the printer definition name in single quotation marks.
2. The printer definition name is case-sensitive.

START | STOP [(COMPLETE | HOLD | DELETE)]

Starts or stops the specified printer. This option is required. You can specify one of these values:

START

Starts the specified printer.

STOP [(COMPLETE | HOLD | DELETE)]

Stops the specified printer based on the specified option. You can specify one of these values:

COMPLETE

The printer stops after the current job completes. This option is the default.

HOLD

The current job is held and the printer stops.

DELETE

The current job is deleted and the printer stops.

INVENTORY(*inventory_name*)
> Specifies the Printer Inventory name that is used to build the cross-system coupling facility (XCF) group name. The name must be a Printer Inventory that is running. The default is AOP1.

XCFQUALIFIER(*group_qualifier*)
> Specifies the one-character, alphanumeric XCF group qualifier name that is used to build the XCF group name. If you omit this option, the value is blank.

Usage notes

1. Before you run the AOPCMND command, your installation needs to customize Infoprint Server to use the command. For information, see *z/OS Infoprint Server Customization*.
2. To use the AOPCMND command, you must have READ access to the AOP.ADMINISTRATOR profile in the PRINTSRV class.
3. Before you use AOPCMND to start or stop printers, the IP PrintWay daemon, **aopoutd**, must be active.
4. You can run the AOPCMND command from any processor in the sysplex where Infoprint Server is running. The TSO/E user does not need to be on the same processor as Infoprint Server.
5. Run the AOPCMND command from the TSO/E READY prompt, ISPF 6, or a TSO command processor (running as a batch job or started task).

Examples

1. To stop a printer, use the following command at the READY prompt. The IP PrintWay printer finishes printing the current job and then stops.

   ```
   READY
   aopcmnd printer 'lp1happy' stop
   ```

   You see these messages when the printer stops successfully:

   ```
   AOP197I REQUEST TO STOP-COMPLETE lp1happy HAS BEEN SENT TO OUTIBM00 IN XCF GROUP
   AOPAOP1
   READY
   AOP3505I IP PrintWay stopped the printer, as requested by TSOUSER.
   CN(INTERNAL)
   READY
   ```

2. To stop the printer immediately and place the current print job into a held state, use this command at the READY prompt:

   ```
   READY
   aopcmnd printer 'lp2happy' stop(hold)
   ```

   You see these messages when the printer is held successfully:

   ```
   AOP197I REQUEST TO STOP-HOLD lp2happy HAS BEEN SENT TO OUTIBM00 IN XCF GROUP
   AOPAOP1
   READY
   AOP3505I IP PrintWay stopped the printer, as requested by TSOUSER.
   CN(INTERNAL)
   READY
   ```

Exit values

0
> Starting or stopping of the printer was successfully initiated.

>0
> An error occurred that prevented starting or stopping the printer.

Related information

For more information about customizing the AOPCMND command, see *z/OS Infoprint Server Customization*.

Chapter 7. Working with output data sets on the JES spool by using JES commands and SDSF

These tasks describe how to use JES commands and the JES2 System Display and Search Facility (SDSF) to work with output data sets that Infoprint Server processes:

- "Locating output data sets allocated by Infoprint Server" on page 59
- "Using JES commands and SDSF to work with output data sets" on page 60

Locating output data sets allocated by Infoprint Server

Table 19 on page 59 shows the fields that the JES2 System Display and Search Facility (SDSF) (or a comparable product) displays that can help you locate data sets that Infoprint Server allocated on the JES spool. The information that SDSF displays in each field depends on how the print request was submitted.

Table 19. SDSF fields

If the print request was submitted in this way:	Job name field contains	Job ID field contains	Owner field contains	Last qualifier of data set name contains
z/OS UNIX **lp** command	User ID of the job submitter[1]	Infoprint Server job ID[2]	User ID of the job submitter	Last 8 characters of the name of the file to be printed[3]
AOPPRINT JCL procedure	Job name	z/OS job ID assigned by JES	User ID of the job submitter	Last 8 characters of the name of the file to be printed[3]
Batch job that uses a DD JCL statement [4]	Job name	z/OS job ID assigned by JES	User ID of the user who started the Infoprint Server daemons	Name that is specified in the DSNAME JCL parameter [5]
Print command or application on a remote system[6]	Name of the job submitter on the remote system[1, 7]	Infoprint Server job ID[2]	User ID of the user who started the Infoprint Server daemons	Last 8 characters of the name of the file to be printed[3]
VTAM application (such as a CICS and IMS application)	Owner name from the printer definition or print data, or the member name of the NetSpool startup procedure[1]	Infoprint Server job ID[2]	User ID of the user who started the Infoprint Server daemons	LU name of the VTAM application (primary LU name)

Table 19. SDSF fields (continued)				
If the print request was submitted in this way:	**Job name field contains**	**Job ID field contains**	**Owner field contains**	**Last qualifier of data set name contains**

1. The job submitter or VTAM application can specify a job name in the **sysout-job-name** job attribute. If specified, this job name is used instead.

2. The Infoprint Server job ID starts with the 2–character prefix that is defined in the **job-prefix** attribute in the system configuration definition. The default prefix is PS. The job submitter or VTAM application can specify a job ID in the **sysout-job-id** job attribute. If specified, this job ID is used instead. The **lp** command returns this job ID to the job submitter.

3. A # in the data set name indicates that JES does not allow the character in this field. For example, if the file to be printed is myfile.print, this field contains le#print.

4. Infoprint Server allocates the data set on the JES spool when (1) the job submitter uses the Print Interface subsystem and (2) IP PrintWay basic mode sends data sets to the Print Interface LPD, a situation that can occur when the **resubmit for filtering** option is selected in the printer definition.

5. A ? in the data set name indicates that the DSNAME parameter was not specified.

6. Print commands include the **lpr**, **enq**, **lp**, and **print** commands. Job submitters can also print from a remote system by using SAP R/3 or a standard Windows print submission method.

7. If the document was submitted with an **lpr** command, the job name is the user ID specified in the P control code in the LPD control file. If the user ID is unknown, the job name might contain UNKNOWN or ANONYMOU. A # in the name indicates that the name contains a character that JES does not allow.

Tips:

1. JES commands might return a different job ID from the job ID that SDSF displays. JES commands display the z/OS job ID that z/OS assigns to the data set. If the Print Interface subsystem allocated the data set on the JES spool, the JES commands return the same job ID as SDSF displays.

2. The fully qualified data set name might not contain the same values as SDSF displays. For example, the job ID in the fully qualified data set name is always a job ID assigned by z/OS to the data set. The job ID in the data set name matches the job ID displayed by SDSF only for data sets that NetSpool allocates on the JES spool.

3. If Print Interface or NetSpool already converted EBCDIC data to ASCII, by using approximately 32 KB records, you might not be able to use your standard tools to view the data on the spool.

4. When a user requests more than 255 copies of the same data set, multiple output groups for the data set are created on the JES spool. Each output group has the same user ID and job ID. To delete the data set, you must individually delete all output groups for the same data set.

Using JES commands and SDSF to work with output data sets

You can use JES and SDSF commands to do these actions on output data sets, depending on whether you run IP PrintWay extended mode or basic mode:

IP PrintWay extended mode: If IP PrintWay extended mode is not currently processing a data set, you can delete, hold, and release it. And, you can change its attributes, such as its priority, DEST, CLASS, and FORMS values. You can do these actions on data sets that IP PrintWay has not yet processed, is waiting to retransmit, or has retained on the JES spool after completion. You cannot do these actions on data sets that IP PrintWay extended mode is processing. You can use Infoprint Central, however, to work with data sets that IP PrintWay extended mode is processing. See .

These considerations apply when you run IP PrintWay extended mode:

- If you hold a retained data set, the data set remains held until you release or delete it. IP PrintWay does not delete it automatically when the retain time expires.

- If you hold a data set between retransmissions, the next data set prints on the printer. If you then release the held data set, it prints as soon as the printer is available, after any print jobs with a higher priority. IP PrintWay does not wait for the retry interval to expire.
- If you release a retained data set, it prints as soon as the printer is available, after any print jobs with a higher priority. Notice that you can release retained data sets even though they are not held.
- If you release a data set between retransmissions, it prints as soon as the printer is available. IP PrintWay does not wait for the retry interval to expire. Notice that you can release data sets while IP PrintWay is waiting for the retry interval to expire, even though they are not held.
- If you change attributes of any data set, IP PrintWay uses the new attributes when it prints the data set again. If the data set is retained or between retransmissions, the data set prints as soon as the printer is available. (See Limitation.)

IP PrintWay basic mode: If IP PrintWay basic mode has not selected a data set for processing, you can delete, hold, and release it. And, you can change its attributes, such as its DEST, CLASS, and FORMS values. However, you cannot delete, hold, or release data sets that IP PrintWay is waiting to retransmit or data sets that IP PrintWay retained on the JES spool. You can use the Infoprint Server ISPF panels, however, to work with data sets that IP PrintWay basic mode is retransmitting or retained on the JES spool. See Chapter 4, "Using the IP PrintWay transmission queue (basic mode)," on page 37.

These considerations apply when you run IP PrintWay basic mode:

1. If you change attributes of a data set, IP PrintWay uses the new attributes when it prints the data set. (See Limitation.)
2. If IP PrintWay stops, which causes it to release data sets to JES, you cannot change the host name or IP address, print-queue name, component name, retry time, retry limit, or retention times of the data sets. IP PrintWay ignores any changes that you make to these values.

Limitation: If a print request selects an IP PrintWay printer by specifying the name of its printer definition, you cannot use JES commands or SDSF to move the data set to an alternative IP PrintWay printer by changing the DEST, CLASS, and FORMS values of the output data set. This limitation is because Infoprint Server uses the printer name, if specified, to select a printer. All print requests submitted through Print Interface or NetSpool select the printer by specifying the name of its printer definition. Also, the printer name can be specified in the FSSDATA and SUBSYS JCL parameters.

However, if you run IP PrintWay extended mode, you can use Infoprint Central to move a data set to an alternative IP PrintWay printer even though the print request selected the IP PrintWay printer by specifying the name of its printer definition. For more information, see the Infoprint Central online help system.

Chapter 8. Viewing messages

You can view messages from:

- Infoprint Server common message log
- IP PrintWay basic mode
- NetSpool
- Data transforms

Viewing messages in the common message log

You use the common message log to see messages from most Infoprint Server components and from PSF for z/OS (PSF) in one place. The log can contain messages from:

- All components of Infoprint Server except for IP PrintWay basic mode

  IP PrintWay extended mode writes its messages only to the common message log. Other components (such as NetSpool and Print Interface), also write messages to other locations (such as the NetSpool message-log data set and the system console log).

- IBM transform products that work with Infoprint Server

  For information about whether a transform writes messages to the common message log, see the documentation for the transform.

- PSF for z/OS (PSF)

  PSF can be customized to write messages for print jobs and printers to the common message log.

Authorized users can use Infoprint Central to view messages in the common message log for selected print jobs and printers. In addition, Infoprint Server administrators can use the **aoplogu** command to select messages in a particular time range and copy them to a file or view them on the terminal.

You can enter the **aoplogu** command on the z/OS UNIX command line, or you can submit a batch job that runs the **aoplogu** command. Infoprint Server provides sample job AOPLOGUS in SYS1.SAMPLIB to run the **aoplogu** command. You must edit sample job AOPLOGUS before you submit it.

aoplogu command

Format

```
aoplogu [-n log-stream]
aoplogu [-b time] [-e time] [-n log-stream]
aoplogu [-l time] [-n log-stream]
```

Description

Infoprint Server administrators use the **aoplogu** command to view messages in the common message log. You can specify that you want to view:

- All the messages.
- The messages in a range of times. For example, the messages from 6 September 2013 to 10 September 2013, or the messages that begin on 6 September 2013.
- The most recent messages for a length of time. For example, the messages for the last day or for the last 2 minutes.

The messages are written to standard output (stdout).

The **aoplogu** command can read messages that are written in a z/OS UNIX file system (by default, the `/var/Printsrv` file system) or in an MVS system logger log stream.

Options

-b *time*
> The beginning time of the range of messages that you want to view. The default is the oldest message that is available in the common message log.

-e *time*
> The ending time of the range of messages that you want to view. The default is the most recent message that is available in the common message log.

-l *time*
> The most recent messages for the length of time that you specify.

-n *log-stream*
> The name of a log stream that is defined to the MVS system logger for the Infoprint Server common message log. Specify this option only if your installation defined a log stream and Infoprint Server is not running. If Infoprint Server is running, the **aoplogu** command can automatically determine the name of the log stream.
>
> If you specify this option, the **aoplogu** command reads messages only from the specified log stream. It does not read any messages that were written in the z/OS UNIX file system or in any other log streams.

The format of *time* is one of these:

```
year:month:day:hour:minute
month:day:hour:minute
day:hour:minute
hour:minute
minute
```

Usage notes

1. To use the **aoplogu** command, you must be defined as a z/OS UNIX user and be connected to the AOPADMIN group. For more information, see *z/OS Infoprint Server Customization*.
2. If your installation uses the MVS system logger for the Infoprint Server common message log, you must also have READ access to the resource profile for the log stream in the RACF LOGSTRM class. For more information, see *z/OS Infoprint Server Customization*.
3. When you specify the **-b** or **-e** option, the defaults for the year, month, day, and hour are the current year, month, day, and hour.
4. When you specify the **-b** or **-e** option, you can enter 2–4 digits for the year. For example, 13, and 2013 all mean the year 2013.
5. You can enter any value for the units of time, beginning with 0. For example, you can enter 25 for the hour or 61 for the minute.
6. The time is inclusive. For example, `aoplogu -b 0 -e 0` includes all messages that occurred in the first minute of the current hour.

Examples

1. To view all the messages:

   ```
   aoplogu
   ```

2. To view all the messages from 6 September 2013 to 10 September 2013:

   ```
   aoplogu -b 2013:09:06:0:0 -e 2013:09:10:0:0
   ```

3. To view all the messages for the last day:

```
aoplogu -l 1:0:0
```

4. To view all the messages for the last 2 minutes:

```
aoplogu -l 2
```

5. To view all the messages for the last day plus the last 3 hours and to put them in a file called
   `mymessages`:

```
aoplogu -l 1:3:0 > mymessages
```

Environment variables

AOPCONF
Names the Infoprint Server configuration file. The file that is named in this variable takes precedence
over configuration file `/etc/Printsrv/aopd.conf`.

LANG
The language that is used for messages.

LC_ALL
The locale that is used to format date and time information in common log messages.

LC_TIME
The locale that is used to format date and time information in common log messages.

LIBPATH
The path that is used to locate dynamic link libraries (DLL).

NLSPATH
The directory where the Infoprint Server message catalogs are located.

TZ
The time zone that is displayed in common log messages.

Files

/etc/Printsrv/aopd.conf
The default Infoprint Server configuration file. The file that is named in the AOPCONF environment
variable takes precedence over this file.

Exit values

0
Successful completion.

>0
An error prevented the messages from being displayed.

Format of messages in the common message log

The **aoplogu** command displays messages in the common message log in this format:

```
date time priority:level user:id system:name inventory:name [job:id]
[filename:name] [dsn:name] [output_device:name] [job_selection_rule:name]
[fsa:name] [luname:name] [jes_jobname:name] [program:name] msg:message
```

For example:

```
5/19/13 17:04:13 (UTC-7) priority:info user:OMVSID system:SYS1 inventory:AOP1
job:PS000469 output_device:lpr://myprinter.xyz.com/RAW
program:aopoutd msg:AOP3613I The print job was completed successfully.
```

Field
    Description

date
The date the message was written.

dsn
The fully qualified data set name that JES assigns. The document name is the last qualifier. The # symbol in the document name replaces any character that JES does not allow in a document name. For example, if the last 8 characters of the document name are `file.lwp`, this field contains `FILE#LWP`. This field might not contain the system ID, which is the first qualifier in a fully qualified data set name.

filename
The name of the file to be printed. Blanks are converted to an underscore (_).

fsa
The name of the JES functional subsystem application (FSA) for the PSF printer.

inventory
The name of the Printer Inventory.

jes_jobname
The job name, or the name of the job submitter or owner:

- For a batch job, the name of the job that created the print job.

- For print requests submitted from remote systems (such as Windows), the first 8 characters of the logon name that is used on the remote system. A # symbol in the name replaces a character (such as a period) that z/OS does not allow in the job name.

- For print requests submitted from VTAM applications (such as CICS or IMS), the owner name in the data stream, the default owner in the printer definition, or the name of the NetSpool startup procedure.

job
The job ID.

- A job ID with a PS prefix indicates that Infoprint Server created the output data set on the JES spool. (Your installation can specify a different job prefix in the **job-prefix** attribute in the system configuration definition.)

- A job ID with a JOB, STC, or TSU prefix indicates that either JES or the Print Interface subsystem created the output data set on the JES spool.

- Job submitters can specify the **sysout-job-id** job attribute to override the job ID.

job_selection_rule
The name of an IP PrintWay job selection rule that IP PrintWay extended mode uses to select the print job from the JES spool for processing.

luname
The NetSpool logical unit (LU) name for the printer.

msg
The message number and text.

output_device
An identifier of the IP PrintWay extended mode printer where the print job printed or is scheduled to print, in one of these formats:

direct_sockets://*hostname:port*
The host name and port number of the IP PrintWay printer.

lpr://*hostname/queue*
The host name and print queue name of the IP PrintWay printer.

mailto:
An indication that the output data set is to be sent to an email destination.

uri
The Uniform Resource Identifier (URI) of the Internet Printing Protocol (IPP) server that is running in the printer. Examples are:

```
ipp://myprinter.xyz.com

http://myprinter.xyz.com:631
```

fsa_name
>   The name of the JES functional subsystem application (FSA) for the PSF printer.

priority
>   The severity of the message:

>   **action**
>   >   A situation occurred that ended processing.

>   **error**
>   >   An error occurred.

>   **info**
>   >   An information message.

>   **severe**
>   >   A severe error occurred.

>   **warning**
>   >   A warning situation occurred.

program
>   The name of the Infoprint Server daemon, command, or program that issued the message:

>   **aopd**
>   >   The Printer Inventory Manager daemon.

>   **aopd.JESStatusDaemon**
>   >   The Printer Inventory Manager status daemon.

>   **aopd.JESScavenger**
>   >   The Printer Inventory Manager scavenger daemon.

>   **aopippd**
>   >   The IPP Server daemon. It processes print requests from remote clients that use the Internet Printing Protocol (IPP).

>   **aoplpd**
>   >   The line printer daemon (LPD). It processes print requests from remote clients that use the TCP/IP line printer requester (LPR) protocol.

>   **aopnetd**
>   >   The NetSpool daemon. Together with the NetSpool started task, it processes print requests from VTAM applications such as CICS and IMS.

>   **aopoutd**
>   >   An IP PrintWay extended mode daemon. It sends output to remote printers in the Internet Protocol network and to email destinations.

>   **aopsapd**
>   >   The SAP callback daemon. It handles callback notification for the SAP Output Management System (OMS).

>   **aopssid**
>   >   The Infoprint Central daemon. It communicates with JES.

>   **aopsubd**
>   >   The Print Interface subsystem daemon. It processes output data sets that specify the Print Interface subsystem on the SUBSYS parameter of the DD statement.

>   **aopwsmd**
>   >   An IP PrintWay extended mode daemon. It uses the IP PrintWay job selection rules in the Printer Inventory to select output data sets from the JES spool.

>   **aopxfd**
>   >   The Infoprint Server Transform Manager daemon. It manages other transform daemons, which transform data from one format to another.

cancel

The **cancel** command.

InfoprintCentral

Infoprint Central.

lp

The **lp** command.

PSF_z/OS

PSF for z/OS.

NetSpool started task

The name of the NetSpool started task. Together with the NetSpool daemon, it processes print requests from VTAM applications such as CICS and IMS.

other values

The name of an Infoprint Server program or the name of a program that used the Infoprint Server application programming interface (API).

system

The 1–8 character name for the MVS system.

time

The time that Infoprint Server wrote the message, followed by the time zone. For information about time zones, see *z/OS UNIX System Services Command Reference*.

user

The z/OS user ID or the name of the user who submitted the print job, the z/OS user ID of the user who did the Infoprint Central action on the print job, or the z/OS user ID of the user who started the Infoprint Server daemons.

Viewing IP PrintWay basic mode messages

IP PrintWay basic mode writes a message to the IP PrintWay message-log data set when it receives a data set from JES, when IP PrintWay successfully or unsuccessfully transmits the data set to the target printer or email destination, and when IP PrintWay releases the data set to JES. Also, IP PrintWay writes other messages to this data set, and IP PrintWay installation exits can write messages to this data set.

The messages wrap around to the beginning when the data set becomes full. The time stamp that precedes each message indicates when IP PrintWay wrote the message. IP PrintWay writes a string that contains equal signs, ========, at the end of the last message written.

Your installation can write an IP PrintWay Message exit to suppress unwanted messages from the message-log data set. For more information, see *z/OS Infoprint Server Customization*.

To view the messages:

1. Start an Infoprint Server ISPF session.

   For information about how to start an Infoprint Server ISPF session, see "Starting the ISPF session and configuring the panels" on page 221.

2. On the main Infoprint Server ISPF panel, select: **7 Configure**.

   Make sure that the **Message log** field contains the name of the IP PrintWay message log used by the IP PrintWay functional subsystem (FSS). This name must match the data set name that is specified in the IP PrintWay startup procedure.

3. On the main Infoprint Server ISPF panel, select: **6 PrintWay Message**.

4. To find the latest message, press the REFRESH function key on the Infoprint Server ISPF panels, or search for a string of equal signs.

Viewing NetSpool messages

NetSpool writes messages to several locations:

- NetSpool writes all messages to the operator console.
- NetSpool writes most messages, except for messages that are written at initialization and termination, to the Infoprint Server common message log if it is enabled. For information about how to enable the common message log, see *z/OS Infoprint Server Customization*. For information about how to view messages in the common message log, see "Viewing messages in the common message log" on page 63.
- NetSpool writes some messages, except for messages that are written at initialization and termination and job-related messages, to the NetSpool message log data set if it is specified in the NetSpool startup procedure. You can view messages in this data set by browsing it.

Viewing transform messages

If you use transforms, you can find messages in these locations:

- Common message log: Most transforms that work with Infoprint Server write messages in the Infoprint Server common message log. These messages are related to errors in the transform or transform configuration. For information about whether the transform writes messages to the common message log, see the documentation for the transform.
- Transform `stderr` file: Messages in this file are related to errors in the transform or transform configuration. For information about how to find the transform `stderr` file, see *z/OS Infoprint Server Messages and Diagnosis*.

  Tip: The transform `stderr` files are deleted when you restart the Infoprint Server Transform Manager.

- Printed output: Some transforms write messages that are related to errors in the input data stream on a separate page at the end of the transformed output.

Chapter 9. Planning the Printer Inventory

The Printer Inventory consists of UNIX files (such as z/FS files) that contain information about your printing environment. In the following information, *PSF* refers to PSF for z/OS and to the AFP Download Plus feature of PSF.

The Printer Inventory can contain these types of objects, called *definitions*:

Printer definitions
> Describe the printers in your system. IP PrintWay, PSF, or JES can control the printers.
>
> Printer definitions can also:
>
> - Describe an email destination. The destination can be one email address or a list of email addresses.
> - Include other Printer Inventory objects called *components*. With components, you can use one object to specify information that is common to several printer definitions.

Printer pool definitions
> Describe groups of printer definitions that you want to broadcast data to (applies only to NetSpool). Only VTAM applications can print to a printer pool definition.

FSS definitions
> Describe the IP PrintWay basic mode and PSF functional subsystems (FSSs) that the system programmer defined to your JES system.

FSA definitions
> Describe the IP PrintWay basic mode and PSF functional subsystem applications (FSAs) that the system programmer defined to your JES system.

Job selection rules
> Describe the rules that IP PrintWay extended mode uses to determine which print jobs to select from the JES spool to print.

System configuration definition
> Contains configuration information for all components of Infoprint Server. Authorized administrators can edit this definition.

Trace parameters definitions
> Describe tracing Infoprint Server daemons.

Table 20 on page 71 summarizes the types of objects you can create or edit in the Printer Inventory and indicates when the definitions are required. Required definitions are needed by all installations. Optional definitions are required only if the condition is met. See the page reference for more information about the definition.

Table 20. Printer Inventory objects

Inventory definition	Condition	See
Printer definition	Required[1]	"Planning printer definitions" on page 72
Components	Optional: To simplify administration of printer definitions	"Planning printer definitions" on page 72
Printer pool definition	Optional: To broadcast data from VTAM applications through NetSpool to multiple printer definitions	"Planning printer pool definitions" on page 80
FSS definition for IP PrintWay basic mode	Optional: To customize the IP PrintWay basic mode FSS	"Planning FSS definitions" on page 80

Inventory definition	Condition	See
Table 20. Printer Inventory objects (continued)		
Inventory definition	**Condition**	**See**
FSS definition for PSF	Optional[2]	"Planning FSS definitions" on page 80
FSA definition for IP PrintWay basic mode	Optional: To specify unique trace parameters for the FSA	"Planning FSA definitions" on page 81
FSA definition for PSF	Optional[2]	"Planning FSA definitions" on page 81
Job selection rule	Optional: To have IP PrintWay extended mode select print jobs from the JES spool	"Planning job selection rules" on page 82
System configuration	Required [3]	

1. In some cases, you can support more than one printer with the same printer definition. For more information, see "One printer definition for several actual printers" on page 74.
2. You must create FSS and FSA definitions for PSF if you configure PSF to use the Printer Inventory. For information about how to configure PSF to use the Printer Inventory, see:
   - *PSF for z/OS: Customization*
   - *PSF for z/OS: AFP Download Plus*
3. Infoprint Server requires a system configuration definition to exist in the Printer Inventory, which authorized administrators can edit. For information about the system configuration definition, see *z/OS Infoprint Server Customization*.

To create and manage Printer Inventory definitions, you can use one of these methods or a combination of these methods:

- **Infoprint Server ISPF panels:** With the ISPF panels, you can add, list, browse, copy, edit, and delete definitions. For information about how to use the ISPF panels, see Chapter 16, "Using ISPF panels to manage the Printer Inventory," on page 221.
- **Printer Inventory Definition Utility (PIDU):** With the PIDU program, you can create, display, list, modify, rename, delete, export, and dump definitions. You might find the PIDU program convenient for creating numerous definitions at one time or for making the same change to many definitions. For information about how to run the PIDU program, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 237.
- **Infoprint Server migration program:** The migration program can create PSF FSS and FSA definitions in the Printer Inventory from information in your PSF startup procedures and JES definitions.

Planning printer definitions

A printer definition contains information about one or more printers or email destinations. The printer can be a local printer or remote printer in your Internet Protocol network.

A printer definition contains these general types of information:

- Information that Print Interface and NetSpool use to allocate data sets on the JES spool.

  For example, the JES output class (CLASS), the destination name (DEST), the forms name (FORMS), and the form definition name for all data sets submitted to the printer definition.
- Information that IP PrintWay uses to transmit data sets from the JES spool to the printer or the email destination.

  For example, the IP address of the printer or the email addresses of the email recipients.

Users, who can be job submitters or applications, submit print jobs to a printer by specifying the name of the printer definition or, in some cases, the CLASS, DEST, and FORMS values for the printer definition. The name of a printer definition is case-sensitive and can contain up to 17 printable characters.

Before you create printer definitions, you need to understand the following information:

- The types of printer definitions you can create
- How many printer definitions you need to create for each actual printer
- The printer attributes that you can specify in the printer definitions
- How to use components to help you manage large numbers of printer definitions

Selecting the type of printer definition

One of the first decisions to make when you plan the Printer Inventory is the type of printer definition to create for each printer or email destination. The type indicates the program that sends data from the JES spool to the printer. The types of printer definitions you can create are:

- IP PrintWay: Select this type for:
  - TCP/IP-attached, non-AFP printers
  - AFP printers that are controlled by a remote PSF print server
  - Email destinations
  - TCP/IP-attached printers that are defined to Infoprint Server running on another z/OS system

  When you use the Infoprint Server ISPF panels to select the printer definition type, you also must select the transmission protocol that IP PrintWay is to use to transmit data to the printer. You can select the LPR, direct sockets, Internet Printing Protocol (IPP), or email protocol. For information about how to determine which protocol to select, see Chapter 12, "Planning printer definitions for IP PrintWay," on page 129.

- PSF: Select this type for AFP printers that PSF for z/OS or a comparable product controls. AFP printers can be locally-attached, SNA-attached, or TCP/IP-attached.

- General: Select this type for printers that do not fall into the other two categories. For example, select General for line printers that JES controls.

Use this ISPF panel to select the type of printer:

```
                  Choose a Definition Type and Protocol
Option ===> _
  Type             Protocol
1 IP PrintWay      LPR
2 IP PrintWay      direct sockets
3 IP PrintWay      IPP
4 IP PrintWay      VTAM
5 IP PrintWay      email
6 PSF
7 General
```

Note: The VTAM protocol is listed on the ISPF panel; however, the VTAM protocol is only used if Infoprint Coaxial Printer Support for z/OS is installed. Because Infoprint Coaxial Printer Support for z/OS is not supported in z/OS V2R5, the VTAM protocol is no longer documented.

Tip: Select the type of definition carefully because Infoprint Server processing differs according to the selected type. For example, if the printer definition type is PSF, Print Interface converts text data to line data before it places the data on the JES spool. Also, if the printer definition type is IP PrintWay, you can use the Infoprint Server ISPF panels to specify information specific to IP PrintWay, such as the IP address of the printer.

Determining how many printer definitions to create

You can create:

- One printer definition to represent each actual printer or email destination.
- One printer definition to represent several actual printers or email destinations.
- Several printer definitions to represent one actual printer or email destination.

One printer definition for one actual printer

The most common configuration for all types of printer definitions is the one in which you create one printer definition for each print queue or printer and for each email destination. Job submitters use this configuration to direct output to a specific printer or email destination.

Note: You can use the same printer definition to process different types of data. For example, you can use the same printer definition for printing data that is submitted by VTAM applications, data that is submitted by workstation applications, and data that is submitted from TSO.

Each printer definition can be associated with only one NetSpool printer LU name. Therefore, if your installation needs to print on the same actual printer with different printer LU names, you need to create more than one printer definition for the same printer.

To work in this configuration, the JES work-selection criteria for each PSF functional subsystem application (FSA) must be unique. For example, one FSA can be defined to JES with work-selection criterion of destination BLDG5, while the other printer FSA can be defined with work-selection criterion of destination BLDG6. For information about specifying JES work-selection criteria, see *z/OS JES2 Initialization and Tuning Guide* or *z/OS JES3 Initialization and Tuning Guide*.

One printer definition for several actual printers

If you want to minimize the number of printer definitions you create in the Printer Inventory, you can create one printer definition for several actual printers or email destinations in these situations:

- If job submitters can specify the address of an IP PrintWay printer or the addresses of email recipients on either the OUTPUT JCL statement or in Infoprint Server job attributes, you can create one printer definition for all printers or email destinations that share the same characteristics. This situation is because job submitters can print to one printer definition, but direct the output data set to a specific printer or email address by using a JCL parameter or job attribute. For more information, see "Selecting the LPR protocol (basic and extended mode)" on page 136, "Selecting the direct sockets protocol (basic and extended mode)" on page 140, and "Selecting the email protocol (basic and extended mode)" on page 144.
- If job submitters use the Print Interface subsystem to submit print requests to PSF printers, you can create one printer definition for printers that share the same characteristics. This situation is because job submitters can print to one printer definition, but direct the output data set to a specific PSF printer by specifying that printer's work-selection criteria (for example, the printer's CLASS and DEST values) on the OUTPUT JCL statement. For more information, see "Using the Print Interface subsystem" on page 96.
- If your installation has several PSF or JES printers that share the same JES work-selection criteria, you need to create only one printer definition for all the printers. For example, if there are several similar PSF printers in building 5, you can specify the same JES work-selection criterion (for example, destination BLDG5) in the JES FSA definitions for all printers in building 5. In this example, JES balances the workload among the printers in building 5. Job submitters can submit all output data sets to the same printer definition and JES can direct the output data set to the printer that becomes available first.

  For information about how to specify JES work-selection criteria, see *z/OS JES2 Initialization and Tuning Guide* or *z/OS JES3 Initialization and Tuning Guide*.

Guideline: Create at least one printer definition for each printer so that all job submission methods can be used to print on a printer, including those job submission methods that do not permit the specification of the JES output class, destination name, or IP address. For example, you cannot use the `lp` command to specify the JES output class or destination name. And, when the IP PrintWay basic mode `resubmit for filtering` option is used, the printer's IP address cannot be specified on the OUTPUT JCL statement.

Several printer definitions for one actual printer

You might need to create more than one printer definition for the same actual printer or print queue in these situations:

- To print documents with different requirements on the same actual printer or print queue. For example, to print documents on a PSF printer with different overlays. You would create two printer definitions for the actual printer. In one printer definition, specify the name of one overlay. In the other printer definition, specify the name of the other overlay.

  As an alternative, job submitters who use the **lp** command or an OUTPUT JCL statement can specify the name of the overlay during job submission. However, not all job-submission methods allow specification of job attributes such as an overlay name.

- To print VTAM application data on the same actual printer with different requirements. For example, to print on the same printer with different NetSpool end-of-file rules, you would create two printer definitions with two different NetSpool printer LU names.

- To print ASCII or formatted data (such as PCL data) and EBCDIC data to the same IP PrintWay print queue from the local z/OS system with an OUTPUT JCL statement to submit the print job. For information, see "Printing data without formatting (basic mode)" on page 200.

Specifying attributes in a printer definition

The characteristics of a printer and print jobs that you specify in a printer definition are called *printer attributes*. When you use ISPF panels to create or edit printer definitions, you specify printer attributes as values in panel fields. If you use the Printer Inventory Definition Utility to create or edit printer definitions, you specify printer attributes as keyword and value pairs. Although you can specify many attributes in a printer definition, you do not need to specify all of them because Infoprint Server and JES supply default values for many of the attributes.

Some attributes are used by all components of Infoprint Server. However, other attributes are used only by one component of Infoprint Server. Therefore, depending on which components of Infoprint Server you plan to use in your installation, you might not need to specify all of the attributes. For example, if you do not plan to use NetSpool to print VTAM application data, you do not need to specify attributes that only NetSpool uses. The online help for each panel field describes which components use the field.

Most of the attributes that you can specify in a printer definition are divided into logical groups called *sections*. The sections of a printer definition are Allocation, Processing, NetSpool Options, NetSpool End-of-File, IP PrintWay Options, and Protocol. Figure 1 on page 75 shows the different types of printer definitions and the sections that each type contains.

IP PrintWay Printer Definitions:
- Allocation
- Processing
- NetSpool Options
- NetSpool End-of-File
- IP PrintWay Options
- Protocol

PSF Printer Definitions:
- Allocation
- Processing
- NetSpool Options
- NetSpool End-of-File

General Printer Definitions:
- Allocation
- Processing
- NetSpool Options
- NetSpool End-of-File
- IP PrintWay Options

Figure 1. Sections of printer definitions

Appendix B, "ISPF panels," on page 487 shows the panels that you use to specify attributes in a printer definition.

Allocation section

The Allocation section contains attributes that tell NetSpool and Print Interface how to allocate output data sets on the JES spool. For example, you can specify the output class, destination name, or job priority.

Each attribute in the Allocation section corresponds to a parameter that you can specify on an OUTPUT JCL statement. For a table that shows all field names in the Allocation section and the corresponding OUTPUT parameters, see "Allocation attributes and corresponding OUTPUT or DD statement parameters" on page 479. Because each field corresponds to an OUTPUT parameter, if you need more information about any of the attributes, see *z/OS MVS JCL Reference*.

You can use some print-submission methods to specify the same attributes that you can specify in the Allocation section. The attribute that is specified during job submission overrides the attribute in the printer definition. For example, if the **lp** command contains the **form-definition** attribute, Print Interface allocates the job on the JES spool with the form definition name on the **lp** command.

"ISPF panel for the Allocation section or component" on page 488 shows the panel that you use to specify attributes in the Allocation section of a printer definition.

Processing section

The Processing section contains attributes that tell NetSpool, Print Interface, and IP PrintWay how to process data. For example, you can specify attributes that control the page-formatting that is done by NetSpool and IP PrintWay and attributes that control data transforms done by Print Interface.

The Processing section also contains attributes that Print Interface and IP PrintWay use to determine whether the document can print on the printer. These attributes are called *validation attributes*. If the document cannot print on the printer, Print Interface rejects the print request, and IP PrintWay places the job on the system hold queue. For example, you can specify the types of data formats that the printer supports or the maximum size job that can print.

"ISPF panel for the Processing section or component" on page 489 shows the panel that you use to specify attributes in the Processing section of a printer definition.

NetSpool options section

The NetSpool Options section contains attributes that tell NetSpool how to convert the input data stream before it writes the data to the JES spool. NetSpool can convert the input data stream to either a line or PCL data stream. Or, you can request that NetSpool write the input data stream without change to the JES spool. "ISPF panel for the NetSpool Options section or component" on page 491 shows the panel that you use to specify attributes in the NetSpool Options section of a printer definition.

NetSpool end-of-file section

The NetSpool End-of-File section contains attributes that tell NetSpool when to close the output data set on the JES spool so that the data can be printed. "ISPF panel for the NetSpool End-of-File section or component" on page 491 shows the panels that you use to specify attributes in the NetSpool End-of-File section of a printer definition.

IP PrintWay options section

The IP PrintWay Options section contains attributes that tell IP PrintWay such things as how long to retain data sets on the JES spool after transmission to the remote system, how often to retransmit unsuccessful transmissions, or which exits to call while processing data. "ISPF panel for the IP PrintWay Options section or component" on page 492 shows the panel that you use to specify attributes in the IP PrintWay Options section of a printer definition.

Protocol section

The Protocol section contains attributes that tell IP PrintWay which transmission protocol to use to transmit data sets to the remote system: line printer requester (LPR), direct-sockets printing, Internet Printing Protocol (IPP), or email. The Protocol section also contains attributes that are specific to the type of transmission protocol you select. For example, you can specify LPR options such as whether you want the LPD on the remote system to print a banner page.

The Protocol section also contains the name of the RACF profile that controls who can use Infoprint Central for the web to work with a printer. The RACF profile applies only if you run IP PrintWay extended mode.

"ISPF panels for the Protocol section or component" on page 493 shows the panels that you use to specify attributes in the Protocol section of a printer definition.

Including components in printer definitions

Because a Printer Inventory might contain hundreds or thousands of printer definitions, changing information in many printer definitions can be time-consuming. Therefore, you might want to create more objects in the Printer Inventory, called *components*, and include them in printer definitions. Consider creating components when several printer definitions share attributes. To use components:

1. Specify the shared attributes in a component, instead of specifying the same attributes in many printer definitions.
2. Include the component in all printer definitions to which those attributes apply.

When you change the attributes in a component, all printer definitions that include that component pick up the new attributes.

Creating components is optional. Some printer definitions in the Printer Inventory might include components, while other printer definitions might not. Whether you use components, you can use the Printer Inventory Definition Utility (PIDU) to change many printer definitions at one time. For information about PIDU, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 237.

When you create components, you do not need to specify every attribute in that component. Instead, you might want to specify some attributes in the printer definitions. For example, the Protocol component contains an attribute that defines the host name or IP address of the remote printer. Because the host name or IP address is usually unique for each remote printer, you can omit the host name or IP address from the component and instead specify it in the printer definition.

When you include components in a printer definition, you can override some of the attributes that are specified in the components by specifying a different value in the printer definition itself. For example, if one printer definition requires a longer retention time on the JES spool, you can override the attribute that specifies the retention time in the printer definition itself. You do not need to create a new component. However, notice that if you override an attribute in a printer definition, when you change the same attribute in the component, the printer definition does not pick up the new attribute.

You can create these types of components (one type for each section of a printer definition): Allocation, Processing, NetSpool Options, NetSpool End-of-File, IP PrintWay Options, and Protocol.

Tip: Another reason to create components is so that job submitters who use JCL can override printer attributes that are specified in the printer definition. Job submitters can specify a component name in the PRTOPTNS parameter of the OUTPUT JCL statement. The printer attributes specified in components with that name override the printer attributes specified in the printer definition. For more information, see "Creating components for the PRTOPTNS JCL parameter (basic and extended mode)" on page 190.

Example of components for IP PrintWay printer definitions

Figure 2 on page 78 shows an example of components that you can include in IP PrintWay printer definitions. After the figure is a description of the components.

IP Printway
Printer Definitions

Components

Printer 1

Allocation	①
Processing	②
NetSpool Options	
NetSpool End-of-File	③a
IP PrintWay Options	④
Protocol	⑤a

Printer 2

Allocation	①
Processing	②
NetSpool Options	
NetSpool End-of-File	③b
IP PrintWay Options	④
Protocol	⑤b

Allocation

①

Processing

②

NetSpool End-of-File

③b
③a

IP PrintWay Options

④

Protocol

⑤b
⑤a

*Component not shown: NetSpool Options

Figure 2. Components for IP PrintWay printer definitions

1. **Allocation component:** Both IP PrintWay printer definitions that are shown include the same Allocation component. In this component, you can specify the work-selection criteria that are defined for the IP PrintWay FSA (basic mode) or in the IP PrintWay job selection rule (extended mode). For example, if IP PrintWay selects jobs in output class P, specify class P in this component.

   You might need to specify some allocation attributes in the printer definitions themselves. For example, if job submitters need to select these printer definitions with the CLASS, DEST, or FORMS parameters on an OUTPUT JCL statement, the value for the DEST or FORMS attribute must be unique for each printer definition. Because this value is unique, do not specify it in the component. Instead, specify the DEST or FORMS value in the printer definition itself. For more information, see "Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)" on page 159.

2. **Processing component:** Both IP PrintWay printer definitions include the same Processing component. In this component, you can specify the data formats that the printer's print queues can accept. For example: line data, text data, and PCL data. You can also specify whether you want the printer's LPD to print a page header.

3. **NetSpool End-of-File components:** Each IP PrintWay printer definition includes a different NetSpool End-of-File component.

   a. The IP PrintWay printer definition for Printer 1 includes NetSpool End-of-File component 3a.

   b. The IP PrintWay printer definition for Printer 2 includes NetSpool End-of-File component 3b.

   In these components, you can specify different end-of-file rules for NetSpool to use.

Only printer definitions that are configured for use with NetSpool need to include a NetSpool End-of-File component. However, you can include a NetSpool End-of-File component even if NetSpool is not configured.

4. **IP PrintWay Options component:** Both IP PrintWay printer definitions include the same IP PrintWay Options component. In this component, you can specify a retry time and a retention time for unsuccessfully transmitted data sets. You can also specify the name of an IP PrintWay exit program.

5. **Protocol components:** Each IP PrintWay printer definition includes a different Protocol component.

   a. The IP PrintWay printer definition for Printer 1 includes Protocol component 5a. In this component, you can specify attributes for the LPR protocol.

   b. The IP PrintWay printer definition for Printer 2 includes Protocol component 5b. In this component, you can specify attributes for the IPP protocol.

   Because the host name or IP address (for the LPR and direct sockets protocols), the URL (for the IPP protocol), and the email addresses (for the email protocol) are typically unique, do not specify these values in the component. Instead, specify the IP address, URL, logical unit name, and email addresses in each printer definition that includes the component.

Tip: Neither printer definition in this example includes a NetSpool Options component.

Example of components for PSF printer definitions

shows an example of components you can include in PSF printer definitions. After the figure is a description of each component and printer definition.

You can include the same components in different types of printer definitions. For example, IP PrintWay and PSF printer definitions can share the NetSpool End-of-File components, if the same NetSpool end-of-file rule is appropriate.
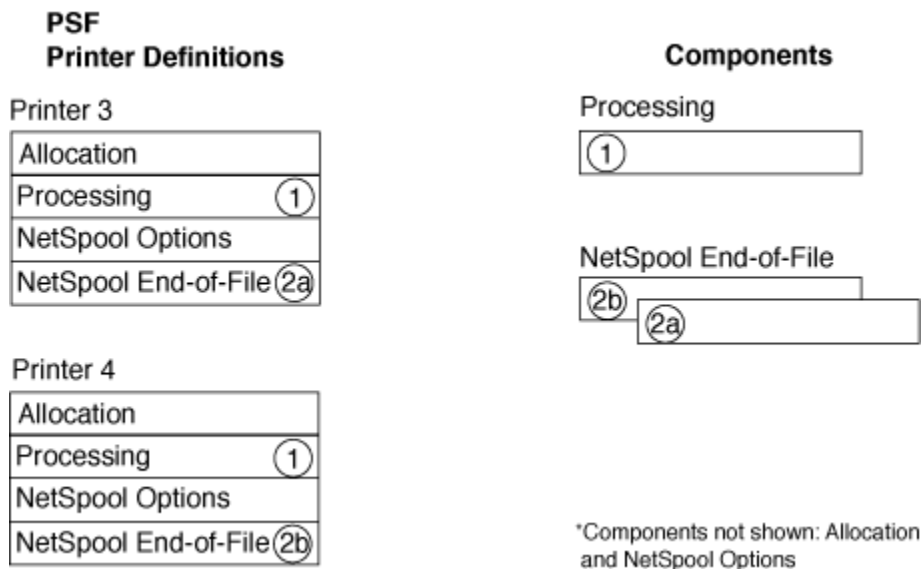
Figure 3. Components for PSF printer definitions

1. **Processing component:** Both PSF printer definitions include the same Processing component. In this component, you can specify the data formats that the PSF printers support and the data transforms that you want to use.

2. **NetSpool End-of-File component:** Each PSF printer definition includes a different NetSpool End-of-File component.

   a. The PSF printer definition for Printer 3 includes NetSpool End-of-File component 2a.

   b. The PSF printer definition for Printer 4 includes NetSpool End-of-File component 2b.

   In these components, you might specify different end-of-file rules for NetSpool to use.

Only printer definitions that are configured for use with NetSpool need to include a NetSpool End-of-File component. However, you can include a NetSpool End-of-File component even if NetSpool is not configured.

Notes:

1. Neither printer definition in this example includes an Allocation component because each PSF printer FSA in this example has unique work-selection criteria, which means that Print Interface and NetSpool must allocate data sets on the JES spool with different allocation values. Therefore, the allocation values are specified in the printer definitions themselves.

2. Neither printer definition in this example includes a NetSpool Options component.

Planning printer pool definitions

You can use printer pool definitions to broadcast data to more than one printer at a time. Each printer pool definition defines the group of printer definitions to which you want to broadcast data.

Only NetSpool supports broadcasting. Therefore, only VTAM applications can print to a printer pool definition. NetSpool uses the attributes that are specified in the Allocation section of each printer definition to create output data sets on the JES spool, one output data set for each printer definition.

Figure 4 on page 80 shows the relationship between a printer pool definition and printer definitions.
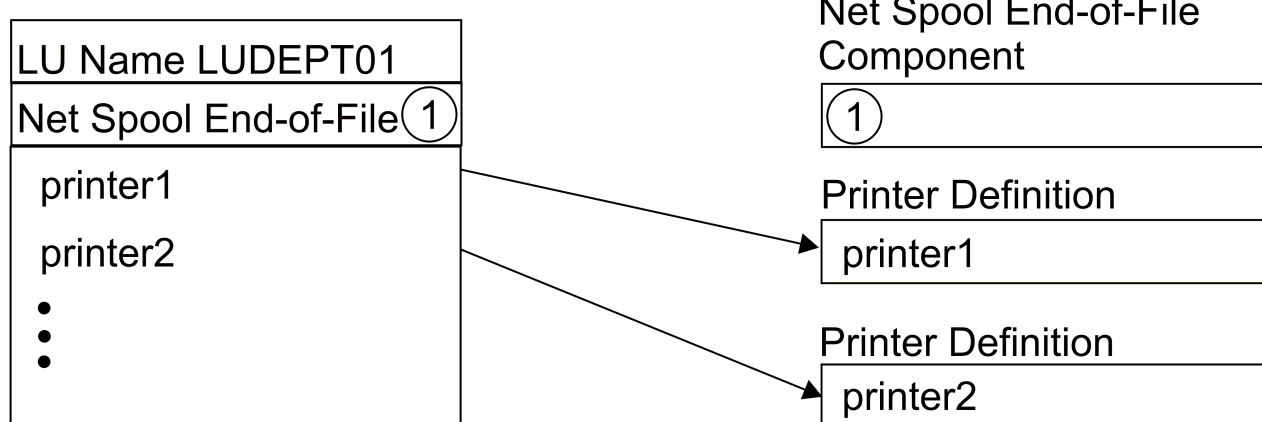
Figure 4. Relationship between printer pool definition and printer definitions

The printer pool definition specifies the NetSpool printer LU name (LUDEPT01 in this example) and lists the printer definitions in the broadcast group (Printer 1 and Printer 2). The printer definitions are standard printer definitions. That is, they can be used for printing directly from clients, including VTAM applications.

"ISPF panel for a printer pool definition" on page 496 shows the panel that you use to specify attributes in a printer pool definition. For more information about how to create a printer pool definition, see "Broadcasting data with multiple printer definitions" on page 123.

Planning FSS definitions

An FSS definition contains information about a JES functional subsystem (FSS). You can define these types of FSS definitions:

- IP PrintWay basic mode FSS definitions. IP PrintWay can use the information in this definition when the FSS starts.

- PSF FSS definitions. PSF can use the information in this definition when the FSS starts.

You can use the Infoprint Server ISPF panels to create and manage FSS definitions. "ISPF panel for an IP PrintWay FSS definition" on page 497 shows the panel that you use to create an FSS definition. For information about how to use the ISPF panels, see "Managing FSS definitions" on page 232. You can also

use the Printer Inventory Definition Utility (PIDU) to create FSS definitions. For information, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 237.

Note: You must also define each IP PrintWay basic mode and PSF FSS to JES. The FSS definition in the Printer Inventory does not replace the JES definition.

IP PrintWay basic mode FSS definitions

In an IP PrintWay basic mode FSS definition, you can specify configuration information that applies to all functional subsystem applications (FSAs) in the IP PrintWay FSS. You can define one IP PrintWay FSS definition for each FSS that your installation defined to JES.

In the FSS definition you can specify this information:

- The name of the TCP/IP startup procedure
- The language IP PrintWay basic mode uses for messages
- The type of tracing to start for each FSA and the size of tracing tables
- The number of hiperspace blocks each FSA can use
- Whether IP PrintWay basic mode is to use the standard TCP/IP translation table to convert data from EBCDIC to ASCII
- The default document code page that IP PrintWay basic mode uses when it converts data from an EBCDIC code page to the printer's code page

Creating IP PrintWay FSS definitions is optional. If an IP PrintWay FSS definition is not created when IP PrintWay starts, IP PrintWay uses default values for the other attributes you can specify in an FSS definition.

If you create an FSS definition after the FSS starts or if you change any information in the FSS definition, you must restart the IP PrintWay FSS to pick up the changes.

Tip: *z/OS Infoprint Server Customization* and the ISPF help panels contain more information about the values you can specify in an IP PrintWay FSS definition.

PSF FSS definitions

In a PSF FSS definition you can specify configuration information that applies to all PSF functional subsystem applications (FSAs) in the FSS (functional subsystem). You must create one FSS definition for each FSS that your installation defined to JES.

If you want PSF to use configuration information that is specified in an FSS definition, you must customize PSF to use the Printer Inventory. If PSF uses the Printer Inventory, an FSS definition must exist in the Printer Inventory.

If you create an FSS definition after the PSF FSS is started or if you change any information that PSF uses in the FSS definition, you must restart the PSF FSS to pick up the changes.

Tip: For complete information about the fields and values you can specify in a PSF FSS definition, see:

- *PSF for z/OS: Customization*
- *PSF for z/OS: AFP Download Plus*

PSF for z/OS: Customization also explains how to use a migration program to create PSF FSS definitions.

Planning FSA definitions

An FSA definition contains information about functional subsystem applications (FSAs) defined to JES. You can define these types of FSA definitions:

- IP PrintWay basic mode FSA definition. IP PrintWay uses the information in this definition when the FSA starts.
- PSF FSA definition. PSF uses the information in this definition when the FSA starts.

You can use the Infoprint Server ISPF panels to create and manage FSA definitions. "ISPF panel for an IP PrintWay FSA definition" on page 498 shows the panel that you use to create an FSS definition. For information about how to use the ISPF panels, see "Managing FSA definitions" on page 233. You can also use the Printer Inventory Definition Utility (PIDU) to create FSS definitions. For information, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 237.

Note: You must also define each IP PrintWay basic mode and PSF FSA to JES. The FSA definition in the Printer Inventory does not replace the JES definition.

IP PrintWay basic mode FSA definitions

You can create one IP PrintWay basic mode FSA definition for each IP PrintWay FSA that your installation defined to JES. In each IP PrintWay FSA definition you can specify the type of tracing to start for the FSA.

Creating IP PrintWay FSA definitions is optional. If an IP PrintWay FSA definition was not created for an FSA, IP PrintWay uses the tracing value that is specified in the FSS definition.

If you create an FSA definition after the FSA is started or if you change the FSA definition, you must restart the IP PrintWay FSA to use the changed values. However, you do not need to restart the FSS and any other IP PrintWay FSA.

Tip: *z/OS Infoprint Server Customization* and the ISPF help panels contain information about values you can specify in an IP PrintWay FSA definition.

PSF FSA definitions

You can create one PSF FSA definition for each PSF FSA that your installation defined to JES. In each PSF FSA definition you can specify configuration information that applies to that FSA.

If you want PSF to use configuration information that is specified in FSA definitions, you must customize PSF to use the Printer Inventory. If PSF uses the Printer Inventory, an FSA definition must exist in the Printer Inventory for each PSF FSA in the FSS.

If you create an FSA definition after the PSF FSA is started or if you change any information in the FSA definition, you must restart the PSF FSA to pick up the changes. However, you do not need to restart the PSF FSS.

If you create an FSA definition for a PSF printer, you can use Infoprint Central to control it.

Tip: For complete information about the fields and values you can specify in a PSF FSA definition, see:

- *PSF for z/OS: Customization*
- *PSF for z/OS: AFP Download Plus*

PSF for z/OS: Customization also explains how to use a migration program to create PSF FSA definitions.

Planning job selection rules

IP PrintWay extended mode uses the job selection rules to determine which print jobs to select from the JES spool for printing. You must create at least one job selection rule for IP PrintWay to select print jobs. The attributes of the print job must match all of the values in a rule to be selected.

You can use the Infoprint Server ISPF panels to create and manage job selection rules. "ISPF panel for an IP PrintWay job selection rule" on page 497 shows the panel that you use to create a job selection rule. For information about how to use the ISPF panels, see "Managing job selection rules" on page 235. You can also use the Printer Inventory Definition Utility (PIDU) to create job selection rules. For information, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 237.

For detailed information about how to set up and use job selection rules, see *z/OS Infoprint Server Customization*.

Chapter 10. Planning printer definitions for Print Interface

Before using Print Interface to allocate output data sets on the JES spool, you must specify the attributes that Print Interface uses in the printer definitions. If a printer definition does not exist for a printer, you must create one. If a printer definition exists, edit it and specify the attributes that Print Interface uses.

When you specify the attributes that Print Interface uses, users can use one of several different methods to submit print jobs to Print Interface. For example: the **lp** command, the AOPPRINT JCL procedure, an **lpr** command, the Infoprint Port Monitor for Windows, or the Print Interface subsystem. The attributes that you specify in a printer definition are the same regardless of the method users might use to submit print jobs.

Table 58 on page 481 summarizes the attributes that Print Interface uses and indicates whether each attribute is required or optional. You can use the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) to specify these attributes.

Note: For detailed information about each attribute (including the values that you can specify, restrictions, and examples), use the online help for each field on the ISPF panels.

The following information describes how to do administration tasks for Print Interface:

- "Specifying JES allocation parameters" on page 83
- "Validating that documents can print as requested" on page 85
- "Using the aopfiltr.so filter" on page 88
- "Using the LPD compatibility filter" on page 89
- "Using an installation-provided filter" on page 93
- "Converting data from EBCDIC to ASCII or ASCII to EBCDIC" on page 94
- "Mapping output bin and input tray names to numbers for an AFP printer" on page 95
- "Using the Print Interface subsystem" on page 96
- "Creating the Infoprint Server default printer definition" on page 101

Specifying JES allocation parameters

You can specify attributes in the Allocation section of the printer definition to tell Print Interface how to allocate output data sets on the JES spool. For example, you can specify the JES output class and destination name.

Some job submission methods let job submitters specify Infoprint Server job attributes, which override the attributes you specify in this section. When the Print Interface subsystem is used, parameters that are specified on the DD and OUTPUT JCL statements override the values that are specified in this section.

Each attribute in the Allocation section of a printer definition corresponds to a parameter on a DD or OUTPUT JCL statement. "Allocation attributes and corresponding OUTPUT or DD statement parameters" on page 479 lists fields in the Allocation section and the corresponding JCL parameters. For a full explanation of each JCL parameter, see *z/OS MVS JCL Reference*. Also, the ISPF online help for each field summarizes the meaning of each field.

NetSpool also uses these attributes in the Allocation section to allocate data sets on the JES spool. In most cases, the same attributes are suitable for both NetSpool and Print Interface. To specify unique attributes for Print Interface and NetSpool, you must create two separate printer definitions for the printer: one for print requests submitted to Print Interface and another for print requests submitted to NetSpool.

As an alternative to specifying attributes in the Allocation section, job submitters can specify Infoprint Server job attributes and application programmers can embed job attributes in the VTAM application data sent to NetSpool. For information about how to specify job attributes, see *z/OS Infoprint Server User's Guide*.

Procedure for specifying attributes

On the Allocation panel, specify:

- **Spool allocation values** heading: The fields under this heading correspond to the OUTPUT JCL parameters that JES uses to direct output data sets from the JES spool to IP PrintWay, PSF, or another JES functional subsystem application (FSA):

  - In a PSF printer definition, specify the JES work-selection criteria for the PSF printer FSA. For example, if the JES work-selection criteria are class E and destination BLDG5, specify E in the **CLASS** field and BLDG5 in the **DEST** field.

  - In an IP PrintWay basic mode printer definition, specify the JES work-selection criteria that are defined for the IP PrintWay basic mode FSA. For example, if the work-selection criterion is class P, specify P in the **CLASS** field.

  - In an IP PrintWay extended mode printer definition, specify the job-selection criteria that are defined in the IP PrintWay extended mode job selection rule. For example, if the job-selection criterion is class P, specify P in the **CLASS** field.

  JES work-selection criteria are defined in the JES3 DEVICE statement and the JES2 PRT*nnnnn* statement.

- Specify other fields that the PSF, IP PrintWay, transforms, and JES use.

Tip: If you need to specify the same allocation attributes in more than one printer definition, specify the attributes in an Allocation component. Then, include that component in each printer definition to which the component applies.

Example

This ISPF panel shows how to specify an output class and destination in the Allocation section of a PSF printer definition.

```
                              Allocation

Spool allocation values:
    CLASS . . . . E                GROUPID . . _____
    DEST. . . . . BLDG5            LINECT. . . ___
    JES node. . . _____         PRMODE  . . _____
    FCB . . . . . ____             PRTY. . . . __
    FLASH count . ___              THRESHLD. . _____
    FLASH name. . ____             UCS . . . . ____
    FORMS . . . . _____         WRITER. . . _____
    USERDATA
     . . _____ (extend)
    BURST . . . . _  1. Yes  2. No
    HOLD. . . . . _  1. Yes  2. No
    OUTDISP . . . _  1. Purge (without printing)  2. Leave
                     3. Keep  4. Hold  5. Write
Values for Separator Pages:
    Address
     . . _____(extend)
    Building . . _____
    Department . _____
    Name . . . . _____
    Room . . . . _____
    Title  . . . _____
Resource Related Values:
    Form definition . _____
    Character sets  . ____   ____  ____   ____
    Overlay front . . _____   Back . . _____
    Input tray  . . . ___
    Output bin  . . . _____
    Page definition . _____
    Resource library. _____ (extend)
    Resource directories. _____ (extend)
    Image shift x-direction front . . _____   Back . . _____
                y-direction front . . _____   Back . . _____
Error Reporting Values:
    Print error reporting. . _  1. None  2. All  3. Character  4. Position
    Error disposition. . . . _  1. Default  2. Hold  3. Quit
    Print error messages . . _  1. No  2. Yes
        Maximum messages. .___
Other Values:
    Notify . . . . . . . _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
    Checkpoint pages . . _____
    Checkpoint seconds . _____
    Copies . . . . . . . _____
    Copy group . . . . . ___  ___   ___   ___   ___   ___   ___ ___
    Color map. . . . . . _____
    Com setup member . . _____
    JES form length. . . _____
    Resolution . . . . . ___
    AFP parameters . . . _____
    Duplex. . . . . . . _  1. Simplex  2. Duplex  3. Tumble
    Label data pages . . _  1. Yes  2. No
    Restrict printable area . . _  1. Yes  2. No
    _ Table reference characters
    _ Save AFP statistics
```

Result: Print Interface allocates output data sets in JES output class E and with destination name BLDG5. The PSF printer (FSA) defined to JES with work-selection criteria of class E and destination BLDG5 selects the output data set for printing.

Validating that documents can print as requested

Before Print Interface accepts a print request, it can validate that the document can print as requested. For example, Print Interface can verify that the printer supports the data format of the input document. If Print Interface determines that a document cannot print, Print Interface rejects the print request with a message and does not allocate a data set on the JES spool.

lists the fields in a printer definition that Print Interface uses to validate that the print request can print on the selected printer. The third column in the table indicates the job attribute or JCL parameter that the job submitter specifies to request a print function.

Table 21. Printer definition fields used for validation in Print Interface		
Field name	**Meaning**	**Job attribute and JCL parameter**
Data format	Input data formats the printer supports. For more information, see "Data formats" on page 86.	`document-format` job attribute
Duplexes supported	Duplexing supported by the printer (simplex, duplex, and tumble)	`duplex` job attribute and DUPLEX JCL parameter
Forms supported	Forms names allowed	`forms` job attribute and FORMS JCL parameter
Maximum copies	Maximum number of copies allowed	`copies` job attribute and COPIES JCL parameter
Maximum document size	Maximum size of document (in bytes) allowed. This number does not include copies.	None. Print Interface determines the document size.
Print-error reporting supported	Types of error-reporting supported by the printer (invalid-character and print-positioning errors)	`print-error-reporting` job attribute and DATACK JCL parameter

Notes:

1. Print Interface does not inspect options that are specified in the form definition that is used to print the job during validation. For example, if the form definition specifies five copies, Print Interface does not use this copy count to determine whether the print request exceeds the copy limit.

2. Print Interface validates the JCL parameters if (1) the Print Interface subsystem is used or (2) the IP PrintWay basic mode `resubmit for filtering` option is used.

Data formats

In the **Data format** field, select all input data formats that the printer supports. Also, select all input data formats that can be transformed into a supported data format by the associated filter.

Print Interface automatically determines the type of data format in each input document unless the job submitter specifies the data format in the `document-format` job attribute. If Print Interface cannot determine the input data format, the default is **other**.

Guidelines:

1. In a PSF printer definition, select **line data**, **text**, and **MO:DCA-P**. PSF accepts line data and MO:DCA-P formats. Print Interface automatically transforms text data into line data when the printer definition is a PSF printer definition.

   If you installed a transform product, you can also select other data formats. For information, see Chapter 13, "Planning printer definitions for transforms," on page 203.

   Tip: If your installation installed PSF for z/OS, you can select the XML data format without specifying a filter because PSF can process XML files by using a page definition.

2. In an IP PrintWay printer definition, select the data formats that are accepted by the printer.

   If the printer accepts text data, select **line data** and **text** because Print Interface automatically converts line data to text data.

   If you install a transform product, you can also select other data formats. For information, see Chapter 13, "Planning printer definitions for transforms," on page 203.

3. Select **other** as one of the supported data formats only if you want Print Interface to send documents with an unknown data format to the printer, or for the Xerox data format. By default, the **other** data

format is selected, so be sure to clear it unless the printer can accept data formats other than the ones that Print Interface can automatically detect.

4. If several printers support the same data formats, consider creating a Processing component in which you select the data formats and specify any associated filters. Then, include this component in the printer definitions for all printers that support the same data formats. However, make sure that you do not specify any values in the **Data format** and **Filter** fields in the printer definition itself because the values that you specify in the printer definition completely override all values that are specified in the same fields in the Processing component.

explains the types of input data formats that you can select. You can select more than one type of data format.

Table 22. Data formats	
Data format	**Meaning**
JPEG	Joint Photographic Experts Group file format (JFIF).
Line data	Character data. It can contain carriage-control characters and table-reference characters. This type of data is typically found in mainframe data sets and is usually EBCDIC data.
MO:DCA-P	The Mixed Object Document Content Architecture for Presentation that is defined by Ricoh. Line-data records can be mixed with the MO:DCA-P data. This data format is also called *Advanced Function Presentation* (AFP) format.
PCL	The Printer Control Language data format that is defined by Hewlett Packard.
PDF	The Portable Document Format that is defined by Adobe.
PostScript	The PostScript data format that is defined by Adobe.
SAP	The SAP Output text format (OTF) or ABAP format that is defined by SAP.
Text	Character data. It can contain control characters LF (or NL), CR, HT, VT, and FF. This type of data is typically found in workstation files and is often ASCII data.
TIFF	Tagged image file format.
XML	The Extensible Markup Language.
Other	All data formats that do not fall into one of the other categories, such as the Xerox data format. This is the default data format when Infoprint Server cannot determine the data format.

Procedure for specifying attributes

On the Processing panel, specify the fields that are listed in .

Tip: When you leave the default settings on the Processing panel, Print Interface does not validate print requests.

Example

This ISPF panel shows how to specify the valid data formats, duplexing options, and print-error reporting options. Only a portion of the panel is shown.

```
                              Processing
⋮
Supported Data Formats and Associated Filters:
Data format:  Filter:

/ Line data    _____ (extend)
/ MO:DCA-P     _____ (extend)
_ PostScript   _____ (extend)
/ Text         _____ (extend)
_ PCL          _____ (extend)
_ PDF          _____ (extend)
_ SAP          _____ (extend)
/ XML          _____ (extend)
_ TIFF         _____ (extend)
_ JPEG         _____ (extend)
_ Other        _____ (extend)

_ Resubmit for filtering

⋮

Maximum document size . _____
Maximum copies. . . . . _____
Forms supported . . . . _____ _____ _____ _____ _____   (more)
Duplex supported. . . . / Simplex  _ Duplex   _ Tumble
Print-error reporting supported . / Character  / Position
⋮
```

Result: Print Interface rejects any print request that contains these data formats or print options:

- A data format of PostScript, PCL, PDF, SAP, TIFF, JPEG, or an unknown data format.
- The **duplex=yes** or **duplex=tumble** job attribute.
- The DUPLEX=NORMAL or DUPLEX=TUMBLE parameter on the OUTPUT JCL statement.

Using the aopfiltr.so filter

For each type of data format that Print Interface supports, you can specify the name of an associated filter. A *filter* is a program that can inspect and modify data before Print Interface writes the data to an output data set on the JES spool. When you specify the name of a filter for a supported data format in a printer definition, Print Interface automatically calls that filter before it writes data to the JES spool.

Infoprint Server provides filter **aopfiltr.so**, which prepares text data for printing on ASCII printers. This filter converts ASCII line-feed controls that are not preceded by carriage-return controls to carriage-return and line-feed controls (X'0D0A'). The X'0D0A' control is suitable for most ASCII printers.

Guidelines:

1. Specify filter **aopfiltr.so** for the **text** data format in all IP PrintWay printer definitions except when you select the email protocol.
2. Do not specify filter **aopfiltr.so** in a PSF printer definition.

Procedure for specifying attributes

On the Processing panel of an IP PrintWay printer definition, specify:

- **Data format** field: Select the **Text** data format.
- **Filter** field: Specify the name of the **aopfiltr.so** filter. Type the absolute path name if the filter is not in a directory that is named in the LIBPATH environment variable.
- **Resubmit for filtering** field: Do not select this field if the only filter you specify in the printer definition is **aopfiltr.so**. For more information about this field, see "Resubmitting documents to Print Interface for filtering (basic mode)" on page 195. Selecting this field can adversely impact system performance. This field applies only to IP PrintWay basic mode. IP PrintWay extended mode ignores it.

Tip: When you use the Infoprint Server ISPF panels to create an IP PrintWay printer definition, filter **aopfiltr.so** is automatically displayed in the **Filter** field on the Processing panel of an IP PrintWay printer definition when you select the LPR, direct sockets, IPP, or email protocol.

Example

This ISPF panel shows how to specify the **aopfiltr.so** filter that Infoprint Server provides in the Processing section of an IP PrintWay printer definition. Only a portion of the ISPF panel is shown.

```
                              Processing
⋮

Supported Data Formats and Associated Filters:

Data format:  Filter:

_ Line data    _____ (extend)
_ MO:DCA-P     _____ (extend)
_ PostScript   _____ (extend)
/ Text         aopfiltr.so_____ (extend)
_ PCL          _____ (extend)
_ PDF          _____ (extend)
_ SAP          _____ (extend)
_ XML          _____ (extend)
_ TIFF         _____ (extend)
_ JPEG         _____ (extend)
_ Other        _____ (extend)

_ Resubmit for filtering
⋮
```

Using the LPD compatibility filter

For each type of data format that Print Interface supports, you can specify the name of an associated filter. A *filter* is a program that can modify data before Print Interface writes the data to an output data set on the JES spool. When you specify the name of a filter for a supported data format in a printer definition, Print Interface automatically calls that filter before it writes data to the JES spool.

Infoprint Server provides the LPD compatibility filter, **lpd_compat.so**, which formats text data and line data in a similar way to the z/OS TCP/IP LPD and creates line data. This filter is suitable for use with the **line data** and **text** data formats for printers that accept line data.

The LPD compatibility filter, **lpd_compat.so**, supports some LPD command codes and parameters that the Print Interface LPD does not otherwise support. (LPD command codes and parameters are specified in the LPD control file that is sent by the LPR with each document to be printed.) You can also use this filter to specify the **-f**, **-l**, and **-w** filter options, which correspond to the FILTER, LINECOUNT, and WIDTH parameters of the TCP/IP LPR command.

Table 23 on page 89 summarizes the LPD command codes that are supported by the Print Interface LPD, with and without the LPD compatibility filter. For a full description of the LPD command codes, see RFC 1179.

Table 23. LPD command codes supported by Print Interface LPD			
Command code	**Description**	**Supported without compatibility filter**	**Supported with compatibility filter**
C	Class	No	No
H	Host name	No	No
I	Indent printing	No	No

Table 23. LPD command codes supported by Print Interface LPD (continued)			
Command code	**Description**	**Supported without compatibility filter**	**Supported with compatibility filter**
J	Job name. This value becomes the title in the Infoprint Server **title-text** job attribute if the T command code does not exist.[2]	Yes	Yes
	Job name parameters [1]	No	No
L	Print banner page	No	No
M	Mail when printed. This value activates notification.	Yes	Yes
N	Name of source file. This value becomes the file name that is displayed by the **lpq** or **lpstat** command. The compatibility filter also uses this name as the title if the T command code does not exist and the **p** command code is specified.	Yes	Yes
P	Owner. Print Interface allocates data sets on the JES spool with this value in the job name field. [2]	Yes	Yes
T	Title. This value becomes the title in the Infoprint Server **title-text** attribute.	Yes	Yes
W	Width of output	No	Yes
X	Infoprint Server job attributes. If attributes are prefixed with AOP, the LPD validates that the job attributes are supported by the printer.	Yes	No
1, 2, 3, 4	File names for troff fonts.	No	No
c	Plot CIF file	Yes [3]	Yes [3]
d	Print DVI file	Yes [3]	Yes [3]
f	Print formatted file	Yes [3] [4]	Yes
g	Plot file	Yes [3]	Yes [3]
l	Print file leaving control characters	Yes [4]	Yes
n	Print ditroff output file	Yes [3]	Yes [3]
o	Print PostScript output file	Yes[3]	Yes [3]
p	Print a header and page numbers on each page	No	Yes
r	Print with FORTRAN (ANSI) carriage controls	Yes	Yes
t	Print troff output file	Yes [3]	Yes [3]
v	Print raster file	Yes [3]	Yes [3]

Table 23. LPD command codes supported by Print Interface LPD (continued)			
Command code	**Description**	**Supported without compatibility filter**	**Supported with compatibility filter**
1. You can use the z/OS TCP/IP LPR command to specify these parameters as part of the job name: DEST, FOR, FORM, IDENTIFIER, LINECOUNT, OTHER, PASS, and PRIORITY. Print Interface does not support these parameters. 2. JES does not permit the Print Interface LPD to allocate data sets on the JES spool with the owner's name. Therefore, to make the owner name visible on the JES spool, the Print Interface LPD makes the owner name the job name *except* when IP PrintWay submits the data set to the Print Interface LPD. In this case, the Print Interface LPD keeps the original job name so that the operator can use the original job name to find the data set on the spool. 3. Print Interface automatically detects the data format of the input data stream and ignores the format specification in the command code. For example, Print Interface detects a PostScript data stream even if the **o** command code is not specified. 4. Without the compatibility filter, command codes **f** and **l** are equivalent. Print Interface leaves all ASCII control characters in the output data stream. 5. If an unsupported command code is specified in the LPD control file, the command code is ignored and no error is reported. 6. The Print Interface LPD, with or without the compatibility filter, does not support these functions that you can specify with the z/OS TCP/IP LPR command: • Carriage control specification • Top margin 7. The Print Interface LPD, with or without the compatibility filter, can print multiple copies of the same file when the LPD control file contains multiple lowercase command codes followed by the name of the same print file. (The Print Interface LPD always prints at least one copy of a file, even if no lowercase command code is specified in the LPD control file.)			

Guidelines:

1. If you want the functions that filter **lpd_compat.so** provides, specify it for the **Text** and **Line data** data formats in PSF printer definitions and General printer definitions.
2. Do not specify filter lpd_compat.so in IP PrintWay printer definitions.

Filter options

As an option, when you specify the **lpd_compat.so** filter, you can also specify a filter code, a maximum line count, and a maximum line width in the printer definition. You specify these values in filter options. Job submitters can specify the same filter options in the Infoprint Server **filter-options** job attribute.

The **lpd_compat.so** filter accepts these options:

%filter-options
    Causes options that are specified in the **filter-options** job attribute (specified, for example, on the **lp** command) to be passed to the transform.

    You can type the **%filter-options** option in any position relative to the other filter options. If you specify filter options to the right of **%filter-options**, those options override the same options that are specified in the **filter-options** job attribute.

-f *filter*
    Specifies the type of filter processing. This option is used only if the **f**, **l**, **p**, and **r** command codes are not specified in the LPD control file. The default value is **f**. Valid values are:

    Filter
        Meaning

f

Paginate the data, but do not add a heading. Truncate lines that exceed the maximum width. Discard any ASCII control characters except CR, FF, LF, BS, NL, VT, and HT.

l

Do not paginate the data or add a heading. Pass through all control characters.

p

Paginate the data, adding a heading to each page. The heading includes the date and time that Infoprint Server received the data, the title, and the page number. The title is the name of file as specified by the N (name) command code in the LPD control file, unless the T (title) command code is specified. After a page of text, a new page is started with a new page number. Truncate lines that exceed the maximum width.

r

Interpret the first column of each input line as a FORTRAN (ANSI) carriage control. Blank, "1", "0", "+" and "-" carriage controls are supported. Truncate lines that exceed the maximum width.

The filter values correspond to the values allowed on the FILTER parameter of the z/OS TCP/IP LPR command.

-l *length*

Specifies the maximum number of lines to include on a page. This value applies only to filters **f** and **p**. The default value is 60 lines. To prevent Print Interface from inserting page breaks, specify 0.

This option corresponds to the LINECOUNT subparameter of the z/OS TCP/IP LPR command and also to the PAGESIZE parameter of the z/OS TCP/IP SERVICE statement.

-w *width*

Specifies the maximum number of columns to allow on a line. Lines longer than the number specified (except for the title line) are truncated. The number that is specified does not include the carriage control character at the beginning of each line. This value applies only to filters **f**, **p**, and **r**. It is used only if the W (width) command code is not specified in the LPD control file. The default action is that lines are not truncated.

This option corresponds to the WIDTH parameter of the TCP/IP LPR command and to the LINESIZE parameter of the TCP/IP SERVICE statement.

Procedure for specifying attributes

On the Processing panel of a printer definition, specify:

- **Data format** field: Select the data format to which the filter applies. For filter **lpd_compat.so**, select **Line data** and **Text**.
- **Filter** field: Specify **lpd_compat.so**. Type the absolute path name if the filter is not in a directory that is named in the LIBPATH environment variable.
- **Resubmit for filtering** field: Do not select this field if the only filter you specify in the printer definition is **lpd_compat.so**. For more information about this field, see "Resubmitting documents to Print Interface for filtering (basic mode)" on page 195. Selecting this field can adversely impact system performance. This field applies only to IP PrintWay basic mode. IP PrintWay extended mode ignores it.

Example

This ISPF panel shows how to specify the **lpd_compat.so** filter that Infoprint Server provides in the Processing section of a PSF printer definition. Only a portion of the ISPF panel is shown.

```
                              Processing
Printer definition name . myprinter_____
⋮

Supported Data Formats and Associated Filters:
Data format:  Filter:

 /  Line data   lpd_compat.so -w 72 %filter-options_____  (extend)
 _  MO:DCA-P    _____     (extend)
 _  PostScript  _____     (extend)
 /  Text        lpd_compat.so -w 72 %filter-options_____   (extend)
 _  PCL         _____     (extend)
 _  PDF         _____     (extend)
 _  SAP         _____     (extend)
 _  XML         _____     (extend)
 _  TIFF        _____     (extend)
 _  JPEG        _____     (extend)
 _  Other       _____     (extend)

 _  Resubmit for filtering
⋮
```

The filter options mean:

- The **%filter-options** option causes the filter to use any filter options that a job submitter specifies in the **filter-options** job attribute. For example, on an **lp** command.
- The **-w** option causes the filter to truncate lines that exceed 72 printable characters.

    Because the **-w** option is specified to the left of *%filter-options*, a **-w** option that is specified in the **filter-options** job attribute overrides this value.

To print an MVS data set with a header on each page and a maximum width of 80 characters, a user can specify the **filter-options** job attribute on this **lp** command:

```
lp -d myprinter -o "filter-options='-f p -w 80'" "//'MYDATA'"
```

Using an installation-provided filter

For each type of data format (line-data, MO:DCA-P, PostScript, text, PCL, PDF, SAP, XML, and other), you can specify the name of an associated filter. A *filter* is a program that can inspect and modify data. When you specify the name of a filter for a supported data format in a printer definition, the filter is called when the data format is detected. Print Interface can call the associated filter (a filter is called only once for each data set) before it writes the data to an output data set on the JES spool.

Your installation can write its own filter program, either a DLL filter or a UNIX filter. For information about how to write a filter, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

On the Processing panel, specify:

- **Data format** field: Select the data format of the input document that your filter applies to.
- **Filter** field: Specify the name of the filter followed by the options that you want to provide as command line arguments to the filter.
  - If the filter is a DLL filter, type the absolute path name unless the filter is in a directory that is named in the LIBPATH environment variable.
  - If the filter is a UNIX filter, type spawn before the filter name. Type the absolute path name of the filter unless the filter is in a directory that is named in the PATH environment variable.

Example

This ISPF panel shows how to specify a UNIX filter that is written by your installation for line data. Only a portion of the ISPF panel is shown.

```
                        Processing
⋮
Data format:  Filter:

/ Line data  spawn /usr/mylib/my_unix_filter -a option operand  (extend)
_ MO:DCA-P   _____  (extend)
_ PostScript _____  (extend)
_ Text       _____  (extend)
_ PCL        _____  (extend)
_ PDF        _____  (extend)
_ SAP        _____  (extend)
_ XML        _____  (extend)
_ TIFF       _____  (extend)
_ JPEG       _____  (extend)
_ Other      _____  (extend)

⋮
```

If the input data stream contains line data, Print Interface calls the **my_unix_filter** filter to transform line data. The option and operand that follow the filter name are passed to the filter.

Converting data from EBCDIC to ASCII or ASCII to EBCDIC

Print Interface can convert data from EBCDIC to ASCII or from ASCII to EBCDIC before it writes text data to the JES spool. Print Interface automatically detects these types of formatted data and does not convert the data: JPEG, MO:DCA-P (also called *AFP*), PCL, PDF, PostScript, SAP, TIFF, and XML.

Print Interface uses the **iconv** utility that is provided with z/OS to convert text data between EBCDIC and ASCII code pages. You can specify the document and printer code pages that Print Interface uses as the source and target code pages. For more information about the **iconv** utility, see *z/OS XL C/C++ Programming Guide*.

If a filter is specified in the printer definition, Print Interface converts data from one code page to another before it calls the filter.

Procedure for specifying attributes

On the Processing panel, specify:

- **Document code page** field: Leave this field blank, or specify the code page that is used to create documents that are submitted to this printer definition. In most cases, you leave this field blank. If the field is blank, Print Interface determines the appropriate code page:
  - If the print request was submitted from the local z/OS system (with, for example, the **lp** command or the AOPPRINT procedure), Print Interface uses the document code page for the z/OS locale. This is usually an EBCDIC code page.
  - If the print request was submitted from a remote system, Print Interface uses the ASCII code page that is defined in the **ascii-codepage** attribute in the system configuration definition. If the attribute is not specified, it uses the default ASCII code page, ISO8859-1. For information about the **ascii-codepage** attribute, see *z/OS Infoprint Server Customization*.

  Tip: To print ASCII documents from the local z/OS system, specify an ASCII code page (for example, IBM-850) in this field or ask the job submitter to specify the ASCII code page in the **document-codepage** job attribute.

- **Printer code page** field: Specify the code page the printer uses to print the job. In an IP PrintWay printer definition, specify the name of an ASCII code page (such as IBM-850). In a PSF printer definition, specify the name of an EBCDIC code page (such as IBM-037). If you use ISPF panels to create a printer definition, the ASCII or EBCDIC code page that is specified in the system configuration definition is displayed in this field.

  Tip: If this field is blank, Print Interface does not convert data from one code page to another.

  Tips:

1. You can specify any code pages that are supported by z/OS. For code page names, see *z/OS XL C/C++ Programming Guide*.

2. If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:

   - The code pages in the **Document code page** and **Printer code page** fields.
   - The code page for the z/OS locale and the custom code page. The locale is set in the LC_CTYPE environment variable and in the **Language** field of the Infoprint Server ISPF Configuration panel.

   For information about how to create conversion tables, see information about code set conversion utilities in *z/OS XL C/C++ Programming Guide*.

3. You do not need to specify code page attributes in the printer definition unless you need to change either the document or printer code page. If you use the Infoprint Server ISPF panels to create printer definitions, by default, the printer code page field already contains the name of either an EBCDIC or ASCII code page, depending on the printer. In an IP PrintWay printer definition, the default code page is the ASCII code page that is specified in the `ascii-codepage` attribute in the system configuration definition. In a PSF or General printer definition, the default code page is the EBCDIC code page that is specified in the `ebcdic-codepage` attribute in the system configuration definition.

Mapping output bin and input tray names to numbers for an AFP printer

The *input tray* is the tray on the printer that serves as the paper source. The *output bin* is a bin on the printer where printed jobs are delivered. Users can use the `input-tray` and `output-bin` job attributes to specify a tray name, such as 3-hole and a bin name, such as staple.

If you define input tray or output bin names in a printer definition, a job submitter or VTAM application can use those names in the `input-tray` or `output-bin` job attribute. If you do not define any tray or bin names, Print Interface and NetSpool ignore the `input-tray` or `output-bin` job attribute. If, however, you define some tray or bin names, Print Interface and NetSpool reject a print request that specifies an undefined tray or bin name in the job attribute.

When you define input tray names, you must map the names to the numbers that an AFP printer uses for paper-source identification. When you define output bin names, you must map the names to the bin numbers that an AFP printer uses for output-bin identification. For tray and bin numbers that the printer uses, see your printer documentation.

Tip: Whether you define input tray or output bin names in a printer definition, a job submitter can specify the tray and bin number directly by using the `input-tray-number` and `output-bin-number` job attributes or the INTRAY and OUTBIN JCL parameters. The job submitter can specify any tray and bin numbers. You do not need to specify the numbers in the printer definition.

Procedure for specifying attributes

On the Processing panel, specify:

- **Input tray name** and **Number** fields: Specify a name and the tray number that is used by the AFP printer.
- **Output bin name** and **Number** fields: Specify a name and the bin number that is used by the printer.

Example

This ISPF panel shows how to map input tray names and output bin names to numbers in the Processing section of a PSF printer definition. Only a portion of the ISPF panel is shown.

```
                           Processing
  ⋮

   Input tray name:      Number:    Output bin name:      Number:

   top                   1          staple                4
   bottom                2          side                  2
   envelope              65         top                   1
   manual                100
   3-hole                3
```

If a user specifies the **input-tray=envelope** job attribute, Print Interface and NetSpool allocate the output data set on the JES spool with tray number 65. If the printer is an AFP printer, PSF uses tray number 65 when it communicates with the printer.

If a user specifies the **output-bin=staple** attribute on the **lp** command, Print Interface and NetSpool allocate the output data set with bin number 4. If the printer is an AFP printer, PSF uses bin number 4 when it communicates with the printer.

Using the Print Interface subsystem

A z/OS job submitter can specify the SUBSYS parameter on the DD JCL statement to request that the Print Interface subsystem process output data created by the batch application. SUBSYS subparameters are:

- Name of the Print Interface subsystem
- Name of the printer definition to use
- Infoprint Server job attributes

The job submitter can also specify other parameters on the DD and OUTPUT JCL statements that the Print Interface subsystem supports.

The Print Interface subsystem transforms data from one format to another (if transforms are requested in the printer definition) and allocates a sysout data set on the JES spool. The Print Interface subsystem can be used to print on any type of printer.

When you create a printer definition to be used with the Print Interface subsystem, you do not need to specify any special fields. Therefore, if you already created a printer definition, no changes are required.

Typically, you create one printer definition for each printer. However, when you create printer definitions to be used just with the Print Interface subsystem, you can simplify administration by creating only one printer definition for all printers that share attributes. If you create one printer definition for printing to several printers, the job submitter must specify the JCL parameters that are required to direct the output to the desired printer:

- If you create one PSF printer definition for all printers that are controlled by PSF, the job submitter must specify the JCL parameters that correspond to the JES work-selection criteria for that printer. For example, the output class and destination name.

  Example: This example shows the DD and OUTPUT statements that can be used to direct output to a specific PSF printer with a printer definition named `anyafpprinter`:

  ```
   //JOB1    JOB ...
   //STEP1   EXEC PGM=USERA
   //OUTDS1  OUTPUT CLASS=F,DEST=PRT003
   //DD1     DD SUBSYS=(AOP1,'anyafpprinter'),OUTPUT=(*.OUTDS1)
  ```

- If you create one IP PrintWay printer definition for all printers that use the LPR protocol, the job submitter must specify the printer's host name or IP address and print queue name.

  Example: This example shows the DD and OUTPUT statements that can be used to direct output to a specific printer with a printer definition named `anypsprinter`:

  ```
   //JOB2    JOB ...
   //STEP1   EXEC PGM=USERA
  ```

```
//OUTDS1 OUTPUT DEST='IP:PRINTER1.XYZ.COM',PRTQUEUE='queue'
//DD1    DD SUBSYS=(AOP1,'anypsprinter'),OUTPUT=(*.OUTDS1)
```

- If you create one IP PrintWay printer definition for all printers that use the direct sockets protocol, the job submitter must specify the printer's host name or IP address and port number on the OUTPUT JCL statement.

  Example: This example shows the DD and OUTPUT statements that can be used to direct output to a specific printer with a printer definition named `anynetprinter`:

  ```
  //JOB2   JOB ...
  //STEP1  EXEC PGM=USERA
  //OUTDS1 OUTPUT DEST='IP:PRINTER2.XYZ.COM',PORTNO='2501'
  //DD1    DD SUBSYS=(AOP1,'anynetprinter'),OUTPUT=(*.OUTDS1)
  ```

Guideline: Create one printer definition for each printer so that users can use all job submission methods to print on the printer, including those job submission methods that do not permit the job submitter to specify the JES output class, destination name, or IP address. For example, you cannot use the **lp** command to specify the JES output class or destination name. And, when the IP PrintWay basic mode **resubmit for filtering** option is used, the printer's host name or IP address cannot be specified on the OUTPUT JCL statement.

When the Print Interface subsystem is used, JES always assigns each data set to a separate JES output group. This is true even if the data set would otherwise be in the same JES output group as other data sets in the job step. Therefore, if the printer is controlled by IP PrintWay, these results occur:

- Data sets in the same job step might not print together or might not print in the original order.
- Data sets in the same job step are always sent in separate emails.
- If you currently add a separator page before the first data set in a JES output group, that separator page now prints before each data set.

Related task: Create a default Infoprint Server printer definition, as described in "Creating the Infoprint Server default printer definition" on page 101.

Procedure for specifying attributes

When you create a printer definition to be used with the Print Interface subsystem, the fields in these sections of the printer definition have special considerations:

- **Main** section:
  - **Printer definition name** field: To use the Print Interface subsystem, the job submitter must specify the printer definition name in either the SUBSYS or FSSDATA JCL parameter. This name is case-sensitive. Therefore, the job submitter must enter it exactly as you specify it in the printer definition.
  - **Use DEST, CLASS, and FORMS for IP PrintWay printer selection** field: The Print Interface subsystem ignores this field. The job submitter must specify the name of the printer definition. If none is specified, the Infoprint Server default printer definition is used. For information, see "Creating the Infoprint Server default printer definition" on page 101.
- **Allocation** section: The job submitter can specify JCL parameters and job attributes that correspond to all of the attributes in this section of the printer definition. Therefore, these attributes are not required. The JCL parameters and job attributes that are specified during job submission override the attributes that are specified in the printer definition.

  Guideline: Even though the job submitter can specify these same attributes in JCL parameters, specify default values for required JCL parameters, for example:

  - In a PSF printer definition, if the JES output class and destination name are JES work-selection criteria for the printer, specify the CLASS and DEST fields. If you do, the job submitter can omit the CLASS and DEST parameters on the OUTPUT JCL statement.
  - In an IP PrintWay printer definition, if the JES output class is the JES work-selection criteria for IP PrintWay, specify the CLASS field. If you do, the job submitter can omit the CLASS parameter on the OUTPUT JCL statement.

- **Processing** section:
  - **Filter** field: Specify transform filters. For information, see Chapter 13, "Planning printer definitions for transforms," on page 203.
  - **Resubmit for filtering** field: IP PrintWay ignores this field because the Print Interface subsystem already transformed the data.

    Guideline: If you run IP PrintWay basic mode, select this field so that IP PrintWay can transform data sets.
  - **Maximum document size** field: If the transformed data written to the sysout data set exceeds the number of bytes specified in this field, the Print Interface subsystem does not allocate any data sets in the job step and returns a JCL error.
  - **Maximum copies** and **xxxx-supported** fields: The Print Interface subsystem validates that values in the corresponding JCL parameters and job attributes are supported. If not, the Print Interface subsystem does not allocate any data sets in the job step and returns a JCL error. For more information, see "Validating that documents can print as requested" on page 85.
- **NetSpool Options** section: NetSpool does not use the Print Interface subsystem. Therefore, the Print Interface subsystem ignores attributes that are specified in this section.
- **NetSpool End-of-File** section: NetSpool does not use the Print Interface subsystem. Therefore, the Print Interface subsystem ignores attributes that are specified in this section.
- **IP PrintWay Options** section: The **Dataset grouping** field does not apply because JES assigns each data set to a different JES output group.
- **Protocol** section: You must complete the required fields. However, the DEST=IP:, PRTQUEUE, and PORTNO parameters on the OUTPUT JCL statement override the printer's host name or IP address, print queue name, and port number.

Example 1. A PSF printer definition

These ISPF panels show a printer definition that can be used for printing to a PSF-controlled printer with the Print Interface subsystem. Only a portion of some ISPF panels are shown.

```
                        PSF Printer Definition

 Printer definition name . myafpprinter_____
 Description . _____ (extend)
 Location. . . Building 003_____ (extend)

                          Component name      Custom values
 Section                  (enter to list)     (enter to customize)
 Allocation          => _____         => *_
 Processing          => _____         => *_
 NetSpool options    => _____         => __
 NetSpool end-of-file => _____         => __

 NetSpool LU name . _____    LU classes . . __  __  __  __  __  __   (extend)
```

```
                          Allocation

 Printer definition name . myafpprinter____

 Spool allocation values:
    CLASS . . . . F              GROUPID . . _____
    DEST. . . . . PRT003__       LINECT. . . ___


    ⋮
```

```
                              Processing

Printer definition name . myafpprinter

:
Supported data formats and associated filters:
Data format:  Filter:

/ Line data    _____  (extend)
/ MO:DCA-P     _____  (extend)
/ PostScript   ps2afp.dll  %filter-options -r 300_____  (extend)
/ Text         _____  (extend)
/ PCL          pcl2afp.dll -c letter_300 %filter-options_  (extend)
/ PDF          ps2afp.dll  %filter-options -r 300_____  (extend)
/ SAP          sap2afp.dll %filter-options -r 300_____  (extend)
/ XML          _____  (extend)
_ TIFF         _____  (extend)
_ JPEG         _____  (extend)
_ Other        _____  (extend)

:
 Maximum document size . _____
 Maximum copies. . . . . _____
 Forms supported . . . . _____ _____ _____ _____ _____
 Duplex supported. . . . / Simplex   / Duplex   / Tumble
 Print-error reporting supported . / Character   / Position

:
```

Result: A job submitter can use these JCL statements to print a PostScript document on this printer:

```
//JOB1   JOB  ...
//STEP1  EXEC PGM=USERA
//OUTDS1 OUTPUT FORMDEF=MYFDEF,USERLIB=MYLIB
//DD1    DD SUBSYS=(AOP1,'myafpprinter','filter-options="-a io1"'),
//         DSNAME=&&MYDATA,OUTPUT=*.OUTDS1
```

1. The Print Interface subsystem accepts line data, AFP data, PCL data, PostScript data, PDF data, SAP data, and XML data. It calls the associated transform if a filter is specified. It passes any transform options, such as the **-a** option, that were specified in the **filter-options** attribute in the SUBSYS JCL parameter to the transform.

2. The Print Interface subsystem allocates a sysout data set on the JES spool with output class F, destination name PRT003, and data set name MYDATA. JES defaults apply for other output parameters that are not specified in the JCL or in the Allocation section of the printer definition. For example, the JES default form name is used.

3. The Print Interface subsystem writes the transformed data to the sysout data set.

4. The PSF printer that prints data sets in class F with destination name PRT003 selects the data set from the JES spool and prints it, using form definition F1MYFDEF in library MYLIB to format the data.

Example 2. An IP PrintWay printer definition

These ISPF panels show a printer definition that can be used for printing to an IP PrintWay controlled printer that accepts PCL data with the Print Interface subsystem. Only a portion of some ISPF panels are shown.

```
                    IP PrintWay Printer Definition

  Printer definition name . mypclprinter____
  Description . _____ (extend)
  Location. . . Atlanta_____ (extend)

                      Component name       Custom values
  Section            (enter to list)     (enter to customize)
  Allocation          => _____      => *_
  Processing          => _____      => *_
  NetSpool options    => _____      => __
  NetSpool end-of-file => _____      => __
  IP PrintWay options  => _____      => __
  Protocol            => _____      => *_

  _ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
  NetSpool LU name . _____    LU classes . . __  __  __  __  __  __   (extend)
```

```
                            Allocation

  Printer definition name . mypclprinter___

  Spool allocation values:
     CLASS . . . . P            GROUPID . . _____
     DEST. . . . . _____     LINECT. . . ___

  ⋮
```

```
                            Processing

  Printer definition name . mypclprinter___

  ⋮

  Supported data formats and associated filters:
  Data format:  Filter:

  / Line data   afpxpcl.dll -c US %filter-options_____ (extend)
  / MO:DCA-P    afpxpcl.dll -c US %filter-options_____ (extend)
  _ PostScript  _____ (extend)
  / Text        aopfiltr.so_____ (extend)
  / PCL         _____ (extend)
  _ PDF         _____ (extend)
  _ SAP         _____ (extend)
  _ XML         _____ (extend)
  _ TIFF        _____ (extend)
  _ JPEG        _____ (extend)
  _ Other       _____ (extend)

  / Resubmit for filtering

  ⋮
   Maximum document size . _____
   Maximum copies. . . . . _____
   Forms supported . . . . _____ _____ _____ _____ _____
   Duplex supported. . . . / Simplex   / Duplex   / Tumble
   Print-error reporting supported . / Character   / Position

  ⋮
```

```
                            LPR Protocol

   Printer definition name . mypclprinter___
   Operator security profile
      . . . _____

   Printer IP address . printer1.xyz.com_____ (extend)
   Print queue name . . text_____ (extend)
  ⋮
```

Result: A job submitter can use these JCL statements to print AFP data to the printer:

```
//JOB1   JOB  ...
//STEP1  EXEC PGM=USERA
//OUTDS1 OUTPUT FORMDEF=MYFDEF,USERLIB=MYLIB
//DD1    DD SUBSYS=(AOP1,'mypclprinter'),DSNAME=&&MYDATA,
//         OUTPUT=*.OUTDS1
```

1. The Print Interface subsystem accepts text data, line data, AFP data, or PCL data and calls the associated transform. The AFP to PCL transform uses form definition F1MYFDEF in library MYLIB to format the data.
2. The subsystem allocates a sysout data set on the JES spool in JES output class P with data set name MYDATA. JES defaults are used for output parameters that are not specified in the JCL or in the Allocation section of the printer definition.
3. If IP PrintWay is customized to select data sets in output class P, IP PrintWay selects the data set from the JES spool and sends the data to the printer whose address is specified in printer definition `mypclprinter`.

Creating the Infoprint Server default printer definition

The default Infoprint Server printer definition is used in these situations:

lp command
> The job submitter does not specify a printer definition on the **lp** command and the PRINTER and LPDEST environment variables are not set.

Print Interface subsystem
> The printer definition in omitted in the SUBSYS parameter on the DD JCL statement and the FSSDATA parameter is not specified on the OUTPUT JCL statement.

You can use any printer definition that you already created as the default printer definition. However, you must specify the name of the default printer definition on the Infoprint Server Configuration panel. By default, the name of the default printer definition is `lp1`.

Procedure for specifying the name of the default printer definition

To specify the name of the default printer definition:

1. On the Infoprint Server Printer Inventory Manager panel, select 7 `Configure`.
2. On the Configuration panel, specify the name in the **Default printer** field.

Example

This ISPF panel shows how to specify the name of the default printer definition.

```
                           Configuration
  ⋮

Printer Inventory:
    Configuration file . /etc/Printsrv/aopd.conf
    NLS path . . . . . . /usr/lpp/Printsrv/En_US/%N
    Language . . . . . . En_US
    Default printer. . . default-printer

  ⋮
```

Results:

- The **lp** command uses the printer definition that is named `default-printer` if the job submitter does not specify a printer definition name and the PRINTER and LPDEST variables are not set.
- The Print Interface subsystem uses the printer definition that is named `default-printer` if the job submitter does not specify a printer definition name.

Chapter 11. Planning printer and printer pool definitions for NetSpool

Before you can use NetSpool to print VTAM application data, you must specify fields (attributes) that NetSpool uses in the printer definition. Table 59 on page 482 summarizes the attributes that NetSpool uses and indicates whether each attribute is required or optional. If a printer definition does not exist for the printer or email destination, you must create one. If a printer definition exists, edit it and specify the attributes that NetSpool uses.

You can configure printer definitions for use by NetSpool before or after you start the NetSpool program. If NetSpool is already started, NetSpool automatically starts the printer LU when you save the printer definition, provided that the printer LU is assigned to one of the LU classes that NetSpool started. If the printer LU is not active in VTAM, NetSpool automatically starts it when the printer LU becomes active.

If you change printer attributes in an existing printer definition while a VTAM session with the printer LU is active, in most cases NetSpool uses the changed values when it allocates the next output data set on the JES spool. However, changes to the LU class and end-of-file rules are related to the VTAM session and do not take effect with the next data set. For information, see "Grouping NetSpool printer LUs into LU classes" on page 104 and "Specifying how NetSpool determines end-of-file" on page 119.

In addition to configuring the printer definition for use by NetSpool, you must also define the NetSpool printer LU name to VTAM. If NetSpool is already started, define the printer LU to VTAM before you configure the printer definition, because NetSpool attempts to start the printer LU as soon as the printer definition is saved in the Printer Inventory. For information, see Chapter 15, "Defining NetSpool printer LUs to VTAM," on page 217.

The following information describes the administrative tasks for NetSpool:

- "Specifying the NetSpool printer LU name" on page 103
- "Grouping NetSpool printer LUs into LU classes" on page 104
- "Specifying JES allocation parameters" on page 105
- "Converting SCS and 3270 data streams to line data streams" on page 106
- "Converting SCS and 3270 data streams to PCL data streams" on page 110
- "Selecting no data stream conversion" on page 116
- "Specifying a default user ID and job attribute prefix" on page 117
- "Selecting a font" on page 117
- "Specifying how NetSpool determines end-of-file" on page 119
- "Broadcasting data with multiple printer definitions" on page 123
- "Validating that documents can print as requested" on page 124
- "Using an installation-provided filter" on page 126
- "Mapping output bin and input tray names to numbers for an AFP printer" on page 127

Note: For detailed information about each attribute (including the values that you can specify, restrictions, and examples), use the online help for each field on the ISPF panels.

Specifying the NetSpool printer LU name

In each printer definition, you must specify the NetSpool printer logical unit (LU) name that you want to associate with the printer. NetSpool uses this name to establish a session with VTAM applications. This name is the VTAM secondary LU (SLU) name and must match the name in the ACB parameter of the APPL statement. For information about how to select NetSpool printer LU names and how to create APPL statements, see Chapter 15, "Defining NetSpool printer LUs to VTAM," on page 217.

Each printer LU name in the Printer Inventory must be unique. That is, you cannot specify the same LU name in more than one printer definition. If you need to associate more than one NetSpool printer LU name with the same printer, you must create additional printer definitions for that printer. These printer definitions can be identical except for the printer definition name and the NetSpool LU name.

If the printer LU name is in one of the LU classes that NetSpool started, NetSpool automatically attempts to start a VTAM session with the printer. If the printer LU is not yet active in VTAM, NetSpool automatically starts the printer when the printer LU becomes active. If the printer LU name is not in one of the started LU classes, the operator must use the NetSpool ADD command to add it. For information, see "Starting NetSpool printer LUs" on page 28.

Guideline: Do not change the LU name in a printer definition while a VTAM session with the printer is active.

Procedure for specifying attributes

To specify the NetSpool printer LU name, specify this attribute on the first ISPF panel that is displayed for the printer definition:

- **LU Name** field: Specify the LU name.

"Main ISPF panel for an IP PrintWay printer definition" on page 487 shows the ISPF panel that you use to specify LU name. Use the online help for the ISPF panel and the help for each field on the panel for more information.

Grouping NetSpool printer LUs into LU classes

With NetSpool, you can group NetSpool printer LUs into *logical-unit classes*. A class is identified by a number 1–64.

You might want to group logical printers into classes for these reasons:

- To start classes of logical printers at different times. For example, you might want to process requests for one class of printers during the day and process requests for another class of printers during the night.
- To spread processing of different classes of logical printers over different address spaces. You might want to do this if you have many logical printers.

The NetSpool startup procedure identifies which LU classes NetSpool is to start. After NetSpool is started, the operator can dynamically start and stop individual logical printers that are in different classes from those classes specified when NetSpool was started. For information about the NetSpool startup procedure, see *z/OS Infoprint Server Customization*. For information about how to start printers in other classes, see Chapter 2, "Starting and stopping the NetSpool task and NetSpool LUs," on page 25.

Each NetSpool printer LU can belong to one or more LU classes. If you assign a printer LU to more than one class, NetSpool starts that printer LU when you start any one of the classes. For example, if you assign a printer LU to classes 1 and 2, NetSpool starts the printer LU if either class 1 or class 2 is specified in the NetSpool startup procedure.

Grouping NetSpool LUs into classes is optional. If you do not specify an LU class, NetSpool assigns the printer LU to class 1. When you start NetSpool, start class 1 and NetSpool starts all printer LUs defined in the Printer Inventory.

You can change the LU class for a printer definition. If you change the LU class after NetSpool started the printer LU, NetSpool takes these actions:

- If the new LU class is one of the classes that NetSpool started, NetSpool automatically attempts to start the printer LU.
- If the new LU class is not in one of the started LU classes, NetSpool stops the printer LU after the VTAM application ends the session.

Procedure for specifying attributes

On the first ISPF panel for the printer definition, specify:

- **LU Classes** field: Specify one or more LU classes that are represented by a number (1 – 64).

"Main ISPF panel for an IP PrintWay printer definition" on page 487 shows the ISPF panel that you use to specify LU classes.

Specifying JES allocation parameters

You must specify attributes in the Allocation section of a printer definition to tell NetSpool how to allocate output data sets on the JES spool. For example, you can specify the JES output class or destination name.

Each attribute in the Allocation section of a printer definition corresponds to a parameter that you can specify on an OUTPUT JCL statement. "Allocation attributes and corresponding OUTPUT or DD statement parameters" on page 479 lists fields in the Allocation section and the corresponding OUTPUT JCL parameters. For a full explanation of each JCL parameter, see *z/OS MVS JCL Reference*. The ISPF online help for each field summarizes the meaning of each field.

Some of the attributes apply only if the printer is a PSF printer or the printer definition specifies a transform. For information about the fields that apply when you use a transform, see the documentation for the transform.

Print Interface also uses the attributes in the Allocation section to allocate data sets on the JES spool. In most cases, the same attributes are suitable for both NetSpool and Print Interface. If you need to specify unique attributes for NetSpool, you must create two separate printer definitions for the same printer.

Procedure for specifying attributes

On the Allocation panel, specify:

- **Spool allocation values** heading: The fields under this heading correspond to the OUTPUT JCL parameters that JES can use to direct output data sets from the JES spool to IP PrintWay, a PSF printer, or another JES functional subsystem application (FSA):

  - In a PSF printer definition, specify the JES work-selection criteria that are defined for the PSF printer FSA. For example, if the JES work-selection criteria are class E and destination BLDG5, specify E in the **CLASS** field and BLDG5 in the **DEST** field.

  - In an IP PrintWay basic mode printer definition, specify the JES work-selection criteria that are defined for the IP PrintWay basic mode FSA. For example, if the work-selection criterion is class P, specify P in the **CLASS** field.

  - In an IP PrintWay extended mode printer definition, specify the job-selection criteria that are defined in the IP PrintWay extended mode job selection rule. For example, if the job-selection criterion is class P, specify P in the **CLASS** field.

  Tip: JES work-selection criteria are defined in the JES3 DEVICE statement and the JES2 PRT*nnnnn* statement.

- Specify other fields that transforms, PSF, or IP PrintWay use:

  - If your installation uses the transforms, specify fields that the transforms use. For information about these fields, see the documentation for the transform.

  - In an IP PrintWay printer definition, specify fields that IP PrintWay uses. For information about these fields, see "Specifying allocation parameters for IP PrintWay (basic and extended mode)" on page 163.

  - In a PSF printer definition, specify fields that correspond to the JCL parameters that PSF uses. For information about these JCL parameters, see *PSF for z/OS: User's Guide*.

Tip: If you need to specify the same allocation attributes in more than one printer definition, specify the attributes in an Allocation component. Then, include that component in each printer definition to which the component applies.

Example

This ISPF panel shows how to specify an output class and destination in the Allocation section of a printer definition.

```
                          Allocation

Spool allocation values:
   CLASS . . . . E            GROUPID . . _____
   DEST. . . . . BLDG5        LINECT. . . ___
   JES node. . . _____     PRMODE  . . _____
   FCB . . . . . ____         PRTY. . . . ___
   FLASH count . ___          THRESHLD. . _____
   FLASH name. . ____         UCS . . . . ____
   FORMS . . . . _____     WRITER. . . _____
   USERDATA
      . . _____ (extend)
   BURST . . . . _  1. Yes  2. No
   HOLD. . . . . _  1. Yes  2. No
   OUTDISP . . . _  1. Purge (without printing)  2. Leave
                    3. Keep  4. Hold  5. Write
Values for Separator Pages:
   Address
      . . _____(extend)
   Building . . _____
   Department . _____
   Name . . . . _____
   Room . . . . _____
   Title  . . . _____
Resource Related Values:
   Form definition . _____
   Character sets  . ____  ____  ____  ____
   Overlay front . . _____   Back . . _____
   Input tray  . . . ___
   Output bin  . . . _____
   Page definition . _____
   Resource library. _____ (extend)
   Resource directories. _____ (extend)
   Image shift x-direction front . . _____   Back . . _____
               y-direction front . . _____   Back . . _____
Error Reporting Values:
   Print error reporting. . _  1. None  2. All  3. Character  4. Position
   Error disposition. . . . _  1. Default  2. Hold  3. Quit
   Print error messages . . _  1. No  2. Yes
        Maximum messages. .___
Other Values:
   Notify . . . . . . _____   at node . . _____
                      _____   at node . . _____
                      _____   at node . . _____
                      _____   at node . . _____
   Checkpoint pages . . _____
   Checkpoint seconds . _____
   Copies . . . . . . . _____
   Copy group . . . . . ___  ___  ___  ___  ___  ___  ___ ___
   Color map. . . . . . _____
   Com setup member . . _____
   JES form length. . . _____
   Resolution . . . . . ___
   AFP parameters . . . _____
   Duplex. . . . . . . _  1. Simplex  2. Duplex  3. Tumble
   Label data pages . . _  1. Yes  2. No
   Restrict printable area . . _  1. Yes  2. No
   _ Table reference characters
   _ Save AFP statistics
```

NetSpool allocates output data sets in JES output class E and with destination name BLDG5. The FSA defined to JES with work-selection criteria of class E and destination BLDG5 selects the output data set for printing.

Converting SCS and 3270 data streams to line data streams

In each printer definition, you can select a NetSpool formatting option. The formatting option controls how NetSpool formats the data streams created by your VTAM applications. You can select one of these formatting options:

- Convert to line (default)
- Convert to PCL
- None

To convert data streams to line data or to PCL format, a separate transform product is not required.

The **Convert to line** formatting option is described here. When you select the **Convert to line** option, NetSpool converts SCS data streams (on VTAM LU type 1 sessions) and 3270 data streams (on VTAM LU type 0 and type 3 sessions) to line data streams.

You can select the **Convert to line** option for a wide range of printers, including:

- Line printers that are controlled by JES

  Line printers that natively accept line data streams.
- AFP printers that are controlled by PSF

  AFP printers do not natively accept line data streams. However, PSF can convert line data streams to Intelligent Printer Data Streams (IPDS), which AFP printers accept.
- Network printers that are controlled by IP PrintWay

  Network printers do not natively accept line data streams. However, IP PrintWay can convert line data streams to ASCII text data streams, which most network printers accept. If you install the separately priced AFP to PCL, AFP to PDF, or AFP to PostScript transform, NetSpool can convert line data streams to PCL, PDF, or PostScript data streams.

  Tip: The NetSpool **Convert to PCL** formatting option is also suitable for most network printers. When NetSpool converts input data streams to PCL data streams, it can support more of the formatting options in the original data streams, such as print density and line density, than when it converts to line data streams.

When you select the **Convert to line** option, NetSpool converts the printable data, SCS controls, and 3270 controls in the input data stream to line data with ANSI carriage-control characters. Carriage-control characters control line spacing and skipping operations. NetSpool supports most of the SCS and 3270 controls in the input data stream that are associated with printing. However, NetSpool ignores those SCS and 3270 controls for which no equivalent support exists in line data. NetSpool writes the line data to the JES spool in variable-length, blocked records, with a maximum record size of 4092 bytes.

To complete the fields in the printer definition that are related to NetSpool formatting, you need to understand these functions that NetSpool provides when you select the **Convert to line** option:

Page formatting
NetSpool formats data into lines and pages before it writes it to the JES spool. The page formatting is different for SCS and 3270 input data streams.

SCS data streams
NetSpool uses the SCS Set Horizontal Format (SHF) and SCS Set Vertical Format (SVF) controls in the input data stream to format data into lines and pages. The SHF and SVF controls specify page-formatting values such as line length, page length, margins, and tabs. The SHF and SVF controls take effect immediately and remain in effect until either the next SHF or SVF control or until NetSpool establishes another VTAM session with the printer.

If the SCS data stream does not contain SHF and SVF controls, NetSpool uses default values. In each printer definition, you can specify the default values that NetSpool is to use for the line length, page length, margins, and tabs.

3270 data streams
NetSpool uses the 3270 Write Control Characters (WCCs) in the input data stream to format data into lines and pages. To change page-formatting values for 3270 data, the application programmer must change the WCCs generated by the VTAM application that creates the 3270 data. NetSpool does not use the SCS default page-formatting values that are specified in the printer definition when it formats 3270 data.

DBCS support

NetSpool supports these SCS and 3270 controls and orders, which identify double-byte character set (DBCS) strings:

- Shift Out and Shift In
- Set Attribute, with the Character Set attribute

In addition, NetSpool supports these 3270 orders, which identify DBCS strings:

- Start Field Extended with the Character Set attribute
- Modify Field with the Character Set attribute

In place of these controls and orders, NetSpool inserts Shift Out and Shift In line-data controls where necessary in the line-data output. When you print DBCS data on printers that are controlled by PSF, you must select the PSF **SOSI2** option to prevent printing unwanted blanks.

For tables that describe how NetSpool converts SCS and 3270 data streams to line data streams, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

To convert SCS and 3270 data streams to line data streams:

1. On the NetSpool Options panel, select the **Convert to line** formatting option.
2. (Optional) On the Processing panel, specify these default page-formatting values, which NetSpool uses for input SCS data streams only:

   - **Line length** field: Specify the maximum number of columns on each line. This is the default value for the SCS maximum presentation position (MPP) value. Allowed values are 1–255. The default value is 80.
   - **Page length** field: Specify the maximum number of lines per page. This is the default value for the SCS maximum presentation line (MPL) value. Allowed values are 1–255. The default value is 1, which means that NetSpool does not control the number of lines that are placed on a page. The VTAM application controls the number of lines per page.
   - **Margins: Left** field: Specify the column number at which you want data to start on each line. This is the default value for the SCS left margin (LM) value. Allowed values are 1–255. The default value is 1.
   - **Margins: Right** field: Specify the column number at which you want data to end on each line. This is the default value for the SCS right margin (RM) value. Allowed values are 1 - 255. The default value is 80.
   - **Margins: Top** field: Specify the line number of the first line on each page. This is the default value for the SCS top margin (TM) value. Allowed values are 1–255. The default value is 1.
   - **Margins: Bottom** field: Specify the line number of the last line of data on each page. This is the default value for the SCS bottom margin (BM) value. Allowed values are 1 - 255. The default value is 1 (no bottom margin).

     If you specify a value of 1, NetSpool does not insert form feeds when the input data stream spaces past the bottom margin. However, NetSpool does insert form feeds when an explicit form feed or a Select Vertical Channel command occurs in the input data.
   - **Tabs: Horizontal** field: Specify horizontal tabs. This is the default value for the SCS horizontal tab (HT) value. Allowed values are 0–255. The default is no horizontal tabs. The input data stream can add more tab positions but cannot remove default tabs set in this field.

     NetSpool always sets the first tab to the left margin value. Therefore, do not specify it. NetSpool ignores a value of 0. In this example, NetSpool sets horizontal tabs at columns 6, 15, 50, 75, and 100.

```
SCS Conversion:
    Margins:  Top . . . ___    Bottom . . ___    Left . . 6__    Right . . ___
    Tabs:  Vertical . . ___   ___   ___   ___  (extend)
           Horizontal . 15_   50_   75_   100  ___  (extend)
```

- **Tabs: Vertical** field: Specify vertical tabs. This is the default value for the SCS vertical tab (VT) value. Allowed values are 0–255. The default is no vertical tabs.

  NetSpool always sets the first tab to the top margin value. Therefore, do not specify it. NetSpool ignores a tab value of 0. NetSpool uses the first 11 tabs as line numbers for Select Vertical Channel 2–12. In this example, NetSpool sets:

  – Vertical tabs at lines 6, 20, 40, and 50

  – Vertical channels are set: CH01=6, CH02=20, CH04=40, CH05=50

  These vertical channels are not set: CH03, CH06 through CH12.

```
SCS Conversion:
    Margins:  Top . . . 6__
    Tabs:  Vertical . . 20_   0__   40_   50_   ___  (extend)
```

3. (Optional) If you want to send the data in PDF format in an email, specify the AFP to PDF transform in the **Filter** field.

4. If the printer is controlled by PSF and you print DBCS output, on the Allocation panel, specify:

   - **PRMODE** field: Specify SOSI2.
   - **Character sets** field: Specify a single-byte font and a double-byte font.

Tip: If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

Examples

These examples show how to complete the ISPF panels to convert SCS and 3270 input data streams to line data streams.

Example 1. Converting SCS data streams to line data streams

This ISPF panel shows how to request that NetSpool convert input data streams from VTAM applications to line data streams.

```
                        NetSpool Options

 Printer definition name . myprinter_____

 Formatting . . . . 2   1. None  2. Convert to line  3. Convert to PCL
    Record size . . _____
    RECFM . . . . . _   1. VB  2. VBA  3. VBM
⋮
```

This ISPF panel shows how to specify default page-formatting values for SCS data streams.

```
                        Processing
⋮

 SCS Conversion:
    Margins:  Top . . . 6__    Bottom . . 61_    Left . . 3__    Right . . 75_
    Line length . . . . 80_                 Page length . . 66_
    Tabs:  Vertical . . ___   ___   ___   ___   ___  (extend)
           Horizontal . 5__   10_   15_   20_   ___  (extend)
⋮
```

Example 2. Converting 3270 data streams to line data streams

This ISPF panel shows how to request that NetSpool convert input data streams from your VTAM applications to line data streams.

```
                         NetSpool Options

 Printer definition name . myprinter_____

 Formatting . . . . 2   1. None  2. Convert to line  3. Convert to PCL
     Record size . . _____
     RECFM . . . . . _   1. VB  2. VBA  3. VBM
 ⋮
```

Converting SCS and 3270 data streams to PCL data streams

In each printer definition, you can select a NetSpool formatting option. The formatting option controls how NetSpool formats the data streams created by your VTAM applications. You can select one of these formatting options:

- Convert to line (default)
- Convert to PCL
- None

To convert data streams to line data or to PCL format, a separate transform product is not required.

The **Convert to PCL** formatting option is described here. When you select the **Convert to PCL** option, NetSpool converts SCS data streams (on VTAM LU type 1 sessions) and 3270 data streams (on VTAM LU type 0 or type 3 sessions) to Printer Control Language (PCL) 5 data streams.

You can select **Convert to PCL** for printers that are controlled by IP PrintWay that accept PCL data streams. When you select this option, IP PrintWay automatically transmits PCL data streams created by NetSpool to the printer without additional page formatting.

Most printers that accept PCL data streams can also accept text data streams. Therefore, for these printers you can select either the NetSpool **Convert to PCL** or the **Convert to line** formatting option. The **Convert to PCL** option provides these additional functions:

- For SCS data streams, NetSpool can support these additional print control functions in the input data stream, which provide better print fidelity:
  - Line-density and print-density
  - Page orientation
  - Paper-source and output-bin
  - Job-separation
  - Duplex

  When you select the **Convert to line** option, NetSpool cannot fulfill these requests in the input data stream because of limitations in line data.

- For SCS data streams, NetSpool can automatically change the orientation of the page between portrait and landscape on a page by page basis. NetSpool can also reduce print output, if necessary, to make the data fit on the line or page.

- For both SCS and 3270 data streams, you can use NetSpool to specify the line density, print density, and page orientation for each printer in the printer definition. This means that you do not need to set these values at the printer's control panel or specify the PCL commands in the IP PrintWay **Document header** field.

However, the **Convert to PCL** option is not suitable in these printing situations. Therefore, in these situations, instead select the **Convert to line** option:

- The printer is controlled by JES or PSF. JES and PSF do not accept PCL data.

- Your VTAM applications generate DBCS data. NetSpool cannot support DBCS data when you select the **Convert to PCL** option.
- You want to use a form definition and page definition to format your data and print it on a PCL printer. In this case, select the NetSpool **Convert to line** option and also use the AFP to PCL transform to convert line data streams created by NetSpool to PCL data streams.

When you select the **Convert to PCL** option, NetSpool converts EBCDIC data, SCS controls, and 3270 controls in the input data stream to ASCII data and PCL commands. NetSpool supports most of the SCS and 3270 controls in the input data stream that are associated with printing. NetSpool ignores those SCS and 3270 controls for which no equivalent PCL commands exist. NetSpool writes PCL data streams to the JES spool in variable-length, blocked format, with a maximum record size of 32752 bytes.

To complete the fields in the printer definition that are related to NetSpool formatting, you need to understand these functions that NetSpool provides when you select the **Convert to PCL** option:

EBCDIC to ASCII conversion
NetSpool converts data from EBCDIC to ASCII before it writes it to the JES spool. To convert data to ASCII, NetSpool converts data from an EBCDIC code page (also called the *document code page*) to an ASCII code page (also called the *printer code page*) by using the IBM **iconv** utility. For most printing situations, the default document and printer code pages that NetSpool uses are suitable. However, in each printer definition, you can specify different document and printer code pages.

Page formatting
NetSpool formats data into lines and pages before it writes it to the JES spool. The page formatting is different for SCS and 3270 input data streams.

SCS data streams
NetSpool uses SCS Set Horizontal Format (SHF) and SCS Set Vertical Format (SVF) controls to format data into lines and pages. The SHF and SVF controls specify page-formatting values such as line length, page length, margins, and tabs. The SHF and SVF controls take effect immediately and remain in effect until either the next SHF or SVF control or until NetSpool starts writing a new output data set to the JES spool.

If the SCS data stream does not contain SHF and SVF controls, NetSpool uses default values. In each printer definition, you can specify the default values that NetSpool is to use for the line length, page length, margins, and tabs.

3270 data streams
NetSpool uses page-formatting values in the 3270 Write Control Characters (WCCs) in the 3270 data stream to format data into lines and pages. To change page-formatting values for 3270 data, the application programmer must change the WCCs generated by the VTAM application that creates the 3270 data. For 3270 data streams, NetSpool does not use any of the default page-formatting values for line length, page length, margins, and tabs that you specify in the printer definition.

Print density, line density, and page orientation
NetSpool can generate PCL commands to set the print density (characters per inch), line density (lines per inch), and page orientation (portrait or landscape). NetSpool processing differs for SCS and 3270 data streams.

SCS data streams
NetSpool converts the SCS Set Print Density (SPD) and SCS Set Line Density (SLD) controls in the input data stream to corresponding PCL commands. In each printer definition, you can specify the default print density and line density that NetSpool is to use when the SCS data stream does not contain SPD and SLD controls. The SCS data stream does not contain orientation controls. However, in each printer definition, you can specify the page orientation that NetSpool is to use. Also, you can request that NetSpool automatically determine the appropriate orientation of each page.

3270 data streams
3270 data streams do not contain print density, line density, and page orientation information. In each printer definition, you can specify the print density, line density, and page orientation that NetSpool is to use.

For both SCS and 3270 data streams, if you do not specify density or orientation values in the printer definition, the values set at the printer's control panel are used unless the density and orientation are specified in another location. Density and orientation can be specified in several places. If they are specified in more than one place, the first value in this list is used. For example, a value that is specified in the SCS data stream overrides all other values.

1. SCS controls that occur in the input SCS data stream, including any PCL commands and SCS controls added by the NetSpool Transparent Data exit
2. PCL commands or SCS controls added by the NetSpool Beginning of File exit
3. Density and orientation values you specify in the printer definition under the **NetSpool PCL Conversion** heading
4. PCL commands that you specify in the IP PrintWay **Document header** field in the printer definition
5. PCL commands added by the IP PrintWay Begin Data Set exit
6. The default value set at the printer's control panel

Automatic page orientation (SCS data streams only)
When you select the automatic page orientation option in the printer definition, NetSpool automatically determines the appropriate orientation (portrait or landscape) of each page based on the line length and page length of that page. If necessary, NetSpool reduces the size of the print (the font size) and increases the line density so that data fits on a line.

NetSpool uses the line and page lengths that are specified in SCS controls and in the **Print density**, **Line density**, **Line length**, and **Page length** fields to determine the appropriate page orientation for each page. If the line length is greater than the page length, NetSpool sets the orientation to landscape. Otherwise, it sets the orientation to portrait. When NetSpool sets the orientation to landscape, if the **Line length** field (or the MPP in the SCS SHF control) is greater than 106, NetSpool sets the print density to 15 characters per inch and the line density to 8 lines per inch.

For more information, see:

- *z/OS Infoprint Server User's Guide* for tables that describe how NetSpool converts SCS and 3270 data streams to PCL data streams
- *z/OS Infoprint Server Customization* for information about NetSpool exits

Procedure for specifying attributes

To request that NetSpool convert SCS and 3270 data streams to PCL data streams:

1. On the NetSpool Options panel, select the **Convert to PCL** formatting option.
2. (Optional) On the Processing panel, specify code pages for EBCDIC to ASCII conversion:
   - **Document code page** field: Leave this field blank or specify the name of an EBCDIC code page that is supported by IBM. If you leave this field blank, the default code page is the EBCDIC code page specified in the `ebcdic-codepage` attribute in the system configuration definition. If the attribute is not specified, NetSpool uses code page IBM-1047.
   - **Printer code page** field: Specify the name of an ASCII code page that is supported by IBM. The ISPF panels automatically display the ASCII code page that is specified in the `ascii-codepage` attribute in the system configuration definition. If no code page is specified in the printer definition, NetSpool uses code page IBM-850.

   Guidelines:

   a. For most printing situations, you do not need to modify the code pages in the printer definition. The initial values in the printer definition are generally suitable.
   b. If you plan to use this printer definition with Print Interface and with NetSpool, leave the **Document code page** field blank and specify a code page in the **Printer code page** field. For information about how Print Interface uses these fields, see "Converting data from EBCDIC to ASCII or ASCII to EBCDIC" on page 94.

c. You can specify any code pages that are supported by IBM. For valid code page names, see *z/OS XL C/C++ Programming Guide*.

d. If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:

- The code pages in the **Document code page** and **Printer code page** fields.
- The code page for the z/OS locale and the custom code page.

For information about how to create conversion tables, see information about code set conversion utilities in *z/OS XL C/C++ Programming Guide*.

(Optional) On the Processing panel, specify these default page-formatting values, which NetSpool uses for input SCS data streams only:

- **Line length** field: Specify the maximum number of columns on each line. This is the default value for the SCS maximum presentation position (MPP) value. Allowed values are 1–255. The default value is 80.
- **Page length** field: Specify the maximum number of lines per page. This is the default value for the SCS maximum presentation line (MPL) value. Allowed values are 1–255. The default value is 1, which means that NetSpool does not control the number of lines that are placed on a page. The VTAM application controls the number of lines per page.
- **Margins: Left** field: Specify the column number at which you want data to start on each line. This is the default value for the SCS left margin (LM) value. Allowed values are 1–255. The default value is 1.
- **Margins: Right** field: Specify the column number at which you want data to end on each line. This is the default value for the SCS right margin (RM) value. Allowed values are 1 - 255. The default value is 80.
- **Margins: Top** field: Specify the line number of the first line on each page. This is the default value for the SCS top margin (TM) value. Allowed values are 1–255. The default value is 1.
- **Margins: Bottom** field: Specify the line number of the last line of data on each page. This is the default value for the SCS bottom margin (BM) value. Allowed values are 1 - 255. The default value is 1 (no bottom margin).

  If you specify a value of 1, NetSpool does not insert form feeds when the input data stream spaces past the bottom margin. However, NetSpool does insert form feeds when an explicit form feed or a Select Vertical Channel command occurs in the input data.

- **Tabs: Horizontal** field: Specify horizontal tabs. This is the default value for the SCS horizontal tab (HT) value. Allowed values are 0–255. The default is no horizontal tabs. The input data stream can add more tab positions but cannot remove default tabs set in this field.

  NetSpool always sets the first tab to the left margin value. Therefore, do not specify it. NetSpool ignores a value of 0. In this example, NetSpool sets horizontal tabs at columns 6, 15, 50, 75, and 100.

```
SCS Conversion:
   Margins:  Top . . . ___    Bottom . . ___    Left . . 6__    Right . . ___
   Tabs:  Vertical . . ___  ___  ___  ___  ___   (extend)
          Horizontal . 15_  50_  75_  100  ___   (extend)
```

- **Tabs: Vertical** field: Specify vertical tabs. This is the default value for the SCS vertical tab (VT) value. Allowed values are 0–255. The default is no vertical tabs.

  NetSpool always sets the first tab to the top margin value. Therefore, do not specify it. NetSpool ignores a tab value of 0. NetSpool uses the first 11 tabs as line numbers for Select Vertical Channel 2–12. In this example, NetSpool sets:

  – Vertical tabs at lines 6, 20, 40, and 50

  – Vertical channels are set: CH01=6, CH02=20, CH04=40, CH05=50

  These vertical channels are not set: CH03, CH06 through CH12.

```
SCS Conversion:
   Margins:  Top . . .  6__
   Tabs:  Vertical . .  20_  0__  40_  50_  ___  (extend)
```

3. (Optional) On the Processing panel, specify these PCL conversion values:

   - **Print density** field: Specify the number of characters per inch. Valid values are 1–255. The default is the PCL Pitch command or Horizontal Motion Index command that is specified in the **Document header** field or, if none is specified, the value set on the printer's control panel.

   - **Line density** field: Specify the number of lines per inch. Valid values are 1–72. The default is the PCL Line Spacing command or Vertical Motion Index command that is specified in the **Document header** field or, if none is specified, the value set on the printer's control panel.

   - **Orientation** field: Select one of these options. **None** is the default.

     - **None:** NetSpool does not specify the PCL page orientation. The PCL Logical Page Orientation command that is specified in the IP PrintWay **Document header** field or the orientation set at the printer is used.

     - **Portrait:** Lines are printed parallel to the paper's short edge.

     - **Landscape:** Lines are printed parallel to the paper's long edge.

   - **SCS automatic page orientation** field: Select this field if you want NetSpool to automatically determine the orientation (portrait or landscape) of each page. NetSpool ignores this field for 3270 data streams.

     Guideline: If you select this field, also specify values in the **Print density**, **Line density**, **Line length**, and **Page length** fields.

4. On the IP PrintWay Options panel:

   - Select any IP PrintWay formatting option because IP PrintWay ignores the IP PrintWay **Formatting** field if NetSpool converted data to PCL.

   - (Optional) Specify PCL commands in the **Document header** and **Document trailer** fields.

     Guidelines:

     a. You might want to select a font in the **Document header** field. For more information, see .

     b. If you specify PCL commands in the **Document header** field, do these:

        i) Specify PCL and PJL reset commands before any other PCL commands in the **Document header** field.

        ii) Specify PCL and PJL reset commands in the **Document trailer** field. This is because NetSpool does not reset the printer to its original status when you specify your own PCL commands in the **Document header** field.

           For example, specify these PCL 5 commands to reset the printer to its original status:

           <ESC>%-12345X
           Resets the printer and enters PJL mode.

           <ESC>E
           Resets the printer.

```
Document header  . . <ESC>%-12345X<ESC>E_____(extend)
    / Translate document header
Document trailer . . <ESC>E<ESC>%-12345X_____(extend)
    / Translate document trailer
```

        iii) You can also choose to leave the **Document header** field and **Document trailer** fields blank. If you leave these fields blank, NetSpool automatically generates the necessary PCL commands to reset the printer to its original status both before and after each data set.

Tip: If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

Examples

These examples show how to complete the ISPF panels for SCS and 3270 input data streams.

Example 1. Converting SCS data streams to PCL data streams

This ISPF panel shows how to request that NetSpool convert the input data stream to PCL format.

```
                           NetSpool Options

 Printer definition name . myprinter_____

 Formatting . . . . 3   1. None  2. Convert to line  3. Convert to PCL
     Record size . . _____
     RECFM . . . . . _   1. VB  2. VBA  3. VBM
 ⋮
```

This ISPF panel shows how to specify code pages and other formatting values.

```
                           Processing
 ⋮

Document code page . . _____
Printer code page. . . ISO8859-1_____
 ⋮
 SCS Conversion:
     Margins:  Top . . . 6__   Bottom . . 61_   Left . . 3__   Right . . 75_
     Line length . . . . 80_            Page length . . 66_
     Tabs:  Vertical . . ___  ___  ___  ___  ___  (extend)
            Horizontal . 5__  10_  15_  20_  ___  (extend)

 NetSpool PCL Conversion:
     Print density . . . 10_
     Line density. . . . 6__
     Orientation . . . . 1 1. None  2. Portrait  3. Landscape
     / SCS automatic page orientation
 ⋮
```

Example 2. Converting 3270 data streams to PCL data streams

These ISPF panels show how to request that NetSpool convert input data streams to PCL data streams.

```
                           NetSpool Options

 Printer definition name . myprinter_____

 Formatting . . . . 3   1. None  2. Convert to line  3. Convert to PCL
     Record size . . _____
     RECFM . . . . . _   1. VB  2. VBA  3. VBM
 ⋮
```

This ISPF panel shows how to specify code pages and other formatting values.

```
                           Processing
 ⋮
Document code page . . _____
Printer code page. . . ISO8859-1_____
 ⋮
 NetSpool PCL Conversion:
     Print density . . . 10_
     Line density. . . . 6__
     Orientation . . . . 2  1. None  2. Portrait  3. Landscape
 ⋮
```

Selecting no data stream conversion

In each printer definition, you can select a NetSpool formatting option. The formatting option controls how NetSpool formats the data streams created by your VTAM applications. You can select one of these formatting options:

- Convert to line (default)
- Convert to PCL
- None

The **None** formatting option is described here. When you select the **None** option, NetSpool does not inspect or convert the input data streams. Instead, NetSpool writes input data streams unchanged to the JES spool.

You can select the **None** option when your VTAM applications create output data that the printer can accept without change. For example, if you have VTAM applications that generate ASCII PCL or PostScript data.

When you select the **None** option, NetSpool writes data to the JES spool in variable-length, blocked records, with a maximum record size of 32752. You can select a different record format and change the maximum record size in the printer definition.

When you select the **None** option, NetSpool does not call any exits.

Procedure for specifying attributes

To request that NetSpool not convert the input data stream:

1. On the NetSpool Options panel, specify these fields:

   Formatting
   Select the **None** option.

   Maximum record size
   (Optional) Specify the maximum size of the variable-length records. Allowed values are 1–32752. The default value is 32752.

   RECFM
   Select one of these record formats:

   - VB: variable blocked (default)
   - VBA: variable blocked with ANSI carriage controls
   - VBM: variable blocked with machine carriage controls

2. If the printer is controlled by IP PrintWay, on the IP PrintWay Options panel, select **None** in the **Formatting** field if you do not want IP PrintWay to convert data to ASCII or do any page formatting.

Tip: If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

Example

This ISPF panel shows how to request no NetSpool formatting and also specify the record size and record format of the output data set.

```
                        NetSpool Options
⋮
 Formatting . . . . 1   1. None  2. Convert to line  3. Convert to PCL
    Record size . . 80___
    RECFM . . . . . 1   1. VB  2. VBA  3. VBM

 Default owner. . . _____
 Embedded attributes prefix . . _____
```

Specifying a default user ID and job attribute prefix

To specify the default owner of printed output, or to identify job attributes that are embedded in print data, you can specify these fields in each printer definition:

Default owner
The default Infoprint Server job owner for the associated LU if the print data does not specify an owner. The job owner is used for output data sets created for this NetSpool LU. In addition:

- The Infoprint Server job owner can help you find jobs with Infoprint Central.
- The job owner in this field is also used as the JES job name if no other owner or job name is specified in the print data.
- The job owner that is specified in this field is not used as the JES job owner. The JES job owner is always the ID of the user who started the Infoprint Server daemons.

If this field is blank, the default job owner is the ID of the user who started the NetSpool daemon **aopnetd**.

Embedded attributes prefix
The prefix that identifies job attributes that are embedded in the print data. For information about how to embed job attributes in VTAM application print data, see *z/OS Infoprint Server User's Guide*. NetSpool uses the embedded job attributes when it allocates an output data set on the spool.

If this field is blank, NetSpool does not use job attributes that are specified in the print data. If this field contains a value, print jobs that do not contain embedded job attributes are not affected.

Tip: Do not use embedded job attributes if you specify the Timer end-of-file rule. Results can be unpredictable.

Procedure for specifying attributes

On the NetSpool Options panel, specify these fields:

- **Default owner** field: Specify a combination of 1–8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be a number. Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase.
- **Embedded attributes prefix** field: Enter either character data or hexadecimal data:
  - To enter character data, enter 1–12 letters, numbers, or special characters. Character data is case-sensitive.
  - To enter hexadecimal data, enter 1–12 bytes of data. Enclose the data in single quotation marks, prefixed with the letter "x".

Example

This ISPF panel shows how to specify a default owner and an embedded attribute prefix.

```
                         NetSpool Options
:
 Formatting . . . . _    1. None  2. Convert to line  3. Convert to PCL
     Record size . . _____
     RECFM . . . . . _    1. VB  2. VBA  3. VBM

 Default owner. . . smith__
 Embedded attributes prefix . . <<ibmjobattr_____
```

Selecting a font

NetSpool assumes a fixed-pitch font when it formats data. Therefore, you must use a fixed-pitch font to print the data so you can maintain the correct alignment of characters. If you select the **Convert to PCL** formatting option, you must use a fixed-pitch, scalable font to print the data.

If the printer's default font is not suitable, you can specify a font by using one of these methods (the method you use depends on whether the printer is controlled by IP PrintWay or PSF):

Printers that PSF controls
Name the font in the **Character sets** field on the Allocation panel of the printer definition.

Printers that IP PrintWay controls
You can specify a font in one of these places:

- Specify PCL commands to select the font in the IP PrintWay **Document header** field in the printer definition. IP PrintWay sends the PCL commands in this field to the printer. Therefore, this font is used to print all data sets transmitted to the printer, not only data sets created by NetSpool.

- Specify PCL commands to select the font in the NetSpool Beginning of File exit. This font is used to print all data sets created by NetSpool.

- Name the font in the **Character sets** field on the Allocation panel of the printer definition. Use this method if you use the AFP to PCL or AFP to PostScript transform, or you print to a remote system that runs PSF. Otherwise, the font you specify in this field is ignored.

Guidelines:

1. If a fixed-pitch font is not suitable for all of your print jobs, you can set up more than one printer definition for the same printer. Then, specify a fixed-pitch font in the printer definition that NetSpool uses.

2. If you are using PSF printers, consider specifying the **chars** attribute in embedded job attributes.

3. PCL commands in the NetSpool Beginning of File exit override PCL commands in the **Document header** field.

4. If you use the AFP to PCL or the AFP to PostScript transform, do not specify a PCL command in the NetSpool Beginning of File exit because the AFP to PCL and AFP to PostScript transforms cannot interpret PCL commands.

5. If you select the **SCS automatic page orientation** field, specify the size of the font in the **Line density** and **Print density** fields instead of in a PCL command so that NetSpool can accurately determine the appropriate page orientation. This is because NetSpool cannot detect the size of a font that is specified in a PCL command or in the **Character sets** field.

Procedure for specifying attributes

To complete ISPF panels to specify a fixed-pitch font:

- If the printer is controlled by PSF, name the font in the **Character sets** field on the Allocation panel.

- If the printer is controlled by IP PrintWay, and IP PrintWay uses the AFP to PCL transform or the AFP to PostScript transform for line data, name the font in the **Character sets** field on the Allocation panel.

- If the printer is controlled by IP PrintWay, and IP PrintWay does not use a transform for line data, specify PCL commands to select the font in the **Document header** field on the IP PrintWay Options panel. Also, be sure to reset the printer to its original state in the **Document trailer** field.

Tip: If you need to specify the same fields in more than one printer definition, specify the fields in components. Then, include those components in each printer definition to which the components apply.

Examples

Example 1. Specifying a fixed-pitch font for a printer controlled by PSF

This example shows how to complete the ISPF panels to specify a fixed-pitch font for a printer that is controlled by PSF. Also, use this example if the printer definition is controlled by IP PrintWay and IP PrintWay uses the AFP to PCL or the AFP to PostScript transform.

```
                                    Allocation
⋮
Resource Related Values:
⋮

   Character sets  . 60DB   ____   ____   ____
⋮
```

In this example, PSF, the AFP to PCL transform, and the AFP to PostScript transform use the Gothic Text Latin1, fixed-pitch, font. The pitch is 10 characters per inch.

Example 2. Specifying a fixed-pitch font for a printer controlled by IP PrintWay

This example shows how to complete the ISPF panels to specify PCL commands to select a fixed-pitch font to print the data and then reset the printer to its default settings.

```
                          IP PrintWay Options
⋮
 Document header  . . <ESC>%-12345X<ESC>E<ESC>(8U<esc>(s0p10h0s3b4102T(extend)
     / Translate document header
 Document trailer . . <ESC>E<ESC>%-12345X                            (extend)
     / Translate document trailer
⋮
```

The PCL commands in the **Document header** field reset the printer to its default settings and then select the fixed-pitch Letter Gothic font. The meanings of the PCL commands in the example are:

<ESC>%-12345X
  Reset the printer and enter PJL mode.

<ESC>E
  Reset the printer.

<ESC>(8U
  Select the Roman-8 symbol set.

<ESC>(s0p10h0s3b4102T
  Set fixed spacing (0p), 10 characters per inch (10h), upright style (0s), bold weight (3b), and Letter Gothic typeface (4102T).

Notes:

1. The last letter of each command is a capital letter to denote the end of the command.

2. When you select the NetSpool **Convert to PCL** formatting option, the value in the **Print density** field overrides the number of characters per inch set in the **Document header** field.

Specifying how NetSpool determines end-of-file

To ensure that data that belongs together gets printed in the correct order, NetSpool writes data that belongs together to a single output data set on the JES spool. For printing in the SNA network, the concept of a data set is not needed because an application that is starting a session with a printer gains exclusive control of that printer during the session. In contrast, when printing in a JES environment, the sending application is not ensured exclusive control of the printer. Between two successive data sets from one application, data sets from other applications might print. If the first attempt to print a data set fails, and a later retransmission succeeds, two successive data sets from the same application might even be printed in reverse order.

To create an output data set, NetSpool must determine where one data set ends and the next one begins. You specify the rules that NetSpool uses to make this determination. You can specify different rules for different combinations of VTAM primary logical unit (PLU) names and LU types. The PLU name identifies the VTAM application that sends data to NetSpool.

The rules generally use information that is found in the input data stream to determine when to end the current output data set. VTAM request unit (RU) chaining information, a string in the input data stream, or a timer can be used. Work with the application programmers in your installation to determine the appropriate end-of-file rules for each printer definition.

Note: If you edit end-of-file rules in a printer definition while VTAM sessions with the printer LU are active, you must restart the active sessions from your VTAM application, such as CICS and IMS, to pick up the changes.

End-of-file rules

Print data for a logical printer is received as a stream of VTAM request units (RUs). The SNA architecture defines two groupings of RUs that are of interest:

- A *chain* consists of one or more RUs.
- A *bracket* consists of all of the RUs in one or more related chains.

From an SNA-theory point of view, the use of brackets is the most logical way to determine data set boundaries. By using this technique, a request marked BB (Begin Bracket) indicates the start of a new data set, and the end of a chain marked EB (End Bracket) marks the end of the data set. This is the default end-of-file rule that NetSpool uses unless you change it. It is called the *end-of-bracket* rule.

The end-of-bracket rule works with both CICS and IMS LU type 1 sessions, with CICS LU type 3 sessions, and with other applications able to control the use of the BB and EB bracket bits. However, for some applications, the end-of-bracket rule does not work well, as indicated by these examples:

1. In a CICS application with an LU type 0 session:

   - BB is sent on the session's first request.
   - No EB is sent at the end of the transaction.
   - Result: The output for the entire session is treated as one data set, causing a potentially long delay in printing.

2. In an IMS application with a non-SNA 3270 printer:

   - Each line of output is sent as a separate chain marked BB, EB.
   - Result: Each line is treated as a separate data set, causing unnecessary processor usage and increasing the chances of data sets from other applications intruding.

With NetSpool, you can specify five end-of-file rules. NetSpool uses only one of these rules for any one session:

End-of-bracket (default)
NetSpool ends the data set when the RU chain is marked EB (End Bracket) and starts a new data set when a request unit (RU) is marked BB (Begin Bracket).

End-of-session
NetSpool ends the data set at the end of the VTAM session for this printer definition.

End-of-chain
NetSpool ends the data set at the end of a chain.

String
NetSpool ends the data set when the last RU in a chain contains a specified string of data. You can also specify whether NetSpool is to keep or delete the specified string of data in the output data set.

Timer
NetSpool ends the data set when the time interval specified in either the **Timeout idle interval** field or the **Busy interval** field expires and NetSpool receives the last RU in the chain.

The **Timer idle interval** field specifies the amount of time NetSpool waits for input data before it prints the data already received. If NetSpool does not receive any input data during this time and a reasonable stopping point is reached (end of an RU chain), NetSpool closes the output data set so it can be printed.

The **Busy interval** field specifies the amount of time for which NetSpool receives data without printing it. After this time interval expires, NetSpool closes the output data set when a reasonable stopping point is reached (end of an RU chain and the top of a new page).

Use the timer method only when none of the other end-of-file rules makes sense because:

- The use of timers to detect data set boundaries is an inexact method. Tuning is required to choose the best timer values, and even then the results are inexact.
- Under each of the other end-of-file rules, exact data set boundaries can be determined directly from the received print data requests.

These rules apply when you select the **Timer** option:

- Specify this option only for LU types 0 and 3.
- Do not select this option when you select the **None** formatting option or when you use the **Embedded attributes prefix** field on the NetSpool Options panel.

Delete form-feed option

When you specify an end-of-file rule, you can also specify whether you want NetSpool to delete form-feed controls that occur in the input data stream before it writes the output data set on the JES spool. You can delete form-feed controls to remove blank pages that might print before or after the data. You can specify which form-feed controls NetSpool is to delete:

- Leading form-feed controls: NetSpool deletes the form-feed control at the beginning of the output data set.
- Trailing form-feed controls: NetSpool deletes the form-feed control at the end of the output data set.
- Both leading and trailing form-feed controls: NetSpool deletes the form-feed control both at the beginning and the end of the output data set.

These considerations apply when you delete trailing form-feed controls:

- For LU type 1 sessions, the form-feed control in the last RU is deleted. If the end-of-session rule is selected, form-feed controls at the end of a data set are not deleted.
- For LU types 0 and 3 sessions, the form-feed control in the page that is built by the last RU chain is deleted. However, for LU type 3, if the end-of-bracket rule is selected and the RU that ends the bracket is a null single element chain, the form-feed control from the prior chain is deleted.

Procedure for specifying attributes

You only need to specify an end-of-file rule and a form-feed option if the defaults are not suitable. By default, NetSpool uses the end-of-bracket rule to determine end of file and does not delete any form-feed controls.

In the NetSpool End-of-File section of the printer definition, you can specify either default rules or specific rules for different primary logical unit (PLU) names:

- A default rule can apply either to all LU types (LU type 0, LU type 1, and LU type 3) or to a specific LU type. NetSpool uses a default rule only if you do not specify another rule for the PLU name and LU type being processed.
- A rule for a specific PLU name or PLU name pattern can apply either to all LU types (LU type 0, LU type 1, and LU type 3) or to a specific LU type. The order in which you type the PLU names on the ISPF panel can be important because NetSpool uses the first rule that applies to the PLU name and LU type being processed.

  A PLU pattern must contain these characters:

  – At least one letter or number.
  – Either asterisks (*) or question marks (?) but not both:

- An asterisk represents any number of characters at the start or end of a PLU name. Do not type an asterisk in the middle of a pattern.
- A question mark represents exactly one character. Type a question mark anywhere in the pattern.

For example, these are valid name patterns: IMS*, ??XYZ???

Although you can specify more than one end-of-file rule in the NetSpool End-of-File section, NetSpool uses only one rule for each VTAM session.

Tip: If the same end-of-file rules and form-feed options are used by more than one NetSpool printer LU, specify the attributes in an NetSpool End-of-File component. Then, include that component in the printer definitions for the NetSpool printer LUs to which the rules apply.

Example

These two ISPF panels show how to specify an end-of-file rule in the NetSpool End-of-File section of a printer definition.

On the NetSpool End-of-File Rules panel, you must indicate whether you want to specify a default end-of-file rule or an end-of-file rule for a specific PLU name or PLU name pattern. In this example, a PLU name pattern, IMS*, is specified. This means that NetSpool uses the end-of-file rule that you specify on the next panel for all PLU names that start with IMS. Because option 5 is selected, the end-of-file rule that you specify on the next panel applies to all LU types with the PLU name pattern, including types 0, 1, and 3.

```
                        NetSpool End-of-File Rules
Option ===> 5
Default rules       1 All LUs    2 LU0    3 LU1    4 LU3

PLU name IMS*       5 All LUs    6 LU0    7 LU1    8 LU3
PLU name _____   9 All LUs   10 LU0   11 LU1   12 LU3
PLU name _____  13 All LUs   14 LU0   15 LU1   16 LU3
PLU name _____  17 All LUs   18 LU0   19 LU1   20 LU3
PLU name _____  21 All LUs   22 LU0   23 LU1   24 LU3
PLU name _____  25 All LUs   26 LU0   27 LU1   28 LU3
PLU name _____  29 All LUs   30 LU0   31 LU1   32 LU3
PLU name _____  33 All LUs   34 LU0   35 LU1   36 LU3
⋮
```

The NetSpool End of File Rule panel is displayed when you press **Enter** on the first panel. On this panel, you must select the end-of-file rule. In this example, these options are selected:

String
When NetSpool finds X'FF' in the input data stream, NetSpool ends the data set on the JES spool and starts a new one.

Keep
NetSpool writes X'FF' to the output data set.

Delete form feed
NetSpool does not delete any form-feed controls in the output data set.

```
                        NetSpool End of File Rule

End of file method . 4  1. End of bracket  2. End of chain  3. End of session
                        4. String          5. Timer
Delete form feed . . 1  1. None  2. Leading  3. Trailing  4. Both

String . x'FF'
    / Keep

Timeout idle interval . . _____   Busy interval . . _____
```

Broadcasting data with multiple printer definitions

Users can use NetSpool to broadcast the same data to multiple printers or email destinations at the same time. NetSpool formats the data one time and allocates separate output data sets on the JES spool for each printer or email destination.

To broadcast data, you must create three types of objects in the Printer Inventory:

1. A printer definition for each destination. The destination can be a printer or an email address list. If you created a printer definition for the destination, you do not need to create a new one.

2. A NetSpool End-of-File component that contains the end-of-file rules that NetSpool uses. If you want to use the default end-of-file rule (end-of-bracket), you do not need to create a component.

3. A printer pool definition. In this definition, specify the printer LU name that VTAM applications use as the secondary LU name when they print to this pool of printers or email destinations. Also, select these:

   • The printer definitions that you created in step 1.

   • (Optional) The NetSpool End-of-File component that you created in step 2.

   • (Optional) The default owner of printed output.

   • (Optional) The identifier for job attributes that are embedded in print data.

The printer definition that you list first in the printer pool definition must specify the attributes that NetSpool uses to format data. NetSpool formats the data only once and writes the same data in each data set it allocates on the JES spool.

Procedure for specifying attributes

In the printer definitions that you plan to list in the printer pool definition, do these:

• Specify the **NetSpool LU name** field only if your VTAM applications need to print directly to this printer definition. Leave this field blank if you want to list this printer in the printer pool definition. Instead, specify the secondary LU name that your VTAM applications use in the **LU name** field in the printer pool definition.

• On the Allocation panel, specify the fields that are required to allocate output data sets on the JES spool. For more information, see "Specifying JES allocation parameters" on page 105.

If the default values are not appropriate, list one of the printer definitions first in the printer pool definition and specify these attributes:

• On the Processing panel:

  – All fields under the **SCS Conversion** heading.

  – All fields under the **NetSpool PCL Conversion** heading.

• On the NetSpool Options panel: All fields. The **Default owner** and the **Embedded attributes prefix** fields are optional (for more information, see "Specifying a default user ID and job attribute prefix" on page 117).

• On the Allocation panel: **HOLD** field. NetSpool uses this field only in the first printer definition that is listed in the printer pool definition.

In the printer pool definition on the Printer Pool panel, specify these fields:

Pool name
> Specify a name for the printer pool definition. This name can be the same as the NetSpool printer LU name.

LU name
> Specify the NetSpool printer LU name. For more information, see "Specifying the NetSpool printer LU name" on page 103.

Description
> (Optional) Specify a description to help you manage your printer pool definitions.

LU classes

Specify the LU classes for the printer LU name if the default is not appropriate. For more information, see "Grouping NetSpool printer LUs into LU classes" on page 104.

NetSpool end-of-file component

Specify the name of a component if the default end-of-file rule is not appropriate. For more information, see "Specifying how NetSpool determines end-of-file" on page 119.

Default owner

(Optional) Specify the default owner of printed output. For more information, see "Specifying a default user ID and job attribute prefix" on page 117.

Embedded attributes prefix

(Optional) Specify the identifier for job attributes that are embedded in print data. For more information, see "Specifying a default user ID and job attribute prefix" on page 117.

Printer definition names

Select the printer definitions to which you want to broadcast data from a list that you can display. (Place your cursor on this field and press **Enter**.)

Tip: First select the printer definition in which you specified the attributes that you want NetSpool to use when formatting the data.

Example

This ISPF panel shows how to create a printer pool definition.

```
                           Printer Pool

Pool name . .   ludept01_____
LU name . . .   LUDEPT01
Description .   All department 001 printers (extend)
LU classes. .   2_  __  __  __  __  __     (extend)
NetSpool end-of-file component . . eof1_____   (list)
Default owner  . . . . . . . . . smith___
Embedded attributes prefix . . . . <<ibmjobattr_____

Printer definition names . . printer1_____   printer2_____   (list)
        -----------------  -----------------  -----------------
        -----------------  -----------------  -----------------
        -----------------  -----------------  -----------------
        -----------------  -----------------  -----------------
```

When a VTAM application prints to LU name LUDEPT01, NetSpool uses the end-of-file rules that are specified in NetSpool end-of-file component that is named `eof1` and the formats the input data stream with attributes that are specified in printer definition `printer1`. NetSpool uses the attributes in the Allocation sections of printer definitions that are named `printer1` and `printer2` to create two output data sets on the JES spool.

Validating that documents can print as requested

Before NetSpool accepts a print request, it can validate that the data can print as requested on the printer. If NetSpool determines that a document cannot print, NetSpool rejects the print request with a message and does not allocate a data set on the JES spool.

Table 24 on page 124 lists the fields in a printer definition that NetSpool uses to validate that the print request can print on the printer. The third column in the table indicates the job attribute that the VTAM application can specify in the embedded job attributes to request a print function.

Table 24. Printer definition fields used for validation in NetSpool

Field name	Meaning	Job attribute
Data format	Data formats the printer supports. For more information, see "Data formats" on page 86.	**document-format** If not specified, NetSpool detects the data format.

Table 24. Printer definition fields used for validation in NetSpool (continued)		
Field name	**Meaning**	**Job attribute**
Duplexes supported	Duplexing supported by the printer (simplex, duplex, and tumble)	`duplex`
Forms supported	Forms names allowed	`forms`
Maximum copies	Maximum number of copies allowed	`copies`
Maximum document size	Maximum size of document (in bytes) allowed. This number does not include copies.	None. NetSpool determines the document size.
Print-error reporting supported	Types of error-reporting supported by the printer (invalid-character and print-positioning errors)	`print-error-reporting`
Note: NetSpool does not inspect options that are specified in the form definition that is used to print the job during validation. For example, if the form definition specifies five copies, NetSpool does not use this copy count to determine whether the print request exceeds the copy limit.		

Procedure for specifying attributes

On the Processing panel, specify the fields that are listed in . In the **Data format** field, be sure to select these data formats, depending on the option you select in the **Formatting** field on the NetSpool Options panel:

- If you select the **Convert to line** option, select **Line data**.
- If you select the **Convert to PCL** option, select **PCL**.
- If you select the **None** option, select **Other**.

Tip: Select all data formats for no data stream validation. (This selection is the default.)

Example

This ISPF panel shows how to specify the valid data formats for a printer that can print PostScript, text, and PCL data. Notice that **Line data** is selected even though the printer does not accept line data. You must select **Line data** because the NetSpool **Convert to line** option is selected in the **Formatting** field. IP PrintWay automatically converts line data to text data before it sends the data to the printer. Only a portion of the panel is shown.

```
                              Processing
⋮
 Data format:  Filter:

/ Line data   _____ (extend)
_ MO:DCA-P    _____ (extend)
/ PostScript _____ (extend)
/ Text        _____ (extend)
/ PCL         _____ (extend)
_ PDF         _____ (extend)
_ SAP         _____ (extend)
_ XML         _____ (extend)
_ TIFF        _____ (extend)
_ JPEG        _____ (extend)
_ Other       _____ (extend)

_ Resubmit for filtering

⋮


Maximum document size . _____
Maximum copies. . . . . _____
Forms supported . . . . _____ _____ _____ _____    (more)
Duplex supported. . . . / Simplex   /  Duplex    / Tumble
Print-error reporting supported . / Character   / Position
⋮
```

Using an installation-provided filter

For each type of data format, you can specify the name of an associated filter. A *filter* is a program that can inspect and modify data. When you specify the name of a filter for a supported data format in a printer definition, the filter is called when the data format is detected. NetSpool can call the associated filter (a filter is called only once for each data set) after it converts the input SCS or 3270 data to either line or PCL data, and before it writes the data to an output data set on the JES spool.

Your installation can write its own filter program, either a DLL filter or a UNIX filter. For information about how to write a filter, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

On the Processing panel, specify:

- **Data format** field: Select the data format of the input document that your filter applies to.
- **Filter** field: Specify the name of the filter followed by the options that you want to provide as command line arguments to the filter.
  - If the filter is a DLL filter, type the absolute path name unless the filter is in a directory that is named in the LIBPATH environment variable.
  - If the filter is a UNIX filter, type spawn before the filter name. Type the absolute path name of the filter unless the filter is in a directory that is named in the PATH environment variable.

Example

This ISPF panel shows how to specify a UNIX filter that is written by your installation for line data. Only a portion of the ISPF panel is shown.

```
                           Processing
 ⋮
Data format:  Filter:

/ Line data  spawn /usr/mylib/my_unix_filter -a option operand  (extend)
_ MO:DCA-P   _____  (extend)
_ PostScript _____  (extend)
_ Text       _____  (extend)
_ PCL        _____  (extend)
_ PDF        _____  (extend)
_ SAP        _____  (extend)
_ XML        _____  (extend)
_ TIFF       _____  (extend)
_ JPEG       _____  (extend)
  Other      _____  (extend)

 ⋮
```

If the input data stream contains line data, NetSpool calls the **my_unix_filter** filter to transform line data. The option and operand that follow the filter name are passed to the filter.

Mapping output bin and input tray names to numbers for an AFP printer

The *input tray* is the tray on the printer that serves as the paper source. The *output bin* is a bin on the printer where printed jobs are delivered. Users can use the **input-tray** and **output-bin** job attributes to specify a tray name, such as **3-hole** and a bin name, such as **staple**.

If you define input tray or output bin names in a printer definition, a job submitter or VTAM application can use those names in the **input-tray** or **output-bin** job attribute. If you do not define any tray or bin names, Print Interface and NetSpool ignore the **input-tray** or **output-bin** job attribute. If, however, you define some tray or bin names, Print Interface and NetSpool reject a print request that specifies an undefined tray or bin name in the job attribute.

When you define input tray names, you must map the names to the numbers that an AFP printer uses for paper-source identification. When you define output bin names, you must map the names to the bin numbers that an AFP printer uses for output-bin identification. For tray and bin numbers that the printer uses, see your printer documentation.

Tip: Whether you define input tray or output bin names in a printer definition, a job submitter can specify the tray and bin number directly by using the **input-tray-number** and **output-bin-number** job attributes or the INTRAY and OUTBIN JCL parameters. The job submitter can specify any tray and bin numbers. You do not need to specify the numbers in the printer definition.

Procedure for specifying attributes

On the Processing panel, specify:

- **Input tray name** and **Number** fields: Specify a name and the tray number that is used by the AFP printer.
- **Output bin name** and **Number** fields: Specify a name and the bin number that is used by the printer.

Example

This ISPF panel shows how to map input tray names and output bin names to numbers in the Processing section of a PSF printer definition. Only a portion of the ISPF panel is shown.

```
                         Processing
⋮

  Input tray name:      Number:    Output bin name:     Number:

  top_____           1__        staple_____        4__
  bottom_____        2__        side_____        2__
  envelope_____       65_        top_____        1__
  manual_____        100
  3-hole_____       3__
```

If a user specifies the **input-tray=envelope** job attribute, Print Interface and NetSpool allocate the output data set on the JES spool with tray number 65. If the printer is an AFP printer, PSF uses tray number 65 when it communicates with the printer.

If a user specifies the **output-bin=staple** attribute on the **lp** command, Print Interface and NetSpool allocate the output data set with bin number 4. If the printer is an AFP printer, PSF uses bin number 4 when it communicates with the printer.

Chapter 12. Planning printer definitions for IP PrintWay

Before you use IP PrintWay to send print output to remote printers and email destinations, you must create printer definitions. Typically, you create one printer definition for each printer and one for each email destination. In the printer definition, you specify the printer's address or the recipients' email addresses. However, depending on the job submission method that is used and the type of printer, job submitters can sometimes specify a printer's address or email addresses during job submission in job attributes and JCL parameters. If so, you might be able to create one printer definition for a group of printers that share attributes, and another printer definition for all email destinations.

Guideline: Create at least one printer definition for each printer for these reasons:

- Some job submission methods (for example, the LPR command) do not support specification of job attributes or JCL parameters.
- Job submitters cannot specify the printer's address if the printer uses the IPP protocol.
- Infoprint Central cannot display information about idle IP PrintWay printers when a printer definition does not exist for that printer.

In the printer definition, you also can specify attributes that IP PrintWay uses to format data in the output data set and transmit data sets to the printer. Table 60 on page 484 summarizes the printer attributes that IP PrintWay uses and indicates whether the attributes are required or optional.

After you create printer definitions and specify attributes that are used by IP PrintWay, job submitters can print from batch applications by using JCL. However, before job submitters can print from VTAM applications by using NetSpool or from local and remote systems by using Print Interface, you might need to specify more attributes in the printer definition. For information about these attributes, see Chapter 11, "Planning printer and printer pool definitions for NetSpool," on page 103 and Chapter 10, "Planning printer definitions for Print Interface," on page 83.

You can create and edit IP PrintWay printer definitions before you start IP PrintWay or while IP PrintWay is running. If you create or edit a printer definition while IP PrintWay is running, IP PrintWay uses the new attributes the next time IP PrintWay selects a data set from the JES spool that uses the printer definition. IP PrintWay extended mode also uses the new attributes the next time it tries printing a data set that failed to print.

IP PrintWay basic mode and IP PrintWay extended mode use the same printer definitions. However, when you move from IP PrintWay basic mode to IP PrintWay extended mode, you might need to make some changes. For information, see "Comparing printer definitions for IP PrintWay basic mode and extended mode" on page 131.

Table 25 on page 129 lists the information that describes how to do IP PrintWay tasks. Some of the tasks apply only to the indicated IP PrintWay transmission protocol. Notice that some tasks apply only to IP PrintWay extended mode or IP PrintWay basic mode. If no mode is indicated in parentheses in the title, the task applies to both modes.

Note: The VTAM protocol is only used if Infoprint Coaxial Printer Support for z/OS is installed. Because Infoprint Coaxial Printer Support for z/OS is not supported in z/OS V2R5, the task for using the VTAM protocol is no longer documented.

Table 25. Administration tasks for IP PrintWay. This table shows the tasks that apply to each IP PrintWay protocol.

Task	LPR	Direct sockets	IPP	Email
"Comparing printer definitions for IP PrintWay basic mode and extended mode" on page 131	Yes	Yes	Yes	Yes

Task	LPR	Direct sockets	IPP	Email
"Selecting the LPR protocol (basic and extended mode)" on page 136	Yes	No	No	No
"Selecting the direct sockets protocol (basic and extended mode)" on page 140	No	Yes	No	No
"Selecting the IPP protocol (basic and extended mode)" on page 142	No	No	Yes	No
"Selecting the email protocol (basic and extended mode)" on page 144	No	No	No	Yes
"Specifying a printer definition name, description, and location (basic and extended mode)" on page 158	Yes	Yes	Yes	Yes
"Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)" on page 159	Yes	Yes	Yes	Yes
"Setting up operator security for the printer (extended mode)" on page 162	Yes	Yes	Yes	No
"Specifying allocation parameters for IP PrintWay (basic and extended mode)" on page 163	Yes	Yes	Yes	Yes
"Handling unsuccessful data transmissions (basic and extended mode)" on page 165	Yes	Yes	Yes	Yes
"Retaining data sets on the JES spool (basic and extended mode)" on page 170	Yes	Yes	Yes	Yes
"Tracking the number of printed pages (extended mode)" on page 172	No	Yes	No	No
"Converting between EBCDIC and ASCII (extended mode)" on page 176 "Converting between EBCDIC and ASCII (basic mode)" on page 193	Yes	Yes	Yes	Yes
"Converting line data to a text data stream (basic and extended mode)" on page 177	Yes	Yes	Yes	Yes
"Using an FCB to format data (basic and extended mode)" on page 179	Yes	Yes	Yes	Yes
"Transmitting multiple data sets in a JES output group (basic and extended mode)" on page 181	Yes	Yes	No	Yes
"Sending commands to the printer (basic and extended mode)" on page 183	Yes	Yes	Yes	Yes
"Validating that data sets can print as requested (basic and extended mode)" on page 186	Yes	Yes	Yes	Yes
"Printing with a remote PSF print server (basic and extended mode)" on page 188	Yes	No	No	No

Table 25. Administration tasks for IP PrintWay. This table shows the tasks that apply to each IP PrintWay protocol. *(continued)*

Task	LPR	Direct sockets	IPP	Email
"Creating an IP PrintWay default printer definition (basic and extended mode)" on page 189	Yes	Yes	No	No
"Creating components for the PRTOPTNS JCL parameter (basic and extended mode)" on page 190	Yes	Yes	Yes	Yes
"Using an installation-provided filter (basic and extended mode)" on page 192	Yes	Yes	Yes	Yes
"Resubmitting documents to Print Interface for filtering (basic mode)" on page 195	Yes	Yes	Yes	Yes
"Printing data without formatting (basic mode)" on page 200	Yes	Yes	Yes	Yes
"Formatting for PostScript landscape orientation (basic mode)" on page 201	Yes	Yes	Yes	No

Note: For detailed information about each field (such as values you can specify, restrictions, and examples), use the online help for each field on the Infoprint Server ISPF panels.

Comparing printer definitions for IP PrintWay basic mode and extended mode

IP PrintWay basic mode and extended mode can use the same printer definitions. However, some fields in printer definitions apply only to IP PrintWay basic mode, and some fields apply only to IP PrintWay extended mode.

Most installations do not need to change printer definitions when they migrate from IP PrintWay basic mode to IP PrintWay extended mode. However, you need to review the following information to see whether changes are required.

IP PrintWay extended mode fields

Table 26 on page 132 lists the fields in printer definitions (and the corresponding printer attributes) that apply only to IP PrintWay extended mode. IP PrintWay basic mode ignores these fields. Table 26 on page 132 describes the changes that you might want to make in printer definitions when you migrate to extended mode.

Table 26. Printer definition fields that apply only to IP PrintWay extended mode		
ISPF panel field (attribute)	**Description**	**Change required to printer definition**
Automatic dataset grouping (automatic-dataset-grouping)	If this field is selected, IP PrintWay extended mode transmits all the data sets in the same JES output group to a printer in one transmission, or sends the data sets in the same email. This is an efficient method of transmitting data sets to a printer. However, it might not be suitable for some older printers. This field, if selected, overrides the option that is selected in the **Dataset grouping** field. For more information, see "Transmitting multiple data sets in a JES output group (basic and extended mode)" on page 181.	Select this field for more efficient printing if your printer supports it.
Backup printer (backup-printer-definition-name)	This field identifies the backup printer that is used when the primary IP PrintWay printer is not functioning because it is broken or offline.	Select this field if you want the job sent to a backup printer after all retransmissions for the current job are unsuccessful.
Embedded headers (mail-embedded-headers)	If this field is selected, IP PrintWay extended mode examines line-data documents for an email header. If a header is found, it sends the email to the recipients in the header.	Select this field if any line-data documents can contain email headers.
Form feed (form-feed)	This field specifies the form-feed controls to add to text data to indicate the start of a new page.	Specify this field if the printer or print server requires form-feed characters other than X'0D0C' (carriage-return and form-feed controls).
Inline message (mail-inline-message)	This field specifies an optional message that IP PrintWay extended mode includes at the beginning of each email on the line after the optional **Inline text attribute** text string.	Specify the message text if you want to include a standard greeting or introductory paragraph.
Inline text attribute (mail-inline-text-attribute)	This field specifies an optional text job attribute that IP PrintWay extended mode includes inline as a text string value at the beginning of each email.	Specify the text job attribute, such as **name-text**, if you want to include a text string at the beginning of each email before an inline message. For example, if name-text="Mr. Jones", then Mr. Jones is included on the first line in the email.
Inline text and line data (mail-inline-text)	If this field is selected, IP PrintWay extended mode includes text and line-data documents inline in the body of the email instead of in attachments.	Specify this field if you want text and line data included inline in the email.

Table 26. Printer definition fields that apply only to IP PrintWay extended mode (continued)		
ISPF panel field (attribute)	**Description**	**Change required to printer definition**
Operator security profile (operator-security-profile)	This field contains the name of a RACF profile that your security administrator defines. The RACF profile controls who can display information about and do actions on the printer with Infoprint Central. For more information, see "Setting up operator security for the printer (extended mode)" on page 162.	Specify the name of the RACF profile for the printer if you use Infoprint Central.
Record pages printed for accounting (page-accounting)	If this field is selected, IP PrintWay extended mode records the number of printed pages in the SMF type 6 record. For more information, see "Tracking the number of printed pages (extended mode)" on page 172.	Select this field for more accurate accounting information. The printer must support PJL and the direct sockets printing protocol.
Restart printing after last successful page (page-restart)	If this field is selected, IP PrintWay extended mode tells the printer to restart printing after the last page that the printer reported printed successfully. For more information, see "Tracking the number of printed pages (extended mode)" on page 172.	Select this field to save paper and printing costs when IP PrintWay tries printing again. The printer must support PJL and the direct sockets printing protocol.

IP PrintWay basic mode fields

Table 27 on page 133 lists the fields (and corresponding attributes) that apply only to IP PrintWay basic mode. IP PrintWay extended mode ignores these fields. Table 27 on page 133 describes the changes you might need to make in printer definitions that specify these fields when you migrate to extended mode.

Tip: To find all printer definitions that contain an attribute you want to change, use the Printer Inventory Definition Utility (PIDU) program. See "list—list names of objects" on page 262.

Table 27. Printer definition fields that apply only to IP PrintWay basic mode		
ISPF panel field (attribute)	**Description**	**Change required to printer definition**
• **Double-byte translate table (db-translate-table)** • **SOSI mode (printway-sosi-mode)** • **Translation dataset qualifier (translation-dataset-qualifier)**	IP PrintWay extended mode does not use single-byte or double-byte TCP/IP translate tables that are specified in these fields to translate data between EBCDIC and ASCII. IP PrintWay extended mode uses only the `iconv` utility to translate data between code pages.	You might need to specify the desired ASCII code page in the **Printer code page** field. For information, see "Converting between EBCDIC and ASCII (extended mode)" on page 176.

Table 27. Printer definition fields that apply only to IP PrintWay basic mode (continued)		
ISPF panel field (attribute)	**Description**	**Change required to printer definition**
Formatting (printway-formatting)	IP PrintWay extended mode ignores these formatting options: • **None:** IP PrintWay detects the data format and only formats data sets that contain line data. • **Use FCB:** IP PrintWay uses the FCB if one is specified in the FCB JCL parameter.	None.
PostScript header (printway-postscript)	IP PrintWay extended mode ignores this field and does not add any PostScript headers.	If a printer definition currently specifies these options: • **Landscape** or **Always landscape**: Specify printer commands for landscape printing in the **Document header** field. See "Specifying printer commands for landscape printing" on page 184. • **Add**: Specify the AFP to PostScript transform in the **Filter** field.
Resubmit for filtering (resubmit-for-filtering)	IP PrintWay extended mode ignores this field because it transforms data streams by calling the transforms directly, without resubmitting the data sets to Print Interface.	None.

IP PrintWay basic mode and extended mode fields

Table 28 on page 135 lists the fields (and corresponding attributes) that IP PrintWay basic mode and extended mode support in different ways. Table 28 on page 135 describes the changes that you might need to make in printer definitions that specify these fields when you migrate to extended mode.

Tip: To find all printer definitions that contain an attribute you want to change, use the Printer Inventory Definition Utility (PIDU) program. See "list—list names of objects" on page 262.

Table 28. Printer definition fields that have special considerations for IP PrintWay extended mode

ISPF panel field (attribute)	Description	Action required
Data format (document-formats-supported)	This field specifies the types of data formats that the printer accepts or that can be transformed to a format the printer accepts. IP PrintWay extended mode validates that the format of the input data stream is one of the supported types. This field also applies to IP PrintWay basic mode, but only when the **Resubmit for filtering** option is selected. For more information, see "Validating that data sets can print as requested (basic and extended mode)" on page 186.	Select all the data formats that IP PrintWay accepts.
Duplex supported (duplexes-supported)	This field specifies whether the printer can print in duplex. IP PrintWay extended mode validates that the printer supports the duplexing option that is specified in the DUPLEX parameter on the OUTPUT JCL statement. This field also applies to IP PrintWay basic mode, but only when the **Resubmit for filtering** option is selected. For more information, see "Validating that data sets can print as requested (basic and extended mode)" on page 186.	Select all the duplex options that IP PrintWay accepts.
Line termination (line-termination)	The default line-termination controls for IP PrintWay extended mode are different from those controls in basic mode. The defaults, in EBCDIC, are: IP PrintWay basic mode: • LPR, direct sockets, IPP: X'25' (line-feed) • Email: X'0D15' (carriage-return, new-line) IP PrintWay extended mode: • LPR (ASCII printer code page), direct sockets, IPP: X'0D15' • LPR (EBCDIC printer code page): X'0D25' • Email: X'0D15' In addition, IP PrintWay extended mode uses the printer code page (**Printer code page** field) to translate the line-termination controls from EBCDIC to ASCII, while IP PrintWay basic mode uses a hardcoded translate table.	If the **Line termination** field contains 0D25 or 25 and the **Printer code page** field contains ISO8859-1, leave the **Line termination** field blank so that IP PrintWay extended mode uses the default value. Otherwise, code page ISO8859-1 translates EBCDIC X'25' to ASCII X'85', which can cause data to not print correctly.

Table 28. Printer definition fields that have special considerations for IP PrintWay extended mode (continued)

ISPF panel field (attribute)	Description	Action required
Location (location)	This field specifies the location of the printer. This field is especially useful when you run IP PrintWay extended mode because Infoprint Central users can find printers to work with by specifying the printer location. For more information, see "Specifying a printer definition name, description, and location (basic and extended mode)" on page 158.	Specify the location of the printer.
Response timeout (response-timeout)	This field specifies how long IP PrintWay waits for a response from the printer before resending data to the printer if retransmissions are requested. You might want to specify a higher timeout value in this field when you run IP PrintWay extended mode, because a higher timeout value gives the operator more time to correct a printer problem, and IP PrintWay extended mode can print to other printers while it waits for a response from a printer. The IP PrintWay basic mode FSA cannot print to other printers while it waits for a response from one printer, so you typically specify a lower timeout value when you run IP PrintWay basic mode. For more information, see "Handling unsuccessful data transmissions (basic and extended mode)" on page 165.	Specify a higher timeout value when you run IP PrintWay extended mode.

Selecting the LPR protocol (basic and extended mode)

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, and email.

Select the IP PrintWay LPR protocol if you want IP PrintWay to transmit data sets to the printer or print server with the TCP/IP LPR protocol that is defined by RFC 1179. When IP PrintWay uses this protocol, an LPD that adheres to RFC 1179 must be running in the remote printer or print server.

When you select the LPR protocol, IP PrintWay transmits data to the LPD at the host name or IP address and print queue name that you specify in the printer definition. A job submitter can override the IP address and print queue name that is specified in the printer definition by specifying the host name or IP address on the OUTPUT JCL statement or in an Infoprint Server job attribute.

Because some job submitters can specify the printer's host name or IP address, you can create one printer definition for several printers that share attributes. To use this printer definition, the job submitter must specify the name of the printer definition, the printer's host name or IP address, and the printer's print queue name on the OUTPUT JCL statement or in Infoprint Server job attributes. If the job submitter does not specify the name of the printer definition on an OUTPUT JCL statement, IP PrintWay uses printer attributes that are specified in the default IP PrintWay printer definition that is described in "Creating

an IP PrintWay default printer definition (basic and extended mode)" on page 189. For more information about job submission, see *z/OS Infoprint Server User's Guide*.

When you select the LPR protocol, IP PrintWay also transmits a control file for each data set to the LPD. In the printer definition, you can specify whether you want IP PrintWay to transmit the control file before or after the data set. IP PrintWay converts some attributes that you specify in the printer definition to control codes in this control file. In addition, in the printer definition, you can specify any other control codes that the LPD accepts.

By default, IP PrintWay prints multiple copies of a data set by transmitting the data set to the printer multiple times. However, some LPDs can print multiple copies when IP PrintWay transmits the data set to the printer only one time. If your printer supports printing multiple copies of the same data set, you can select the `Optimize copies` option in the printer definition to improve performance. To determine whether your printer supports printing multiple copies of the same data set, select the **Optimize copies** field and submit a print request with multiple copies. If your printer prints only one copy, clear this option.

Related customization tasks: These IP PrintWay customization tasks are related to the LPR protocol:

- Customize the TCP/IP component of z/OS Communications Server.
- IP PrintWay extended mode writes temporary data sets to the `/var/Printsrv/printway` directory. If necessary, increase the amount of space available to this directory.
- IP PrintWay basic mode writes temporary files to hiperspace. If necessary, increase the amount of available hiperspace in the IP PrintWay FSS definition.

For information about how to do these tasks and other customization tasks that are related to the LPR protocol, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

1. On the Choose a Definition Type and Protocol panel, select **IP PrintWay LPR**. If you copy a printer definition, select an IP PrintWay printer definition that uses the LPR protocol.
2. On the LPR Protocol panel, specify these fields:

   IP address
   Specify the host name or IP address of the printer or print server. If another printer definition refers to this printer, use the same uppercase and lowercase letters when you type the host name. If you run IP PrintWay extended mode, the IP address can be in dotted decimal or colon-hexadecimal format. If you run IP PrintWay basic mode, the IP address can be in dotted decimal format, but not in colon-hexadecimal format.

   Limitation: IP PrintWay basic mode does not support IPv6. Only IP PrintWay extended mode supports it.

   Tip: If you run IP PrintWay extended mode and specify a host name, define the host name in the domain name server (DNS) before you save the printer definition. If you create the DNS entry after you save the printer definition, Infoprint Central cannot display the printer for this printer definition until someone submits a print job to the printer definition or until you modify an attribute in the printer definition.

   Print queue name
   Specify the name of the print queue in the printer or print server. To determine the correct queue name, see the documentation for the network interface card, the printer, or the print server.

   Tip: Some common queue names are:

   - TEXT and RAW are queue names that are used for some Ricoh printers, most HP printers, and most Lexmark printers. Specify the RAW queue for formatted text data, PCL data, and PostScript data.
   - TEXT and PASS are queue names that are used for some Ricoh printers. Specify the PASS queue for formatted text data, PCL data, and PostScript data.

Formatted text data must contain a carriage return and line feed controls at the end of each line. If you specify RAW or PASS and you run IP PrintWay basic mode, also specify 0D25 in the **Line termination** field. This value causes IP PrintWay basic mode to add carriage return and line feed controls at the end of each line. IP PrintWay extended mode adds carriage return and either line feed or new line controls at the end of each line by default.

Mode
   Select one of these options:

   Control file last
      IP PrintWay transmits the control file after the data file. All LPDs that adhere to RFC 1179 support this mode (default).

   Control file first
      IP PrintWay transmits the control file before the data file. Not all LPDs support this mode. However, with this mode, some LPDs print data as it is received and print larger files.

   Stream
      IP PrintWay transmits the control file before the data file. The remote LPD must support the RECEIVE CONTROL FILE FIRST and RECEIVE DATA FILE WITH UNSPECIFIED LENGTH commands. Select this mode for IBM network stations.

   Remote PSF
      IP PrintWay transmits files to a remote PSF print server. For more information about this option, see "Printing with a remote PSF print server (basic and extended mode)" on page 188.

Optimize copies
   Select this field if the printer's LPD can print multiple copies of the same data set.

Restrict ports
   Select this field to restrict the z/OS ports that IP PrintWay uses to the range of 721 to 731. Select this option if the printer's LPD requires that IP PrintWay restrict itself to ports in this range. When you do not select the **Restrict Ports** field, IP PrintWay can use any free port, which increases the probability of finding an available port.

Print banner page, Banner class, Banner job name, Filename, Indent, Owner, Print function, Title, Width
   (Optional) Specify values that IP PrintWay transmits to the printer in the LPD control file. For a description of these fields and the default values, see the ISPF online help panels.

   Tip: Although IP PrintWay transmits these values to the LPD, the LPD might not support them. For example, the LPD might not support printing a banner page or indenting data.

User options
   (Optional) Specify control codes that are supported by the LPD. IP PrintWay adds these control codes to the end of the LPD control file.

3. On the IP PrintWay Options panel, specify these fields:

   Automatic dataset grouping (extended mode) or Dataset grouping
      Select how you want IP PrintWay to transmit data sets that are in the same JES output group. For information, see "Transmitting multiple data sets in a JES output group (basic and extended mode)" on page 181.

      Tip: When you run IP PrintWay extended mode, select the **Automatic dataset grouping (extended mode)** field. Automatic data set grouping is the most efficient method of transmitting data sets to the printer. Also, it makes sure that data sets in the same output group print together.

   Document header or Document trailer
      You might need to specify a command to force the printer to start each copy on a new sheet of paper. For more information, see "Sending commands to the printer (basic and extended mode)" on page 183.

Example

These ISPF panels show how to specify the LPR protocol in a printer definition.

Tip: This example shows only some of the ISPF panels that comprise a printer definition. For a complete printer definition that is suitable for the LPR protocol, see Appendix D, "Sample IP PrintWay printer definitions," on page 513.

Use the Choose a Definition Type and Protocol panel to select the protocol type when you use the Add function to create a printer definition.

```
                        Choose a Definition Type and Protocol
 Option ===> 1
   Type               Protocol
 1 IP PrintWay        LPR
 2 IP PrintWay        direct sockets
 3 IP PrintWay        IPP
 4 IP PrintWay        VTAM
 5 IP PrintWay        email
 6 PSF
 7 General
```

To display this LPR Protocol panel, press **Enter** on the **Custom values** field for the Protocol section on the main panel for the printer definition.

```
                           LPR Protocol

 Printer definition name . myprinter_____
 Operator security profile
    . . . _____

 Printer IP address . printer1.boulder_____ (extend)
 Print queue name . . RAW_____ (extend)

 LPR Processing Options:
    Mode . . . . . . . . 2  1. Control file first  2. Control file last
                           3. Stream               4. Remote PSF

    _  Optimize copies
    _  Restrict ports
    /  Print banner page
        Banner class. .  Department 001, Building 003
        Banner job name  _____ (extend)
    Filename . . . . . .  _____
    Indent . . . . . . .  _____
    Owner. . . . . . . .  _____
    Print function . . .  _
    Title. . . . . . . .  _____ (extend)
    Width. . . . . . . .  _____
    User options . . . .  _____ (extend)
```

Results:

- IP PrintWay uses the LPR protocol to transmit data sets to print queue `text` at IP address `printer1.boulder`. Because the **Restrict ports** field is not selected, IP PrintWay lets TCP/IP select any available port on the z/OS system to transmit data.

- Because **Control file last** is selected in the **Mode** field, IP PrintWay transmits the control file to the LPD after the data file.

- IP PrintWay also transmits the text that is specified in the **Banner class** field to the LPD in the control file for printing on a banner page, a page that prints before the data set. However, the banner prints only if the LPD can print banner pages.

To display this IP PrintWay Options panel, press **Enter** on the **Custom values** field for the IP PrintWay Options section on the main panel for the printer definition:

```
                            IP PrintWay Options

Printer definition name . myprinter
⋮
 / Automatic dataset grouping (extended mode)
 Dataset grouping. . . . 3  1. None  2. Job  3. Concatenate job
⋮
```

Result: IP PrintWay sends all data sets in the same JES output group to the printer in the same transmission:

- IP PrintWay extended mode uses the **Automatic dataset grouping** field. IP PrintWay extended mode uses the **Dataset grouping** field only if the **Automatic dataset grouping** field is not selected.
- IP PrintWay basic mode uses the **Concatenate job** option of the **Dataset grouping** field.

Selecting the direct sockets protocol (basic and extended mode)

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, and email.

Select the IP PrintWay direct sockets protocol if you want IP PrintWay to use the TCP/IP direct sockets printing protocol to transmit data sets directly to a designated port on a printer or print server. When you select this protocol, the printer or print server must support direct sockets printing.

Tips:

1. Some printers support the direct sockets printing protocol and other protocols, such as the LPR protocol. For large data sets, the direct sockets printing protocol can provide better performance. However, you might want to select the LPR protocol to take advantage of the formatting options that IP PrintWay can specify in the LPD control file. For example, printing a banner page.

2. When you select the direct sockets protocol, IP PrintWay extended mode can record the number of printed pages in the SMF type 6 record and can restart printing after the last page that printed successfully. For information, see "Tracking the number of printed pages (extended mode)" on page 172.

When you select the direct sockets protocol, IP PrintWay transmits data to the printer or print server at the IP address (or host name) and port number that you specify in the printer definition. A job submitter can override the IP address and port number that is specified in the printer definition by specifying the IP address in the DEST=IP: parameter and the port number in the PORTNO parameter on the OUTPUT JCL statement.

Because the job submitter can override the IP address and port number, you can create one printer definition for several printers that share attributes. To use this printer definition, the job submitter must specify the name of the printer definition, the IP address, and the port number on the OUTPUT JCL statement. If the job submitter does not specify the name of the printer definition on the OUTPUT JCL statement, IP PrintWay uses printer attributes that are specified in the default IP PrintWay printer definition that is described in "Creating an IP PrintWay default printer definition (basic and extended mode)" on page 189. For more information about job submission, see *z/OS Infoprint Server User's Guide*.

Because the direct sockets printing protocol cannot print multiple copies of a single data set, IP PrintWay prints multiple copies by transmitting the data set to the printer the requested number of times.

Related customization tasks: These IP PrintWay customization tasks are related to the direct sockets protocol:

- Customize the TCP/IP component of z/OS Communications Server.
- When more than one copy is requested, IP PrintWay extended mode writes temporary files to the /var/Printsrv/printway directory. If necessary, increase the amount of space available to this directory.

- When you specify a value in the **Maximum document size** field, or select the **Delete form feed** option, IP PrintWay basic mode writes temporary files to hiperspace. If necessary, increase the amount of available hiperspace in the IP PrintWay FSS definition.

For information about how to do these tasks and other customization tasks that are related to the direct sockets protocol, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

1. Add a printer definition. On the Choose a Definition Type and Protocol panel, select **IP PrintWay direct sockets**. If you copy a printer definition, select an IP PrintWay printer definition that uses the direct sockets protocol.
2. On the Direct Sockets Protocol panel, specify these fields:

   IP address
   Specify the host name or IP address of the printer or print server. If another printer definition refers to this printer, use the same uppercase and lowercase letters when you type the host name. If you run IP PrintWay extended mode, the IP address can be in dotted decimal or colon-hexadecimal format. If you run IP PrintWay basic mode, the IP address can be in dotted decimal format, but not in colon-hexadecimal format.

   Limitation: IP PrintWay basic mode does not support IPv6. Only IP PrintWay extended mode supports it.

   Tip: If you run IP PrintWay extended mode and specify a host name, define the host name in the domain name server (DNS) before you save the printer definition. If you create the DNS entry after you save the printer definition, Infoprint Central cannot display the printer for this printer definition until someone submits a print job to the printer definition or until you modify an attribute in the printer definition.

   Port number
   Specify the port number at which the printer or print server supports printing. To determine the correct port number, see the documentation for the network interface card or printer.

   Tip: Some common port numbers are:

   - Port 9100, which is used by some Ricoh printers, most HP printers, and most Lexmark printers.
   - Port 2501, which is used by some Ricoh printers.

   Record pages printed for accounting
   (Optional) IP PrintWay extended mode records the number of printed pages in the SMF type 6 record. For more information, see "Tracking the number of printed pages (extended mode)" on page 172.

   Restart printing after last successful page
   (Optional) IP PrintWay extended mode restarts printing after the last page in the print job that printed successfully. For more information, see "Tracking the number of printed pages (extended mode)" on page 172.

Example

These ISPF panels show how to specify the direct sockets protocol in a printer definition.

When you use the Add function to create a new printer definition, you can use the Choose a Definition Type and Protocol panel to select the protocol type.

```
                       Choose a Definition Type and Protocol
Option ===> 2
  Type            Protocol
1 IP PrintWay     LPR
2 IP PrintWay     direct sockets
3 IP PrintWay     IPP
4 IP PrintWay     VTAM
5 IP PrintWay     email
6 PSF
7 General
```

To display this Direct Sockets Protocol panel, press **Enter** on the **Custom values** field for the Protocol section on the main panel for the printer definition.

```
                       Direct Sockets Protocol

Printer definition name . myprinter_____
Operator security profile
     . . . _____
Printer IP address . 99.999.123.456_____ (extend)

Port number. . . . . 2501_

Printer Job Language (PJL) options:
   _ Record pages printed for accounting
   _ Restart printing after last successful page
```

Result: IP PrintWay uses the direct sockets protocol to transmit data sets to port number 2501 at IP address 99.999.123.456. IP PrintWay transmits only a data file, without a control file.

Selecting the IPP protocol (basic and extended mode)

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, and email.

Select the IP PrintWay IPP (Internet Printing Protocol) protocol if you want IP PrintWay to transmit data sets over the Internet to the printer. When you select the IPP protocol, an IPP server must be running in the remote printer or host system.

IP PrintWay transmits the print data stream to the IPP server at the URL that you specify in the printer definition. When submitting a print job, a job submitter cannot override the URL, which means that you must create one printer definition for each printer.

Along with the data, IP PrintWay also transmits a control file that contains these IPP job attributes:

- **copies**
- **document-name**
- **job-name**
- **requesting-user-name**
- **sides**

The IPP server that is running in the printer or print server processes the IPP job attributes that IP PrintWay sends with each print request. The IPP server ignores any IPP job attributes that it does not support. For example, some IPP servers do not support the **copies** and **sides** attributes, so the output might not print as requested. If the IPP server ignores one or more of the IPP job attributes for a print job, a message in the IP PrintWay message log indicates which job attributes were ignored.

Limitations: When you select the IPP protocol, IP PrintWay does not support:

1. **Concatenate job** option of the **Dataset grouping** field
2. **Automatic dataset grouping** field

Related customization tasks: These IP PrintWay customization tasks are related to the IPP protocol:

- If you did not install Infoprint Server files in default directories, specify the directories in the STDENV data set in the IP PrintWay startup procedure.
- Customize the TCP/IP component of z/OS Communications Server.
- When more than one copy is requested, IP PrintWay extended mode writes temporary files to the `/var/Printsrv/printway` directory. If necessary, increase the amount of space available to this directory.
- When you specify a value in the **Maximum document size** field or select the **Delete form feed** option, IP PrintWay basic mode writes temporary files to hiperspace. If necessary, increase the amount of available hiperspace in the IP PrintWay FSS definition.

For information about how to do these tasks and other customization tasks that are related to the IPP protocol, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

1. Add a printer definition. On the Choose a Definition Type and Protocol panel, select **IP PrintWay IPP**. If you copy a printer definition, select an IP PrintWay printer definition that uses the IPP protocol.
2. In the **URL** field on the IPP Protocol panel, specify the Uniform Resource Locator (URL) of the IPP server. Consult your IPP printer or IPP print server documentation for the format of the URL to use. The format of the URL depends on the implementation of the IPP printer or print server and varies among printer manufacturers.

Example

These ISPF panels show how to specify the IPP protocol in a printer definition.

When you use the Add function to create a printer definition, you can use the Choose a Definition Type and Protocol panel to select the protocol type.

```
                       Choose a Definition Type and Protocol
Option ===> 3
  Type              Protocol
1 IP PrintWay       LPR
2 IP PrintWay       direct sockets
3 IP PrintWay       IPP
4 IP PrintWay       VTAM
5 IP PrintWay       email
6 PSF
7 General
```

To display this IPP Protocol panel, press **Enter** on the **Custom values** field for the Protocol section on the main panel for the printer definition.

```
                         IPP Protocol

 Printer definition name . myprinter
 Operator security profile
    . . .  _____
 URL. . . . . . . . . http://mprinter.xyz.com:631                (extend)
```

Result: IP PrintWay uses the IPP protocol to transmit data sets to an IPP server at URL `http://myprinter.xyz.com:631`.

Selecting the email protocol (basic and extended mode)

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, and email.

Select the IP PrintWay email protocol if you want IP PrintWay to transmit data sets to one or more email addresses over the internet with the sendmail to z/OS Communications Server SMTP (CSSMTP) bridge as the mail transport.

IP PrintWay transmits emails to the email addresses that you specify in the printer definition. Some job submitters can override the email addresses during job submission. You can set up just one printer definition for the email protocol because the job submitter can specify the email addresses. You must specify a default email address in this printer definition.

IP PrintWay provides these functions when you select the email protocol:

- IP PrintWay can send an output data set to one or more primary and secondary email addresses at the same time.
- You can specify email addresses or the name of an alias that is defined to the sendmail bridge. The sendmail bridge expands alias names into one or more real email addresses. For information, see "Using the email address list in an alias file" on page 150.
- You can specify the email address or alias name that recipients of the email can reply to.
- IP PrintWay basic mode sends all documents as email attachments. IP PrintWay extended mode can include text and line-data documents inline in the body of an email. To request this function, select the **Inline text and line data** field in the printer definition.
- IP PrintWay can send data sets that are in the same JES output group in the same email. To request this function, select the **Concatenate job** option in the **Dataset grouping** field or the **Automatic dataset grouping (extended mode)** field.
- IP PrintWay can transform the input data from one format to another before it creates the attachment. For example, if your installation installed an AFP to PDF transform, you can transform line-data or AFP data to PDF format. For information about how to request a transform, see Chapter 13, "Planning printer definitions for transforms," on page 203.
- Depending on the method that is used to submit jobs, some job submitters can customize the subject of the email. For those situations in which the job submitter cannot specify a subject, you can specify a default subject line in the printer definition. For example, when you print VTAM application data (such as CICS data) through NetSpool, the job submitter cannot customize the subject line unless the VTAM application embeds the **title-text** job attribute in the print data.
- When you print VTAM application data (such as CICS data) through NetSpool, you can print data and also send it to a set of email addresses at the same time. To do this, create a printer pool definition and in the pool definition list the printer definition that specifies the email addresses and also the printer definition for the printer itself. For more information, see "Broadcasting data with multiple printer definitions" on page 123.
- IP PrintWay extended mode can send emails to the recipients specified in an email header in line-data documents. To select this function, select the **Embedded headers** field. For the format of the email header, see *z/OS Infoprint Server User's Guide*.
- IP PrintWay extended mode can include a text job attribute inline as a text string at the beginning of emails. To select this function, specify the **Inline text attribute** field.
- IP PrintWay extended mode can include a message in the beginning of emails on the line after the optional **Inline text attribute** text string. To select this function, specify the **Inline message** field.

Table 29 on page 145 shows how IP PrintWay constructs an email.

Table 29. Fields in an email		
For this email field:	**IP PrintWay uses this value:**	**For example:**
Date and time	Current date and time	```12/22/2004 12:00:00 AM```
Primary recipients	Email addresses and sendmail alias names that are specified in the: 1. **To** field in the email header in a line-data document (extended mode only) 2. XTPIPADR field of the IP PrintWay Routing exit 3. MAILTO JCL parameter or **mail-to-addresses** job attribute 4. **To addresses** field in printer definition	```To: toname@xyz.com, dept01list```
"Blind copy (bcc)" recipients	Email addresses and sendmail alias names that are specified in the: 1. **Bcc** field in the email header in a line-data document (extended mode only) 2. MAILBCC JCL parameter or **mail-bcc-addresses** job attribute 3. **BCC addresses** field in printer definition	```bcc: bccname@xyz.com, dept01list```
"Copy (cc)" recipients	Email addresses and sendmail alias names that are specified in the: 1. **Cc** field in the email header in a line-data document (extended mode only) 2. MAILCC JCL parameter or **mail-cc-addresses** job attribute 3. **CC addresses** field in printer definition	```cc: copyname@xyz.com, dept01list```

Table 29. Fields in an email (continued)

For this email field:	IP PrintWay uses this value:	For example:
Sender (continued on next page)	The descriptive string (if any) of 1–60 characters that is specified in the:	`<USER1@SYSTEM1.DOMAIN1>`
	1. **From** field in the email header in a line-data document (extended mode only)	or
	2. MAILFROM JCL parameter or **mail-from-name** job attribute	`From: John Q. Sender` `<USER1@SYSTEM1@DOMAIN1>`
	3. **From name** field in the printer definition	
	followed by the user ID of the job creator:	
	• For print requests processed by NetSpool, the user ID specified in the:	
	1. **owner** job attribute	
	2. **Default owner** field in the printer definition	
	• If Print Interface processed the print request and the job was submitted from a remote system, the USERID associated with Infoprint Server, for example, AOPSTC	
	followed by the address of the job creator:	
	• If **mail-use-reply-addr-as-from-addr=no**:	
	1. **mail-from-address** job attribute	
	2. **From address** field in the printer definition	
	• If **mail-use-reply-addr-as-from-addr=yes**:	
	1. **mail-reply-address** job attribute	
	2. **Reply address** field in the printer definition	

Table 29. Fields in an email (continued)		
For this email field:	**IP PrintWay uses this value:**	**For example:**
Sender (continued)	**Important:** • For print requests processed by IP PrintWay, you cannot use either the **sendmail -f** command or the **From** field in the email header to override the value of the **Sender** field. The value of the **From** field is used only as a descriptive string that precedes the user ID and address. • In most cases, the value of the **Sender** field is not a valid z/OS email address. Use the **Reply address** field to specify the email address of the sender.	
Reply address	Email address that is specified in the: 1. **Reply-to** field in the email header in a line-data document (extended mode only) 2. REPLYTO JCL parameter or **mail-reply-address** job attribute 3. **Reply address** field in printer definition	`Reply To: myname@xyz.com`
Subject	Text that is specified in the: 1. **Subject** field in the email header in a line-data document (extended mode only) 2. TITLE JCL parameter, **title-text** job attribute, or TITLE parameter of the LPR command 3. **Title** field in printer definition If no title is specified, either the job name or the fully qualified data set name is used. (See Note "1" on page 148.)	`Subject: Annual Report for` `XYZ Corporation`

Beginning lines of body	Inline text and messages that are specified in the:
	
	1. **Inline text attribute** field in the printer definition (extended mode only)
	
	2. **Inline message** field in the printer definition (extended mode only)
		`Dear Mr. Jones,`
		`The third quarter sales report`
		`is attached.`

Table 29. Fields in an email (continued)		
For this email field:	**IP PrintWay uses this value:**	**For example:**
Name of attachment	1. Text that is specified in the MAILFILE JCL parameter or **mail-file-name** job attribute	February 2004 sales report.txt, MYFILE.txt, MYFILE.afp, MYFILE.pdf
	2. If Print Interface processes the print request, the text that is specified in the **sysout-dataset-name** job attribute, or the last 8 characters of the file name	
	3. If NetSpool processes the print request, the text that is specified in the **sysout-dataset-name** job attribute, or the LU name of the VTAM application that submitted the print request (primary LU)	
	4. If the print job is submitted with JCL, the last qualifier of the data set name on the JES spool, or the job name	
	IP PrintWay attaches a suffix to the file name that designates the document format. (See Note "2" on page 148.)	

Notes:

1. In these situations, Infoprint Server generates the job name. In all other cases, the job name is the name of the batch job.

   - If NetSpool processes the print request, the job name is the name that is specified in the **sysout-job-name** job attribute, the owner name that is specified in the **owner** job attribute or in the printer definition, or the member name of the NetSpool startup procedure.

   - If Print Interface, except for the subsystem, processes the print request, the job name is the name that is specified in the **sysout-job-name** job attribute or the user ID of the person who submitted the print request.

2. Considerations for the name of the file attachment:

   - A # in the file name means that the original file name contains a character that JES does not allow in a data set name. For example, if the original file name is myfile.print, this field contains le#print.

   - These suffixes designate the document format:

     Suffix
     Document format

     afp
     Advanced Function Presentation (also known as MO:DCA-P)

     jpg
     Joint Photographic Experts Group file information format (JFIF)

     pcl
     Hewlett Packard Printer Control Language

     pdf
     Adobe Portable Document Format

     ps
     Adobe PostScript

sap
> SAP R/3 Output Text Format (OTF) or ABAP

tif
> Tagged image file format

txt
> Text

octet-stream
> Unrecognized format

Tip: Table 30 on page 149 shows the environment variables and configuration attributes that the administrator can set to control the suffixes that IP PrintWay appends to the file names. IP PrintWay extended mode uses configuration attributes instead of environment variables.

Table 30. Environment variables and configuration attributes for email suffixes

Environment variable	Configuration attribute	Meaning
AOP_MAIL_PRESERVE _ SUFFIXES	mail-preserve-suffixes	A list of suffixes that IP PrintWay preserves in file names that are specified in the MAILFILE JCL parameter or in the **mail-file-name** job attribute. If the file name ends with one of the suffixes in this list, IP PrintWay does not append another suffix to the file name.
AOP_MAIL_DO_NOT_ ADD_SUFFIX	mail-do-not-add-suffixes	Indicates whether IP PrintWay appends a suffix to file names that are specified in the MAILFILE JCL parameter or the **mail-file-name** job attribute.

For information about these environment variables and configuration attributes, see *z/OS Infoprint Server Customization*.

3. IP PrintWay uses the values in a document email header only if the **Embedded headers** field is selected in the printer definition or the **mail-embedded-headers** job attribute is specified.

Limitations:

1. In most situations, the sender field of the email does not contain the email address of the individual who sent the email. Therefore, job submitters need to specify the reply address in the **mail-reply-address** attribute. If job submitters cannot specify attributes, you can specify the reply address in the **Reply address** field in the printer definition.

2. In these cases, the recipient does not reply to the sender:

   - If NetSpool processed the print request and no owner is specified in either the **owner** job attribute or in the printer definition, the sender is the ID of the user who started the Infoprint Server daemons and the domain is the domain of the system on which the sendmail bridge is running.

   - If Print Interface processed the print request and the job was submitted from a remote system, the sender is the name of the user on the remote system. However, the domain name is the domain of the system on which the sendmail bridge is running, so in most cases, this would not be a valid z/OS email address.

3. IP PrintWay ignores the number of requested copies and always sends only one data set to an email address.

4. IP PrintWay cannot add PostScript headers to data sets with line data. If you want to email line data as a PostScript document, use the AFP to PostScript transform to convert line data to PostScript format.

Related customization tasks: These IP PrintWay customization tasks are related to the email protocol:

- Configure the sendmail to CSSMTP bridge.
- If you did not install Infoprint Server files and the sendmail bridge in default directories, specify the directories in either the AOPMAILER environment variable or the **mailer-path-name** configuration attribute. For information, see *z/OS Infoprint Server Customization*.
- Customize the TCP/IP component of z/OS Communications Server.
- When you specify a value in the **Maximum document size** field or select the **Delete form feed** option, IP PrintWay basic mode writes temporary files to hiperspace. If necessary, increase the amount of available hiperspace in the IP PrintWay FSS definition.

For information about how to do these tasks and other customization tasks that are related to the email protocol, see *z/OS Infoprint Server Customization*.

Using the email address list in an alias file

You can specify one or more alias names in a printer definition. An alias name is a file that is defined to the sendmail bridge and that lists one or more actual email addresses. The sendmail bridge expands alias names into email addresses when it sends an email. For example, alias name dept123 might represent the email addresses of all employees in department 123:

```
user10xyz.com,user20xyz.com,user30xyz.com,user40xyz.com,user50xyz.com
```

Note: In z/OS V2R5, only existing alias files are supported. You cannot create new alias files to be used with the sendmail bridge.

Options for sending email data

IP PrintWay extended mode can include:

- A text job attribute inline as a text string on the first line of an email. You request this function with the **Inline text attribute** field in the printer definition. For example, you can specify name-text in the **Inline text attribute** field in the printer definition. The name-text job attribute can be defined in these ways:
  - For a job spooled to JES, with the JCL NAME parameter when the document is allocated on the JES spool.
  - For a batch job, with either the NAME parameter or the PRTATTRS parameter specified on the OUTPUT JCL statement:

    ```
    NAME='Dear Mr. Jones,'
    ```

    or

    ```
    PRTATTRS='name-text="Dear Mr. Jones,"'
    ```

  - For an **lp** or AOPPRINT job, with a **-o** parameter:

    ```
    -o 'name-text="Dear Mr. Jones,"'
    ```

  - For a NetSpool job, in a data stream as a NetSpool Job Attribute:

    ```
    <<IBMJOBATTR0020name-text=Dear Mr. Jones,
    ```

- A message inline at the beginning of an email. You request this function with the **Inline message** field in the printer definition. An inline message is included in the email on the line that follows an inline text attribute, if one is specified.

IP PrintWay basic mode sends all documents as email attachments. IP PrintWay extended mode can include text and line-data documents inline in the body of an email when the **Inline text and line data** field is selected in the printer definition. The text and line data that is included inline follows any inline text attribute and inline message that you specify.

Table 31 on page 151 summarizes how email recipients can view email attachments that are created by IP PrintWay.

Table 31. Data formats for email attachments and viewers	
For this data format:	**Use this viewer:**
Text	Any text editor such as Windows Notepad.
AFP	The AFP Viewer plug-in for Windows, which you can download from Ricoh Production Print Software (dl.ricohsoftware.com/downloads/aa9a248e-101c-4aa6-b109-1cf7403f3b4f).
PDF	The Adobe Acrobat Reader, which you can download from the Adobe website. To view PDF data that is created by the AFP to PDF transform, you might need to customize Acrobat Reader.
PostScript	A Ghostscript viewer, such as GSview.

Procedure for specifying email protocol attributes

You can either create a new printer definition for an email destination or modify an existing printer definition for a printer.

Creating a new email printer definition

Do these steps to create a new printer definition for an email destination. These steps describe fields that have special considerations for the email protocol. You might also need to specify other fields in the printer definition to use all the functions that Infoprint Server provides.

1. Use the Infoprint Server ISPF panels to add a printer definition. On the Choose a Definition Type and Protocol panel, select **IP PrintWay email**.

2. On the Email Protocol panel, specify the **To addresses** field and any of these other fields:

   To addresses
   The email addresses or alias names of the recipients of the email. You can specify 1–32 email addresses (to add more entries, put your cursor on **more** and press **Enter**). Each email address can be 1–60 characters. An address that the job submitter specifies overrides this value.

   CC addresses
   The email addresses or alias names of the "copy (cc)" recipients of the email. A *cc* means that other recipients of the email can see the cc recipient listed. You can specify 1–32 email addresses (to add more entries, put your cursor on **more** and press **Enter**). Each email address can be 1–60 characters. An address that the job submitter specifies overrides this value.

   BCC addresses
   The email addresses or alias names of the "blind copy (bcc)" recipients of the email. A *bcc* means that other recipients of the email do not see the bcc recipient listed. You can specify 1–32 email addresses (to add more entries, put your cursor on **more** and press **Enter**). Each email address can be 1 - 60 characters. An address that the job submitter specifies overrides this value.

   From address
   The email address that you want to appear as the sender's email address. You can specify a sendmail alias name that represents one or more email addresses.

   From name
   The descriptive name or other identifier of the sender of the email. You can specify one name. It can be 1–60 characters, including blanks. IP PrintWay always includes *userid@domainname* to identify the sender. The user ID of the job submitter is *userid*. The domain name where Infoprint Server is running is *domainname*. For example: JOHN@SYSTEM1.

   Reply address
   The email address or alias name that recipients of the email can reply to. You can specify one email address. It can be 1–60 characters. An address that the job submitter specifies overrides

this value. If you do not specify this field, most email programs use the sender's email address, which is *userid@domainname*. The user ID of the job submitter is *userid*. The domain name where Infoprint Server is running is *domainname*.

Use reply address as from address
Specify this field to use the value of the **Reply address** field instead of the value of the **From address** field as the sender's email address.

Embedded headers
If any line-data documents contain email headers, select the **Embedded headers** field. When this field is selected, IP PrintWay looks for an email header in each document with line-data format. If a header is found, IP PrintWay sends the email to the recipients specified in the header. If no line-data documents contain email headers, clear this field for improved performance.

Inline text and line data
Select this field if you want to include text data and line-data inline in the body of the email instead of in attachments.

Inline text attribute
Specify an optional text job attribute that you want to include inline as a text string value at the beginning of each email before an inline message. The text job attributes are:

- **building-text**
- **department-text**
- **name-text**
- **room-text**
- **title-text**

The text string value that is defined for the text job attribute is included in the email on the line before an inline message. For example, if name-text="Bob Sill", then Bob Sill is included on the first line in the email.

Inline message
Specify an optional message to include in the beginning of each email on the line after the optional **Inline text attribute** text string.

Each email address or alias name must be in this format:

```
username[@domainname]
```

username
The name of the recipient or the name of an alias that is defined to the sendmail bridge.

@domainname
The domain name of the target system. If you specify an alias, omit @*domainname*.

3. On the Allocation panel, specify these fields:

Spool allocation values
Specify either the job-selection values that are specified in the IP PrintWay job selection rule (extended mode) or the work-selection values specified in the JES FSA definition (basic mode). For example, if the job-selection value for IP PrintWay is class E, specify E in the **CLASS** field.

Title
(Optional) Specify a default subject for the email. You can specify up to 60 characters, including blanks and any other printable characters. A job submitter can override this value.

If you run IP PrintWay basic mode, this field applies only to documents that NetSpool or Print Interface processes.

4. On the Processing panel, specify these fields:

Filter
(Optional) Specify any transforms that you want to use. For example, you might want to specify the AFP to PDF transform for the **Line data** and **MO:DCA-P** data formats to create PDF documents.

If you run IP PrintWay basic mode and specify a transform, also select the **Resubmit for filtering** option.

Printer code page
   Specify one of these code pages:

   - Any ASCII code page: IP PrintWay converts EBCDIC data from the document code page (default is IBM-1047) to the specified ASCII code page.
   - EBCDIC code page IBM-1047: The sendmail bridge converts EBCDIC data from code page IBM-1047 to the ASCII code page.

   Tips:

   a. The only EBCDIC code page that you can specify is IBM-1047 because the sendmail bridge can convert data only from code page IBM-1047 to an ASCII code page.

   b. If the code page for the locale on the z/OS system where Infoprint Server is running is not IBM-1047, specify an ASCII code page instead of an EBCDIC code page.

   c. Specify a code page that the **iconv** utility supports, or specify a custom ASCII code page. For code page names that **iconv** supports, see *z/OS XL C/C++ Programming Guide*.

   d. If you specify a custom code page, make sure that conversion tables exist to convert between the custom code page and these code pages:

      - The code page in the **Document code page** field
      - The code page for the z/OS locale

      For information about how to create conversion tables, see information about code set conversion utilities in *z/OS XL C/C++ Programming Guide*.

5. On the NetSpool Options panel, if your installation prints from VTAM applications such as CICS and IMS, select the **Convert to line** formatting option. NetSpool can transform line data to PDF data if you specify the AFP to PDF transform on the Processing panel. Or, IP PrintWay can convert the line data to text data. Both PDF and text data can be viewed in an email attachment. Do not select the **Convert to PCL** formatting option because PCL data cannot be easily viewed.

6. On the IP PrintWay Options panel:

   a. Select how you want IP PrintWay to handle data sets that are in the same JES output group. Select one of these values in the **Dataset grouping** field:

      Concatenate job
         All data sets are sent in the same email to the address specified for the first data set in the output group.

      None or Job
         Each data set is sent in a separate email. IP PrintWay extended mode sends each email to the address specified for the first data set in the output group unless the AOP_MAIL_USE_FIRST_ADDRESS =NO environment variable or the **mail-use-first-address=no** attribute is set. If AOP_MAIL_USE_FIRST_ADDRESS=NO or **mail-use-first-address=no**, IP PrintWay extended mode sends each email to the address or addresses that are specified for the data set in the email header, in a job attribute, or in a JCL parameter.

      Tips:

      i) In IP PrintWay extended mode, the **Automatic dataset grouping** field provides the same function as the **Concatenate job** option.

      ii) These fields apply only for data sets that JES assigns to the same output group. For example, when Print Interface and NetSpool allocate data sets on the JES spool, JES assigns each data set to a separate output group. For more information, see "Transmitting multiple data sets in a JES output group (basic and extended mode)" on page 181.

   b. Leave the **Retry time** and **Retry limit** fields blank. Retries are not suggested for the email protocol. For more information about these fields, see "Handling unsuccessful data transmissions (basic and extended mode)" on page 165.

Modifying a printer definition

To modify a printer definition that currently represents a printer to send data to an email destination instead:

1. Use the Infoprint Server ISPF panels to list the printer definition you want to modify. On the List Printer Definition panel, use the **X** function. On the Choose a Definition Type and Protocol panel, select **IP PrintWay email**.

2. On the Email Protocol panel, specify the **To addresses** field and any of these other fields:

    To addresses
    The email addresses or alias names of the recipients of the email. You can specify 1–32 email addresses (to add more entries, put your cursor on **more** and press **Enter**). Each email address can be 1–60 characters. An address that the job submitter specifies overrides this value.

    CC addresses
    The email addresses or alias names of the "copy (cc)" recipients of the email. A *cc* means that other recipients of the email can see the cc recipient listed. You can specify 1–32 email addresses (to add more entries, put your cursor on **more** and press **Enter**). Each email address can be 1–60 characters. An address that the job submitter specifies overrides this value.

    BCC addresses
    The email addresses or alias names of the "blind copy (bcc)" recipients of the email. A *bcc* means that other recipients of the email do not see the bcc recipient listed. You can specify 1–32 email addresses (to add more entries, put your cursor on **more** and press **Enter**). Each email address can be 1–60 characters. An address that the job submitter specifies overrides this value.

    From address
    The email address that you want to appear as the sender's email address. You can specify a sendmail alias name that represents one or more email addresses.

    From name
    The descriptive name or other identifier of the sender of the email. You can specify one name. It can be 1–60 characters, including blanks. IP PrintWay always includes *userid@domainname* to identify the sender. The user ID of the job submitter is *userid*. The domain name where Infoprint Server is running is *domainname*. For example: JOHN@SYSTEM1.

    Reply address
    The email address or alias name that recipients of the email can reply to. You can specify one email address. It can be 1–60 characters. An address that the job submitter specifies overrides this value. If you do not specify this field, most email programs use the sender's email address, which is *userid@domainname*. The user ID of the job submitter is *userid*. The domain name where Infoprint Server is running is *domainname*.

    Use reply address as from address
    Specify this field to use the value of the `mail-reply-address` field instead of the value of the `From address` field as the sender's email address.

    Embedded headers
    If any line-data documents contain email headers, select the **Embedded headers** field. When this field is selected, IP PrintWay looks for an email header in each document with line-data format. If a header is found, IP PrintWay sends the email to the recipients specified in the header. If no line-data documents contain email headers, clear this field for improved performance.

    Inline text and line data
    Select this field if you want to include text documents and line-data documents inline in the body of the email instead of in attachments.

    Inline text attribute
    Specify an optional text job attribute that you want to include inline as a text string value at the beginning of each email. The text job attributes are:

    - `building-text`
    - `department-text`

- **name-text**
- **room-text**
- **title-text**

   The text string value for the text job attribute is included in the email on the line before an inline message. For example, if name-text="Bob Sill", then Bob Sill is included on the first line in the email.

Inline message
   Specify an optional message to include in the beginning of each email, but on the line after the optional **Inline text attribute** text string.

Each email address or alias name must be in this format:

```
username[@domainname]
```

username
   The name of the recipient or the name of an alias that is defined to the sendmail bridge.

@*domainname*
   The domain name of the target system. If you specify an alias, omit @*domainname*.

3. On the Allocation panel, specify these fields:

Spool allocation values
   Change these fields to specify either the job-selection values that are specified in the IP PrintWay job selection rule (extended mode) or the work-selection values specified in the JES FSA definition (basic mode). For example, if the job-selection value for IP PrintWay is class E, specify E in the **CLASS** field. If the printer definition currently represents an IP PrintWay controlled printer, no changes are required.

Title
   (Optional) Specify a default subject for the email. You can specify up to 60 characters, including blanks and any other printable characters. A title that is specified by the job submitter overrides this value. If you run IP PrintWay basic mode, this field applies only to documents that NetSpool or Print Interface processes.

4. On the Processing panel, specify these fields:

Printer code page
   Specify an ASCII code page or EBCDIC code page IBM-1047.

Print page header
   Clear this field if you do not want a page header on each page of the email attachment.

PostScript header
   Remove any selected options so that IP PrintWay does not attempt to add a PostScript header.

Filter
   (Optional) Specify transforms. For example, you might want to specify the AFP to PDF transform for the **Line data** and **MO:DCA-P** data formats to create PDF documents. If you run IP PrintWay basic mode and specify a transform, also select the **Resubmit for filtering** option.

   Remove filter **lpd_compat.so** if it is specified for the **Text** data format.

5. On the NetSpool Options panel, if your installation prints from VTAM applications such as CICS and IMS, select the **Convert to line** formatting option. NetSpool can transform line data to PDF data if you specify the AFP to PDF transform on the Processing panel. Or, IP PrintWay can convert the line data to text data. Both PDF and text data can be viewed in an email attachment. Do not select the **Convert to PCL** formatting option because PCL data cannot be easily viewed.

6. On the IP PrintWay Options panel:

   a. Select how you want IP PrintWay to handle data sets that are in the same JES output group. Select one of these values in the **Dataset grouping** field:

Concatenate job

Each data is sent in the same email to the address specified for the first data set in the output group.

None or Job

Each data set is sent in a separate email. IP PrintWay extended mode sends each email to the address specified for the first data set in the output group unless the AOP_MAIL_USE_FIRST_ADDRESS =NO environment variable or the **mail-use-first-address=no** attribute is set. If AOP_MAIL_USE_FIRST_ADDRESS=NO or **mail-use-first-address=no**, IP PrintWay extended mode sends each email to the address or addresses that are specified for the data set in the email header, in a job attribute, or in a JCL parameter.

Tips:

i) In IP PrintWay extended mode, the **Automatic dataset grouping** field provides the same function as the **Concatenate job** option.

ii) These fields apply only for data sets that JES assigns to the same output group. For example, when Print Interface and NetSpool allocate data sets on the JES spool, JES assigns each data set to a separate output group. For more information, see "Transmitting multiple data sets in a JES output group (basic and extended mode)" on page 181.

b. Blank out any values that are specified in the **Retry time** and **Retry limit** fields. Retransmissions are not suggested for the email protocol. For more information about these fields, see "Handling unsuccessful data transmissions (basic and extended mode)" on page 165.

c. Blank out any values that are specified in the **Document header** and **Document trailer** fields. Printer commands might be displayed as unrecognizable text when the email attachment is viewed.

Testing the printer definition

To verify that you typed the email addresses correctly in the printer definition and in the sendmail alias file, submit a job from the local system with the **lp** command. For example, if your printer definition is named `deptmail`, enter this command on the z/OS UNIX command line:

```
lp -d deptmail myfile
```

Results:

- IP PrintWay writes a message to indicate that the sendmail bridge successfully accepted the email request. However, this message does not mean that the sendmail bridge successfully delivered the email.

- If the email cannot be delivered and the z/OS Communications Server SMTP (CSSMTP) application is configured and running, it notifies the original sender. See *z/OS Communications Server: IP Configuration Guide*.

Example

These ISPF panels show how to create a printer definition that is named `deptmail`, select the email protocol, and complete fields that are specific to the email protocol.

Tip: This example shows only some of the ISPF panels and fields that comprise a printer definition. For a complete printer definition that is suitable for the email protocol, see Appendix D, "Sample IP PrintWay printer definitions," on page 513.

Use the Add function of the Infoprint Server ISPF panels to create a printer definition. On the Choose a Definition Type and Protocol panel, select the email protocol:

```
              Choose a Definition Type and Protocol
Option ===> 5

Type            Protocol
1 IP PrintWay      LPR
2 IP PrintWay      direct sockets
3 IP PrintWay      IPP
4 IP PrintWay      VTAM
5 IP PrintWay      email
6 PSF
7 General
```

To display this Email Protocol panel, press **Enter** on the **Custom values** field for the Protocol section on the main panel for the printer definition:

```
                           Email Protocol

  Printer definition name . deptmail_____

  To addresses
     . . . toname@xyz.com,janey@xyz.com,jimmy@xyz.com_____ (more)
  CC addresses
     . . . copyname@xyz.com_____       (more)
  BCC addresses
     . . . _____       (more)
  From address
     . . . _____
  From name . . . . . John Q. Sender_____
  Reply address . . johnsender@xyz.com_____
  _ Use reply address as from address

  IP PrintWay Extended Mode:
     _ Embedded headers
     _ Inline text and line data
     Inline text attribute . . name-text_____
     Inline message
        . . . Greetings:<LF><LF>The sales report is attached.<LF>_____ (extend)
```

Results:

- Emails are sent to `toname@xyz.com`, `janey@xyz.com`, and `jimmy@xyz.com`.

- A copy of the email is sent to `copyname@xyz.com`.

- The email includes this description of the sender: `John Q. Sender`.

- Most email programs that recipients use send replies to this address: `johnsender@xyz.com`.

- All documents are sent as attachments.

- The text string that is defined for the value in the **Inline text attribute** field is included on the first line of each email. For example, if `name-text="Company Employees"`, `Company Employees`, is included on the first line.

- The text in the **Inline message** field is included at the beginning of each email on the line after the text string that is defined for the value in the **Inline text attribute** field.

To display this Allocation panel, press **Enter** on the **Custom values** field for the Allocation section on the main panel for the printer definition:

```
                           Allocation

 Printer definition name . deptmail_____

  ⋮
 Values for Separator Pages:
    Address   . . _____ (extend)
    Building . . _____
    Department . _____
    Name . . . . _____
    Room . . . . _____
    Title . . . Annual Report for XYZ Corporation_____
  ⋮
```

Result: For data sets that IP PrintWay extended mode, NetSpool, or Print Interface processes, the email subject is `Annual Report for XYZ Corporation` unless the job submitter specifies another title.

To display this IP PrintWay Options panel, press **Enter** on the **Custom values** field for the IP PrintWay Options section on the main panel for the printer definition:

```
                          IP PrintWay Options

Printer definition name . deptmail
   ⋮
/ Automatic dataset grouping (extended mode)
Dataset grouping. . . . 3  1. None  2. Job  3. Concatenate job

   ⋮
```

Result: IP PrintWay sends all data sets in the same JES output group in the same email.

Specifying a printer definition name, description, and location (basic and extended mode)

You must assign each printer definition a name, which job submitters can use to print to IP PrintWay printers. In addition, you can specify a description of the printer and the printer's location. Although the description and location are optional, they can help users find printers and printer definitions.

Printer definition name
A job submitter can specify the printer definition name in the FSSDATA JCL parameter, the SUBSYS JCL parameter, in the **-d** parameter of the **lp** command, and as the print queue name in the LPR command. For more information about how to specify the printer definition name, see *z/OS Infoprint Server User's Guide*. Follow these guidelines:

- Select a name that is unique for all printer definitions and printer pool definitions in the Printer Inventory.

- The name is case-sensitive. If job submitters use the incorrect case, Infoprint Server cannot find the printer definition and reports an error. To avoid errors, use all lowercase or all uppercase letters.

- Batch job submitters can specify the DEST, CLASS, and FORMS parameters instead of the printer definition name on the OUTPUT JCL statement to direct output to IP PrintWay printers. Therefore, consider specifying the DEST value as the printer definition name. For more information, see "Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)" on page 159.

- Infoprint Central users can specify the printer definition name to find printers, print jobs, and printer definitions. Users can specify the exact name or only the first few characters of the name. Therefore, you might want to use a naming pattern that lets users find multiple printers and printer definitions more easily.

Description
The description is used for information purposes only. For example, you can specify the model number of the printer in the **Description** field. However, it is also a search criterion on the Infoprint Server ISPF panels. The description is case-sensitive. Therefore, to make searching easier, consider using all lowercase or uppercase letters.

Location
The location is used for information purposes only. For example, the information in the **Location** field can help Infoprint Central users direct service personnel to the printer if it requires service. However, it is also a search criterion on the Infoprint Server ISPF panels and in Infoprint Central. Follow these guidelines:

- The location is case-sensitive. Infoprint Central can do case-sensitive or case-insensitive searches. However, ISPF panels only do case-sensitive searches. Therefore, to make searching easier, consider using all lowercase or uppercase letters.

- Infoprint Central users can specify the exact location information or only the first few characters of the location. Therefore, use a format that lets users find printers and printer definitions more easily.

For example, if you use this format, Infoprint Central users can find all printers in the (1) city, (2) city/building, or (3) city/building/office:

```
Location. . . mycity/mybuilding/myoffice
```

- If more than one printer definition exists for the same IP PrintWay printer, specify the same location in all printer definitions so that Infoprint Central can find the printer.

  Tip: To see whether more than one printer definition exists for a printer, on the Select Printer Definitions ISPF panel, specify the host name or dotted decimal address of the printer in the **IP address** field. A list of all printer definitions for the printer is returned.

Procedure for specifying attributes

On the IP PrintWay Printer Definition panel, specify these fields:

Printer definition name
Specify a 1 – 17 character name, including any letters, numbers, or special characters except for blanks.

Description
Specify a 1 – 256 character description, including any letters, numbers, special characters, and blanks.

Location
Specify a 1 – 256 character location, including any letters, numbers, special characters, and blanks.

Example

This ISPF screen shows how to specify the name of the printer definition, a description of the printer, and the printer's location.

```
                          IP PrintWay Printer Definition

Printer definition name . myprinter_____
Description . INFOPRINT 1312_____ (extend)
Location. . . DENVER/B003/A1-03_____ (extend)
 ⋮
```

Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)

A z/OS job submitter can specify the printer definition that IP PrintWay is to use on the DD or OUTPUT JCL statement in one of these JCL parameters:

FSSDATA
The job submitter can specify the name of the printer definition in the **printer** subparameter of the FSSDATA parameter on the OUTPUT JCL statement. The name of the printer definition is case-sensitive and must exactly match the name in the Printer Inventory.

Tip: Job submitters can specify the FSSDATA parameter with IP PrintWay basic mode and IP PrintWay extended mode, even though IP PrintWay extended mode is not implemented as a JES functional subsystem (FSS).

SUBSYS
When you are using the Print Interface subsystem, the job submitter must specify the name of the printer definition in the second subparameter of the SUBSYS parameter on the DD statement. The destination, class, and form name are not used to select the printer definition.

DEST, CLASS, and FORMS
The job submitter can specify values that match the ones that are specified in the DEST, CLASS, and FORMS fields of the printer definition except when the Print Interface subsystem is used. The

job submitter can specify the destination, class, and form name on either the DD or OUTPUT JCL statement. If the job submitter does not specify a value for the DEST, CLASS, or FORMS parameters, the default value that is assigned by JES must match the corresponding value, if any, specified in the printer definition.

To enable printer selection with the **DEST**, **CLASS**, and **FORMS JCL** parameters, you must select the **Use DEST, CLASS, and FORMS for IP PrintWay printer selection** option. You must also specify a unique combination of DEST, CLASS, and FORMS values in each printer definition in which you select this option. You do not need to specify all three DEST, CLASS, and FORMS values in each printer definition.

To select a printer definition, the job submitter specifies the same DEST, CLASS, and FORMS values on the OUTPUT JCL statement that you specified in the printer definition. For example:

1. Create these printer definitions:

Printer definition name	DEST field	CLASS field	FORMS field
Dept#4	D004	P	Not specified
Dept#5	D005	P	Not specified
Manager#5	D005	P	MANAGER

2. To select one of these printer definitions, the job submitter can specify these parameters on the OUTPUT JCL statement:

   - To select Dept#4 printer, specify one of these OUTPUT statements:
     – `//OUT1 OUTPUT DEST=D004,CLASS=P`

       The FORMS parameter can contain any value.
     – `//OUT2 OUTPUT FSSDATA='printer=Dept#4'`
   - To select Dept#5 printer, specify one of these OUTPUT statements:
     – `//OUT3 OUTPUT DEST=D005,CLASS=P`

       The FORMS parameter can contain any value except for MANAGER.
     – `//OUT4 OUTPUT FSSDATA='printer=Dept#5'`
   - To select Manager#5 printer, specify one of these OUTPUT statements:
     – `//OUT5 OUTPUT DEST=D005,CLASS=P,FORMS=MANAGER`
     – `//OUT6 OUTPUT FSSDATA='printer=Manager#5'`

Hierarchy of printer selection

If the OUTPUT JCL statement specifies DEST, CLASS, and FORMS values that match more than one printer definition, IP PrintWay selects the printer definition with the best match, by using this hierarchy:

1. The printer definition with matching DEST, CLASS, and FORMS values.
2. The printer definition with matching DEST and CLASS values, but with no matching FORMS value.
3. The printer definition with matching DEST and FORMS values, but with no matching CLASS value.
4. The printer definition with matching CLASS and FORMS values, but with no matching DEST value.
5. The printer definition with matching DEST value, but with no matching CLASS and FORMS values.
6. The printer definition with matching CLASS value, but with no matching DEST and FORMS values.
7. The printer definition with matching FORMS value, but with no matching DEST and CLASS values.

This example illustrates the hierarchy of printer selection that IP PrintWay uses:

1. Create these printer definitions:

Printer definition name	DEST field	CLASS field	FORMS field
MyDefault	Not specified	P	Not specified
Dept#5	D005	P	Not specified
Manager#5	D005	P	MANAGER

2. IP PrintWay selects a printer definition:

- If the OUTPUT JCL statement specifies CLASS=P (with any value for DEST except D005 and any value for FORMS except MANAGER), IP PrintWay selects printer definition MyDefault. The MyDefault printer definition is the only printer definition that matches these JCL values.

- If the OUTPUT JCL statement specifies DEST=D005 and CLASS=P (with any value for FORMS except MANAGER), IP PrintWay selects printer definition Dept#5. IP PrintWay uses the selection hierarchy to select printer definition Dept#5 instead of MyDefault, which also matches the JCL values.

- If the OUTPUT JCL statement specifies DEST=D005, CLASS=P, and FORMS=MANAGER, IP PrintWay selects printer definition Manager#5. IP PrintWay uses the selection hierarchy to select printer definition Manager#5 instead of MyDefault or Dept#5, which also match the JCL values.

Procedure for specifying attributes for printer selection

To enable printer selection with the DEST, CLASS, or FORMS JCL parameters, specify these attributes in the printer definition:

1. On the first ISPF panel for the printer definition, specify this field:

- **Use DEST, CLASS, and FORMS for IP PrintWay printer selection**: Select this field.

2. On the Allocation panel, specify these fields:

- **CLASS**: Specify a class. Leave this field blank if you do not want IP PrintWay to match the value in the CLASS JCL parameter.

- **DEST**: Specify a destination. Leave this field blank if you want do not want IP PrintWay to match the value in the DEST JCL parameter.

- **FORMS**: Specify a forms name. Leave this field blank if you do not want IP PrintWay to match the value in the FORMS JCL parameter.

The values in the DEST, CLASS, and FORMS fields, together, must be unique in each printer definition in which the **Use DEST, CLASS, and FORMS for IP PrintWay printer selection** option is selected. For example, if you specify DEST PRT5 and CLASS P in one printer definition, you cannot specify DEST PRT5 and CLASS P in another printer definition.

Example

This ISPF panel shows how to request that IP PrintWay use the DEST, CLASS, and FORMS JCL parameters to select this printer definition.

```
Add                      IP PrintWay Printer Definition

Printer definition name . myprinter
Description . _____ (extend)
Location. . . _____ (extend)

                     Component name        Custom values
Section              (enter to list)       (enter to customize)
Allocation        => _____         => *
Processing        => _____         => __
NetSpool options  => _____         => __
NetSpool end-of-file => _____       => __
IP PrintWay options => _____       => __
Protocol          => _____         => *

/ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
NetSpool LU name . _____    LU classes . . __  __  __  __  __  __   (extend)
```

This ISPF panel shows how to specify the DEST, CLASS, and FORMS values that IP PrintWay uses to select this printer definition. In this example, all three values are completed. However, you can omit one or two of the values. Only a portion of the ISPF panel is shown.

```
                              Allocation

Spool allocation values:
    CLASS . . . . P           GROUPID . . _____
    DEST. . . . . PRT5         LINECT. . . ___
    JES node. . . _____      PRMODE  . . _____
    FCB . . . . . ____          PRTY. . . . ___
    FLASH count . ___           THRESHLD. . _____
    FLASH name. . ____          UCS . . . . ____
    FORMS . . . . STD           WRITER. . . _____
    USERDATA
      . . _____ (extend)
    BURST . . . . _  1. Yes  2. No
    HOLD. . . . . _  1. Yes  2. No
    OUTDISP . . . _  1. Purge (without printing)  2. Leave
                     3. Keep  4. Hold  5. Write
⋮
```

Setting up operator security for the printer (extended mode)

If your security administrator created a RACF profile to control who can use Infoprint Central to display information about and do actions on the printer, specify the name of this RACF profile in the printer definition. If you specify the name of a RACF profile, only Infoprint Central users who are authorized to the profile can display information about and do actions on this printer. If you do not specify the name of a RACF profile, or if the profile name is not defined to RACF, any Infoprint Central user can display information about and do actions on the printer.

This task does not apply when you use IP PrintWay basic mode because users can use Infoprint Central to work only with printers controlled by IP PrintWay extended mode, not basic mode.

Rule: If more than one printer definition exists for an IP PrintWay printer, specify the same RACF profile in all printer definitions for the printer. To find all the printer definitions for a printer that uses either the LPR or direct sockets protocol, on the Select Printer Definitions ISPF panel, specify the host name or dotted decimal address of the printer in the **IP address** field.

Tips:

1. You can specify the name of the profile before it is defined to RACF. If you specify a profile name that is not defined to RACF, Infoprint Central proceeds as if the user has the required access to the profile.

2. If the same RACF profile applies to a group of IP PrintWay and PSF printers, specify the same profile name in the IP PrintWay printer definitions and PSF FSA definitions for all the printers in the group.

3. To specify the same operator security profile in a group of IP PrintWay printer definitions, create a Protocol component with the name of the RACF profile, and include that Protocol component in the

printer definitions for all the printers in the group. Creating a component makes it easier to change the name of the RACF profile if necessary.

4. You can use the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) to specify the RACF profile name. If you want to specify the same RACF profile in many IP PrintWay printer definitions, it is easier to use the PIDU program. See "Example 2. Using PIDU to specify the profile name" on page 163.

Related information: For information about how to define RACF profiles in the PRINTSRV class to protect IP PrintWay printers, see Setting up security for Infoprint Central in *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

On the LPR Protocol panel, the Direct Sockets Protocol panel, or the IPP Protocol panel, specify this field:

Operator security profile
Specify the name of the RACF resource profile in the PRINTSRV class.

Example 1. Using ISPF panels to specify the profile name

This ISPF screen shows how to specify the name of the RACF profile in a printer definition that uses the LPR protocol.

```
                            LPR Protocol

 Printer definition name . myprinter_____
 Operator security profile
     . . . PRINTERS.DENVER_____

 Printer IP address . myprinter.xyzcorp.denver_____  (extend)
 Print queue name . . RAW_____     (extend)


 ⋮
```

Example 2. Using PIDU to specify the profile name

These commands show how to specify the name of the same RACF profile in all IP PrintWay printer definitions that do not already contain a profile name.

1. Enter these commands as one command on the z/OS UNIX command line:

```
pidu -qc "list printer where printer-type=ip-printway and
operator-security-profile=null;" | awk'{print "modify printer " $1
" operator-security-profile = \"PRINTERS.DENVER\";"}' > /tmp/defs
```

   The **list** command lists the names of all IP PrintWay printer definitions with no value in the **operator-security-profile** attribute. These names are piped to the **awk** program, which writes **modify** commands to modify the printer definitions to file /tmp/defs.

2. Inspect the /tmp/defs file to make sure the **modify** commands are acceptable.

3. Enter this command to update the Printer Inventory:

```
pidu < /tmp/defs
```

Specifying allocation parameters for IP PrintWay (basic and extended mode)

The fields in the Allocation section of a printer definition, which you might need to set if you use IP PrintWay, are described here. Values in the Allocation section apply to these documents:

• All documents that Print Interface and NetSpool allocate on the JES spool

• All documents that IP PrintWay extended mode processes

Job attributes and JCL parameters override values that are specified in the Allocation section of the printer definition. For example, the `title-text` job attribute and the TITLE JCL parameter override the value that is specified in the **Title** field on the Allocation panel.

Also, IP PrintWay uses the **CLASS**, **DEST**, and **FORMS** fields on the Allocation panel to select the printer definition to use. For information, see "Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)" on page 159.

Procedure for specifying attributes

On the Allocation panel, specify these fields:

- **Spool allocation values** heading: Specify the JES job-selection values for IP PrintWay:

  – If you run IP PrintWay extended mode, specify the same job-selection values that are specified in the IP PrintWay job selection rule. For example, if the job selection rule specifies class P, specify P in the **CLASS** field.

  – If you run IP PrintWay basic mode, specify the same work-selection values that are specified in the JES definition for the IP PrintWay FSA. For example, if the JES definition specifies class P and destination PRT001, specify P in the **CLASS** field and PRT001 in the **DEST** field.

  Also, specify:

  – **FCB**: Specify the name of the forms control buffer (FCB) you want IP PrintWay to use. For information, see "Using an FCB to format data (basic and extended mode)" on page 179.

  – **CLASS**, **DEST**, and **FORMS**: Specify the class, destination, and forms IP PrintWay uses to select this printer definition. For information, see "Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)" on page 159.

- **Values for separator pages** heading:

  – **Address, Building, Department, Name, Room, Title**: Specify the values that IP PrintWay exits (for example, the Begin Data Set) can print on separator pages. For information about IP PrintWay exits, see *z/OS Infoprint Server Customization*.

  – **Title**: Specify the subject line for emails (email protocol), or the title that is passed to LPDs (LPR protocol). You can specify up to 60 characters, including blanks and any other printable characters.

- **Other values** heading:

  – **Notify**: Specify up to four user IDs that IP PrintWay notifies when a data set is successfully or unsuccessfully transmitted, or when IP PrintWay deletes the data set from the JES spool.

  – **Copies**: Specify the number of copies to be printed. Allowed values are 1 - 32640. The default value is 1.

    Guidelines:

    1. Email protocol: This field does not apply. Only one copy is sent.

    2. IPP protocol: Some IPP printers do not support the `copies` IPP job attribute. In this case, only one copy prints.

    3. LPR protocol: If only one copy prints, clear the **Optimize copies** field.

    4. If a copy does not start on a separate page, specify printer commands to start a new page. For information, see "Specifying printer commands to print on a new sheet of paper" on page 184.

    5. This field does not apply to output data sets that z/OS batch jobs create because JES sets a default of one copy.

  – **Duplex**: Specify the type of duplexing.

    Guidelines:

    1. LPR, direct-sockets, and email protocols: This field does not apply.

    2. IPP Protocol: The IPP server must support the `sides` IPP job attribute. If it does not, the printer's default is used.

Handling unsuccessful data transmissions (basic and extended mode)

IP PrintWay can retransmit unsuccessful data transmissions to a printer. Typically, a data transmission is unsuccessful because one of these types of errors occurred:

- Connection error

  IP PrintWay cannot connect to the printer in the time period that is specified in the printer definition. This type of error occurs before IP PrintWay sends any data to the printer. It can occur if the printer is powered off or a network problem exists.

- Response error

  The printer reports an error, or IP PrintWay does not receive a response from the printer in the time period that is specified in the printer definition. This type of error occurs when IP PrintWay sends data to the printer. It can occur because the printer is offline or the printer requires operator intervention. For example, the printer might be out of paper, or it might have a paper jam. Or, it can occur because the printer takes a long time to respond.

If an error (such as a connection or response error) occurs, you can request that IP PrintWay try the operation again.

- After a connection error, IP PrintWay tries to connect to the printer again.
- After a response error, IP PrintWay resends data to the printer from the beginning of the print job.

  When the printer becomes ready after a response error, the printer prints any data that IP PrintWay sent before the response error and is still in the printer's buffer. Then, it prints data that IP PrintWay resent.

  If you run IP PrintWay extended mode and use the direct sockets protocol, you can direct IP PrintWay to tell the printer where to restart printing after a response error. IP PrintWay can tell the printer to restart printing from the last page that the printer indicated printed successfully or from the beginning of the print job. For information, see "Tracking the number of printed pages (extended mode)" on page 172.

  Tip: Whenever IP PrintWay resends data, the printer might print duplicate pages. To prevent duplicate pages, consider specifying a high response timeout value especially if you run IP PrintWay extended mode. See the description of the **Response timeout** field in "Setting timeout values" on page 165.

An administrator can use IP PrintWay extended mode to define a backup printer in case the retransmissions fail because the IP PrintWay printer is broken or offline. The backup printer is defined in the ISPF printer definitions panel or PIDU. The operator can then select the backup printer for IP PrintWay to use when the primary printer is not functioning. When all retransmissions to a printer are unsuccessful, IP PrintWay checks to see whether a backup printer is defined for the job. If a backup printer is defined, IP PrintWay automatically moves the print job to the queue for the defined backup printer. See "Procedure for specifying a backup printer" on page 169.

If an error persists after IP PrintWay completes the retransmissions, or if no retransmissions are requested, IP PrintWay can retain the failed print job on the JES spool so that the operator can release the print job to print after the problem is corrected. For information, see "Retaining data sets on the JES spool (basic and extended mode)" on page 170.

Setting timeout values

To change the default timeout values, set these fields in the printer definition:

- **Connection timeout:** The maximum amount of time that IP PrintWay waits while it attempts to connect to the printer. If the printer is turned on and the network is operational, IP PrintWay connects to the printer in a few seconds. However, if the printer is powered off, IP PrintWay waits for the connection timeout period.

  While it waits to connect to the printer:

  - The IP PrintWay basic mode FSA cannot process any other print jobs. However, other IP PrintWay basic mode FSAs can process other print jobs.

– IP PrintWay extended mode can process other print jobs.

Guidelines:

1. The default value of 30 seconds is suitable for most printers.
2. Do not specify a low connection timeout value. IP PrintWay might not be able to connect to the printer in the specified time because of network traffic.
3. Increase the connection timeout value if IP PrintWay reports a timeout error when the printer is turned on. (IP PrintWay writes a message with TCP/IP ERRNO of 60).
4. IP PrintWay basic mode: Do not specify a high connection timeout value because the IP PrintWay basic mode FSA cannot process any other print jobs during this period.

- **Response timeout:** The maximum amount of time that IP PrintWay waits for a response from a printer after it sends data to it. When the response timeout value expires, IP PrintWay either resends data (if retransmissions are requested) or fails the print job.

  If a printer is ready and its buffer is not full, most printers respond to IP PrintWay immediately. However, if a printer requires operator intervention (for example, the printer is out of paper), most printers do not respond until the printer becomes ready. In addition, if you select one of the PJL options in the printer definition (see "Tracking the number of printed pages (extended mode)" on page 172), most printers do not respond until the printer finishes printing the document.

  While it waits for a response from the printer:

  – The IP PrintWay basic mode FSA cannot process any other print jobs. However, other IP PrintWay basic mode FSAs can process other print jobs.
  – IP PrintWay extended mode can process other print jobs.

  The default response timeout value is 10 minutes. The maximum value that you can specify is 31 days, which is the maximum time that TCP/IP allows IP PrintWay to wait for a response.

  Guidelines:

  1. Do not set the response timeout value too low, especially if you print large documents on printers that have small buffers or that print slowly. For example, a response timeout value of 30 seconds might cause IP PrintWay to try the transmission again before the printer finishes printing its buffer.
  2. A high response timeout value gives an operator more time to correct a problem before IP PrintWay resends data to the printer (if retransmissions are requested) or fails the print job. For example, you might want to specify a response timeout value of 3 days if your printers are unattended over a long weekend.
  3. IP PrintWay extended mode: If you select one of the PJL options in the printer definition (see "Tracking the number of printed pages (extended mode)" on page 172), most printers respond only after the printer finishes printing the document. Therefore, the response timeout value needs to be long enough to allow the largest documents to finish printing.
  4. IP PrintWay extended mode: A high response timeout value does not affect printing to other printers. However, if you specify a high response timeout value for many printers, IP PrintWay can exceed the maximum number of MVS tasks that IP PrintWay extended mode (**aopoutd** daemon) can have active at one time. This can happen if IP PrintWay waits for responses from many printers at the same time.

     If you see the following message, which indicates that you are close to exceeding the maximum number of MVS tasks, ask your system administrator to increase the maximum number of MVS tasks in the AOPOUTD_MAXTHREADTASKS environment variable or the **aopoutd-max-thread-tasks** configuration attribute. For example, you might increase the number to 250.

     ```
     BPXI040I PROCESS LIMIT MAXTHREADTASKS HAS REACHED 85% OF ITS CURRENT CAPACITY
              OF 200 FOR PID=nnnnnn IN JOB AOPOUTD.
     ```

     For information about AOPOUTD_MAXTHREADTASKS and **aopoutd-max-thread-tasks**, see *z/OS Infoprint Server Customization*.

     Tip: The LIMMSG statement in the BPXPRMxx member of SYS1.PARMLIB controls whether z/OS UNIX® issues message BPXI040I. The default is SYSTEM, meaning that z/OS UNIX issues BPXI040I

messages when processes reach the system limit or a process limit set in the OMVS segment of the owning user ID or with the SETOMVS command. You can change the LIMMSG value dynamically with the SETOMVS command.

5. IP PrintWay basic mode: If you want to specify a high response timeout value, ask your system administrator to define an IP PrintWay FSA to JES that selects print jobs for this one printer only. If an IP PrintWay FSA selects print jobs for several printers, when one printer with a high response timeout value does not respond for a long time, printing to the other printers can be delayed until the operator corrects the problem and the printer becomes ready.

6. Email protocol: IP PrintWay ignores this field.

Setting retry values

To request retransmissions, set these fields in the printer definition:

- **Retry limit:** The number of times that IP PrintWay tries a connection or data transmission. By default, IP PrintWay does not do any retransmissions.

  If you request at least one retransmission, IP PrintWay automatically tries the transmission one time immediately after the transmission fails. This automatic retransmission is in addition to the retransmissions you request. The automatic retransmission permits the print job to be transmitted when a transmission problem is short-lived. For example, after receiving a print job, some printers do not become ready to receive another print job for 1 or 2 seconds.

  The RETRYL parameter on an OUTPUT JCL statement overrides this value.

  Guidelines:

  1. Specify a retry limit greater than 0 because some printer errors are short-lived.

  2. When you send data to an email destination, do not request retransmissions because email errors are typically not short-lived and because IP PrintWay resends emails to the entire list of email addresses, not just to the email address in error.

- **Retry time:** The amount of time between each retransmission. By default, IP PrintWay retransmits immediately.

  Between retransmissions, IP PrintWay basic mode and extended mode continue to select and process other print jobs from the JES spool and transmit them to other printers and print queues. However, to maintain the correct order of transmission, IP PrintWay does not attempt to transmit other print jobs to this printer until it completes all retransmissions.

  The RETRYT parameter on an OUTPUT JCL statement overrides this value.

Table 32 on page 167 shows how IP PrintWay tries transmissions again when you specify different retry limits and retry times in the printer definition.

Table 32. How retry limit and retry time work together

Retry limit	Retry time	IP PrintWay action
0 or blank	Any value	IP PrintWay does not try the transmission again.
>0	0 or blank	IP PrintWay automatically tries the transmission again one time immediately after the original transmission fails. Then, IP PrintWay tries again for the specified number of times at the specified interval. If retry time is blank, IP PrintWay tries again approximately every second.

Procedure for specifying attributes for trying unsuccessful transmissions again

On the IP PrintWay Options panel, specify these fields:

- **Connection timeout:** Specify the maximum number of seconds that IP PrintWay is to wait for TCP/IP to connect to the printer. Allowed values are 5–180. The default value is 30 seconds.
- **Response timeout:** Specify the maximum number of seconds that IP PrintWay is to wait for a response from the printer before it attempts any retransmissions. Allowed values are 0–2678400. The maximum value is 2678400 seconds (31 days). The default value is 600 seconds (10 minutes).
- **Retry limit:** Specify the number of retransmissions you want IP PrintWay to attempt. Allowed values are 0–32767.
- **Retry time:** Specify the time IP PrintWay is to wait between each retransmission. Allowed values are 0 seconds–9999 hours, 59 minutes, and 59 seconds.

Example 1. Setting timeout and retry values (basic mode)

This ISPF panel shows how to specify timeout and retry values that are suitable for IP PrintWay basic mode. Only a portion of the ISPF panel is shown.

```
                         IP PrintWay Options
⋮

 Retry time . . . . .  0000:10:00
 Retry limit. . . . .  3___

 Connection timeout .  30_
 Response timeout . .  60___
⋮
```

Results:

- IP PrintWay attempts to connect to the printer. If the connection is not established in 30 seconds (connection timeout), IP PrintWay attempts to connect again immediately (automatic retransmission).
- After 10 minutes (retry time), IP PrintWay attempts to connect to the printer again. IP PrintWay tries the connection 3 times (retry limit). The maximum number of connection attempts is 5 (original + automatic + retry limit).
- After IP PrintWay connects to the printer, it sends the print job to the printer. It waits up to 60 seconds (response timeout) for a response from the printer.
- If the printer does not respond in 60 seconds, IP PrintWay waits up to 10 minutes (retry time) for a response. If the printer becomes ready during the 10 minutes, IP PrintWay resumes sending the print job to the printer.
- After the 10 minutes, IP PrintWay resends the print job to the printer up to three times (retry limit) and waits up to 10 minutes each time for a response.
- If the transmission is unsuccessful after all retransmission attempts, IP PrintWay retains the print job on the JES spool if retention is requested. Otherwise, it deletes the print job from the JES spool.

In this example:

- The maximum time that IP PrintWay basic mode waits to connect to the printer is:

```
30 seconds + 30 seconds + 3(10 minutes + 30 seconds) = 32 minutes, 30 seconds
```

- The maximum time that IP PrintWay basic mode waits for a response from the printer is:

```
60 seconds + 3(10 minutes + 60 seconds) = 34 minutes
```

Example 2. Setting timeout and retry values (extended mode)

This ISPF panel shows how to specify timeout and retry values that are suitable for IP PrintWay extended mode. Only a portion of the ISPF panels are shown.

```
                         IP PrintWay Options
⋮

 Retry time . . . . .  0000:10:00
 Retry limit. . . . .  3

 Connection timeout .  30
 Response timeout . .  259200
⋮
```

Results:

- IP PrintWay attempts to connect to the printer. If the connection is not established in 30 seconds (connection timeout), IP PrintWay attempts to connect again immediately (automatic retransmission).
- After 10 minutes (retry time), IP PrintWay attempts to connect to the printer again. IP PrintWay tries the connection 3 times (retry limit). The maximum number of connection attempts is 5 (original + automatic + retry limit).
- When the connection is established, IP PrintWay sends the print job to the printer. It waits up to 259200 seconds (response timeout of 3 days) for a response from the printer.
- If the printer does not respond in 259200 seconds, IP PrintWay waits for 10 minutes (retry time). If the printer becomes ready during the 10 minutes, IP PrintWay resumes sending the print job to the printer.
- After the 10 minutes, IP PrintWay resends the print job to the printer up to three times (retry limit) and waits up to 10 minutes each time for a response.
- If the transmission is unsuccessful after all retransmission attempts, IP PrintWay retains the print job on the JES spool if retention is requested. Otherwise, it deletes the print job from the JES spool.

In this example:

- The maximum time that IP PrintWay extended mode waits to connect to the printer is:

```
30 seconds + 30 seconds + 3(10 minutes + 30 seconds) = 32 minutes, 30 seconds
```

- The maximum time that IP PrintWay extended mode waits for a response from the printer is:

```
259200 seconds + 3(10 minutes + 259200 seconds) = 10 days, 30 minutes
```

Procedure for specifying a backup printer

To define a backup printer that is used when all retransmissions for a job are unsuccessful, specify these fields on the IP PrintWay Options panel for the primary printer definition:

- **Retry limit**

  See "Setting retry values" on page 167.

  Note: You can use the defaults for the other retransmission values or set your own values.

- **Backup printer**

  Specify the name of an existing IP PrintWay extended mode printer definition that is used when the print job does not print on the original printer. Allowed values are any combination of 1–17 letters (a-z, A-Z, numbers (0-9), and special characters (such as $ # @ . - + /). This field is case-sensitive and blanks are not allowed.

  Guidelines:

  1. The name of the backup printer must be an existing IP PrintWay printer definition. List the printer definitions in ISPF to find a valid backup printer.
  2. Specify a backup printer that uses the same protocol and prints similar jobs as the original printer because the job is formatted with the original printer definition, not the backup printer definition.

This ISPF panel shows how to specify a retry limit and a backup printer name. Only a portion of the ISPF panel is shown.

```
                          IP PrintWay Options
⋮

 Retry time . . . . . _____
 Retry limit. . . . . 3___

 Connection timeout . 30_
 Response timeout . . 600__
 Backup printer . . . ipwbackup_____    (extended mode)
⋮
```

Results:

1. IP PrintWay attempts to connect to the printer. If the connection is not established in 30 seconds (connection timeout), IP PrintWay attempts to connect again.

2. If the connection is not established, IP PrintWay immediately tries the connection 3 more times (retry limit).

3. After IP PrintWay connects to the printer, it sends the print job to the printer. It waits up to 600 seconds (response timeout) for a response from the printer.

4. If the printer does not respond in 600 seconds, IP PrintWay resends the print job to the printer up to 3 times (retry limit).

5. When all retransmissions to a printer are unsuccessful, IP PrintWay automatically moves the print job to the queue for the defined backup printer.

   When the job is moved to the backup printer, you see this message:

   ```
   AOP3621I job is printed on backup printer printer definition name.
   ```

   Otherwise, if the specified backup printer is not defined in the Printer Inventory, you see this message:

   ```
   AOP3622W job cannot use backup printer printer definition name because it is not
   defined in the Printer Inventory.
   ```

   Note: If you did not specify a backup printer that uses the same protocol and prints similar jobs as the original printer, the job fails.

Retaining data sets on the JES spool (basic and extended mode)

IP PrintWay can retain data sets on the JES spool for a specified time after the data sets complete processing. Although retaining data sets on the JES spool uses spool space, you can retransmit data sets that are not printed correctly or are not successfully sent to the email destination. When the retention period for data sets expires, IP PrintWay deletes them from the JES spool.

When IP PrintWay retains data sets on the JES spool:

- If you run IP PrintWay basic mode, retained data sets remain selected by IP PrintWay.

- If you run IP PrintWay extended mode, all retained data sets are released to JES. They are either in the held state (JES2) or in the keep state (JES3).

The operator can work with retained data sets:

- If you run IP PrintWay basic mode, the operator can use the Infoprint Server ISPF panels to move data sets to different printers, reset them, hold them, or delete them. For information, see Chapter 4, "Using the IP PrintWay transmission queue (basic mode)," on page 37.

  If the operator resets a data set, IP PrintWay basic mode restarts printing it from the beginning of the data set.

If the operator holds a data set, the data set is held until the operator resets or deletes the data set. IP PrintWay basic mode does not delete it automatically when its retention period expires.

- If you run IP PrintWay extended mode, the operator can use Infoprint Central or JES commands to move print jobs to different printers, release them, hold them, or delete them. For information, see Chapter 5, "Using Infoprint Central," on page 45 and "Using JES commands and SDSF to work with output data sets" on page 60. (In some cases, you must use Infoprint Central, instead of JES commands, to move print jobs to different printers.)

  If the operator releases a print job, IP PrintWay extended mode restarts printing either from the beginning of the first data set in the print job or after the last page that printed successfully. For more information, see "Tracking the number of printed pages (extended mode)" on page 172.

  If the operator holds a print job, all data sets in that print job are held until the operator releases or deletes the print job. IP PrintWay extended mode does not delete the print job automatically when its retain time expires.

You can specify these fields in the printer definition to control retention:

- **Retention period: Successful:** The time IP PrintWay retains all data sets that are successfully transmitted.
- **Retention period: Failure:** The time IP PrintWay retains all data sets that are not successfully transmitted after all requested retransmissions are attempted. If a failed data set is part of a JES output group (print job), IP PrintWay retains all data sets in the print job.

Guidelines:

1. IP PrintWay basic mode: Do not retain successful data sets, and retain failed data sets for as short a time as possible because a system abend (abend code 878) can occur when an IP PrintWay FSS retains a high number of data sets on the JES spool. Or, migrate to IP PrintWay extended mode.

2. IP PrintWay extended mode: You can specify longer retention times because a system abend does not occur when you retain many data sets on the JES spool. However, retaining successful data sets reduces restart performance.

IP PrintWay considers a print job to be successful when IP PrintWay finishes processing the print job without error. Table 33 on page 171 summarizes when IP PrintWay considers a print job to be successful for each transmission protocol.

Table 33. IP PrintWay successful print jobs

For this protocol:	IP PrintWay considers print jobs successful when:
Direct sockets	• A PJL option is selected: The printer finishes printing all documents in the print job. • A PJL option is not selected: The printer or print server receives all documents in the print job. However, printing might fail later. For information about PJL options, see "Tracking the number of printed pages (extended mode)" on page 172.
Email	The sendmail bridge accepts the mail request. However, transmission of the mail to remote recipients might fail later.
IPP, LPR	The printer or print server receives all documents in the print job. However, printing might fail later.

Procedure for specifying attributes

On the IP PrintWay Options panel, specify these fields:

- **Retention period: Successful**: Specify the amount of time IP PrintWay is to retain successfully transmitted data sets. Specify a time period from 0 seconds to 9999 hours, 59 minutes, and 59 seconds.

- **Retention period: Failure**: Specify the amount of time IP PrintWay is to retain data sets whose transmission failed. Specify a time period from 0 seconds to 9999 hours, 59 minutes, and 59 seconds.

To request that IP PrintWay retain data sets on the JES spool forever, specify **FOREVER** in either field. However, the operator must delete data sets from the JES spool when they are no longer required.

Example

This ISPF panel shows how to specify a retention period for data sets whose transmission fails. Only a portion of the ISPF panel is shown.

```
                        IP PrintWay Options

 ⋮

 Retention period:
    Successful. . . . _____    Failure . . 0024:00:00

 ⋮
```

Result: IP PrintWay retains data sets that cannot be transmitted on the JES spool for 24 hours.

Tracking the number of printed pages (extended mode)

IP PrintWay extended mode can track the number of pages that print on printers that support Hewlett Packard (HP) Printer Job Language (PJL). This function is available only for printers that use the direct-sockets printing protocol.

To track the number of printed pages, select one or both of these PJL options in the printer definition:

- **Record pages printed for accounting**: If this option is selected, IP PrintWay records the number of printed pages in the SMF type 6 record, in field SMF6PGE. This provides you with more accurate accounting information.
- **Restart printing after last successful page**: If this option is selected, IP PrintWay tells the printer to restart printing after the last page that the printer reported printed successfully. This option reduces the number of duplicate pages that print, especially when large documents are printed. This option applies when IP PrintWay restarts printing after an error occurs and when the operator releases a retained print job that is partially printed.

  If this option is not selected, IP PrintWay restarts printing from the beginning of the print job.

When you select either of these PJL options, IP PrintWay provides these additional functions:

- When the operator cancels a print job from the printer console, IP PrintWay detects that the print job is canceled and does not try the transmission again.
- IP PrintWay waits until print jobs are finished printed before it considers them successful and deleting them from the JES spool. If a failure occurs during printing, IP PrintWay retains the failed print jobs on the JES spool (if retention is requested).
- IP PrintWay writes a message with the number of pages that printed in the print job. The number of pages is the same as the number in the SMF type 6 record. The operator can use Infoprint Central to view this message in the log for the Infoprint Server print job.

Tip: If you select one of the PJL options, you might need to increase the response timeout value (**Response timeout** field) in the printer definition. This is because most printers respond only after the document finishes printing. Therefore, the response timeout value needs to be long enough to allow the largest documents to finish printing. For more information, see "Handling unsuccessful data transmissions (basic and extended mode)" on page 165.

Performance: If you select one of the PJL options:

- Printer throughput can be slower in these situations:

- You print more than one copy of a document.
- You print multiple documents in one print job.

The effect on printer throughput can vary for different printers.

- Printer throughput is not affected when you print one document at a time. That is, it takes the same amount of time to print the same one document. However, IP PrintWay writes its completion message (AOP3613I The print job was completed successfully) later:
  - If you select a PJL option, IP PrintWay writes this message when the printer indicates that it finished printing the document.
  - If you do not select a PJL option, IP PrintWay writes this message when the printer indicates that it received the document in its buffer.

Job name: The job name that IP PrintWay extended mode sends to the PJL printer has this format:

```
AOP dsname copy timestamp
```

AOP
    Indicates that IP PrintWay sent the file to the printer.

dsname
    The z/OS JES sysout data set name of the file. Usually this name includes system name, user ID, job name, job ID, data set ID, and the short data set name.

copy
    The number of the copy. For example, 1 means the first copy.

timestamp
    Date and time in the country locale. The time stamp is truncated if the full job name would exceed the 80 characters that are allowed in a PJL job name.

Sample job names are:

```
AOP SYS1.USER1.MYJOB.STC18767.D0000103.TEST 1  08/27/10 12:39:37 PM
```

```
AOP SYS1.USER2.MYJOB.JOB18869.D0000101.? 1  08/27/10 12:44:33 PM
```

Printing scenarios for tracking printed pages

These scenarios describe various situations and indicate how many pages print and the page count that IP PrintWay records in the SMF type 6 record. The number of pages that print and the SMF page count depend on where IP PrintWay extended mode tells the printer to restart printing.

IP PrintWay does not resend a print job to the printer

IP PrintWay sends a 200 page print job to the printer. The printer prints without error. If the printer runs out of paper or has a paper jam while it is printing, the printer operator fixes the problem before the IP PrintWay response timeout value expires. Table 34 on page 173 shows how many pages print and the page count in the SMF type 6 record (field SMF6PGE).

Table 34. Pages printed when no error occurs

When printing restarts	Total pages printed	Page count in SMF record
After last successful page	200	200
Beginning of print job	200	200

IP PrintWay resends a print job to the printer

IP PrintWay sends a 200 page print job to the printer. After printing 175 pages, the printer runs out of paper. The printer has 25 pages that are stored in its buffer and are not printed yet. The IP PrintWay response timeout value expires before the operator adds paper. IP PrintWay resends the print job to the

printer and tells the printer where to restart printing. shows how many pages print and the page count in the SMF type 6 record (field SMF6PGE).

Table 35. Pages printed when IP PrintWay retransmits a print job				
When printing restarts	**Pages printed before retry**	**Pages printed when printer is ready**	**Total pages printed**	**Page count in SMF record**
After last successful page	1-175	176-200 (in buffer) 176-200	225	200
Beginning of print job	1-175	176-200 (in buffer) 1-200	400	375

IP PrintWay resends a failed print job to the printer

IP PrintWay sends a 200 page print job to the printer. After printing 175 pages, the printer runs out of paper. The printer has 25 pages that are stored in its buffer and are not printed yet. IP PrintWay finishes all retransmissions before the printer becomes ready. IP PrintWay retains the print job on the spool. When the operator releases the print job, IP PrintWay resends the print job and tells the printer where to restart printing. shows how many pages print and the page count in the SMF type 6 record (field SMF6PGE).

Table 36. Pages printed when IP PrintWay prints a failed print job					
When printing restarts	**Pages printed before failure**	**Pages printed when printer is ready**	**Pages printed when operator releases job**	**Total pages printed**	**Page count in SMF record**
After last successful page	1-175	176-200 (in buffer)	176-200	225	• 175 in record for failed print • 200 in record for successful print (See Note.)
Beginning of print job	1-175	176-200 (in buffer)	1-200	400	375
Note: IP PrintWay writes two SMF records for each document. It writes one record when it retains the print job on the JES spool, and it writes another record when it prints the print job again. The SMF6DCI field in each record indicates whether the document finished printing.					

Requirements for tracking printed pages

The requirements are:

- The printer must support the direct sockets printing protocol.
- The printer must support these PJL commands as described in HP documentation:
  - USTATUS DEVICE
  - USTATUS JOB
  - USTATUS PAGE

If the printer does not support these PJL commands, IP PrintWay extended mode writes a warning or error message to the common message log.

- Documents must not already contain a PJL JOB command. If a document contains a PJL JOB command, IP PrintWay extended mode writes an error message to the common message log (AOP3859E) and does not process the print job.

Tips:

1. To determine whether a printer supports PJL, contact the printer manufacturer. However, some printers that support PJL do not support PJL commands as described in HP documentation. To determine whether a printer supports PJL, select a PJL option in the printer definition and submit a print job. Look in the Infoprint Server common message log for one of these messages:

   ```
   AOP3858E The printer requires intervention or does not support PJL.
   AOP3856E The printer does not support the PJL USTATUS JOB command.
   AOP3854W The printer does not support the PJL USTATUS PAGE command.
   AOP3855W The printer does not support the PJL USTATUS DEVICE command.
   AOP3857W The printer does not return information after each page prints.
   ```

   You can use Infoprint Central to look for these messages in the log for the Infoprint Server print job.

   See also "Limitations for tracking printed pages" on page 175 for a list of printers that do not support the PJL commands.

2. If you use an AFP to PCL or the AFP to PostScript transform, customize the transform to not add PJL commands. For information, see the documentation for the transform.

3. For information about how to change the protocol of an existing printer definition to the direct sockets protocol, see "Changing the type of a printer definition or the IP PrintWay protocol type" on page 227.

Limitations for tracking printed pages

The limitations are:

- If the operator holds or moves a print job that is printing, when the operator releases the print job, IP PrintWay tells the printer to start printing from the beginning of the print job.

- If the operator stops IP PrintWay while some print jobs are printing, when you start IP PrintWay, IP PrintWay tells the printer to start printing from the beginning of the print jobs.

- If a network problem occurs while the printer is printing a print job, IP PrintWay might not be able to determine the number of pages that printed. Therefore, more duplicate pages might be printed.

- The PJL enhancements are not fully supported if IP PrintWay runs on multiple systems in a sysplex. This is because if an error occurs after some pages printed, and IP PrintWay retransmits the print job on another system in the sysplex, IP PrintWay cannot determine how many pages already printed. In this situation, IP PrintWay tells the printer to start printing from the beginning of the print job, and the page count in the SMF type 6 record includes only the pages that printed during the last retransmission.

- These older printers, and printers that use the same controller, support the PJL commands but do not return correct page information for each document. Therefore, the page count in the SMF type 6 record will be inaccurate, and some pages might not print if IP PrintWay resends data after an error. IP PrintWay does not write a warning or error message when a PJL option is selected for these printers.
  - InfoPrint 21
  - InfoPrint 70
  - InfoPrint 70 Plus
  - InfoPrint 2060ES
  - InfoPrint 2075ES
  - InfoPrint 2085
  - InfoPrint 2090ES
  - InfoPrint 2105
  - InfoPrint 2105ES

Procedure for specifying attributes for tracking printed pages

On the Direct Sockets Printing Protocol panel, specify these fields:

- **Record pages printed for accounting:** IP PrintWay extended mode records the number of printed pages in the SMF type 6 record.
- **Restart printing after last successful page:** IP PrintWay extended mode restarts printing after an error from the last page in the print job that printed successfully.

Example

This ISPF panel shows how to select both PJL options. The printer in this example supports the direct-sockets printing protocol. Only a portion of the ISPF panel is shown.

```
                          Direct Sockets Protocol
⋮


  Printer Job Language (PJL) options:
     / Record pages printed for accounting
     / Restart printing after last successful page
```

Converting between EBCDIC and ASCII (extended mode)

This information applies to IP PrintWay extended mode. If you run IP PrintWay basic mode, see "Converting between EBCDIC and ASCII (basic mode)" on page 193.

IP PrintWay extended mode can convert line and text data from EBCDIC to ASCII, or from ASCII to EBCDIC, before it transmits data sets to the printer. You specify in the printer definition whether you want IP PrintWay to convert data.

Tip: IP PrintWay does not convert data between EBCDIC and ASCII if Print Interface allocates the data set on the JES spool or if NetSpool converts the data stream to any format other than line data. In these cases, Print Interface or NetSpool already converted data to the printer code page.

IP PrintWay extended mode uses the **iconv** utility to convert data between EBCDIC and ASCII. The **iconv** utility converts data from one code page to another, from the code page that is used to create the document to the code page used by the printer. For more information about the **iconv** utility, see *z/OS XL C/C++ Programming Guide*. Print Interface and NetSpool also use **iconv** to convert data from EBCDIC to ASCII.

Procedure for specifying attributes

To use the **iconv** utility to convert data from the document code page to the printer code page:

- On the Processing panel of the printer definition, specify these fields:

  - **Document code page**: Leave this field blank or specify the name of a code page that is supported by IBM. If you leave this field blank, the default code page is the EBCDIC code page specified in the **ebcdic-codepage** attribute in the system configuration definition. If no code page is specified, IP PrintWay extended mode uses code page IBM-1047.

  - **Printer code page**: Specify the name of either an ASCII code page (such as ISO8859-1) or an EBCDIC code page (such as IBM-1047) that is supported by IBM. For code page names, see *z/OS XL C/C++ Programming Guide*.

    If you leave this field blank, IP PrintWay uses a default code page that is appropriate for the protocol:

    - Email protocol: IBM-1047 (an EBCDIC code page)
    - LPR, direct sockets, or IPP protocol: IBM-850 (an ASCII code page)

If you use the ISPF panels to create an IP PrintWay printer definition, the default ASCII or EBCDIC code page that is specified in the system configuration definition is initially displayed in the printer definition:

- Email protocol: Default EBCDIC code page
- LPR, direct sockets, or IPP protocol: Default ASCII code page

Guidelines:

1. For most printing situations, you do not need to modify the code pages in the printer definition. The initial values in the printer definition are generally suitable. However, when you create a printer definition for the email protocol, if the code page that is initially displayed in the **Printer code page** field is not IBM-1047, you must specify a suitable ASCII code page instead. For more information, see "Creating a new email printer definition" on page 151.

2. If you plan to use this printer definition with both Print Interface and with IP PrintWay, leave the **Document code page** field blank and specify a code page in the **Printer code page** field. For information about how Print Interface uses these fields, see "Converting data from EBCDIC to ASCII or ASCII to EBCDIC" on page 94.

3. You can specify any code pages that are supported by IBM. For valid code page names, see *z/OS XL C/C++ Programming Guide*.

4. If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:

   • The code pages in the **Document code page** and **Printer code page** field.

   • The code page for the z/OS locale and the custom code page.

   For information about how to create conversion tables, see information about code set conversion utilities in *z/OS XL C/C++ Programming Guide*.

Converting line data to a text data stream (basic and extended mode)

IP PrintWay automatically converts line data into text data except in these situations:

• Print Interface already formatted line data into text data.

• You specify a filter in the **Filter** field for the **Line data** format.

• You select the **Remote PSF** option in the **Mode** field.

• IP PrintWay basic mode: You select the **None** option in the **Formatting** field.

• IP PrintWay extended mode: IP PrintWay detects that the data set does not contain line data.

You can specify these fields in the printer definition to control how IP PrintWay converts line data into text data:

• **Carriage control type**: An indication of whether to use the carriage-control characters that are present in the data set to format data. By default, IP PrintWay automatically determines whether a data set contains carriage controls and uses carriage controls if they are present.

  Tip: For most printing applications, do not select any value in this field. The IP PrintWay default is suitable for most applications, regardless of whether carriage controls are present or not.

• **Delete form feed**: An indication of whether to delete form-feed controls from the beginning and end of data sets. By default, IP PrintWay does not delete any form-feed controls.

  Tip: You might need to delete form-feed controls if your applications insert form-feed controls that result in blank pages that are being printed at the beginning or end of data sets.

• **Form feed**: The form-feed controls, which are specified in EBCDIC, that the printer or print server requires. IP PrintWay extended mode converts the form-feed controls to ASCII and adds them to text data to indicate the start of a new page. The default form-feed controls are: X'0D0C' (carriage-return and form-feed). IP PrintWay basic mode ignores this field.

- **Line termination**: The line-termination controls, which are specified in EBCDIC, that the printer or print server requires. IP PrintWay converts the line-termination controls to ASCII and adds them to text data to indicate the end of a line. The default line-termination controls are:
    - IP PrintWay basic mode: LPR, direct sockets, IPP, and email protocols: X'25' (line-feed)
    - IP PrintWay extended mode:
        - LPR (with an ASCII printer code page), direct sockets, IPP, and email protocols: X'0D15' (carriage-return and new-line)
        - LPR protocol (with an EBCDIC printer code page): X'0D25' (carriage-return and line-feed)

    Tips:
    1. IP PrintWay extended mode: If the **Printer code page** field contains ISO8859-1, leave the **Line termination** field blank. If you need to specify 25 or 0D25, specify a printer code page that translates EBCDIC X'25' to ASCII X'0A', such as code page IBM-850.
    2. IP PrintWay basic mode: Consider specifying 0D25 in the **Line termination** field. This value is more suitable for many ASCII printers than the IP PrintWay default line-termination control of X'25'.

- **Omit line termination at EOF**: An indication of whether to omit the line-termination controls that IP PrintWay adds at the end of each document that contains ANSI carriage controls. IP PrintWay does not add any line-termination controls at the end of documents for the IPP and email protocols, so this field does not apply to these protocols.

    Tips:
    1. Some printers require line-termination controls at the end of documents so that data for the next document starts printing at the beginning of the line.
    2. Line-termination controls that are added at the end of documents can cause a printing problem when an application adds transparent data to the end of a document.

- **Transparent data char**: The transparent-data control that is used in the input data. IP PrintWay transmits data after the transparent-data control without converting it from EBCDIC to ASCII. However, IP PrintWay does not transmit the transparent data control and the 1-byte length field after the control. The default transparent data control is X'35'.

IP PrintWay uses the ANSI or machine carriage controls in the input data stream to format data. IP PrintWay supports the print no space, space 1 line, space 2 lines, and space 3 lines carriage controls. If FCB processing is enabled, IP PrintWay also supports skip-to-channel carriage controls. For more information about how to enable FCB processing in the printer definition, see "Using an FCB to format data (basic and extended mode)" on page 179.

For data sets without carriage controls, you can specify these fields in the printer definition to control how IP PrintWay formats data into pages:

- **Pagination**: An indication of whether IP PrintWay formats line data without carriage controls into pages. By default, pagination is selected.
- **Margins: Top** and **Margins: Bottom**: Number of blank lines to leave in the top and bottom margins. The default is no margins.
- **Page height**: Number of lines to print on a page. The default is 58 lines.
- **Print page header**: An indication of whether to insert a header at the top of each page. The three-line header contains the fully qualified data set name and a page number, followed by two blank lines.

Procedure for specifying attributes

To format data, specify these attributes in the printer definition.

- On the Processing panel, specify these fields:
    - **Pagination**
    - **Margins: Top** and **Margins: Bottom**

- **Page height**
- **Print page header**
- On the IP PrintWay Options panel, specify these fields:
  - **Formatting** (basic mode)
  - **Line termination**
  - **Transparent data char**
  - **Form feed** (extended mode)
  - **Delete form feed**
  - **Omit line termination at EOF**

Example

These ISPF panels show how to specify formatting options for IP PrintWay. The fields that are shown on the Processing panel apply only for data sets that do not contain carriage-control characters. Only a portion of the panel is shown.

```
                              Processing
⋮
 IP PrintWay Line-to-Text Conversion:
    / Pagination
       Margins:  Top . . 5_____     Bottom . . 5_____
       Page height . . . 66_____
       / Print page header

⋮
```

```
                         IP PrintWay Options
⋮

 Formatting:
    Transparent data char . 35
    Form feed .  .  .  .  . 0D0C____   (extended mode)
    Delete form feed. . . . 1  1. None   2. Leading  3. Trailing  4. Both
    Carriage control type . _  1. None   2. Machine  3. ANSI
    _ Automatic dataset grouping (extended mode)
    Dataset grouping. . . . 2  1. None   2. Job  3. Concatenate job
    Line termination. . . . _____
    _ Omit line termination at EOF

 Basic Mode Formatting:
    Formatting. . . . . . . 2  1. None          2. Standard
                               3. Translate only  4. Use FCB
⋮
```

Using an FCB to format data (basic and extended mode)

IP PrintWay can use a forms control buffer (FCB) to format line data when IP PrintWay creates a text data stream:

- IP PrintWay extended mode uses an FCB if an FCB is specified.
- IP PrintWay basic mode uses an FCB if an FCB is specified and you select the **Use FCB** option in the printer definition.

An FCB can be specified in several locations. If an FCB is specified in more than one location, IP PrintWay uses this hierarchy for selecting the FCB:

1. The FCB specified in the FCB parameter of the OUTPUT JCL statement or in the **forms-control-buffer** job attribute.

2. The FCB specified in the **Forms control buffer** field of the printer definition (on the Allocation panel).

   IP PrintWay uses the FCB specified in the printer definition when one of these conditions is met:

- IP PrintWay extended mode processes the data set.
- NetSpool allocates the data set on the JES spool.

3. The FCB defined to JES as the default FCB (IP PrintWay basic mode only).

The specified FCB must be in the SYS1.IMAGELIB library. When IP PrintWay searches for the FCB in SYS1.IMAGELIB, it prefixes the FCB name with FCB4 to create the member name. If this member is not found in SYS1.IMAGELIB, PrintWay uses prefix FCB2, and if it is not found, PrintWay uses prefix FCB3. If no members are found, IP PrintWay writes a message that states that the member does not exist in SYS1.IMAGELIB, and it retains the data set if retention is requested for failed data sets.

If the input data stream contains carriage controls, IP PrintWay accepts skip-to-channel carriage controls in the input data, in addition to carriage controls for print no space, space 1 line, space 2 lines, and space 3 lines. If the input data does not contain carriage controls, IP PrintWay reports an error.

Table 37 on page 180 summarizes the FCB functions that IP PrintWay supports in a text output data stream. IP PrintWay can create a text data stream when you select the LPR, direct sockets, IPP, or email protocol.

Table 37. FCB functions supported by IP PrintWay	
FCB function	**Text output data stream**
Number of lines per page	Yes
Number of lines per inch	No
Channel codes	Yes
Left margin (indexing)	No
Skip a line	Yes

Tip: IP PrintWay does not format data sets that Print Interface allocates on the JES spool.

JES3 notes for IP PrintWay basic mode:

1. JES3 passes the FCB parameter that is specified on an OUTPUT JCL statement to IP PrintWay basic mode only if FCB is specified as a JES3 work-selection criterion for the PrintWay basic mode FSA.

2. JES3 provides a default FCB to IP PrintWay basic mode unless you specify the PDEFAULT=FCB parameter in the JES initialization statement for the IP PrintWay basic mode FSA.

3. For information about how to configure JES3 initialization statements for IP PrintWay basic mode, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

To format data sets by using an FCB, specify these fields in the printer definition:

- (Basic mode) On the IP PrintWay Options panel, specify this field:

  – **Formatting**: Select **Use FCB**.

  When you select **Use FCB** in the **Formatting** field, IP PrintWay basic mode uses the FCB only if an FCB is specified for the data set. If no FCB is specified, IP PrintWay does standard formatting. Therefore, you can select **Use FCB** even if some data sets do not use an FCB. However, in a JES3 environment you might want to configure the IP PrintWay basic mode FSA so that JES3 does not pass a default FCB name to IP PrintWay.

  IP PrintWay extended mode ignores this field. It always uses the FCB if one is specified for a data set.

- (Optional) On the Allocation panel, specify the name of a default FCB in the **FCB** field.

Example

This ISPF panel shows how to request that IP PrintWay basic mode use the FCB, if one is specified, to format the data. Only a portion of the ISPF panel is shown.

```
                              IP PrintWay Options
⋮
Basic Mode Formatting:
⋮
        Formatting. . . . . . 4  1. None          2. Standard
                                 3. Translate only 4. Use FCB
⋮
```

Transmitting multiple data sets in a JES output group (basic and extended mode)

You can use IP PrintWay to control how it transmits data sets that are in the same JES output group to a printer or to an email destination. You can request that IP PrintWay transmit each data set individually in a separate transmission or email, or together in one transmission or email. Transmitting data sets in the same transmission makes sure that data sets from other print requests do not print between the data sets in the JES output group.

A JES output group consists of output data sets created in the same batch job that has the same OUTPUT JCL parameters, such as the same CLASS, DEST, FORMS, and TITLE parameters. For more information about how JES places output data sets into output groups, see *z/OS JES2 Initialization and Tuning Guide* or *z/OS JES3 Initialization and Tuning Guide*.

You can specify these fields and options in the printer definition to control the transmission of data sets in the same JES output group:

Automatic dataset grouping (extended mode) field
Select this field if you want IP PrintWay extended mode to transmit all the data sets to a printer in the same transmission or send all the data sets in the same email (each data set is a separate attachment). This method is an efficient way of transmitting data sets that makes sure the data sets print together. Most printers start printing each data set on a new sheet of paper.

If more than one copy is requested, data sets print in the order IP PrintWay receives them from JES. For example, if you request 2 copies of data set A and 3 copies of data set B, data sets print in this order: data set A, data set A, data set B, data set B, data set B.

Tips:

1. Some older printers do not support this type of transmission. These printers might not start each data set on a new sheet of paper, or they might print an extra blank page between data sets. If this case, you can specify a printer command to start a new sheet in the **Document Header** field or clear this option and select the **Job** option or the **Concatenate job** option in the **Dataset grouping** field instead.

2. IP PrintWay basic mode ignores this field and instead uses the option that is selected in the **Dataset grouping** field.

3. If you select this field, IP PrintWay extended mode ignores the option that is selected in the **Dataset grouping** field.

Concatenate job option – Dataset grouping field
Select this option if you want IP PrintWay to combine all the data sets into a single transmission that is called a *concatenation* and transmit them to a printer in the same transmission or send all the data sets in the same email (each data set is a separate attachment). This method is an efficient way of transmitting data that makes sure the data sets print together. IP PrintWay inserts form feeds between data sets so that, in most cases, each data set starts printing on a new page.

If more than one copy is requested, the data sets print in the order in which IP PrintWay concatenated them. However, the number of copies that are requested for the first data set applies to all data sets.

For example, if you print 2 copies of data set A and 3 copies of data set B, 2 copies of each data set print in this order: data set A, data set B, data set A, data set B.

Tips:

1. Some printers might start printing data sets on the back side of a sheet in duplex mode. In this case, you can (1) select the **Automatic dataset grouping (extended mode)** field, (2) select the **Job** option, or (3) specify a printer command to start a new sheet in the **Document header** field.

2. IP PrintWay basic mode: If you select the **Resubmit for filtering** field, data sets might start printing on the same page as the previous data set in the concatenation. Also, when you select the **Resubmit for filtering** field, all the data sets in the output group must have the same type of carriage controls and the same data format.

3. If you print copies, do not select this option because the correct number of copies might not print. The number of copies that are requested for the first data set in the concatenation applies to all data sets in the concatenation. The number of copies that are requested for the second and subsequent data sets is ignored.

Job option – Dataset grouping field

Select this option if you want IP PrintWay to transmit the data sets to a printer as individual data sets at the same time or send the data sets in separate emails. This method makes it likely that data sets in the same JES output group print together. However, data sets from other print requests might print between the data sets. Each data set starts printing on the front side of a sheet of paper.

If you print to a print server, each data set arrives and is stored as a separate file at the print server. Therefore, the data sets can be individually managed on the remote print spool.

If more than one copy is requested, the data sets print in the order that IP PrintWay receives them from JES. For example, when you print 2 copies of data set A and 3 copies of data set B, data sets print in this order: data set A, data set A, data set B, data set B, data set B.

None option – Dataset grouping field

Select this option if you want IP PrintWay basic mode to transmit the data sets to a printer as individual data sets as soon as each data set is ready to print, or send each data set in a separate email.

If more than one copy is requested, the data sets print in the order that IP PrintWay receives them from JES. For example, when you print 2 copies of data set A and 3 copies of data set B, data sets print in this order: data set A, data set A, data set B, data set B, data set B.

Tip: This option does not apply to IP PrintWay extended mode. If you select it, IP PrintWay extended mode uses the **Job** option instead.

Limitations:

1. If Print Interface or NetSpool allocates a data set on the JES spool, JES places each data set in a separate output group even when the job submitter submits multiple data sets with the same **lp** command or in the same job step by using the Print Interface subsystem. Therefore, IP PrintWay cannot group data sets. The **Automatic dataset grouping** and **Dataset grouping** fields do not apply.

2. When it uses the IPP protocol, IP PrintWay supports only the **Job** and **None** options in the **Dataset grouping** field. The **Automatic dataset grouping** field does not apply.

Procedure for specifying attributes

To specify how IP PrintWay transmits data sets in the same JES output group, specify one of these fields on the IP PrintWay Options panel:

- **Automatic dataset grouping (extended mode)**
- **Dataset grouping:** Select **None**, **Job**, or **Concatenate job**. The default is **Job**.

Example

This ISPF panel shows how to request that IP PrintWay transmit all the data sets in the same JES output group to the printer in the same transmission or send the data sets in the same email:

- IP PrintWay extended mode uses the **Automatic dataset grouping** field.
- IP PrintWay basic mode uses the **Dataset grouping** field.

Only a portion of the ISPF panel is shown.

```
                          IP PrintWay Options
  :
  / Automatic dataset grouping (extended mode)
  Dataset grouping. . . . 3  1. None  2. Job  3. Concatenate job :
```

Sending commands to the printer (basic and extended mode)

In the printer definition, you can specify printer commands that IP PrintWay sends to the printer. Printer commands are sometimes called *printer setup strings*. You can specify printer commands in these fields:

- **Document header**: IP PrintWay sends the printer commands that are specified in this field to the printer at the beginning of each document. For example, you might specify PCL commands to select a font or request landscape printing.
- **Document trailer**: IP PrintWay sends the printer commands that are specified in this field to the printer at the end of each document. For example, you might specify a PCL command to reset the printer to its default state.

IP PrintWay sends the document header to the printer after it sends any separator page that the Begin Data Set exit adds, and it sends the document trailer before it sends any separator page that the End Data Set exit adds. The order is:

1. Separator page (Begin Data Set exit)
2. Document header
3. Document
4. Document trailer
5. Separator page (End Data Set exit)

For example, if you specify commands for landscape printing in the **Document header** field, the separator page that the Begin Data Set exit adds does not print in the landscape orientation. To print the separator page in the landscape orientation, the Begin Data Set exit must add printer commands for landscape printing before the separator page data.

You can also specify a document header and document trailer in the IP PrintWay Begin Data Set exit (in the ANFUEXTP control block). The document header and document trailer that the exit specifies in the ANFUEXTP control block override the document header and trailer that is specified in the printer definition. You can use the Begin Data Set exit to specify a different document header and trailer for each document. For information about the Begin Data Set exit, see *z/OS Infoprint Server Customization*.

You can specify printer commands in either EBCDIC or ASCII representation, and you can request that IP PrintWay convert the printer commands to the printer's code page (either an EBCDIC or ASCII code page) before it transmits them to the printer. For example, if the printer accepts ASCII data, you can enter the printer commands in EBCDIC in the printer definition and request that IP PrintWay convert them to ASCII before transmission. For information about how IP PrintWay converts data between EBCDIC and ASCII, see "Converting between EBCDIC and ASCII (extended mode)" on page 176.

When you enter data in EBCDIC in the printer definition, you can use the special values in Table 38 on page 184, which IP PrintWay converts to the indicated EBCDIC hexadecimal values. If you use these special values, use EBCDIC representation for the rest of the printer commands as well.

Table 38. Special values for EBCDIC		
Value	**Hex (EBCDIC)**	**Meaning**
<FF>	0C	Form feed
<CR>	0D	Carriage return
<LF>	25	Line feed
<ESC>	27	Escape
<SP>	40	Space

Tip: To print the euro on a euro-capable printer, you might need to load the 9N symbol set into the printer. You can select the 9N symbol set on the printer panel, or you can specify this PCL command in the **Document header** field to load the 9N symbol set: <ESC>(9N

Specifying printer commands to print on a new sheet of paper

In these cases, you might need to specify printer commands to print data sets on new sheets of paper:

- When you print multiple copies, some printers print the next copy on the back side of the sheet of paper, or even on the same side as the previous copy.

  To determine whether your printer prints each copy on a new sheet of paper, print multiple copies of a data set that is less than one page in length.

- When you select the direct sockets protocol and print multiple data sets in the same output group, sometimes the second and subsequent data sets in the output group print on the back side of the sheet of paper, or even on the same side as the previous data set. This printing can occur when you select the **Concatenate job** option in the **Dataset grouping** field.

To force printing on a new sheet of paper, specify one of these printer commands, depending on the type of data that is typically printed on the printer. For most printers, specify the command in the **Document trailer** field. However, for other printers, you might need to specify the printer command in the **Document header** field or in both fields:

- For PostScript data streams, specify the PJL Universal Exit Language (UEL) command:

  ```
  <ESC>%-12345X
  ```

- For non-PostScript data streams, specify the PCL Select Front command:

  ```
  <ESC>&a1G
  ```

Note: Some printers that accept PCL commands might not accept the **PJL UEL** command.

Specifying printer commands for landscape printing

To print documents in the landscape orientation on a printer that can print PCL data, specify these printer commands in the **Document header** field:

```
<ESC>E<ESC>&l2A<ESC>&l1O<ESC>&l8D<ESC>&l1E<ESC>&l66F<ESC>(s12H
```

<ESC>E
> Reset the printer.

<ESC>&l2A
> Set paper size to letter (the "l" is a lowercase L).

<ESC>&l1O
> Set orientation to landscape (the "O" is a capital letter O).

<ESC>&l8D
> Set lines per inch to 8.

<ESC>&l1E
> Set top margin to 1 line.

<ESC>&l66F
> Set number of print lines to 66.

<ESC>(s12H
> Set font pitch to 12 characters per inch.

Procedure for specifying attributes to send commands to the printer

On the IP PrintWay Options panel, specify these fields:

- **Document header**: Specify printer commands to be sent to the printer at the beginning of each data set and each copy of a data set.
- **Translate document header**: Select this field if the value needs to be converted to the code page the printer accepts. For example, select this field if the **Document header** field is in EBCDIC representation and the printer accepts ASCII data.
- **Document trailer**: Specify printer commands to be sent to the printer at the end of each data set and each copy of a data set.
- **Translate document trailer**: Select this field if the value needs to be converted to the code page the printer accepts. For example, select this field if the **Document trailer** field is in EBCDIC representation and the printer accepts ASCII data.

Tip: If you need to specify the same printer commands in more than one printer definition, specify them in an IP PrintWay Options component. Then, include that component in each printer definition to which the values apply.

Example

This ISPF panel shows how to specify PCL commands in a document header and trailer for a PCL printer. Only a portion of the ISPF panel is shown.

```
                              IP PrintWay Options
⋮

 Document header  . . <ESC>E<ESC>&l2A<ESC>&l1O<ESC>&l8D<ESC>&l1E<ESC (extend)
     / Translate document header
 Document trailer . . <ESC>E_____ (extend)
     / Translate document trailer

⋮
```

Tip: Place your cursor on **extend** and press **Enter** to enter the entire document header value.

```
                       Extended Field
 Command ==>

Document header
<ESC>E<ESC>&l2A<ESC>&l1O<ESC>&l8D<ESC>&l1E<ESC>&l66F<ESC>(s12H

_____
_____
_____
_____
```

Result: IP PrintWay sends the instructions in the **Document header** field to the printer. The PCL commands in the **Document header** field mean:

<ESC>E
> Reset the printer.

<ESC>&l2A
> Set paper size to letter (the "l" is a lowercase L).

<ESC>&l1O
> Set orientation to landscape (the "O" is a capital letter O).

<ESC>&l8D
> Set lines per inch to 8.

<ESC>&l1E
> Set top margin to 1 line.

<ESC>&l66F
> Set number of print lines to 66.

<ESC>(s12H
> Set font pitch to 12 characters per inch.

The <ESC>E in the **Document trailer** field resets the printer.

The **Translate document header** and **Translate document trailer** fields are selected so that IP PrintWay translates the data from EBCDIC to ASCII before transmission to the printer.

Validating that data sets can print as requested (basic and extended mode)

Before it transmits a data set to the printer, IP PrintWay uses information you provide in the printer definition to validate that the data set can print as requested on the printer. For example, IP PrintWay can validate that the data set does not exceed a size limit. You might want to specify limits because the printer itself has certain limitations, such as a small buffer that cannot receive large data sets, or you might want to specify limits for other reasons, such as you want to prevent job submitters from printing large data sets on slow printers.

Table 39 on page 186 lists the fields in a printer definition that IP PrintWay uses to validate that a data set can print on the printer. The third column in the table indicates the JCL parameter that the job submitter specifies to request the print function, and the fourth column indicates that the action IP PrintWay takes if the validation fails.

Table 39. Printer definition fields used for validation in IP PrintWay

Field name	Meaning	JCL parameter	IP PrintWay action if validation fails
Data format[1]	Input data formats the printer supports. For more information, see "Data formats" on page 86.	None. IP PrintWay determines the data format.	IP PrintWay does not transmit the data set to the printer.[4]
Duplexes supported	Duplexing supported by the printer (simplex, duplex, and tumble)	DUPLEX	IP PrintWay does not transmit the data set to the printer.[4]

Table 39. Printer definition fields used for validation in IP PrintWay (continued)

Field name	Meaning	JCL parameter	IP PrintWay action if validation fails
Maximum document size	Maximum size (in bytes) allowed for all data sets (documents) in the output group (print job). If you run IP PrintWay basic mode, this number includes the size of all copies.[3]	None. IP PrintWay determines the document size.	If the output group contains only one data set, or if IP PrintWay is transmitting the data sets in a concatenation, IP PrintWay does not transmit any documents in the output group to the printer. Otherwise, IP PrintWay sends documents to the printer until the maximum size is reached and then does not transmit any more data sets in the output group.[4] When you use the resubmit for filtering option in IP PrintWay basic mode, if the output from a transform exceeds the maximum document size, Print Interface writes an error message and does not write the output from the transform to the JES spool. IP PrintWay considers that the document completed successfully.
Maximum copies [2]	Maximum number of copies allowed. [3]	COPIES	IP PrintWay transmits the number of copies allowed.

1. IP PrintWay basic mode does not validate the data format.

2. IP PrintWay ignores the **Maximum copies** field if the protocol does not support copies. For example, the email protocol does not support copies.

3. The number of copies that are specified in the form definition is not included when the number of copies or the size of a data set is calculated.

4. IP PrintWay retains the failed data sets on the JES spool if a retention period for failed transmissions is specified.

Print Interface and NetSpool also use these fields to validate that print requests can print as requested. If Print Interface or NetSpool determine that a data set cannot print, no output data set is allocated on the JES spool.

Procedure for specifying attributes

(Optional) On the Processing panel, specify these fields:

- **Data format:** (extended mode) Specify all the input data formats that the printer supports. Select all fields if you do not want IP PrintWay to validate the input data format.

- **Duplexes supported:** Select all the types of duplexing the printer supports. Select all options if you do not want IP PrintWay to validate duplexing.

- **Maximum document size**: Specify the maximum number of bytes in a print job to send to the printer. Allowed values are 1–2147483646. Leave this field blank if you do not want IP PrintWay to limit the size.

- **Maximum copies**: Specify the maximum number of copies of the same data set that can be printed. Allowed values are 1–32640. Leave this field blank if you do not want IP PrintWay to limit the number of copies.

Example

This ISPF panel shows how to specify the data formats the printer accepts, and also limit the document size and number of copies. Only a portion of the ISPF panel is shown.

```
                              Processing
    ⋮
Data format:  Filter:

/ Line data   _____ (extend)
_ MO:DCA-P    _____ (extend)
/ PostScript  _____ (extend)
/ Text        aopfiltr.so_____ (extend)
/ PCL         _____ (extend)
_ PDF         _____ (extend)
_ SAP         _____ (extend)
_ XML         _____ (extend)
_ TIFF        _____ (extend)
_ JPEG        _____ (extend)
_ Other       _____ (extend)

    ⋮
Maximum document size . 1000000___
Maximum copies. . . . . 100___
    ⋮
Duplex supported. . . . / Simplex  _  Duplex   _ Tumble

    ⋮
```

Printing with a remote PSF print server (basic and extended mode)

IP PrintWay can use the LPR protocol to send data sets to a remote system that runs PSF. When it processes a file for a remote system that runs PSF, IP PrintWay does not convert the input data from EBCDIC to ASCII and does not format it. However, IP PrintWay does add a record length field to each record.

In addition, IP PrintWay sends AFP options, such as the name of the form definition in the LPD control file. IP PrintWay prefixes each option with **-o**. For a list of the **-o** option, see Appendix C, "Remote PSF options," on page 509.

To create **-o** options, IP PrintWay uses values specified in DD and OUTPUT JCL statements or in Infoprint Server job attributes. For example, if the job submitter specifies the FORMDEF parameter on the OUTPUT JCL statement, IP PrintWay creates the **-of** option in the LPD control file. For some JCL parameters, such as the CLASS and FORMS parameters, keep in mind that JES sets default values.

You can specify one more **-o** option in the **User options** field, which IP PrintWay adds to the LPD control file. To specify more than one option, you must use the Printer Inventory Definition Utility (PIDU) and specify the **server-user-options** attribute. For more information, see "server-user-options" on page 464.

Tip: The **-o** options that IP PrintWay creates by using values that are specified in the DD and OUTPUT JCL parameters override the same **-o** options that are specified in the **User options** field (or **server-user-options** attribute).

Procedure for specifying attributes

1. On the Protocol panel, specify these fields:

   - **Mode**: Select the **Remote PSF** option.
   - **IP address**: Specify the host name or IP address of the system where PSF is running. You can specify the IP address in dotted decimal or colon-hexadecimal format.

- **Print queue name**: Specify the name of the remote print queue.
- **User options**: (Optional) Specify one more option for the remote PSF print server. This field is case-sensitive. For example, you can specify:

  ```
  -ooverlay=O1MYLOGO
  ```

2. (Optional) On the Allocation panel, you can specify these fields. IP PrintWay transmits these values to the remote PSF print server if no other value is specified during job submission. If you run IP PrintWay basic mode, the values on the Allocation panel apply only to documents that Print Interface or NetSpool processes.

- **Spool allocation values**:

  - **CLASS**
  - **DEST**
  - **FORMS**
  - **FCB**
  - **PRMODE**
  - **UCS**

- **Resource related values**:

  - **Form definition**
  - **Character sets**
  - **Input tray**
  - **Output bin**
  - **Page definition**
  - **Image shift**

- **Error reporting values: Print error reporting**

- **Other values**:

  - **Copies**
  - **Duplex**
  - **Table reference characters**

Tip: When you select the **Remote PSF** option, IP PrintWay basic mode ignores the **Formatting** field in the IP PrintWay section. IP PrintWay basic mode processes data sets as if you selected the **None** formatting option.

Creating an IP PrintWay default printer definition (basic and extended mode)

If a job submitter specifies the printer IP address on an OUTPUT JCL statement (in the DEST=IP: parameter), but does not specify a printer definition name in the FSSDATA parameter, IP PrintWay can use values that are specified in its default printer definition. The name of the IP PrintWay default printer definition is DFLTNTRY.

In the IP PrintWay default printer definition, you can specify default values that IP PrintWay uses if any of these OUTPUT JCL parameters are not specified on the OUTPUT JCL statement:

- RETAINF and RETAINS
- RETRYL and RETRYT
- PRTOPTNS

Infoprint Server creates a default printer definition if one does not exist. If you want to use different default values, you can edit the default printer definition.

The default printer definition that Infoprint Server creates specifies these default values:

JCL Parameter
>   **Default**

RETAINS
>   0; IP PrintWay does not retain data sets on the JES spool after transmission is successful.

RETAINF
>   0; IP PrintWay does not retain data sets on the JES spool after transmission fails.

RETRYL
>   0; IP PrintWay does not try unsuccessful transmissions again.

RETRYT
>   0; IP PrintWay does not wait between each retransmission.

PRTOPTNS
>   IP PrintWay uses default values for all printer definition fields. For information about default values, see the ISPF field help.

Procedure for specifying attributes

In the IP PrintWay default printer definition, you can specify any attributes that apply to IP PrintWay. These attributes have special considerations:

1. On the main ISPF panel for the printer definition, specify these fields:

   - **Printer definition name**: The name must be DFLTNTRY (uppercase).
   - **Use DEST, CLASS, and FORMS for IP PrintWay printer selection**: Do not select this field.

2. On the Processing panel:

   - Do not select the **Resubmit for filtering** field. If you select this field, IP PrintWay basic mode ignores the IP address that the job submitter specifies in the DEST=IP: parameter of the OUTPUT JCL statement and transmits the data set to the IP address specified in the printer definition. The **Resubmit for filtering** field does not apply to IP PrintWay extended mode.

3. On the Protocol panel:

   - **Printer IP address**, **Print queue name**, **Port number**: Leave these fields blank because IP PrintWay always uses the IP address and print-queue name or port number specified on the OUTPUT JCL statement. IP PrintWay uses either the LPR or direct sockets protocol, depending on which JCL parameters are specified on the OUTPUT JCL statement. IP PrintWay uses the LPR protocol if the PRTQUEUE parameter is specified, and uses the direct sockets protocol if the PORTNO parameter is specified.

Creating components for the PRTOPTNS JCL parameter (basic and extended mode)

In the PRTOPTNS parameter of the OUTPUT JCL statement, a job submitter can specify the name of a set of components that contain IP PrintWay printing options. IP PrintWay uses the printing options in these components instead of the options that are specified in the printer definition that IP PrintWay uses to print the data set.

You need to create components for use with the PRTOPTNS JCL parameter only if job submitters want to print with different printing options from those specified in the printer definition. One situation where users might want to specify different printing options is when you did not create a printer definition for the printer and IP PrintWay uses options in the default printer definition. (IP PrintWay uses options in the default printer definition when the job submitter specifies the DEST=IP: JCL parameter and omits the FSSDATA=printer JCL parameter.)

You can specify IP PrintWay options in three types of components:

- Processing

- IP PrintWay Options
- Protocol

When the job submitter names a set of components in the PRTOPTNS JCL parameter, IP PrintWay uses only a subset of all the options that might be specified in the named components. IP PrintWay ignores the other options in the components. "Procedure for specifying attributes" on page 191 identifies the fields that contain the options that IP PrintWay uses from the components.

Procedure for specifying attributes

Rules:

1. Use the same name for the Processing, IP PrintWay Options, and Protocol components.
2. Because a job submitter can use the PRTOPTNS parameter to specify a maximum of 16 characters, limit the component name to 16 characters.
3. Create at least one Processing, IP PrintWay Options, or Protocol component. If a component does not exist, IP PrintWay uses default values for the printing options in the missing component.

To create a set of components for the PRTOPTNS parameter:

1. In the Processing component, specify any of these fields (leave a field blank if you want IP PrintWay to use the default value):
   - **Double-byte translation table**
   - **Margins: Top** and **Margins: Bottom**
   - **Maximum document size**
   - **Page height**
   - **Pagination**
   - **Print page header**
   - **SOSI mode**
   - **Translation data set qualifier**
2. In the IP PrintWay Options component, specify any of these fields (leave a field blank if you want IP PrintWay to use the default value):
   - **Automatic dataset grouping**
   - **Carriage control type**
   - **Dataset grouping**
   - **Delete form feed**
   - **Exits: Begin data set**
   - **Exits: End data set**
   - **Exits: Record**
   - **Formatting**
   - **Line termination**
   - **Omit line termination at EOF**
   - **PostScript header**
   - **Transparent data char**
3. In the Protocol component, specify any of these fields (leave a field blank if you want IP PrintWay to use the default value):
   - **Banner class**
   - **Filename**
   - **Indent**

- **Mode**
- **Owner**
- **Print banner page**
- **Print function**
- **Record pages printed for accounting**
- **Restart printing after last successful page**
- **Restrict ports**
- **Title**
- **User Options**
- **Width**

Tip: If you specify a value for any field that is not in this list, IP PrintWay ignores the value and uses the value in the printer definition instead.

Example

Assume that you created a Processing component, an IP PrintWay Options component, and a Protocol component named `PWoptions`. To use IP PrintWay options in these components, the job submitter can specify the PRTOPTNS parameter in an OUTPUT JCL statement, as shown:

```
//OUT1 OUTPUT PRTOPTNS='PWoptions' ...
```

The component name is case-sensitive. Therefore, if the name contains special characters or lowercase characters, the job submitter must enclose the name in quotation marks.

Using an installation-provided filter (basic and extended mode)

For each type of data format, you can specify the name of an associated filter. A *filter* is a program that can inspect and modify data. When you specify the name of a filter for a supported data format in a printer definition, the filter is called when the data format is detected. IP PrintWay can call the associated filter (a filter is called only once for each data set):

- IP PrintWay extended mode calls the filter before it transmits the data set to the printer.
- IP PrintWay basic mode uses the filter only if you also select the **Resubmit for filtering** field. IP PrintWay basic mode resubmits the data to Print Interface, which calls the associated filter program.

Your installation can write its own filter program, either a DLL filter or a UNIX filter. For information about how to write a filter, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

On the Processing panel, specify:

- **Data format** field: Select the data format of the input document that your filter applies to.
- **Filter** field: Specify the name of the filter followed by the options that you want to provide as command line arguments to the filter.
  - If the filter is a DLL filter, type the absolute path name unless the filter is in a directory that is named in the LIBPATH environment variable.
  - If the filter is a UNIX filter, type `spawn` before the filter name. Type the absolute path name of the filter unless the filter is in a directory that is named in the PATH environment variable.
- **Resubmit for filtering** field: Select this field if you run IP PrintWay basic mode. For more information about this field, see "Resubmitting documents to Print Interface for filtering (basic mode)" on page 195. Selecting this field can adversely impact system performance.

Example

This ISPF panel shows how to specify a UNIX filter that is written by your installation for line data. Only a portion of the ISPF panel is shown.

```
                              Processing
⋮
Data format:  Filter:

/ Line data   spawn /usr/mylib/my_unix_filter -a option operand   (extend)
_ MO:DCA-P    _____   (extend)
_ PostScript  _____   (extend)
_ Text        _____   (extend)
_ PCL         _____   (extend)
_ PDF         _____   (extend)
_ SAP         _____   (extend)
_ XML         _____   (extend)
_ TIFF        _____   (extend)
_ JPEG        _____   (extend)
_ Other       _____   (extend)

/ Resubmit for filtering

⋮
```

If the input data stream contains line data, IP PrintWay calls the **my_unix_filter** filter to transform line data. The option and operand that follow the filter name are passed to the filter.

Converting between EBCDIC and ASCII (basic mode)

This information applies to IP PrintWay basic mode. If you run IP PrintWay extended mode, see "Converting between EBCDIC and ASCII (extended mode)" on page 176.

IP PrintWay basic mode can convert line and text data from EBCDIC to ASCII or from ASCII to EBCDIC before it transmits a data set to the remote printer. You specify in the printer definition whether you want IP PrintWay basic mode to convert data and also the conversion method you want IP PrintWay basic mode to use.

Tip: IP PrintWay basic mode does not convert data between EBCDIC and ASCII if Print Interface allocated the data set on the JES spool or if NetSpool converted the data stream to any format other than line data. In these cases, Print Interface or NetSpool already converted data to the printer code page.

IP PrintWay basic mode can use one of these methods to convert data between EBCDIC and ASCII:

- **iconv** utility (default method)

  The **iconv** utility converts data from one code page to another, from the code page that is used to create the document to the code page used by the printer. For more information about the **iconv** utility, see *z/OS XL C/C++ Programming Guide*. Print Interface and NetSpool also use **iconv** to convert data from EBCDIC to ASCII. IBMsuggests that you use **iconv** because you can specify attributes in the printer definition that are suitable for both Print Interface and IP PrintWay. By default, IP PrintWay uses this method.

- TCP/IP translation tables

  For compatibility with previous releases, you can request that IP PrintWay use either the standard TCP/IP translation table that is supplied by IBM or a customized TCP/IP translate table that is created with the CONVXLAT program. For information about using translation tables and the CONVXLAT program, see *z/OS Communications Server: IP Configuration Reference*.

  Note: IBM suggests that you do not use TCP/IP translation tables because if you specify the attributes that are required for IP PrintWay to use the TCP/IP translation tables, you must create a separate printer definition if you want to use Print Interface to print on the same printer.

Procedure for specifying attributes

The procedure that you use depends on how you want IP PrintWay to convert data between EBCDIC and ASCII.

Using iconv to convert data between code pages

To use the **iconv** utility to convert data from the document code page to the printer code page:

- In the IP PrintWay FSS definition, specify the source code page in the **Document code page** field. If no code page is specified, the default is IBM-1047.
- In the IP PrintWay Options section of the printer definition, select `Standard`, `Use FCB`, or `Translate only` in the **Formatting** field. `Standard` is the default.
- On the Processing panel of the printer definition, specify these fields:
  - **Document code page**: Leave this field blank. IP PrintWay uses the document code page that you specified in the FSS definition.
  - **Printer code page**: Specify the name of either an ASCII code page (such as ISO8859-1) or an EBCDIC code page (such as IBM-1047) that is supported by IBM. For code page names, see *z/OS XL C/C++ Programming Guide*.

    If you leave this field blank, the default action depends on the protocol selected in the printer definition:

    - Email protocol: IP PrintWay does not convert data from one code page to another.
    - LPR, direct sockets, or IPP protocol: IP PrintWay uses IBM-850 as the printer code page.

    If you use the ISPF panels to create an IP PrintWay printer definition, the panel, by default, displays either the default ASCII or the default EBCDIC code page that is specified in the system configuration definition, depending on the protocol that is selected in the printer definition:

    - Email protocol: The EBCDIC code page is displayed.
    - LPR, direct sockets, or IPP protocol: The ASCII code page is displayed.
  - Leave the **Translation data set qualifier** field blank.
  - Leave the **Double-byte translate table** fields blank.

Using the standard TCP/IP translation table

To use the standard TCP/IP translation table to convert from EBCDIC to ASCII:

- In the IP PrintWay FSS definition, select the **Old-style translation** field. You do not need to select this field if you select a double-byte option in the **Double-byte translate table** field.
- On the IP PrintWay Options panel of the printer definition, in the **Formatting** field: Select **Standard**, **Use FCB**, or **Translate only**. **Standard** is the default.
- On the Processing panel, specify these fields:
  - **Document code page**: Leave this field blank.
  - **Printer code page**: Leave this field blank.

    Tip: When you leave this field blank, Print Interface does not translate data from one code page to another, for example from EBCDIC to ASCII. Therefore, your output might not print correctly. If you have a problem printing documents with Print Interface, create a second printer definition for this printer, and specify a printer code page or use the default ASCII code page that is displayed in this field when you use the ISPF panels to create an IP PrintWay printer definition.
  - **Translation data set qualifier**: Leave this field blank.
  - **Double-byte translate table**: To print DBCS data, select a double-byte option.

Using a customized or a DBCS TCP/IP translation table

To use a customized TCP/IP translation table or a DBCS TCP/IP translation table to convert data between EBCDIC and ASCII:

- On the IP PrintWay Options panel in the **Formatting** field: Select either **Standard**, **Use FCB**, or **Translate only** option. **Standard** is the default.
- On the Processing panel, specify these fields:
  - **Printer code page**: Leave this field blank.

    Tip: When you leave this field blank, Print Interface does not translate data from one code page to another, for example from EBCDIC to ASCII. Therefore, your output might not print correctly. If you have a problem printing documents with Print Interface, create a second printer definition for this printer, and specify a printer code page or use the default ASCII code page that is displayed in this field when you use the ISPF panels to create an IP PrintWay printer definition.

  - **Translation data set qualifier**: Specify the name of the table.
  - **Double-byte translate table**: To print DBCS data, select a double-byte option.

Search order for TCP/IP translation tables

IP PrintWay uses this search order to find a customized TCP/IP translation table:

1. *xlate_name.language_name*
2. *tcpip_hlq.xlate_name.language_name*
3. *tcpip_hlq*.STANDARD.*language_name*

xlate_name
> The name in the **Translation data set qualifier** field

tcp_hlq
> The TCP/IP high-level qualifier, TCPIP by default

language_name
> For single-byte data streams, *language_name* is TCPXLBIN. For double-byte data stream, *language_name* depends on the value that is selected in the **Double-byte translate table** field. For example, if you specify the SCHINESE option, *language_name* is TCPSCBIN.

IP PrintWay uses this search order to find a standard TCP/IP translation table:

1. *tcpip_hlq*.LPR.*language_name*
2. *tcpip_hlq*.STANDARD.*language_name*

tcp_hlq
> Specifies the TCP/IP high-level qualifier, TCPIP by default.

language_name
> For single-byte data streams, *language_name* is TCPXLBIN. For double-byte data stream, *language_name* depends on the value that is selected in the **Double-byte translate table** field. For example, if you specify the SCHINESE option, *language_name* is TCPSCBIN.

Resubmitting documents to Print Interface for filtering (basic mode)

With the IP PrintWay basic mode **resubmit for filtering** option, you can transform data in any output data set that IP PrintWay selects from the JES spool. For example, with this option you can use these AFP data transforms which IBM transform products provide:

- The AFP to PCL transform, which lets you print AFP and line-data documents to PCL printers
- The AFP to PostScript transform, which lets you print AFP and line-data documents to PostScript printers

- The AFP to PDF transform, which lets you create PDF output for viewing and printing from a workstation

IP PrintWay extended mode transforms data without resubmitting data sets to Print Interface, so the **resubmit for filtering** option does not apply. IP PrintWay extended mode ignores the **Resubmit for filtering** field if it is selected.

shows the processing that occurs when you select the **Resubmit for filtering** field in a printer definition.
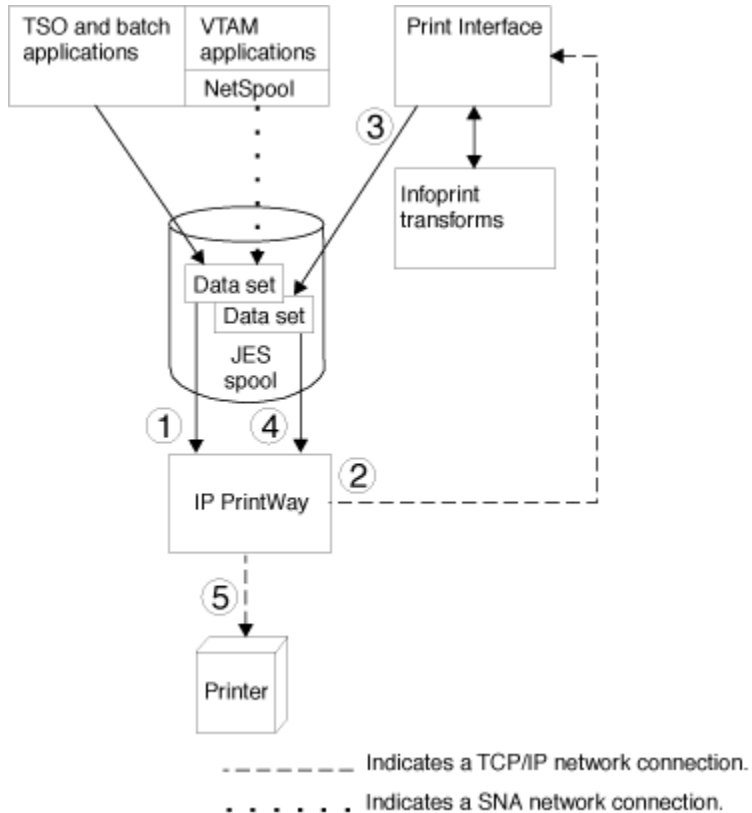
Figure 5. Processing when resubmit for filtering option is selected

1. IP PrintWay basic mode selects a data set from the JES spool. It selects the printer definition to use based on the parameters that are specified on the OUTPUT JCL statement. (The job submitter can specify either the FSSDATA parameter or the DEST, CLASS, and FORMS parameters to select the printer definition.) IP PrintWay detects that the data set is not already processed by Print Interface.

2. Because the **Resubmit for filtering** field is selected in the printer definition, IP PrintWay basic mode transmits the data set and its JCL parameters to Print Interface.

3. Print Interface validates that the printer supports the data format and the print options requested in the JCL parameters. Print Interface calls the transform filter (if any) associated with the input data format and writes the transformed data to a second output data set on the JES spool.

4. IP PrintWay basic mode selects the second output data set from the JES spool. If Print Interface called a data transform, IP PrintWay transmits the data, unchanged, to the printer. Otherwise, IP PrintWay does the formatting that is specified in the printer definition.

5. IP PrintWay transmits the data to the remote printer.

Steps 2, 3, and 4 are done only when the **Resubmit for filtering** field is selected.

Note: The processing that is shown in results in two data sets allocated on the JES spool. Therefore, do not select this option unless necessary because system performance can be adversely affected.

These considerations apply when IP PrintWay basic mode resubmits a data set to Print Interface for filtering:

- IP PrintWay writes two accounting records for the same data, one for the first data set transmitted to Print Interface (see step 2) and another for the second data set transmitted to the printer (see step 5). Your system programmer can write an IP PrintWay SMF exit routine to suppress one of the SMF records. For more information about the SMF accounting record, see Chapter 18, "Using accounting information in SMF type 6 records," on page 475.
- IP PrintWay retains both data sets on the JES spool if you specify a retention period in the **Retention period** fields. Retention periods specified at job submission (for example, on an OUTPUT JCL statement) apply only to the first data set allocated on the JES spool.
- The Print Interface LPD must listen at port 515.
- Job submitters cannot specify the printer's IP address, print queue name, or port number on the OUTPUT JCL statement or in an Infoprint Server job attribute. IP PrintWay ignores these values if specified at job submission and, instead, uses the values in the printer definition.
- Do not select the **Resubmit for filtering** field in the IP PrintWay default printer definition.
- JES always assigns each data set that Print Interface allocates on the JES spool to a separate JES output group. This is true even if the data set was originally in the same JES output group as other data sets when IP PrintWay first selected it from the JES spool. Therefore, when you select the **Resubmit for filtering** field, IP PrintWay cannot transmit data sets in the original JES output group together to the printer or send them in the same email. These results occur:
  - Data sets in the same original JES output group might not print together or might not print in the original order, even if the **Job** or **Concatenate job** option is selected in the **Dataset grouping** field. This result is especially likely if your installation customized the Infoprint Server Transform Manager so that it can transform more than one data set at the same time. When you transform more than one data set at the same time, small data sets are transformed more quickly and then IP PrintWay can transmit them to the printer before larger data sets.
  - Data sets in the same original JES output group are always sent in separate emails, even if the **Concatenate job** option is selected in the **Dataset grouping** field.
  - If your installation adds a separator page only before the first data set in a JES output group, that separator page prints before each data set.
- The second sysout data set, which Print Interface allocates on the JES spool, contains the same job name, job ID, and last qualifier of the data set name as the original sysout data set on the JES spool. Therefore, the operator can use these values to find the job submitter's data set on the JES spool.

For information about how to write IP PrintWay exit routines and configure the Print Interface LPD, see *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

On the Processing panel, specify these fields:

- **Resubmit for filtering**: Select this field to enable the IP PrintWay basic mode transform function.
- **Data Format** and **Filter**:
  - Select the data format and specify the associated filter program to transform the data.
  - (Optional) Specify other fields that are used by the filters. For information about the fields to specify, see Chapter 13, "Planning printer definitions for transforms," on page 203.
- **Validation fields**: (Optional) Specify fields that Print Interface uses to validate the print request, such as the **Duplex supported** field. For information about these fields, see "Validating that documents can print as requested" on page 85. By default, Print Interface does not do validation.

On the Allocation panel, specify the JES allocation parameters that Print Interface uses when it allocates data sets on the JES spool after filtering. For information about these fields, see "Specifying JES allocation parameters" on page 83. For example, be sure to specify values for the JES work-selection parameters, such as CLASS, that IP PrintWay uses to select data sets from the JES spool. (For more information about JES work-selection parameters, see *z/OS Infoprint Server Customization*.) In some cases, the values the job submitter specified on the OUTPUT JCL statement override the corresponding

values that you specify in the Allocation panel. Table 40 on page 198 shows the OUTPUT JCL statement parameters that override the values on the Allocation panel.

Table 40. OUTPUT JCL statements that override allocation values when **resubmit for filtering** option is selected

OUTPUT parameters	Printer definition fields
ADDRESS, BUILDING, DEPT, NAME, ROOM, TITLE	Address, Building, Department, Name, Room, Title
DATACK	Print error reporting
DUPLEX	Duplex
CHARS [1]	Character sets
COPIES[2]	Copies
FORMDEF	Form definition
FORMS[3]	FORMS
INTRAY, OUTBIN	Input tray, Output bin
OFFSETXB, OFFSETXF OFFSETYB, OFFSETYF	Image shift x-direction back/front Image shift y-direction back/front
OVERLAYB, OVERLAYF	Overlay back/front
PAGEDEF[4]	Page definition
PRMODE	PRMODE
TRC	Table reference characters
USERLIB	Resource library

1. If the CHARS parameter is not specified, the value in the UCS JCL parameter is used.

2. The COPIES parameter can also be specified on the DD JCL statement.

3. The form name can also be specified in the SYSOUT parameter on the DD statement.

4. If PAGEDEF parameter is not specified, the value in the FCB JCL parameter is used.

Example

This ISPF panel shows how to request that all line data and AFP data be transformed to PCL data with the **afpxpcl.dll** filter. Only a portion of the ISPF panel is shown.

```
                           Processing
   ⋮

   Supported data formats and associated filters:
   Data format:   Filter:
   / Line data    afpxpcl.dll_____  (extend)
   / MO:DCA-P     afpxpcl.dll_____  (extend)
   _ PostScript   _____  (extend)
   / Text         aopfiltr.so_____  (extend)
   / PCL          _____  (extend)
   _ PDF          _____  (extend)
   _ SAP          _____  (extend)
   _ XML          _____  (extend)
   _ TIFF         _____  (extend)
   _ JPEG         _____  (extend)
   _ Other        _____  (extend)

   / Resubmit for filtering
   ⋮
   Maximum document size . _____
   Maximum copies. . . . . _____
   Forms supported . . . . _____ _____ _____ _____
   Duplex supported. . . . / Simplex   / Duplex   / Tumble
   Print-error reporting supported . / Character   / Position
   ⋮
```

This ISPF panel shows how to specify the JES allocation values that Print Interface uses when it allocates the data set on the JES spool.

```
                         Allocation

Spool allocation values:
    CLASS . . . . E            GROUPID . . _____
    DEST. . . . . BLDG5        LINECT. . . ___
    JES node. . . _____     PRMODE  . . _____
    FCB . . . . . ____         PRTY. . . . __
    FLASH count . ___          THRESHLD. . _____
    FLASH name. . ____         UCS . . . . ____
    FORMS . . . . _____     WRITER. . . _____
    USERDATA
      . . _____ (extend)
    BURST . . . . _   1. Yes  2. No
    HOLD. . . . . _   1. Yes  2. No
    OUTDISP . . . _   1. Purge (without printing)  2. Leave
                      3. Keep  4. Hold  5. Write
Values for Separator Pages:
    Address
      . . _____(extend)
    Building . . _____
    Department . _____
    Name . . . . _____
    Room . . . . _____
    Title  . . . _____
Resource Related Values:
    Form definition . _____
    Character sets  . ____   ____   ____   ____
    Overlay front . . _____   Back . . _____
    Input tray  . . . ___
    Output bin  . . . _____
    Page definition . _____
    Resource library. _____ (extend)
    Resource directories. _____ (extend)
    Image shift x-direction front . . _____   Back . . _____
                y-direction front . . _____   Back . . _____
Error Reporting Values:
    Print error reporting. . _  1. None  2. All  3. Character  4. Position
    Error disposition. . . . _  1. Default  2. Hold  3. Quit
    Print error messages . . _  1. No  2. Yes
        Maximum messages. .___
Other Values:
    Notify . . . . . . . _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
    Checkpoint pages . . _____
    Checkpoint seconds . _____
    Copies . . . . . . . _____
    Copy group . . . . . ___  ___  ___  ___  ___  ___  ___  ___
    Color map. . . . . . _____
    Com setup member . . _____
    JES form length. . . _____
    Resolution . . . . . ___
    AFP parameters . . . _____
    Duplex. . . . . . . _  1. Simplex  2. Duplex  3. Tumble
    Label data pages . . _  1. Yes  2. No
    Restrict printable area . . _  1. Yes  2. No
    _ Table reference characters
    _ Save AFP statistics
```

Result: Print Interface allocates data sets on the JES spool with CLASS=E and DEST=BLDG5. Print Interface uses the FORMS value that is specified by the job submitter on the OUTPUT JCL statement instead of std, which is specified in the **FORMS** field. For information about other JCL values that override values specified on this panel, see Table 40 on page 198.

Printing data without formatting (basic mode)

If you run IP PrintWay basic mode and your batch applications create output that contains ASCII text data, PCL data, PDF data, or AFP data, you must request in the printer definition that IP PrintWay basic mode transmit the data sets to the printer or email destination without formatting the data. To do this, select the IP PrintWay **none** formatting option in the printer definition.

Tip: IP PrintWay extended mode detects the data stream and automatically sends data other than line data to the printer without formatting.

In some situations, even though IP PrintWay basic mode does not format the data, it might be necessary to translate the data stream to either ASCII or EBCDIC, depending on the requirements of the destination. In this situation, select the **Translate only** formatting option in the printer definition.

Select the IP PrintWay basic mode **none** formatting option when your batch applications create:

- ASCII text, PCL, or PDF data to be printed on an ASCII printer
- AFP, PCL, or PDF data to be sent to an email destination

Select the IP PrintWay basic mode **Translate only** formatting option when your batch applications create:

- ASCII text data to be mailed to an email destination

In these situations, IP PrintWay can automatically determine that it needs to transmit the data stream unchanged to the printer. Therefore, in these cases, it ignores the IP PrintWay formatting option that is selected in the printer definition and automatically processes data sets as if the **none** formatting option were selected:

- The data stream contains a PostScript header.
- Print Interface converted the data stream to a format suitable for its destination.
- The **Remote PSF** option is selected on the LPR Protocol panel.
- NetSpool converted the data stream to a PCL data stream (the **Convert to PCL** option is selected on the NetSpool Options panel).

Procedure for specifying attributes

On the IP PrintWay Options panel, specify these fields:

- **Formatting**: Select **None** or **Translate only**.

  When you select the **None** or **Translate only** formatting option, IP PrintWay ignores these fields:

  - Processing panel: All fields under the **IP PrintWay Line-to-Text Conversion** and **SCS Conversion** headings
  - IP PrintWay Options panel: All fields under the **Formatting** and **Basic Mode Formatting** headings (except for the **Formatting** field)

- (Optional) Specify other fields such as **Document header** and **Document trailer**.

Example

This ISPF panel shows how to request that IP PrintWay not translate or format data. Only a portion of the ISPF panel is shown.

```
                          IP PrintWay Options
 ⋮

 Basic Mode Formatting:
 ⋮
    Formatting. . . . . . . 1  1. None          2. Standard
                              3. Translate only  4. Use FCB

 ⋮
```

Formatting for PostScript landscape orientation (basic mode)

IP PrintWay basic mode can format non-PostScript data sets in the landscape orientation for printing on a PostScript printer. To request landscape orientation, you can select a landscape option in the **PostScript header** field.

IP PrintWay extended mode ignores the **PostScript header** field. For information about how to print in landscape orientation when you run IP PrintWay extended mode, see "Specifying printer commands for landscape printing" on page 184.

Note: IP PrintWay does not format data if Print Interface allocated the data set on the JES spool or if NetSpool converted the data stream to any format other than line data. In these cases, Print Interface or NetSpool formats the data. Therefore, the **PostScript header** field does not apply to these data sets.

If you select one of the landscape options in the **PostScript header** field, IP PrintWay basic mode sends this PostScript program to the printer before it sends data. This program intercepts the data, formats it, and prints it. This PostScript program does not work if the data to be printed is already PostScript data.

```
614 25 translate 90 rotate .88 .76 scale
/n 1 def
/fs 10 def
/ls 11.2 def
/ld ls 2 mul def
/lt ls 3 mul def
/t 740 fs sub def
/y t def /ff t def /os 20 def
/s 512 string def
/Courier-Bold findfont
fs scalefont setfont
/p {n {copypage} repeat erasepage} def
/i (%stdin) (r) file def
/{/c i read not {p stop} if def
c 26 eq {p stop} if
/x 20 def
/y c 43 eq {y /x os def}
{c 32 eq {y ls sub}
{c 48 eq {y ld sub}
{c 45 eq {y lt sub}
{c 49 eq {ff} {y} ifelse}
ifelse} ifelse} ifelse} ifelse def
/ff 0 def
y 65 le {p /y t def} if x y moveto
/os i s readline not {p stop} if dup show
length 0 eq {20} {20.72} ifelse def } loop
```

Limitations:

1. If you select a landscape option, do not use the same printer definition to print PostScript data sets from a batch application. If you do, an error occurs.

2. Do not select a landscape option when you select the email protocol.

3. If you select a landscape option, do not specify printer commands in the **Document header** and **Document trailer** fields.

Procedure for specifying attributes

On the IP PrintWay Options panel, specify these fields:

- **Formatting**: Select the **Standard** option.
- **PostScript header**: Select the **Landscape** option.

Chapter 13. Planning printer definitions for transforms

Table 41 on page 203 lists the transform products that you can use with Infoprint Server, the transforms that each product provides, and where you can find more information about the transforms and how to customize them.

Table 41. Transforms that work with Infoprint Server		
Transform product	**Transform**	**For information, see:**
IBM Infoprint Transforms to AFP for z/OS (5655-N60)	PCL to AFP PDF to AFP PostScript to AFP SAP to AFP	*IBM Infoprint Transforms to AFP for z/OS*
IBM Print Transform from AFP to PCL for Infoprint Server for z/OS (5655-TF2)	AFP to PCL	*IBM Print Transforms from AFP for Infoprint Server for z/OS*
IBM Print Transform from AFP to PDF for Infoprint Server for z/OS (5655-TF1)	AFP to PDF	*IBM Print Transforms from AFP for Infoprint Server for z/OS*
IBM Print Transform from AFP to PostScript for Infoprint Server for z/OS (5655-TF3)	AFP to PostScript	*IBM Print Transforms from AFP for Infoprint Server for z/OS*
IBM Infoprint XT for z/OS (5655-O15)	Xerox to AFP	*IBM Infoprint XT for z/OS*
Ricoh InfoPrint Transform Manager for Linux	AFP to PDF GIF to AFP JPEG to AFP PCL to AFP PDF to AFP PostScript to AFP TIFF to AFP	*InfoPrint Transform Manager for AIX, Linux, and Windows: Planning and Installing* and *InfoPrint Transform Manager for Linux: afp2pdf Transform Installation and User's Guide* in Ricoh Software Information Center (help.ricohsoftware.com/swinfocenter)
Ricoh InfoPrint Manager for AIX®	PCL to AFP PDF to AFP PostScript to AFP	*InfoPrint Manager for AIX: Procedures* in Ricoh Software Information Center (help.ricohsoftware.com/swinfocenter)
InfoPrint Manager for Windows	PCL to AFP PDF to AFP PostScript to AFP	*InfoPrint Manager for Windows: Procedures* in Ricoh Software Information Center (help.ricohsoftware.com/swinfocenter)

The following information describes how to direct Infoprint Server to automatically call an Infoprint transform before writing documents to the JES spool or sending them to the printer.

Using transform filters

To transform data automatically, you specify a transform *filter* in the printer definition. A transform filter is a program that transforms the input data to another data format.

You can specify a different filter for each input data format that Infoprint Server supports: line data, JPEG, MO:DCA-P, PCL, PDF, PostScript, SAP, TIFF, XML, text, and other. After Infoprint Server detects the input data format of a document, it calls the transform filter that you associated with that data format.

Table 42 on page 204 lists the transform products and the name of the transform filters that you can associate in the printer definition with different data formats.

Table 42. Infoprint transforms, filter names, and data formats

Transform product	Transform	Transform filter	Data formats
IBM Print Transform from AFP to PCL for Infoprint Server for z/OS	AFP to PCL	afpxpcl.dll	Line data MOD:CA-P XML
IBM Print Transform from AFP to PDF for Infoprint Server for z/OS	AFP to PDF	afpxpdf.dll	Line data MOD:CA-P XML
IBM Print Transform from AFP to PostScript for Infoprint Server for z/OS	AFP to PostScript	afpxps.dll	Line data MOD:CA-P XML
IBM Infoprint Transforms to AFP for z/OS	PCL to AFP	pcl2afp.dll	PCL
	PDF to AFP	ps2afp.dll	PDF
	PostScript to AFP	ps2afp.dll	PostScript
	SAP to AFP	sap2afp.dll	SAP
IBM Infoprint XT for z/OS	Xerox to AFP	x2afp.dll	Other
Ricoh InfoPrint Transform Manager for Linux	AFP to PDF	aoprxf.so	Line data MO:DCA-P
	GIF to AFP	aoprxf.so	Other
	PCL to AFP	aoprxf.so	PCL
	JPEG to AFP	aoprxf.so	JPEG
	PDF to AFP	aoprxf.so	PDF
	PostScript to AFP	aoprxf.so	PostScript
	TIFF to AFP	aoprxf.so	TIFF
Ricoh InfoPrint Manager for AIX and Windows	PCL to AFP	aoprform.dll	PCL
	PDF to AFP	aoprform.dll	PDF
	PostScript to AFP	aoprform.dll	PostScript

Notes:

1. **The `ps2afp.dll` filter transforms both PDF and PostScript data to AFP format.**

2. **Infoprint Server provides filters `aoprxf.so` and `aoprform.dll`. The separate transform products provide the other transform filters.**

A filter can accept options, which control processing of the transform. Table 43 on page 205 summarizes the options that you can specify for each transform filter.

Table 43. Transform filter options	
Filter	**Options**

aoprform.dll	`[%filter-options] [-a imagetype] [-l length] [-P portnumber]`
	`[-p pagerange] [-q transformattributes]… [-r resolution ]`
	`[-t outputtype] [-w width] [-x xoffset] [-y yoffset]`
	`ipaddress`

aoprxf.so	`[%filter-options] [%xf-options]`
	`[-xf "transformattributes"]…`
	`[option …]`

All other filters	`[%filter-options] [option …]`

Filter options for the aoprform.dll filter

You can specify these filter options for the **aoprform.dll** filter:

%filter-options
> Causes any options that a job submitter specified in the **filter-options** job attribute to be passed directly to the transform.
>
> You can type `%filter-options` in any position relative to other filter options. If you specify any options to the right of **%filter-options**, those options override the same options that were specified in the **filter-options** job attribute, with the exception of any options that are cumulative.

-a *imagetype*
> The type of AFP data stream image that the transform generates for each page in the PCL, PostScript, or PDF file. Valid values are:
>
> **fs45**
>> IOCA color FS45 images. Specify this value for color printers such as the InfoPrint Color 1454 or 1464 printer. Specify this value only for the PostScript and PDF data formats.
>
> **im1**
>> IM1 image. This type of image is not compressed.
>
> **io1**
>> IOCA image. This type of image is not compressed.
>
> **io1-g4**
>> Compressed Image Object Content Architecture (IOCA) image in Modified Telecommunication Standardization Sector (TSS) T.6 G4 Facsimile Coding Scheme (G4 MMR) format. This is the suggested output type because it takes up less space on the hard disk, and it prints faster.
>>
>> **Tips:**
>>
>> 1. Some older AFP printers do not support printing with an image type of **io1-g4**. For these printers, specify an image type of **io1-mmr** because it is the compressed image type that is supported by these printers. This image type results in faster printing than uncompressed image types.
>> 2. TSS was formerly the International Telegraph and Telephone Consultative Committee (CCITT).
>
> **io1-mmr**
>> Compressed IOCA image in Modified Modified Read (MMR) format.

-l *length*
> This option is passed directly to the InfoPrint Manager transform daemon. For the values you can specify, see the **ps2afp** or **pcl2afp** command description in *InfoPrint Manager: Reference*.

-P
> The TCP/IP port number on the AIX or Windows system at which the transform daemon is receiving data. Consult the AIX or Windows administrator for the correct value to specify. If you omit this option, the default port for the type of input data is used. Valid values are:

Value
> **Meaning**

8251
> The default port number for the PostScript and PDF data formats.

8253
> The default port number for the PCL data format.

924 - *nnnnn*
> Any valid port number greater than or equal to 924 at which the transform daemon is receiving data.

-p *pagerange*
> This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the **ps2afp** or **pcl2afp** command description in *InfoPrint Manager: Reference*.

-q *transformattributes*
> When you select the FS45 image output (−a fs45), you can specify these transform attributes and values. For a detailed description of these attributes and values, see *InfoPrint Manager: Reference*.

> **color-profile={euroscale | <u>none</u> | swop}**
>> Specifies the color profile that the transform is to use. The default value is **none**. You can also specify these synonyms:

>> **Value**
>>> **Synonym**

>> **euroscale**
>>> Euroscale

>> **swop**
>>> SWOP

> **color-rendering-intent={<u>relative</u> | perceptual}**
>> Specifies how the transform is to process shades that the color printer cannot reproduce exactly. The default value is **`relative`**.

> **color-toner-saver={<u>no</u> | yes}**
>> Specifies whether the transform is to reduce the amount of color toner that is used by the printer. The default value is **no**. You can also specify these synonyms:

>> **Value**
>>> **Synonym**

>> **no**
>>> false

>> **yes**
>>> true

> **presentation-object-container-extraction-mode={<u>ignore</u> | inline}**
>> Specifies how the transform generates presentation object container resources in the output stream. The default value is **`ignore`**.

Rules:

1. Specify attributes in this format: *attribute=value*.

2. If you specify more than one attribute, separate the attributes with a space.

3. Do not abbreviate the attribute names and values.

4. Use the exact uppercase and lowercase letters for the attribute and values.

5. If the **-q** value contains spaces, enclose the entire value in single or double quotation marks.

6. You can specify the **-q** option multiple times. If you specify the same attribute multiple times, the last value that is specified for the attribute is used.

-r *resolution*
>   This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the **ps2afp** or **pcl2afp** command description in *InfoPrint Manager: Reference*.

-t *outputtype*
>   Determines the type of output to generate.
>
>   Valid values are:
>
>   **document**
>   >   Printable document. This is the default value.
>
>   **overlay**
>   >   Graphic image that can be printed on each page of a printable document.
>
>   **pagesegment**
>   >   Graphic image that can be embedded in a printable document.
>   >
>   >   **Tip:** When you generate overlays or page segments from multiple-page documents, the user might want to use the **-g** or **-p** option to select pages. Otherwise, one overlay or page segment is created for each page of the input file.

-w *width*
>   This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the **ps2afp** or **pcl2afp** command description in *InfoPrint Manager: Reference*.

-x *xoffset*
>   This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the **ps2afp** or **pcl2afp** command description in *InfoPrint Manager: Reference*.

-y *yoffset*
>   This option is passed directly to the Ricoh InfoPrint Manager transform daemon. For the values you can specify, see the **ps2afp** or **pcl2afp** command description in *InfoPrint Manager: Reference*.

ipaddress
>   The host name or dotted decimal address of the AIX or Windows system on which the transform daemon is running. This is a required option. For example, 9.99.9.23 or AIX4.

Tip: Ricoh InfoPrint Manager transforms, by default, create 32 K records. To limit the maximum AFP record length to 8 K bytes, the InfoPrint Manager administrator must add this statement to the InfoPrint Manager configuration file for the transform (for example, configuration file ps2afpd.cfg):

```
pragma=AFPDSRECORDLENGTH=8000
```

Filter options for the aoprxf.so filter

You can specify these filter options for the **aoprxf.so** filter:

%filter-options
>   Causes any option that a job submitter specified in the **filter-options** job attribute to be passed directly to the transform.
>
>   You can type %filter-options in any position relative to other filter options. If you specify any options to the right of **%filter-options**, those options override the same options that were specified in the **filter-options** job attribute, with the exception of any options that are cumulative. If an option is cumulative, the transform applies all occurrences of the option.

%xf-options
>   Causes transform attributes that a job submitter specified in the **xf-options** job attribute to be used.
>
>   You can type %xf-options in any position relative to **-xf** option. If you specify the **-xf** option to the right of **%xf-options**, the transform attributes specified in the **-xf** option override the transform attributes that were specified in the **xf-options** job attribute.

-xf "*transformattributes*"
> In this option, you can specify one or more of these transform attributes:
>
> - fail-on-datastream-error=yes | <u>no</u>
> - output-format=pdf | <u>modca-p</u>
> - trailer-error-page=<u>yes</u> | no
> - transform-id=*transform_ID*
>
> For a description of these transform attributes, see xf-options in *z/OS Infoprint Server User's Guide*.
>
> **Rules:**
>
> 1. Specify attributes in this format: *attribute=value*.
> 2. If you specify more than one attribute, separate the attributes with a space.
> 3. You can abbreviate the attribute names and values.
> 4. Use the exact uppercase and lowercase letters for the attribute and values.
> 5. If the **-xf** value contains any spaces, enclose the entire value in single or double quotation marks.
> 6. You can specify the **-xf** option multiple times. If you specify the same attribute multiple times, the last value that is specified for the attribute is used.
>
> **Examples:**
>
> ```
> aoprxf.so -xf "fail-on-datastream-error = yes"
> aoprxf.so -xf "fail-on-datastream-error=yes trailer-error-page=no"
> aoprxf.so -xf fail-on-datastream-error=yes -xf trailer-error-page=no
> ```

option
> Any option that the transform accepts. Separate multiple options with a space. For information about the options, see the documentation for the transform.
>
> **Tips:**
>
> - Infoprint Server does not check the syntax of these options. It passes them directly to the transform.
> - Some of the InfoPrint Transform Manager for Linux transform options are different from the transform options you can specify with IBM transforms. For example, the InfoPrint Transform Manager for Linux **-a** option, which specifies the type of IOCA image to create, accepts different values. Also, the InfoPrint Transform Manager for Linux transforms use different abbreviations for millimeters (**m**), inches (**i**), and pels (**pels**).
>
>   **Examples:**
>
>   ```
>   ps2afp.dll -l 297mm -w 210mm -r 240 -a io1-g4
>   aoprxf.so -l 297m -w 210m -r 240 -a IO1_G4
>   ```
>
> - The InfoPrint Transform Manager for Linux transforms, by default, create AFP records that are 32 K bytes in length. To set the maximum number of bytes in a record to 8 K, specify this **-pragma** option:
>
>   ```
>   -xf -pragma afpdsrecordlength=8000
>   ```
>
>   To create 8 K records, you must specify 8000, which is less than 8 K. This is because the length of the actual AFP records is greater than the value specified in the **-pragma** option.

Filter options for other transform filters

You can specify these filter options for transform filters **pcl2afp.dll, ps2afp.dll, sap2afp.dll, afpxpcl.dll, afpxps.dll, afpxpdf.dll**, and **x2afp.dll**.

%filter-options

Causes any options that a job submitter specified in the **filter-options** job attribute to be passed directly to the transform.

You can type `%filter-options` in any position relative to other filter options. If you specify transform options to the right of **%filter-options**, those options override the same options that were specified in the **filter-options** job attribute, with the exception of any options that are cumulative. If an option is cumulative, the transform applies all occurrences of the option.

option

Any option that the transform accepts. Separate multiple options with a space. For information about the transform options, see:

- *IBM Print Transforms from AFP for Infoprint Server for z/OS*
- *IBM Infoprint Transforms to AFP for z/OS*
- *IBM Infoprint XT for z/OS*

Tip: Infoprint Server does not check the syntax of these options. It passes them directly to the transform.

Procedure for specifying attributes for transform filters

On the Processing panel, specify these fields:

- **Data format** field: Select the formats of the input documents to which the filter applies. For information about which data formats to select for each filter, see Table 42 on page 204.
- **Filter** field: Specify the name of the filter followed by any filter options. Type the absolute path name if the filter is not in a directory that is named in the LIBPATH environment variable that is specified in the **aopstart** EXEC and the `/etc/profile` file.
- **Resubmit for filtering** field: Select this field if you run IP PrintWay basic mode and want to transform documents that are submitted from batch applications. This field does not apply to IP PrintWay extended mode. For more information about this field, see "Resubmitting documents to Print Interface for filtering (basic mode)" on page 195.

Note: If several printers support the same data formats, consider creating a Processing component in which you select the data formats and specify any associated filters. Then include this component in the printer definitions for all printers that support the same data formats. However, make sure that you do not specify any values in the **Data format** and **Filter** fields in the printer definition itself because the values that you specify in the printer definition completely override all values that are specified in the same fields in the Processing component.

Example 1. Specifying the aoprxf.so filter for transforms to AFP

This ISPF panel shows how to specify the **aoprxf.so** filter to use transforms to AFP that InfoPrint Transform Manager for Linux provides. Only a portion of the Processing panel is shown.

```
                          Processing
⋮
Supported data formats and associated filters:
Data format:  Filter:

/ Line data    _____ (extend)
/ MO:DCA-P     _____ (extend)
/ PostScript   aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
/ Text         _____ (extend)
/ PCL          aoprxf.so -a I01_G4 -l 297m -w 210m -r 240 %filter-opt (extend)
/ PDF          aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
_ SAP          _____ (extend)
/ XML          _____ (extend)
/ TIFF         aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
/ JPEG         aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-optio (extend)
_ Other        _____ (extend)

_ Resubmit for filtering

⋮
```

Tip:

To enter more characters than can fit on the line, move the cursor to **extend** and press **Enter**. On the Extended Field panel, type all the characters. Do not end a line that continues to the next line with a blank character. Be sure to press **Enter** and check your text before you exit the Extended Field panel.

```
-------------------------- Extended Field ---------------------

PostScript Filter

aoprxf.so -a FS45 -l 297m -w 210m -r 240 %filter-options %xf-opt
ions _____
_____
_____
```

Explanation of fields:

- The selected data formats are suitable for AFP printers that PSF controls:

    Line data, MO:DCA-P, XML
    These data formats are selected because PSF can accept these data formats. No filter is required.

    Text
    This data format is selected because Infoprint Server automatically converts text data into line data when the printer definition is a PSF printer definition. No filter is required.

    PostScript, PCL, PDF, TIFF, JPEG
    These data formats are selected because InfoPrint Transform Manager for Linux transforms can transform these data formats to AFP format.

- The **-a**, **-l**, **-r**, and **-w** options are passed directly to InfoPrint Transform Manager for Linux.

- **%filter-options** causes the transforms to use any transform options that the job submitter specifies in the **filter-options** job attribute. Because **%filter-options** is specified to the right of the transform options (**-a, -l, -r, -w**), the job submitter can override these transform options.

- **%xf-options** causes the transforms to use any transform attributes, such as **trailer-error-page**, that the job submitter specifies in the **xf-options** job attribute.

- **Resubmit for filtering** is not selected because this field does not apply to a PSF printer definition. However, you must select this field in an IP PrintWay printer definition if you run IP PrintWay basic mode.

Example 2. Specifying the aoprxf.so filter for the AFP to PDF transform

This ISPF panel shows how to specify the **aoprxf.so** filter to use the AFP to PDF transform that InfoPrint Transform Manager for Linux provides. Only a portion of the Processing panel is shown.

```
                          Processing
⋮
Supported data formats and associated filters:
Data format:  Filter:

_ Line data   _____ (extend)
/ MO:DCA-P    aoprxf.so %filter-options %xf-options -xf output-forma (extend)
_ PostScript  _____ (extend)
_ Text        _____ (extend)
_ PCL         _____ (extend)
/ PDF         _____ (extend)
_ SAP         _____ (extend)
_ XML         _____ (extend)
_ TIFF        _____ (extend)
_ JPEG        _____ (extend)
_ Other       _____ (extend)

/ Resubmit for filtering
⋮
```

Tip: To enter more characters than can fit on the line, move the cursor to **extend** and press **Enter**. On the Extended Field panel, type all the characters. Do not end a line that continues to the next line with a blank character. Be sure to press **Enter** and check your text before you exit the Extended Field panel.

```
--------------------------- Extended Field ---------------------

MO:DCA-P Filter

aoprxf.so %filter-options %xf-options -xf output-format=pdf_____
_____
_____
_____
```

Explanation of fields:

- The selected data formats are suitable for a printer or email destination that accepts PDF format:

  MO:DCA-P
  This data format is selected because the AFP to PDF transform can transform MO:DCA-P data to PDF format. The AFP to PDF transform that InfoPrint Transform Manager for Linux provides cannot transform line data; therefore, the **Line data** format is not selected.

  PDF
  This data format is selected. No filter is specified because documents in PDF format do not need to be transformed.

- **%filter-options** causes the transform to use any transform options that the job submitter specifies in the **filter-options** job attribute.

- **%xf-options** causes the transform to use any transform attributes that the job submitter specifies in the **xf-options** job attribute.

- The **-xf** option specifies PDF as the output format. This option is required to use the AFP to PDF transform.

- **Resubmit for filtering** is selected. Select this field if you run IP PrintWay basic mode. IP PrintWay extended mode ignores this field.

Example 3. Specifying the aoprform.dll filter

This ISPF panel shows how to specify the **aoprform.dll** transform filter to use transforms that Ricoh InfoPrint Manager provides. Only a portion of the Processing panel is shown.

```
                              Processing
Printer definition name . myprinter_____
⋮

Supported Data Formats and Associated Filters:
Data format:  Filter:

/  Line data   _____ (extend)
/  MO:DCA-P    _____ (extend)
/  PostScript aoprform.dll %filter-options -r 300 sys4_____ (extend)
/  Text        _____ (extend)
/  PCL         aoprform.dll %filter-options -r 300 sys4_____ (extend)
/  PDF         aoprform.dll %filter-options -r 300 sys4_____ (extend)
_  SAP         _____ (extend)
/  XML         _____ (extend)
_  TIFF        _____ (extend)
_  JPEG        _____ (extend)
_  Other       _____ (extend)

_  Resubmit for filtering

⋮
```

Explanation of fields:

- The selected data formats are suitable for AFP printers that PSF controls:

  - **Line data**, **MO:DCA-P**, and **XML** are selected because PSF can accept these data formats. No filter is required.

  - **Text** is selected because Infoprint Server automatically converts text data into line data when the printer definition is a PSF printer definition. No filter is required.

  - **PostScript**, **PCL**, and **PDF** are selected because Ricoh InfoPrint Manager transforms can transform these data formats to AFP format.

- **%filter-options** causes the transforms to use any options that the job submitter specifies in the **filter-options** job attribute. Because **%filter-options** is specified to the left of the **-r** transform option, the job submitter cannot override this option.

- The **-r** option specifies the resolution of the output. This option is passed to the Ricoh InfoPrint Manager transform daemon.

- **sys4** causes the **aoprform.dll** filter to pass the data to be transformed to the system with host name sys4.

- **Resubmit for filtering** is not selected because this field does not apply to a PSF printer definition. However, you must select this field in an IP PrintWay printer definition if you run IP PrintWay basic mode.

Chapter 14. Planning PSF FSS and FSA definitions

PSF FSS and FSA definitions in the Printer Inventory contain configuration information that PSF for z/OS or the AFP Download plus feature of PSF can use. In addition, PSF FSA definitions contain information that Infoprint Central uses.

Tip: In Infoprint Central, a "PSF printer" can refer to an AFP printer or to an AFP Download Plus sender.

You can create these definitions in the Printer Inventory:

- An FSS definition for each PSF functional subsystem (FSS)
- An FSA definition for each PSF functional subsystem application (FSA)

You must create PSF FSS and FSA definitions in these cases:

- You want to specify PSF configuration information in the Printer Inventory
- You want to use Infoprint Central to work with PSF printers

The following information describes how to specify information in PSF FSA definitions that Infoprint Central uses. For information about how to specify PSF configuration information, see:

- *PSF for z/OS: Customization*
- *PSF for z/OS: AFP Download Plus*

Tip: If you want to submit print requests through Print Interface or NetSpool, you must also create printer definitions in the Printer Inventory. If you do not plan to submit print jobs with Print Interface or NetSpool, it is not necessary to create printer definitions.

Specifying the FSA name, description, and location

You must specify the FSA name. In addition, you can specify a description and a location for the PSF printer or AFP Download Plus receiver.

FSA name: The FSA name must match the FSA name in the JES initialization statement.

Description: The description is a search criterion on the Infoprint Server ISPF panels. To make searching easier, consider using all lowercase or uppercase letters because the ISPF panels can only do case-sensitive searches.

Location: The location is a search criterion on the Infoprint Server ISPF panels and in Infoprint Central. The location can also help Infoprint Central users direct service personnel to the printer if it requires service. Follow these guidelines:

- Infoprint Central can do case-sensitive or case-insensitive searches. However, ISPF panels only do case-sensitive searches. Therefore, to make searching easier, consider using all lowercase or uppercase letters.
- Infoprint Central users can specify location information to find a PSF printer. They can specify either the exact location information or the first few characters of the location. Therefore, use a format that lets users find printers more easily. For example, if you use this format, Infoprint Central users can find all printers in the (1) city, (2) city/building, or (3) city/building/office:

```
Location. . . city/building/office
```

Procedure for specifying attributes

On the PSF FSA panel, specify these fields:

- **FSA name**: Specify the same FSA name as specified in the JES initialization statement for the FSA.

- **Description**: Specify a 1 – 256 character description, including any letters, numbers, special characters, and blanks.
- **Location**: Specify a 1 – 256 character location, including any letters, numbers, special characters, and blanks.

Example

This ISPF screen shows how to specify the FSA name, a description of the printer, and the printer's location.

```
                                PSF FSA, TCP/IP

FSA Name. . .  PRT001__
Description .  INFOPRINT 2000                                        (extend)
Location. . .  DENVER/B003/A1-03                                     (extend)
  ⋮
```

Setting up operator security for the printer

If your security administrator created a RACF profile to control who is authorized to use Infoprint Central to display information about and do actions on the PSF printer, specify the name of this RACF profile in the FSA definition.

Tips:

1. You can specify the name of the profile before it is defined to RACF. If you specify a profile name that is not defined to RACF, Infoprint Central proceeds as if the user has the required access to the profile.
2. If the same RACF profile applies to a group of IP PrintWay and PSF printers, specify the same profile name in the PSF FSA definitions and IP PrintWay printer definitions for all the printers in the group.
3. You can use the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) to specify the RACF profile name. If you want to specify the same RACF profile in many PSF FSA printer definitions, it is easier to use the PIDU program. See "Example 2. Using PIDU to specify the profile name" on page 215.

Related information: For information about how to define RACF profiles in the PRINTSRV class to protect PSF printers, see Setting up security for Infoprint Central in *z/OS Infoprint Server Customization*.

Procedure for specifying attributes

On the PSF FSA panel, specify this field:

- **Operator security profile**: Specify the name of the RACF resource profile in the PRINTSRV class.

Example 1. Using ISPF panels to specify the profile name

This ISPF screen shows how to specify the name of the RACF profile on a PSF FSA panel:

```
                                PSF FSA, TCP/IP

FSA Name. . .  PRT001__
Description .  INFOPRINT 2000                                        (extend)
Location. . .  DENVER/B003/A1-03                                     (extend)
Operator security profile
    . . .  PRINTERS.DENVER
  ⋮
```

Example 2. Using PIDU to specify the profile name

This example shows how to specify the name of a RACF profile in all PSF FSA definitions for TCP/IP-attached printers that do not already have a profile.

1. Enter these commands as one command on the z/OS UNIX command line:

```
pidu -qc "list fsa where fsa-type=psf-tcpip and
operator-security-profile=null;" |awk '{print "modify fsa " $1
" operator-security-profile=\"PRINTERS.DENVER\";"}' > /tmp/defs
```

   The **list** command lists the names of all PSF FSA definitions for TCP/IP-attached printers with no value in the **operator-security-profile** attribute. These names are piped to the **awk** program, which writes **modify** commands to modify the **operator-security-profile** attribute.

2. Inspect the /tmp/defs file to make sure the **modify** commands are acceptable.

3. Enter this command to update the Printer Inventory:

```
pidu < /tmp/defs
```

Chapter 15. Defining NetSpool printer LUs to VTAM

To define a NetSpool printer LU to VTAM, do these tasks:

- Select NetSpool printer LU names.
- Create VTAM APPL statements for each NetSpool LU name.
- Define resources in VTAM applications.

In addition to defining the NetSpool LU names to VTAM, you must specify the NetSpool LU names in the printer definitions for the target printers. In the printer definitions, you also specify other printer attributes used by NetSpool. For information, see Chapter 11, "Planning printer and printer pool definitions for NetSpool," on page 103.

Selecting NetSpool printer LU names

Each installation determines how many NetSpool printer logical units (LUs) to define. A sample configuration might be to define one NetSpool printer LU to replace each SNA-network printer in your installation. Alternatively, you can define a greater or fewer number of NetSpool logical printers than you have SNA-network printers.

Each NetSpool printer LU is identified with a 1–8 character alphanumeric name. You specify this LU name in the printer definitions and in the application-program LU name you use to define the NetSpool printer LU to VTAM.

When you name logical printers, you can do one of these without changing the primary LU (PLU) resource definitions of your VTAM applications:

- Assign NetSpool logical-printer names that are the *same* as the printer names currently defined in the resource definitions of the VTAM applications. For example, if the printer LU name used by a VTAM application is IMSPR001, the NetSpool LU name might be IMSPR001.
- Assign NetSpool logical-printer names that are different from the printer names that are used by the VTAM application. You might want to do this to make the NetSpool LU names more meaningful to your operators. For example, if the printer LU name used by your VTAM application is IMSPR001, the NetSpool LU name might be LUPRT001.

  You map the old and new names to each other in the VTAM APPL statements that define the logical printers to VTAM, as described in the ACBNAME parameter in "Creating APPL statements for NetSpool printer LUs" on page 218.

In either of these two cases, because only one set of VTAM definitions with the same names can be known to VTAM at a time, you must do one of these:

- Remove the VTAM LU statements for the SNA-network printers.
- Deactivate the major node that contains the VTAM LU statements before you activate the logical-printer LUs with the same name.

This means that other VTAM applications cannot communicate with the SNA-network printers at the same time NetSpool is running.

Note: If other VTAM applications still need to communicate with the SNA-network printers at the same time NetSpool is running, you must assign new PLU names in the resource definitions of the VTAM applications with NetSpool. Use the new printer names as the NetSpool logical-printer names and also as the application-program LU names when you define the logical printers to VTAM.

Naming considerations for IMS/CICS users of telnet

In IMS or CICS subsystems, applications receive communication services from terminal-management functions of subsystems. Thus, the IMS programmer thinks of a device as an LTERM, and the CICS programmer thinks of a device as a TCTTE entry.

Many IMS and CICS applications have algorithms that derive LTERM or TCTTE names for printers by doing some hashing technique on the input LTERM or TCTTE names. If NetSpool is used with Telnet, this creates problems because Telnet assigns the input LU name (and thereby the LTERM or TCTTE name) arbitrarily from a pool of LU names. If this type of algorithm is in use in your installation, and you are using Telnet, IBM suggests that you use the IP-LU mapping feature of Telnet. You can use this feature to specify the input LU name rather than having it randomly selected from a pool. This would, in turn, permit the application to select the LU name for the printer. See the LUMAP statement described in *z/OS Communications Server: IP Configuration Reference*.

Creating APPL statements for NetSpool printer LUs

NetSpool runs as a VTAM application program, maintaining separate LU-LU sessions for each NetSpool printer LU. Each LU-LU session is between:

- A primary LU, which is the VTAM application that initiates the VTAM session and sends print requests
- A secondary LU, which is the NetSpool printer LU

You must create a VTAM APPL definition statement in the SYS1.VTAMLST data set for each NetSpool printer LU. Create the APPL statement in a new or existing application major node definition. Figure 6 on page 218 shows two sample APPL statements under a major node named NETSPOOL.

```
NETSPOOL   VBUILD TYPE=APPL
*
LUPRT001   APPL   MODETAB=ISTINCLM,DLOGMOD=S3270,EAS=1,SESSLIM=YES
IMSPR002   APPL   ACBNAME=LUPRT002,MODETAB=ISTINCLM,DLOGMOD=SCS,EAS=1,SESSLIM=YES
```

Figure 6. Sample APPL statements for NetSpool LUs

The parameters on the APPL statement are:

statement-name
Specifies the secondary LU name that is used by VTAM applications to establish a VTAM session. If this name does not match the NetSpool LU name that is specified in the printer definition, the ACBNAME parameter must match the LU name in the printer definition. Specify one to eight alphanumeric characters. In this example, the names are: LUPRT001 and IMSPR002.

ACBNAME=lu-name
Specifies the NetSpool LU name. This name must match the LU name that is specified in the printer definition.

This parameter is optional. If you omit it, the default is the name that is specified as the *statement-name*.

If the LU name in the printer definition matches the *statement-name*, IBM suggests that you omit the ACBNAME parameter and let it default, as shown in the first APPL statement in Figure 6 on page 218.

If the LU name in the printer definition does not match the name in *statement-name*, which is the secondary LU name, you must specify the same LU name as in the printer definition in this parameter, as shown in the second APPL statement in Figure 6 on page 218.

MODETAB=table-name
Specifies the name of a VTAM logon mode table to be used to associate each logon mode entry-name with a set of session parameters. If not specified, the default name is ISTINCLM.

DLOGMOD=entry-name
Specifies the name of an entry in the VTAM logon mode table that contains session parameters to be used when the primary LU does not provide other parameters. If this entry is used to establish the

session parameters, this entry must specify correct LU type, FM profile, and TS profile parameters, as shown in Table 44 on page 219. If not specified, the default is the first entry in the VTAM logon mode table that is specified in the MODETAB parameter.

Note: The *entry-name* must be in the VTAM logon mode table that is named in the MODETAB parameter or in the default table named ISTINCLM.

EAS=1
Specifies the number of active sessions for this printer. Always specify 1.

SESSLIM=YES
Specify YES to allow VTAM to queue pending sessions for the secondary LU, if the secondary LU already has an active session with another primary LU.

PARSESS=NO
Specifies that multiple sessions are not allowed. PARSESS=NO is the default, so it is not shown in the example.

Note: Do not code any APPC-related keywords.

For more information about the APPL statement, see *z/OS Communications Server: SNA Resource Definition Reference*.

If the APPL statement name or the ACBNAME name is the same as the LU name of an SNA-network printer, either remove the LU definitions for the SNA-network printers or deactivate the major node that contains those LU statements.

Defining resources for VTAM applications

The resource definitions for your VTAM applications, such as CICS or IMS, must comply with these requirements:

- A printer that is defined in the resource definition must contain a network name that matches the APPL statement name.
- The session parameters (BIND parameters) established for the printer must be valid, as shown in Table 44 on page 219.
- If you are using CICS, you must specify QUERY=NO on the TYPETERM macro for the printers.

For information about defining resources, see the IMS or CICS information that is related to resource definitions.

Specifying correct BIND parameters

The VTAM BIND request that the VTAM application, the primary LU, sends to establish a session with a NetSpool printer LU, the secondary LU, must result in correct BIND parameters. That is:

- The LU type must be consistent with the type of print data to be sent during the session.
- The FM Profile and TS Profile values must be valid for that LU type.
- The presentation space must not exceed the maximum size.

Table 44 on page 219 shows the valid combinations of the BIND parameters.

Table 44. VTAM BIND parameter requirements				
Data type	**LU type**	**FM profile**	**TS profile**	**Presentation space**
3270 data	LU 0	2	2	Maximum is 16384 bytes
3270 data	LU 3	3	3	Maximum is 16384 bytes

Table 44. VTAM BIND parameter requirements (continued)				
Data type	LU type	FM profile	TS profile	Presentation space
SNA character string (SCS) data	LU 1	3 or 4	3 or 4	

VTAM applications that establish sessions with NetSpool printer LUs can either use the BIND parameters in the logon mode table entry referred to in the APPL statement for the NetSpool printer LU, or the applications can override the BIND parameters, by using their own resource definitions. In either case, the BIND parameters must be correct.

In most cases, CICS and IMS subsystems override the BIND parameters that are associated with the NetSpool printer LU with BIND parameters that are consistent with the type of data in the print requests. However, in one case, when an IMS application sends a BIND request, and the NetSpool printer LU logical printer is defined in IMS as a non-SNA 3270 device, IMS uses the BIND parameters that are specified for the NetSpool printer LU, without any changes. Therefore, in this instance, the BIND parameters for the NetSpool printer LU must be correct for a 3270 data stream, as shown in Table 44 on page 219.

Chapter 16. Using ISPF panels to manage the Printer Inventory

The following information describes how to use Infoprint Server ISPF panels to manage entries in the Printer Inventory. You can use ISPF panels to add, list, browse, copy, edit, and delete printer definitions, components, printer pool definitions, FSA definitions, FSS definitions, and job selection rules.

You can also use the Printer Inventory Definition Utility (PIDU) to manage entries in the Printer Inventory. The PIDU program can be useful for creating many entries in the Printer Inventory. Also, you can use the PIDU program to create a backup copy of the Printer Inventory (see the **export** command). For information, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 237.

For examples of some of the Infoprint Server ISPF panels, see Appendix B, "ISPF panels," on page 487.

When the Printer Inventory Manager is started, it creates the Printer Inventory files if they do not exist in directory `/var/Printsrv` or in the directory that is specified in the `base-directory` statement of the Infoprint Server configuration file (`aopd.conf`). To view the Printer Inventory files, use either the Infoprint Server ISPF panels or the PIDU program.

Starting the ISPF session and configuring the panels

Before using the Infoprint Server ISPF panels, Infoprint Server must be started. The Printer Inventory Manager daemon, **aopd**, must be active.

To use the Infoprint Server ISPF panels, you must have access to one or more of these RACF resource profiles:

- AOP.ADMINISTRATOR profile in the PRINTSRV class:
  - READ access to browse any object in the Printer Inventory.
  - UPDATE access to add, edit, and delete any objects in the Printer Inventory except for the system configuration definition.
- AOP.CONFIGURATION profile in the PRINTSRV class:
  - READ access to browse the system configuration definition.
  - UPDATE access to force-create or edit the system configuration definition.

  If the AOP.CONFIGURATION profile does not exist, READ access to the AOP.ADMINISTRATOR profile lets you browse the system configuration definition and UPDATE access to the AOP.ADMINISTRATOR profile lets you force-create or edit the system configuration definition.
- AOPADMIN profile in the FACILITY class:

  If the AOP.ADMINISTRATOR profile does not exist, READ access to the AOPADMIN profile lets you browse, add, edit, and delete any object in the Printer Inventory except for the system configuration definition.

For information about how to set up security for the Printer Inventory, see *z/OS Infoprint Server Customization*.

Displaying Infoprint Server panels in Japanese

The ISPF panels are available in English and Japanese. To view Japanese panels:

- Define the code page to your 3270 emulator as IBM-939.
- When you start ISPF, enter: `ISPF Japanese`.
- Define the terminal type as 3270KN on the ISPF Settings panel.

Customizing CUA attributes for ISPF fields

Before you start using the Infoprint Server panels, you might want to customize your CUA (common user access) settings for ISPF fields. When you customize CUA settings, values that are specified in components can be displayed in a different color from other values on the panels. This lets you quickly distinguish between values that are specified in components and custom values (that is, values specified in a printer definition itself) on those ISPF panels that display both types of values.

To customize your ISPF CUA settings:

1. On the ISPF Settings panel, select **Colors** from the action bar and then select **CUA attributes**.
2. Change an attribute, such as color, for **Choice Entry** fields so that it is different from the attribute for **Normal Entry** fields. Values from components are displayed with the attributes selected for **Choice Entry** fields, while other values are displayed with the attributes selected for the **Normal Entry** fields.

Displaying the main Infoprint Server panel

To display the main Infoprint Server panel:

1. On the ISPF Primary panel, select the **System tools** option.
2. On the z/OS System Programmer Primary Option panel, select the **Infoprint Server** option. The first panel is called the Infoprint Server Printer Inventory Manager panel. If the z/OS System Programmer Primary Option panel does not contain the **Infoprint Server** option, ask your system programmer to customize your ISPF environment, as described in *z/OS Infoprint Server Customization*.
3. Before you use the panels for the first time, check the panel configuration. On the Infoprint Server Printer Inventory Manager panel, select **7 ISPF** and press **Enter**.
4. On the Infoprint Server: ISPF Panel Configuration panel, fill in the fields to configure your panels. Your system programmer can change the default values that appear on this panel in file AOPINIT, as described in *z/OS Infoprint Server Customization*. Use the ISPF online help for information about each field. To save the new settings and exit the panel, press the END function key.

Defining an Infoprint Server default printer definition

You can specify the name of a printer definition to be used as the default printer by the `lp` and `lpstat` commands and by the Print Interface subsystem. The default name is `lp1`.

The **PRINTER** and **LPDEST** environment variables override the default printer definition name for the `lp` command.

To specify a default printer definition:

1. On the Infoprint Server Printer Inventory Manager panel, select **7 Configure** and press **Enter**.
2. On the Configuration panel, complete the **Default printer** field and press the END function key.
3. Add a printer definition with that name. For information, see "Adding a printer definition" on page 223.

Managing the system configuration definition

The following information describes how to use the Infoprint Server ISPF panels to manage the system configuration definition. Administrators can use ISPF panels to create, edit, or browse the definition.

Creating or editing the system configuration definition

To create or edit the system configuration definition:

1. On the Infoprint Server Printer Inventory Manager ISPF panel, select **8 System** and press **Enter**. If you have authority to edit the system configuration definition, the Infoprint Server System Configuration panel is displayed in Edit mode. Otherwise, the panel is displayed in Browse mode.
2. On the Infoprint Server System Configuration panel:

a. Fill in any of the editable fields on the panel. To display help information about each field, place the cursor on the value area of the field and press the HELP function key.

b. (Optional) To validate the fields before you save the panel, press **Enter**.

c. Save the changes to the system configuration definition. Do one of these:

- To save the changes but keep the panel on the screen, type SAVE on the command line and press **Enter**.
- To save the changes and exit the panel, press the END function key.
- To exit the panel without saving the changes, type CANCEL on the command line and press **Enter**.

Changes to the system configuration definition take effect as soon as you save them with a few exceptions. The help information for each field says whether you need to restart any Infoprint Server daemons before the change can take effect.

Browsing the system configuration definition

To browse the system configuration definition:

1. On the Infoprint Server Printer Inventory Manager ISPF panel, select **8 System** and press **Enter**. If you have authority to browse the system configuration definition, but not edit it, the Infoprint Server System Configuration panel is displayed in Browse mode.

2. On the Infoprint Server System Configuration panel:

a. To display help information about each field, place the cursor on the value area of the field and press the HELP function key.

b. To return to the previous panel, press the END function key.

Managing printer definitions

The following information describes how to use the Infoprint Server ISPF panels to manage printer definitions. For information about how to specify attributes in a printer definition for the components of Infoprint Server that you plan to use, see:

- Chapter 10, "Planning printer definitions for Print Interface," on page 83
- Chapter 11, "Planning printer and printer pool definitions for NetSpool," on page 103
- Chapter 12, "Planning printer definitions for IP PrintWay," on page 129
- Chapter 13, "Planning printer definitions for transforms," on page 203

Adding a printer definition

The procedure for adding a printer definition is described here.

Tip: It is more efficient to add a printer definition by copying an existing printer definition of the same type. For information, see "Copying a printer definition" on page 226.

To add a printer definition:

1. On the Infoprint Server Printer Inventory Manager panel, select **1 Add** and press **Enter**.

2. On the Choose a Definition Type and Protocol panel, select the type of printer definition and press **Enter**. Types are: IP PrintWay, PSF, and General. If the type is IP PrintWay, also select the type of transmission protocol (LPR, direct sockets, IPP, or email). Depending on selected type and protocol, different ISPF panels are displayed. For information about the types of printer definitions, see "Selecting the type of printer definition" on page 73.

3. On the IP PrintWay Printer Definition panel, the PSF Printer Definition panel, or the General Printer Definition panel:

a. Complete the printer definition name and other fields on this panel. To display online help information about how to use components and how to specify custom values, place the cursor

on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.

To complete the fields for each section of the printer definition (for example, the Allocation section), you can do one of these:

- Select a component that contains the attributes you want:

    i) Place the cursor on the **Component Name** field for the section and press **Enter**.

    ii) On the Component List panel, select the component name from the list and press **Enter**. If a component doesn't exist, create the component on the Component List panel.

    Note: Before you can save a printer definition that includes a component, all included components must exist in the Printer Inventory.

- Complete the fields in each section directly in this printer definition:

    i) Place the cursor on the **Custom Values** field for the section and press **Enter**.

    ii) On the next panel, complete the fields and press the END function key to return to the Printer Definition panel. The fields that you complete are not saved in the inventory until you press the END function key from the Printer Definition panel.

- Select a component, but also specify some fields directly in the printer definition:

    i) Select a component, and then place the cursor on the **Custom Values** field and press **Enter**.

    ii) On the next panel, the values that are specified in the component are displayed in blue. If you specify a different value for a field, this value overrides the value in the component.

For a list of the required and optional fields for NetSpool, IP PrintWay, and Print Interface, see table Appendix A, "Printer attribute tables," on page 479.

From this panel, you can also create and manage all of the components for the different sections of the printer definition. Place the cursor on the **Component Name** field for the section and press **Enter**. For more information, see "Managing components" on page 228.

b. If you want to validate the fields before you save the printer definition, press **Enter**.

c. To save the new definition but keep the panel on the screen, type SAVE on the command line and press **Enter**.

Tip: Type SAVE on the command line to easily add more than one printer definition of the same type.

d. To save the new definition and exit the panel, press the END function key.

Adding multiple printer definitions

To add more than one printer definition of the same type (IP PrintWay, PSF, or General) at the same time:

1. Follow the instructions that are described in "Adding a printer definition" on page 223 or "Copying a printer definition" on page 226, and complete the fields for the first printer definition.

2. To save the printer definition, type SAVE on the command line and press **Enter**. The printer definition panel remains on your screen. You can type SAVE from any of the printer definition panels.

3. Complete the fields for the second printer definition. Specify a new printer definition name and change any other values.

    Tip: You do not need to return to the main printer definition panel to change the name of the printer definition. Specify the new name in the **Printer definition name** field that is displayed at the top of each printer definition panel.

4. Type SAVE on the command line to save the second printer definition, and repeat these steps.

Tip: You can also use the Printer Inventory Definition Utility (PIDU) program to add many printer definitions at one time. First, use the ISPF panels to create one printer definition of the desired type and protocol. Then, use the PIDU **export** command to generate a PIDU **create** command for that printer definition. Replicate and edit the **create** command to create other printer definitions. For detailed

information and examples, see Chapter 17, "Using the PIDU program to manage the Printer Inventory," on page 237.

Listing printer definitions

You must display a list of printer definitions before you can browse, copy, edit, delete, or change the type of a printer definition. You can list all printer definitions, or you can select the printer definitions that you want to list.

Listing all printer definitions

To display a list of all printer definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **2 List** and press **Enter**.
2. On the Printer Definition List panel, you can type one of the actions to do the other functions that are described in this section. Press the END function key to exit the list. Press **Enter** at any time to obtain a current list.

Listing selected printer definitions

You can select printer definitions based on one or more of these criteria. Printer definitions are listed if they meet all of the criteria you specify.

- Name of the printer definition
- Type of printer definition: IP PrintWay, PSF, or General
- Type of data formats the printer supports
- Location of the printer
- Destination that is associated with the printer definition
- Class that is associated with the printer definition
- Forms name associated with the printer definition
- Destination node that is associated with the printer definition
- Logical unit name for the printer definition
- Host name or IP address of the printer

To display a list of selected printer definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **3 Select** and press **Enter**.
2. On the Select Printer Definitions panel, type values in one or more fields to specify selection criteria and press **Enter**. The online help for each field explains how to use an * or ? to represent one or more variable characters.
3. On the Printer Definition List panel, you can type an action in front of one or more printer definitions and press **Enter**. Press **Enter** at any time to obtain a current list.
4. Press the END function key to exit the list.

Tip: To list all printer definitions that use a particular component, see "Listing printer definitions that include a component" on page 229.

Browsing a printer definition

When you browse a printer definition, you can view fields but you cannot change any of them. To browse the printer definition:

1. List the printer definition that you want to browse, as described in "Listing printer definitions" on page 225.
2. On the Printer Definition List panel, type B in the **A** column in front of the printer definition you want to browse and press **Enter**.

3. On the Printer Definition panel:

    a. To view a component that is named in the printer definition, place the cursor on the component name and press **Enter**.

    b. To view all of the attributes for this printer definition, including the attributes that are specified in the component (if one is named in the **Component Name** field, place the cursor on the **Custom Values** field and press **Enter**.

    c. To return to the Printer Definition List panel, press the END function key.

Copying a printer definition

To add a printer definition, you can copy an existing definition and modify fields in the definition as necessary. To make sure that the correct fields are displayed on the ISPF panels, be sure to copy the same type of printer definition (IP PrintWay, PSF, or General) as the one you want to add. If the printer definition is an IP PrintWay printer definition, also be sure to copy a printer definition that uses the same protocol (LPR, direct sockets, IPP, or email) as the one you want to add.

When you copy a printer definition, you can change any field. However, you must change the **Printer Name** field.

To copy a printer definition:

1. List the printer definition you want to copy, as described in "Listing printer definitions" on page 225.
2. On the Printer Definition List panel, type C in the **A** column in front of the printer definition you want to copy and press **Enter**.
3. On the Printer Definition panel:

    a. Change the **Printer Name** field and any other field. To validate the fields, press **Enter**.

    b. To save the new printer definition, but maintain the panel on the screen, type SAVE on the command line and press **Enter**. You can now add more printer definitions. To save the new definition and return to the Printer Definition List panel, press the END function key.

       Tip: Type SAVE on the command line to easily add more than one printer definition of the same type.

    c. To save the new definition and exit the panel, press the END function key.

Editing a printer definition

When you edit a printer definition, you can edit any field. Changes that you make generally take effect for the next data set that NetSpool and Print Interface allocate on the JES spool and the next data set that IP PrintWay selects from the JES spool. Changes that you make to a printer definition do not affect data sets that are in the process of being allocated on the JES spool or data sets that are retained on the JES spool after successful or failed transmission.

Changes to the NetSpool end-of-file rules and NetSpool LU class, however, are related to the VTAM session and do not take effect for the next data set allocated on the JES spool. For information about when changes to these fields take effect, see "Specifying how NetSpool determines end-of-file" on page 119 and "Grouping NetSpool printer LUs into LU classes" on page 104.

If you change the name of a printer definition, the name is automatically changed in any printer pool definition that lists the printer definition.

Tip: To change the protocol type in an IP PrintWay printer definition, see "Changing the type of a printer definition or the IP PrintWay protocol type" on page 227.

To edit a printer definition:

1. List the printer definition you want to edit, as described in "Listing printer definitions" on page 225.
2. On the Printer Definition List panel, type E in the **A** column in front of the printer definition whose fields you want to edit, and press **Enter**.
3. On the Printer Definition panel:

a. Change any field on the panels. To validate the fields, press **Enter**.

b. To save the printer definition but maintain the panel on the screen, type SAVE on the command line and press **Enter**. To save the printer definition and return to the Printer Definition List panel, press the END function key.

Deleting a printer definition

When you delete a printer definition, the printer definition is removed from the Printer Inventory. If a printer pool definition contains the printer definition, the printer definition is automatically removed from the printer pool definition. To delete a printer definition:

1. List the printer definition you want to delete, as described in "Listing printer definitions" on page 225.
2. On the Printer Definition List panel, type D in the **A** column in front of the printer definition you want to delete and press **Enter**.
3. On the Confirm Delete panel, press **Enter** to delete the printer definition. Press the END function key to cancel the delete request.

Changing the type of a printer definition or the IP PrintWay protocol type

Do these steps to change the type of the printer definition or to change the type of protocol that IP PrintWay uses to transmit data to the printer. The printer definition types are IP PrintWay, PSF, or General. The IP PrintWay protocol types are LPR, direct sockets, IPP, and email.

Note: The VTAM protocol is listed on the ISPF panel; however, the VTAM protocol is only used if Infoprint Coaxial Printer Support for z/OS is installed. Because Infoprint Coaxial Printer Support for z/OS is not supported in z/OS V2R5, the VTAM protocol is no longer documented.

1. List the printer definition you want to change, as described in "Listing printer definitions" on page 225.
2. On the Printer Definition List panel, type X in the **A** column in front of the printer definition you want to change and press **Enter**.
3. On the Choose a Definition Type and Protocol panel, select the printer definition type and the protocol type. Press **Enter**.
4. If you selected an IP PrintWay type, the Protocol panel is displayed. On the Protocol panel, specify the required fields for the type of protocol and save the printer definition.

   Before you save the printer definition, make sure that these fields are correct on the Processing panel:

   - **Printer code page**: For the LPR, direct sockets, and IPP protocols, specify an ASCII code page. For the email protocol, specify an EBCDIC code page.
   - **Filter** field for the **Text** data format: For the LPR, direct sockets, and IPP protocols, specify either the `aopfiltr.so` or `lpd_compat.so` filter. For the email protocol, do not specify either of these filters.

5. If you selected either PSF or General type, the Printer Definition List panel is displayed. If you need to edit any fields in the printer definition, type E in the **A** column in front of the printer definition. If you changed the type from IP PrintWay to either PSF or General, make sure that these fields are correct on the Processing panel:

   - **Printer code page**: Specify an EBCDIC code page.
   - **Filter** field for the **Text** data format: Do not specify the `aopfiltr.so` filter.

Testing a printer definition

The ISPF panels check the validity of many of the values you specify in the fields of a printer definition. However, to check the validity of all fields (for example, to verify the IP address of the remote printer) print a file to the printer named in the printer definition. If IP PrintWay finds an error, it sends a message to the IP PrintWay message log. If NetSpool finds an error, it sends a message to the NetSpool message log if one exists.

If you configured data transforms, print data of each format to the printer definition.

Managing components

The following information describes how to use Infoprint Server ISPF panels to manage components. A component contains attributes that are common to several printer definitions. You can define one or more components for each section of a printer definition, such as the Allocation section and the Processing section. For more information about components and when you might want to create them, see "Including components in printer definitions" on page 77.

For information about how to customize your ISPF settings so that values that you specify in components are displayed in different colors on ISPF panels, see "Customizing CUA attributes for ISPF fields" on page 222.

Listing components

You must obtain a list of components before you can add, copy, edit, rename, or delete a component. To obtain a list of components:

1. Add, edit, or copy any printer definition, as described in "Adding a printer definition" on page 223, "Copying a printer definition" on page 226 or "Editing a printer definition" on page 226.

2. On the Printer Definition panel:

   a. If you are adding a printer definition, specify a printer definition name.

   b. Place the cursor on the **Component Name** field for one section of the printer definition, such as the Allocation section, and press **Enter**.

3. The Component List panel displays all of the components for the section. On this panel, you can type an action in the **A** column to do the other functions that are described in this section. Press the END function key to return to the Printer Definition panel.

4. Type CANCEL on the command line of the Printer Definition panel, unless you want to add, edit, or copy the printer definition.

Adding a component

You can add a component of a printer definition as described here.

Tip: It is more efficient to add a component by copying an existing component of the same type. For information, see "Copying a component" on page 229.

To add a component:

1. List the components for the section of the printer definition, for example, the Allocation section, as described in "Listing components" on page 228.

2. On the Component List panel, type add on the command line and press **Enter**.

3. On the next panel:

   a. Type a component name in the **Component name** field. The components for the same section must have unique names. However, components for different sections can have the same name. For example, an Allocation component and a Processing component can have the same name.

   b. Specify any other attributes. You can leave blank the fields that you want to specify in the printer definitions that include this component. In the printer definitions that include the component, you can override any attributes that are specified in the component and you can specify attributes that are left blank in the component. To validate the fields, press **Enter**.

   c. To save the new component but keep the panel on the screen, type SAVE on the command line and press **Enter**. To save the new component and return to the Component List panel, press the END function key.

      Tip: Type SAVE on the command line to easily add more than one component of the same type.

   d. To save the new component and exit the panel, press the END function key.

Listing printer definitions that include a component

To list the printer definitions that include a particular component:

1. List the components for the section of the printer definition, as described in "Listing components" on page 228.

2. On the Component List panel, type P in the **A** column in front of the component name and press **Enter**.

3. The Printer Definition List panel displays a list of printer definitions that include the component. On this panel, you can add, edit, browse, copy, those printer definitions. Press the END function key to return to the Component List panel.

Browsing a component

When you browse a component, you can view fields but you cannot change any of them. To browse any component:

1. List the components for the section of the printer definition as described in "Listing components" on page 228.

2. On the Component List panel, type B in the **Action** column next to the components you want to browse and press **Enter**.

3. The next panel displays the component. Press the END function key to return to the Component List panel.

Copying a component

You can add a component by copying an existing component to a new component and changing the name and any other fields. Because the components for each section of a printer definition, for example the Allocation section, contain different fields, be sure to copy the correct type of component.

To copy a component:

1. List the components for the section of the printer definition as described in "Listing components" on page 228.

2. On the Component List panel, type C in the **A** column in front of the component you want to copy and press **Enter**.

3. On the next panel:

   a. Change the **Component Name** field and any other field. To validate the fields, press **Enter**.

   b. To save the new component, but keep the panel on the screen, type SAVE on the command line and press **Enter**. To save the new definition and return to the Component List panel, press the END function key.

      Tip: Type SAVE on the command line to easily add more than one component of the same type.

   c. To save the new component and exit the panel, press the END function key.

Editing a component

When you edit a component, you can edit any field. The changes that you make take effect for all printer definitions that include that component. Therefore, before you edit a component, you might want to list the printer definitions that include the component.

If you change the name of a component, the component name is automatically changed in all printer definitions and printer pool definitions that include that component.

To edit a component:

1. List the components for the section of the printer definition as described in "Listing components" on page 228.

2. On the Component List panel, type E in the **A** column in front of the components you want to edit and press **Enter**.

3. On the next panel:

   a. Change any field on the panels. To validate the fields, press **Enter**.

   b. To save the component, but keep the panel on the screen, type SAVE on the command line and press **Enter**. To save the component and return to the Component List panel, press the END function key.

   c. To save the component and exit the panel, press the END function key.

Renaming a component

To rename a component and also change the component name in all printer definitions and printer pool definitions that include the component:

1. List the components for the section of the printer definition as described in "Listing components" on page 228.

2. On the Component List panel, type R in the **A** column in front of the component you want to rename and press **Enter**.

3. On the Enter the New Component Name panel, type the new name and press **Enter**. Press the END function key to cancel the rename request.

Deleting a component

You can delete a component only if no printer definitions or printer pool definitions include that component. You can use the procedure described in "Listing printer definitions that include a component" on page 229 to determine whether any printer definitions include the component to be deleted.

To delete a component:

1. List components as described in "Listing components" on page 228.

2. On the Component List panel, type D in the **A** column in front of the components you want to delete and press **Enter**.

3. On the Confirm Delete panel, press **Enter** to delete the component, or press the END function key to cancel the delete request.

Managing printer pool definitions

The following information describes how to use the Infoprint Server ISPF panels to manage printer pool definitions. A printer pool definition is used by NetSpool to broadcast data to several printer definitions. For more information about printer pool definitions and when you might want to create them, see "Planning printer pool definitions" on page 80.

Adding a printer pool definition

You can add a printer pool definition as described here.

Before you add a printer pool definition, create the printer definitions for the printers in the pool, if necessary.

To add a printer pool definition:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.

2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **7 Add** and press **Enter**.

3. On the Printer Pool panel:

   a. To display online help information about how to use the panel, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of each field and press the HELP function key.

b. Fill in the **LU name** field and the **Printer definition names** fields. To select printer definitions one at a time from a list, place the cursor on the word **list** and press **Enter**.

If a printer definition does not exist, you can create it from the list panel. Before you can save a printer pool definition, all printer definitions that are listed in the printer pool definition must exist in the Printer Inventory.

The order in which printer definition names are listed is significant. NetSpool uses formatting attributes in the printer definition that you list first.

c. Other fields on the Printer Pool panel are optional. For more information about which fields to specify in printer pool definitions, see "Broadcasting data with multiple printer definitions" on page 123.

d. To validate the fields before you save the printer pool definition, press **Enter**.

e. To save the new definition but keep the panel on the screen, typeSAVE on the command line and press **Enter**.

f. To save the new definition and exit the panel, press the END function key.

Listing printer pool definitions

You must display a list of printer pool definitions before you can browse, copy, edit, or delete a printer pool definition. You can list all printer pool definitions, or you can select the printer pool definitions that you want to list.

Listing all printer pool definitions

To display a list of all printer pool definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **8 List** and press **Enter**.
3. On the Pool List panel, you can type one of the actions to do the other functions that are described in this section. Press the END function key to exit the list. Press **Enter** at any time to obtain a current list.

Listing selected printer pool definitions

You can select printer pool definitions based on one or more of these criteria. Printer pool definitions are listed if they meet all of the criteria you specify.

- Name of the printer pool definition
- NetSpool logical-unit (LU) name
- Description of the printer pool definition
- LU class
- NetSpool End-of-File component name
- Names of printer definitions in the pool

To display a list of selected printer pool definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **9 Select** and press **Enter**.
3. On the Select Pool panel, type values in one or more fields to specify selection criteria and press **Enter**. The online help for each field explains how to use an * or ? to represent one or more variable characters.
4. On the Pool List panel, you can type an action in front of one or more printer definitions and press **Enter**. Press **Enter** at any time to obtain a current list.
5. Press the END function key to exit the list.

Browsing, copying, editing, and deleting a printer pool definition

To browse, copy, edit, or delete the printer pool definition:

1. List the printer definition that you want to work with, as described in "Listing printer pool definitions" on page 231.
2. On the Pool List panel, type B, C, E, or D in the **A** column in front of the printer pool definition you want to work with and press **Enter**.
3. To return to the Pool List panel, press the END function key.

Managing FSS definitions

The following information describes how to use the Infoprint Server ISPF panels to manage FSS (functional subsystem) definitions. For more information about FSS definitions and when you might want to create them, see "Planning FSS definitions" on page 80.

Adding an FSS definition

You can add an FSS definition as described here.

Tip: It is more efficient to add an FSS definition by copying an existing FSS definition of the same type. For information, see "Browsing, copying, editing, and deleting an FSS definition" on page 233.

To add an FSS definition:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **4 Add**.
3. On the Choose an FSS type to add panel, select the type of FSS definition and press **Enter**. Types are: IP PrintWay and PSF. Depending on the type you select, different ISPF panels are displayed.
4. On the IP PrintWay FSS panel or the PSF FSS panel:

   a. Complete the FSS name and other fields on this panel. The FSS name must match the name of the FSS as defined to JES. To display online help information, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.

   b. To validate the fields before you save the FSS definition, press **Enter**.

   c. To save the new definition but keep the panel on the screen, type SAVE on the command line and press **Enter**.

      Tip: Type SAVE on the command line to easily add more than one FSS definition of the same type.

   d. To save the new definition and exit the panel, press the END function key.

Tip: If you already created some FSS definitions, you can add an FSS definition by typing A in the **A** column on the FSS Definition List panel. For more information, see "Listing FSS definitions" on page 232.

Listing FSS definitions

You must display a list of FSS definitions before you can browse, copy, edit, or delete an FSS definition. You can list all FSS definitions, or you can select the FSS definitions that you want to list.

Listing all FSS definitions

To display a list of all FSS definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **5 List** and press **Enter**.
3. On the FSS List panel, you can type one of the actions to do the other functions that are described in this section. Press the END function key to exit the list. Press **Enter** at any time to obtain a current list.

Listing selected FSS definitions

You can select FSS definitions to list based on one or more of these criteria. FSS definitions are listed if they meet all of the criteria you specify.

- FSS name
- Description of the FSS definition
- Type of FSS definition: IP PrintWay or PSF

To display a list of selected FSS definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **6 Select** and press **Enter**.
3. On the FSS Select panel, type values in one or more fields to specify selection criteria and press **Enter**. The online help for each field explains how to use an * or ? to represent one or more variable characters.
4. On the FSS List panel, you can type an action in front of one or more printer definitions and press **Enter**. Press **Enter** at any time to obtain a current list.
5. Press the END function key to exit the list.

Browsing, copying, editing, and deleting an FSS definition

To browse, copy, edit, or delete an FSS definition:

1. List the FSS definition that you want to work with, as described in "Listing FSS definitions" on page 232.
2. On the FSS List panel, type B, C, E, or D in the **A** column in front of the FSS definition you want to work with and press **Enter**.
3. To return to the FSS List panel, press the END function key.

Managing FSA definitions

The following information describes how to use the Infoprint Server ISPF panels to manage FSA (functional subsystem application) definitions. For more information about FSA definitions and when you might want to create them, see "Planning FSA definitions" on page 81.

Adding an FSA definition

You can add an FSA definition as described here.

Tip: It is more efficient to add an FSA definition by copying an existing FSA definition of the same type. For information, see "Browsing, copying, editing, and deleting an FSA definition" on page 234.

To add an FSA definition:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **1 Add**.
3. On the Choose an FSA type to add panel, select the type of FSA definition and press **Enter**. Types are: IP PrintWay, PSF channel, PSF SNA, PSF TCP/IP, and AFP Download Plus. Depending on the type you select, different ISPF panels are displayed.
4. On the IP PrintWay FSA panel or the PSF FSA panel:
   a. Complete the FSA name and other fields on this panel. The FSA name must match the name of the FSA as defined to JES. To display online help information, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.
   b. To validate the fields before you save the FSA definition, press **Enter**.

c. To save the new definition but keep the panel on the screen, type SAVE on the command line and press **Enter**.

   Tip: Type SAVE on the command line to easily add more than one FSA definition of the same type.

d. To save the new definition and exit the panel, press the END function key.

Tip: If you already created some FSA definitions, you can add an FSA definition by typing A in the **A** column on the FSA Definition List panel. For more information, see "Listing FSA definitions" on page 234.

Listing FSA definitions

You must display a list of FSA definitions before you can browse, copy, edit, or delete an FSA definition. You can list all FSA definitions, or you can select the FSA definitions that you want to list.

Listing all FSA definitions

To display a list of all FSA definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **2 List** and press **Enter**.
3. On the FSA List panel, you can type one of the actions to do the other functions that are described in this section. Press the END function key to exit the list. Press **Enter** at any time to obtain a current list.

Listing selected FSA definitions

You can select FSA definitions to list based on one or more of these criteria. FSA definitions are listed if they meet all of the criteria you specify.

- FSA name
- Description of the FSA definition
- Type of FSA definition: IP PrintWay, PSF channel, PSF SNA, PSF TCP/IP, or PSF AFP Download Plus.

To display a list of selected FSA definitions:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **3 Select** and press **Enter**.
3. On the FSA Select panel, type values in one or more fields to specify selection criteria and press **Enter**. The online help for each field explains how to use an * or ? to represent one or more variable characters.
4. On the FSA List panel, you can type an action in front of one or more printer definitions and press **Enter**. Press **Enter** at any time to obtain a current list.
5. Press the END function key to exit the list.

Browsing, copying, editing, and deleting an FSA definition

To browse, copy, edit, or delete an FSA definition:

1. List the FSA definition that you want to work with, as described in "Listing FSS definitions" on page 232.
2. On the FSA List panel, type B, C, E, or D in the **A** column in front of the FSA definition you want to work with and press **Enter**.
3. To return to the FSA List panel, press the END function key.

Note: When you edit values in an FSA definition, you need to restart the IP PrintWay FSA or PSF printer for your changes to take effect.

Managing job selection rules

This information describes how to use the Infoprint Server ISPF panels to manage job selection rules. Job selection rules apply only to IP PrintWay extended mode.

For detailed information about how to set up and use job selection rules, see *z/OS Infoprint Server Customization*.

Adding a job selection rule

You can add a job selection rule as described here.

Tip: It is more efficient to add a job selection rule by copying an existing job selection rule. For information, see "Browsing, copying, editing, and deleting a job selection rule" on page 235.

To add a job selection rule:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **10 Add**.
3. On the Job Selection Rule panel:

   a. Complete the Rule name and other fields on this panel. To display online help information, place the cursor on the command line and press the HELP function key. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.

   b. To validate the fields before you save the job selection rule, press **Enter**.

   c. To save the new job selection rule but keep the panel on the screen, type SAVE on the command line and press **Enter**.

   Tip: Type SAVE on the command line to easily add more than one job selection rule.

   d. To save the new job selection rule and exit the panel, press the END function key.

Tip: If you already created some job selection rules, you can add a job selection rule by typing A in the **A** column on the Job Selection Rule List panel. For more information, see "Listing job selection rules" on page 235.

Listing job selection rules

You must display a list of job selection rules before you can browse, copy, edit, or delete a job selection rule.

To display a list of all job selection rules:

1. On the Infoprint Server Printer Inventory Manager panel, select **4 Other Definitions** and press **Enter**.
2. On the FSA, FSS, Pool, and Job Selection Rule Management panel, select **11 List** and press **Enter**.
3. On the Job Selection Rule List panel, you can type one of the actions to do the other functions that are described in this section. Press the END function key to exit the list. Press **Enter** at any time to obtain a current list.

Browsing, copying, editing, and deleting a job selection rule

To browse, copy, edit, or delete a job selection rule:

1. List the job selection rule that you want to work with, as described in "Listing job selection rules" on page 235.
2. On the Job Selection Rule List panel, type B, C, E, or D in the **A** column in front of the job selection rule you want to work with and press **Enter**.
3. To return to the Job Selection Rule List panel, press the END function key.

Chapter 17. Using the PIDU program to manage the Printer Inventory

The following information describes how to use the Printer Inventory Definition Utility (PIDU) program to manage objects in the Printer Inventory. Inventory objects include printer definitions, printer pool definitions, components, FSS definitions, FSA definitions, job selection rules, and trace-parameters objects.

The PIDU program is useful for creating and editing many objects at the same time. Also, you can use it to do some functions that you cannot do with Infoprint Server ISPF panels. For example, you can export or dump objects in the Printer Inventory to a file, and you can do more powerful searches of the Printer Inventory.

Running the PIDU program

Before running the PIDU program, Infoprint Server must be started. The Printer Inventory Manager daemon, **aopd**, must be active.

To run the PIDU program, you must have a UID of 0 or be a member of the AOPADMIN group. In addition, you must have access to one or more of these RACF resource profiles:

- AOP.ADMINISTRATOR profile in the PRINTSRV class:
  - READ access to display, dump, export, or list any object in the Printer Inventory.
  - UPDATE access to create, delete, force-create, modify, or rename any object except for the system configuration definition.

  If the AOP.ADMINISTRATOR profile does not exist, READ access to the AOPADMIN profile in the FACILITY class lets you do the functions.

- AOP.CONFIGURATION profile in the PRINTSRV class:
  - READ access to display, dump, export, or list the system configuration definition.
  - UPDATE access to force-create or modify the system configuration definition.

  If the AOP.CONFIGURATION profile does not exist, UPDATE access to the AOP.ADMINISTRATOR profile in the PRINTSRV class lets you force-create or modify the system configuration definition.

- AOPADMIN profile in the FACILITY class:

  If the AOP.ADMINISTRATOR profile does not exist, READ access to the AOPADMIN profile lets you browse, add, edit, and delete any object in the Printer Inventory except for the system configuration definition.

For information about how to establish security for the Printer Inventory, see *z/OS Infoprint Server Customization*.

You can run the PIDU program in two ways:

- From the z/OS UNIX shell with the **pidu** command. See "Running the PIDU program with the pidu command" on page 237.
- As a batch job. See "Running the PIDU program as a batch job" on page 240.

Running the PIDU program with the pidu command

Format

```
pidu [-qv] [-c "command; …"]… [filename]…
```

Description

With the **pidu** command, you can specify one or more of the PIDU commands that are shown in <u>Table 45 on page 242</u> to manage objects in the Printer Inventory. You can specify PIDU commands in the **-c** option or in a file. The **pidu** command writes a report of errors to standard error (`stderr`) and writes informational messages and command output to standard output (`stdout`).

Options

-c '*command; ...***'**
-c "*command; ...***"**
    Specifies one or more PIDU commands. Enclose the commands in single or double quotation marks, and end each statement with a semicolon. If a command contains a value that requires single quotation marks, such as a hexadecimal value, enclose the commands in double quotation marks. You can repeat the **-c** option.

    If you do not specify the **-c** option or the name of a file, **pidu** reads the commands from standard input (`stdin`), which can be either keyboard data or output from another command.

    You can specify these PIDU commands:

    - **create**
    - **delete**
    - **display**
    - **display-fully**
    - **dump**
    - **export**
    - **force-create**
    - **list**
    - **modify**
    - **rename**

    For detailed information about these commands, see <u>"PIDU commands" on page 242</u>.

-q
    Suppresses informational messages that the **pidu** command writes to `stdout`.

-v
    Writes the name of the Printer Inventory to `stderr`. Also provides more informational messages.

Operands

filename
    The name of a UNIX file or sequential MVS data set that contains the commands. You can repeat this option.

    If the data set is an MVS data set, specify `//` before the file name. If you specify a fully qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output file is named `USERID.MYFILE`, enter:

```
//\'USERID.MYFILE\'
```

    If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

    To specify commands from `stdin`, omit the file name and the **-c** option.

Usage notes

- You can specify PIDU commands interactively from your keyboard. For an example, see "Entering PIDU commands interactively" on page 239.
- When you specify PIDU commands in a UNIX file (such as a z/FS file) or an MVS data set:
  - Start comments with a number sign (#).
  - Include blank lines if you want.
  - You can specify the PIDU command names, attribute names, and attribute values on separate lines.
  - In a UNIX file, an attribute value can span lines if all lines other than the last line end with a backslash. Be sure that no blank characters are present after the backslash. For example:

    ```
    attribute1 =
    'A very, very, very long \
    value'
    ```

  - In an MVS data set, the entire attribute value must be on one line. To specify a very long attribute value, allocate a data set that has a logical record length of 255 (LRECL=255) and a variable blocked record format (RECFM=VB). Then specify the entire value on one line. For example:

    ```
    attribute1 =
    'A very, very, very long value'
    ```

Examples -- pidu

Entering PIDU commands interactively

To enter one or more PIDU commands interactively from your keyboard:

1. On the z/OS UNIX command line, type `pidu` and press **Enter**.
2. Type a PIDU command and press **Enter**. For example, to create a printer definition, type:

   ```
   create printer lp1 description="Default printer"
    location="Printer room" printer-type=ip-printway dcf-routing=yes
    destination=LP1 printer-ip-address=printer1.boulder luname=LUPRT001
    lu-classes={2} include-allocation=printway
    include-processing = pcl_printer include-printway-options=pcl_land_17cpi
    include-netspool-eof-rules=bracket include-netspool-options=pcl
    include-protocol=lpr_options ;
   ```

   For an explanation of this **create** command, see "Creating an IP PrintWay printer definition for a PCL printer with LPR protocol" on page 250.

3. After the command is processed, type another command and press **Enter**. For example, to display the attributes of the printer definition that is just created, enter:

   ```
   display printer lp1;
   ```

4. After the command is processed, use **Ctrl-D** or type `exit` to end the **pidu** command.

Specifying PIDU commands on the command line

To specify two PIDU **list** commands with the **-c** option, enter:

```
pidu -c "list printer; list printer-pool;"
```

Specifying PIDU commands in a file

To specify a UNIX file that is named `pidu.commands` and that contains PIDU commands, enter:

```
pidu pidu.commands
```

To specify a fully qualified MVS data set named MARY.PIDU.CMDS, enter:

```
pidu //\'MARY.PIDU.CMDS\'
```

To prefix your TSO user ID to the data set name, enter:

```
pidu //PIDU.CMDS
```

File `pidu.commands` (or data set PIDU.CMDS) contains the PIDU commands. For example:

```
create printer lp1 description="Default printer"
 location="Printer room" printer-type=ip-printway dcf-routing = yes destination=LP1
 printer-ip-address=printer1.boulder 1uname = LUPRT001 lu-classes={ 2 }
 include-allocation=printway include-processing=pcl_printer
 include-printway-options=pcl_land_17cpi include-netspool-options=pcl
 include-netspool-eof-rules=bracket include-protocol=lpr_options ;
list printer;       # List all printer definitions
```

Specifying PIDU commands with hexadecimal values

To specify a PIDU create command that contains the line-termination attribute, enter:

```
pidu -c "create printer lp2 line-termination=X'0D25';"
```

Environment variables

AOPCONF
Names the Infoprint Server configuration file. The file that is named in this variable takes precedence over the user-specific configuration file ($HOME/.aopconf) and the system default configuration file (/etc/Printsrv/aopd.conf).

LIBPATH
The path that is used to locate dynamic link libraries (DLL).

NLSPATH
Lists the directory where the Infoprint Server message catalogs are located.

PATH
Lists the directory where the Infoprint Server executables are located.

Files

$HOME/.aopconf
Contains the user-specific Infoprint Server configuration file. This file takes precedence over /etc/Printsrv/aopd.conf.

/etc/Printsrv/aopd.conf
The default Infoprint Server configuration file.

Exit values

0
The PIDU commands were done successfully.

>0
An error occurred that prevented one or more PIDU commands from being done successfully.

Running the PIDU program as a batch job

You can run the PIDU program as a batch job from TSO by using the AOPBATCH or BPXBATCH program. The following information describes how to use the AOPBATCH program because the AOPBATCH program sets default environment variables that the PIDU program requires.

Using AOPBATCH to run the PIDU program

You can start AOPBATCH in JCL with this EXEC statement:

```
//stepname EXEC PGM=AOPBATCH,PARM='pidu [-v] [-q]'
```

-q

Suppresses informational messages that the **pidu** command writes to the output data set named in the STDOUT DD statement.

-v

Writes the name of the Printer Inventory to the output data set named in the STDERR DD statement. Also provides more informational messages.

You can specify these DD statements:

STDENV

Specifies environment variables that are used by the PIDU program. You can specify the environment variables either in-stream or in a UNIX file or MVS data set. For the environment variables used by the PIDU program, see "Environment variables" on page 240. When you use AOPBATCH, you need to specify the PATH, LIBPATH, and NLSPATH environment variables only if your installation did not install Infoprint Server files in the default directories. Specify the AOPCONF environment variable if the Infoprint Server configuration file is not in /etc/Printsrv/aopd.conf or in $HOME/.aopconf. Specify the environment variables in the format *variable* = *value*.

STDERR

Specifies a SYSOUT data set, a UNIX file, or an MVS data set. The PIDU program writes error messages to this file or data set.

STDIN

Specifies PIDU commands in-stream or names a UNIX file or MVS data set that contains the commands.

Tip: If any attribute value is greater than 80 characters, you cannot specify the PIDU commands in-stream because an attribute value cannot span lines and the SYSIN DD * statement specifies a maximum of 80 characters on one line. Instead, specify the PIDU commands in an MVS data set that has a logical record length (LRECL) of 255 and a variable blocked (VB) blocksize (BLKSIZE).

STDOUT

Specifies a SYSOUT data set, a UNIX file, or an MVS data set. The PIDU program writes its output and informational messages to this file or data set.

IBM provides sample JCL in the AOPPIDU member of SYS1.SAMPLIB for running the PIDU program with the AOPBATCH utility. Figure 7 on page 241 shows member AOPPIDU.

```
//AOPPIDU  JOB ,'pidu'
//*
//PIDU     EXEC PGM=AOPBATCH,PARM='pidu'
//*
//STDIN    DD  DSN=hlq.INVDEFS,DISP=SHR
//*
//STDOUT   DD  SYSOUT=*
//STDERR   DD  SYSOUT=*
//*
//* STDENV may point to a dataset containing environment variables.
//*      Builtin values will work for the default installation.
//*STDENV   DD  DSN=environment,DISP=SHR
```

Figure 7. Sample JCL for running the PIDU program as a batch job: SYS1.SAMPLIB(AOPPIDU)

Example

This example lists all printer definitions and printer pool definitions, and specifies environment variables in-stream in the JCL:

```
//AOPPIDU  JOB ...
//PIDU     EXEC PGM=AOPBATCH,PARM='pidu'
//STDIN    DD  *
```

```
list printer;
list printer-pool;
/*
//STDOUT   DD  SYSOUT=*
//STDERR   DD  SYSOUT=*
//STDENV   DD *
PATH=/usr/mylib/Printsrv/bin
LIBPATH=/usr/mylib/Printsrv/lib
NLSPATH=/usr/mylib/Printsrv/%L/%N:/usr/mylib/Printsrv/En_US/%N
/*
```

Tip: If your installation installed Infoprint Server files in default directories, you can omit the STDENV DD statement.

Using BPXBATCH to run the PIDU program

If you use the BPXBATCH utility program to run the **pidu** command, you must always set the PATH, LIBPATH, and NLSPATH environment variables, even if your installation installed Infoprint Server files in default locations. Specify the AOPCONF environment variable if the Infoprint Server configuration file is not in /etc/Printsrv/aopd.conf or in $HOME/.aopconf. For information about these environment variables, see "Environment variables" on page 240.

For information about the BPXBATCH utility program, see *z/OS UNIX System Services Command Reference*.

PIDU commands

As input to the PIDU program, you must specify one or more PIDU commands. Table 45 on page 242 summarizes the PIDU commands, the function of each command, and where to find more information about the command.

Table 45. Summary of PIDU commands

PIDU command	Function of command	See
create	Create an object.	"create and force-create—create an object" on page 245
delete	Delete an object.	"delete—delete an object" on page 256
display	Display the attributes of an object.	"display—show attributes of an object" on page 257
display-fully	Display the attributes of a printer definition plus the attributes of any components that the printer definition includes.	"display-fully—show attributes of a printer definition plus included components" on page 258
dump	Dump all objects.	"dump—dump the Printer Inventory to a file" on page 259
export	Generate **create** or **force-create** commands for all objects that the administrator has created or only for objects that meet certain criteria.	"export—export objects to a file" on page 260
force-create	Create an object or replace an object of the same name if it exists in the same object class.	"create and force-create—create an object" on page 245
list	List all objects or only objects that meet certain criteria.	"list—list names of objects" on page 262

Table 45. Summary of PIDU commands (continued)

PIDU command	Function of command	See
modify	Modify attributes of an object.	"modify—change attributes of an object" on page 264
rename	Rename an object.	"rename—rename an object" on page 265

The following considerations apply when you use these **pidu** commands to work with the system configuration definition:

- **create**: This command is not allowed.
- **delete**: This command is not allowed because the system configuration definition is required.
- **export**: This command exports the system configuration definition.
- **force-create**: This command creates or replaces the system configuration definition.
- **modify**: This command modifies the system configuration attributes.
- **rename**: This command is not allowed because the system configuration definition must be named aopd.conf. Note that, although they have the same name, the system configuration definition is not the same thing as the aopd.conf file.

Tip: To abbreviate command names, use enough characters to make the command name unique. For example, you can abbreviate **display** as **di**.

PIDU object classes

Most PIDU commands require that you identify the *object class* of the object in the Printer Inventory that you want to work with. Table 46 on page 243 summarizes how the PIDU program classifies objects in the Printer Inventory.

Table 46. Classes of objects used by the PIDU program

Object class	Description of object
allocation	An Allocation component
configuration	The system configuration definition
fsa	An FSA definition
job-selection-rule	A job selection definition
netspool-eof-rules	A NetSpool End-of-File component
netspool-options	A NetSpool Options component
printer	A printer definition
printer-pool	A printer pool definition
printway-fss	An FSS definition for an IP PrintWay functional subsystem
printway-options	An IP PrintWay Options component
processing	A Processing component
protocol	A Protocol component
psf-fss	An FSS definition for a PSF functional subsystem
trace-parameters	Trace parameters for tracing a daemon

Where predicate

With two of the PIDU commands, **export** and **list**, you can construct a **where** predicate to select the objects you want to export or list. In the **where** predicate, you can specify one or more conditions.

The **where** predicate has this format:

```
where condition [and|or condition]…
```

A condition has this format:

```
[not] attribute operator value
```

not
Indicates that the evaluation of the condition is to be reversed.

attribute
Specifies the name of a single-valued attribute that is valid for the object class.

Note: Multi-valued attributes are not supported.

You can specify any attribute that is valid for the object class. You can also specify the attribute **name** to limit definitions by name. For a list of the valid attributes, see "Attribute listing" on page 268.

operator
Specifies one of the operators that are shown in Table 47 on page 244.

value
Specifies the value of the attribute. All values are case-sensitive. Therefore, be sure to type the same uppercase and lowercase letters as are stored in the Printer Inventory. The special value **null** means that an attribute is not specified.

If you use the **match** operator, you must specify a regular expression as defined in "Regular Expressions" in *z/OS UNIX System Services Command Reference*.

If the value contains special characters (such as * { } - >), enclose the value in quotation marks.

Table 47 on page 244 summarizes the operators that you can use when you construct a condition. Some operators are valid only for certain types of attribute values, as indicated in the table. For example, you can use the **match** operator only for attributes that accept strings values.

Table 47. Operators for attributes				
Operator	**Operation**	**String values**	**Fixed values**	**Integer values**
=	Equal	Yes	Yes	Yes
!=	Not equal	Yes	Yes	Yes
>	Match a value greater than the specified value	Yes[1]	No	Yes
<	Match a value less than the specified value	Yes[1]	No	Yes
<=	Match a value less than or equal to the specified value	Yes[1]	No	Yes
>=	Match a value greater than or equal to the specified value	Yes[1]	No	Yes
match	Match the specified regular expression	Yes[1]	No	No
1. A string value is evaluated with binary collation.				

To specify an expression with multiple conditions, separate the conditions with one of these operators:

and
> The expression is true only if both conditions are true.

or
> The expression is true if either condition is true.

Multiple conditions are evaluated with an order of precedence, with **and** conditions evaluated before **or** conditions. You can override the order by using parentheses. Expressions in parentheses are evaluated first.

Tip: For examples of the **where** predicate, see:

- "export—export objects to a file" on page 260
- "list—list names of objects" on page 262

create and force-create—create an object

Format

```
create objectclass name [attribute = value]… ;

force-create objectclass name [attribute = value]… ;
```

Description

The **create** command creates an object in the Printer Inventory. The object must not exist in the Printer Inventory.

The **force-create** command does the same function as the **create** command except that if an object of the same name exists in the same object class, it is replaced.

You cannot use the **create** command to create the system configuration definition in the **configuration** class. However, you can use the **force-create** command to create the system configuration definition or to replace all attributes in the existing system configuration definition.

Operands

objectclass
> The class of the object that you want to create. For a list of the object classes, see Table 46 on page 243.
>
> You can specify the **configuration** class on a **force-create** command but not on a **create** command.

name
> A name to identify the object. Objects in the same object class cannot have the same name. Also, a printer pool definition (**printer-pool** object class) cannot have the same name as a printer definition (**printer** object class).
>
> The name of a **trace-parameters** object is the three-character daemon type, such as AOP for the Printer Inventory Manager daemon or NET for the NetSpool daemon. See "Attributes for the trace-parameters object class" on page 469 for the daemon types.
>
> When you create a printer definition, printer-pool definition, job selection rule, or component, specify any combination of 1–17 letters (a–z, A–Z), numbers (0–9), and special characters (such as $ # @ . - = /). Blank characters are not allowed. In an IP PrintWay printer definition, use name DFLTNTRY to designate the IP PrintWay default printer definition. The name is case-sensitive.
>
> When you create an FSS or FSA definition, this name must match the name that is used to define the FSA or FSS to JES. Specify a valid combination of 1–8 letters, numbers, and national characters

(# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase.

If the name contains special characters, enclose the name in single or double quotation marks.

Tip: When you create or replace the system configuration definition, specify `aopd.conf` as the name. Note that the system configuration definition is not the same as the `aopd.conf` file, although they have the same name.

attribute = value
One or more attributes and values. Separate attributes with spaces. For the valid attributes for each object class, see "Attribute listing" on page 268.

Usage notes

- A printer definition can include one or more components. For example, a printer definition can include one Allocation component and one Processing component. When a printer definition includes a component, the attributes that are specified for the component apply to the printer definition as well. To include a component, use the **include**-*object* attributes, such as **include-allocation** and **include-processing**.

- When you create a printer definition and include components, you can override any attribute that is specified in a component. To do this, specify the same attribute on the **create** statement for the printer definition. The attribute that you specify on the **create** statement applies only to the printer definition. The value of the attribute in the component is not changed.

  Tip: If an attribute is specified in a printer definition, and you later change the value for that attribute in an included component, the value in the printer definition remains unchanged.

- You must create components before you create any printer definitions that include these components.

- You must create printer definitions before you create any printer pool definitions that list these printer definitions.

- To help you specify a valid **create** statement, first use the ISPF panels to create the object in the Printer Inventory and then use the PIDU **display** or **export** command to list the attributes for the object.

- If you repeat the same attribute in a **create** statement, the PIDU program uses the last specification.

Examples—create and force-create

You can find more examples of PIDU commands in the file `/usr/lpp/Printsrv/samples/sample.pidl`

All examples of the **create** command also apply to the **force-create** command.

Force-creating the system configuration definition

This example creates the system configuration definition. In this example, you cannot substitute the **create** command for the **force-create** command.

```
pidu -c 'force-create configuration aopd.conf
        ascii-codepage=ISO8859-5 mailer-path-name="/bin/altmail"
        log-retention=3 hardcopy-messages=list
        hardcopy-message-list={AOP3614I AOP3803E} ; '
```

Tip: When you create or replace the system configuration definition, specify `aopd.conf` as the name. Note that, although they have the same name, the system configuration definition is not the same thing as the `aopd.conf` file.

Creating an Allocation component

This example creates an Allocation component named `printway`. This Allocation component might be included in all printer definitions for printers to be managed by the same IP PrintWay basic mode FSA.

```
pidu -c 'create allocation printway
        description="JES allocation values for IP PrintWay"
        output-class=K ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **output-class**: This attribute specifies the output class that is the JES work-selection criterion for the IP PrintWay basic mode FSA. In this example, the output class is K. NetSpool and Print Interface allocate output data sets on the JES spool in class K.

Creating a Processing component for PCL printers

This example creates a Processing component that is named `pcl_printer` that contains attributes suitable for printers that can print PCL files:

```
pidu -c 'create processing pcl_printer
        description = "Generic PCL options"
        printer-codepage = ISO8859-1
        document-formats-supported = { text pcl modca-p line-data }
        filters = { text -> aopfiltr.so modca-p -> "afpxpcl.dll -c us"
                    line-data -> "afpxpcl.dll -c us" }
        pcl-print-density =  10
        pcl-line-density =  6 ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **printer-codepage**: This attribute specifies ASCII code page ISO8859-1. Specify an ASCII code page so that Print Interface converts EBCDIC data to ASCII before it writes data to the JES spool. NetSpool also converts data to this code page when the **netspool-formatting=convert-to-pcl** attribute is specified in the printer definition.
- **document-formats-supported**: This attribute specifies that the printer accepts text, PCL, MO:DCA-P, and line data. The printer accepts MOD:CA-P and line data because a transform is associated with this data format in the **filters** attribute.
- **filters**: This attribute requests that Print Interface use these filters:
  - **aopfiltr.so** filter for text data. IBM suggests that you specify this filter for text data. **aopfiltr.so** is provided with Infoprint Server. For information about this filter, see "Using the aopfiltr.so filter" on page 88.
  - **afpxpcl.dll** filter for MO:DCA-P (AFP) data and line data. This filter transforms AFP and line data to PCL data.
- **pcl-print-density**: This attribute specifies the number of characters per inch to be printed on a line. NetSpool uses this value when the **netspool-formatting=convert-to-pcl** attribute is also specified in the printer definition.
- **pcl-line-density**: This attribute specifies the number of lines per inch to be printed on a page. NetSpool uses this value when the **netspool-formatting=convert-to-pcl** attribute is also specified in the printer definition.

Creating a Processing component for AFP printers

This example creates a Processing component that is named `afp_printer` that contains attributes suitable for printing on AFP printers:

```
pidu -c 'create processing afp_printer
        description = "AFP options"
        printer-codepage = IBM-1047
```

```
        document-formats-supported = { modca-p line-data text pcl postscript pdf}
        filters = { pcl -> "pcl2afp.dll %filter-options"
                    postscript -> "ps2afp.dll %filter-options"
                    pdf -> "ps2afp.dll %filter-options"} ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **printer-codepage**: This attribute specifies EBCDIC code page IBM-1047. Specify an EBCDIC code page so that Print Interface converts ASCII data to EBCDIC before it writes data to the JES spool.
- **document-formats-supported**: This attribute specifies that the printer accepts MO:DCA-P, line data, text, PCL, PostScript, and PDF data.
- **filters**: This attribute requests that Infoprint Server use the **pcl2afp.dll** filter to transform PCL data to AFP format (MO:DCA-P) and the **ps2afp.dll** filter to transform both PostScript and PDF data to AFP format.

Creating an IP PrintWay Options component

This example creates an IP PrintWay Options component that is named `pcl_land_17cpi` that contains attributes suitable for printing in the landscape orientation on PCL printers and for retaining data sets on the JES spool that IP PrintWay cannot transmit to the remote printer.

```
pidu -c 'create printway-options pcl_land_17cpi
        description = "PCL landscape 17 cpi"
        retry-limit = 5
        retry-time  = 5:00
        failure-retention-period = forever
        document-header = "<esc>E<esc>&l10<esc>(s17H"
        document-trailer = "<esc>E" ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **retry-limit**: This attribute specifies that IP PrintWay is to try unsuccessful transmissions again up to five times before it considers that the transmission failed.
- **retry-time**: This attribute specifies that IP PrintWay is to try unsuccessful transmissions again every 5 minutes. IP PrintWay also automatically tries an unsuccessful transmission again right after the first transmission fails.
- **failure-retention-period**: This attribute specifies that IP PrintWay retain the output data set on the JES spool if the transmission fails.
- **document-header**: This attribute specifies printer commands for printing in the landscape direction. IP PrintWay translates the instructions to ASCII and transmits them to the printer before the data.
- **document-trailer**: This attribute specifies printer commands to reset the printer to its original state. IP PrintWay translates the instructions to ASCII and transmits them to the printer after the data.

Creating a NetSpool Options component for PCL printers

This example creates a NetSpool Options component named `pcl`. The attributes in this component request that NetSpool convert data to PCL before it writes data to the JES spool.

```
pidu -c 'create netspool-options pcl
        description = "Convert to PCL"
        netspool-formatting = convert-to-pcl ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **netspool-formatting**: This attribute requests that NetSpool converts data to PCL before it writes data to the JES spool.

Creating a NetSpool Options component to print binary data

This example creates a NetSpool Options component named `binary`. The attributes in this component request that NetSpool does not convert or format data before it writes data to the JES spool.

```
pidu -c 'create netspool-options binary
        description = "No formatting; 80 byte records"
        netspool-formatting = none
        maximum-record-size = 80
        recfm = vba ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **netspool-formatting**: This attribute specifies that NetSpool not format data before it writes data to the JES spool.
- **maximum-record-size**: This attribute specifies that NetSpool write a maximum record size of 80 bytes.
- **recfm**: This attribute specifies that NetSpool use a record format of VBA.

Creating a NetSpool End-of-File component

This example creates a NetSpool End-of-File component named `bracket`. The attributes in this component tell NetSpool to use the end-of-bracket rule to determine when to close the output data set on the JES spool, and also request that NetSpool delete form feed controls that occur at the end of the output data set.

```
pidu -c 'create netspool-eof-rules bracket
        description="Bracket rule; delete trailing form feeds"
        eof-rules={
        default={ all -> {eof-method=end-bracket delete-form-feed=trailing} }
        } ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **eof-rules**: This attribute specifies the start of the end-of-file rules.
- **default**: This attribute defines default end-of-file rules that apply to all LU types.
- **eof-method**: This attribute requests that NetSpool use the end-of-bracket rule.
- **delete-form-feed**: This attribute requests that NetSpool delete form feed controls at the end of the output data set.

Creating a Protocol component for LPR protocol

This example creates a Protocol component that is named `lpr_options` and that contains attributes suitable for transmitting data sets with IP PrintWay and the LPR to LPD protocol.

```
pidu -c 'create protocol lpr_options
        description = "LPR to PASS queue"
        protocol-type = lpr
        print-queue-name = PASS ; '
```

The attributes set in this component are:

- **description**: This attribute describes the component.
- **protocol-type**: This attribute requests the LPR to LPD protocol.
- **print-queue-name**: This attribute specifies the name of the PASS print queue on the target printer.

Creating an IP PrintWay printer definition for a PCL printer with LPR protocol

This example creates a printer definition that is named `lp1` for a printer that is managed by IP PrintWay. IP PrintWay uses the LPR to LPD TCP/IP protocol to transmit data to the remote printer or print server.

```
pidu -c 'create printer lp1
        description = "Default printer"
        location = "Printer room"
        printer-type = ip-printway
        dcf-routing = yes
        destination = LP1
        printer-ip-address = printer1.boulder
        luname = LUPRT001
        lu-classes = { 2 }
        default-owner = smith
        embedded-attributes-prefix = "<<ibmjobattr"
        operator-security-profile = "DENVER.001"
        include-allocation = printway
        include-processing = pcl_printer
        include-printway-options = pcl_land_17cpi
        include-netspool-options = pcl
        include-netspool-eof-rules = bracket
        include-protocol = lpr_options ; '
```

Users can access this printer definition in these ways:

- Local and remote users can use `lp1` as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:

  - ipp://*host*/servlet/IPPServlet/lp1
  - http://*host*:631/servlet/IPPServlet/lp1

  The host name or IP address of the z/OS system is *host*.

- JCL users can specify either (1) FSSDATA=`'printer=lp1'` or (2) CLASS=K and DEST=LP1 on an OUTPUT JCL statement. JCL users can also use the AOPPRINT procedure, specifying `lp1` as the printer name.
- VTAM applications use NetSpool printer LU name LUPRT001.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the location of the printer.
- **printer-type**: This attribute specifies that IP PrintWay manages the printer.
- **dcf-routing**: This attribute specifies that users can select this printer with the DEST, CLASS, and FORMS parameters on an OUTPUT JCL statement. In this example, the DEST value is specified in the **destination** attribute, the CLASS value is specified in the included Allocation component that is named `printway`, and the FORMS value is not specified.
- **destination**: This attribute specifies that Print Interface and NetSpool allocate output data sets on the JES spool with a DEST value of LP1. Because **dcf-routing=yes**, IP PrintWay selects this printer definition when the OUTPUT JCL statement contains a DEST value of LP1 and a CLASS value of K.
- **printer-ip-address**: This attribute specifies the IP address of the remote printer or print system.
- **luname**: This attribute specifies the NetSpool printer LU name.
- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 2.
- **default-owner:** This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.
- **embedded-attributes-prefix:** This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes that are embedded in the print data.
- **operator-security-profile**: This attribute controls who can use Infoprint Central to work with this printer.

- **include-***object*: These attributes include components in the printer definition. All attributes that are specified in the named components apply to this printer definition. You must create components **printway**, **pcl_printer**, **pcl_land_17cpi**, **pcl**, **bracket**, and **lpr_options**.

Creating an IP PrintWay printer definition for a PCL printer with IPP protocol

This example creates a printer definition that is named `lab_printer` for a remote printer to which IP PrintWay transmits data. IP PrintWay uses Internet Printing Protocol (IPP) to transmit data to an IPP server that is running on the remote printer or print server.

```
pidu -c 'create printer lab_printer
         description = "IPP printer in 004 lab"
         location = "Lab printer room - building 004"
         printer-type = ip-printway
         dcf-routing = yes
         destination = LAB
         luname = LUPRT003
         lu-classes = { 2 }
         default-owner = smith
         embedded-attributes-prefix = "<<ibmjobattr"
         operator-security-profile = "DENVER.001"
         protocol-type = ipp
         printer-uri = "ipp://myprinter.xyz.com"
         include-allocation = printway
         include-processing = pcl_printer
         include-printway-options = pcl_land_17cpi
         include-netspool-options = pcl
         include-netspool-eof-rules = bracket ; '
```

Users can access this printer definition in these ways:

- Local and remote users can use `lab_printer` as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:
  - ipp://*host*/servlet/IPPServlet/lab_printer
  - http://*host*:631/servlet/IPPServlet/lab_printer

  The host name or IP address of the z/OS system is *host*.
- JCL users can specify either (1) FSSDATA='`printer=lab_printer`' or (2) CLASS=K and DEST=LAB on an OUTPUT JCL statement. JCL users can also use the AOPPRINT procedure, specifying `lab_printer` as the printer name.
- VTAM applications use NetSpool printer LU name LUPRT003.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the location of the printer.
- **printer-type**: This attribute specifies that IP PrintWay manages the printer.
- **dcf-routing**: This attribute specifies that users can select this printer with the DEST, CLASS, and FORMS parameters on an OUTPUT JCL statement. In this example, the DEST value is specified in the **destination** attribute, the CLASS value is specified in the Allocation component that is named `printway`, and the FORMS value is not specified.
- **destination**: This attribute specifies that NetSpool and Print Interface allocate output data sets on the JES spool with a DEST value of LAB. Because **dcf-routing=yes**, IP PrintWay selects this printer definition when the OUTPUT JCL statement contains a DEST value of LAB and a CLASS value of K.
- **luname**: This attribute specifies the NetSpool printer LU name.
- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 2.
- **default-owner:** This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.

- **embedded-attributes-prefix:** This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes that are embedded in the print data.
- **operator-security-profile**: This attribute controls who can use Infoprint Central to work with this printer.
- **protocol-type**: This attribute requests that IP PrintWay use Internet Printing Protocol (IPP) to transmit data to the printer.
- **printer-uri**: This attribute specifies the Uniform Resource Identifier (URI) of the remote printer.
- **include-***object*: These attributes include components in the printer definition. All attributes that are specified in the named components apply to this printer definition. The named components were created in previous examples.

Creating an IP PrintWay printer definition for the email protocol

This example creates a printer definition that is named deptmail and selects the email protocol:

```
pidu -c 'create printer deptmail
        description = "Email destination"
        location = "Departments 01 and 02"
        printer-type = ip-printway
        printer-codepage = IBM-1047
        dcf-routing = yes
        destination = DEPTMAIL
        protocol-type = email
        title-text = "My default email title"
        mail-bcc-addresses = {"user2@xyz.com" dept01list}
        mail-cc-addresses = {"user3@xyz.com" dept02list}
        mail-from-name = "John Q. Sender"
        mail-reply-address = {"mysecretary@xyz.com"}
        mail-to-addresses = {"user1@xyz.com" dept03list}
        luname = DEPTMAIL
        lu-classes={ 1 }
        default-owner = smith
        embedded-attributes-prefix = "<<ibmjobattr"
        printway-formatting = use-fcb
        print-page-header = no
        dataset-grouping = concatenate-job
        include-allocation = printway ; '
```

Users can access this printer definition in these ways:

- Local and remote users can use deptmail as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:

  - ipp://*host*/servlet/IPPServlet/deptmail
  - http://*host*:631/servlet/IPPServlet/deptmail

  The host name or IP address of the z/OS system is *host*.
- JCL users can specify either (1) FSSDATA='printer=deptmail' or (2) CLASS=K and DEST=DEPTMAIL on an OUTPUT JCL statement. Users of the AOPPRINT procedure specify deptmail as the printer name.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the email destination.
- **printer-type**: This attribute specifies IP PrintWay.
- **printer-codepage**: This attribute specifies EBCDIC code page IBM-1047. Specify an EBCDIC code page so that Print Interface and IP PrintWay convert ASCII text data to EBCDIC.
- **dcf-routing**: This attribute specifies that job submitters can use the DEST, CLASS, and FORMS parameters on an OUTPUT JCL statement to select this printer definition. In this example, the DEST value is specified in the **destination** attribute, the CLASS value is specified in the Allocation component that is named printway, and the FORMS value is not specified.

- **destination**: This attribute specifies that Print Interface and NetSpool allocate output data sets on the JES spool with a DEST value of DEPTMAIL. Because the **dcf-routing=yes** attribute is specified, IP PrintWay uses this printer definition for all data sets on the JES spool with a DEST value of DEPTMAIL and a CLASS value of K.
- **protocol-type**: This attribute requests that IP PrintWay use the email protocol.
- **title-text**: This attribute specifies a default subject for emails.
- **mail-bcc-addresses**: This attribute specifies the email addresses of the "blind copy (bcc)" recipients of the email. A *bcc* means that other recipients of the email do not see the bcc recipient listed. One email address and one sendmail alias name are specified.
- **mail-cc-addresses**: This attribute specifies the email addresses of the "copy (cc)" recipients of the email. A *cc* means that other recipients of the email can see the cc recipient listed. One email address and one sendmail alias name are specified.
- **mail-from-name**: This attribute specifies the descriptive name or other identifier of the sender of the email.
- **mail-reply-address**: This attribute specifies the email address that recipients of the email can reply to. If this attribute is omitted, most email programs use the sender's email address. The default is *userid@domainname*. The user ID of the job submitter is *userid*. The domain name where Infoprint Server is running is *domainname*.
- **mail-to-addresses**: This attribute specifies the email addresses of the recipients of the email. One email address and one sendmail alias name are specified.
- **luname**: This attribute specifies the NetSpool printer LU name.
- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 1.
- **default-owner**: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.
- **embedded-attributes-prefix**: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes that are embedded in the print data.
- **printway-formatting**: This attribute specifies IP PrintWay use the FCB, if one is specified, to format line data.
- **print-page-header**: This attribute causes IP PrintWay not to add a page header when it formats line data.
- **dataset-grouping**: This attribute requests that data sets that are in the same JES output group are sent as attachments in the same email.
- **include-allocation:** This attribute includes the previously defined Allocation component that is named `printway`. See "Creating an Allocation component" on page 247.

Creating a PSF printer definition

This example creates a printer definition that is named `prt2` for an AFP printer that is controlled by PSF:

```
pidu -c 'create printer prt2
        description = "Dept 002 printer"
        location = "Building 002 printer room"
        printer-type = psf-mvs
        destination = DEPT002
        output-class = J
        luname = LUPRT002
        lu-classes = { 2 }
        default-owner = smith
        embedded-attributes-prefix = "<<ibmjobattr"
        include-processing = afp_printer
        include-netspool-eof-rules = bracket ; '
```

Users can access this printer definition in these ways:

- Local and remote users can use `prt2` as the name of the destination, print queue, or printer definition.
- IPP clients can use one of these URIs:

- ipp://*host*/servlet/IPPServlet/prt2
- http://*host*:631/servlet/IPPServlet/prt2

The host name or IP address of the z/OS system is *host*.

- JCL users can use the AOPPRINT procedure to access this printer definition, specifying `prt2` as the printer name. For information about the AOPPRINT procedure, see *z/OS Infoprint Server User's Guide*.
- VTAM applications can use NetSpool printer LU name LUPRT002.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the location of the printer.
- **printer-type**: This attribute specifies that PSF manages the printer.
- **output-class**: This attribute specifies the output class that is the JES work-selection criterion for the PSF printer FSA. In this example, the output class is J. NetSpool and Print Interface allocate output data sets on the JES spool in class J.
- **luname**: This attribute specifies the NetSpool printer LU name.
- **lu-classes**: This attribute assigns the NetSpool printer LU name to LU class 2.
- **default-owner**: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.
- **embedded-attributes-prefix**: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes that are embedded in the print data.
- **include-***object*: These attributes include components in the printer definition. All attributes that are specified in the named components apply to this printer definition. The named components were created in previous examples.

Creating a general printer definition

This example creates a printer definition that is named `fred` for a printer that is not controlled by IP PrintWay or by PSF:

```
pidu -c 'create printer fred
        description = "Fred Jones"
        location = "Office A-11"
        printer-type = general
        general-spooling-mode = line
        destination = FRED ;'
```

Users can access this printer definition in these ways:

- Local and remote users use `fred` as the name of the destination, print queue, or printer definition.
- IPP clients use one of these URIs:

  - ipp://*host*/servlet/IPPServlet/fred
  - http://*host*:631/servlet/IPPServlet/fred

  The host name or IP address of the z/OS system is *host*.

- JCL users can use the AOPPRINT procedure to access this printer definition, specifying `fred` as the printer name. For information about the AOPPRINT procedure, see *z/OS Infoprint Server User's Guide*.

  Tip: This example does not specify the **luname** attribute. Therefore, VTAM applications cannot print to this printer definition.

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **location**: This attribute describes the location of the printer.
- **printer-type**: This attribute specifies General.

- **general-spooling-mode**: This attribute tells Print Interface to write data to the output data set on the JES spool in record format.
- **destination**: This attribute specifies the destination name that is the JES work-selection criterion for the printer. NetSpool and Print Interface allocate output data sets on the JES spool with destination name FRED.

Creating a printer pool definition

This example creates a printer pool definition named DEPT004. NetSpool creates a separate output data set on the JES spool for each printer definition in the printer pool definition.

To print to printer definitions p1, p2, and p3, VTAM applications use NetSpool printer LU name LU4.

```
pidu -c 'create printer-pool DEPT004
        description = "All printers in dept 004"
        luname = LU4
        lu-classes = { 1 2 }
        default-owner = smith
        embedded-attributes-prefix = "<<ibmjobattr"
        include-netspool-eof-rules = bracket
        printer-names = { p1 p2 p3 } ; '
```

The attributes set in this printer definition are:

- **description**: This attribute describes the printer definition.
- **luname**: This attribute specifies the NetSpool printer LU name LU4.
- **lu-classes**: This attribute assigns the NetSpool printer LU to LU classes 1 and 2.
- **default-owner**: This attribute specifies the default Infoprint Server job owner for data sets that NetSpool spools for the associated logical unit (LU) if embedded job attributes in the print data do not specify an owner.
- **embedded-attributes-prefix**: This attribute specifies, for data sets that NetSpool spools, the prefix that identifies job attributes that are embedded in the print data.
- **include-netspool-eof-rules**: This attribute includes the NetSpool End-of-File Rules component named `bracket`. You must also create this component.
- **printer-names**: This attribute lists the names of the printer definitions in the pool. You must create printer definitions that are named p1, p2, and p3.

Creating an IP PrintWay FSS definition

This example creates an FSS definition for an IP PrintWay functional subsystem (FSS) named PRINTWAY. The name of this definition (PRINTWAY) must match the name that is used to define the FSS to JES. An IP PrintWay FSS definition is optional. Create one only if you want to change the default values that IP PrintWay uses.

```
pidu -c 'create printway-fss PRINTWAY
        trace-mode = internal ; '
```

The **trace-mode** attribute turns internal tracing on for the IP PrintWay FSS and all functional subsystem applications (FSAs) in this FSS.

Creating an IP PrintWay FSA definition

This example creates an FSA definition for an IP PrintWay functional subsystem application (FSA) named PRT123. The name of the FSA definition (PRT123) must match the name that is used to define the FSA to JES. An IP PrintWay FSA definition is optional. Create one only if you want to change default values that IP PrintWay uses.

```
pidu -c 'create fsa PRT123
        fsa-type = ip-printway
        trace-mode = full ; '
```

The attributes set in this printer definition are:

- **fsa-type**: This attribute tells the ISPF panels to display this definition as an IP PrintWay FSA definition.
- **trace-mode**: This attribute requests a full trace for this FSA.

Creating a PSF FSS definition

This example creates an FSS definition for a PSF functional subsystem (FSS) named PSFFSS. Your system programmer must also define an FSS named PSFFSS to JES.

```
pidu -c 'create psf-fss PSFFSS
        tcpip-job-name          = TCPIP ; '
```

Creating a PSF FSA definition

This example creates an FSA definition for a PSF functional subsystem application (FSA) named PRT3. Your system programmer must also define an FSA named PRT3 to JES.

```
pidu -c 'create fsa PRT3
        fsa-type = psf-tcpip
        form-definition = A10110
        location = "Bldg 3"
        operator-security-profile = "DENVER.001"
        page-definition = A08682
        printer-ip-address = 9.99.12.33 ; '
```

The attributes set in this printer definition are:

- **fsa-type**: This attribute tells the ISPF panels to display this definition as a PSF FSA definition for a TCP/IP-connected printer.
- **form-definition**: This attribute names the default form definition for the printer.
- **location**: This attribute describes the location of the printer.
- **operator-security-profile**: This attribute controls who can use Infoprint Central to work with this printer.
- **page-definition**: This attribute names the default page definition for the printer.
- **printer-ip-address**: This attribute identifies the IP address of the target printer.

Creating a job selection rule

This example creates a job selection rule named `Class-N`. IP PrintWay extended mode uses the job selection rules to determine which print jobs to select from the JES spool for printing. You must create at least one job selection rule for IP PrintWay to select print jobs. You can create as many job selection rules as you need. The attributes of the print job must match all of the values in a rule to be selected.

```
 pidu -c 'create job-selection-rule Class-N
        job-selection-status = enabled
        output-class-list = {N}
        description = "Select overnight print jobs in Class N" ; '
```

The attributes set in this job selection rule are:

- **job-selection-status**: This attribute specifies that IP PrintWay uses the job selection rule to determine which print jobs to select from the JES spool for printing.
- **output-class-list**: This attribute specifies that IP PrintWay selects print jobs only in the specified JES output class.
- **description**: This attribute describes the job selection rule.

delete—delete an object

Format

```
delete objectclass name ;
```

Description

The **delete** command deletes an object from the Printer Inventory.

You cannot delete the system configuration definition in the **configuration** class. The system configuration definition is a required object.

Operands

objectclass
> The class of the object that you want to delete. For a list of the object classes, see Table 46 on page 243.
>
> You cannot specify the **configuration** class.

name
> The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.
>
> The name of a **trace-parameters** object is the three-character daemon type, such as AOP for the Printer Inventory Manager daemon or NET for the NetSpool daemon. See "Attributes for the trace-parameters object class" on page 469 for the daemon types.

Usage notes

- You cannot delete a component that is included in one or more printer definitions. You must first modify the printer definitions to remove the component names. You can use the PIDU **list** command to list all printer definitions that include a component and the PIDU **modify** command to modify the printer definitions.
- If you delete a printer definition that is listed in a printer pool definition, that printer definition is removed from the list of printers in the printer pool definition.

Examples—delete

Deleting a component

This example deletes the NetSpool Options component named `binary`. This example also shows the **list** command that you need to use before you delete the component to make sure that no printer definitions include that component.

```
pidu -c 'list printer where include-netspool-options=binary ; '
pidu -c 'delete netspool-options binary ; '
```

Deleting an FSA definition

This example deletes the FSA definition named FSA1:

```
pidu -c 'delete fsa FSA1 ; '
```

display—show attributes of an object

Format

```
display objectclass name ;
```

Description

The **display** command lists the attributes for an object in the Printer Inventory. This command writes the attributes to stdout. The attributes are displayed in the format that is required by the **create** command.

Operands

objectclass
> The class of the object that you want to display. For a list of the object classes, see Table 46 on page 243.

name
> The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.
>
> The name of a **trace-parameters** object is the three-character daemon type, such as AOP for the Printer Inventory Manager daemon or NET for the NetSpool daemon. See "Attributes for the trace-parameters object class" on page 469 for the daemon types.
>
> **Tip:** To display the system configuration definition, specify aopd.conf as the name. Note that, although they have the same name, the system configuration definition is not the same thing as the aopd.conf file.

Usage notes

- The **display** command does not list attributes that are specified in any components that are included in a printer definition. If a printer definition includes components, use the **display-fully** command.
- The **display** command might not list attributes that you set to default values because to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Examples—display

Displaying a printer definition

This example displays attributes for the lp1 printer definition. It does not display attributes for the components that are included in the lp1 printer definition.

```
pidu -c 'display printer lp1 ; '
```

Displaying an FSA definition

This example displays attributes for the **FSA1** FSA definition:

```
pidu -c 'display fsa FSA1 ; '
```

Displaying the system configuration definition

This example displays attributes in the aopd.conf system configuration definition:

```
pidu -c 'display configuration aopd.conf ; '
```

display-fully—show attributes of a printer definition plus included components

Format

```
display-fully printer name ;
```

Description

The **display-fully** command lists the attributes for a printer definition in the Printer Inventory plus the attributes of any components that the printer definition includes, such as an Allocation component or a Processing component. This command writes the attributes to stdout.

Operands

printer
The class of the object that you want to display. The only valid object class is **printer**.

name
The name of the printer definition. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

Usage notes

- If the same attribute is defined in a printer definition and a component, the value in the printer definition overrides the value in the component.
- The **display-fully** command might not list attributes that are set to default values. This is because, to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Examples—display-fully

Displaying all attributes for a printer definition and its components

This example displays all attributes for the lp1 printer definition. It also displays all attributes for the components that are included in the lp1 printer definition.

```
pidu -c 'display-fully printer lp1 ; '
```

dump—dump the Printer Inventory to a file

Format

```
dump filename ;
```

Description

The **dump** command writes the contents of the Printer Inventory to the named file. Your IBM service representative might ask you to use the **dump** command to assist IBM in diagnosing problems in the Printer Inventory.

Operands

filename
The name of the output file, which can be a UNIX file or an MVS data set. The output file does not need to exist. However, if the file already exists, the contents are overwritten.

If the data set is an MVS data set, specify // before the file name. If you specify a fully qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output file is named USERID.MYFILE, enter:

```
//\'USERID.MYFILE\'
```

If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

Usage notes

- If you allocate an MVS data set for the output file, IBM suggests that you use RECFM=VB and LRECL=8192. However, other values might be suitable as well.
- To write the contents of the Printer Inventory to a file in a more readable format, or to back up the Printer Inventory, use the **export** command.

Examples—dump

This example writes the contents of the Printer Inventory to file named `inventory.dump`:

```
pidu -c 'dump inventory.dump ; '
```

This example writes the contents of the Printer Inventory to an MVS data set named USER1.INVENT.DUMP:

```
pidu -c "dump //\'USER1.INVENT.DUMP\' ; "
```

export—export objects to a file

Format

```
export filename [objectclass [where condition [and|or condition]… ] ];
```

Description

The **export** command can export all objects that an administrator can create in the Printer Inventory. It also exports the system configuration definition. The **export** command can also export only selected objects that meet the conditions that are specified on the command. The **export** command does not export print job information that is stored in the Printer Inventory.

You can use the **export** command to back up or create a copy of the Printer Inventory. You can use the statements in the output file as input to the PIDU program to restore the Printer Inventory or to create the Printer Inventory on another system.

The **export** command writes a **create** statement for each exported object to an output file. However, it creates a **force-create** statement for the system configuration definition because the **create** command is not valid for the system configuration definition.

The output file does not need to exist. If the file already exists, the file is replaced.

Tip: Use the **export** command to back up the Printer Inventory while Infoprint Server is running. Do not use ordinary copy commands to create a backup copy while Infoprint Server is running because the copy might contain inconsistent data. For more information about how to schedule regular backups of the Printer Inventory and how to restore the Printer Inventory, see *z/OS Infoprint Server Customization*.

Operands

filename
> The name of the output file, which can be a UNIX file or an MVS data set.
>
> If the data set is an MVS data set, specify // before the file name. If you specify a fully qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output data set is named USERID.MYFILE, enter:

```
//\'USERID.MYFILE\'
```

> If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

objectclass
> The class of the objects that you want to export. For a list of the object classes, see Table 46 on page 243. If you omit this operand, all objects are exported.

where *condition* **[and|or** *condition***]...**
> One or more conditions, which can limit the objects that are exported. Only objects that are in the specified object class and that meet the conditions are exported. If you omit the **where** predicate, all objects in the specified object class are exported.
>
> For information about how to specify conditions, see "Where predicate" on page 244.

Usage notes

- If you allocate an MVS data set for the output file, IBM suggests that you use RECFM=VB and LRECL=8192. However, other values might be suitable as well.
- The **export** command might not export attributes that you set to default values. This is because, to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Examples—export

Exporting all objects in the Printer Inventory

- This example exports all objects in the Printer Inventory to UNIX file `inventory.export`:

```
pidu -c 'export inventory.export ; '
```

- This example exports all objects in the Printer Inventory to MVS data set USER1.INVENT.EXPORT:

```
pidu -c "export //\'USER1.INVENT.EXPORT\' ; "
```

Exporting all or selected printer definitions

- This example exports all printer definitions in the Printer Inventory to UNIX file `printers.export`:

```
pidu -c 'export printers.export printer ; '
```

- This example exports all printer definitions that contain attribute **output-class = K**, either in the printer definition or in an included component, to file `classk.export`:

```
pidu -c 'export classk.export printer where output-class=K ; '
```

Exporting selected FSA definitions

This example exports selected FSA definitions in the Printer Inventory to UNIX file `psffsa.export`. The **where** predicate specifies that only FSA definitions used by PSF be exported.

```
pidu -c 'export psffsa.export fsa
        where fsa-type=psf-tcpip or fsa-type=psf-channel or fsa-type=psf-sna
        or fsa-type=afp-download-plus ; '
```

Exporting the system configuration definition

This example exports the system configuration definition in the Printer Inventory to UNIX file `configuration.export`.

```
pidu -c 'export configuration.export configuration ; '
```

list—list names of objects

Format

```
list objectclass [where condition [and|or condition]… ] ;
```

Description

The **list** command lists the names of all objects in a specified object class or only objects that meet certain criteria.

Operands

objectclass
> The class of the objects that you want to list. For a list of the object classes, see Table 46 on page 243.

where *condition* **[and|or** *condition***…]**
> Conditions that can limit the objects that are listed. Only objects that meet the conditions are listed. If you omit the **where** predicate, all objects in the specified object class are listed.
>
> For information about how to specify a condition, see "Where predicate" on page 244.

Usage notes

You can use the **list** command in combination with the **modify** command to list all or selected objects in an object class and then modify one or more attributes. For an example, see "Listing and modifying printer definitions " on page 265.

Examples—list

Listing printer definitions

- This example lists all IP PrintWay printer definitions:

```
pidu -c 'list printer where printer-type=ip-printway ; '
```

- This example lists all PSF printer definitions:

```
pidu -c 'list printer where printer-type=psf-mvs ; '
```

- This example lists printer definitions that include the Protocol component named `lpr_options`:

```
pidu -c 'list printer where include-protocol=lpr_options ; '
```

- This example lists printer definitions that specify an LU name in the **luname** attribute. That is, the value of the **luname** attribute is not a null value.

  ```
  pidu -c 'list printer where not luname=null ; '
  ```

- This example lists IP PrintWay printer definitions that do not include a Protocol component. That is, the value of the **include-protocol** attribute is a null value.

  ```
  pidu -c 'list printer where printer-type=ip-printway and include-protocol=null;'
  ```

- This example lists printer definitions whose names start with `prt`:

  ```
  pidu -c 'list printer where name match "^prt" ; '
  ```

- This example lists printer definitions that contain attribute **output-class=K** either in the printer definition or in an included component:

  ```
  pidu -c 'list printer where output-class=K ; '
  ```

- This example lists printer definitions that have a printer type of **ip-printway** and also have either output class X or Y. The parentheses cause the **or** expression to be evaluated first.

  ```
  pidu -c 'list printer where printer-type=ip-printway and
           (output-class = X or output-class = Y) ; '
  ```

Listing printer pool definitions

This example lists all printer pool definitions in the Printer Inventory:

```
pidu -c 'list printer-pool ; '
```

Listing components

This example lists all components in the Printer Inventory:

```
pidu -c 'list allocation ; list netspool-eof-rules ; list netspool-options ; '
pidu -c 'list printway-options ; list processing ; list protocol ; '
```

Listing FSS definitions

- This example lists all IP PrintWay FSS definitions:

  ```
  pidu -c 'list printway-fss ; '
  ```

- This example lists all PSF FSS definitions:

  ```
  pidu -c 'list psf-fss ; '
  ```

Listing FSA definitions

- This example lists all FSA definitions in the Printer Inventory:

  ```
  pidu -c 'list fsa ; '
  ```

- This example lists all IP PrintWay FSA definitions:

  ```
  pidu -c 'list fsa where fsa-type=ip-printway ; '
  ```

- This example lists all PSF FSA definitions:

  ```
  pidu -c 'list fsa where fsa-type=psf-channel or fsa-type=psf-sna or
  fsa-type=psf-tcpip or fsa-type=afp-download-plus ; '
  ```

modify—change attributes of an object

Format

modify *objectclass name* [*attribute = value*]… ;

Description

The **modify** command modifies attributes for an object in the Printer Inventory. The object must exist in the Printer Inventory.

Changes that you make to attributes for a printer definition or component generally take effect for the next data set that NetSpool and Print Interface allocate on the JES spool and the next data set that IP PrintWay selects from the JES spool. However, changes to NetSpool end-of-file rules or to the NetSpool LU class (attribute **lu-classes**) are related to the VTAM session and do not take effect for the next data set allocated on the JES spool. For information about when changes to these fields take effect, see "Specifying how NetSpool determines end-of-file" on page 119 and "Grouping NetSpool printer LUs into LU classes" on page 104.

Changes that you make to a printer definition or component do not affect data sets that IP PrintWay retained on the JES spool after successful or failed transmission.

Changes that you make to attributes for an FSA definition take effect only when you restart the IP PrintWay or PSF FSA. Changes that you make to attributes for an FSS definition take effect when you restart the FSS.

With a few exceptions, changes that you make to attributes in the system configuration definition take effect when you run the PIDU command. However, if you change certain attributes you must stop and restart the daemons that use the attribute before the change can take effect.

Operands

objectclass
> The class of the object that you want to modify. For a list of the object classes, see Table 46 on page 243.

name
> The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.
>
> The name of a **trace-parameters** object is the three-character daemon type, such as AOP for the Printer Inventory Manager daemon or NET for the NetSpool daemon. See "Attributes for the trace-parameters object class" on page 469 for the daemon types.
>
> **Tip:** To modify the system configuration definition, specify aopd.conf as the name. Note that, although they have the same name, the system configuration definition is not the same thing as the aopd.conf file.

attribute = value
> One or more attributes and values. Separate attributes with spaces. For the valid attributes for each object class, see "Attribute listing" on page 268.

Usage notes

- To remove an attribute, type null as the value for the attribute. For a description of the **null** value, see "Default values" on page 267.
- If you modify an attribute in a component, the modified attribute applies to all printer definitions that include the component unless the attribute is also specified for the printer definition itself. In this case, the printer definition retains its attribute value.
- If you repeat the same attribute in a **modify** statement, the PIDU program uses the last specification.

- You can use the **list** command with the **modify** command to modify all or selected objects in an object class. For an example, see .

Examples—modify

Modifying an allocation component

This example modifies the Allocation component named `printway`. The modified attribute (**output-class)** applies to all printer definitions that include this component unless the **output-class** attribute is specified for the printer definition itself.

```
pidu -c 'modify allocation printway output-class=L ; '
```

Modifying a printer definition

This example changes the protocol that is used by IP PrintWay in the printer definition named `lab_printer`. (For the **create** statement for this printer definition, see .)

```
pidu -c 'modify printer lab_printer
        protocol-type           = lpr
        printer-uri             = null
        printer-ip-address      = printer2.boulder
        print-queue-name        = TEXT ; '
```

The attributes that are modified in this printer definition are:

- **protocol-type**: The new protocol is the LPR protocol.
- **printer-uri**: This attribute is removed because the URI is not used for the LPR protocol.
- **printer-ip-address**: This attribute specifies the host name of the remote printer. It is required for the LPR protocol.
- **print-queue-name**: This attribute specifies the print queue name on the remote printer. It is required for the LPR protocol.

Modifying the system configuration definition

This example specifies the name of a log stream that is defined to the MVS system logger in the system configuration definition, which is named `aopd.conf`:

```
pidu -c 'modify configuration aopd.conf logstream-name = AOP.MSG ; '
```

Listing and modifying printer definitions

This example, entered as one command on the z/OS UNIX command line, lists selected printer definitions and changes an attribute in those printer definitions. This example uses these PIDU commands and the **awk** command:

1. The PIDU **list** command lists the names of all printer definitions with **output-class=K**.

2. These names are input to the **awk** program, which writes PIDU **modify** commands to modify the **output-class** attribute. For information about the **awk** program, see *z/OS UNIX System Services Command Reference*.

3. The output from the **awk** program is input to the **pidu** command:

```
pidu -qc "list printer where output-class = K ; " |
    awk '{ print "modify printer " $1 " output-class = \"B\";" }' |
    pidu
```

rename—rename an object

Format

```
rename objectclass name newname ;
```

Description

The **rename** command renames an object in the Printer Inventory.

If you rename a component, this command automatically renames the component in all printer definitions that include the component. If you rename a printer definition, this command automatically renames the printer definitions in all printer pool definitions that list the printer definition.

You cannot rename the system configuration definition in the **configuration** class.

Operands

objectclass
> The class of the object that you want to rename. For a list of the object classes, see Table 46 on page 243.
>
> You cannot specify the **configuration** class.

name
> The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.
>
> The name of a **trace-parameters** object is the three-character daemon type, such as AOP for the Printer Inventory Manager daemon or NET for the NetSpool daemon. See "Attributes for the trace-parameters object class" on page 469 for the daemon types.

newname
> The new name to identify the object. This name must be a unique name for the class of object in the Printer Inventory.
>
> When you create a printer definition, printer-pool definition, job selection rule, or component, specify any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed. In an IP PrintWay printer definition, use name DFLTNTRY to designate the IP PrintWay default printer definition. The name is case-sensitive.
>
> When you create an FSS or FSA definition, this name must match the name that is used to define the FSA or FSS to JES. Specify a valid combination of 1 - 8 letters, numbers, and special characters (# $ @). The first character cannot be numeric. Lowercase letters are converted to uppercase.
>
> If the name contains special characters, enclose the name in single or double quotation marks.

Example—rename

This example renames the printer definition that is named `lab_printer` to new name `jim`:

```
pidu -c 'rename printer lab_printer jim ; '
```

Attribute characteristics

These are the characteristics of the attributes that you can specify in PIDU commands :

- Valid abbreviations for attribute names and values
- Default values for attributes
- Single-valued and multi-valued attributes
- Types of values: integers, strings, and fixed values

Abbreviations

The attributes that are listed show attribute names and values in their complete form. Often, 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 **d-f-s** for the **document-formats-supported** attribute. You can use **po** for the **postscript** value, and specify the attribute and value pair as **d-f-s={po}**.

Sometimes specifying only the first letter in each word is ambiguous. For example, **c** might stand for **class** or **copies**. Here, specify enough of the name so that it is unique, as in **cl** or **co**. If the values are ambiguous, the PIDU program rejects the command with an error message.

Default values

When you create an object and omit an attribute, no value is assigned to that attribute in the Printer Inventory. For attributes that have no value, Infoprint Server takes a default action, which is described in the heading "Default value".

If you do specify a value for an attribute and later want to remove the attribute so that Infoprint Server does the default action, use the **modify** command and specify **null** as the attribute value.

For example, to remove the value for the **notify** attribute, you might specify:

```
notify = null
```

Single-valued and multi-valued attributes

Specify attributes in this format, with or without spaces on either side of the equal sign:

```
attribute=value
attribute = value
```

Attributes can be either *single-valued* or *multi-valued*.

Single-valued attributes
Single-valued attributes accept only one value. For single-valued attributes, the syntax is:

```
attribute = value
attribute = "value with spaces"
```

Multi-valued attributes
Multi-valued attributes accept one or more values that are separated with spaces and enclosed in braces. Multi-valued attributes can contain a *list* of values or a *value-map*.

- A *list* assigns one or more values to the attribute. The syntax is:

```
attribute = {value1 value2 value3}
```

For example: printer-names={printer1 printer2 printer3}
- A *value-map* assigns one value to another. The syntax is:

```
attribute = {value1 -> value2 value3 -> value4}
```

For example: filters={pcl -> pcl2afp.dll pdf -> pdf2afp.dll}

Types of values

You can specify these types of values:

- Integer values
- String values
- Fixed values, also known as enumerated values

Integer values

Some attributes accept integer values. You can specify integer values in either decimal or hexadecimal format. Begin a hexadecimal value with 0 (zero) followed by the letter x. After the 0x, type any number (0-9) or a letter (A-F or a-f). Lowercase letters are equivalent to uppercase letters. The **display** command always displays the decimal equivalent of hexadecimal values.

For example, these integer values are equivalent:

```
dump-code = 0x09600c00
dump-code = 157289480
```

String values

Some attributes accept a string of printable characters. Enclose a string value in double or single quotation marks if it includes blanks or special characters (such as #, (,), or $). For example:

```
description = "My printer"
```

Most string values are stored in the Printer Inventory with the same uppercase and lowercase letters that you type when you specify the value. However, in some cases, lowercase letters are converted to uppercase letters. For example, the value you enter for the **output-class** attribute is converted to uppercase because JES accepts only uppercase letters for the JES output class.

Fixed values (enumerated values)

Some attributes accept one or more keywords as values. These keywords are called *fixed values*. The **pidu** command calls these values *enumerated values*. Fixed values are case-sensitive. Always use lowercase characters when you are typing fixed values. For example, you can specify these fixed values for the **printer-type** attribute:

```
printer-type=ip-printway
printer-type=psf-mvs
printer-type=general
```

Attribute listing

The attributes that you can use when you create or modify objects in the Printer Inventory are described here. The attributes for each object class are listed alphabetically in the section for that object class. Table 48 on page 268 summarizes the object classes and where you can find the list of valid attributes for that object class.

Table 48. Object classes	
Object class	**See**
allocation	"Attributes for the allocation object class" on page 287
configuration	"Attributes for the configuration object class" on page 316
fsa	"Attributes for the fsa object class" on page 333
job-selection-rule	"Attributes for the job selection rule object class" on page 376
netspool-eof-rules	"Attributes for the netspool-eof-rules object class" on page 383
netspool-options	"Attributes for the netspool-options object class" on page 383
printer	"Attributes for the printer object class" on page 387
printer-pool	"Attributes for the printer-pool object class" on page 397
printway-fss	"Attributes for the printway-fss object class" on page 400

Table 48. Object classes (continued)

Object class	See
printway-options	"Attributes for the printway-options object class" on page 406
processing	"Attributes for the processing object class" on page 422
protocol	"Attributes for the protocol object class" on page 445
psf-fss	"Attributes for the psf-fss object class" on page 465
trace-parameters	"Attributes for the trace-parameters object class" on page 469

Table 49 on page 269 lists the attributes in alphabetical order. It shows what object classes each attribute applies to and where to find information about the attribute. Some attributes can be in more than one object class.

Table 49. Attributes and valid object classes

Attribute	Object class	See
above-the-bar-storage	**fsa**	"above-the-bar-storage" on page 334
acknowledgement-level	**fsa**	"acknowledgement-level" on page 334
address-text	**allocation**	"address-text" on page 287
address-text	**printer**	"address-text" on page 287
afp-parameters	**allocation**	"afp-parameters" on page 287
afp-parameters	**printer**	"afp-parameters" on page 287
afpdp-dataset-grouping	**fsa**	"afpdp-dataset-grouping" on page 335
afpdp-working-directory	**fsa**	"afpdp-working-directory" on page 335
allow-all-characters-in-line-data	**configuration**	"allow-all-characters-in-line-data" on page 316
aopippd-max-thread-tasks	**configuration**	"aopippd-max-thread-tasks" on page 317
aoplpd-max-thread-tasks	**configuration**	"aoplpd-max-thread-tasks" on page 317
aopnetd-max-thread-tasks	**configuration**	"aopnetd-max-thread-tasks" on page 317
aopoutd-max-thread-tasks	**configuration**	"aopoutd-max-thread-tasks" on page 318
aopsubd-max-thread-tasks	**configuration**	"aopsubd-max-thread-tasks" on page 318
aopssid-max-thread-tasks	**configuration**	"aopssid-max-thread-tasks" on page 318
aopwsmd-max-thread-tasks	**configuration**	"aopwsmd-max-thread-tasks" on page 319
applid	**fsa**	"applid" on page 335
ascii-codepage	**configuration**	"ascii-codepage" on page 319
automatic-dataset-grouping	**printer**	"automatic-dataset-grouping" on page 406
automatic-dataset-grouping	**printway-options**	"automatic-dataset-grouping" on page 406
auxiliary-files-modca-level	**fsa**	"auxiliary-files-modca-level" on page 336
backup-printer-definition-name	**printer**	"backup-printer-definition-name" on page 407

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
backup-printer-definition-name	**printway-options**	"backup-printer-definition-name" on page 407
begin-dataset-exit	**printer**	"begin-dataset-exit" on page 407
begin-dataset-exit	**printway-options**	"begin-dataset-exit" on page 407
blank-compression	**fsa**	"blank-compression" on page 336
blank-truncation	**psf-fss**	"blank-truncation" on page 465
blank-truncation-classes	**configuration**	"blank-truncation-classes" on page 320
building-text	**allocation**	"building-text" on page 288
building-text	**printer**	"building-text" on page 288
burster-trimmer-stacker	**allocation**	"burster-trimmer-stacker" on page 288
burster-trimmer-stacker	**printer**	"burster-trimmer-stacker" on page 288
capture-inline-resources	**fsa**	"capture-inline-resources" on page 336
carriage-control-type	**printer**	"carriage-control-type" on page 408
carriage-control-type	**printway-options**	"carriage-control-type" on page 408
channel-buffer-count	**fsa**	"channel-buffer-count" on page 337
chars	**allocation**	"chars" on page 289
chars	**fsa**	"chars" on page 337
chars	**printer**	"chars" on page 289
checkpoint-pages	**allocation**	"checkpoint-pages" on page 290
checkpoint-pages	**printer**	"checkpoint-pages" on page 290
checkpoint-seconds	**allocation**	"checkpoint-seconds" on page 290
checkpoint-seconds	**printer**	"checkpoint-seconds" on page 290
close-libraries-when-idle	**fsa**	"close-libraries-when-idle" on page 337
color-map	**allocation**	"color-map" on page 291
color-map	**fsa**	"color-map" on page 338
color-map	**printer**	"color-map" on page 291
com-setup-member	**allocation**	"com-setup-member" on page 291
com-setup-member	**fsa**	"com-setup-member" on page 338
com-setup-member	**printer**	"com-setup-member" on page 291
compression	**fsa**	"compression" on page 338
concatenation-separators	**printway-fss**	"concatenation-separators" on page 401
configuration-version	**configuration**	"configuration-version" on page 320
connection-timeout	**printer**	"connection-timeout" on page 408
connection-timeout	**printway-options**	"connection-timeout" on page 408
console-name	**configuration**	"console-name" on page 320

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`consolidate-im1-images`	`fsa`	"consolidate-im1-images" on page 339
`copies`	`allocation`	"copies" on page 291
`copies`	`printer`	"copies" on page 291
`copy-group`	`allocation`	"copy-group" on page 292
`copy-group`	`printer`	"copy-group" on page 292
`creator-userid`	`job-selection-rule`	"creator-userid" on page 377
`cse-check-fit`	`fsa`	"cse-check-fit" on page 339
`cse-orientation`	`fsa`	"cse-orientation" on page 339
`cse-preserve-page-position`	`fsa`	"cse-preserve-page-position" on page 339
`cse-sheet-eject`	`fsa`	"cse-sheet-eject" on page 340
`dataset-grouping`	`printer`	"dataset-grouping" on page 409
`dataset-grouping`	`printway-options`	"dataset-grouping" on page 409
`db-translate-table`	`printer`	"db-translate-table" on page 422
`db-translate-table`	`processing`	"db-translate-table" on page 422
`dcf-routing`	`printer`	"dcf-routing" on page 388
`default-document-codepage`	`printway-fss`	"default-document-codepage" on page 402
`default-owner`	`netspool-options`	"default-owner" on page 384
`default-owner`	`printer`	"default-owner" on page 384
`default-owner`	`printer-pool`	"default-owner" on page 397
`default-process-mode`	`fsa`	"default-process-mode" on page 340
`delete-form-feed`	`printer`	"delete-form-feed" on page 410
`delete-form-feed`	`printway-options`	"delete-form-feed" on page 410
`department-text`	`allocation`	"department-text" on page 293
`department-text`	`printer`	"department-text" on page 293
`description`	`allocation`	"description" on page 293
`description`	`fsa`	"description" on page 341
`description`	`job-selection-rule`	"description" on page 377
`description`	`netspool-eof-rules`	"description" on page 383
`description`	`netspool-options`	"description" on page 384
`description`	`printer`	"description" on page 388
`description`	`printer-pool`	"description" on page 398
`description`	`printway-fss`	"description" on page 402

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
description	**printway-options**	"description" on page 410
description	**processing**	"description" on page 423
description	**protocol**	"description" on page 446
description	**psf-fss**	"description" on page 466
dest-ip-address	**job-selection-rule**	"dest-ip-address" on page 377
destination	**allocation**	"destination" on page 293
destination	**printer**	"destination" on page 293
destination-pattern	**job-selection-rule**	"destination-pattern" on page 378
direct-download	**fsa**	"direct-download" on page 341
disconnect-action	**fsa**	"disconnect-action" on page 341
display-afpdp-status	**fsa**	"display-afpdp-status" on page 342
document-codepage	**printer**	"document-codepage" on page 423
document-codepage	**processing**	"document-codepage" on page 423
document-formats-supported	**printer**	"document-formats-supported" on page 424
document-formats-supported	**processing**	"document-formats-supported" on page 424
document-header	**printer**	"document-header" on page 411
document-header	**printway-options**	"document-header" on page 411
document-trailer	**printer**	"document-trailer" on page 411
document-trailer	**printway-options**	"document-trailer" on page 411
dump-code	**fsa**	"dump-code" on page 342
dump-message-id	**fsa**	"dump-message-id" on page 342
duplex	**allocation**	"duplex" on page 294
duplex	**printer**	"duplex" on page 294
duplexes-supported	**printer**	"duplexes-supported" on page 425
duplexes-supported	**processing**	"duplexes-supported" on page 425
ebcdic-codepage	**configuration**	"ebcdic-codepage" on page 321
eject-to-front-facing	**fsa**	"eject-to-front-facing" on page 343
embedded-attributes-prefix	**netspool-options**	"embedded-attributes-prefix" on page 384
embedded-attributes-prefix	**printer**	"embedded-attributes-prefix" on page 384
embedded-attributes-prefix	**printer-pool**	"include-netspool-eof-rules" on page 398
end-dataset-exit	**printer**	"end-dataset-exit" on page 412
end-dataset-exit	**printway-options**	"end-dataset-exit" on page 412
end-sna-conversation	**fsa**	"end-sna-conversation" on page 343

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
error-disposition	allocation	"error-disposition" on page 294
error-disposition	printer	"error-disposition" on page 294
error-disposition-supported	fsa	"error-disposition-supported" on page 343
fail-on-transform-error	printer	"fail-on-transform-error" on page 425
fail-on-transform-error	processing	"fail-on-transform-error" on page 425
failure-action	fsa	"failure-action" on page 344
failure-retention-period	printer	"failure-retention-period" on page 413
failure-retention-period	printway-options	"failure-retention-period" on page 413
filters	printer	"filters" on page 426
filters	processing	"filters" on page 426
flash-count	allocation	"flash-count" on page 295
flash-count	printer	"flash-count" on page 295
flash-name	allocation	"flash-name" on page 295
flash-name	printer	"flash-name" on page 295
form-definition	allocation	"form-definition" on page 296
form-definition	fsa	"form-definition" on page 344
form-definition	printer	"form-definition" on page 296
form-feed	printer	"form-feed" on page 413
form-feed	printway-options	"form-feed" on page 413
forms	allocation	"forms" on page 296
forms	printer	"forms" on page 296
forms-control-buffer	allocation	"forms-control-buffer" on page 297
forms-control-buffer	printer	"forms-control-buffer" on page 297
forms-list	job-selection-rule	"forms-list" on page 378
forms-supported	printer	"forms-supported" on page 427
forms-supported	processing	"forms-supported" on page 427
fsa-trace-dsname	fsa	"fsa-trace-dsname" on page 344
fsa-type	fsa	"fsa-type" on page 344
general-spooling-mode	printer	"general-spooling-mode" on page 389
global-overlay	fsa	"global-overlay" on page 345
goca-box-supported	fsa	"goca-box-supported" on page 345
goca-fractional-line-supported	fsa	"goca-fractional-line-supported" on page 345

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
goca-process-color-supported	**fsa**	"goca-process-color-supported" on page 346
group-identifier	**allocation**	"group-identifier" on page 297
group-identifier	**printer**	"group-identifier" on page 297
hardcopy-messages	**configuration**	"hardcopy-messages" on page 321
hardcopy-message-list	**configuration**	"hardcopy-message-list" on page 322
highlight-communications-failure-message	**fsa**	"highlight-communications-failure-message" on page 346
hold	**allocation**	"hold" on page 298
hold	**printer**	"hold" on page 298
ignore-dcf-routing-errors	**configuration**	"ignore-dcf-routing-errors" on page 322
image-output-format	**fsa**	"image-output-format" on page 346
include-allocation	**printer**	"include-allocation" on page 389
include-netspool-eof-rules	**printer**	"include-netspool-eof-rules" on page 390
include-netspool-eof-rules	**printer-pool**	"include-netspool-eof-rules" on page 398
include-netspool-options	**printer**	"include-netspool-options" on page 390
include-printway-options	**printer**	"include-printway-options" on page 390
include-processing	**printer**	"include-processing" on page 391
include-protocol	**printer**	"include-protocol" on page 391
inhibit-recovery	**fsa**	"inhibit-recovery" on page 347
inline-bcoca-objects	**fsa**	"inline-bcoca-objects" on page 347
inline-color-management-resources	**fsa**	"inline-color-management-resources" on page 347
inline-foca-objects	**fsa**	"inline-foca-objects" on page 348
inline-form-definitions	**fsa**	"inline-form-definitions" on page 348
inline-goca-objects	**fsa**	"inline-goca-objects" on page 348
inline-ioca-objects	**fsa**	"inline-ioca-objects" on page 349
inline-object-containers	**fsa**	"inline-object-containers" on page 349
inline-overlays	**fsa**	"inline-overlays" on page 349
inline-page-segments	**fsa**	"inline-page-segments" on page 349
inline-ptoca-objects	**fsa**	"inline-ptoca-objects" on page 350
inline-truetype-fonts	**fsa**	"inline-truetype-fonts" on page 350
input-tray-map	**printer**	"input-tray-map" on page 427
input-tray-map	**processing**	"input-tray-map" on page 427
input-tray-number	**allocation**	"input-tray-number" on page 298

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`input-tray-number`	`printer`	"input-tray-number" on page 298
`input-tray-substitutions`	`fsa`	"input-tray-substitutions" on page 350
`interrupt-message-page`	`fsa`	"interrupt-message-page" on page 351
`interrupt-message-page-copies`	`fsa`	"interrupt-message-page-copies" on page 351
`ioca-replicate-trim-supported`	`fsa`	"ioca-replicate-trim-supported" on page 352
`ipp-port-number`	`configuration`	"ipp-port-number" on page 323
`ipsmode`	`configuration`	"ipsmode" on page 323
`issue-intervention-messages`	`fsa`	"issue-intervention-messages" on page 352
`issue-setup-messages`	`fsa`	"issue-setup-messages" on page 352
`jes-form-length`	`allocation`	"jes-form-length" on page 299
`jes-form-length`	`printer`	"jes-form-length" on page 299
`jes-maximum-line-count`	`allocation`	"jes-maximum-line-count" on page 299
`jes-maximum-line-count`	`printer`	"jes-maximum-line-count" on page 299
`jes-node`	`allocation`	"jes-node" on page 300
`jes-node`	`printer`	"jes-node" on page 300
`jes-priority`	`allocation`	"jes-priority" on page 300
`jes-priority`	`printer`	"jes-priority" on page 300
`jes-threshold`	`allocation`	"jes-threshold" on page 300
`jes-threshold`	`printer`	"jes-threshold" on page 300
`jes-writer`	`allocation`	"jes-writer" on page 301
`jes-writer`	`printer`	"jes-writer" on page 301
`jes-writer-pattern`	`job-selection-rule`	"jes-writer-pattern" on page 379
`job-prefix`	`configuration`	"job-prefix" on page 324
`job-selection-status`	`job-selection-rule`	"job-selection-status" on page 379
`label-data-pages`	`allocation`	"label-data–pages" on page 301
`label-data-pages`	`fsa`	"label-data-pages" on page 353
`label-data-pages`	`printer`	"label-data–pages" on page 301
`label-separator-pages`	`fsa`	"label-separator-pages" on page 353
`line-termination`	`printer`	"line-termination" on page 414
`line-termination`	`printway-options`	"line-termination" on page 414
`location`	`fsa`	"location" on page 354

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`location`	`printer`	"location" on page 392
`log-messages`	`psf-fss`	"log-messages" on page 466
`logmode`	`fsa`	"logmode" on page 354
`log-retention`	`configuration`	"log-retention" on page 324
`logstream-name`	`configuration`	"logstream-name" on page 325
`lower-page-limit`	`job-selection-rule`	"lower-page-limit" on page 379
`lower-record-limit`	`job-selection-rule`	"lower-record-limit" on page 380
`lpd-port-number`	`configuration`	"lpd-port-number" on page 325
`lpr-banner-class`	`printer`	"lpr-banner-class" on page 446
`lpr-banner-class`	`protocol`	"lpr-banner-class" on page 446
`lpr-banner-job-name`	`printer`	"lpr-banner-job-name" on page 446
`lpr-banner-job-name`	`protocol`	"lpr-banner-job-name" on page 446
`lpr-filename`	`printer`	"lpr-filename" on page 447
`lpr-filename`	`protocol`	"lpr-filename" on page 447
`lpr-indent`	`printer`	"lpr-indent" on page 447
`lpr-indent`	`protocol`	"lpr-indent" on page 447
`lpr-mode`	`printer`	"lpr-mode" on page 448
`lpr-mode`	`protocol`	"lpr-mode" on page 448
`lpr-optimize-copies`	`printer`	"lpr-optimize-copies" on page 448
`lpr-optimize-copies`	`protocol`	"lpr-optimize-copies" on page 448
`lpr-print-banner`	`printer`	"lpr-print-banner" on page 449
`lpr-print-banner`	`protocol`	"lpr-print-banner" on page 449
`lpr-print-function`	`printer`	"lpr-print-function" on page 449
`lpr-print-function`	`protocol`	"lpr-print-function" on page 449
`lpr-restrict-ports`	`printer`	"lpr-restrict-ports" on page 450
`lpr-restrict-ports`	`protocol`	"lpr-restrict-ports" on page 450
`lpr-title`	`printer`	"lpr-title" on page 450
`lpr-title`	`protocol`	"lpr-title" on page 450
`lpr-width`	`printer`	"lpr-width" on page 451
`lpr-width`	`protocol`	"lpr-width" on page 451
`lu-classes`	`printer`	"lu-classes" on page 392
`lu-classes`	`printer-pool`	"lu-classes" on page 399
`luname`	`fsa`	"luname" on page 354

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`luname`	`printer`	"luname" on page 392
`luname`	`printer-pool`	"luname" on page 399
`mail-bcc-addresses`	`printer`	"mail-bcc-addresses" on page 451
`mail-bcc-addresses`	`protocol`	"mail-bcc-addresses" on page 451
`mail-cc-addresses`	`printer`	"mail-cc-addresses" on page 452
`mail-cc-addresses`	`protocol`	"mail-cc-addresses" on page 452
`mail-do-not-add-suffixes`	`configuration`	"mail-do-not-add-suffixes" on page 326
`mail-embedded-headers`	`printer`	"mail-embedded-headers" on page 453
`mail-embedded-headers`	`protocol`	"mail-embedded-headers" on page 453
`mail-from-address`	`printer`	"mail-from-address" on page 453
`mail-from-address`	`protocol`	"mail-from-address" on page 453
`mail-from-name`	`printer`	"mail-from-name" on page 454
`mail-from-name`	`protocol`	"mail-from-name" on page 454
`mail-inline-message`	`printer`	"mail-inline-message" on page 455
`mail-inline-message`	`protocol`	"mail-inline-message" on page 455
`mail-inline-text`	`printer`	"mail-inline-text" on page 455
`mail-inline-text`	`protocol`	"mail-inline-text" on page 455
`mail-inline-text-attribute`	`printer`	"mail-inline-text-attribute" on page 456
`mail-inline-text-attribute`	`protocol`	"mail-inline-text-attribute" on page 456
`mail-preserve-suffixes`	`configuration`	"mail-preserve-suffixes" on page 326
`mail-reply-address`	`printer`	"mail-reply-address" on page 457
`mail-reply-address`	`protocol`	"mail-reply-address" on page 457
`mail-to-addresses`	`printer`	"mail-to-addresses" on page 457
`mail-to-addresses`	`protocol`	"mail-to-addresses" on page 457
`mail-use-first-address`	`configuration`	"mail-use-first-address" on page 327
`mail-use-reply-addr-as-from-addr`	`printer`	"mail-use-reply-addr-as-from-addr" on page 458
`mail-use-reply-addr-as-from-addr`	`protocol`	"mail-use-reply-addr-as-from-addr" on page 458
`mailer-options`	`configuration`	"mailer-options" on page 327
`mailer-path-name`	`configuration`	"mailer-path-name" on page 328
`map-to-outline-fonts`	`fsa`	"map-to-outline-fonts" on page 354
`mark-interrupt-message-page`	`fsa`	"mark-interrupt-message-page" on page 355
`max-historical-inventory-size`	`configuration`	"max-historical-inventory-size" on page 328

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`max-thread-tasks`	`configuration`	"max-thread-tasks" on page 329
`maximum-copies`	`printer`	"maximum-copies" on page 428
`maximum-copies`	`processing`	"maximum-copies" on page 428
`maximum-document-size`	`printer`	"maximum-document-size" on page 429
`maximum-document-size`	`processing`	"maximum-document-size" on page 429
`maximum-hiperspace-blocks`	`printway-fss`	"maximum-hiperspace-blocks" on page 402
`maximum-record-size`	`netspool-options`	"maximum-record-size" on page 385
`maximum-record-size`	`printer`	"maximum-record-size" on page 385
`message-count-before-dump`	`fsa`	"message-count-before-dump" on page 355
`message-files-read-access`	`fsa`	"message-files-read-access" on page 356
`mcf-name`	`fsa`	"mcf-name" on page 355
`name`	`allocation`	"name" on page 301
`name`	`configuration`	"name" on page 329
`name`	`fsa`	"name" on page 356
`name`	`job-selection-rule`	"name" on page 380
`name`	`netspool-eof-rules`	"name" on page 383
`name`	`netspool-options`	"name" on page 385
`name`	`printer`	"name" on page 393
`name`	`printer-pool`	"name" on page 400
`name`	`printway-fss`	"name" on page 403
`name`	`printway-options`	"name" on page 415
`name`	`processing`	"name" on page 429
`name`	`protocol`	"name" on page 458
`name`	`psf-fss`	"name" on page 466
`name-text`	`allocation`	"name-text" on page 302
`name-text`	`printer`	"name-text" on page 302
`national-language`	`printway-fss`	"national-language" on page 403
`netspool-formatting`	`netspool-options`	"netspool-formatting" on page 386
`netspool-formatting`	`printer`	"netspool-formatting" on page 386
`netspool-use-fixed-jobid`	`configuration`	"netspool-use-fixed-jobid" on page 329
`netspool-use-unaltered-jobid`	`configuration`	"netspool-use-unaltered-jobid" on page 330
`no-response-action`	`fsa`	"no-response-action" on page 356

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
no-response-notify	**fsa**	"no-response-notify" on page 357
normal-output-disposition	**allocation**	"normal-output-disposition" on page 302
normal-output-disposition	**printer**	"normal-output-disposition" on page 302
notify	**allocation**	"notify" on page 303
notify	**printer**	"notify" on page 303
nst-trace-dsname	**psf-fss**	"nst-trace-dsname" on page 467
offset-interrupt-message-page	**fsa**	"offset-interrupt-message-page" on page 357
offset-stacking	**fsa**	"offset-stacking" on page 358
oid-format-supported	**fsa**	"oid-format-supported" on page 358
old-style-translation	**printway-fss**	"old-style-translation" on page 404
omit-line-termination-at-eof	**printer**	"omit-line-termination-at-eof" on page 415
omit-line-termination-at-eof	**printway-options**	"omit-line-termination-at-eof" on page 415
operator-security-profile	**fsa**	"operator-security-profile" on page 358
operator-security-profile	**job-selection-rule**	"operator-security-profile" on page 381
operator-security-profile	**printer**	"operator-security-profile" on page 459
operator-security-profile	**protocol**	"operator-security-profile" on page 459
output-bin-map	**printer**	"output-bin-map" on page 429
output-bin-map	**processing**	"output-bin-map" on page 429
output-bin-number	**allocation**	"output-bin-number" on page 304
output-bin-number	**printer**	"output-bin-number" on page 304
output-class	**allocation**	"output-class" on page 304
output-class	**printer**	"output-class" on page 304
output-class-list	**job-selection-rule**	"output-class-list" on page 381
overlay-back	**allocation**	"overlay-back" on page 304
overlay-back	**printer**	"overlay-back" on page 304
overlay-front	**allocation**	"overlay-front" on page 305
overlay-front	**printer**	"overlay-front" on page 305
override-3800-default-font	**fsa**	"override-3800-default-font" on page 359
owner	**printer**	"owner" on page 459
owner	**protocol**	"owner" on page 459
page-accounting	**printer**	"page-accounting" on page 460

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`page-accounting`	`protocol`	"page-accounting" on page 460
`page-accounting-supported`	`fsa`	"page-accounting-supported" on page 359
`page-definition`	`allocation`	"page-definition" on page 306
`page-definition`	`fsa`	"page-definition" on page 360
`page-definition`	`printer`	"page-definition" on page 306
`page-restart`	`printer`	"page-restart" on page 460
`page-restart`	`protocol`	"page-restart" on page 460
`paper-length`	`fsa`	"paper-length" on page 360
`paper-width`	`fsa`	"paper-width" on page 361
`pcl-line-density`	`printer`	"pcl-line-density" on page 430
`pcl-line-density`	`processing`	"pcl-line-density" on page 430
`pcl-orientation`	`printer`	"pcl-orientation" on page 430
`pcl-orientation`	`processing`	"pcl-orientation" on page 430
`pcl-print-density`	`printer`	"pcl-print-density" on page 431
`pcl-print-density`	`processing`	"pcl-print-density" on page 431
`pdf-author`	`printer`	"pdf-author" on page 393
`pdf-author`	`processing`	"pdf-author" on page 393
`pdf-digital-certificate-name`	`printer`	"pdf-digital-certificate-name" on page 394
`pdf-digital-certificate-name`	`processing`	"pdf-digital-certificate-name" on page 394
`pdf-encryption-level`	`printer`	"pdf-encryption-level" on page 431
`pdf-encryption-level`	`processing`	"pdf-encryption-level" on page 431
`pdf-keywords`	`printer`	"pdf-keywords" on page 394
`pdf-keywords`	`processing`	"pdf-keywords" on page 394
`pdf-owner-identifier`	`printer`	"pdf-owner-identifier" on page 432
`pdf-owner-identifier`	`processing`	"pdf-owner-identifier" on page 432
`pdf-protect`	`printer`	"pdf-protect" on page 432
`pdf-protect`	`processing`	"pdf-protect" on page 432
`pdf-signature-contact`	`printer`	"pdf-signature-contact" on page 394
`pdf-signature-contact`	`processing`	"pdf-signature-contact" on page 394
`pdf-signature-location`	`printer`	"pdf-signature-location" on page 395
`pdf-signature-location`	`processing`	"pdf-signature-location" on page 395
`pdf-signature-name`	`printer`	"pdf-signature-name" on page 395
`pdf-signature-name`	`processing`	"pdf-signature-name" on page 395

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
pdf-signature-reason	**printer**	"pdf-signature-reason" on page 395
pdf-signature-reason	**processing**	"pdf-signature-reason" on page 395
pdf-subject	**printer**	"pdf-subject" on page 396
pdf-subject	**processing**	"pdf-subject" on page 396
pdf-title	**printer**	"pdf-title" on page 396
pdf-title	**processing**	"pdf-title" on page 396
pdf-user-accessibility-control-file	**printer**	"pdf-user-accessibility-control-file" on page 396
pdf-user-accessibility-control-file	**processing**	"pdf-user-accessibility-control-file" on page 396
pdf-user-identifier	**printer**	"pdf-user-identifier" on page 433
pdf-user-identifier	**processing**	"pdf-user-identifier" on page 433
pinst-trace-dsname	**psf-fss**	"pinst-trace-dsname" on page 467
port-number	**fsa**	"port-number" on page 361
port-number	**printer**	"port-number" on page 461
port-number	**protocol**	"port-number" on page 461
print-error-messages	**allocation**	"print-error-messages" on page 306
print-error-messages	**fsa**	"print-error-messages" on page 361
print-error-messages	**printer**	"print-error-messages" on page 306
print-error-messages-maximum	**allocation**	"print-error-messages-maximum" on page 307
print-error-messages-maximum	**fsa**	"print-error-messages-maximum" on page 362
print-error-messages-maximum	**printer**	"print-error-messages-maximum" on page 307
print-error-reporting	**allocation**	"print-error-reporting" on page 307
print-error-reporting	**fsa**	"print-error-reporting" on page 362
print-error-reporting	**printer**	"print-error-reporting" on page 307
print-error-reporting-supported	**printer**	"print-error-reporting-supported" on page 434
print-error-reporting-supported	**processing**	"print-error-reporting-supported" on page 434
print-page-header	**printer**	"print-page-header" on page 434
print-page-header	**processing**	"print-page-header" on page 434
print-queue-name	**printer**	"print-queue-name" on page 462
print-queue-name	**protocol**	"print-queue-name" on page 462
printer-acquire-interval	**fsa**	"printer-acquire-interval" on page 362

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`printer-codepage`	`printer`	"printer-codepage" on page 435
`printer-codepage`	`processing`	"printer-codepage" on page 435
`printer-connect-interval`	`fsa`	"printer-connect-interval" on page 363
`printer-disconnect-interval`	`fsa`	"printer-disconnect-interval" on page 363
`printer-ip-address`	`fsa`	"printer-ip-address" on page 363
`printer-ip-address`	`printer`	"printer-ip-address" on page 462
`printer-ip-address`	`protocol`	"printer-ip-address" on page 462
`printer-management-mode`	`fsa`	"printer-management-mode" on page 364
`printer-names`	`printer-pool`	"printer-names" on page 400
`printer-release-interval`	`fsa`	"printer-release-interval" on page 364
`printer-release-mode`	`fsa`	"printer-release-mode" on page 364
`printer-type`	`printer`	"printer-type" on page 397
`printer-uri`	`printer`	"printer-uri" on page 463
`printer-uri`	`protocol`	"printer-uri" on page 463
`printway-bottom-margin`	`printer`	"printway-bottom-margin" on page 436
`printway-bottom-margin`	`processing`	"printway-bottom-margin" on page 436
`printway-formatting`	`printer`	"printway-formatting" on page 416
`printway-formatting`	`printway-options`	"printway-formatting" on page 416
`printway-page-height`	`printer`	"printway-page-height" on page 436
`printway-page-height`	`processing`	"printway-page-height" on page 436
`printway-pagination`	`printer`	"printway-pagination" on page 437
`printway-pagination`	`processing`	"printway-pagination" on page 437
`printway-postscript`	`printer`	"printway-postscript" on page 416
`printway-postscript`	`printway-options`	"printway-postscript" on page 416
`printway-sosi-mode`	`printer`	"printway-sosi-mode" on page 438
`printway-sosi-mode`	`processing`	"printway-sosi-mode" on page 438
`printway-top-margin`	`printer`	"printway-top-margin" on page 438
`printway-top-margin`	`processing`	"printway-top-margin" on page 438
`process-mode`	`allocation`	"process-mode" on page 308
`process-mode`	`printer`	"process-mode" on page 308
`protocol-type`	`printer`	"protocol-type" on page 464
`protocol-type`	`protocol`	"protocol-type" on page 464
`prune-double-byte-fonts`	`fsa`	"prune-double-byte-fonts" on page 365
`prune-single-byte-fonts`	`fsa`	"prune-single-byte-fonts" on page 365

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`psf-send-default-character`	`fsa`	"psf-send-default-character" on page 365
`recfm`	`netspool-options`	"recfm" on page 387
`recfm`	`printer`	"recfm" on page 387
`record-exit`	`printer`	"record-exit" on page 417
`record-exit`	`printway-options`	"record-exit" on page 417
`recover-from-font-not-found`	`fsa`	"recover-from-font-not-found" on page 365
`release-ds-when-repositioning`	`fsa`	"release-ds-when-repositioning" on page 366
`report-line-mode-conversion-paper-length-errors`	`fsa`	"report-line-mode-conversion-paper-length-errors" on page 366
`resolution`	`allocation`	"resolution" on page 309
`resolution`	`fsa`	"resolution" on page 367
`resolution`	`printer`	"resolution" on page 309
`resource-deletion-ratio`	`fsa`	"resource-deletion-ratio" on page 367
`resource-directories`	`allocation`	"resource-directories" on page 309
`resource-directories`	`printer`	"resource-directories" on page 309
`resource-library`	`allocation`	"resource-library" on page 309
`resource-library`	`printer`	"resource-library" on page 309
`response-timeout`	`fsa`	"response-timeout" on page 368
`response-timeout`	`printer`	"response-timeout" on page 418
`response-timeout`	`printway-options`	"response-timeout" on page 418
`restore-blanks-classes`	`psf-fss`	"restore-blanks-classes" on page 467
`restrict-printable-area`	`allocation`	"restrict-printable-area" on page 310
`restrict-printable-area`	`fsa`	"restrict-printable-area" on page 368
`restrict-printable-area`	`printer`	"restrict-printable-area" on page 310
`resubmit-for-filtering`	`printer`	"resubmit-for-filtering" on page 439
`resubmit-for-filtering`	`processing`	"resubmit-for-filtering" on page 439
`retained-fonts`	`fsa`	"retained-fonts" on page 368
`retained-form-definitions`	`fsa`	"retained-form-definitions" on page 368
`retained-object-containers`	`fsa`	"retained-object-containers" on page 369
`retained-page-definitions`	`fsa`	"retained-page-definitions" on page 369
`retained-page-segments`	`fsa`	"retained-page-segments" on page 370
`retry-limit`	`printer`	"retry-limit" on page 419
`retry-limit`	`printway-options`	"retry-limit" on page 419

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`retry-time`	`printer`	"retry-time" on page 419
`retry-time`	`printway-options`	"retry-time" on page 419
`room-text`	`allocation`	"room-text" on page 311
`room-text`	`printer`	"room-text" on page 311
`save-afp-statistics`	`allocation`	"save-afp-statistics" on page 311
`save-afp-statistics`	`printer`	"save-afp-statistics" on page 311
`save-auxiliary-files`	`fsa`	"save-auxiliary-files" on page 370
`scs-automatic-page-orientation`	`printer`	"scs-automatic-page-orientation" on page 439
`scs-automatic-page-orientation`	`processing`	"scs-automatic-page-orientation" on page 439
`scs-bottom-margin`	`printer`	"scs-bottom-margin" on page 440
`scs-bottom-margin`	`processing`	"scs-bottom-margin" on page 440
`scs-horizontal-tabs`	`printer`	"scs-horizontal-tabs" on page 441
`scs-horizontal-tabs`	`processing`	"scs-horizontal-tabs" on page 441
`scs-left-margin`	`printer`	"scs-left-margin" on page 441
`scs-left-margin`	`processing`	"scs-left-margin" on page 441
`scs-maximum-line-length`	`printer`	"scs-maximum-line-length" on page 442
`scs-maximum-line-length`	`processing`	"scs-maximum-line-length" on page 442
`scs-maximum-page-length`	`printer`	"scs-maximum-page-length" on page 442
`scs-maximum-page-length`	`processing`	"scs-maximum-page-length" on page 442
`scs-right-margin`	`printer`	"scs-right-margin" on page 442
`scs-right-margin`	`processing`	"scs-right-margin" on page 442
`scs-top-margin`	`printer`	"scs-top-margin" on page 443
`scs-top-margin`	`processing`	"scs-top-margin" on page 443
`scs-vertical-tabs`	`printer`	"scs-vertical-tabs" on page 443
`scs-vertical-tabs`	`processing`	"scs-vertical-tabs" on page 443
`secure-transmission`	`fsa`	"secure-transmission" on page 370
`select-work-from-hold-queue`	`configuration`	"select-work-from-hold-queue" on page 330
`send-messages-on-failure`	`fsa`	"send-messages-on-failure" on page 371
`send-messages-to-sysout`	`fsa`	"send-messages-to-sysout" on page 371
`send-separator-pages`	`fsa`	"send-separator-pages" on page 371
`server-user-options`	`printer`	"server-user-options" on page 464
`server-user-options`	`protocol`	"server-user-options" on page 464

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`set-3800-dataset-header-origin`	`fsa`	"set-3800-dataset-header-origin" on page 372
`set-3800-dataset-origin`	`fsa`	"set-3800-dataset-origin" on page 372
`set-3800-job-header-origin`	`fsa`	"set-3800-job-header-origin" on page 372
`set-3800-job-trailer-origin`	`fsa`	"set-3800-job-trailer-origin" on page 372
`set-3800-messages-origin`	`fsa`	"set-3800-messages-origin" on page 373
`smf-recording`	`configuration`	"smf-recording" on page 331
`snmp-enabled`	`fsa`	"snmp-enabled" on page 373
`successful-retention-period`	`printer`	"successful-retention-period" on page 420
`successful-retention-period`	`printway-options`	"successful-retention-period" on page 420
`suppress-copy-marks`	`fsa`	"suppress-copy-marks" on page 373
`suppress-post-unix-filter-formatting`	`configuration`	"suppress-post-unix-filter-formatting" on page 331
`table-reference-characters`	`allocation`	"table-reference-characters" on page 311
`table-reference-characters`	`printer`	"table-reference-characters" on page 311
`tcpip-64k-buffer-support`	`fsa`	"tcpip-64k-buffer-support" on page 374
`tcpip-job-name`	`printway-fss`	"tcpip-job-name" on page 404
`tcpip-job-name`	`psf-fss`	"tcpip-job-name" on page 468
`title-text`	`allocation`	"title-text" on page 312
`title-text`	`printer`	"title-text" on page 312
`trace-mode`	`fsa`	"trace-mode" on page 374
`trace-mode`	`printway-fss`	"trace-mode" on page 405
`trace-prompt`	`printway-fss`	"trace-prompt" on page 405
`trace-prompt`	`psf-fss`	"trace-prompt" on page 468
`trace-table-size`	`fsa`	"trace-table-size" on page 375
`trace-table-size`	`printway-fss`	"trace-table-size" on page 406
`trace-table-size`	`psf-fss`	"trace-table-size" on page 469
`trace-user-data`	`fsa`	"trace-user-data" on page 375
`trailer-transform-error-page`	`printer`	"trailer-transform-error-page" on page 444
`trailer-transform-error-page`	`processing`	"trailer-transform-error-page" on page 444
`tracedata`	`trace-parameters`	"tracedata" on page 471
`tracedirectory`	`trace-parameters`	"tracedirectory" on page 471

Table 49. Attributes and valid object classes (continued)

Attribute	Object class	See
`traceexit`	`trace-parameters`	"traceexit" on page 472
`tracefiles`	`trace-parameters`	"tracefiles" on page 472
`tracefilter`	`trace-parameters`	"tracefilter" on page 472
`tracemegabytes`	`trace-parameters`	"tracemegabytes" on page 473
`tracemsg`	`trace-parameters`	"tracemsg" on page 473
`traceon`	`trace-parameters`	"traceon" on page 474
`translate-document-header`	`printer`	"translate-document-header" on page 420
`translate-document-header`	`printway-options`	"translate-document-header" on page 420
`translate-document-trailer`	`printer`	"translate-document-trailer" on page 421
`translate-document-trailer`	`printway-options`	"translate-document-trailer" on page 421
`translation-dataset-qualifier`	`printer`	"translation-dataset-qualifier" on page 444
`translation-dataset-qualifier`	`processing`	"translation-dataset-qualifier" on page 444
`transmit-recovery-pages`	`fsa`	"transmit-recovery-pages" on page 376
`transparent-data-character`	`printer`	"transparent-data-character" on page 421
`transparent-data-character`	`printway-options`	"transparent-data-character" on page 421
`unicode-enabled`	`psf-fss`	"unicode-enabled" on page 469
`universal-character-set`	`allocation`	"universal-character-set" on page 313
`universal-character-set`	`printer`	"universal-character-set" on page 313
`upper-page-limit`	`job-selection-rule`	"upper-page-limit" on page 382
`upper-record-limit`	`job-selection-rule`	"upper-record-limit" on page 382
`use-httpd-userid`	`configuration`	"use-http-userid" on page 332
`use-line-mode-migration-linect`	`fsa`	"use-line-mode-migration-linect" on page 376
`use-output-disposition`	`configuration`	"use-output-disposition" on page 332
`use-unencrypted-connection`	`configuration`	"use-unencrypted-connection" on page 333
`userdata`	`allocation`	"userdata" on page 313
`userdata`	`printer`	"userdata" on page 313
`x-image-shift-back`	`allocation`	"x-image-shift-back" on page 313
`x-image-shift-back`	`printer`	"x-image-shift-back" on page 313
`x-image-shift-front`	`allocation`	"x-image-shift-front" on page 314
`x-image-shift-front`	`printer`	"x-image-shift-front" on page 314
`y-image-shift-back`	`allocation`	"y-image-shift-back" on page 315

Table 49. Attributes and valid object classes (continued)		
Attribute	**Object class**	**See**
`y-image-shift-back`	`printer`	"y-image-shift-back" on page 315
`y-image-shift-front`	`allocation`	"y-image-shift-front" on page 315
`y-image-shift-front`	`printer`	"y-image-shift-front" on page 315

Attributes for the allocation object class

The attributes that are valid when you create Allocation components are listed here. Allocation components are in object class **allocation**. These attributes are also valid for the **printer** object class.

Required attributes

No attributes are required. However, if you plan to use Print Interface or NetSpool, you must specify the attributes that correspond to the JES work-selection criteria defined for the program (PSF or IP PrintWay) that you want to process the output data sets from the JES spool.

address-text

This multi-valued, list attribute specifies the address that is printed on the separator pages for a data set.

ISPF field name

Address

Allowed values

You can enter 1–4 values. Each value is a combination of 1–60 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - /). If a value contains blanks or special characters, enclose it in double quotation marks. If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
address-text={"6300 Diagonal Hwy." "Boulder, CO" 80301}
```

This example uses three values, corresponding to three address lines.

Default value

None.

Usage guidelines

- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the `lpr-mode` attribute is `to-remote-psf`.
- This attribute is equivalent to the ADDRESS parameter of the OUTPUT JCL statement.

afp-parameters

This single-valued attribute specifies the name of a data set that contains AFP Download Plus parameters. If the data set is a partitioned data set, also specify the name of the member that contains the parameters, as shown in the example.

ISPF field name

AFP parameters

Allowed values

A valid data set name, with an optional member name. For example:

```
USER.AFPPARMS
USER.PDS(AFPPARMS)
```

Default value

None.

Usage guidelines

- The data set must exist and be cataloged.
- This attribute is equivalent to the AFPPARMS parameter of the OUTPUT JCL statement.
- For more information about AFP Download Plus, see *PSF for z/OS: AFP Download Plus*.

building-text

This single-valued attribute specifies the building location that is printed on the separator pages for a data set.

ISPF field name

Building

Allowed values

You can enter a combination of 1–60 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - /). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

```
building-text="Building 003"
```

Default value

No default value.

Usage guidelines

- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- This attribute is equivalent to the BUILDING parameter of the OUTPUT JCL statement.

burster-trimmer-stacker

This single-valued attribute indicates whether forms printed on a printer that is equipped with a burster-trimmer-stacker are left in continuous fanfold or are separated, trimmed, and stacked in single sheets.

ISPF field name

BURST

Allowed values

You can enter one of these fixed values:

yes
  The forms are burst, trimmed, and stacked.

no
  The forms are left in continuous fanfold.

Default value

The installation default determines whether the forms are burst, trimmed, and stacked.

Usage guidelines

- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the BURST parameter of the OUTPUT and DD JCL statements.

chars

This multi-valued, list attribute specifies the names of the coded fonts that are used to print a data set on a printer.

ISPF field name

Character sets

Allowed values

You can enter 1–4 coded font names. Each name is a combination of 1–4 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

For valid coded font names, see *z/OS Font Collection*. Omit the X0 or XZ prefix from the coded font name.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
chars={60DB 60D8}
```

Default value

The font that is specified in the page definition is used. If the page definition does not specify a font:

- The transforms use the default font in the transform configuration file. If no font is specified, the transforms use font X060D9.
- PSF uses its default font.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- Some coded fonts have 6-character names, not counting the prefix. For the 4-character alternate coded font name, see *IBM AFP Fonts: Font Summary for AFP Font Collection*.
- PSF and the transforms use this attribute only if the page definition used to print the job does not specify fonts. If you specify fonts with this attribute and the page definition also specifies fonts, PSF and the transforms use the fonts that are named in the page definition. PSF, however, uses the font in this attribute if the default page definition is used.

- If you specify more than one coded font with the **chars** attribute, the job must contain either shift-out-shift-in (SOSI) codes or table reference characters (TRCs) to use coded fonts other than the first one. IBM suggests that you do not mix SOSI codes and TRCs.
  - If the job contains TRCs, you must specify the **table-reference-characters** attribute value as true. PSF and the transforms use the TRC characters to select the corresponding coded font that is specified with the **chars** attribute.
  - If the job contains SOSI codes, PSF and the transforms use the first coded font that is specified with the **chars** attribute as the single-byte font and the second coded font as the double-byte font.

  For more information about using multiple coded fonts, see *AFP: Programming Guide and Line Data Reference* and *PSF for z/OS: User's Guide*.

- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is to-remote-psf.

- This attribute is equivalent to the CHARS parameter of the OUTPUT and DD JCL statements.

checkpoint-pages

This single-valued attribute specifies the number of pages you want between checkpoints that PSF takes while it is processing a data set.

ISPF field name

Checkpoint pages

Allowed values

You can enter an integer 1 - 32767.

Default value

JES uses your system default. If no system default exists, PSF does not record checkpoints.

Usage guidelines

- If you specify a value for this attribute and for **checkpoint-seconds**, JES determines which value to use.
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the **CKPTPAGE** parameter of the OUTPUT JCL statement.

checkpoint-seconds

This single-valued attribute specifies the number of seconds you want between checkpoints that PSF takes while it is processing a data set.

ISPF field name

Checkpoint seconds

Allowed values

You can enter an integer 1 - 32767.

Default value

JES uses your system default. If no system default exists, PSF does not record checkpoints.

Usage guidelines

- If you specify a value for this attribute and for **checkpoint-pages**, JES determines which value to use.
- This attribute does not apply to IP PrintWay printer definitions.

- This attribute is equivalent to the CKPTSEC parameter of the OUTPUT JCL statement.

color-map

This single-valued attribute specifies the name of the object container for the color mapping table resource that PSF uses to print a data set containing color translation information. This attribute is only used when it is sending output to a printer that supports color mapping table resources.

ISPF field name

Color map

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

If a color map is not specified for the data set or for the printer, PSF uses an internal color mapping table.

Usage guidelines

- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the COLORMAP parameter of the OUTPUT JCL statement.
- Use a prefix of M1 for color mapping table resources.

com-setup-member

This single-valued attribute specifies the name of the object container for the microfilm setup resource that PSF uses to print data on a microfilm device. This attribute is only used when it is sending output to a microfilm device.

ISPF field name

Com setup member

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks.

Default value

No default value.

Usage guidelines

- Use a prefix of H1 for microfilm setup resources.
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the COMSETUP parameter of the OUTPUT JCL statement.

copies

This single-valued attribute specifies the number of collated copies you want to print.

ISPF field name

Copies

Allowed values

You can enter an integer 1 - 32640.

Default value

1

Usage guidelines

- This attribute does not apply to the email protocol. Only one copy is sent.
- Some Internet Printing Protocol (IPP) printers do not support the **copies** IPP job attribute. In this case, only one copy prints.
- PSF sends the entire document to the printer the specified number of times.
- PSF ignores this attribute if you specify one or more values for the **copy-group** attribute.
- This attribute is similar to the COPIES parameter of the OUTPUT and DD JCL statements.

copy-group

This multi-valued, list attribute specifies the number of copies of each page of the data set you want printed consecutively before the next page is printed. You can enter 1–8 copy groups. The data set is sent to the printer once for each copy group. The total number of copies equals the sum of the copy groups.

ISPF field name

Copy group

Allowed values

You can enter 1–8 integers, each with a value 1–255. If you specify more than one value, separate the values with spaces and enclose the list of values in braces.

Example:

```
copy-group={1 3 2}
```

When a data set containing three pages is printed:

- Copy group 1 prints one copy of each page.
- Copy group 2 prints three copies of each page.
- Copy group 3 prints two copies of each page.

Default value

No default values.

Usage guidelines

- Each individual copy group or the sum of all copy groups cannot be greater than 255.
- When a copy group is specified, the **copies** attribute is ignored.
- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is similar to the COPIES parameter of the OUTPUT and DD JCL statements.

department-text

This single-valued attribute specifies the department identifier that is printed on the separator pages for a data set.

ISPF field name

Department

Allowed values

You can enter a combination of 1–60 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - /). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

```
department-text="Payroll Dept."
```

Default value

No default value.

Usage guidelines

- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is to-remote-psf.
- This attribute is equivalent to the DEPT parameter of the OUTPUT JCL statement.

description

This single-valued attribute describes the printer definition. This attribute is not required. However, the description can help users select a printer.

ISPF field name

Description

Allowed values

You can enter a combination of 1–256 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

```
description="4019 LaserPrinter PS39"
```

Default value

No default value.

destination

This single-valued attribute specifies a destination name for output data sets.

ISPF field name

DEST

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

JES determines the value.

Usage guidelines

- If you also specify the **jes-node** attribute, it becomes part of the DEST parameter for allocation: DEST=*jes-node.dest*.
- When you specify **dcf-routing=yes**, IP PrintWay uses this value, if specified, for printer selection. For more information, see the **dcf-routing** attribute in "Attributes for the printer object class" on page 387.
- This attribute is equivalent to the DEST parameter of the OUTPUT JCL statement.

duplex

This single-valued attribute indicates whether printing is done on both sides of the sheet and if so, how.

ISPF field name

Duplex

Allowed values

You can enter one of these fixed values:

no
    Prints on the front side of the paper only.

yes
    Prints on both sides of the paper so the top edge of side 1 is the top edge of side 2.

tumble
    Prints on both sides of the paper but tumbles the print so the top edge of side 1 is the bottom edge of side 2.

Default value

The value in the form definition or the internal copy group is used.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- If IP PrintWay transmits the data set to a remote printer, the document is printed on both sides only if the line printer daemon (LPD) or the IPP server for the target printer supports duplex printing.
- IP PrintWay sends this attribute to the remote printer if **lpr-mode=to-remote-psf**.
- This attribute is equivalent to the DUPLEX parameter of the OUTPUT JCL statement.

error-disposition

This single-valued attribute indicates the disposition of a data set when PSF stops processing the data set because an error occurs during printing.

ISPF field name

Error disposition

Allowed values

You can enter one of these fixed values:

default
Take the standard PSF action.

hold
Hold the data set on the JES spool until it is released by the system operator.

quit
Release the data set to JES. JES handles the data set based on the value of the `normal-output-disposition` attribute.

Default value

default

Usage guidelines

- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the PRTERROR parameter of the OUTPUT JCL statement.

flash-count

This single-valued attribute specifies the number of copies on which the forms flash (specified by the `flash-name` attribute) is to be printed, beginning with the first copy printed. A *forms flash* is a 3800 printer hardware frame that prints a photographic negative on selected forms.

ISPF field name

FLASH count

Allowed values

You can enter an integer 0 - 255.

Default value

255

Usage guidelines

This attribute is similar to the FLASH parameter of the OUTPUT and DD JCL statements.

flash-name

This single-valued attribute specifies the name of the forms flash used to print a data set. A *forms flash* is a 3800 printer hardware frame that prints a photographic negative on selected forms. PSF ignores this attribute for all printers but the 3800 printer. The number that is specified by the `flash-count` attribute determines how many copies of the data set are printed with the forms flash.

ISPF field name

FLASH name

Allowed values

You can enter a combination of 1–4 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

No default value.

Usage guidelines

This attribute is similar to the FLASH parameter of the OUTPUT and DD JCL statements.

form-definition

This single-valued attribute specifies the name of the form definition that defines how a data set is printed.

ISPF field name

Form definition

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

You can specify the form definition name with or without the F1 prefix. However, if the name of the form definition, without the F1 prefix, starts with F1, specify the full name. For example, F1F1USER.

Default value

PSF and the transforms use the first inline form definition. If none exists:

- PSF uses the installation-defined default form definition.
- The transforms use the default form definition in the transform configuration file, `aopxfd.conf`. If a default form definition is not specified in the file, the transforms use F1CP0110.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- To correctly print documents that contain an inline form definition when you are using the AFP Printer Driver for Windows, do not specify a value for this attribute.
- If the job submitter specifies a form definition, it overrides the form definition in this attribute.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- This attribute is equivalent to the FORMDEF parameter of the OUTPUT JCL statement.

forms

This single-valued attribute specifies the name of the form on which data sets are printed.

ISPF field name

FORMS

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

JES determines the default value.

Usage guidelines

- If the job submitter specifies a form name, it overrides the form name in this attribute.
- When you specify **dcf-routing = yes**, IP PrintWay uses this value, if specified, for printer selection. For more information, see the **dcf-routing** attribute in "Attributes for the printer object class" on page 387.
- This attribute is equivalent to the FORMS parameter of the OUTPUT JCL statement.

forms-control-buffer

This single-valued attribute specifies the name of the forms control buffer (FCB) a printer uses to control the vertical format when it is printing a data set.

ISPF field name

FCB

Allowed values

You can enter a combination of 1–4 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

JES determines the default value.

Usage guidelines

- IP PrintWay basic mode: If this is an IP PrintWay printer definition, also specify `printway-formatting=use-fcb` so that IP PrintWay basic mode uses the forms control buffer.
- This attribute is equivalent to the FCB parameter of the OUTPUT and DD JCL statements.

group-identifier

This single-valued attribute specifies the name that JES assigns to the output group for the data set. JES always assigns each data set that NetSpool and Print Interface allocate on the JES spool to a separate JES output group even though you specify a name in this attribute.

ISPF field name

GROUPID

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z) or numbers (0-9). Blanks and special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

No default value.

Usage guidelines

This attribute is equivalent to the GROUPID parameter of the OUTPUT JCL statement.

hold

This single-valued attribute indicates the disposition of output data sets that Print Interface or NetSpool allocates on the JES spool.

ISPF field name

HOLD

Allowed values

You can enter one of these fixed values:

yes or true
Hold the data set until it is released by the system operator. Then, print the data set and purge it.

no or false
In JES2, use the value that is specified in the **normal-output-disposition** attribute. In JES3, print the data set and then purge it.

Default value

The JES default is no.

Usage guidelines

This attribute is equivalent to the HOLD parameter of the DD JCL statement.

input-tray-number

This single-valued attribute specifies a number that identifies the paper source that is used to print a data set. To determine the tray numbers that your printer supports, see its documentation.

ISPF field name

Input tray

Allowed values

You can enter an integer 1 - 255.

Default value

The default is the number in the form definition or the printer's default paper source.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- The transforms map this tray number to the tray number of the PCL or PostScript printer, by using tray-mapping values that are specified in the transform configuration file, `aopxfd.conf`.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.

- The input tray that a job submitter specifies overrides this attribute.
- This attribute is equivalent to the INTRAY parameter of the OUTPUT JCL statement.

jes-form-length

This single-valued attribute indicates the paper length in inches or centimeters. This field is used to change the paper length of the physical paper at the printer without reconfiguring the printer. The value must contain at least one digit and an abbreviation for inches or centimeters.

ISPF field name

JES form length

Allowed values

You can enter a value in the format *nn.mmmuu*:

nn
A number 0–99. You must specify at least one digit to the left of the decimal point.

mmm
A number 0–999. The decimal point and the digits after the number are optional.

uu
One of these fixed values:

in
Inches

cm
Centimeters

Examples:

```
jes-form-length=9.5in
jes-form-length=12.345cm
jes-form-length=2in
jes-form-length=0.5cm
```

Default value

JES uses the printer's default paper length.

Usage guidelines

This attribute is equivalent to the FORMLEN parameter of the OUTPUT JCL statement.

jes-maximum-line-count

This single-valued attribute specifies the maximum number of lines that are printed on each output page.

ISPF field name

LINECT

Allowed values

You can enter an integer 0 - 255.

Default value

JES determines the default.

Usage guidelines

This attribute is equivalent to the LINECT parameter of the OUTPUT JCL statement.

jes-node

This single-valued attribute specifies the name of the destination node to which JES sends the data sets. This node is used with the value of the **destination** attribute as part of the JCL DEST parameter: DEST=*jesnode.dest*.

ISPF field name

JES node

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

JES uses the node from which the job was submitted.

Usage guidelines

This attribute is similar to the DEST=*nodename.name* parameter of the OUTPUT JCL statement.

jes-priority

This single-valued attribute specifies a number that determines the order in which a data set is placed in the print queue. A data set with a higher number has a higher priority and is printed sooner.

ISPF field name

PRTY

Allowed values

You can enter an integer 0 - 255.

Default value

JES determines the default.

Usage guidelines

- If the job submitter specifies a priority, it overrides the priority in this attribute.
- This attribute is equivalent to the PRTY parameter of the OUTPUT JCL statement.
- JES might override or ignore this attribute, depending on how JES is configured in your installation.

jes-threshold

This single-valued attribute specifies a number that indicates the maximum size that is allowed for a data set to print it as one unit of work. The size is calculated as the number of records in a data set multiplied by the number of copies requested. When this size exceeds the **jes-threshold** value, the data set is printed as two units of work.

ISPF field name

THRESHLD

Allowed values

You can enter an integer 1 - 99999999.

Default value

JES uses the installation default that is specified at initialization.

Usage guidelines

This attribute is equivalent to the THRESHLD parameter of the OUTPUT JCL statement.

jes-writer

This single-valued attribute specifies the name of an external writer that processes the data sets. An external writer is an IBM- or installation-written program.

ISPF field name

WRITER

Allowed values

You can enter a combination of 1–8 letters (a–z, A–Z), numbers (0–9) and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

No default value.

Usage guidelines

This attribute is equivalent to the WRITER parameter of the OUTPUT JCL statement.

label-data–pages

This single-valued attribute indicates whether the security label is printed on each page of printed output. The security label represents a security level and categories that are defined to RACF. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name

Label data pages

Allowed values

You can enter one of these fixed values:

yes
    The security label that is determined by SECLABEL is printed.

no
    The security label is not printed.

Default value

PSF sets the default based on whether PSFMPL is active.

Usage guidelines

- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is equivalent to the DPAGELBL parameter of the OUTPUT JCL statement.

name

This single-valued attribute specifies the name of the component.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Component Name

Allowed values

Any combination of 1–17 letters (a–z, A–Z), numbers (0–9), and special characters (such as $ # @ . - = /). Blank characters are not allowed. If the value contains special characters, enclose it in double quotation marks.

Default value

None.

name-text

This single-valued attribute specifies the requester name that is printed on the separator pages for a data set.

ISPF field name

Name

Allowed values

You can enter a combination of 1–60 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - /). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

```
name-text="R. Roper"
```

Default value

No default value.

Usage guidelines

- Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is to-remote-psf.
- This attribute is equivalent to the NAME parameter of the OUTPUT JCL statement.

normal-output-disposition

This single-valued attribute indicates the normal output disposition of sysout data sets that Print Interface or NetSpool allocate on the JES spool.

ISPF field name

OUTDISP

Allowed values

You can enter one of these fixed values:

write
Print the data set, then purge it.

hold
Hold the data set until released, then print the data set and purge it.

keep
Print the data set, then hold it until it is released.

leave
Hold the data set until released, then print the data set and hold it until it is released.

purge
Delete the data set without printing (not suggested).

Default value

JES2 uses the installation default for normal disposition for the sysout class of the data set.

Usage guidelines

- IP PrintWay ignores the **keep** and **leave** options. IP PrintWay always deletes data sets after it prints them or sending them to an email destination unless the job submitter or printer definition specifies a retention period. See "failure-retention-period" on page 413 and "successful-retention-period" on page 420.
- Do not select the **purge** option because JES deletes the data sets from the JES spool before they are printed.
- This attribute is similar to the OUTDISP parameter of the OUTPUT JCL statement.
- This attribute applies only to JES2. JES3 ignores it.
- JES2 ignores this attribute if **hold=yes**.

notify

This multi-valued, list attribute specifies the user IDs you want notified when the print jobs are completed. The notification sent to the specified user IDs indicates whether the print job completed successfully.

ISPF field name

NOTIFY... at node

Allowed values

You can enter 1–4 values in the format *node.userid*:

node
The node that is associated with the user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. Lowercase letters are converted to uppercase. If you do not specify a node, the node from which the job was submitted is used.

userid
The user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. The first character must be alphabetic or national. Lowercase letters are converted to uppercase.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
notify={boulder.martha charlie}
```

Default value

If you do not specify at least one user ID, no notification is sent. If you specify a user ID without a node, the node from which the job was submitted is used.

Usage guidelines

- This attribute is equivalent to the NOTIFY parameter of the OUTPUT JCL statement.

output-bin-number

This single-valued attribute identifies the output bin a printer uses. To determine the bin numbers that your printer supports, see its documentation.

ISPF field name

Output bin

Allowed values

You can enter an integer 1 - 65535.

Default value

The default is the output bin number in the form definition or the printer's default output bin.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is to-remote-psf.
- The output bin that a job submitter specifies overrides this attribute.
- This attribute is equivalent to the OUTBIN parameter of the OUTPUT JCL statement.

output-class

This single-valued attribute specifies a JES output class for output data sets.

ISPF field name

CLASS

Allowed values

You can enter a letter (a–z, a–Z) or number (0-9). Special characters are not allowed. Lowercase letters are converted to uppercase.

Default value

JES determines the default value.

Usage guidelines

- When you specify **dcf-routing = yes**, IP PrintWay uses this value, if specified, for printer selection. For more information, see the **dcf-routing** attribute in "Attributes for the printer object class" on page 387.
- This attribute is equivalent to the CLASS parameter of the OUTPUT JCL statement.

overlay-back

This single-valued attribute specifies the name of the predefined data (lines, shading, text, boxes, or logos) that PSF and the transforms print on the back side of a page when the data set is duplexed.

ISPF field name

Overlay back

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

No default value.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- This overlay prints in addition to any overlay that the form definition specifies.
- If the job submitter specifies a back overlay, it overrides this overlay.
- This attribute is equivalent to the OVERLAYB parameter of the OUTPUT JCL statement.
- Use a prefix of 01 for overlay resources.

overlay-front

This single-valued attribute specifies the name of the predefined data (lines, shading, text, boxes, or logos) that PSF and transforms print on the front side of a page.

ISPF field name

Overlay front

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

No default value.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- This overlay prints in addition to any overlay that the form definition specifies.
- If the job submitter specifies a front overlay, it overrides this overlay.
- This attribute is equivalent to the OVERLAYF parameter of the OUTPUT JCL statement.

- Use a prefix of 01 for overlay resources.

page-definition

This single-valued attribute specifies the name of the page definition that defines how a data set is printed.

ISPF field name

Page definition

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

You can specify the page definition name with or without the P1 prefix. However, if the name of the page definition, without the P1 prefix, starts with P1, specify the full name. For example, P1P1USER.

Default value

PSF and the transforms use the first inline page definition. If none exists:

- PSF uses the installation-defined default page definition.
- The transforms use the default page definition in the transform configuration file, `aopxfd.conf`. If a default page definition is not specified in the file, the transforms use P1P08682.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- If the job submitter specifies a page definition, it overrides the page definition in this attribute.
- This attribute is equivalent to the PAGEDEF parameter of the OUTPUT JCL statement.

print-error-messages

This single-valued attribute indicates whether all message groups generated in the processing of a data set are printed or saved in a file:

- If PSF prints the data set on the z/OS system, the messages are printed at the end of the data set.
- If PSF sends the data set to an AFP Download Plus receiver to print on another system, PSF saves the messages in a file on the z/OS system.

ISPF field name

Print error messages

Allowed values

You can enter one of these fixed values:

yes
   PSF prints or saves all error messages until an error occurs that ends processing.

no
   PSF does not print or save error messages unless an error occurs that ends processing. If that happens, only the message group that describes the last error is printed or saved.

Default value

The default value for the PSF printer or for the AFP Download Plus sender.

Usage guidelines

- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is similar to the PIMSG parameter of the OUTPUT JCL statement.

print-error-messages-maximum

This single-valued attribute specifies the maximum number of message groups that PSF generates when the value of the **print-error-messages** attribute is **yes**. When the maximum number is reached, PSF stops processing the data set and deletes it from the JES spool.

ISPF field name

Maximum messages

Allowed values

You can enter an integer 0 - 999. A value of 0 means the data set is processed until it completes or an error occurs that ends processing of the data set.

Default value

16

Usage guidelines

- This attribute does not apply to IP PrintWay printer definitions.
- This attribute is similar to the PIMSG parameter of the OUTPUT JCL statement.

print-error-reporting

This single-valued attribute indicates whether the printer reports character and position errors. Character errors are caused by trying to use a code point that is not assigned to a character in a font. Position errors are caused by trying to print outside the printable area.

ISPF field name

Print error reporting

Allowed values

You can enter one of these fixed values:

none
Do not report any character or position errors.

all
Report all character and position errors.

character
Report only character errors.

position
Report only position errors.

Default value

Usage guidelines

- If you enter **all**, **character**, or **position**, it must be one of the values of the **print-error-reporting-supported** attribute of the Processing component of the printer definition.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- This attribute is similar to the DATACK parameter of the OUTPUT JCL statement.

process-mode

This single-valued attribute specifies the processing mode for printing a data set.

ISPF field name

PRMODE

Allowed values

You can enter a combination of 1–8 letters (a–z, a–Z) or numbers (0-9). Blanks and special characters are not allowed. These fixed values have special meaning:

LINE
    The data set is scheduled to a line-mode printer.

PAGE
    The data set is scheduled to a page-mode printer.

SOSI1
    In a line-mode data set containing both single-byte and double-byte characters, PSF converts each shift-out, shift-in code to a blank and a Set Coded Font Local text control.

SOSI2
    In a line-mode data set containing both single-byte and double-byte characters, PSF converts each shift-out, shift-in code to a Set Coded Font Local text control.

SOSI3
    In a line-mode data set containing both single-byte and double-byte characters, PSF converts each shift-in code to a Set Coded Font Local text control and two blanks. It converts each shift-out code to a Set Coded Font Local text control.

SOSI4
    When double-byte character set (DBCS) text is converted from ASCII to EBCDIC, PSF skips each shift-out, shift-in code and does not count the code when it calculates offsets for the print data set.

Default value

JES determines the default.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is to-remote-psf.
- For the shift-out, shift-in process to work correctly, either the **chars** attribute or the page definition that is used to print the job must specify two coded fonts. The first must be a single-byte font, and the second must be a double-byte font.
- If the job submitter specifies a shift-in/shift-out value, it overrides this attribute.
- Do not mix SOSI codes and TRCs in the same job.
- This attribute is equivalent to the PRMODE parameter of the OUTPUT JCL statement.

resolution

This single-valued attribute indicates the resolution at which the output was formatted. PSF uses this value to choose the correct resolution system library that was previously defined by the system programmer.

ISPF field name

Resolution

Allowed values

You can enter one of these fixed values:

240
    The data set was formatted with resources at 240 pels per inch.

300
    The data set was formatted with resources at 300 pels per inch.

Default value

The system default library is used.

Usage guidelines

This attribute does not apply to IP PrintWay printer definitions.

resource-directories

This multi-valued, list attribute specifies the directories that contain TrueType and OpenType fonts that PSF uses to process data sets. PSF searches these directories before it searches system-defined resource directories. PSF searches the directories in the order that you specify them.

ISPF field name

Resource directories

Allowed values

You can enter 1–8 valid directory names. Each directory name can be up to 255 characters. The first character must be a slash. If the value contains special characters other than slashes or periods, enclose it in double quotation marks.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
resource-directories={/u/myserid/truetype /u/myuserid/opentype}
```

Default value

PSF determines the resource directories.

Usage guidelines

- If the job submitter specifies resource directories, those directories override this attribute.
- This attribute is equivalent to the USERPATH parameter of the OUTPUT JCL statement.

resource-library

This multi-valued, list attribute specifies the names of user libraries that contain the AFP resources PSF and the AFP to PCL, AFP to PDF, or AFP to PostScript transform use to process data sets. The specified libraries are searched before any other resource libraries defined to PSF or to the transforms.

The resources that are contained in the libraries include fonts, page segments, overlays, page definitions, and form definitions. For PSF to search the specified libraries for page definitions or form definitions, you or the job submitter must specify a value for the **page-definition** or **form-definition** attribute.

ISPF field name

Resource library

Allowed values

You can enter 1–8 valid library names. If the value contains special characters other than periods, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
resource-library={font.library overlay.library}
```

Default value

None.

Usage guidelines

- All resource libraries must exist and be cataloged.
- The job submitter must be authorized to read the libraries.
- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is to-remote-psf.
- If the job submitter specifies a user library, it overrides this attribute.
- This attribute is equivalent to the USERLIB parameter of the OUTPUT JCL statement.

restrict-printable-area

This single-valued attribute indicates whether an area on each page of printed output is reserved for the security label. When an area is reserved for a security label, the printed output is shifted on each page. You cannot print data in the reserved area.

ISPF field name

Restrict printable area

Allowed values

You can enter one of these fixed values:

yes
    An area on each page is reserved for the security label.

no
    An area is not reserved for the security label.

Default value

PSF sets the default based on whether PSFMPL is active.

Usage guidelines

- This attribute does not apply to IP PrintWay printer definitions.

• This attribute is equivalent to the SYSAREA parameter of the OUTPUT JCL statement.

room-text

This single-valued attribute specifies the room name that is printed on the separator pages for a data set.

ISPF field name

Room

Allowed values

You can enter a combination of 1–60 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - /). If the value contains blanks or special characters, enclose it in double quotation marks.

Default value

No default value.

Usage guidelines

• Whether the text specified by this attribute is printed depends on how the system administrator configures the separator sheet.

• IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.

• This attribute is equivalent to the ROOM parameter of the OUTPUT JCL statement.

save-afp-statistics

This single-valued attribute indicates whether you want PSF to generate an AFP Statistics (AFPSTATS) report. An AFPSTATS report gives you detailed information about the data set, such as where resources were found and what significant events happened.

ISPF field name

Save AFP statistics

Allowed values

You can enter one of these fixed values:

yes
    An AFPSTATS report is generated.

no
    An AFPSTATS report is not generated.

Default value

An AFPSTATS report is not generated.

Usage guidelines

• This attribute is equivalent to the AFPSTATS parameter of the OUTPUT JCL statement.

table-reference-characters

This single-valued attribute indicates whether data sets printed on this printer contain table-reference characters (TRCs). A TRC selects a font character set named by the **chars** attribute or the page definition that is used to print the job. A TRC is the first character of each line in the data set unless the first character is a carriage control character. In that case, the TRC is the second character.

ISPF field name

Table reference characters

Allowed values

You can enter one of these fixed values:

yes or true
Data sets contain TRCs.

no or false
Data sets do not contain TRCs.

Default value

no

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- If the value of this attribute is **yes** and the page definition does not specify fonts, you must specify fonts with the **chars** attribute.
- If the data set contains TRCs and the value of this attribute is **no**, your printed output does not correct. PSF and the transforms interpret the TRCs as text characters.
- Do not mix SOSI codes and TRCs in the same job.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- This attribute is equivalent to the TRC parameter of the OUTPUT JCL statement.

title-text

This single-valued attribute specifies the description of the output that can be printed on the separator pages for a data set. IP PrintWay also sends it to the printer's LPD for printing on a separator page that is generated by the printer's LPD. It also is the subject of emails when the job submitter does not specify another title.

ISPF field name

TITLE

Allowed values

You can enter a combination of 1–60 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - /). If the value contains blanks or special characters, enclose it in double quotation marks. For example:

```
title-text="Annual Report"
```

Default value

No default value.

Usage guidelines

- Whether the text specified by this attribute is printed depends on how the administrator configures the separator sheet or how the LPD is implemented.

- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is to-remote-psf.
- This attribute is equivalent to the TITLE parameter of the OUTPUT JCL statement.

universal-character-set

This single-valued attribute specifies a code for the universal character set (UCS) a printer uses to print data sets.

ISPF field name

UCS

Allowed values

You can enter a combination of 1–4 letters (a–z, a–Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. If the value contains special characters, enclose it in double quotation marks. Lowercase letters are converted to uppercase.

Default value

JES determines the default.

Usage guidelines

This attribute is equivalent to the UCS parameter of the OUTPUT and DD JCL statements.

userdata

This multi-valued, list attribute specifies installation-defined information for the user.

ISPF field name

USERDATA

Allowed values

You can enter 1–16 values. Each value is a combination of 1–60 letters (a–z, a–Z), numbers (0-9), blanks, and special characters (such as: @ $ # , * - /). If a value contains blanks or special characters, enclose it in double quotation marks. If you specify more than one value, separate the values with spaces and enclose the list of values in braces. For example:

```
userdata={UserValue "LocalKey=Installation Data" "Installation Data"}
```

Default value

No default value.

Usage guidelines

This attribute is equivalent to the USERDATA parameter of the OUTPUT JCL statement.

x-image-shift-back

This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted horizontally on the back side of each physical page.

ISPF field name

Image shift x-direction back

Allowed values

You can enter a number from 000.000 to 999.999, followed by the units. No blank spaces are allowed. These units are valid:

Unit
    Meaning

IN
    Inches

CM
    Centimeters

MM
    Millimeters (default unit)

PELS
    Picture elements (1/240 inch)

POINTS
    Points (1/72 inch)

For example, you can enter these values:

```
x-image-shift-back=25.4
x-image-shift-back=2.54CM
x-image-shift-back=1IN
x-image-shift-back=240PELS
x-image-shift-back=72POINTS
```

Default value

The default is the number in the form definition. The default unit is millimeters.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETXB parameter of the OUTPUT JCL statement.

x-image-shift-front

This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted horizontally on the front side of each physical page.

ISPF field name

Image shift x-direction front

Allowed values

You can enter a number from 000.000 to 999.999, followed by the unit. For information about allowed units, see .

Default value

The default is the number in the form definition. The default unit is millimeters.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETXF parameter of the OUTPUT JCL statement.

y-image-shift-back

This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted vertically on the back side of each physical page.

ISPF field name

Image shift y-direction back

Allowed values

You can enter a number from 000.000 to 999.999, followed by the unit. For information about allowed units, see "x-image-shift-back" on page 313.

Default value

The default is the number in the form definition.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.
- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETYB parameter of the OUTPUT JCL statement.

y-image-shift-front

This single-valued attribute specifies a decimal number that indicates how much the logical page is shifted vertically on the front side of each physical page.

ISPF field name

Image shift y-direction front

Allowed values

You can enter a number from 000.000 to 999.999, followed by the unit. For information about allowed units, see "x-image-shift-back" on page 313.

Default value

The default is the number in the form definition. The default unit is millimeters.

Usage guidelines

- This attribute applies to documents printed on an AFP printer.

- Products that transform AFP documents can support this attribute. For information, see the documentation for the transform.
- IP PrintWay sends this attribute to the remote printer if the value of the **lpr-mode** attribute is `to-remote-psf`.
- The number that a job submitter specifies overrides this attribute.
- This attribute is similar to the OFFSETYF parameter of the OUTPUT JCL statement.

Attributes for the configuration object class

The attributes that are valid in the system configuration definition are listed here. The system configuration definition is in object class **configuration**.

You cannot delete the system configuration definition, but you can use the PIDU **force-create** command to create or replace the system configuration definition and the **modify** command to modify attributes in it.

The name of the system configuration definition is always `aopd.conf`. You cannot rename it. Note that, although they have the same name, the system configuration definition is not the same thing as the `aopd.conf` file.

If you add or modify an attribute in the system configuration definition, with a few exceptions, the new value takes effect immediately or when Infoprint Server processes the next print job; you do not need to restart Infoprint Server. For information about whether you need to restart any Infoprint Server daemons, see the description of each attribute.

Required attributes

The **configuration-version** attribute is the only required attribute.

allow-all-characters-in-line-data

This single-valued attribute indicates whether Infoprint Server considers all characters in data, including unprintable characters, to be line data.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Allow all characters in line data

Allowed values

You can specify one of these fixed values:

yes
Infoprint Server accepts all characters in data, including unprintable characters, as line data.

no
If line data contains unprintable characters, Infoprint Server does not consider the data to be line data.

Default value

no

Usage guidelines

- If a job submitter specifies the data format with the **document-format** attribute, Infoprint Server ignores this field.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

aopippd-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the Internet Printing Protocol (IPP) daemon, **aopippdxp**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 1–65535.

Default value

200

Usage guidelines

If you change this attribute, stop **aopippd** and restart Infoprint Server.

aoplpd-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the Infoprint Server LPD, **aoplpd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 0–65535.

Default value

200

Usage guidelines

If you change this attribute, stop **aoplpd** and restart Infoprint Server.

aopnetd-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the NetSpool daemon, **aopnetd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 0–65535.

Default value

200

Usage guidelines

If you change this attribute, stop **aopnetd** and restart Infoprint Server.

aopoutd-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the IP PrintWay extended mode daemon **aopoutd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 0–65535.

Default value

200

Usage guidelines

If you change this attribute, stop **aopoutd** and restart Infoprint Server.

aopssid-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the Infoprint Central daemon, **aopssid**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 0–65535.

Default value

200

Usage guidelines

If you change this attribute, stop **aopssid** and restart Infoprint Server.

aopsubd-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the Print Interface subsystem daemon, **aopsubd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 0–65535.

Default value

200

Usage guidelines

If you change this attribute, stop **aopsubd** and restart Infoprint Server.

aopwsmd-max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for the IP PrintWay extended mode daemon **aopwsmd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 0–65535.

Default value

200

Usage guidelines

If you change this attribute, stop **aopwsmd** and restart Infoprint Server.

ascii-codepage

This single-valued attribute specifies the name of the Infoprint Server default ASCII code page. You can specify an IBM-supplied or custom ASCII code page.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

ASCII

Allowed values

A combination of 1–16 letters, numbers, and special characters. Blanks are not allowed.

Default value

ISO8859-1

Usage guidelines

If you change this attribute, you do not need to restart Infoprint Server.

blank-truncation-classes

This single-valued attribute specifies the JES output classes for which IP PrintWay extended mode removes trailing blank characters. If a data set is allocated in one of the listed classes, and the data set contains either line data or text data, IP PrintWay removes any blank characters that occur at the end of each record or line.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Blank truncation classes

Allowed values

One to 36 one-character letters or numbers, or an asterisk (*) which indicates all JES output classes. Lowercase letters are converted to uppercase. For example:

```
blank-truncation-classes = ABC123
```

Default value

None.

Usage guidelines

- This attribute can slow performance and cause IP PrintWay to use more system resources.
- If you change this attribute, you do not need to restart Infoprint Server.

configuration-version

This single-valued attribute is the version number of the system configuration definition.

ISPF field name

This attribute is not displayed on the ISPF panel.

Allowed values

The only allowed value is v1.

Default value

None.

Usage guidelines

Infoprint Server sets this attribute to the correct version level. Do not specify this attribute.

console-name

This single-valued attribute specifies the name of the extended multiple console support (MCS) console that Infoprint Central uses to send commands to the z/OS system.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Extended MCS console name

Allowed values

A combination of 2-8 letters, numbers, and national characters ($, #, and @). The first character cannot be numeric, and blanks are not allowed.

Default value

The default console name is the Printer Inventory name followed by the last 4 characters of the system name. For example:

```
AOP1DEVI
```

Usage guidelines

- Do not use the reserved names: HC, INSTREAM, INTERNAL, OPERLOG, SYSIOSRS, SYSLOG, UNKNOWN.
- If the **start-daemons = ssid** attribute is specified in the Infoprint Server configuration file (`aopd.conf`), the console name must be unique among all active and inactive console names on all systems in a sysplex. Note that, although they have the same name, the `aopd.conf` file is not the same thing as the system configuration definition.

  To display all consoles, use this MVS command: DISPLAY EMCS,ST=L
- If you change the console name while the Infoprint Central daemon (**aopssid**) is running, stop the **aopssid** daemon and restart Infoprint Server.

ebcdic-codepage

This single-valued attribute specifies the name of the Infoprint Server default EBCDIC code page. You can specify an IBM-supplied or custom EBCDIC code page.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

EBCDIC

Allowed values

A combination of 1–16 letters, numbers, and special characters. Blanks are not allowed.

Default value

IBM-1047

Usage guidelines

If you change this attribute, you do not need to restart Infoprint Server.

hardcopy-messages

This single-valued attribute specifies the additional messages that you want Infoprint Server to send to the hardcopy log.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Send messages to hardcopy log

Allowed values

You can specify one of these fixed values:

all
> Send all eligible messages to the hardcopy log.

list
> Send only the additional messages that are listed in the **hardcopy-message-list** attribute to the hardcopy log.

none
> Send no additional messages, except console messages, to the hardcopy log.

Default value

Usage guidelines

If you change this attribute, you do not need to restart Infoprint Server.

hardcopy-message-list

This multi-valued, list attribute specifies the messages to send to the hardcopy log when the **hardcopy-messages = list** attribute is specified.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Message list for hardcopy log

Allowed values

You can specify 1–72 message IDs. Each message ID can be a combination of 7–8 letters (a-z, A-Z) and numbers (0-9); the last character must be the severity code (E, I, S, T, or W). You can use uppercase characters, lowercase characters, or both. If you specify more than one message ID, separate them with spaces and enclose the list in braces. For example:

```
hardcopy-message-list = {AOP3614I AOP3803E}
```

Default value

None.

Usage guidelines

- You do not need to specify messages that Infoprint Server sends to the console, such as those messages with the API prefix, because they are automatically sent to the hardcopy log.
- If your installation uses the MPFLSTxx PARMLIB member for message automation, you might want to specify the same message IDs in MPFLSTxx.
- If you change this attribute, you do not need to restart Infoprint Server.

ignore-dcf-routing-errors

This single-valued attribute indicates whether IP PrintWay extended mode writes an error message when it cannot find a printer definition in the Printer Inventory that matches the specified DEST, CLASS, and FORMS JCL parameters.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Ignore DEST, CLASS, FORMS routing errors

Allowed values

You can specify one of these fixed values:

yes

IP PrintWay ignores CLASS, DEST, and FORM routing errors and does not write an error message.

no

IP PrintWay writes error message AOP3201E when it cannot find a printer definition that matches the DEST, CLASS, and FORMS parameters. IP PrintWay also saves information about the print job in the Printer Inventory.

Default value

no

Usage guidelines

- Specify yes to conserve storage and processing resources if IP PrintWay writes message AOP3201E numerous times in the common message log. Keep in mind that without the message, it might be difficult to determine why IP PrintWay did not process a print job.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

ipp-port-number

This single-valued attribute specifies the number of the port at which the Infoprint Server Internet Printing Protocol (IPP) Server waits for print requests.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

IPP port number

Allowed values

A number 1–65535.

Default value

631, a well-known port for communication between IPP clients and servers.

Usage guidelines

- Make sure that the port is not used by any other service on the same TCP/IP stack.
- If you change this attribute, you do not need to restart Infoprint Server.

ipsmode

This single-valued attribute indicates the product function level that you want Infoprint Server to operate with.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Operating mode

Allowed values

You can specify one of these fixed values:

z201
> Infoprint Server operates with z/OS 2.1 product functions.

z202
> Infoprint Server operates with z/OS 2.2 or later product functions.

Default value

z201

Usage guidelines

This attribute does not apply to IP PrintWay basic mode.

job-prefix

This single-valued attribute specifies the prefix of the job IDs for output data sets that Infoprint Server creates on the JES spool. For example, if the prefix is PS, the job ID might be PS001234.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Job ID prefix

Allowed values

A combination of two letters, numbers, and national characters ($, #, and @). The first character cannot be numeric.

Default value

PS

Usage guidelines

If you change this attribute, you do not need to restart Infoprint Server.

log-retention

This single-valued attribute specifies the number of days worth of messages that Infoprint Central displays for print jobs and printers, and the number of days for which Infoprint Central displays print jobs after they are removed from the JES spool.

In addition, if you do not use the MVS system logger (`logstream-name` attribute is not specified), the value in this attribute is the number of days worth of messages that Infoprint Server retains in the common message log. If you use the MVS system logger, the retention period for the system logger log stream is used instead.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Log retention period (days)

Allowed values

A number 0–59.

Default value

1

Usage guidelines

- Specify a value greater than 0, or use the default value of 1 day, if either of these conditions apply:
  - You do not use the MVS system logger for Infoprint Server messages.
  - You use Infoprint Central to work with print jobs and printers.
- Make sure that the file system mounted at the `/var` or `/var/Printsrv` mount point has enough space to contain information about print jobs for the number of days that are specified in this attribute. If you do not use the MVS system logger, also make sure that there is enough space for messages.
- If you change this attribute, you do not need to restart Infoprint Server.

logstream-name

This single-valued attribute specifies the name of a log stream that is defined to the MVS system logger for Infoprint Server messages.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Log stream name

Allowed values

A 1–26 character log stream name that consists of one or more qualifiers. Each qualifier can contain a combination of 1–8 letters (a-z, A-Z), numbers (0-9), and national characters ($, #, and @). The first character of each qualifier cannot be a number. Each qualifier must be separated by a period. Lowercase letters are converted to uppercase. For example:

```
logstream-name = AOP.MSG
```

Default value

If this attribute is not specified, Infoprint Server does not use the system logger for messages. It writes messages in the `/var/Printsrv` file system instead.

Usage guidelines

- To view messages that Infoprint Server writes either in the specified log stream or in a z/OS file system, use the **aoplogu** command. For information, see <u>"Viewing messages in the common message log" on page 63</u>.
- If you change this attribute, you do not need to restart Infoprint Server.

lpd-port-number

This single-valued attribute specifies the number of the port at which the Infoprint Server line printer daemon (LPD) waits for print requests.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

LPD port number

Allowed values

A number 1–65535.

Default value

515, a well-known port for communication between LPDs and line printer requesters (LPRs).

Usage guidelines

- Make sure that the port is not used by any other service on the same TCP/IP stack.
- The port number must not be reserved in the `hlq.PROFILE.TCPIP` data set.
- If you specify a port other than 515, some limitations exist.
- Users specify this port number when they configure the Infoprint Port Monitor for Windows.
- If you change this attribute, you do not need to restart Infoprint Server.

mail-do-not-add-suffixes

This single-valued attribute indicates whether IP PrintWay extended mode appends a suffix to file names that are specified in the MAILFILE JCL parameter or the **mail-file-name** job attribute.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Do not add suffixes to files

Allowed values

You can specify one of these fixed values:

yes
  IP PrintWay does not append suffixes to the file names.

no
  IP PrintWay appends one of these suffixes to file names for the data formats it recognizes: afp, jpg, pcl, pdf, ps, sap, tif, txt, or octet-stream (for unrecognized data formats).

Default value

no

Usage guidelines

- If **mail-do-not-add-suffixes=yes**, IP PrintWay ignores the **mail-preserve-suffixes** attribute.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode. If you run basic mode, specify the equivalent AOP_DO_NOT_ADD_SUFFIX environment variable in the IP PrintWay basic mode startup procedure.

mail-preserve-suffixes

This single-valued attribute specifies the suffixes that IP PrintWay extended mode preserves in file names that are specified in the MAILFILE JCL parameter or in the **mail-file-name** job attribute. IP PrintWay does not append another suffix to file names with preserved suffixes.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Preserve suffixes

Allowed values

A list of 1–50 suffixes. Each suffix can contain 1–10 characters and must start with a period. If you specify more than one suffix, separate the suffixes with spaces and enclose the entire value in single or double quotation marks. For example:

```
mail-preserve-suffixes = ".123 .xls .doc"
```

Default value

None.

Usage guidelines

- If **mail-do-not-add-suffixes=yes**, IP PrintWay ignores the **mail-preserve-suffixes** attribute.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode. If you run basic mode, specify the equivalent AOP_MAIL_PRESERVE_SUFFIXES environment variable in the IP PrintWay basic mode startup procedure.

mail-use-first-address

This single-valued attribute indicates whether IP PrintWay extended mode sends each document to the email address or addresses that are specified for the first document in the print job. This attribute applies only when the print job contains more than one document.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Send email to address of first document

Allowed values

You can specify one of these fixed values:

yes
> IP PrintWay sends each document to the email addresses specified for the first document in the print job. This is the default.

no
> IP PrintWay sends each document to the email addresses specified for that document.

Default value

yes

Usage guidelines

- When the printer definition specifies a concatenation option, IP PrintWay always uses one email to send all documents in a print job to the email address or addresses that are specified for the first document in the print job whether this attribute is specified.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

mailer-options

This single-valued attribute specifies options for the sendmail bridge. IP PrintWay extended mode specifies these options in addition to the **-i** option when it sends emails. This attribute is optional; however, only a limited number of options are supported by the sendmail bridge in z/OS V2R5. For supported options, see *z/OS Communications Server: IP User's Guide and Commands*

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Application options

Allowed values

Valid sendmail bridge options. If you specify more than one option, separate the options with spaces and enclose the entire value in single or double quotation marks.

Default value

None.

Usage guidelines

- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode. If you run IP PrintWay basic mode, specify the equivalent AOPMAILER_OPTIONS environment variable in the IP PrintWay basic mode startup procedure.

mailer-path-name

This single-valued attribute specifies the full path name of the sendmail bridge that IP PrintWay extended mode uses to send output to email destinations. The path name is case-sensitive.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Application path

Allowed values

A valid path name. The path name must start with a slash (/).

Default value

`/bin/sendmail`

Usage guidelines

- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode. If you run IP PrintWay basic mode, specify the equivalent AOPMAILER environment variable in the IP PrintWay basic mode startup procedure.

max-historical-inventory-size

This single-valued attribute specifies the maximum size in megabytes (MBs) of the Historical Inventory in the `/var/Printsrv/hinv` directory. The Historical Inventory contains information about print jobs and documents that are no longer on the JES spool. When the maximum size is reached, Infoprint Server overwrites the oldest historical information.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Maximum Historical Inventory size

Allowed values

A number 0–99999. A value of 0 means that Infoprint Server does not limit the size of the Historical Inventory. However, the number of days that are specified in the **log-retention** attribute limits the amount of information in the Historical Inventory.

Default value

10

Usage guidelines

If you change this attribute, you do not need to restart Infoprint Server.

max-thread-tasks

This single-valued attribute specifies the MAXTHREADTASKS limit for these Infoprint Server daemons: **aopippd**, **aopnetd**, **aopoutd**, **aopssid**, **aopsubd**, and **aopwsmd**. The MAXTHREADTASKS limit is the maximum number of MVS tasks that a single process (daemon) can have concurrently active.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

A number 0–65535.

Default value

200

Usage guidelines

If you change this attribute, stop all Infoprint Server daemons and restart Infoprint Server.

name

This single-valued attribute specifies the name of the system configuration definition. The name of the system configuration definition is always `aopd.conf`. You cannot change it. Note that, although they have the same name, the system configuration definition is not the same thing as the `aopd.conf` file.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **force-create** or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

This attribute is not displayed on the ISPF panel.

Allowed values

`aopd.conf`

Default value

None.

netspool-use-fixed-jobid

This single-valued attribute whether NetSpool assigns the same job ID to all output data sets that it creates on the JES spool.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

You can specify one of these fixed values:

yes
  NetSpool assigns the same job ID to all output data sets. The job ID is the value that is specified in the job-prefix attribute, which defaults to PS, followed by 000000. For example, PS000000.

no
  NetSpool assigns a unique job ID to each data set.

Default value

no

Usage guidelines

If you change this attribute while NetSpool is running, stop the NetSpool daemon (**aopnetd**) and restart Infoprint Server.

netspool-use-unaltered-jobid

This single-valued attribute indicates whether NetSpool assigns a job ID to output data sets that it creates on the JES spool.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Other

Allowed values

You can specify one of these fixed values:

yes
  NetSpool does not assign a job ID to the output data sets. The job ID for each data set is the same as the job ID of the **aopnetd** daemon.

no
  NetSpool assigns a job ID to each data set.

Default value

no

Usage guidelines

If you change this attribute while NetSpool is running, stop the NetSpool daemon (**aopnetd**) and restart Infoprint Server.

select-work-from-hold-queue

This single-valued attribute indicates whether IP PrintWay extended mode selects new held output groups from the JES spool.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Select work from hold queue

Allowed values

You can specify one of these fixed values:

yes

> IP PrintWay selects new held output groups from the JES spool. You can then use Infoprint Central to move the held output groups to different IP PrintWay printers before it releases them.

no

> IP PrintWay does not select new held output groups from the JES spool. You can then use JES or SDSF commands to release individual data sets in an output group for printing.

Default value

yes

Usage guidelines

- If you change this attribute while IP PrintWay is running, stop the IP PrintWay daemons (**aopoutd** and **aopwsmd**) and restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

smf-recording

This single-valued attribute indicates whether IP PrintWay extended mode writes System Management Facilities (SMF) type 6 records for data sets that it sends to a printer or email destination. SMF type 6 records contain accounting information.

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Write SMF records

Allowed values

You can specify one of these fixed values:

yes

> IP PrintWay writes SMF type 6 records.

no

> IP PrintWay does not write SMF type 6 records.

Default value

yes

Usage guidelines

- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

suppress-post-unix-filter-formatting

This single-valued attribute indicates whether IP PrintWay extended mode formats line and text data after a UNIX filter processes it

Note: For more information about this attribute, see *z/OS Infoprint Server Customization*.

ISPF field name

Suppress formatting after UNIX filter

Allowed values

You can specify one of these fixed values:

yes
> IP PrintWay does not format line and text data after a UNIX filter processes it.

no
> IP PrintWay always formats line and text data after a UNIX filter processes it. For example, IP PrintWay processes carriage control characters and transparent data characters, and converts the data from the document code page to the printer code page.

Default value

no

Usage guidelines

- Specify yes if you use a UNIX filter that calls an AFP transform to convert line data to PCL, PDF, or PostScript format.
- If you change this attribute, you do not need to restart Infoprint Server.
- This attribute does not apply to IP PrintWay basic mode.

use-http-userid

This single-valued attribute indicates whether the Java Virtual Machine (JVM) is started with the Apache HTTPD server user ID rather than the user ID of the first user who logged on to Infoprint Central.

ISPF field name

Use Apache HTTP server user ID

Allowed values

You can specify one of these fixed values:

yes
> The Apache HTTPD server user ID is used when the JVM is started.

no
> The first user ID that logged on to Infoprint Central is used when the JVM is started.

Default value

no

Usage guidelines

- To use this attribute, make sure that resources in the FACILITY class are defined to RACF. See *z/OS Infoprint Server Customization*
- If you change the value, the new value takes effect when you restart the Apache HTTP Server.

use-output-disposition

This single-valued attribute indicates whether Infoprint Central uses the document OUTDISP value when it releases print jobs from the JES2 spool to non-IP PrintWay printers, such as PSF.

ISPF field name

Use output disposition

Allowed values

You can specify one of these fixed values:

yes
> Infoprint Central uses the document OUTDISP value when it releases print jobs.

no
> Infoprint Central releases print jobs according to its defined job-release function; for example, the job is purged after it prints.

Table 50 on page 333 shows the release-job function that depends on how **use-output-disposition** is set. Setting the attribute changes the release function only when OUTDISP=KEEP and OUTDISP=LEAVE.

*Table 50. Release function based on the OUTDISP and **use-output-disposition** values*

OUTDISP value	**use-output-disposition=no**	**use-output-disposition=yes**
KEEP	When Infoprint Central releases the job, the document prints a second time, and then is purged.	When Infoprint Central releases the job, the document prints again and remains on the spool so that you can print more copies.
LEAVE	When Infoprint Central releases the job, the document prints once, and then is purged.	When Infoprint Central releases the job, the document prints and remains on the spool so that you can print more copies.

Default value

no

use-unencrypted-connection

This single-valued attribute indicates whether Infoprint Central uses an unencrypted connection to communicate with the browser.

ISPF field name

Use unencrypted connection

Allowed values

You can specify one of these fixed values:

yes
> Infoprint Central uses an unencrypted connection to communicate with the browser. You do not need to enable the Secure Sockets Layer (SSL) on the IBM HTTP Server—Powered by Apache.
>
> ⚠️ **Warning:** IBM does not recommend setting this attribute to **yes**. Using an unencrypted connection can expose your network communication to nefarious actors. User IDs, passwords, and data are vulnerable to attacks against the browser or during data transmission using network traffic system techniques.

no
> Infoprint Central uses an encrypted SSL (TLS) connection to communicate with the browser. You must enable SSL on the IBM HTTP Server—Powered by Apache.

Default value

no

Attributes for the fsa object class

The attributes that are valid when you create FSA definitions are listed here. These attributes are in object class **fsa**. You can create FSA definitions for PSF (or the AFP Download Plus feature of PSF) or IP PrintWay basic mode.

Tip: PSF refers to PSF for z/OS, the AFP Download Plus feature of PSF, or both.

When you create an FSA definition for PSF, all attributes are valid. However, only a subset of the attributes applies for each type of FSA: PSF channel, PSF TCP/IP, PSF SNA, and PSF AFP Download Plus. For information about which attributes PSF uses, see:

- *z/OS Infoprint Server Introduction*
- *PSF for z/OS: AFP Download Plus*.

When you create an FSA definition for IP PrintWay basic mode, only these attributes are valid:

- **description**
- **fsa-type**
- **trace-mode**

Required attributes

For Infoprint Server to display the correct ISPF panel for an FSA definition, you must specify the **fsa-type** attribute. In addition, PSF requires these attributes:

- **applid** (when `fsa-type=psf-sna`)
- **form-definition**
- **luname** (when `fsa-type=psf-sna`)
- **page-definition**
- **printer-ip-address** (when `fsa-type=psf-tcpip` or `fsa-type=afp-download-plus`)

IP PrintWay does not require any attributes in an FSA definition.

above-the-bar-storage

This single-valued attribute specifies whether PSF uses storage that is above the bar for processing inline resources.

ISPF field name

Above the bar storage

Allowed values

You can enter one of these fixed values:

none
> PSF stores inline resources above the 16 MB line but below the 2GB bar (in the region area) during job processing. This is the default.

inline resources
> PSF stores inline resources above the 2GB bar during job processing.

acknowledgement-level

This single-valued attribute specifies whether PSF requests an acknowledgment every sheet or every page.

ISPF field name

Acknowledgement level

Allowed values

You can enter one of these fixed values:

page
> An acknowledgment is requested for every page that is printed (default).

sheet
> An acknowledgment is requested for every sheet that is printed.

afpdp-dataset-grouping

This single-valued attribute indicates whether output data sets in the same job are grouped together when sending them to the AFP Download Plus receiver.

ISPF field name

Data set grouping

Allowed values

You can enter one of these fixed values:

yes
> PSF groups output data sets into jobs. The AFP Download Plus receiver prints the data sets in the same job in sequence with one set of separator pages for the job.

no
> PSF does not group output data sets into jobs (default). The AFP Download Plus receiver treats each data set as a separate job.

afpdp-working-directory

This single-valued attribute specifies the name of the UNIX directory that AFP Download Plus uses as its working directory.

ISPF field name

Working directory

Allowed values

You can enter a directory name of up to 255 characters. PSF adds the beginning and ending forward slashes if they are missing from the directory name. If the value contains special characters other than slashes or periods, enclose the value in double quotation marks. This attribute is case-sensitive.

Default value

PSF uses directory `/var/psf/`.

Usage guidelines

The directory must exist before you start AFP Download Plus.

applid

This single-valued attribute specifies the name of the VTAM application-program node for an FSA when PSF is printing to an SNA-attached printer in deferred-printing mode.

ISPF field name

Applid

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks.

auxiliary-files-modca-level

This single-valued attribute indicates the MO:DCA Interchange Set level that auxiliary files, such as separator pages and message files, support.

ISPF field name

Auxiliary files MO:DCA level

Allowed values

You can enter one of these fixed values:

bpf-match
Auxiliary files contain the same Begin Print File (BPF) MO:DCA Interchange Set triplet and Function Set triplets that are specified on the BPF of the user's data set in the job.

IS/3
Auxiliary files are MO:DCA IS/3 compliant.

none
Auxiliary files do not support a MO:DCA IS level (default).

Usage guidelines

- Do not use JESNEWS when you are specifying `bpf-match` for this attribute. If the JESNEWS data set is active, AFP Download Plus matches the JESNEWS data set, and the Job Header auxiliary file that is created does not match the MO:DCA interchange set level for the user's data set.
- Make sure that changes are made to the PRINTDEV statement for this FSA so that auxiliary files are generated correctly.

blank-compression

This single-valued attribute specifies whether PSF compresses blanks in line data. Blank compression is a data-compression function in PSF that reduces the amount of data that is sent through the attachment. PSF compresses blanks in line data that contains more than five contiguous blanks.

ISPF field name

Blank compression

Allowed values

You can enter one of these fixed values:

yes
PSF compresses blanks.

no
PSF does not compress blanks (default).

Usage guidelines

Blank compression for host-connected, channel-attached printers most likely does not improve data transmission.

capture-inline-resources

This single-valued attribute specifies whether PSF tells a connected DPF to capture and store inline resources.

ISPF field name

Capture inline resources

Allowed values

You can enter one of these fixed values:

yes
> DPF captures inline resources.

no
> DPF does not capture inline resources (default).

channel-buffer-count

This single-valued attribute specifies the number of 32 KB (32768 bytes) buffers that are needed for processing jobs on a channel-attached printer.

ISPF field name

Channel buffer count

Allowed values

You can enter an integer 1 - 10000. This value is multiplied by 32 KB (32768 bytes) to determine the total amount of reserved storage.

chars

This multi-valued, list attribute specifies the names of the coded fonts that are used to print a data set on a printer.

ISPF field name

Character sets

Allowed values

You can enter 1–4 coded font names. Each name can be any combination of 1–4 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For valid coded font names, see *IBM AFP Fonts: Font Summary for AFP Font Collection*.

If you specify more than one value, separate the values by spaces and enclose the list of values in braces. For example:

```
chars={GT12 GB12 GI12}
```

close-libraries-when-idle

This single-valued attribute specifies whether PSF closes the resource libraries when there is no print activity for 60 seconds.

ISPF field name

Close libraries when idle

Allowed values

You can enter one of these fixed values:

yes
> PSF closes resource libraries.

no
> PSF does not close resource libraries (default).

Usage guidelines

Closing the resource libraries causes the operating system to free the fixed storage below the 16 MB line that is required for I/O to the resource libraries. However, this function adds the processor usage of closing and reopening the libraries between print activity.

color-map

This single-valued attribute specifies the name of the object container for the color mapping table resource that PSF uses to print a data set containing color translation information. This attribute is only used when the printer supports color mapping table resources.

ISPF field name

Color map

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

Default value

If a color map is not specified for the print job or printer, PSF uses an internal color mapping table.

com-setup-member

This single-valued attribute specifies the name of the object container for the microfilm setup resource that PSF uses to print data on a microfilm device. This attribute is only used when you are sending output to a microfilm device.

ISPF field name

Com setup member

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks.

compression

This single-valued attribute indicates whether PSF compresses data before it sends it to the AFP Download Plus receiver.

ISPF field name

Compression

Allowed values

You can enter one of these fixed values:

lzw
    PSF uses the LZW compression algorithm to compress data.

none
    PSF does not compress data (default).

consolidate-im1-images

This single-valued attribute specifies whether PSF consolidates a multiple-celled IM1 image into a single Image Object Content Architecture (IOCA) image.

ISPF field name

Consolidate IM1 images

Allowed values

You can enter one of these fixed values:

yes
  PSF consolidates a multiple-celled IM1 image into a single IOCA image.

no
  PSF converts a multiple-celled IM1 image to multiple IOCA images (default).

cse-check-fit

This single-valued attribute specifies how PSF checks the pages for cut-sheet emulation (CSE) mode.

ISPF field name

Check CSE fit

Allowed values

You can enter one of these fixed values:

no
  PSF does not check to see whether the page fits 2 up on the sheet (default).

first
  PSF only checks the first page that is printed for a new copy group to see whether it fits 2 up on the sheet.

all
  PSF checks front side of all pages to see if they fit 2 up on the sheet.

cse-orientation

This single-valued attribute specifies whether PSF generates portrait or landscape pages for printing in cut-sheet emulation (CSE) mode.

ISPF field name

CSE orientation

Allowed values

You can enter one of these fixed values:

portrait
  PSF generates portrait pages (default).

landscape
  PSF generates landscape pages.

cse-preserve-page-position

This single-valued attribute indicates whether PSF preserves page placement when it repositions because of error recovery or an operator command. This attribute applies only when PSF is printing in cut-sheet emulation (CSE) mode.

If you specify yes, you must also specify `cse-sheet-eject=yes`.

ISPF field name

CSE preserve page position

Allowed values

You can enter one of these fixed values:

yes
Page placement is preserved.

no
Page placement is not preserved (default).

cse-sheet-eject

This single-valued attribute indicates whether PSF starts printing each data set and each copy of a data set on a new sheet of paper when PSF is printing in cut-sheet emulation (CSE) mode.

ISPF field name

CSE sheet eject

Allowed values

You can enter one of these fixed values:

yes
PSF starts printing on a new sheet. PSF also starts printing on a new sheet whenever it does offset stacking. For example, when the form definition requests separation for a new copy group.

no
PSF starts printing on the next sheet or, in N_UP printing, on the next front-side partition. The next front-side partition might occur on the same sheet. This is the default.

default-process-mode

This single-valued attribute specifies the default processing mode PSF uses to print data sets containing both single-byte and double-byte fonts.

ISPF field name

Default process mode

Allowed values

PSF ignores all values but these fixed values:

SOSI1
Each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control (default).

SOSI2
Each shift-out, shift-in code is converted to a Set Coded Font Local text control.

SOSI3
The shift-out code is converted to a Set Coded Font Local text control. The shift-in code is converted to a Set Coded Font Local text control and two blanks.

SOSI4
Each shift-out, shift-in code is skipped and not counted when offsets are calculated for the print data set. SOSI4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC.

description

This single-valued attribute describes the FSA definition. The description can help you select an FSA definition from a list.

ISPF field name

Description

Allowed values

You can enter any combination of 1–256 letters (a-z, A-Z), numbers (0–9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose the value in quotation marks.

direct-download

This single-valued attribute indicates whether PSF sends MO:DCA-P data directly to the AFP Download Plus receiver without first storing the data in a temporary file on the z/OS system.

ISPF field name

Direct download

Allowed values

You can enter one of these fixed values:

none
    PSF does not send MO:DCA-P data directly to the AFP Download Plus receiver (default).

modca-p
    PSF sends MO:DCA-P data directly to the AFP Download Plus receiver.

Usage guidelines

- The **modca-p** value can improve performance.
- If **direct-download=modca-p**, the AFP Download Plus receiver must support the direct download method of receiving MO:DCA-P data.

disconnect-action

This single-valued attribute specifies the action that PSF takes when the time specified by the **printer-disconnect-interval** attribute expires and no output is available from JES. This attribute is only for SNA-attached and TCP/IP-attached printers.

ISPF field name

Disconnect action

Allowed values

You can enter one of these fixed values:

stop
    PSF stops the printer FSA, which can then be restarted only by an operator command.

redrive
    PSF redrives the printer FSA according to the value specified by the **printer-management-mode** attribute (default).

display-afpdp-status

This single-valued attribute specifies whether PSF displays the processing and transmission status of AFP Download Plus on the console.

ISPF field name

Display status

Allowed values

You can enter one of these fixed values:

yes
　　PSF displays the status.

no
　　PSF does not display the status (default).

dump-code

This single-valued attribute specifies a PSF reason code or a restartable abend reason code that causes a conditional dump of the PSF address space when the reason code occurs.

ISPF field name

Dump: Code

Allowed values

You can enter an integer 0 - 2147483647 or a 7–8 character hexadecimal value. A PSF reason code is an 8-character hexadecimal value. An abend reason code is a 7-character hexadecimal value. The first three characters are always ABD. When you enter a hexadecimal value (which is suggested), you can enter the hexadecimal characters only or the hexadecimal characters with a prefix of 0x. For example, enter the dump-code attribute in one of these ways:

```
dump-code=09600c00
dump-code=0x09600c00
dump-code=157289480
```

dump-message-id

This single-valued attribute specifies a PSF message that causes a conditional dump of the PSF address space when the message occurs.

ISPF field name

Dump: Message ID

Allowed values

You can enter a value in the format APS*nnnnt*:

nnnn
　　Three to four-digit message number

t
　　One of these type codes:

　　A
　　　　Message requiring operator action

　　I
　　　　Information message

eject-to-front-facing

This single-valued attribute specifies whether PSF is to tell your continuous-forms printer to do an eject to front facing before the job-header page, before the start of a new document, or both.

ISPF field name

Eject to front facing

Allowed values

You can enter one of these fixed values:

none
    Eject to front facing is not done (default).

job
    Eject to front facing is done before the job-header page.

document
    Eject to front facing is done between documents in a data set.

both
    Eject to front facing is done before the job-header page and between documents.

end-sna-conversation

This single-valued attribute specifies whether PSF ends the SNA LU1 conversation between print jobs while it maintains the SNA session with the printer when the NPRO timer expires or after no job is available for 1 minute and the last page printed is stacked.

ISPF field name

End SNA conversation

Allowed values

You can enter one of these fixed values:

yes
    PSF ends the SNA LU1 conversation with the printer.

no
    PSF maintains the SNA LU1 conversation between print jobs (default).

error-disposition-supported

This single-valued attribute specifies whether PSF accepts the error disposition that is requested for a data set when PSF ends a data set because an error occurs during processing.

ISPF field name

Error disposition supported

Allowed values

You can enter one of these fixed values:

yes
    PSF accepts the requested error disposition.

no
    PSF does not accept the requested error disposition (default).

failure-action

This single-valued attribute specifies the PSF action after a printer failure, an SNA session failure, or an Internet Protocol network failure.

ISPF field name

Failure action

Allowed values

You can enter one of these fixed values:

stop
> PSF must be restarted by an operator command.

connect
> PSF establishes a connection or waits for the printer (default).

form-definition

This single-valued attribute specifies the name of the default form definition that defines how a data set is printed. This attribute is required; however, if the job submitter specifies a form definition, it overrides the form definition in this attribute.

ISPF field name

Form definition

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

You can specify the form definition name with or without the F1 prefix. However, if the name of the form definition, without the F1 prefix, starts with F1, specify the full name. For example, F1F1USER.

fsa-trace-dsname

This single-valued attribute specifies the data set to which PSF directs an FSA trace when **trace-mode=full**, **trace-mode=ipds**, **trace-mode=limit**, or **trace-mode=sync**.

ISPF field name

FSA trace dsname

Allowed values

You can enter a valid data set name that is allocated before the PSF FSA is started.

fsa-type

This single-valued attribute specifies the type of FSA.

Allowed values

You can enter one of these fixed values:

afp-download-plus
> An FSA for the AFP Download Plus feature of PSF.

ip-printway
> An FSA for IP PrintWay basic mode.

psf-channel
>   An FSA for a channel-attached printer that is controlled by PSF.

psf-sna
>   An FSA for an SNA-attached printer that is controlled by PSF.

psf-tcpip
>   An FSA for a TCP/IP-attached printer that is controlled by PSF.

global-overlay

This single-valued attribute specifies the member name of a medium overlay that the printer places on every sheet of output, including separator pages and message pages.

ISPF field name

Overlay

Allowed values

You can enter a combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

goca-box-supported

This single-valued attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Box drawing orders.

ISPF field name

GOCA Box orders

Allowed values

You can enter one of these fixed values:

yes
>   The printer supports the orders.

no
>   The printer does not support the orders (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

goca-fractional-line-supported

This single-valued attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Set Fractional Line Width drawing orders.

ISPF field name

GOCA Set Fractional Line Width orders

Allowed values

You can enter one of these fixed values:

yes
>   The printer supports the orders.

no
> The printer does not support the orders (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

goca-process-color-supported

This single-valued attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Set Process Color drawing orders.

ISPF field name

GOCA Set Process Color orders

Allowed values

You can enter one of these fixed values:

yes
> The printer supports the orders.

no
> The printer does not support the orders (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

highlight-communications-failure-message

This single-valued attribute specifies whether PSF highlights the message that it writes to the z/OS console when a communications failure occurs with the printer (message APS6501A). Highlighting the communications failure message can help you detect a problem that requires attention because the message remains on the console until the operator deletes it. This attribute applies to TCP/IP-attached printers.

ISPF field name

Highlight communications failure message

Allowed values

You can enter one of these fixed values:

yes
> PSF highlights the communications failure message.

no
> PSF does not highlight the communications failure message (default).

image-output-format

This single-valued attribute indicates the format that PSF uses for all image data that it sends to the AFP Download Plus receiver.

ISPF field name

Image output format

Allowed values

You can enter one of these fixed values:

ioca
> Image data is in uncompressed Image Object Content Architecture (IOCA) format (default).

unchanged
> Image data is in the same format as in the input document.

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

inhibit-recovery

This single-valued attribute indicates whether PSF inhibits error recovery for a job so that data is only resent to the printer if it is not already printed.

ISPF field name

Inhibit recovery

Allowed values

You can enter one of these fixed values:

yes
> Error recovery is inhibited and data is only resent if it is not printed.

no
> Recovery is not inhibited and data is resent from the point of the error (default).

inline-bcoca-objects

This single-valued attribute indicates whether PSF includes Bar Code Object Content Architecture (BCOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Bar code objects (BCOCA)

Allowed values

You can enter one of these fixed values:

yes
> PSF includes BCOCA objects inline (default).

no
> PSF does not include BCOCA objects inline.

inline-color-management-resources

This single-valued attribute indicates whether PSF includes color management resources (CMRs) inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Color management resources

Allowed values

You can enter one of these fixed values:

all
> PSF includes all CMRs that are on the sending system. If you specify this value, transmission time is longer because CMRs can be large. Specify this value if the receiving system does not contain CMRs.

generic
> PSF includes all generic CMRs and all CMRs that the data stream references. Specify this value if any documents use CMRs that are not on the receiving system. Device-specific CMRs must be on the receiving system or in the printer. This value is the default.

none
> PSF does not include any CMRs inline. Specify this value if the CMRs are on the receiving system.

inline-foca-objects

This single-valued attribute indicates whether PSF includes Font Object Content Architecture (FOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Font objects (FOCA)

Allowed values

You can enter one of these fixed values:

yes
> PSF includes FOCA objects inline (default).

no
> PSF does not include FOCA objects inline.

inline-form-definitions

This single-valued attribute indicates whether PSF includes form definitions inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Form definitions

Allowed values

You can enter one of these fixed values:

yes
> PSF includes form definitions inline (default).

no
> PSF does not include form definitions inline.

inline-goca-objects

This single-valued attribute indicates whether PSF includes Graphics Object Content Architecture (GOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Graphics objects (GOCA)

Allowed values

You can enter one of these fixed values:

yes
> PSF includes GOCA objects inline (default).

no
  PSF does not include GOCA objects inline.

inline-ioca-objects

This single-valued attribute indicates whether PSF includes Image Object Content Architecture (IOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Image objects (IOCA)

Allowed values

You can enter one of these fixed values:

yes
  PSF includes IOCA objects inline (default).

no
  PSF does not include IOCA objects inline.

inline-object-containers

This single-valued attribute indicates whether PSF includes object containers inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Object containers

Allowed values

You can enter one of these fixed values:

yes
  PSF includes object containers inline (default).

no
  PSF does not include object containers inline.

inline-overlays

This single-valued attribute indicates whether PSF includes overlays inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Overlays

Allowed values

You can enter one of these fixed values:

yes
  PSF includes overlays inline (default).

no
  PSF does not include overlays inline.

inline-page-segments

This single-valued attribute indicates whether PSF includes page segments inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Page segments

Allowed values

You can enter one of these fixed values:

yes
  PSF includes page segments inline (default).

no
  PSF does not include page segments inline.

inline-ptoca-objects

This single-valued attribute indicates whether PSF includes Presentation Text Object Content Architecture (PTOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Presentation text objects (PTOCA)

Allowed values

You can enter one of these fixed values:

yes
  PSF includes PTOCA objects inline (default).

no
  PSF does not include PTOCA objects inline.

inline-truetype-fonts

This single-valued attribute indicates whether PSF includes TrueType and OpenType fonts inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

TrueType fonts

Allowed values

You can enter one of these fixed values:

yes
  PSF includes TrueType and OpenType fonts fonts inline (default).

no
  PSF does not include TrueType and OpenType fonts fonts inline.

input-tray-substitutions

This multi-valued, value-map attribute associates one input tray number with two substitute tray numbers: one tray number for jobs that print on a single side of the paper and another tray number for jobs that print on both sides of the paper.

ISPF field name

Input Tray Substitutions

Allowed values

One to four sets of values in the format: `input_tray -> {simplex_tray duplex_tray}`:

input_tray
>An integer 1 - 255 that identifies the tray that is specified for the job in the INTRAY JCL parameter, the **input-tray-number** job attribute, or the form definition PSF uses to print the job.

simplex_tray
>An integer 1–255 that identifies the tray PSF is to use for jobs that are printed on a single side of the paper.

duplex_tray
>An integer 1 - 255 that identifies the tray PSF is to use for jobs that are printed on both sides of the paper.

To determine the tray numbers for your printer, see the printer documentation.

Enclose the entire values in braces. For example:

```
input-tray-substitutions = { 1 ->{1 3} 2 -> {2 4} }
```

In this example:

- When the job submitter specifies tray 1, PSF uses tray 1 for jobs that print on a single side of the paper and tray 3 for jobs that print on both sides of the paper.
- When the job submitter specifies tray 2, PSF uses tray 2 for jobs that print on a single side of the paper and tray 4 for jobs that print on both sides of the paper.

Default value

PSF does not use substitute tray numbers.

Usage guidelines

Specify this attribute when the same side-sensitive or edge-sensitive paper is loaded in different trays in two different directions. That is, in one direction for printing on a single side of the paper and in another direction for printing on both sides of the paper.

interrupt-message-page

This single-valued attribute specifies whether the interrupt message page that PSF inserts in your printed output is printed.

ISPF field name

Interrupt message page

Allowed values

You can enter one of these fixed values:

print
>An interrupt message page is printed (default).

suppress
>An interrupt message page is not printed.

interrupt-message-page-copies

This single-valued attribute specifies the number of copies PSF produces of the interrupt message page when the **mark-interrupt-message-page** attribute is specified.

ISPF field name

Interrupt message page: Copies

Allowed values

You can enter an integer from 1 (default) to 10.

ioca-replicate-trim-supported

This single-valued attribute indicates whether the printer supports the Image Object Content Architecture (IOCA) Replicate and Trim function.

ISPF field name

IOCA replicate and trim function

Allowed values

You can enter one of these fixed values:

yes
    The printer supports the function.

no
    The printer does not support the function (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

issue-intervention-messages

This single-valued attribute specifies whether PSF displays intervention messages on the z/OS system console. An intervention message means that a printer has a physical problem, such as a paper jam or an open paper tray. After an operator fixes the problem, the printer starts printing again. This attribute applies to SNA-attached and TCP/IP-attached printers.

ISPF field name

Issue intervention messages

Allowed values

You can enter one of these fixed values:

yes
    Intervention messages are displayed.

no
    Intervention messages are not displayed.

Default value

Intervention messages are not displayed.

issue-setup-messages

This single-valued attribute specifies the setup parameters for which JES must display setup messages on the z/OS system console when an SNA-attached or TCP/IP-attached printer is initialized and at the start of any job that specifies a change in a setup parameter from what is active for the printer.

ISPF field name

Issue setup messages

Allowed values

You can enter one of these fixed values:

none
Do not display setup messages (default).

burst
Display setup messages for the BURST setup parameter.

forms
Display setup messages for the FORMS setup parameter.

all
Display setup messages for both BURST and FORMS setup parameters.

label-data-pages

This single-valued attribute specifies whether the security label is printed on each page of printed output. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name

Label data pages

Allowed values

You can enter one of these fixed values:

yes
The security label that is determined by SECLABEL is printed.

no
The security label is not printed.

Default value

If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

label-separator-pages

This single-valued attribute specifies whether the security label is printed on a separator page. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name

Label separator pages

Allowed values

You can enter one of these fixed values:

yes
The security label that is determined by SECLABEL is printed.

no
The security label is not printed.

Default value

If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

location

This single-valued attribute specifies the location of the printer or the AFP Download Plus receiver. The location can help users find printers or AFP Download Plus receivers.

ISPF field name

Location

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If a value contains blanks or special characters, enclose the value in quotation marks.

Default value

None.

Usage guidelines

If you use the same format to specify the location in all FSA definitions (for example: Bldg 3/Col 2), users can find all printers or AFP Download Plus receivers with similar locations, such as all printers in building 3.

logmode

This single-valued attribute specifies the name of the VTAM logon-mode table entry, which defines the session parameters for an SNA-attached printer.

ISPF field name

Logmode

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

luname

This single-valued attribute specifies the unique, logical-unit name of an SNA-attached printer.

ISPF field name

LU name

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

map-to-outline-fonts

This single-valued attribute specifies whether PSF maps fonts to outline fonts.

ISPF field name

Map to outline fonts

Allowed values

You can enter one of these fixed values:

yes
PSF uses system and user mapping tables to map fonts to corresponding outline fonts.

no
PSF does not map fonts to outline fonts (default).

Usage guidelines

Specify map-to-outline-fonts=yes if your printer supports outline fonts, you have existing applications that use raster fonts, and you want to use outline fonts without changing the applications.

mark-interrupt-message-page

This single-valued attribute specifies whether PSF marks the interrupt message page with form marks.

ISPF field name

Interrupt message page: Mark page

Allowed values

You can enter one of these fixed values:

yes
PSF marks the interrupt message page with form marks.

no
PSF does not mark the interrupt message page (default).

mcf-name

This single-valued attribute specifies how PSF builds the Map Coded Font (MCF) Format 2 structured field in the data it sends to the AFP Download Plus receiver.

ISPF field name

Map Coded Font (MCF) Format 2 Name

Allowed values

You can enter one of these fixed values:

coded-font
PSF uses the name of the coded font to build the MCF structured field. Specify this value for documents that contain double-byte character set (DBCS) fonts.

codepage-character-set
PSF uses the names of the code page and character set to build the MCF structured field (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

message-count-before-dump

This single-valued attribute specifies the number of times the message that is specified by the **dump-message-id** attribute is sent before PSF produces a conditional dump.

ISPF field name

Dump: Count

Allowed values

You can enter an integer from 1 (default) to 99.

message-files-read-access

This single-valued attribute specifies whether users with an **other** permission level can view the message files that AFP Download Plus creates. When AFP Download Plus is installed, only the owner and users in the APSADMIN group have permission to list files in the default message directory, `/var/psf/userinfo/`*userid*, where *userid* is the name of the user who submitted the job.

ISPF field name

Message files read access

Allowed values

You can enter one of these fixed values:

yes
 AFP Download Plus sets permissions for the .MSG files to 664 so that **other** users can view message files.

no
 AFP Download Plus sets permissions for the .MSG files to 660 so that only the owner and users in the APSADMIN group can view message files (default).

Usage guidelines

- When you specify this attribute, it does not change the permissions that are set for existing message files.
- This attribute does not apply to PSF V4R5 and earlier.

name

This single-valued attribute specifies the name of the FSA. This name must be a unique name in the Printer Inventory and it must match the name on the JES initialization statement.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

FSA name

Allowed values

None.

no-response-action

This single-valued attribute specifies what action PSF takes when the time that is specified by the **response-timeout** attribute expires and a response is not received from the printer or from the AFP Download Plus receiver.

ISPF field name

No response action

Allowed values

You can enter one of these fixed values:

notify-jes
PSF notifies JES that an expected response was not received (default).

notify-user
PSF sends a message to the user ID specified by the **no-response-notify** attribute and to JES indicating that an expected response was not received.

notify-operator
PSF sends a message to the system operator and to JES indicating that an expected response was not received.

terminate
PSF stops the printer FSA or the AFP Download Plus FSA. The system operator must issue a command to restart the FSA. The active data set is restarted from the last checkpoint.

no-response-notify

This single-valued attribute specifies the user ID to which PSF sends a message when an expected response is not received from the printer or from the AFP Download Plus receiver before time expires. This attribute is used when **no-response-action=notify-user**.

ISPF field name

No response action: Notify

Allowed values

Specify the value in the format *node.userid*:

node
The node that is associated with the user ID. Specify 1–8 alphanumeric or national ($, #, @) characters. Lowercase letters are converted to uppercase.

The node is required.

userid
The user ID. Specify 1–8 alphanumeric or national ($, #, @) characters. The first character must be alphabetic or national. Lowercase letters are converted to uppercase.

offset-interrupt-message-page

This single-valued attribute specifies whether offset stacking is required for the interrupt message page.

ISPF field name

Interrupt message page: Offset page

Allowed values

You can enter one of these fixed values:

yes
The printed output is offset stacked, beginning at the interrupt message page.

no
No offset stacking is done for the interrupt message page (default).

offset-stacking

This single-valued attribute controls when PSF does offset stacking. You can use offset stacking to separate printed output on cut-sheet printers and on continuous-forms printers that support offset stacking.

ISPF field name

Offset stacking

Allowed values

You can enter one of these fixed values:

dataset
   PSF does offset stacking at the start of a new data set or copy of a data set.

job
   PSF does offset stacking at the start of a new job.

none
   PSF does not do offset stacking.

Usage guidelines

- This attribute controls offset stacking separately from copy marking. If you select a value in this attribute for a printer that supports offset stacking, the COPYMARK parameter (in the JES initialization statement) and the **suppress-copy-marks** attribute control only copy marking and not offset stacking.

- If you do not specify this attribute, the COPYMARK parameter and the **suppress-copy-marks** attribute control both copy marking and offset stacking.

- PSF uses the value in this attribute for all jobs unless you override the value in a PSF Exit 7 Begin Data Set (BDS) call.

oid-format-supported

This single-valued attribute indicates whether the printer supports the Object Identifier (OID) format for TrueType and OpenType fonts.

ISPF field name

Object identifier (OID) format

Allowed values

You can enter one of these fixed values:

yes
   The printer supports the OID format.

no
   The printer does not support the OID format (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

operator-security-profile

This *single-valued* attribute specifies the name of the RACF resource profile in the PRINTSRV class that controls who can use Infoprint Central to work with this PSF printer or AFP Download Plus sender.

ISPF field name

Operator security profile

Allowed values

A combination of letters, numbers, and special characters except for commas, semicolons, parentheses, and blanks. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. Do not start names with AOP. For example:

```
operator-security-profile = "DENVER.001"
```

Usage guidelines

- To authorize users to a group of printers, specify the same profile name in the PSF FSA definitions and IP PrintWay printer definitions for all the printers in the group.
- If you defined profiles in the OPERCMDS class that protect operator commands, users must have the appropriate level of access to those profiles to work with the printer. This is true whether you specify a profile in this attribute.
- For information about the PRINTSRV class, see *z/OS Infoprint Server Customization*.

Default value

None.

override-3800-default-font

This single-valued attribute specifies whether PSF tells the 3800 to replace the hardware default font with the first font in the current font list.

ISPF field name

3800 compatibility: Override default font

Allowed values

You can enter one of these fixed values:

yes
PSF tells the printer to replace the hardware default font.

no
The printer uses the hardware default font (default).

page-accounting-supported

This single-valued attribute indicates whether PSF sends information, such as the number of pages and sheets in a data set, to the AFP Download Plus receiver. The AFP Download Plus receiver can use the information to provide more accurate accounting information.

ISPF field name

Page accounting supported

Allowed values

You can enter one of these fixed values:

yes
PSF sends accounting information to the AFP Download Plus receiver.

no
PSF does not send accounting information (default).

Usage guidelines

Select this option if the AFP Download Plus receiver supports the **-opagecount** and **-osheetcount** parameters.

page-definition

This single-valued attribute specifies the name of the default page definition that defines how a data set is printed. This attribute is required; however, if the job submitter specifies a page definition, it overrides the page definition in this attribute.

ISPF field name

Page definition

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

You can specify the page definition name with or without the P1 prefix. However, if the name of the page definition, without the P1 prefix, starts with P1, specify the full name. For example, P1P1USER.

paper-length

This single-valued attribute specifies the length of the paper that is loaded in the printer. The 3800 Line-Mode Conversion and Line-Mode Migration functions in AFP Download Plus can use this value to format line data.

ISPF field name

Paper length

Allowed values

A value in the format *nnnn.mmmuu*:

nnnn
 A number 0–9999. You must specify at least one digit to the left of the decimal point.

mmm
 A number 0–999. The decimal point and the digits after the number are optional.

uu
 One of these fixed values:

 IN
  Inches

 CM
  Centimeters

 MM
  Millimeters

 PELS
  Picture elements (1/240 inch)

 POINTS
  Points (1/72 inch)

The default is 14IN.

Usage guidelines

If you specify the unit as PELS or POINTS, specify the value as a whole number with no decimal point.

paper-width

This single-valued attribute specifies the width of the paper that is loaded in the printer. The 3800 Line-Mode Conversion and Line-Mode Migration functions in AFP Download Plus can use this value to format line data.

ISPF field name

Paper width

Allowed values

A value in the format *nnnn.mmmuu*:

nnnn
 A number 0–9999. You must specify at least one digit to the left of the decimal point.

mmm
 A number 0–999. The decimal point and the digits after the number are optional.

uu
 One of these fixed values:

 IN
  Inches

 CM
  Centimeters

 MM
  Millimeters

 PELS
  Picture elements (1/240 inch)

 POINTS
  Points (1/72 inch)

The default is 13.2IN.

Usage guidelines

If you specify the unit as PELS or POINTS, specify the value as a whole number with no decimal point.

port-number

This single-valued attribute specifies the port number with which PSF is to establish a connection to a TCP/IP-attached printer or to an AFP Download Plus receiver. The value in this attribute must match the TCP/IP port number in the printer or the AFP Download Plus receiver.

ISPF field name

Port number

Allowed values

You can enter an integer 1 - 65535. The default is 5001.

print-error-messages

This single-valued attribute specifies whether PSF prints error messages at the end of a data set. If `fsa-type=afp-download-plus`, PSF saves all messages in a file on the z/OS system instead of printing them.

ISPF field name

Print error messages

Allowed values

You can enter one of these fixed values:

yes
> PSF prints or saves error messages until an error occurs that ends processing (default).

no
> PSF does not print or save error messages unless an error occurs that ends processing. If that happens, only the message group that describes the last error is printed or saved.

print-error-messages-maximum

This single-valued attribute specifies the maximum number of message groups that PSF generates when **print-error-messages=yes**. When the maximum number is reached, PSF stops processing the data set and deletes it from the JES spool.

ISPF field name

Print error messages: Maximum messages

Allowed values

You can enter an integer 0 - 999. A value of 0 means the data set is processed until it completes or an error occurs that ends processing of the data set. The default is 16.

print-error-reporting

This single-valued attribute specifies whether the printer reports character and position errors to PSF. Character errors are caused by trying to use a code point that is not assigned to a character in a font. Position errors are caused by trying to print outside the printable area.

ISPF field name

Print error reporting

Allowed values

You can enter one of these fixed values:

none
> Do not report any character or position errors (default).

all
> Report all character and position errors.

character
> Report only character errors.

position
> Report only position errors.

printer-acquire-interval

This single-valued attribute specifies the number of seconds between the time PSF releases a printer and when PSF tries to acquire it again. This attribute is only used when **printer-release-mode=time**.

ISPF field name

Acquire interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-connect-interval

This single-valued attribute specifies the number of seconds during which PSF attempts to connect to a printer or to an AFP Download Plus receiver. When the connect interval expires and the connection is not complete, PSF ends the FSA.

ISPF field name

Connect interval

Allowed values

You can enter an integer 0 - 86400. 0 means PSF attempts to connect for an unlimited time.

Default value

For channel-attached and SNA-attached printers, if this attribute is not specified blank, PSF attempts to connect for an unlimited time. For TCP/IP-attached printers and for AFP Download Plus receivers, PSF attempts to connect for 600 seconds (10 minutes).

printer-disconnect-interval

This single-valued attribute specifies the number of seconds until PSF ends the session with an SNA-attached or TCP/IP-attached printer.

ISPF field name

Disconnect interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-ip-address

This single-valued attribute specifies the Internet Protocol (IP) address or host name of the TCP/IP-attached printer or the AFP Download Plus receiver.

ISPF field name

Printer IP address

Allowed values

You can enter a text string of up to 115 characters. Blanks are not allowed. The string must be one of these types of address:

Colon-hexadecimal address
An IPv6 address in colon-hexadecimal format. These rules apply:

- You can omit leading zeros in each hexadecimal value.
- You can omit one sequence of repeat zero values.
- You can specify the last two hexadecimal values in dotted decimal notation.

For example:

```
2001:0db8:85a3:0000:0000:8a2e:0370:7334
```

Dotted decimal address
A series of integers in the range of 0–255, separated by periods (decimal address). For example:

```
9.99.12.85
```

Host name
A series of domain names that can contain alphanumeric characters and dashes (-), separated by periods (.). The first character must be alphabetic or numeric. For example:

```
printer1.boulder.IBM.com
PRT009
```

printer-management-mode

This single-valued attribute specifies how PSF controls an SNA-attached or TCP/IP-attached printer in deferred-printing mode.

ISPF field name

Management mode

Allowed values

You can enter one of these fixed values:

immediate
PSF starts a communication session with the printer immediately and then looks for output available on the JES spool.

dialin
PSF starts a session with the printer when the switched line is connected.

outavail
PSF starts a communication session with the printer only when output is available on the JES spool (default).

printer-release-interval

This single-valued attribute specifies the number of seconds after which PSF responds to a request to release a printer in the method that is specified by the `printer-release-mode` attribute.

ISPF field name

Release interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-release-mode

This single-valued attribute specifies how PSF is to respond to a request to release the printer.

ISPF field name

Release mode

Allowed values

You can enter one of these fixed values:

idle
PSF releases the printer when a request to release is received and the time that is specified by the `printer-release-interval` attribute expires with no output on the spool for the printer.

time
PSF starts the timer for the release interval when a release request is received, even when there is more output on the spool.

none
> PSF does not release the printer (default).

prune-double-byte-fonts

This single-valued attribute specifies whether PSF prunes double-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name

Prune double-byte fonts

Allowed values

You can enter one of these fixed values:

yes
> PSF prunes double-byte raster fonts (default).

no
> PSF does not prune double-byte fonts.

prune-single-byte-fonts

This single-valued attribute specifies whether PSF prunes single-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name

Prune single-byte fonts

Allowed values

You can enter one of these fixed values:

yes
> PSF prunes single-byte raster fonts (default).

no
> PSF does not prune single-byte fonts.

psf-send-default-character

This single-valued attribute specifies whether PSF passes the default character information to the printer by fully populating the outline single-byte code page.

ISPF field name

Send default character

Allowed values

You can enter one of these fixed values:

yes
> PSF passes the default character information to the printer.

no
> PSF does not pass the default character information to the printer (default).

recover-from-font-not-found

This single-valued attribute specifies whether PSF makes sure the outline font that is derived from the mapped font exists before proceeding.

ISPF field name

Recover from font not found

Allowed values

You can enter one of these fixed values:

yes
> PSF does library queries to make sure that the mapped font exists before it loads the font.

no
> PSF does not need to make sure that the mapped font exists (default).

Usage guidelines

- Specify `recover-from-font-not-found=yes` if your printer supports outline fonts, you requested that PSF map to outline fonts, and you do not want pages in your job ended because the outline font identified through the mapped font did not exist on the host.
- When you specify `recover-from-font-not-found=yes`, the performance of PSF is degraded because of additional library queries for every mapped font resource.

release-ds-when-repositioning

This single-valued attribute specifies whether PSF releases data sets to JES when PSF repositions.

ISPF field name

Release data set when repositioning

Allowed values

You can enter one of these fixed values:

yes
> PSF releases the data sets when repositioning. The data sets might be reselected in a different order.

no
> PSF retains data sets during repositioning (default).

report-line-mode-conversion-paper-length-errors

This single-valued attribute indicates whether the 3800 Line-Mode Conversion function in AFP Download Plus reports an error when the paper length in the FCB does not match the value in the **paper-length** attribute.

ISPF field name

Report Line-Mode Conversion paper length errors

Allowed values

You can enter one of these fixed values:

yes
> The Line-Mode Conversion function reports an error. It puts the print job on the hold queue and issues message APS973I.

no
> The Line-Mode Conversion function does not report an error. It uses the value in the **paper-length** attribute (default).

resolution

This single-valued attribute specifies the resolution at which the output was formatted. PSF uses this value to choose the associated resolution system library that was previously defined by the system programmer.

ISPF field name

Resolution

Allowed values

You can enter one of these fixed values:

240
    The data was formatted with resources at 240 pels per inch.

300
    The data was formatted with resources at 300 pels per inch.

Default value

PSF uses the default system library.

Usage guidelines

The resolution in this attribute is used for all jobs unless the Exit 7 BDSC call overrides it.

resource-deletion-ratio

This single-valued attribute determines whether PSF expedites the deletion of all fonts, overlays, object containers, and page segments at the end of data set processing. If the ratio of inline and user resources to the total number of loaded resources (expressed as a percentage) is greater than or equal to this value, PSF expedites resource deletion. If the ratio percentage is less than this value, standard methods are used to delete the resources.

ISPF field name

Resource deletion ratio

Allowed values

You can enter one of these fixed values:

1–100
    PSF expedited resource deletion if the resource ratio percentage is greater than or equal to this value.

0
    PSF does not use this value when deleting resources.

Default value

90

Usage guidelines

- Set the value to a low number if resources are not typically used by subsequent jobs or if resources for most jobs are inline.
- Set the value to a high number if delays are caused by reloading system resources between jobs.
- For more information about deleting resources and the effect on AFP performance, see *z/OS Release Upgrade Reference Summary*.

response-timeout

This single-valued attribute specifies maximum number of seconds PSF waits for a response from the printer or from the AFP Download Plus receiver.

ISPF field name

Response timeout

Allowed values

You can enter an integer from 0 (default) to 86400.

restrict-printable-area

This single-valued attribute specifies whether an area on each page of printed output is reserved for the security label.

ISPF field name

Restrict printable area

Allowed values

You can enter one of these fixed values:

yes
    An area on each page is reserved for the security label.

no
    An area is not reserved for the security label.

Default value

If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

retained-fonts

This single-valued attribute specifies the maximum number of fonts that PSF retains in printer storage between print jobs.

ISPF field name

Retained fonts

Allowed values

You can enter a value 0 - 32767. The default value depends on the type of printer and the amount of storage available in the printer.

Usage guidelines

- When PSF retains fonts, PSF does not need to reload the same fonts for subsequent jobs. However, retaining fonts requires more printer storage.
- This value overrides the reasonable resource loading value (RRLV) for fonts that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-form-definitions

This single-valued attribute specifies the maximum number of form definitions that PSF retains in virtual storage between print jobs.

ISPF field name

Retained form definitions

Allowed values

You can enter a value 0 - 32767. The default value is 6.

Usage guidelines

- When PSF retains form definitions, PSF does not need to reload the same form definitions for subsequent jobs. However, retaining form definitions requires more virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for form definitions that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-object-containers

This single-valued attribute specifies the maximum number of object containers that PSF retains in printer storage between print jobs.

ISPF field name

Retained object containers

Allowed values

You can enter a value 0 - 32767.

Default value

The default value is 0 for 3800 and 3820 printers. The default value is 200 for all other printers.

Usage guidelines

- When PSF retains object containers, PSF does not need to reload the same object containers for subsequent jobs. However, retaining object containers requires more virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for object containers that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-page-definitions

This single-valued attribute specifies the maximum number of page definitions that PSF retains in virtual storage between print jobs.

ISPF field name

Retained page definitions

Allowed values

You can enter a value 0 - 32767. The default value is 6.

Usage guidelines

- When PSF retains page definitions, PSF does not need to reload the same page definitions for subsequent jobs. However, retaining page definitions requires more virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for page definitions that you can specify in the PSF Exit 7 initialization call.

- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-page-segments

This single-valued attribute specifies the maximum number of page segments that PSF retains in printer storage between print jobs.

ISPF field name

Retained page segments

Allowed values

You can enter a value from 0 (default) to 32767.

Usage guidelines

- When PSF retains page segments, PSF does not need to reload the same page segments for subsequent jobs. However, retaining page segments requires more printer storage.
- This value overrides the reasonable resource loading value (RRLV) for page segments that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

save-auxiliary-files

Specifies whether all auxiliary files, such as separator pages and message files, are saved in the job submitter's default message directory, `/var/psf/userinfo/`*userid*. AFP Download Plus never transmits these files to the receiver. The system programmer can validate that these files are IS/3 compliant before they are used in production.

ISPF field name

Save auxiliary files

Allowed values

You can enter one of these fixed values:

yes
    Auxiliary files are saved.

no
    Auxiliary files are not saved (default).

Usage guidelines

When this attribute is specified, AFP Download Plus ignores the `compression`, `direct-download`, and `send-messages-on-failure` attributes if they are specified.

secure-transmission

This single-valued attribute indicates whether PSF encodes data before it sends it to the AFP Download Plus receiver.

ISPF field name

Secure transmission

Allowed values

You can enter one of these fixed values:

yes
 PSF encodes data (default).

no
 PSF does not encode data.

send-messages-on-failure

This single-valued attribute indicates whether PSF sends all messages to the AFP Download Plus receiver when it cannot send an output data set because of an error or because the operator canceled processing of the data set. The receiver can print the messages to help diagnose errors that are detected on the sending system, such as data stream errors.

ISPF field name

Send messages on failure

Allowed values

You can enter one of these fixed values:

all
 PSF sends all messages to the receiver in a message data set in MO:DCA-P format (default).

generic-only
 PSF sends a generic message in line data format to the receiver to indicate that the output data was not sent.

send-messages-to-sysout

This single-valued attribute specifies whether PSF sends a message data set to a SYSOUT data set for redirection to another CLASS or DEST for viewing or printing.

ISPF field name

Send msgs to SYSOUT

Allowed values

You can enter one of these fixed values:

yes
 PSF sends the message data set to a SYSOUT data set.

no
 PSF does not send the message data set to a SYSOUT data set.

send-separator-pages

This single-valued attribute indicates whether PSF sends the job and data set separator pages for each output data set to the AFP Download Plus receiver.

ISPF field name

Send separator pages

Allowed values

You can enter one of these fixed values:

yes
 PSF sends separator pages to the receiver.

no
 PSF does not send separator pages to the receiver (default).

set-3800-dataset-header-origin

This single-valued attribute specifies whether PSF sets the data set header media origin on continuous-forms printers to the top left corner.

ISPF field name

Set media origin to 3800 origin for: Data set header

Allowed values

You can enter one of these fixed values:

yes
> PSF sets the data set header media origin to the upper left corner.

no
> PSF does not set the data set header media origin to the upper left corner (default).

set-3800-dataset-origin

This single-valued attribute specifies whether PSF sets the data set media origin on continuous-forms printers to the upper left corner.

ISPF field name

Set media origin to 3800 origin for: Data set

Allowed values

You can enter one of these fixed values:

yes
> PSF sets the data set media origin to the upper left corner.

no
> PSF does not set the data set media origin to the upper left corner (default).

set-3800-job-header-origin

This single-valued attribute specifies whether PSF sets the job header media origin on continuous-forms printers to the upper left corner.

ISPF field name

Set media origin to 3800 origin for: Job header

Allowed values

You can enter one of these fixed values:

yes
> PSF sets the job header media origin to the upper left corner.

no
> PSF does not set the job header media origin to the upper left corner (default).

set-3800-job-trailer-origin

This single-valued attribute specifies whether PSF sets the job trailer media origin on continuous-forms printers to the upper left corner.

ISPF field name

Set media origin to 3800 origin for: Job trailer

Allowed values

You can enter one of these fixed values:

yes
 PSF sets the job trailer media origin to the upper left corner.

no
 PSF does not set the job trailer media origin to the upper left corner (default).

set-3800-messages-origin

This single-valued attribute specifies whether PSF sets the message data set media origin on continuous-forms printers to the upper left corner.

ISPF field name

Set media origin to 3800 origin for: Message data set

Allowed values

You can enter one of these fixed values:

yes
 PSF sets the message data set media origin to the upper left corner.

no
 PSF does not set the message data set media origin to the upper left corner (default).

snmp-enabled

This single-valued attribute specifies whether PSF operator commands use Simple Network Management Protocol (SNMP) Version 1 for TCP/IP-attached printers for faster response times. The default is yes.

ISPF field name

SNMP enabled

Allowed values

You can enter one of these fixed values:

yes
 PSF operator commands use SNMP (default).

no
 PSF operator commands do not use SNMP.

Usage guidelines

When this attribute is set to yes, make sure that the printer is SNMP enabled. Otherwise, a 20-second delay occurs before the printer starts up.

suppress-copy-marks

This single-valued attribute specifies whether PSF does not print copy marks or do offset stacking. This attribute overrides the COPYMARK parameter of the JES initialization statement for the printer.

ISPF field name

Suppress copy marks

Allowed values

You can enter one of these fixed values:

yes
> Copy marks are not printed and offset stacking is not done.

no
> Copy marks are printed and offset stacking is done if requested in the COPYMARK parameter (default).

Usage guidelines

If you specify **suppress-copy-marks=yes** and also specify any value in the **offset-stacking** attribute, PSF suppresses only the printing of copy marks, while the **offset-stacking** attribute controls when PSF does offset stacking.

tcpip-64k-buffer-support

This single-valued attribute indicates whether the maximum buffer size for TCP/IP send buffers in PSF is 32K or 64K. PSF indicates the maximum buffer size to the printer.

ISPF field name

TCPIP 64K Buffer Support

Allowed values

You can enter one of these fixed values:

yes
> PSF supports 8K, 32K, or 64K send buffers.

no
> PSF supports 8K or 32K send buffers. If this value is **No**, but the printer supports 64K send buffers, PSF abends with reason code 0E12 and you see a message that this value must be **Yes**.

Default value

PSF supports 8K or 32K send buffers.

Usage guidelines

- This attribute applies only to PSF TCP/IP-attached printer definitions.
- Use the default (**No**) unless the printer supports 64K buffers. If the printer supports 64K buffers, use **Yes**.
- Use the default (**No**) with PSF releases earlier than PSF 4.7.0.

trace-mode

This single-valued attribute specifies the type of tracing that is started during FSA initialization. If the FSA already started, a new trace mode takes effect the next time the FSA starts.

ISPF field name

Trace mode

Allowed values

You can enter one of these fixed values:

none
> PSF: No tracing is started during PSF initialization.
>
> IP PrintWay: The tracing mode in the IP PrintWay FSS definition is used for the FSA (default).

internal
> PSF: An internal trace is started (default).

IP PrintWay: Only internal tracing is started.

ipds
>PSF: An external trace that contains only IPDS data is started. An internal trace is also started.

>IP PrintWay: IP PrintWay ignores this value.

limit
>PSF: An external trace like the full trace is started. However, information in some data buffers is truncated. An internal trace is also started.

>IP PrintWay: IP PrintWay ignores this value.

sync
>PSF: An FSA SYNC external trace is started. An internal trace is also started.

>IP PrintWay: IP PrintWay ignores this value.

no-printing

>PSF: PSF ignores this value and starts only an internal trace.

>IP PrintWay: Internal and external tracing is started, without tracing of record processing. Input records and TCP/IP commands are not traced.

full
>PSF and IP PrintWay: An FSA full external trace is started. An internal trace is also started.

Usage guidelines for IP PrintWay only

- If you specify `full` or `no-printing`, you must start a GTF trace before you start the FSA.
- You can use the MODIFY operator command to stop the trace or to start tracing after an FSA starts.
- You might not want to start a full trace during peak processor usage.

trace-table-size

This single-valued attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table.

ISPF field name

Trace table size

Allowed values

You can enter an integer 1 - 999. The default is 32.

trace-user-data

This single-valued attribute specifies whether available user data is traced when a trace function is requested with PSF. The default is `yes`.

ISPF field name

Trace user data

Allowed values

You can enter one of these fixed values:

yes
>User data is traced when it is available (default).

no
>User data is not included during trace processing.

Usage guidelines

- User data is always traced with SNA-attached printers.
- For information about using traces, see *PSF for z/OS: Diagnosis*.

transmit-recovery-pages

This single-valued attribute specifies how often PSF synchronizes with the AFP Download Plus receiver to determine whether the transmitted data was received and, if necessary, retransmit data from the recovery point. The recovery point is the last time that PSF successfully synchronized with the AFP Download receiver.

ISPF field name

Recovery pages

Allowed values

A value 0–65535; the default is 1000. When 0 is specified, PSF does not synchronize the transmitted data with the receiver until the end of a file.

use-line-mode-migration-linect

This single-valued attribute indicates whether the PSF Line-Mode Migration function uses the number of lines that are specified in the LINECT parameter when the LINECT value is smaller than the number of lines that are specified in the FCB.

ISPF field name

Use Line-Mode Migration LINECT

Allowed values

You can enter one of these fixed values:

yes
 The Line-Mode Migration function uses the LINECT parameter.

no
 The Line-Mode Migration function does not use the LINECT parameter. It uses the FCB value (default).

Usage guidelines

If the LINECT value is larger than the FCB value, the Line-Mode Migration function uses the FCB value whether this attribute is specified.

Attributes for the job selection rule object class

The attributes that are valid when you create job selection rules are listed here. These attributes are in object class **job-selection-rule**. This class applies only to IP PrintWay extended mode.

IP PrintWay extended mode uses the job selection rules to determine which output data sets (also called *print jobs*) to select from the JES spool for printing. You must create at least one job selection rule for IP PrintWay to select print jobs. You can create as many job selection rules as you need. The attributes of the print job must match all of the values in a rule to be selected.

Required attributes

All attributes are optional. If you do not specify any attributes, IP PrintWay extended mode selects all output data sets.

creator-userid

This single-valued attribute specifies the user ID of the person who submitted the print job.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

Specify this attribute only to select print jobs that a z/OS user ID owns. Print jobs that a z/OS user ID owns are those submitted with JCL, the **lp** command, or the AOPPRINT JCL procedure. You cannot use this attribute to select other print jobs—for example, print jobs that are submitted from remote systems that Print Interface allocated on the JES spool or print jobs that NetSpool allocated on the JES spool. This is because the owner name associated with NetSpool and most Print Interface print jobs is stored separately from the user name that JES records for print jobs. IP PrintWay selects only print jobs that this user ID submitted.

ISPF field name

Creator

Allowed values

Any combination of 1–8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ?). The first character cannot be a number. Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the ID to represent zero or more unknown characters. You can enter one or more question marks in any position in the ID to represent one unknown character. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. For example:

```
creator-userid = "userid#1"
```

Default value

None.

description

This single-valued attribute specifies the description of a job selection rule. This attribute applies only to IP PrintWay extended mode.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks. For example:

```
description = "Select overnight print jobs in Class-N"
```

Default value

None.

dest-ip-address

This single-valued attribute specifies whether IP PrintWay selects print jobs that specify an IP address in the **DEST=IP:** parameter on the OUTPUT JCL statement.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

Tip: Print jobs that Infoprint Server creates on the JES spool do not specify an IP address.

ISPF field name

DEST IP address

Allowed values

You can enter one of these fixed values:

include
> Select only print jobs that specify an IP address.

exclude
> Do not select any print jobs that specify an IP address.

ignore
> Select any print jobs, regardless of whether they specify an IP address (default).

destination-pattern

This single-valued attribute specifies that IP PrintWay selects only print jobs with this destination name.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

DEST

Allowed values

Any combination of 1–8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ?). Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the name to represent zero or more unknown characters. You can enter one or more question marks in any position in the name to represent one unknown character. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. For example:

```
destination-pattern = "B003*"
```

In JES2, R*, RM*, RMT*, U*, and N* do not match print jobs with a JES route code of remote, special local, local, anylocal, or NJE. Also, do not specify an asterisk for destinations that JES DESTID initialization statements define.

Default value

None.

forms-list

This multi-valued, list attribute specifies that IP PrintWay selects only print jobs with one of these form names.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

FORMS

Allowed values

You can specify 1–8 forms names. Each forms name can be any combination of 1–8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ?). Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the name to represent zero or more unknown characters. You can enter one or more question marks in any position in the name to represent

one unknown character. If the value contains special characters, enclose it in single or double quotation marks. If you specify more than one forms name, separate them with spaces and enclose the list in braces. Lowercase letters are converted to uppercase. For example:

```
forms-list = {ACCT4010 "ST*D"}
```

Default value

None.

jes-writer-pattern

This single-valued attribute specifies the external writer, which is an IBM- or installation-written program. IP PrintWay selects only print jobs with this writer name.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

WRITER

Allowed values

Any combination of 1–8 letters (a-z, A-Z), numbers (0-9), and certain special characters (# $ @ * ?). Blanks and other special characters are not allowed. You can enter one or more asterisks in any position in the name to represent zero or more unknown characters. You can enter one or more question marks in any position in the name to represent one unknown character. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. For example:

```
jes-writer-pattern = "EXTWTR*"
```

Default value

None.

job-selection-status

This single-valued attribute specifies whether IP PrintWay uses the job selection rule to determine which print jobs to select from the JES spool for printing. This attribute applies only to IP PrintWay extended mode.

Allowed values

You can enter one of these fixed values:

enabled
   IP PrintWay uses the job selection rule (default).

disabled
   IP PrintWay does not use the job selection rule.

lower-page-limit

This single-valued attribute specifies the lower limit for the total number of pages in all AFP documents (data sets) in a print job (output group). The total pages must be equal to or greater than the lower limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

Page limit: Lower

Allowed values

A number 0–2147483647.

Default value

None.

Usage guidelines

- If you specify this attribute and do not specify the **upper-page-limit** attribute, the upper limit is 2147483647.
- If you do not specify this attribute and do not specify **upper-page-limit**, IP PrintWay extended mode does not select print jobs based on the number of pages.
- JES calculates the number of pages in a print job.

lower-record-limit

This single-valued attribute specifies the lower limit for the total number of records in all non-AFP documents (data sets) in a print job (output group). The total records must be equal to or greater than the lower limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

Record limit: Lower

Allowed values

A number 0–2147483647.

Default value

None.

Usage guidelines

- If you specify this attribute and do not specify the **upper-record-limit** attribute, the upper limit is 2147483647.
- If you do not specify this attribute and do not specify **upper-record-limit**, IP PrintWay extended mode does not select print jobs based on the number of records.
- JES calculates the number of records in a print job.
- Depending on the program that creates the print job, a record is not always equivalent to one printed line. For example, Print Interface creates records that can contain up to 32 K bytes of data.

name

This single-valued attribute specifies the name of a job selection rule. This attribute applies only to IP PrintWay extended mode.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Rule name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as # $ @ ! = / -). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks. For example:

```
name = "Class-N"
```

Default value

None.

operator-security-profile

This single-valued attribute specifies the name of the RACF resource profile in the PRINTSRV class that controls who can use Infoprint Central to work with this job selection rule. This attribute applies only to IP PrintWay extended mode.

Tips:

1. You can specify the same operator security profile in all job selection rules.
2. For information about the PRINTSRV class, see *z/OS Infoprint Server Customization*.

ISPF field name

Operator security profile

Allowed values

A combination of letters, numbers, and special characters except for commas, semicolons, parentheses, and blanks. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. Do not start names with AOP. For example:

```
operator-security-profile = "DENVER.001"
```

Default value

None.

output-class-list

This multi-valued, list attribute specifies that IP PrintWay selects only print jobs in one of these JES output classes.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

CLASS

Allowed values

You can specify 1–36 output classes. Each output class can be a letter (a-z, A-Z) or a number (0-9). Blanks and special characters are not allowed. If you specify more than one output class, separate them with spaces and enclose the list in braces. For example:

```
output-class-list = {A J 8}
```

Default value

None.

upper-page-limit

This single-valued attribute specifies the upper limit for the total number of pages in all AFP documents (data sets) in a print job (output group). The total pages must be equal to or less than the upper limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

Page limit: Upper

Allowed values

A number 0–2147483647.

Default value

None.

Usage guidelines

- If you specify this attribute and do not specify the **lower-page-limit** attribute, the lower limit is 0.
- If you do not specify this attribute and do not specify **lower-page-limit**, IP PrintWay extended mode does not select print jobs based on the number of pages.
- JES calculates the number of pages in a print job.

upper-record-limit

This single-valued attribute specifies the upper limit for the total number of records in all non-AFP documents (data sets) in a print job (output group). The total records must be equal to or less than the upper limit.

If you also specify another attribute that is used for selecting print jobs, the print jobs must match the values in all attributes to be selected. This attribute applies only to IP PrintWay extended mode.

ISPF field name

Record limit: Upper

Allowed values

A number 0–2147483647.

Default value

None.

Usage guidelines

- If you specify this attribute and do not specify the **lower-record-limit** attribute, the lower limit is 0.
- If you do not specify this attribute and do not specify **lower-record-limit**, IP PrintWay extended mode does not select print jobs based on the number of records.
- JES calculates the number of records in a print job.
- Depending on the program that creates the print job, a record is not always equivalent to one printed line. For example, Print Interface creates records that can contain up to 32 K bytes of data.

Attributes for the netspool-eof-rules object class

Two of the attributes that are valid when you create NetSpool End-of-File components are listed here. These attributes are in object class **netspool-eof-rules**. These attributes are also valid for the **printer** object class.

Because of the complexity of the other attributes that are valid for the **netspool-eof-rules** object class, these attributes are not described here. IBM suggests that you use the Infoprint Server ISPF panels to specify end-of-file rules.

Required attributes

All attributes are optional.

description

This single-valued attribute specifies a description for the component. The description can help you select the correct component from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

name

This single-valued attribute specifies the name of the component.

Note: This is a *non-settable* attribute. Do not specify **name** on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify this attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Component Name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value

None.

Attributes for the netspool-options object class

The attributes that are valid when you create NetSpool Options components are listed here. These attributes are in object class **netspool-options**. These attributes are also valid for the **printer** object class.

Required attributes

All attributes are optional.

default-owner

This single-valued attribute specifies the default Infoprint Server job owner for the associated logical unit (LU) if the print data does not specify an owner. The job owner is used for output data sets created for this NetSpool LU.

ISPF field name

Default owner

Allowed values

A combination of 1–8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.

Default value

NetSpool uses the ID of the user who started the Infoprint Server daemons as the default job owner.

Usage guidelines

- The Infoprint Server job owner helps you find jobs with Infoprint Central.
- The job owner in this attribute is also used as the JES job name if no other owner or job name is specified in the print data.
- The job owner that is specified in this field is not used as the JES job owner. The JES job owner is always the ID of the user who started the Infoprint Server daemons.

description

This single-valued attribute specifies a description for the component. The description can help you select the correct component from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

embedded-attributes-prefix

This single-valued attribute specifies the prefix that identifies job attributes that are embedded in the print data. For information about how to embed job attributes in VTAM application print data, see *z/OS Infoprint Server User's Guide*. NetSpool uses the embedded job attributes when it allocates an output data set on the spool.

ISPF field name

Embedded attributes prefix

Allowed values

A 1–12 character string (1–12 bytes of data if specified in hexadecimal format). To enter a hexadecimal value, begin the value with the letter X and enclose the value in single or double quotation marks. For example:

```
embedded-attributes-prefix = "<<ibmjobattr"
```

Default value

None. If you do not specify this attribute, NetSpool does not use job attributes that are specified in the print data.

maximum-record-size

This single-valued attribute specifies the maximum record size for the variable-length records that NetSpool writes to the output data set when **netspool-formatting=none**.

ISPF field name

Maximum record size

Allowed values

An integer 1–32752.

Default value

NetSpool uses 32752 as the maximum record size.

Usage guidelines

- If the length of the data in the input Request Unit (RU) is less than this value, NetSpool writes one record.
- If the length of the data in the input RU is greater than this value, NetSpool writes multiple records.
- If `netspool-formatting=convert-to-line` (default) or `netspool-formatting=convert-to-pcl`, do not specify this attribute.

name

This single-valued attribute contains the name of the component.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Component Name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value

None.

netspool-formatting

This single-valued attribute specifies the type of formatting that NetSpool does before it writes the input data to an output data set on the JES spool.

ISPF field name

Formatting

Allowed values

You can enter one of these fixed values:

none
> NetSpool writes the input data without change to the output data set. NetSpool uses values that are specified in these attributes:
>
> - **maximum-record-size**
> - **recfm**
>
> NetSpool does not call any exits.

convert-to-line
> NetSpool converts SNA character stream (SCS) and 3270 data streams into line data streams. As an option, specify these attributes in the **processing** object class, which NetSpool uses during conversion:
>
> - **scs-bottom-margin**
> - **scs-horizontal-tabs**
> - **scs-left-margin**
> - **scs-maximum-line-length**
> - **scs-maximum-page-length**
> - **scs-right-margin**
> - **scs-top-margin**
> - **scs-vertical-tabs**
>
> **Synonym:** standard

convert-to-pcl
> NetSpool converts SNA character stream (SCS) and 3270 data streams into PCL data streams. As an option, specify these attributes in the **processing** object class, which NetSpool uses during conversion:
>
> - **pcl-line-density**
> - **pcl-orientation**
> - **pcl-print-density**
> - **scs-automatic-page-orientation**
> - **scs-bottom-margin**
> - **scs-horizontal-tabs**
> - **scs-left-margin**
> - **scs-maximum-line-length**
> - **scs-maximum-page-length**
> - **scs-right-margin**
> - **scs-top-margin**
> - **scs-vertical-tabs**

Default value

convert-to-line

Usage guidelines

If you specify `netspool-formatting=none`, do not specify the **busy-interval** or **idle-interval** attributes.

recfm

This single-valued attribute specifies the record format (RECFM) for the output data sets that NetSpool writes to the JES spool when **netspool-formatting=none**.

ISPF field name

Recfm

Allowed values

You can enter one of these fixed values:

vb
Variable length, blocked records

vba
Variable length, blocked records, with ANSI carriage control characters

vbm
Variable length, blocked records, with machine carriage control characters

Default value

NetSpool writes variable length, blocked records.

Usage guidelines

If **netspool-formatting=convert-to-line** (default) or **netspool-formatting=convert-to-pcl**, do not specify this attribute. NetSpool ignores it if specified.

Attributes for the printer object class

The attributes that are valid when you create printer definitions are listed here. These attributes are in object class **printer**. In addition to these attributes, you can also specify attributes that are valid for the object classes that are listed in Table 51 on page 387. Some object classes that are listed in the table are valid only for certain printer types, as defined by the **printer-type** attribute.

Object class	Valid for printer type	See
allocation	All types	"Attributes for the allocation object class" on page 287
netspool-eof-rules	All types	"Attributes for the netspool-eof-rules object class" on page 383
netspool-options	All types	"Attributes for the netspool-options object class" on page 383
printway-options	general, ip-printway	"Attributes for the printway-options object class" on page 406

Table 51. Object classes whose attributes are valid for printer object class

Table 51. Object classes whose attributes are valid for printer object class (continued)		
Object class	**Valid for printer type**	**See**
`processing`	All types	"Attributes for the processing object class" on page 422
`protocol`	ip-printway	"Attributes for the protocol object class" on page 445

Required attributes

For Infoprint Server to display the correct ISPF panels for a printer definition, you must specify the **printer-type** attribute.

NetSpool requires the **luname** attribute.

Also, see the list of attributes for the other object classes whose attributes are valid for the printer object class. Table 51 on page 387 summarizes these object classes. These object classes identify other required attributes.

dcf-routing

This single-valued attribute specifies whether job submitters can use the DEST, CLASS, and FORMS JCL parameters to select this printer definition. For more information, see "Using DEST, CLASS, and FORMS to select a printer definition (basic and extended mode)" on page 159.

ISPF field name

Use DEST, CLASS, and FORMS for IP PrintWay printer selection

Allowed values

You can enter one of these fixed values:

yes
    The DEST, CLASS, and FORMS parameters can be used to select this printer definition.

no
    The DEST, CLASS, and FORMS cannot be used to select this printer definition.

Default value

Job submitters cannot use IP PrintWay to select this printer with the DEST, CLASS, and FORMS parameters.

Usage guidelines

- This attribute applies only for IP PrintWay printer definitions (**printer-type = ip-printway**).
- If you select yes, you must also specify a value for one or more of these attributes: **output-class**, **destination**, or **forms**. If you omit one of these attributes, IP PrintWay does not use the corresponding JCL parameter for printer selection. The values for the **output-class**, **destination**, and **forms** attributes must, together, be unique in all printer definitions with **dcf-routing = yes**.
- Set this attribute to yes if you are migrating IP PrintWay routing entries and want to continue to use DEST, CLASS, and FORMS as selection criteria.
- Regardless of the value of this attribute, a job submitter can specify a printer name on an OUTPUT JCL statement to select this printer definition (in the FSSDATA parameter).

description

This single-valued attribute specifies a description for the printer definition. The description can help users select a printer definition.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

general-spooling-mode

This single-valued attribute indicates how Print Interface writes the input data to the output data set on the JES spool when **printer-type=general**. Select a value that is suitable for the printer. **spooling-mode** is an alias for this attribute.

ISPF field name

Spooling mode

Allowed values

You can enter one of these fixed values:

line
Print Interface writes the data in records. This value is suitable for JES and AFP printers.

stream
Print Interface writes the data as a data stream, with control characters to indicate the end of lines. This value is suitable for ASCII printers.

Default value

line

Usage guidelines

This attribute applies only for General printer definitions (**printer-type=general**). It is ignored if **printer-type=psf-mvs** or **printer-type=ip-printway**.

include-allocation

This single-valued attribute specifies the name of the Allocation component to be included in this printer definition. An Allocation component is an object in object-class **allocation**.

ISPF field name

Component name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value

No Allocation component is included in the printer definition.

Usage guidelines

All attributes that are specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the **create** or **modify** command for the printer definition.

include-netspool-eof-rules

This single-valued attribute specifies the name of a NetSpool End-of-File component to be included in this printer definition. A NetSpool End-of-File component is an object in object-class **netspool-eof-rules**.

ISPF field name

Component name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value

No NetSpool End-of-File component is included in the printer definition.

Usage guidelines

All attributes that are specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the **create** or **modify** command for the printer definition.

include-netspool-options

This single-valued attribute specifies the name of a NetSpool Options component to be included in this printer definition. A NetSpool Options component is an object in object-class **netspool-options**.

ISPF field name

Component name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value

No NetSpool Options component is included in the printer definition.

Usage guidelines

All attributes that are specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the **create** or **modify** command for the printer definition.

include-printway-options

This single-valued attribute specifies the name of an IP PrintWay Options component to be included in this printer definition. An IP PrintWay Options component is an object in object-class **printway-options**.

ISPF field name

Component name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value

No IP PrintWay Options component is included in the printer definition.

Usage guidelines

- All attributes that are specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the **create** or **modify** command for the printer definition.
- This attribute applies only to IP PrintWay and General printer definitions (**printer-type=ip-printway** and **printer-type=general**).

include-processing

This single-valued attribute specifies the name of a Processing component to be included in this printer definition. A Processing component is an object in object-class **processing**.

ISPF field name

Component name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value

No Processing component is included in the printer definition.

Usage guidelines

All attributes that are specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the **create** or **modify** command for the printer definition.

include-protocol

This single-valued attribute specifies the name of a Protocol component to be included in this printer definition. A Protocol component is an object in object-class **protocol**.

ISPF field name

Component name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks.

Default value

No Protocol component is included in the printer definition.

Usage guidelines

- All attributes that are specified in this component apply to the printer definition. To override an attribute from the component, specify the attribute on the **create** or **modify** command for the printer definition.
- This attribute applies only to IP PrintWay printer definitions (**printer-type=ip-printway**).

location

This single-valued attribute specifies the location of the printer. The location can help users select and find printers.

ISPF field name

Location

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If a value contains blanks or special characters, enclose the value in quotation marks.

Default value

None.

Usage guidelines

- If you use the same format to specify the location in all printer definitions (for example: Bldg 3/Col 2), you can find all printer definitions with similar locations, such as all printers in Building 3.
- If more than one printer definition exists for the same IP PrintWay printer, specify the same location in all printer definitions for the printer so Infoprint Central can find the printer.

lu-classes

This multi-valued, list attribute identifies 1–64 logical-unit (LU) classes for this NetSpool LU. If you specify more than one class, the NetSpool LU is assigned to all of the specified classes.

ISPF field name

LU classes

Allowed values

An integer 1–64. You can specify a list of up to 64 classes. If you specify more than one LU class, separate the LU classes by spaces and surround the list of LU classes with braces. For example:

```
lu-classes={1 4 64}
```

Default value

{1}

Usage guidelines

When NetSpool starts, it starts LUs according to LU class. Therefore, specify the same LU class for all NetSpool LUs that you want to start at the same time.

luname

This single-valued attribute specifies the logical unit (LU) name that NetSpool uses to identify this printer. This name must be a unique LU name in the Printer Inventory.

ISPF field name

NetSpool LU name

Allowed values

A combination of 1–8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.

Default value

None.

Usage guidelines

- This attribute is required for NetSpool to start a session with this printer.
- The name must match the LU name that is specified in the ACBNAME field of the VTAM APPL definition statement.

name

This single-valued attribute specifies the name of the printer definition.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Printer Definition Name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value

None.

pdf-author

This single-valued attribute specifies the PDF author, which can be an author of the PDF output file. This value is displayed in the **Author** field of the PDF document properties.

ISPF field name

Author

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

pdf-digital-certificate-name

This single-valued attribute specifies the name of the digital certificate used to create the signed PDF document.

ISPF field name

Digital certificate name

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

Usage guidelines

- The value of this field is combined with the environment variable AOP_DIGITAL_CERTIFICATE_LOCATION to locate the digital certificate.
- The certificate repository might limit the characters that you can use in this field.

pdf-keywords

This multi-valued, list attribute specifies one or more PDF keywords that highlight the important content within a document.. This value is displayed in the **Keywords** field of the PDF document properties.

ISPF field name

Keywords

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

pdf-signature-contact

This single-valued attribute specifies contact information for the person or authority signing the PDF document. This value is stored in the **/ContactInfo** field of the PDF signature dictionary.

ISPF field name

Signature contact

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

pdf-signature-location

This single-valued attribute specifies the server name or the physical location where the PDF document was signed. This value is stored in the **/Location** field of the PDF signature dictionary.

ISPF field name

Signature location

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

pdf-signature-name

This single-valued attribute specifies the name of the person or authority signing the PDF document. This value is stored in the **/Name** field of the PDF signature dictionary.

ISPF field name

Signature name

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

Usage guidelines

Specify this field only when it is not possible to extract the name from the certificate.

pdf-signature-reason

This single-valued attribute specifies the reason for signing the PDF document. This value is stored in the **/Reason** field of the PDF signature dictionary.

ISPF field name

Signature reason

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

pdf-subject

This single-valued attribute specifies the PDF subject, which can be the subject of the PDF output file. This value is displayed in the **Subject** field of the PDF document properties.

ISPF field name

Subject

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

pdf-title

This single-valued attribute specifies the PDF title, which can describe the use or origin of the PDF output file. This value is displayed in the **Title** field of the PDF document properties.

ISPF field name

Title

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), blanks, and special characters. If the value contains blanks or special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

pdf-user-accessibility-control-file

This single-valued attribute specifies the UNIX file name of the Index Control File (ICF) for PDF user accessibility. This file contains rules that the Accessible PDF Transform uses to find specific text strings, images, and objects in the input and insert specific tags for them in the PDF output.

ISPF field name

User accessibility control file

Allowed values

Any combination of 1–255 of letters (a-z, A-Z), numbers (0-9), and special characters, with a suggested file extension of `.icf`. The value is case-sensitive. If the value contains special characters (such as: @ $ & ( ) > < | ' " #), enclose it in single or double quotation marks.

Default value

None.

Usage guidelines

The value of this field is combined with the environment variable AOP_UACF_LOCATION at run time to fully qualify the location of the ICF. If this environment variable is not specified, the ICF must be a UNIX file located in the default directory, `/usr/lpp/IBMPrintXform/V1R2/samples`.

printer-type

This single-valued attribute specifies the type of printer definition.

ISPF field name

None.

Allowed values

You can enter one of these fixed values:

general
　A printer definition for printers that are not IP PrintWay or PSF types.

ip-printway
　A printer definition for remote printers in your Internet Protocol network to which IP PrintWay transmits data.

psf-mvs
　A printer definition for AFP printers that are controlled by PSF.

Default value

The Infoprint Server ISPF panels display the printer definition as a General printer definition. Print Interface writes data to the output data set on the JES spool in records (**general-spooling-mode=line**).

Attributes for the printer-pool object class

The attributes that are valid when you create printer pool definitions are listed here. These attributes are in object class **printer-pool**.

Required attributes

NetSpool requires these attributes:

- **lu-classes**
- **luname**
- **printer-names**

All other attributes are optional.

default-owner

This single-valued attribute specifies the default Infoprint Server job owner for the associated logical unit (LU) if the print data does not specify an owner. The job owner is used for output data sets created for this NetSpool LU.

ISPF field name

Default owner

Allowed values

A combination of 1–8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.

Default value

NetSpool uses the ID of the user who started the Infoprint Server daemons as the default job owner.

Usage guidelines

- The Infoprint Server job owner helps you find jobs with Infoprint Central.
- The job owner in this attribute is also used as the JES job name if no other owner or job name is specified in the print data.
- The job owner that is specified in this field is not used as the JES job owner. The JES job owner is always the ID of the user who started the Infoprint Server daemons.

description

This single-valued attribute specifies a description for the printer definition. The description can help users select a printer definition.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

embedded-attributes-prefix

This single-valued attribute specifies the prefix that identifies job attributes that are embedded in the print data. For information about how to embed job attributes in VTAM application print data, see *z/OS Infoprint Server User's Guide*. NetSpool uses the embedded job attributes when it allocates an output data set on the spool.

ISPF field name

Embedded attributes prefix

Allowed values

A 1–12 character string (1–12 bytes of data if specified in hexadecimal format). To enter a hexadecimal value, begin the value with the letter X and enclose the value in single or double quotation marks. For example:

```
embedded-attributes-prefix = "<<ibmjobattr"
```

Default value

None. If you do not specify this attribute, NetSpool does not use job attributes that are specified in the print data.

include-netspool-eof-rules

This single-valued attribute specifies the name of a NetSpool End-of-File component to be included in this printer pool definition. A NetSpool End-of-File component is an object in object-class **netspool-eof-rules**.

ISPF field name

NetSpool end-of-file component

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Be sure to specify the correct uppercase and lowercase letters.

Default value

No NetSpool End-of-File component is included in the printer definition.

Usage guidelines

All attributes that are specified in this component apply to the printer pool definition.

lu-classes

This multi-valued, list attribute identifies 1–64 logical-unit (LU) classes for this NetSpool LU. If you specify more than one class, the NetSpool LU is assigned to all of the specified classes.

ISPF field name

LU classes

Allowed values

A number 1–64. You can specify a list of up to 64 classes. If you specify more than one LU class, separate the LU classes with spaces and enclose the list in braces. For example:

```
lu-classes={1 4 64}
```

Default value

None.

Usage guidelines

- NetSpool requires this attribute.
- When NetSpool starts, it starts LUs according to LU class. Therefore, specify the same LU class for all NetSpool LUs that you want to start at the same time.

luname

This single-valued attribute specifies the logical unit (LU) name that NetSpool uses to identify this printer pool definition. This name must be a unique LU name in the Printer Inventory.

ISPF field name

LU name

Allowed values

A combination of 1–8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase.

Default value

None.

Usage guidelines

- NetSpool requires this attribute to start a session with this printer.

- This name must match the LU name that is specified in the ACBNAME field of the VTAM APPL definition statement.

name

This single-valued attribute specifies the name of the printer pool definition.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Pool Name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value

None.

printer-names

This multi-valued, list attribute specifies the names of one or more printer definitions. The printer definitions must exist in the Printer Inventory. NetSpool creates an output data set on the JES spool for each printer definition.

ISPF field name

Printer definition names

Allowed values

A list of one or more printer definition names. Separate the names with spaces and enclose the list of names with braces. For example:

```
printer-names={name1 name2 name3}
```

Default value

None.

Usage guidelines

- NetSpool requires this attribute.
- NetSpool uses these attributes that are defined for the first printer definition in the list. NetSpool ignores these attributes that are defined in subsequent printer definitions:
  - **netspool-formatting**, **maximum-record-size**, **recfm**
  - **scs-left-margin**, **scs-right-margin**, **scs-top-margin**, **scs-bottom-margin**
  - **scs-maximum-line-length**, **scs-maximum-page-length**
  - **horizontal-tab**, **vertical-tab**

Attributes for the printway-fss object class

The attributes that are valid when you create IP PrintWay FSS definitions are listed here. These attributes are in object class **printway-fss**. FSS definitions do not apply to IP PrintWay extended mode.

Required attributes

All attributes are optional.

concatenation-separators

This single-valued attribute controls when IP PrintWay sends records to the printer that the Begin Data Set exit or the End Data Set exit adds. This attribute applies only when the **dataset-grouping=concatenate-job** attribute is specified in the printer definition.

ISPF field name

None

Allowed values

You can enter one of these fixed values:

document
> IP PrintWay sends the records that the Begin Data Set adds at the beginning of each document in the print job. It sends the records that the End Data Set adds at the end of each document in the print job. This lets the exits add different records for each document in the same print job. For example, the exits might add records that contain different printer commands (such as PCL commands). However, if the exits add text for separator pages, extra separator pages can print before and after each copy of a document.

job
> IP PrintWay sends the records that the Begin Data Set adds at the beginning of the first document in the print job. It sends the records that the End Data Set exit adds at the end of the last document in the print job. If the exit adds text for separator pages, extra separator pages do not print before and after each copy of a document.

Default value

job

Usage guidelines

- Specify `concatenation-separators=document` only if the Begin Data Set exit or the End Data Set exit adds printer commands (such as PCL commands) in records and the exits add different printer commands for different documents within the same print job. You need to recode these exits to specify the same printer commands in the document header and document trailer fields in the ANFUEXTP control block in the Begin Data Set exit so that extra separator pages do not print. For information about how to specify printer commands in the Begin Data Set exit, see *z/OS Infoprint Server Customization*.

- After you recode the Begin Data Set and End Data Set exits to specify printer commands in the document header and document trailer fields in the ANFUEXTP control block, either remove this attribute or specify the **concatenation-separators=job** attribute.

- IP PrintWay extended mode always sends the records that the Begin Data Set exit adds at the beginning of the first document in the print job. It sends the records that the End Data Set exit adds at the end of the last document in the print job. This function is equivalent to the IP PrintWay basic mode function when you specify the **concatenation-separators=job** attribute.

- You cannot use the ISPF panels to specify this attribute. You must use the z/OS UNIX **pidu** command:

  - To create a new IP PrintWay FSS definition and specify this attribute, enter this command:

    ```
    pidu -c "create printway-fss fssname concatenation-separators=document;"
    ```

  - To modify an existing IP PrintWay FSS definition to specify this attribute, enter this command:

    ```
    pidu -c "modify printway-fss fssname concatenation-separators=document;"
    ```

  - To delete this attribute from the FSS definition, enter this command:

```
pidu -c "modify printway-fss fssname concatenation-separators=null;"
```

In these examples, *fssname* is the name of the IP PrintWay FSS as defined to JES. For information about how to specify the name of the IP PrintWay FSS definition, see *z/OS Infoprint Server Customization*.

default-document-codepage

This single-valued attribute specifies the name of a default EBCDIC code page to use as the source code page when IP PrintWay translates data from EBCDIC to ASCII.

ISPF field name

Document code page

Allowed values

A valid code page name. An example of a valid code page is:

```
default-document-codepage = IBM-037
```

Default value

IP PrintWay uses code page IBM-1047.

Usage guidelines

- If the printer definition used to print the job contains a code page in the **document-codepage** attribute, that code page overrides this value.
- For code page names, see *z/OS XL C/C++ Programming Guide*.
- If you change this value, you must restart the FSS to pick up the new value.

description

This single-valued attribute specifies a description for the FSA definition. The description can help you select the FSA definition from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

maximum-hiperspace-blocks

This single-valued attribute specifies the maximum number of 4 KB blocks that each functional subsystem application (FSA) in this FSS can use in hiperspace. The number that you specify can affect system performance and also can limit the size of the data sets the FSA can process.

ISPF field name

Hiperspace blocks

Allowed values

An integer 1–524288.

Default value

Each IP PrintWay FSA uses 8,000 4 KB blocks, which is 32 megabytes.

Usage guidelines

- If a data set requires a larger amount of hiperspace, IP PrintWay records an error and retains the data set on the JES spool if a retention period is specified for failed transmissions in the **failure-retention-period** attribute for the printer definition that is used to process the data set.
- If you change this value, you must restart the FSS to pick up the new value.

name

This single-valued attribute specifies the name of the FSS definition.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

FSS Name

Allowed values

Any combination of 1–8 letters (A-Z), numbers (0-9), and national characters ($ # @). Blank characters are not allowed. The first character cannot be a number. Lowercase letters are converted to uppercase.

Default value

None.

national-language

This single-valued attribute specifies the language that IP PrintWay uses for messages.

ISPF field name

National language

Allowed values

You can enter one of these fixed values:

us-english
   IP PrintWay uses English message table ANFMTENU.

ja-japanese
   IP PrintWay uses Japanese message table ANFMTJPN.

Default value

Each IP PrintWay FSA uses English messages.

Usage guidelines

If you change this value, you must restart the FSS to pick up the new value.

old-style-translation

This single-valued attribute indicates whether IP PrintWay uses the standard TCP/IP translate table to convert data from EBCDIC to ASCII when no code pages or TCP/IP translation tables are specified in the printer definition. For more information, see .

ISPF field name

Old-style translation

Allowed values

You can enter one of these fixed values:

yes
> IP PrintWay uses the standard TCP/IP translate table, STANDARD.TCPXLBIN, to convert data if no code pages and translation tables are specified in the printer definition.

no
> IP PrintWay takes the default action. See .

Default value

IP PrintWay uses code pages and the **iconv** utility to convert data. The source code page is specified in the **default-document-codepage** attribute. The target code page is IBM-850.

Usage guidelines

- IP PrintWay ignores this attribute under either of these conditions:
  - The printer definition specifies a code page in either the **document-codepage** or **printer-codepage** attribute. In this case, IP PrintWay uses the **iconv** utility and the specified code pages to convert data.
  - The printer definition specifies a TCP/IP translation table in the **translation-dataset-qualifier** or **db-translate-table** attributes. In this case, IP PrintWay uses the specified translate table instead.
- If you change this value, you must restart the FSS to pick up the new value.

tcpip-job-name

This single-valued attribute specifies the name of the TCP/IP startup procedure. If you changed the name of the TCP/IP startup procedure, specify the new name in this attribute.

ISPF field name

TCP/IP job name

Allowed values

A valid job name. Lowercase letters are converted to uppercase.

Default value

If you do not specify this attribute, the IP PrintWay FSA uses the name that is specified in TCPIPJOBNAME statement in the *wtcphlq*.TCPIP.DATA data set. If the TCPIPJOBNAME statement is not specified, IP PrintWay uses TCPIP as the name of the TCP/IP startup procedure. For more information, see *z/OS Infoprint Server Customization*.

Usage guidelines

If you change this value, you must restart the FSS to pick up the new value.

trace-mode

This single-valued attribute specifies the type of IP PrintWay tracing for the FSS, and the default tracing mode for all functional subsystem applications (FSAs) in the FSS. Tracing starts when the FSS and FSAs starts. The trace mode that is specified in each FSA definition overrides this tracing mode for that FSA.

ISPF field name

Trace mode

Allowed values

You can enter one of these fixed values:

full
Full internal and external tracing.

internal
Internal tracing only.

no-printing
Internal and external tracing, without tracing of record processing. That is, IP PrintWay does not trace input records and TCP/IP commands.

none
No tracing.

Default value

No tracing.

Usage guidelines

- The internal trace mode can assist IBM in diagnosing problems. IBM suggests that you specify this tracing mode.
- If you specify `full` or `no-printing`, you must start a GTF trace before you start the FSS.
- You can use the MODIFY operator command to stop the trace or to start tracing after an FSS or FSA is started.
- Do not start a full trace during peak processor usage.
- You must restart the FSS to pick up a changed value.

trace-prompt

This single-valued attribute indicates whether the operator is prompted each time the FSS starts. If this option is selected, IP PrintWay sends message ANFM020A to the operator when the FSS starts. Prompting lets the operator start tracing all functional subsystem applications (FSAs) before the FSA starts processing any data sets.

ISPF field name

Trace prompt

Allowed values

You can enter one of these fixed values:

yes
The operator is prompted when the FSS starts.

no
The operator is not prompted.

Default value

The operator is not prompted.

Usage guidelines

If you change this value, you must restart the FSS to pick up the new value.

trace-table-size

This single-valued attribute specifies the number of 4 KB pages of storage to allocate for each internal functional subsystem application (FSA) trace table. The storage for the trace tables is allocated above the 16 MB line.

ISPF field name

Trace table size

Allowed values

An integer 1–999.

Default value

IP PrintWay uses 32 (128 KB) as the trace table size.

Usage guidelines

- Storage is allocated for the tables only when internal tracing is active.
- If you change this value, you must restart the FSS to pick up the new value.

Attributes for the printway-options object class

The attributes that are valid when you create IP PrintWay Options components are listed here. These attributes are in object class **printway-options**. These attributes are also valid for the **printer** object class.

Required attributes

All attributes are optional.

automatic-dataset-grouping

This single-valued attribute indicates whether IP PrintWay extended mode automatically groups data sets that are in the same JES output group. Automatic grouping means that IP PrintWay sends all the data sets to a printer in the same transmission, and sends all the data sets in the same email.

ISPF field name

Automatic dataset grouping

Allowed values

You can enter one of these fixed values:

yes
　　IP PrintWay automatically groups data sets and ignores the **dataset-grouping** attribute.

no
　　IP PrintWay groups data sets according to the value selected in the **dataset-grouping** attribute.

Default value

IP PrintWay groups data sets according to the value selected in the **dataset-grouping** attribute.

Usage guidelines

- IBM suggests specifying this attribute so that data sets print together, with each data set starting on a new sheet of paper. However, some printers do not support this type of transmission and do not start each data set on a new sheet. In this case, either specify a command to force a new sheet in the **Document header** field, or do not specify this attribute.
- This attribute does not apply when you select the IPP protocol. For this protocol, IP PrintWay transmits each data set in a separate transmission.
- IP PrintWay basic mode ignores this attribute.

begin-dataset-exit

This single-valued attribute specifies the name of an IP PrintWay Begin Data Set exit routine. IP PrintWay calls this exit before it processes any records in a data set. In this exit, you can add one or more records to the beginning of the data set and you can change IP PrintWay options.

ISPF field name

Begin dataset exit

Allowed values

The name of your exit routine. You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0-9), and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains national characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For example:

```
begin-dataset-exit = ANFUXBD1
```

Default value

IP PrintWay does not call an exit routine before each data set.

Usage guidelines

The exit routine must be in an APF-authorized library that is identified either in the STEPLIB statement in the IP PrintWay startup procedure (IP PrintWay basic mode), in the STEPLIB environment variable (IP PrintWay extended mode), or in a library concatenated to LNKLST.

backup-printer-definition-name

This single-valued attribute specifies the IP PrintWay printer definition name of the backup printer.

ISPF field name

Backup printer

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - + /). This field is case-sensitive and blanks are not allowed.

Default value

None.

Usage guidelines

- IP PrintWay basic mode ignores this field.
- The name of the backup printer must be an existing IP PrintWay printer definition. List the printer definitions to find a valid backup printer.
- The backup printer uses the same protocol and prints similar jobs as the original printer.
- The job is formatted with the original printer definition, not the backup printer definition.
- The job is sent to the backup printer only after all retransmissions for the current job are unsuccessful.

carriage-control-type

This single-valued attribute indicates the type of carriage control characters in the data sets. Specify this attribute only if you want IP PrintWay to do special processing of carriage control characters.

ISPF field name

Carriage control type

Allowed values

You can enter one of these fixed values:

ansi
Interpret the first character of each record as a carriage control character.

machine
Interpret the first character of each record as a carriage control character.

none
Do not interpret the first character of each record as a carriage control character. Specify this value if you want to print all carriage control characters as data.

Default value

IP PrintWay automatically determines the type of carriage controls in each data set.

Usage guidelines

- Do not specify `ansi` or `machine` when you are printing PostScript data sets.
- IP PrintWay processing is the same for `ansi` and `machine`.
- IP PrintWay ignores this attribute under any of these conditions:
  - The data set was placed on the spool by Print Interface.
  - The **printway-formatting** attribute contains a value other than **standard**.
  - NetSpool converted the data to PCL format.

connection-timeout

This single-valued attribute specifies the maximum number of seconds that IP PrintWay waits for TCP/IP to return an error if it cannot connect to the printer. If the connection timeout value expires before the connection can be established, IP PrintWay attempts to connect to the printer again if retransmissions are requested.

ISPF field name

Connection timeout

Allowed values

An integer 5–180.

Default value

IP PrintWay waits 30 seconds.

Usage guidelines

- The default value of 30 seconds is suitable for most printers.
- Do not set the timeout value too low. PrintWay might not be able to connect to the printer in the specified number of seconds because of network traffic.
- If you run IP PrintWay basic mode, do not set the timeout value too high because the IP PrintWay FSA does not process or print any other data sets while it waits to connect to the printer.
- Specify a higher connection timeout value if the timeout value expires before IP PrintWay can connect to the printer when the printer is turned on. IP PrintWay writes an error message when the connection timeout value expires.
- IP PrintWay ignores this value when **protocol-type=email**.

dataset-grouping

This single-valued attribute indicates how IP PrintWay groups data sets that are in the same JES output group (job) when it sends them to a printer or email destination.

ISPF field name

Dataset grouping

Allowed values

You can enter one of these fixed values:

concatenate-job
 Sends data sets to a printer in the same transmission, and sends data sets as attachments in the same email. Specify this value to make sure that data sets print together. However, some printers might start printing on the back side of the paper. In addition, the correct number of copies might not print. The number of copies that are requested for the first data set in the concatenation applies to all data sets in the concatenation. The number of copies that are requested for the second and subsequent data sets in the concatenation is ignored.

 This value does not apply when **protocol-type=ipp**.

job
 Sends data sets to a printer at the same time but not in the same transmission, and sends data sets in separate emails. Specify this value if you want a high probability that data sets print together, but you want to avoid the printing problems that can occur if you select the **concatenate-job** option. You must specify either **dataset-grouping=concatenate-job** or **automatic-dataset-grouping=yes** (extended mode only) to make sure that data sets print together.

none
 Sends each data set to a printer in a separate transmission as soon as the data set is processed, and sends data sets in separate emails. Specify this value to manage each data set separately on the remote system. This value does not apply to IP PrintWay extended mode, which instead uses the **job** value.

Default value

IP PrintWay sends data sets to a printer at the same time but not in the same transmission, and sends data sets in separate emails (**job** option).

Usage guidelines

- IP PrintWay Extended Mode:

  - The **automatic-dataset-grouping** attribute overrides this attribute.

- – If you specify **dataset-grouping=no** or **dataset-grouping=job** (default), IP PrintWay extended mode sends each email in the output group to the address specified for the first data set in the output group unless the AOP_USE_FIRST_ADDRESS =NO environment variable or the **mail-use-first-address=no** attribute is set. If AOP_MAIL_USE_FIRST_ADDRESS=NO or **mail-use-first-address=no**, IP PrintWay extended mode sends each email to the address or addresses that are specified for the data set in the email header, in a job attribute, or in a JCL parameter.
- The **concatenate-job** value does not apply when you select the IPP protocol.
- This attribute does not apply to data sets that Print Interface and NetSpool allocate on the JES spool because JES assigns each data set to a separate output group. It also does not apply to print jobs that are resubmitted to Print Interface for filtering.
- Data sets in the same JES output group must share values for certain parameters on the OUTPUT JCL statement. Therefore, if users do not specify the same values for certain OUTPUT parameters, JES assigns the output data sets to separate output groups. For information about how JES groups output data sets, see *z/OS JES2 Initialization and Tuning Guide* or *z/OS JES3 Initialization and Tuning Guide*.

delete-form-feed

This single-valued attribute indicates the type of form-feed controls that IP PrintWay is to delete from data sets.

ISPF field name

Delete form feed

Allowed values

You can enter one of these fixed values:

none
Do not delete any form-feed controls.

leading
Delete form-feed controls at the beginning of each data set.

trailing
Delete form-feed controls at the end of each data set.

both
Delete form-feed controls at the beginning and end of each data set.

Default value

IP PrintWay does not delete form feeds.

Usage guidelines

- You use this attribute to remove blank pages that are printed at the beginning or end of data sets.
- IP PrintWay ignores this attribute under any of these conditions:
  - – The data set was placed on the spool by Print Interface.
  - – **printway-formatting=none**.
  - – NetSpool converted the data to PCL format.

description

This single-valued attribute specifies a description for the component. The description can help you select the correct component from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

document-header

This single-valued attribute specifies printer-specific data that IP PrintWay includes at the beginning of the document and sends to the remote printer or print server. For example, you might specify printer commands to change the printer default font.

ISPF field name

Document header

Allowed values

A combination of 1–292 letters, numbers, blanks, and special characters. You can also specify the special values in Table 38 on page 184, which IP PrintWay converts to the indicated EBCDIC hexadecimal values.

Table 52. Special values for EBCDIC		
Value	**Hex (EBCDIC)**	**Meaning**
<FF>	0C	Form feed
<CR>	0D	Carriage return
<LF>	25	Line feed
<ESC>	27	Escape
<SP>	40	Space

If you specify these special values, use EBCDIC representation for the rest of the value and specify `translate-document-header=yes` (default) if the printer accepts ASCII data. If the value contains blanks or special characters, enclose it in single or double quotation marks. For example:

```
document-header="<esc>E<esc>&l10<esc>(s17H"
```

To enter a value in hexadecimal format, prefix the value with the letter x and enclose the value in single quotation marks. For example, this example specifies the same value in ASCII representation, in hexadecimal format. Because the value is in ASCII, also specify `translate-document-header=no` if the printer accepts ASCII data. For example:

```
document-header=x'1B451B266C31301B2873313748'
```

Default value

IP PrintWay does not include any data at the beginning of a document.

document-trailer

This single-valued attribute specifies printer-specific data that IP PrintWay includes at the end of the document and sends to the remote printer or print server. For example, if the **document-header** attribute modifies the printer configuration, you might specify this attribute to restore the default printer configuration.

ISPF field name

Document trailer

Allowed values

A combination of 1–292 letters, numbers, blanks, and special characters. You can also specify the special values in Table 38 on page 184, which IP PrintWay converts to the indicated EBCDIC hexadecimal values.

Table 53. Special values for EBCDIC		
Value	**Hex (EBCDIC)**	**Meaning**
<FF>	0C	Form feed
<CR>	0D	Carriage return
<LF>	25	Line feed
<ESC>	27	Escape
<SP>	40	Space

If you specify these special values, use EBCDIC representation for the rest of the value and specify `translate-document-trailer=yes` (default) if the printer accepts ASCII data. If the value contains blanks or special characters, enclose it in single or double quotation marks.

For example:

```
document-trailer="<esc>E"
```

To enter a value in hexadecimal format, prefix the value with the letter x and enclose the value in single quotation marks. This example specifies the same value in ASCII representation, in hexadecimal format. Because the value is in ASCII, also specify `translate-document-trailer=no` if the printer accepts ASCII data. For example:

```
document-trailer=x'1B45'
```

Default value

IP PrintWay does not include any data at the end of a document.

end-dataset-exit

This single-valued attribute specifies the name of an IP PrintWay End Data Set exit routine. IP PrintWay calls the exit that you specify after it processes all records in a data set. In this exit, you can add one or more records to the end of the data set. You can also inspect IP PrintWay options, but you cannot change them.

ISPF field name

End dataset exit

Allowed values

The name of your exit routine. You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0-9), and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains national characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For example:

```
end-dataset-exit = ANFUXED1
```

Default value

IP PrintWay does not call an exit routine after each data set.

Usage guidelines

The exit routine must be in an APF-authorized library that is identified either in the STEPLIB statement in the IP PrintWay startup procedure (IP PrintWay basic mode), in the STEPLIB environment variable (IP PrintWay extended mode), or in a library concatenated to LNKLST.

failure-retention-period

This single-valued attribute specifies the amount of time IP PrintWay retains data sets on the JES spool after all retransmission attempts to the remote printer or print server failed.

ISPF field name

Retention period: Failure

Allowed values

You can specify the fixed value FOREVER, or a time value in this format: *hhhh*:*mm*:*ss*:

hhhh indicates the hours (0000–9999)
mm indicates the minutes (00–59)
ss indicates the seconds (00–59)
FOREVER means retain data sets forever on the JES spool.

For example:

```
failure-retention-period = 12:15:10   (12 hours, 15 minutes, 10 seconds)
failure-retention-period = 5:12       (5 minutes, 12 seconds)
failure-retention-period = 5          (5 seconds)
failure-retention-period = FOREVER
```

Default value

IP PrintWay does not retain data sets on the JES spool.

Usage guidelines

- The job submitter can override this value.
- If you run IP PrintWay basic mode, specify as short a retention time as possible because a system abend (abend code 878) can occur when an IP PrintWay FSS retains a high number of data sets on the JES spool.
- If you run IP PrintWay extended mode and specify either **page-accounting=yes** or **page-restart=yes**, IP PrintWay retains the data set if it does not finish printing successfully.

form-feed

This single-valued attribute specifies the form-feed controls that the printer or print server requires. When it converts line data to text format, IP PrintWay extended mode adds the form-feed controls to the data stream to indicate the start of a new page.

ISPF field name

Form feed

Allowed values

A 1–4 character string (2–8 characters if specified in hexadecimal format) that is the EBCDIC representation of the controls. To enter a hexadecimal value, begin the value with the letter X and enclose the value in single quotation marks.

If you also specify the **delete-form-feed** attribute, specify only these hexadecimal values:

- X'0C' (form-feed control)
- X'0D' (carriage-return control)
- X'25' (line-feed control) or X'15' (new-line control)
- X'40' (blank)

If you specify a different value, IP PrintWay might not delete all leading or trailing form-feed controls.

This example specifies the form-feed control:

```
form-feed=X'0C'
```

Default value

X'0D0C' (carriage-return and form-feed controls)

Usage guidelines

- IP PrintWay basic mode ignores this field.
- IP PrintWay extended mode converts the form-feed controls to the printer code page, typically an ASCII code page.

line-termination

This single-valued attribute specifies the end-of-line controls required by the printer. IP PrintWay translates the controls to ASCII, if necessary, and adds them to the end of each line.

ISPF field name

Line termination

Allowed values

A 1–4 character string (2–8 characters if specified in hexadecimal format) that is the EBCDIC representation of the end-of-line control that IP PrintWay adds at the end of a line. To enter a hexadecimal value, begin the value with the letter X and enclose the value in single quotation marks.

This example specifies the carriage-return (CR) and line-feed controls:

```
line-termination=X'0D25'
```

This example specifies a PIDU create command that contains the line-termination attribute:

```
pidu -c "create printer lp2 line-termination=X'0D25';"
```

Default value

IP PrintWay basic mode: LPR, direct sockets, IPP, and email protocols: X'25' (line-feed)

IP PrintWay extended mode:

- LPR (with an ASCII printer code page), direct sockets, IPP, and email protocols: X'0D15' (carriage-return and new-line)
- LPR protocol (with an EBCDIC printer code page): X'0D25' (carriage-return and line-feed)

Usage guidelines

- IP PrintWay extended mode: If you specify printer code page ISO8859-1 (`printer-codepage=ISO8859-1`), omit the **line-termination** attribute so that IP PrintWay uses the default value. However, if you need to specify a line-termination value of X'25' or X'0D25', also specify an ASCII printer code page that translates EBCDIC X'25' to ASCII X'0A', such as IBM-850.
- IP PrintWay basic mode: Consider specifying a line-termination value of X'0D25'. This value is more suitable for many ASCII printers than the IP PrintWay default line-termination control of X'25'.
- IP PrintWay basic mode ignores this attribute under any of these conditions:
  - Print Interface allocated the data set on the JES spool.
  - **printway-formatting=none**.
  - NetSpool converted the data to PCL format.

name

This single-valued attribute specifies the name of the component.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Component Name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value

None.

omit-line-termination-at-eof

This single-valued attribute indicates whether IP PrintWay is to omit the LF (line feed) control (or other control that is specified in the **line-termination** attribute) at the end of each document.

ISPF field name

Omit line termination at EOF

Allowed values

You can enter one of these fixed values:

yes
  IP PrintWay omits the line termination control at the end of each document.

no
  IP PrintWay includes the line termination control at the end of each document.

Default value

IP PrintWay includes the line termination control at the end of each document.

Usage guidelines

- Specify yes if a line termination control at the end of a document causes printing problems. For example, printing problems can occur when applications add transparent data to the end of data.
- Specify no (default) if your printer requires a line termination control at the end of the document to print data in the next document correctly.
- IP PrintWay ignores this attribute under any of these conditions:
  - The data set was placed on the spool by Print Interface.
  - **`printway-formatting=none`**.
  - **`protocol-type=email`**.
  - **`protocol-type=ipp`**.
  - NetSpool converted the data to PCL format.

printway-formatting

This single-valued attribute specifies the type of translation and formatting that IP PrintWay basic mode does before it transmits data sets to the remote system.

ISPF field name

Formatting

Allowed values

You can enter one of these fixed values:

none
> IP PrintWay does not translate or format data. Select this value to print binary data, such as AFP or PCL data.

standard
> IP PrintWay translates data to ASCII or EBCDIC, adds line-termination controls, and formats data into pages.

translate-only
> IP PrintWay translates data to ASCII or EBCDIC and adds line-termination controls. However, it does not format data into pages.

use-fcb
> IP PrintWay takes the same action as for **`standard`** except that if an FCB is specified for the data set or as a JES default, IP PrintWay formats with the FCB.

Default value

IP PrintWay does standard processing except under the conditions that are described in .

Usage guidelines

- This attribute does not apply to IP PrintWay extended mode.
- Under these conditions, IP PrintWay uses the none value and ignores any other values:
  - **`to-remote-psf=yes`**.
  - NetSpool converted the data to PCL format.
  - Print Interface processed the data set.

printway-postscript

This single-valued attribute specifies the type of PostScript header that IP PrintWay basic mode adds to the beginning of each data set.

ISPF field name

Formatting

Allowed values

You can enter one of these fixed values:

add-header
> IP PrintWay adds PostScript header %!

always-landscape
> IP PrintWay takes the same action as for **landscape**. However, IP PrintWay also adds the landscape header to data sets that already have a PostScript header.

landscape
> IP PrintWay adds a PostScript header for printing in the landscape direction (lines parallel to the long edge of the paper) to data sets that do not already have PostScript headers.

ignore-header
> IP PrintWay ignores the PostScript header on data sets and processes all data sets as non-PostScript data sets.

Default value

IP PrintWay does not add PostScript headers. However, IP PrintWay processes data sets that already contain a PostScript header (%!) as PostScript data sets.

Usage guidelines

- This attribute does not apply to IP PrintWay extended mode.
- If you specify `landscape` or `always-landscape`, also specify `printway-formatting=standard` (default).
- If you specify add, IP PrintWay ignores the **printway-formatting** attribute.
- Do not specify `landscape` if any data sets already have PostScript headers.
- IP PrintWay ignores this attribute under any of these conditions:

  - The data set was placed on the spool by Print Interface.
  - **printway-formatting=none**.
  - NetSpool converted the data to PCL format.

- If **protocol-type=email**, do not specify this attribute.

record-exit

This single-valued attribute specifies the name of the IP PrintWay Record exit routine. IP PrintWay calls this exit for each record in a data set. In a Record exit you can add one or more records, replace a record, or delete a record. You can also inspect IP PrintWay options, but you cannot change them.

ISPF field name

Record exit

Allowed values

The name of your exit routine. You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0-9), and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains national characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For example:

```
record-exit = ANFUXRC1
```

Default value

IP PrintWay does not call an exit routine for each record in a data set.

Usage guidelines

The exit routine must be in an APF-authorized library that is identified either in the STEPLIB statement in the IP PrintWay startup procedure (IP PrintWay basic mode), in the STEPLIB environment variable (IP PrintWay extended mode), or in a library concatenated to LNKLST.

response-timeout

This single-valued attribute specifies the number of seconds that IP PrintWay waits for a response from the remote printer or print server before it reports an error. After an error occurs, IP PrintWay attempts to send the data again if retransmissions are requested.

ISPF field name

Response timeout

Allowed values

An integer 0–2678400.

Default value

IP PrintWay waits 600 seconds (10 minutes) for a response.

Usage guidelines

- Do not set the response timeout value too low, especially if you print large documents on printers that have small buffers or that print slowly. For example, a response timeout value of 30 seconds might cause IP PrintWay to try the transmission again before the printer finished printing its buffer.

- A high response timeout value gives an operator more time to correct a problem before IP PrintWay resends data to the printer (if retries are requested) or fails the print job. For example, you might want to specify a response timeout value of 3 days if your printers are unattended over a long weekend.

- IP PrintWay extended mode: If you select one of the PJL options in the printer definition (see "Tracking the number of printed pages (extended mode)" on page 172), most printers respond only after the printer finished printing the document. Therefore, the response timeout value needs to be long enough to allow the largest documents to finish printing.

- IP PrintWay extended mode: A high response timeout value does not affect printing to other printers. However, if you specify a high response timeout value for many printers, IP PrintWay can exceed the maximum number of MVS tasks that IP PrintWay extended mode (**aopoutd** daemon) can have active at one time. This can happen if IP PrintWay waits for responses from many printers at the same time.

  If you see the following message, which indicates that you are close to exceeding the maximum number of MVS tasks, ask your system administrator to increase the maximum number of MVS tasks in the AOPOUTD_MAXTHREADTASKS environment variable or **aopoutd-max-thread-tasks** configuration attribute. For example, you might increase the number to 250.

  ```
  BPXI040I PROCESS LIMIT MAXTHREADTASKS HAS REACHED 85% OF ITS CURRENT CAPACITY
           OF 200 FOR PID=nnnnnn IN JOB AOPOUTD.
  ```

  For information about AOPOUTD_MAXTHREADTASKS and **aopoutd-max-thread-tasks**, see *z/OS Infoprint Server Customization*.

- IP PrintWay basic mode: If you want to specify a high response timeout value, ask your system administrator to define an IP PrintWay FSA to JES that selects print jobs for this one printer only. If an IP PrintWay FSA selects print jobs for several printers, when one printer with a high response timeout value does not respond for a long time, printing to the other printers can be delayed until the operator corrects the problem and the printer becomes ready.

- Email protocol: IP PrintWay ignores this field.

retry-limit

This single-valued attribute specifies the number of times that IP PrintWay tries an unsuccessful transmission again.

ISPF field name

Retry limit

Allowed values

An integer 0–32767.

Default value

IP PrintWay does not try the transmission again.

Usage guidelines

- For information about how the **retry-time** and **retry-limit** attributes work together, see "Handling unsuccessful data transmissions (basic and extended mode)" on page 165.
- When **protocol-type=email**, do not specify the **retry-limit** and **retry-time** attributes.

retry-time

This single-valued attribute specifies the amount of time IP PrintWay waits between a retransmission. For example, when the retry time is 1 minute, IP PrintWay retransmits every minute, up to the number of times in the **retry-limit** attribute.

ISPF field name

Retry time

Allowed values

A value in this time format: *hhhh*:*mm*:*ss*:

hhhh indicates hours (0000–9999)
mm indicates minutes (00–59)
ss indicates seconds (00–59)

For example:

```
retry-time = 1:00:00        (1 hour, 0 minutes, 0 seconds)
retry-time = 5:30           (5 minutes, 30 seconds)
retry-time = 5             (5 seconds)
```

Default value

IP PrintWay does not wait between retransmissions.

Usage guidelines

- For information about how the **retry-time** and **retry-limit** attributes work together, see "Handling unsuccessful data transmissions (basic and extended mode)" on page 165.
- When **protocol-type=email**, do not specify the **retry-limit** and **retry-time** attributes.

successful-retention-period

This single-valued attribute specifies the amount of time IP PrintWay retains data sets on the JES spool after successful transmission.

ISPF field name

Retention period: Successful

Allowed values

You can specify the fixed value FOREVER, or a time value in this format: *hhhh*:*mm*:*ss*:

hhhh indicates the hours (0000–9999)
mm indicates the minutes (00–59)
ss indicates the seconds (00–59)
FOREVER means retain data sets forever on the JES spool.

For example:

```
successful-retention-period = 12:15:10   (12 hours, 15 minutes, 10 seconds)
successful-retention-period = 5:12       (5 minutes, 12 seconds)
successful-retention-period = 5          (5 seconds)
successful-retention-period = FOREVER
```

Default value

IP PrintWay does not retain data sets on the JES spool.

Usage guidelines

- The job submitter can override this value.
- If you run IP PrintWay basic mode, do not retain successful data sets because a system abend (abend code 878) can occur when an FSS retains a high number of data sets on the JES spool.
- If you run IP PrintWay extended mode and specify either **page-accounting=yes** or **page-restart=yes**, IP PrintWay makes sure that the data set printed successfully before the transmission is considered successful.
- If **protocol-type=email**, the transmission is considered successful when the sendmail bridge accepts the email request. The transmission to remote recipients might fail later.

translate-document-header

This single-valued attribute indicates whether IP PrintWay must translate the string in the **document-header** attribute to the code page required by the printer before it sends it to the remote printer or print server.

ISPF field name

Translate document header

Allowed values

You can enter one of these fixed values:

yes
> IP PrintWay translates the document header to the code page required by the printer. Select this value if, for example, you specify a document header in EBCDIC representation and the printer accepts ASCII data.

no
> IP PrintWay does not translate the document header.

Default value

IP PrintWay translates the string to the code page required by the printer.

translate-document-trailer

This single-valued attribute indicates whether IP PrintWay must translate the string in the **document-trailer** attribute to the code page required by the printer before it sends it to the remote printer or print server.

ISPF field name

Translate document trailer

Allowed values

You can enter one of these fixed values:

yes
> IP PrintWay translates the document trailer to the code page required by the printer. Select this value if, for example, you specify a document trailer in EBCDIC representation and the printer accepts ASCII data.

no
> IP PrintWay translates the document trailer to the code page required by the printer.

Default value

IP PrintWay translates the string to the code page required by the printer.

transparent-data-character

This single-valued attribute specifies the character that designates transparent data in the input or output data stream.

ISPF field name

Transparent data char

Allowed values

A 1-character string (1 - 2 characters if specified in hexadecimal format). To enter a hexadecimal value, begin the value with the letter x and enclose the value in single quotation marks.

This example specifies the transparent data character:

```
transparent-data-character=X'FB'
```

This example specifies a PIDU create command that contains the transparent-data-character attribute:

```
pidu -c "create printer lp2 transparent-data-character=X'FB';"
```

Default value

IP PrintWay uses X'35' as the transparent data character.

Usage guidelines

- This character designates transparent data in the input data stream. IP PrintWay removes transparent data controls and does not translate the transparent data that follows the controls to ASCII.
- IP PrintWay ignores this attribute under any of these conditions:
  - The data set was placed on the spool by Print Interface.

– **printway-formatting=none**.
– NetSpool converted the data to PCL format.

Attributes for the processing object class

The attributes that are valid when you create Processing components are listed here. These attributes are in object class **processing**. These attributes are also valid for the **printer** object class.

Required attributes

No attributes are required. However, you might need to specify the **printer-codepage** attribute for some data formats to print correctly.

db-translate-table

This single-valued attribute specifies the name of the translation table IP PrintWay basic mode uses to convert double-byte character set (DBCS) data from EBCDIC to ASCII.

ISPF field name

Double-byte translate table

Allowed values

You can enter one of these fixed values, depending on the language:

Language
    Allowed values

Chinese
    big5, schinese, tchinese

Japanese
    euckanji, ibmkanji, jis78kj-ascii, jis78kj-jisroman, jis83kj-ascii, jis83kj-jisroman, sjiskanji

Korean
    hangeul, ksc5601

Default value

IP PrintWay uses code pages to convert data to ASCII.

Usage guidelines

- This attribute does not apply to IP PrintWay extended mode.
- If either **document-codepage** or **printer-codepage** is specified, IP PrintWay uses the code pages to convert data and ignores this attribute.
- IP PrintWay transmits the data without converting it to ASCII when the value is `ibmkanji`.
- The binary table data sets that the translation tables come from are:

  – TCPCHBIN (big5, tchinese)
  – TCPHGBIN (hangeul, ksc5601)
  – TCPKJBIN (euckanji, jis78kj, jis83kj, sjiskanji)
  – TCPSCBIN (schinese)

- For `jis78kj` and `jis83kj`, IP PrintWay uses these shift-in escape sequences and ignores the value in the **printway-sosi-mode** attribute: `ascii: ESC(B jisroman: ESC(J`
- IP PrintWay ignores this attribute when **protocol-type=email**.

description

This single-valued attribute specifies a description for the component. The description can help you select the correct component from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

document-codepage

This single-valued attribute specifies the code page that is used to create documents that are submitted to this printer definition. Infoprint Server uses this code page as the source when it converts documents from ASCII to EBCDIC or from EBCDIC to ASCII.

ISPF field name

Document code page

Allowed values

A valid code page name. For example:

```
document-codepage = ISO8859-1
```

Default value

Print Interface determines the default. If the print request was submitted from:

- The local z/OS system, Print Interface uses the code page for the z/OS locale, usually an EBCDIC code page.
- A remote system, Print Interface uses the ASCII code page that is specified in the system configuration definition. If none is specified, it uses code page ISO8859-1.

NetSpool uses the EBCDIC code page that is specified in the system configuration definition. If not is specified, NetSpool uses code page IBM-1047.

IP PrintWay:

- Basic mode uses the code page in the **default-document-codepage** attribute in the **printway-fss** object class or, if not specified, code page IBM-1047.
- Extended mode uses the EBCDIC code page that is specified in the system configuration definition. If not is specified, it uses code page IBM-1047.

Usage guidelines

- In most cases, the default value is suitable. One exception is when you need to print ASCII documents that are submitted with the **lp** command. In this case, specify an ASCII code page either in this attribute or on the **lp** command.
- For code page names, see *z/OS XL C/C++ Programming Guide*.
- If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:

- The code pages in the **document-codepage** and **printer-codepage** attributes.
- The code page for the z/OS locale and the custom code page.

For information about how to create conversion tables, see information about code set conversion utilities in *z/OS XL C/C++ Programming Guide*.

- IP PrintWay basic mode: If **document-codepage** or **printer-codepage** is not specified and **old-style-translation=yes**, IP PrintWay basic mode uses the standard TCP/IP translation table.
- NetSpool converts data between code pages only if **netspool-formatting=convert-to-pcl** in the **netspool-options** object class. Otherwise, NetSpool ignores this attribute.

document-formats-supported

This multi-valued, list attribute indicates which data formats a printer supports. Print Interface, NetSpool, and IP PrintWay extended mode reject a print job with a data format that is not supported.

ISPF field name

Data format

Allowed values

Enter one or more of these fixed values:

jpeg
Joint Photographic Experts Group file format (JFIF).

line-data
Character data. Data is stored in records and can have carriage-control and table-reference characters.

modca-p
Mixed Object Document Content Architecture for Presentation.

pcl
Hewlett Packard Printer Control Language.

pdf
Adobe Portable Document Format.

postscript
Adobe PostScript.

sap
SAP output text format (OTF) or ABAP format.

text
Character data. Data can contain LF, CR, HT, VT, and FF control characters only.

tiff
Tagged image file format.

xml
Extensible Markup Language, which includes Extensible Stylesheet Language formatting objects (XSL-FO).

other
All data formats that are not one of the other types, such as the Xerox data format.

For example:

```
document-formats-supported = {line-data modca-p text};
```

Default value

Print Interface, NetSpool, and IP PrintWay extended mode accept all data formats in the print request.

Usage guidelines

In a PSF printer definition, specify `line-data`, `modca-p`, and `text`.You can also specify other data formats in this attribute. For example, if your installation uses a PCL to AFP transform, also specify `pcl` in this attribute.

duplexes-supported

This multi-valued, list attribute indicates whether the printer can print on one or two sides of the paper. Print Interface, NetSpool, and IP PrintWay extended mode reject a print job that requests an option in the **duplex** job attribute or the DUPLEX parameter of the OUTPUT JCL statement that the printer does not support.

ISPF field name

Duplexes supported

Allowed values

Enter one or more of these fixed values:

no
> The printer can print on one side of the paper.

yes
> The printer can print on both sides of the paper so the top edge of side 1 is the top edge of side 2.

tumble
> The printer can print on both sides of the paper but tumbles the print so the top edge of side 1 is the bottom edge of side 2.

The printer in this example can print on one or two sides of the paper but cannot tumble the output:

```
duplexes-supported = {no yes};
```

Default value

If this attribute is not specified, Print Interface, NetSpool, and IP PrintWay extended mode accept all values in the **duplex** job attribute.

Usage guidelines

This attribute does not apply to duplexing requested in a form definition.

fail-on-transform-error

This single-valued attribute indicates whether transforms fail when data stream errors or warnings occur. Warnings can indicate degraded output.

ISPF field name

Fail on error

Allowed values

Enter one of these fixed values:

error
> The transform fails when an error occurs and does not create an output document. However, the transform continues if warnings occur.

no
> The transform continues processing when a warning or error occurs and creates an output document.

warning
> The transform fails when a warning or error occurs and does not create an output document.

Default value

1. The value in the AOP_FAIL_ON_ERROR environment variable for the transform class.
2. no

Usage guidelines

For information about whether a transform supports this attribute, see the documentation for the transform.

filters

This multi-valued, value-map attribute associates data formats with a filter program for the data format. Print Interface and NetSpool invoke the specified filter before they write data to the output data set. IP PrintWay extended mode invokes the specified filter before it sends data to the printer. To filter batch jobs that are submitted directly to IP PrintWay basic mode, specify the **resubmit-for-filtering** attribute.

ISPF field name

Filters

Allowed values

One or more value pairs in the format: *dataformat -> filterpath* [*options*]:

dataformat
> Specifies the format of the input data. Enter one of these fixed values:

> **jpeg**
>> Joint Photographic Experts Group file format (JFIF).

> **line-data**
>> Bytes map to characters. Data is stored in records with carriage-control and table-reference characters.

> **modca-p**
>> Mixed Object Document Content Architecture for Presentation.

> **pcl**
>> Hewlett Packard Printer Control Language.

> **pdf**
>> Adobe Portable Document Format.

> **postscript**
>> Adobe PostScript.

> **sap**
>> SAP output text format (OTF) or ABAP format.

> **text**
>> Bytes map to characters. Only contains LF, CR, HT, VT, and FF control characters.

> **tiff**
>> Tagged image file format.

> **xml**
>> Extensible Markup Language, which includes Extensible Stylesheet Language formatting objects (XSL-FO).

> **other**
>> All data formats that are not one of the other types, such as the Xerox data format.

filterpath [options]
> Specifies the path name of the filter, followed by filter options. For information about:

- Filter **aopfiltr.so**, see "Using the aopfiltr.so filter" on page 88.
- Filter **lpd_compat.so**, see "Using the LPD compatibility filter" on page 89.
- Filters **aoprxf.so**, **aoprform.dll**, see Chapter 13, "Planning printer definitions for transforms," on page 203.
- Filters that transform products provide, see the documentation for the transform product.

Rules:

1. Specify the full path name unless the filter is in a directory that is named either in the LIBPATH (for DLL filters) or PATH (for UNIX filters) environment variable that is specified in the **aopstart** EXEC and in the /etc/profile file.
2. For a UNIX filter, type spawn before the path name.
3. If the path name contains special characters (such as /), or if you specify filter options, enclose the path name and options in single or double quotation marks.

You can specify one or more value pairs. Enclose the value pairs with braces. Some examples are:

```
filters = {text -> aopfiltr.so}
filters = {pcl -> "pcl2afp.dll %filter-options" pdf -> "ps2afp.dll %filter-options"}
filters = (text -> "spawn /usr/mylib/mfilter myoption1 myoption2")
```

Default value

Infoprint Server does not use any filter.

forms-supported

This multi-valued, list attribute specifies the names of the forms the printer supports. Print Interface and NetSpool reject a print job that requests a forms name in the **forms** attribute that the printer does not support.

ISPF field name

Forms supported

Allowed values

Any combination of 1–8 letters (a-z, A-Z), numbers (0-9), and special characters (# $ @). Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase. If you specify more than one forms name, separate the forms names with spaces and enclose the list in braces. For example:

```
forms-supported = {STANDARD FORM0001}
```

Default value

Print Interface and NetSpool accept any forms name in the **forms** job attribute.

Usage guidelines

If forms is a JES work-selection criterion, specify the same form names that are defined to JES.

input-tray-map

This **multi-valued**, **value-map** attribute associates input tray names with input tray numbers. Infoprint Server can reject a print job that requests an input tray in the **input-tray** job attribute that the printer does not support.

ISPF field name

Input tray name

Allowed values

One or more value pairs in the format: *name -> number*:

name
> A name that can be used by a job submitter in the **input-tray** job attribute. Specify 1–16 letters, numbers, and special characters (such as # $ @ -). If the value contains blanks or special characters, enclose the value in single or double quotation marks.

number
> An integer 1–255 that identifies the paper source. To determine the tray numbers for your printer, see the printer documentation. These names are typically assigned to these numbers:

> **Name**
> > **Number**

> **Alternate or Top**
> > 1

> **Bottom**
> > 2

> **Envelope**
> > 65

> **Manual**
> > 100

Enclose the values with braces. For example:

```
input-tray-map = {top -> 1 bottom -> 2}
```

Default value

No tray names are associated with numbers. If a job submitter specifies the **input-tray** job attribute, it is ignored.

maximum-copies

This single-valued attribute specifies the maximum number of copies that Infoprint Server allows to be printed.

ISPF field name

Maximum copies

Allowed values

An integer 1–32640.

Default value

No limit to the number of copies.

Usage guidelines

- The number of copies that are specified in a form definition or on a TCP/IP command, such as the LPR command, are not included in this value.
- IP PrintWay ignores this attribute when **protocol-type=email** because only one copy is sent to the email destination.

maximum-document-size

This single-valued attribute specifies the maximum number of bytes that Infoprint Server allows for all documents in a print job (output group), including copies for IP PrintWay basic mode. You can use this attribute to limit the size of documents that users can send to a printer.

ISPF field name

Maximum document size

Allowed values

An integer 1–2147483646. Omit this attribute if you want no size limit.

Default value

Infoprint Server does not limit the size of print jobs.

name

This single-valued attribute specifies the name of the component.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Component Name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blank characters are not allowed.

Default value

None.

output-bin-map

This multi-valued, value-map attribute associates output bin names with output bin numbers. Infoprint Server can reject print jobs that request an output bin in the **output-bin** job attribute that the printer does not support.

ISPF field name

Output bin name

Allowed values

One or more value pairs in the format: *name -> number*:

name
    A name that can be used by a job submitter in the **output-bin** job attribute. Specify 1–16 letters, numbers, and special characters (such as # $ @ -). If the value contains blanks or special characters, enclose the value in single or double quotation marks.

number
    An integer 1–65535 that identifies the output bin on the printer. To determine the bin numbers for your printer, see the printer documentation.

Enclose the values with braces. For example:

```
output-bin-map = {bottom -> 1 side -> 2}
```

Default value

No bin names are associated with numbers. If a job submitter specifies the **output-bin** job attribute, it is ignored.

pcl-line-density

This single-valued attribute specifies the number of lines per inch to be printed on a page when NetSpool converts SNA character string (SCS) and 3270 data streams to PCL data streams. NetSpool uses this value only when the SCS data stream does not specify the line density. NetSpool always uses this value for 3270 data streams.

ISPF field name

NetSpool PCL Conversion: Line density

Allowed values

An integer 1–72.

Default value

The PCL Line Spacing or Vertical Motion Index command that is specified in the **document-header** attribute is used. If these commands are not specified, the line density set on the printer's control panel is used.

Usage guidelines

- NetSpool uses this attribute only when **netspool-formatting=convert-to-pcl**. Otherwise, this attribute is ignored.
- If **scs-automatic-page-orientation=yes**, you must specify a value in this attribute.

pcl-orientation

This single-valued attribute specifies the orientation of each page when NetSpool converts SNA character string (SCS) and 3270 data streams to PCL data streams.

ISPF field name

NetSpool PCL Conversion: Orientation

Allowed values

You can enter one of these fixed values:

landscape
Lines print parallel to the paper's long edge.

none
NetSpool does not specify a page orientation in the PCL data stream. The PCL Logical Page Orientation command that is specified in the **document-header** attribute or, if not specified, the orientation set on the printer's control panel is used.

portrait
Lines print parallel to the paper's short edge.

Default value

NetSpool does not specify a page orientation in the PCL data stream. The PCL Logical Page Orientation command that is specified in the **document-header** attribute is used. If this command is not specified, the orientation set at the printer's control panel is used.

Usage guidelines

- NetSpool uses this attribute only when **netspool-formatting=convert-to-pcl**. Otherwise, this attribute is ignored.
- If **scs-automatic-page-orientation=yes**, NetSpool can override the value in this attribute and change the orientation of a page.

pcl-print-density

This single-valued attribute specifies the number of characters per inch to be printed on a line when NetSpool converts SNA character string (SCS) and 3270 data streams to PCL data streams. NetSpool uses this value only when the SCS data stream does not specify the print density. NetSpool always uses this value for 3270 data streams.

ISPF field name

NetSpool PCL Conversion: Print density

Allowed values

An integer 1–255.

Default value

The PCL Pitch or Horizontal Motion Index command that is specified in the **document-header** attribute is used. If these PCL commands are not specified, the print density set on the printer's control panel is used.

Usage guidelines

- NetSpool uses this attribute only when **netspool-formatting=convert-to-pcl**. Otherwise, this attribute is ignored.
- If **scs-automatic-page-orientation=yes**, you must specify a value in this attribute.

pdf-encryption-level

This single-valued attribute specifies the level of encryption that is used to encrypt PDF documents. A high level of encryption provides enhanced security. However, some users might not be able to open PDF documents that use a high level of encryption.

ISPF field name

Encryption level

Allowed values

You can enter one of these fixed values:

bits40
> A low level of encryption (a 40-bit encryption key) is used. Select this value if you email PDF documents to countries that do not use 128-bit encryption, or for users with Adobe Acrobat Reader 3.0–4.x.

bits128
> A high level of encryption (a 128-bit encryption key) is used. Select this value for sensitive PDF documents.

AES128
> Advanced Encryption Standard (AES) 128-bit encryption is used. Select this value for sensitive PDF documents.

AES256
> AES 256-bit encryption is used. Select this value for sensitive PDF documents.

Notes:

1. AES is a modern block cipher that is documented in the FIPS-197 publication.
2. AES encrption requires Integrated Cryptographic Service Facility (ICSF) to be installed and active at the time of use.

Default value

bits128

Usage guidelines

- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The job submitter can override this value.

pdf-owner-identifier

This single-valued attribute specifies the identifier of the owner of an encrypted PDF document. The owner identifier is associated with a password that is stored in a separate database. An owner password is required to restrict actions with the **pdf-protect** attribute.

ISPF field name

Owner identifier

Allowed values

You can enter a text string of 1–256 characters. You can enter any combination of letters, numbers, blanks, and special characters that the AFP to PDF transform's Password exit allows. This text string might be case-sensitive, depending on the Password exit. If the text string you specify contains blanks or special characters (such as @ $ & ( ) > < | ' " #), enclose the text string in single or double quotation marks. For example:

```
pdf-owner-identifier='Nurse-Lee@hospital.com'
```

If the string contains double quotation marks, enclose the string in single quotation marks.

Default value

None.

Usage guidelines

- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The transform encrypts a PDF document when you specify a user identifier, an owner identifier, or both. Encrypting a PDF document protects it from unauthorized access.
- In most cases, the user and owner identifiers need to be different because the user and owner passwords must be different.
- The job submitter can override this value.

pdf-protect

This multi-valued attribute specifies one or more actions that users cannot do on encrypted PDF documents.

ISPF field name

Protected actions

Allowed values

You can enter one or more fixed values to restrict actions. If you specify more than one value, separate the values with spaces and enclose the list of values in braces {}. For example:

```
-j "pdf-protect=all"
-j "pdf-protect={copy update}"
```

Value:	Actions users cannot do:
all	• All actions (copy, print, update)
copy	• Copy or extract content to another document • Extract content for accessibility
print	• Print at low resolution (150 dpi) • Print at high resolution
update	• Change the document • Assemble the document (insert, delete, rotate pages) • Add comments • Complete form fields or sign • Create template pages

Default value

No actions are protected.

Usage guidelines

- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The job submitter can override this value.

pdf-user-identifier

This single-valued attribute specifies the identifier of the user of an encrypted PDF document. The user identifier is associated with a password that is stored in a separate database. The user enters the user password when opening the encrypted PDF document.

ISPF field name

User identifier

Allowed values

You can enter a text string of 1–256 characters. You can enter any combination of letters, numbers, blanks, and special characters that the AFP to PDF transform's Password exit allows. This text string might be case-sensitive, depending on the Password exit. If the text string you specify contains blanks or special characters (such as @ $ & ( ) > < | ' " #), enclose the text string in single or double quotation marks. For example:

```
pdf-user-identifier='Dr-Smith@hospital.com'
```

If the string contains double quotation marks, enclose the string in single quotation marks.

Default value

None. Any user can open the PDF document without a password.

Usage guidelines

- IBM AFP to PDF transforms support this attribute. For information, see the documentation for the transform.
- The transform encrypts a PDF document when you specify a user identifier, an owner identifier, or both. Encrypting a PDF document protects it from unauthorized access.
- In most cases, the user and owner identifiers need to be different because the user and owner passwords must be different.
- The job submitter can override this value.

print-error-reporting-supported

This multi-valued, list attribute specifies the types of errors a printer can report. Print Interface and NetSpool reject print jobs that request error reporting in the **print-error-reporting** attribute that the printer does not support.

ISPF field name

Print-error reporting supported

Allowed values

Enter one or more of these fixed values:

all
   The printer can report both print-positioning and invalid-character errors.

character
   The printer can report invalid-character errors and suppress reporting of print-positioning errors.

none
   The printer can suppress reporting of both print-positioning and invalid-character errors.

position
   The printer can report print-positioning errors and suppress reporting of print-positioning errors.

If you specify more than one value, separate the values with spaces and enclose the list in braces. For example:

```
print-error-reporting-supported = {none character}
```

Default value

Print Interface and NetSpool accept all values in the **print-error-reporting** job attribute.

print-page-header

This single-valued attribute indicates whether IP PrintWay adds a header at the top of each page when formatting data into pages. The header prints on three lines at the top of each page.

ISPF field name

Print page header

Allowed values

You can enter one of these fixed values:

yes
   IP PrintWay adds a header.

no

> IP PrintWay does not add a header.

Default value

IP PrintWay adds a page header.

Usage guidelines

- IP PrintWay ignores this attribute under any of these conditions:
  - The data set contains carriage control characters. IP PrintWay always uses the carriage control characters to format pages and does not add a page header.
  - Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
  - Print Interface converted the line data into text data.
  - The data set contains a PostScript header.
  - **printway-pagination=suppress**.
  - **printway-formatting=none** or **printway-formatting=translate-only**.
- If **protocol-type=email**, specify `print-page-header=no` if you do not want a header added to the email text.

printer-codepage

This single-valued attribute specifies the code page that is used by the printer. Infoprint Server uses this code page as the target when it converts line and text data between ASCII and EBCDIC.

ISPF field name

Printer code page

Allowed values

A valid code page name. Examples of valid code pages are:

```
printer-codepage = ISO8859-1
printer-codepage = IBM-500
```

Default value

If this attribute is not specified, the default action and code page differs for each component of Infoprint Server:

- Print Interface does not convert data between code pages.
- NetSpool uses the IBM-850 (ASCII) code page.
- IP PrintWay basic mode:
  - Email protocol: IP PrintWay does not convert data between code pages.
  - LPR, direct sockets, or IPP protocol: IP PrintWay uses the IBM-850 (ASCII) code page.
- IP PrintWay extended mode:
  - Email protocol: IP PrintWay uses the IBM-1047 (EBCDIC) code page.
  - LPR, direct sockets, or IPP protocol: IP PrintWay uses the IBM-850 (ASCII) code page.

Usage guidelines

- If Print Interface uses this printer definition, you must specify this attribute. If you do not specify a code page, Print Interface does not convert data, so some documents that are processed by Print Interface might not print correctly.
- For code page names, see *z/OS XL C/C++ Programming Guide*.

- If you specify a custom code page, make sure that conversion tables exist to convert between these code pages:
  - The code pages in the **document-codepage** and **printer-codepage** attributes.
  - The code page for the z/OS locale and the custom code page.

  For information about how to create conversion tables, see information about code set conversion utilities in *z/OS XL C/C++ Programming Guide*.
- In an IP PrintWay printer definition for an ASCII printer, specify an ASCII code page such as ISO8859-1.
- In a PSF printer definition, specify an EBCDIC code page such as IBM-1047.
- In an IP PrintWay printer definition for the email protocol, specify one of these:
  - Any ASCII code page: IP PrintWay converts EBCDIC data from the document code page (default is IBM-1047) to the specified ASCII code page.
  - EBCDIC code page IBM-1047: The sendmail bridge converts EBCDIC data from code page IBM-1047 to an ASCII code page. However, if the code page for the locale on the z/OS system where Infoprint Server is running is not IBM-1047, specify an ASCII code page instead of an EBCDIC code page.
- IP PrintWay basic mode: If **document-codepage** or **printer-codepage** is not specified and **old-style-translation=yes**, IP PrintWay basic mode uses the standard TCP/IP translation table.
- NetSpool converts data between code pages only if **netspool-formatting=convert-to-pcl** in the **netspool-options** object class. Otherwise, NetSpool ignores this attribute.

printway-bottom-margin

This single-valued attribute specifies the number of blank lines to leave in the bottom margin. IP PrintWay uses this value when formatting data into pages.

ISPF field name

IP PrintWay pagination: Margins: Bottom

Allowed values

An integer 0–255.

Default value

IP PrintWay does not leave a bottom margin.

Usage guidelines

IP PrintWay ignores this attribute under any of these conditions:

- The data set contains carriage control characters.
- Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
- The data set was placed on the spool by Print Interface.
- The data set contains a PostScript header.
- **printway-formatting=none** or **printway-formatting=translate-only**.
- **printway-pagination=suppress**.
- NetSpool converted the data to PCL format.

printway-page-height

This single-valued attribute specifies the number of lines to place on a page. This number includes any blank lines in the top and bottom margins, lines for the optional page header, and data lines. IP PrintWay uses this attribute when formatting data into pages.

ISPF field name

IP PrintWay pagination: Page height

Allowed values

An integer 0–255.

Default value

IP PrintWay uses 58 lines as the page length.

Usage guidelines

IP PrintWay ignores this attribute under any of these conditions:

- The data set contains carriage control characters.
- Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
- Print Interface converted line data into text data.
- The data set contains a PostScript header.
- **printway-formatting=none** or **printway-formatting=translate-only**.
- **printway-pagination=suppress**.
- NetSpool converted the data to PCL format.

printway-pagination

This single-valued attribute indicates whether IP PrintWay formats data into pages. When formatting data, IP PrintWay can add a header to each page and leave blank lines for top and bottom margins.

ISPF field name

IP PrintWay pagination

Allowed values

You can enter one of these fixed values:

allow
 IP PrintWay formats data into pages if possible.

suppress
 IP PrintWay does *not* format data into pages.

Default value

IP PrintWay formats data into pages.

Usage guidelines

- If you specify allow (default), you can also specify these attributes:

 - **printway-top-margin**
 - **printway-bottom-margin**
 - **printway-page-height**
 - **print-page-header**

- IP PrintWay ignores this attribute under any of these conditions:

 - Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
 - Print Interface converted line data into text data.
 - NetSpool converted the data to PCL format.

– The data set contains carriage control characters.

– The data set contains a PostScript header.

– **printway-formatting=none** or **printway-formatting=translate-only**.

printway-sosi-mode

This single-valued attribute specifies a value that indicates the shift-out shift-in (SOSI) mode that IP PrintWay basic mode uses to delimit double-byte character set (DBCS) data in the ASCII data stream.

ISPF field name

SOSI mode

Allowed values

You can enter one of these fixed values:

ascii
> IP PrintWay translates each EBCDIC SOSI character to an ASCII SOSI character (X'0E' to X'1E' or X'0F' to X'1F').

ebcdic
> IP PrintWay leaves the EBCDIC SOSI characters unchanged and delimits DBCS data with the EBCDIC SOSI characters.

none
> IP PrintWay removes the SOSI characters and does not delimit DBCS data.

space
> IP PrintWay translates each EBCDIC SOSI character to an ASCII space character (X'20').

Default value

IP PrintWay removes SOSI characters and does not delimit DBCS data.

Usage guidelines

This attribute does not apply when:

- IP PrintWay extended mode processes the data stream.
- **db-translate-table** = jis78kj-ascii, jis78kj-jisroman, jis83kj-ascii, jis83kj-jisroman, or ibmkanji. For more information, see the **db-translate-table**.

printway-top-margin

This single-valued attribute specifies the number of blank lines to leave in the top margin. IP PrintWay uses this value when formatting data into pages.

ISPF field name

IP PrintWay pagination: Margins: Top

Allowed values

An integer 0–255.

Default value

IP PrintWay does not leave a top margin.

Usage guidelines

IP PrintWay ignores this attribute under any of these conditions:

- Line data was converted to another format such as PCL, PostScript, PDF, SCS, or DSC format.
- Print Interface converted line data into text data.
- NetSpool converted the data to PCL format.
- The data set contains carriage control characters.
- The data set contains a PostScript header.
- **printway-formatting=none** or **printway-formatting=translate-only**.
- **printway-pagination=suppress**.

resubmit-for-filtering

This single-valued attribute indicates whether a filter in the **filters** attribute is to be used for data sets submitted as batch jobs to IP PrintWay basic mode. When **resubmit-for-filtering=yes**, IP PrintWay resubmits batch data sets to Print Interface. Print Interface calls the filter (if any) associated with the input data format and then writes the data to a new output data set on the JES spool for subsequent processing by IP PrintWay.

ISPF field name

Resubmit for filtering

Allowed values

You can enter one of these fixed values:

yes
> At least one filter in the **filters** attribute applies to batch data sets.

no
> No filters apply to batch data sets.

Default value

no

Usage guidelines

- This attribute does not apply to IP PrintWay extended mode.
- For optimum system performance, specify yes only when needed:
  - Specify yes if you also specify a transform filter, such as **afpxpcl.dll**, in the **filters** attribute.
  - Do not specify yes if the only filter specified is **aopfiltr.so**.
- This attribute has meaning only for IP PrintWay printer definitions. It is ignored for PSF and General printer definitions.

scs-automatic-page-orientation

This single-valued attribute indicates whether NetSpool is to automatically determine the orientation (portrait or landscape) of each page based on the line length and page length of that page. If necessary, NetSpool also reduces the size of the print (the font size) and increases the line density so that data fits on a line. NetSpool uses this attribute only when it converts SCS character string (SCS) data streams to PCL data streams.

ISPF field name

NetSpool PCL Conversion: SCS automatic page orientation

Allowed values

Enter one of these fixed values:

no
> NetSpool does not automatically determine the page orientation.

yes
> NetSpool automatically determines the page orientation if possible. If NetSpool cannot determine the page density and line density, it uses the orientation that is specified in the **pcl-orientation** attribute.

Default value

NetSpool does not automatically determine the page orientation.

Usage guidelines

- NetSpool uses this attribute only when it converts SCS data streams and only when **netspool-formatting=convert-to-pcl**. Otherwise, this attribute is ignored.
- If **scs-automatic-page-orientation=yes**, you must specify values in these attributes:
  - **pcl-print-density**
  - **pcl-line-density**
  - **scs-maximum-line-length**
  - **scs-maximum-page-length**
- NetSpool uses the line and page lengths that are specified in SCS controls and in the **pcl-print-density**, **pcl-line-density**, **scs-maximum-line-length**, and **scs-maximum-page-length** attributes to determine the page orientation of each page. If the line length is greater than the page length, NetSpool sets the orientation to landscape. Otherwise, it sets the orientation to portrait. When NetSpool sets the orientation to landscape, if the **maximum-line-length** attribute (or the MPP in the SCS SHF control) is greater than 106, NetSpool sets the print density to 15 characters per inch and the line density to 8 lines per inch.

scs-bottom-margin

This single-valued attribute specifies the number of the line at which data ends on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams.

ISPF field name

SCS Conversion: Margins: Bottom

Allowed values

An integer 1–255. The number must be equal to or greater than the value in the **scs-top-margin** attribute. It must be equal to or less than the value in the **scs-maximum-page-length** attribute.

In this example, the data ends on line 61. Because the page has 66 lines, the bottom margin has 5 blank lines:

```
scs-bottom-margin = 61   scs-maximum-page-length=66
```

Default value

No bottom margin. NetSpool uses the current maximum presentation line (MPL) value.

Usage guidelines

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- When **scs-bottom-margin=1**, NetSpool does not insert form feeds when the application spaces past the bottom margin. However, NetSpool does insert form feeds when an explicit form feed or a Select Vertical Channel command occurs in the input data.

- NetSpool ignores this attribute if **netspool-formatting = none**.

scs-horizontal-tabs

This multi-valued, list attribute specifies the column numbers of the default horizontal tab settings. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. NetSpool always sets the first tab to the left margin value. You do not need to specify it. NetSpool ignores a value of 0.

ISPF field name

SCS Conversion: Horizontal tabs

Allowed values

An integer 0–255. A number greater than zero must be equal to or between the values in the **scs-left-margin** and **scs-right-margin** attributes.

In this example, horizontal tabs are set at columns 6, 25, 50, 75, and 100.

```
scs-horizontal-tabs = {25 50 75 100} scs-left-margin = 6
```

Default value

NetSpool uses tab value 0.

Usage guidelines

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- The input data stream can add more tab positions but cannot remove default tabs set in this attribute.
- NetSpool ignores this attribute if **netspool-formatting = none**.

scs-left-margin

This single-valued attribute specifies the number of the first column of data on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams.

ISPF field name

SCS Conversion: Margins: Left

Allowed values

An integer 1–255. The number must be equal to or less than the value in the **scs-maximum-line-length** attribute.

In this example, the left margin has 3 blank columns:

```
scs-left-margin = 4
```

Default value

No left margin.

Usage guidelines

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- NetSpool ignores this attribute if **netspool-formatting = none**.

scs-maximum-line-length

This single-valued attribute specifies the number of columns to place on one line. This number includes the left and right margins. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams.

ISPF field name

SCS Conversion: Line length

Allowed values

An integer 1–255.

Default value

NetSpool uses column number 80 as the default.

Usage guidelines

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- NetSpool uses this value as the default maximum presentation position (MPP) value.
- NetSpool ignores this attribute if **netspool-formatting = none**.

scs-maximum-page-length

This single-valued attribute specifies the number of lines to place on a page. This number includes any blank lines in the top and bottom margins and data lines. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams.

ISPF field name

SCS Conversion: Page length

Allowed values

An integer 1–255.

Default value

NetSpool uses 1 as the default.

Usage guidelines

- A Set Vertical Format (SVF) command in the SCS input data stream overrides this value.
- NetSpool uses this value as the default SCS maximum presentation line (MPL) value.
- NetSpool ignores this attribute if **netspool-formatting = none**.

scs-right-margin

This single-valued attribute specifies the column number at which the right margin starts on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams.

ISPF field name

SCS Conversion: Margins: Right

Allowed values

An integer 1–255. The number must be equal to or less than the value in the **scs-maximum-line-length** attribute.

In this example, the right margin is at column 76. Because the line length is 80, the right margin has 5 blank columns:

```
scs-right-margin = 76  scs-maximum-line-length=80
```

Default value

NetSpool uses 80 as the default value.

Usage guidelines

- A Set Horizontal Format (SHF) command in the SCS input data stream overrides this value.
- NetSpool ignores this attribute if **netspool-formatting = none**.

scs-top-margin

This single-valued attribute specifies the number of the first line of data on each page. NetSpool uses this value when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams.

ISPF field name

SCS Conversion: Margins: Top

Allowed values

An integer 1–255. The number must be less than or equal to the value specified in the **scs-maximum-page-length** attribute. In this example, NetSpool leaves 5 blank lines in the top margin:

```
scs-top-margin = 6
```

Default value

No top margin.

Usage guidelines

- NetSpool also uses this value as the line number for Select Vertical Channel 1.
- A Set Vertical Format (SVF) SCS command in the input data stream overrides this value.
- NetSpool ignores this attribute if **netspool-formatting = none**.

scs-vertical-tabs

This multi-valued, list attribute specifies the line numbers of the default vertical tab settings. NetSpool uses these values when it converts SNA character string (SCS) data streams to either line data streams or PCL data streams. The first tab is always set to the top margin value. Do not specify it. A tab value of 0 is ignored. The first 11 tabs are also used as line numbers for Select Vertical Channel 2 - 12.

ISPF field name

SCS Conversion: Vertical tabs

Allowed values

An integer 0–255. A number greater than zero must be equal to or between the values in the **scs-top-margin** and **scs-bottom-margin** attributes.

In this example, vertical tabs are set at lines 6, 20, 40, and 50. These vertical channels are set: CH01=6, CH02=20, CH04=40, CH05=50. These vertical channels are not set: CH03, CH06 through CH12.

```
scs-vertical-tabs = {20 0 40 50} scs-top-margin = 6
```

Default value

NetSpool uses tab value 0.

Usage guidelines

- A Set Vertical Format (SVF) SCS command in the input data stream overrides this value.
- The input data stream can add more tab positions but cannot remove default tabs set in this attribute.
- NetSpool ignores this attribute if **netspool-formatting = none**.

trailer-transform-error-page

This single-valued attribute indicates whether transforms write messages for data stream errors and warnings to a trailer page. The trailer page is the last page in the output document. Warnings can indicate degraded output.

ISPF field name

Trailer error page

Allowed values

Enter one of these fixed values:

error
 The transform writes error messages, but not warning messages, to a trailer page. This option does not apply when the **fail-on-transform-error=error** or **fail-on-transform-error=warning** because no output document is created when an error occurs.

no
 The transform does not write messages to a trailer page.

warning
 The transform writes error and warning messages to a trailer page. This option does not apply when **fail-on-transform-error=warning** because no output document is created when an error or warning occurs.

Default value

1. The value of the AOP_TRAILER_ERROR_PAGE environment variable for the transform class.
2. `warning`

Usage guidelines

For information about whether a transform supports this attribute, see the documentation for the transform.

translation-dataset-qualifier

This single-valued attribute specifies the name of the TCP/IP translation table that IP PrintWay basic mode uses to convert single-byte character set (SBCS) data from EBCDIC to ASCII. This translation table name is used with both single-byte data and double-byte data to determine the high-level qualifier of the translation table data set. Specify this attribute only if you created a custom TCP/IP translate table.

ISPF field name

Translation dataset qualifier

Allowed values

A valid translation table name.

Default value

See Usage Guidelines.

Usage guidelines

- This attribute does not apply to IP PrintWay extended mode.
- If either the **document-codepage** or **printer-codepage** attribute is specified, IP PrintWay uses the code pages to convert data and ignores this attribute.
- If this attribute, the **db-translate-table** attribute, the **document-codepage**, and the **printer-codepage** attribute are not specified, IP PrintWay uses default code pages to convert data. However, you can specify the **old-style-translation** attribute in the FSS definition to force IP PrintWay to use the standard TCP/IP translate table, STANDARD.TCPXLBIN, to convert data.
- IP PrintWay ignores this attribute when **protocol-type=email**.

Attributes for the protocol object class

Attributes are listed here that are valid when you create Protocol components, which are in object class **protocol**. These attributes are also valid for the **printer** object class.

Required attributes

Table 54 on page 445 summarizes the attributes that are required and optional when you create a printer definition. The required and optional attributes depend on the value you select for the **protocol-type** attribute. You can specify attributes either in the printer definition or in an included Protocol component.

Notes:

- When you create a Protocol component, no attributes are required. When you create a default IP PrintWay printer definition, no attributes are required.
- The VTAM protocol is listed on the ISPF panel; however, the VTAM protocol is only used if Infoprint Coaxial Printer Support for z/OS is installed. Because Infoprint Coaxial Printer Support for z/OS is not supported in z/OS V2R5, the VTAM protocol is no longer documented.

Table 54. Required protocol attributes

Value of protocol-type attribute	Required attributes	Optional attributes
direct-sockets	printer-ip-address, port-number	description, operator-security-profile, page-accounting, page-restart
ipp	printer-uri	description, operator-security-profile
lpr	printer-ip-address, print-queue-name	description, lpr-*xxxxx*, operator-security-profile, owner, server-user-options
email	mail-to-addresses	description, mail-bcc-addresses, mail-cc-addresses, mail-embedded-headers, mail-inline-text, mail-inline-text-attribute, mail-inline-message, mail-from-name, mail-reply-address

description

This single-valued attribute specifies a description for the component. The description can help you select the correct component from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

lpr-banner-class

This single-valued attribute specifies the class name that IP PrintWay passes to the remote LPD for printing on a banner page, a page the LPD can print before the document.

ISPF field name

Banner class

Allowed values

A combination of 1–31 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * - /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

IP PrintWay passes the name of the z/OS system to the LPD.

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only when it uses the LPR transmission protocol and **lpr-print-banner=yes**.

lpr-banner-job-name

This single-valued attribute specifies the job name that IP PrintWay passes to the remote LPD for printing on a banner page, a page the LPD can print before the document.

ISPF field name

Banner job name

Allowed values

A combination of 1–99 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * - /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Specify %sysout-job-name to pass the z/OS job name instead of the z/OS fully qualified data set name to the LPD. (See for information about when IP PrintWay passes the fully qualified data set name to the LPD.) For example:

```
lpr-banner-job-name="%sysout-job-name"
```

Default value

IP PrintWay passes one of these values to the LPD:

1. The value that is specified in the **sysout-dataset-name** job attribute.

2. One of these values:

    - IP PrintWay extended mode: The file name of documents that are submitted from remote systems, with the AOPPRINT JCL procedure, or with the **lp** command.
    - IP PrintWay extended mode: The VTAM LU name of the application that submitted the print request to NetSpool.
    - IP PrintWay basic mode and extended modes: The z/OS fully qualified data set name in this format:

    system_name.user_ID.job_name.job_ID.dset_ID.short_dset_name

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol and **lpr-print-banner=yes**.

lpr-filename

This single-valued attribute specifies the file name that IP PrintWay passes to the remote LPD.

ISPF field name

Filename

Allowed values

A combination of 1–31 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * - /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

One of these values:

- IP PrintWay extended mode: The file name of documents that are submitted from remote systems, with the AOPPRINT JCL procedure, or with the **lp** command.
- IP PrintWay extended mode: The VTAM LU name of the application that submitted the print request to NetSpool.
- IP PrintWay basic mode and extended modes: The z/OS fully qualified data set name in this format:

    system_name.user_ID.job_name.job_ID.dset_ID.short_dset_name

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.
- IP PrintWay passes this value to the LPD only if **lpr-print-function=p**.

lpr-indent

This single-valued attribute specifies the number of columns that the remote LPD indents the output it generates.

ISPF field name

Indent

Allowed values

An integer 1–2147483646.

Default value

IP PrintWay does not pass a value to the LPD, so output is not indented.

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-mode

This single-valued attribute specifies the mode that IP PrintWay uses when it transmits data to a remote LPD.

ISPF field name

Mode

Allowed values

You can enter one of these fixed values:

control-file-first
IP PrintWay transmits the control file before the data file. Not all LPDs support this mode. However, some LPDs use this mode to print data as it is received and print larger files.

control-file-last
IP PrintWay transmits the control file after the data file. All LPDs that adhere to RFC 1179 support this mode.

streaming
IP PrintWay transmits the control file before the data file. The remote LPD must support the RECEIVE CONTROL FILE FIRST and RECEIVE DATA FILE WITH UNSPECIFIED LENGTH commands. Specify this value if the target system is an IBM network station.

to-remote-psf
IP PrintWay transmits files to a remote system that runs PSF.

- Adds a record length field to each record.
- Creates `-o` parameters in the control file. `-o` parameters contain AFP values that are specified by the job submitter, such as duplex option.
- Does not format or translate the data file to ASCII. (IP PrintWay ignores the `printway-formatting` attribute.)
- Transmits the control file after the data file.

Default value

IP PrintWay transmits the control file after the data file.

lpr-optimize-copies

This single-valued attribute indicates how IP PrintWay is to transmit documents when the job submitter requests multiple copies.

ISPF field name

Optimize copies

Allowed values

You can enter one of these fixed values:

yes
> IP PrintWay transmits the document to the LPD only one time. IP PrintWay tells the LPD how many copies to print in the LPD control file.

no
> IP PrintWay transmits the document to the LPD multiple times, one time for each copy.

Default value

IP PrintWay does not optimize the transmission of copies.

Usage guidelines

- Select this field to improve performance, but only if the printer's LPD supports printing multiple copies of one file.
- When **lpr-mode=to-remote-psf**, IP PrintWay ignores this attribute and transmits documents only one time because PSF supports printing multiple copies of one file.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-print-banner

This single-valued attribute indicates whether the remote LPD is to print a banner page. When **lpr-print-banner=yes**, IP PrintWay sends information for printing on the banner page to the LPD. A banner page is a page the LPD can print before the document.

ISPF field name

Print banner page

Allowed values

You can enter one of these fixed values:

yes
> The LPD prints a banner page.

no
> The LPD does not print a banner page.

Default value

The LPD prints a banner page.

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-print-function

This single-valued attribute specifies a code that tells the remote LPD what type of data formatting to do.

ISPF field name

Print function

Allowed values

An upper or lowercase letter. These codes usually mean:

Code
    Meaning

f

    Print as a sequence of lines.

l

    Print leaving control characters.

p

    Print with pagination.

r

    Print interpreting the first column as FORTRAN (ANSI) carriage control characters. Supported characters are 1, 0, +, -, and blank.

Default value

IP PrintWay passes code `f` to the remote LPD.

Usage guidelines

- Some LPDs require that you specify code `l` for data that is not to be formatted or that includes transparent data.
- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-restrict-ports

This single-valued attribute indicates whether IP PrintWay must use a z/OS port in the range 721–731 when it communicates with the remote LPD. Specify `lpr-restrict-ports=yes` when the remote LPD enforces this port restriction.

ISPF field name

Restrict ports

Allowed values

You can enter one of these fixed values:

yes
    The z/OS port must be in the range of 721 to 731.

no
    Any z/OS port can be used.

Default value

IP PrintWay uses any z/OS port.

Usage guidelines

- When **`lpr-restrict-ports=no`**, IP PrintWay can use any free port. This increases the probability of finding an available port.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

lpr-title

This single-valued attribute specifies a document title that IP PrintWay passes to the remote LPD.

ISPF field name

Title

Allowed values

A combination of 1–79 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * - /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

1. A title that is specified by the job submitter.
2. One of these values:

   - IP PrintWay extended mode: The file name of documents that are submitted from remote systems, with the AOPPRINT JCL procedure, or with the **lp** command.
   - IP PrintWay extended mode: The VTAM LU name of the application that submitted the print request to NetSpool.
   - IP PrintWay basic mode and extended modes: The z/OS fully qualified data set name in this format:

     system_name.user_ID.job_name.job_ID.dset_ID.short_dset_name

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.
- A title that is specified by the job submitter overrides the value that is specified in this attribute.

lpr-width

This single-valued attribute specifies the maximum number of columns that the remote LPD puts on a line.

ISPF field name

Width

Allowed values

An integer 1–2147483646.

Default value

IP PrintWay does not pass a width value to the LPD.

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol.

mail-bcc-addresses

This multi-valued attribute specifies the email addresses of the "blind copy (bcc)" recipients of an email. A *bcc* means that other recipients of the email do not see the bcc recipient listed. You can also specify one or more sendmail alias names. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

ISPF field name

BCC addresses

Allowed values

You can specify 1–32 email addresses. If you specify more than one value, separate the values with spaces and enclose the list of values in braces {}. Each email address can be 1–60 characters. Blanks are not allowed in an email address. If the email address contains special characters (such as @ $ & ( ) > < | ' " #), enclose the entire email address in single or double quotation marks. If the email address contains the special character @, enclose the value in braces even if only one value exists. If the email address contains double quotation marks, enclose the entire address in single quotation marks. Each address or alias name needs to be in this format:

```
username[@domainname]
```

username
> The name of the recipient or an alias name that is defined to the sendmail bridge.

@*domainname*
> The domain name of the target system. If you specify an alias, omit @*domainname*.

For example:

```
mail-bcc-addresses = {"user2@xyz.com" dept01list}
mail-bcc-addresses = {"user2@xyz.com"}
```

Default value

None.

Usage guidelines

- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

mail-cc-addresses

This multi-valued attribute specifies the email addresses of the "copy (cc)" recipients of an email. A *cc* means that other recipients of the email can see the cc recipient listed. You can also specify one or more sendmail alias names. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

ISPF field name

CC addresses

Allowed values

You can specify 1–32 email addresses. If you specify more than one value, separate the values with spaces and enclose the list of values in braces {}. Each email address can be 1–60 characters. Blanks are not allowed in an email address. If the email address contains special characters (such as @ $ & ( ) > < | ' " #), enclose the entire email address in single or double quotation marks. If the email address contains the special character @, enclose the value in braces even if only one value exists. If the email address contains double quotation marks, enclose the entire address in single quotation marks. Each address or alias name needs to be in this format:

```
username[@domainname]
```

username
> The name of the recipient or an alias name that is defined to the sendmail bridge.

@*domainname*
> The domain name of the target system. If you specify an alias, omit @*domainname*.

For example:

```
mail-cc-addresses = {"user3@xyz.com" dept02list}
mail-cc-addresses = {"user3@xyz.com"}
```

Default value

None.

Usage guidelines

- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

mail-embedded-headers

This single-valued attribute indicates whether line-data documents can contain email headers. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

ISPF field name

Embedded headers

Allowed values

You can enter one of these fixed values:

yes
    IP PrintWay extended mode looks for an email header in the first 32 records of all line-data documents. If a header is found, it sends the email to the addresses in the header and with the subject specified in the header. If no header is found, it sends the email to the addresses specified on the OUTPUT JCL statement, in job attributes, or in the printer definition.

no
    IP PrintWay extended mode does not look for email headers.

Default value

IP PrintWay does not look for an email header.

Usage guidelines

- IP PrintWay extended mode does not look for email headers in documents with other formats (such as text, PCL, and PDF).
- If you print VTAM application data that contains email headers, specify `netspool-formatting=convert-to-line` (default).
- An address or subject in the email header overrides the address and title that is specified on the OUTPUT JCL statement, in job attributes, and in the printer definition.
- For the format of email headers, see *z/OS Infoprint Server User's Guide*.
- IP PrintWay basic mode ignores this attribute. It does not look for email headers in line-data documents.

mail-from-address

This single-valued attribute defines the email address that you want to appear as the sender's email address. You can specify a sendmail alias name that represents one or more email addresses.

ISPF field name

From address

Allowed values

You can specify a string that is 1–60 characters. You can specify any EBCDIC characters. If the string contains blanks or special characters (such as @ $ & ( ) . < > | ' " #), enclose the entire string in single or double quotation marks. For example:

```
-o "mail-from-address='john.q.sender@xyz-usa.com'"
```

If the name contains double quotation marks, enclose the name in single quotation marks.

Default value

Most email programs use the sender's email address, usually *userid*@*domainname*, where *userid* is the TSO user ID of the job submitter and *domainname* is the name of the domain where Infoprint Server is running.

Usage guidelines

- If the administrator specified **mail-use-reply-addr-as-from-addr=yes**, the value of the **mail-reply-address** attribute is used to specify the sender's email address, whether this attribute has a value or not.

mail-from-name

This single-valued attribute specifies the descriptive name or other identifier of the sender of an email. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

ISPF field name

From name

Allowed values

A combination of 1–60 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ & ( ) > < | ' " #). If the name contains blanks or special characters, enclose the entire name in single or double quotation marks. If the name contains double quotation marks, enclose the entire name in single quotation marks.

IP PrintWay always includes *userid*@*domainname* to identify the sender. The user ID of the job submitter is *userid*. The domain name where Infoprint Server is running is *domainname*. For example: JOHN@SYSTEM1.

For example, this specification:

```
mail-from-name = "John Q. Sender"
```

Puts this information in the email:

```
From: John Q. Sender <JOHN@SYSTEM1>
```

Tip: To specify the email address that recipients of an email can reply to, use the **mail-reply-address** attribute.

Default value

None.

Usage guidelines

- Infoprint Server does not verify that the value is in the correct format.
- A name that the job submitter specifies overrides this value.

mail-inline-message

This single-valued attribute specifies data that IP PrintWay extended mode includes inline at the beginning of each email. For example, you can specify a standard greeting and text. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

ISPF field name

Inline message

Allowed values

Up to 292 letters, numbers, blanks, and special characters. If the message contains blanks or special characters, enclose the entire message in single or double quotation marks. You can include control values, such as:

Value
   Description

<LF>
   New line

<SP>
   Blank character

Email programs can interpret control values in different ways.

Tip: Infoprint Server converts each blank in the message to <SP>. If the message exceeds 292 characters, it is truncated.

Examples

```
"Greetings:<LF><LF>The monthly sales report is attached.<LF>"
```

```
"Greetings:<LF><LF>The<SP>monthly<SP>sales<SP>report<SP>is<SP>attached.<LF>"
```

This is the message in the email:

```
Greetings:

The monthly sales report is attached.
[If you include a document in the body of the email, text starts here.]
```

Default value

No inline message is included in the body of the email.

Usage guidelines

• IP PrintWay basic mode ignores this attribute.

mail-inline-text

This single-valued attribute indicates whether data in text and line-data documents is included inline in the body of the email. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

ISPF field name

Inline text and line data

Allowed values

You can enter one of these fixed values:

yes
  Text and line data is included inline.

no
  Text and line data is not included inline. All documents are sent as attachments.

Default value

Text and line data is not included inline. All documents are sent as attachments.

Usage guidelines

- Documents in a format other than line data or text (such as AFP and PDF documents) are always sent as attachments.
- Line data documents that are transformed to another format (such as PDF) are always sent as attachments.
- If you print VTAM application data and want to include data inline, specify `netspool-formatting=line` (default).
- You can separate data from more than one document in an email with a blank line or other text. For a blank line, specify <LF> in the **document-trailer** attribute.
- IP PrintWay basic mode ignores this attribute. It sends text and line data documents as attachments.

mail-inline-text-attribute

This single-valued attribute specifies an existing text job attribute that IP PrintWay extended mode includes inline as a text string at the beginning of each email. This attribute pertains only to printer definitions with **protocol-type=email**. It is optional for these printer definitions.

ISPF field name

Inline text attribute

Allowed values

You can specify one of these single-valued text job attributes:

- **building-text**
- **department-text**
- **name-text**
- **room-text**
- **title-text**

Examples

The **department-text** value is used, which is defined as:

```
department-text="Payroll Department:"
```

This is the text on the first line in the email:

```
Payroll Department:
[If you include message text in the body of the email, text starts here.]
```

Default value

No text data is included at the beginning of the email.

Usage guidelines

- The text string that this attribute specifies is included in the email on the line before the data specified with the `mail-inline-message` attribute.
- IP PrintWay basic mode ignores this attribute.

mail-reply-address

This single-valued attribute specifies the email address that recipients of an email can reply to. You can also specify a sendmail alias name. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with `protocol-type=email`. It is optional for these printer definitions.

ISPF field name

Reply address

Allowed values

A combination of 1–60 letters (a-z, A-Z), numbers (0-9), and special characters (such as @ $ & ( ) > < | ' " #). Blanks are not allowed in an email address. If the email address contains special characters, enclose the entire name in single or double quotation marks. If the name contains double quotation marks, enclose the entire name in single quotation marks. If the email address contains the special character @, enclose the value in braces. The name must be in this format:

```
username[@domainname]
```

username
> The name portion of the address, or an alias name that is defined to the sendmail bridge.

@domainname
> The domain portion of the target system.

For example:

```
mail-reply-address = {"mysecretary@xyz.com"}
```

Default value

None. However, most email programs use the sender's email address. The default is *userid@domainname*. The user ID of the job submitter is *userid*. The domain name where Infoprint Server is running is *domainname*.

Usage guidelines

- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

mail-to-addresses

This `multi-valued` attribute specifies the email addresses of the recipients of an email. You can also specify one or more sendmail alias names. An alias name represents one or more real email addresses. This attribute pertains only to printer definitions with `protocol-type=email`. It is required for these printer definitions. The job submitter can override the email addresses during job submission. You can set up just one printer definition for the email protocol because the job submitter can specify the email addresses. You must specify a default email address in this printer definition.

ISPF field name

To addresses

Allowed values

You can specify 1–32 email addresses. If you specify more than one value, separate the values with spaces and enclose the list of values in braces {}. Each email address can be 1–60 characters. Blanks are not allowed in an email address. If the email address contains special characters (such as @ $ & ( ) > < | ' " #), enclose the entire email address in single or double quotation marks. If the email address contains the special character @, enclose the value in braces even if only one value exists. If the email address contains double quotation marks, enclose the entire address in single quotation marks.

Each email address or alias name must be in this format:

```
username[@domainname]
```

username
    The name of the recipient or an alias name that is defined to the sendmail bridge.

@domainname
    The domain name of the target system. If you specify an alias, omit @*domainname*.

For example:

```
mail-to-addresses = {"user1@xyz.com" dept03list}
mail-to-addresses = {"user1@xyz.com"}
```

Default value

None.

Usage guidelines

- Infoprint Server does not verify that the value is in the correct format.
- An address that the job submitter specifies overrides this value.

mail-use-reply-addr-as-from-addr

This single-valued attribute indicates whether the value of the **mail-reply-address** attribute appears as the sender's email address.

ISPF field name

Use reply address as from address

Allowed values

You can enter one of these fixed values:

yes
    The value of **mail-reply-address** is used as the sender's email address.

no
    Some other value is used as the sender's email address. If a value is specified for the **mail-from-address** attribute, that value is used. Otherwise, most email programs use the sender's email address, usually *userid*@*domainname*, where *userid* is the TSO user ID of the job submitter and *domainname* is the name of the domain where Infoprint Server is running.

Default value

The **mail-from-address** value or the email program 's default value is used as the sender's email address.

name

This single-valued attribute specifies the name of the component.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

Component Name

Allowed values

Any combination of 1–17 letters (a-z, A-Z), numbers (0-9), and special characters (such as $ # @ . - = /). Blanks are not allowed.

Default value

None.

operator-security-profile

This single-valued attribute specifies the name of the RACF resource profile in the PRINTSRV class that controls who can use Infoprint Central to work with this printer. This attribute applies only to IP PrintWay extended mode.

ISPF field name

Operator security profile

Allowed values

A combination of letters, numbers, and special characters except for commas, semicolons, parentheses, and blanks. If the value contains special characters, enclose it in single or double quotation marks. Lowercase letters are converted to uppercase. Do not start names with AOP. For example:

```
operator-security-profile = "DENVER.001"
```

Default value

None.

Usage guidelines

- To authorize users to a group of printers, specify the same profile name in the IP PrintWay printer definitions and PSF FSA definitions for all printers in the group.
- If more than one printer definition exists for a printer, specify the same profile name in each printer definition.
- If the profile name is not defined to RACF, or if you omit this attribute, anyone can work with this printer.
- This attribute does not apply to IP PrintWay basic mode or when you select the email protocol.
- For information about the PRINTSRV class, see *z/OS Infoprint Server Customization*.

owner

This single-valued attribute specifies the owner name that IP PrintWay passes to the remote LPD for printing on the banner page, which is a page that is printed before the document.

ISPF field name

Owner

Allowed values

A combination of 1–31 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as: @ $ # , *
- /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

IP PrintWay passes the user ID for the print job to the LPD.

Usage guidelines

- The implementation and configuration of the remote LPD determine how this value is used.
- IP PrintWay uses this value only if it uses the LPR transmission protocol and `lpr-print-banner=yes`.

page-accounting

This single-valued attribute indicates whether IP PrintWay extended mode records the number of printed
pages in the SMF type 6 accounting record (in field SMF6PGE) for each document.

ISPF field name

Record pages printed for accounting

Allowed values

You can enter one of these fixed values:

yes
    IP PrintWay extended mode records the number of printed pages in the SMF record.

no
    IP PrintWay extended mode does not record the number of printed pages in the SMF record.

Default value

IP PrintWay does not record the number of printed pages.

Usage guidelines

- Specify yes only if the printer supports HP's Printer Job Language (PJL).
- Specify this attribute if the printer supports PJL so that you get more accurate accounting information.
- If you specify this attribute or the `page-restart=yes` attribute, IP PrintWay extended mode also
  supports the cancel function from the printer's console.
- IP PrintWay extended mode uses this attribute only if `protocol-type=direct-sockets`. For other
  protocols, it ignores this attribute and does not record the number of printed pages in the SMF record.
- IP PrintWay basic mode always ignores this attribute. It does not record the number of printed pages in
  the SMF record.
- Documents cannot contain PJL JOB commands. If you use a transform, you might need to customize
  the transform so that it does not add PJL commands. For information, see *z/OS Infoprint Server
  Customization*.

page-restart

This single-valued attribute indicates where IP PrintWay extended mode tells the printer to start printing
again after an error occurs. It can tell the printer to start printing from the beginning of the print job or
after the last page that the printer reported printed successfully.

ISPF field name

Restart printing after last successful page

Allowed values

You can enter one of these fixed values:

yes
> IP PrintWay extended mode tells the printer to start printing after the last page that the printer reported printed successfully.

no
> IP PrintWay extended mode tells the printer to start printing from the beginning of the print job.

Default value

IP PrintWay extended mode tells the printer to start printing from the beginning of the print job.

Usage guidelines

- Specify yes only if the printer supports HP's Printer Job Language (PJL).
- Specify yes if you send large documents to the printer. This can save paper and printing costs.
- To prevent duplicate pages, set a high value in the **response-timeout** attribute to give the operator time to add paper or fix a jam.
- If you specify this attribute or the **page-accounting=yes** attribute, IP PrintWay extended mode also supports the cancel function from the printer's console.
- IP PrintWay extended mode uses this attribute only if **protocol-type=direct-sockets**. For other protocols, it ignores this attribute and always restarts printing from the beginning of the print job.
- IP PrintWay basic mode ignores this attribute. Printing always restarts from the beginning of the print job.
- Documents cannot contain PJL JOB commands. If you use a transform, you might need to customize it to not add PJL commands. For information, see *z/OS Infoprint Server Customization*.

port-number

This single-valued attribute specifies the port number of the remote printer or print server.

ISPF field name

Port number

Allowed values

Specify the port number (1–65545) that is configured in the printer.

Default value

None.

Usage guidelines

- This attribute is required if you create a printer definition and **protocol-type=direct-sockets**. For other protocol types, IP PrintWay ignores this attribute.
- A port number that is specified by the job submitter overrides this attribute.
- To determine the correct port number, see the documentation for the network interface card or printer. Some typical port numbers are:
  - Port 9100 is used by some Ricoh printers, most HP printers, and most Lexmark printers.
  - Port 2501 is used by some Ricoh printers.
- In the IP PrintWay default printer definition that is named DFLTNTRY, omit this attribute because IP PrintWay uses the port number that is specified on the OUTPUT JCL statement.

print-queue-name

This single-valued attribute specifies the name of the print queue in the remote printer or print server. Specify this attribute if you specify the LPR protocol in the **protocol-type** attribute.

ISPF field name

Print queue name

Allowed values

A combination of 1–127 letters (a-z, A-Z), numbers (0-9), and special characters (such as # $ @ ! = / -). Blanks are not allowed. The print queue name is case-sensitive on some remote systems, so be sure to use the correct uppercase and lowercase letters. Examples of print queue names are:

```
print-queue-name = TEXT
print-queue-name = PASS
print-queue-name = RAW
```

Default value

None.

Usage guidelines

- This attribute is required if you create a printer definition and **protocol-type=lpr**. For other protocol types, IP PrintWay ignores this attribute.
- A print queue name that is specified by the job submitter overrides this value.
- To determine the print queue name, see the documentation for the network interface card, the printer, or the print server. Some common queue names are:
  - TEXT and RAW are used for some Ricoh printers, most HP printers, and most Lexmark printers. Specify the RAW queue for formatted text data, PCL data, and PostScript data.
  - TEXT and PASS are used for some Ricoh printers. Specify the PASS queue for text data that contains a carriage return at the end of each line, PCL data, and PostScript data.
  - If you specify the PASS or RAW queues and you run IP PrintWay basic mode, also specify 0D25 in the **Line termination** field. This causes IP PrintWay basic mode to add a carriage return at the end of each line when it converts line data to text data. IP PrintWay extended mode adds a carriage return at the end of each line by default.
- In the IP PrintWay default printer definition that is named DFLTNTRY, omit this attribute because IP PrintWay uses the print queue name that is specified on the OUTPUT JCL statement.

printer-ip-address

This single-valued attribute specifies the Internet Protocol (IP) address or host name of the remote printer or print server.

ISPF field name

Printer IP address

Allowed values

You can enter a text string of up to 115 characters. Blanks are not allowed. The string must be one of these types of address:

Colon-hexadecimal address
An IPv6 address in colon-hexadecimal format. These rules apply:

- You can omit leading zeros in each hexadecimal value.
- You can omit one sequence of repeat zero values.

- You can specify the last two hexadecimal values in dotted decimal notation.

  For example:

  ```
  2001:0db8:85a3:0000:0000:8a2e:0370:7334
  ```

Dotted decimal address

A series of integers in the range of 0–255, separated by periods (decimal address). For example:

```
9.99.12.85
```

Host name

A series of domain names that can contain alphanumeric characters and dashes (-), separated by periods (.). The first character must be alphabetic or numeric. For example:

```
printer1.boulder.IBM.com
PRT009
```

Default value

None.

Usage guidelines

- If you specify a colon-hexadecimal IP address, IP PrintWay extended mode is required.
- If you run IP PrintWay extended mode and specify a host name, define the host name in the domain name server (DNS) before you save the printer definition. If the DNS entry is created after you save the printer definition, Infoprint Central cannot display the printer for this printer definition until someone submits a print job to the printer definition or until you modify an attribute in the printer definition.
- An IP address that is specified by the job submitter overrides this attribute.
- If another printer definition refers to this printer, use the same uppercase and lowercase letters when you type the host name.
- This attribute is required when you create a printer definition and specify either **lpr** or **direct-sockets** in the **protocol-type** attribute. For other protocol types, IP PrintWay ignores this attribute.
- In the IP PrintWay default printer definition that is named DFLTNTRY, you can omit this attribute because the job submitter must specify an IP address.

printer-uri

This single-valued attribute specifies the Uniform Resource Identifier (URI) of the remote Internet Printing Protocol (IPP) server that is running either in a printer or host system. This attribute is required if you create a printer definition and **protocol-type=ipp**.

ISPF field name

URL

Allowed values

A combination of letters, numbers, and special characters, as defined by RFC 2396. Blanks are not allowed. If the value contains special characters, enclose it in quotation marks. Examples of URIs are:

```
printer-uri="ipp://myprinter.xyz.com"
printer-uri="http://myprinter.xyz.com:631"
```

Default value

None.

Usage guidelines

- For URIs prefixed with `ipp`, the default port is 631.
- For IP PrintWay basic mode: If you specify this URI in another printer definition, use the same uppercase and lowercase letters in each printer definition.

protocol-type

This single-valued attribute specifies the transmission protocol that you want IP PrintWay to use to transmit data sets to the remote system.

ISPF field name

Protocol

Allowed values

You can enter one of these fixed values:

direct-sockets
  TCP/IP socket to socket protocol.

email
  TCP/IP Simple Mail Transfer Protocol (SMTP).

ipp
  Internet Printing Protocol (IPP). An IPP server must be running in the remote printer or server.

lpr
  TCP/IP line printer (LPR) to line printer daemon (LPD) protocol. An LPD must be running in the remote printer or print server and listening at port 515.

Default value

lpr

Usage guidelines

- If you specify **direct-sockets**, also specify the **printer-ip-address** and **port-number** attributes.
- If you specify **email**, also specify the **mail-to-addresses** attribute.
- If you specify **ipp**, also specify the **printer-uri** attribute.
- If you specify **lpr**, also specify the **printer-ip-address** and **print-queue-name** attributes.

server-user-options

This single-valued attribute specifies information that IP PrintWay sends to the remote LPD. You can specify options that the remote LPD supports but that IP PrintWay does not automatically generate.

ISPF field name

User options

Allowed values

A combination of 1–255 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as @ $ # , * - /). If the value contains blanks or special characters, enclose it in single or double quotation marks.

Default value

None.

Usage guidelines

- Most LPD servers require each **-o** option to end with a line-feed character (ASCII X'0A'). IP PrintWay automatically adds a line-feed character to the end of the value that you specify for this attribute. However, to specify more than one **-o** option with this attribute, you must separate them with a line-feed character. Because IP PrintWay converts the entire attribute value from EBCDIC to ASCII, you must specify an EBCDIC line-feed character (X'25'). For example: `server-user-options="-oformdef=F1STND01\x25-oti=TitleInfo"`. You must use a PIDU command to specify this value because it contains a hexadecimal character. You cannot use the ISPF panels to specify a hexadecimal character for this attribute. The ISPF panels display this hexadecimal character as an unprintable character (dot).
- IP PrintWay ignores this attribute when it uses the direct sockets or IPP protocol.

Attributes for the psf-fss object class

Attributes are listed here that are valid when you create PSF FSS definitions, which are in object class **psf-fss**.

Tip: *PSF* refers to PSF for z/OS, the AFP Download Plus feature of PSF, or both.

Note: If you change the value for an attribute, you must restart the PSF FSS to pick up the new value. However, you do not need to restart the PSF FSS if you change the **log-messages** attribute because PSF automatically picks up a change to this attribute.

Required attributes

All attributes are optional.

blank-truncation

This single-valued attribute specifies whether trailing blanks in non-page-mode data sets received from JES2 are truncated. Non-page-mode data sets include line-mode data, text data, mixed-mode data, and XML data.

ISPF field name

Blank truncation

Allowed values

You can enter one of these fixed values:

yes
Trailing blanks are truncated for all non-page-mode data sets. To turn off blank truncation for some SYSOUT classes, see the "restore-blanks-classes" on page 467 parameter.

no
Trailing blanks are not truncated for any non-page-mode data sets. Specify this value when all data sets:

- Require right-hand blank padding to print properly
- Contain double-byte font characters

Default value

yes

Usage guidelines

If you specify this attribute for composed-text data sets, it has no effect.

description

This single-valued attribute describes the FSS definition. The description can help you select the FSS definition from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose the value in quotation marks.

Default value

None.

log-messages

This single-valued attribute specifies whether PSF writes messages for print jobs and printers in the Infoprint Server common message log.

ISPF field name

Log messages

Allowed values

You can enter one of these fixed values:

yes
   PSF writes messages in the common message log.

no
   PSF does not write messages in the common message log.

Default value

no

Usage guidelines

If you change this attribute while PSF is running, you do not need to restart the PSF FSS because PSF automatically picks up the change.

name

This single-valued attribute specifies the name of the FSS definition. This name must be a unique FSS definition name in the Printer Inventory and must match the name on the JES FSS definition statement.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

FSS name

Allowed values

None.

Default value

None.

nst-trace-dsname

This single-valued attribute specifies the name of the data set that PSF directs a notify subtask (NST) trace to. This name must be different than the data set name PSF directs an FSA external trace to. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name

NST trace dsname

Allowed values

You can enter a valid data set name.

Default value

None.

Usage guidelines

An NST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.

pinst-trace-dsname

This single-valued attribute specifies the name of the data set that PSF or AFP Download Plus directs a Printer Inventory notify subtask (PINST) trace to. This name must be different from both the NST trace data set name and the data set name that an FSA external trace is directed to.

ISPF field name

PINST trace dsname

Allowed values

You can enter a valid data set name.

Default value

None.

Usage guidelines

A PINST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.

restore-blanks-classes

This single-valued attribute specifies the SYSOUT classes for which you do **not** want trailing blanks truncated for non-page-mode-data sets. Non-page-mode data sets include line-mode data, text data, mixed-mode data, and XML data.

This attribute is used only when `blank-truncation=yes`.

ISPF field name

Restore blanks classes

Allowed values

A string of 1–36 numeric (0–9) or uppercase alphabetic (A–Z) characters. Each character specifies one SYSOUT class value. Do not separate the class values by commas or blanks.

Default value

None.

Usage guidelines

Specify the same classes for which you specified BLNKTRC=NO on the JES2 OUTCLASS(v) statement before z/OS 2.4.

Or, specify this attribute for SYSOUT classes that have:

- Non-page-mode data sets that require trailing blanks to be preserved
- Data sets containing double-byte font characters

tcpip-job-name

This single-valued attribute specifies the name of the TCP/IP startup procedure. If you changed the name of the TCP/IP startup procedure, specify the new name for this attribute. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name

TCP/IP job name

Allowed values

You can enter a valid job name. The letters that you type are converted to uppercase.

Default value

TCPIP

trace-prompt

This single-valued attribute specifies whether the operator is prompted with message APS620A each time the FSS starts. The operator can use prompting to start tracing all FSAs before the FSA starts processing any data sets. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name

Trace prompt

Allowed values

You can enter one of these fixed values:

yes
    The operator is prompted when the FSS starts.

no
    The operator is not prompted.

Default value

no

trace-table-size

This single-valued attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the PSF FSA trace table. This allocation occurs only if the **trace-mode** attribute is internal, ipds, limit, full, or sync. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name

Trace table size

Allowed values

You can enter an integer 1 - 999.

Default value

32

unicode-enabled

This single-valued attribute specifies whether PSF is Unicode-enabled. When PSF is Unicode-enabled, you can use:

- Resources that are in path libraries (also called *resource directories*), such as TrueType fonts, OpenType fonts, color management resources, and data object resources
- QR bar codes with SOSI data

ISPF field name

Unicode enabled

Allowed values

You can enter one of these fixed values:

yes
  PSF is Unicode-enabled.

no
  PSF is not Unicode-enabled.

Default value

no

Usage guidelines

PSF V4R5 and later is always Unicode enabled; therefore, this attribute is ignored.

Attributes for the trace-parameters object class

Attributes are listed here that are valid for tracing Infoprint Server daemons. The attributes are in object class **trace-parameters**.

Note: The **trace-parameters** object class is not used with IP PrintWay basic mode.

You can set tracing values in the **trace-parameters** object that are equivalent to the environment variables for tracing, such as AOPTRACEON. When an Infoprint Server daemon is started, it uses the environment variables for tracing. However, if any of the **trace-parameters** attributes are set for a daemon, Infoprint Server then ignores the tracing environment variables and uses only the attributes that are set in the **trace-parameters** object, such as **traceon**.

When you use PIDU to add, modify, or delete **trace-parameters** attributes, use one of these daemon types for the object name:

AOP
>   The Printer Inventory Manager daemon, **aopd**.

IPC
>   The IBM HTTP Server daemon, which communicates between Infoprint Central and the web browser.

IPP
>   The Internet Printing Protocol (IPP) Server daemon, **aopippd**, which processes print jobs that are submitted by an IPP client.

LPD
>   The line printer daemon (LPD), **aoplpd**, which processes print jobs that are submitted with commands, such as **lpr**, and Infoprint Port Monitor for Windows.

NET
>   The NetSpool daemon, **aopnetd**, which supports printing from VTAM applications, such as CICS and IMS.

OUT
>   The IP PrintWay extended mode daemon, **aopoutd**, which selects output data sets from the JES spool and sends them to remote printers in a Internet Protocol network or to email destinations.

SSI
>   The Infoprint Central daemon, **aopssid**.

SUB
>   The Print Interface subsystem daemon, **aopsubd**, which processes output data sets when the DD JCL statement requests the subsystem on the SUBSYS parameter.

WSM
>   The IP PrintWay extended mode daemon, **aopwsmd**, which looks for new jobs on the JES spool and notifies **aopoutd**.

XFD
>   The Infoprint Server Transform Manager daemon, **aopxfd**.

After you add, modify, or delete the **trace-parameters** object, you must do one of these to make the change effective:

- Stop the daemon and restart Infoprint Server.

- Enter **aopsend -c updatetrace -m** *member-name*.

  member_name indicates one or all daemons. The values are:

  all
  >   All daemons that are currently running.

  aopibm00
  >   The Printer Inventory Manager daemon, **aopd**.

  ippibm00
  >   The Internet Printing Protocol (IPP) Server daemon, **aopippd**.

  lpdibm00
  >   The line printer daemon (LPD), **aoplpd**.

  netibm00
  >   The NetSpool daemon, **aopnetd**.

  outibm00
  >   The IP PrintWay extended mode daemon, **aopoutd**.

  ssiibm00
  >   The Infoprint Central daemon, **aopssid**.

  subibm00
  >   The Print Interface subsystem daemon, **aopsubd**.

wsmibm00
> The IP PrintWay extended mode daemon, **aopwsmd**.

xfdibm00
> The Infoprint Server Transform Manager daemon, **aopxfd**.

For information about using the **aopsend** command, see "aopsend command" on page 18.

For information about using the Printer Inventory to dynamically trace Infoprint Server daemons, see *z/OS Infoprint Server Messages and Diagnosis*.

Required attributes

All attributes are optional.

tracedata

This single-valued attribute specifies whether socket data is traced for a daemon.

ISPF field name

Trace type: Data

Allowed values

You can enter one of these fixed values:

yes
> Socket data is traced.

no
> Socket data is not traced.

Default value

no

Usage guidelines

This parameter takes the place of the AOPTRACEON_DATA environment variable.

tracedirectory

The directory where trace files are created for a daemon.

ISPF field name

Trace directory name

Allowed values

A valid combination of letters (a-z, A-Z), numbers ((0-9), and special characters (. /). Blanks are not allowed. The value is case-sensitive.

Default value

`/var/Printsrv/trace`

Usage guidelines

- The trace directory must exist and either the AOPADMIN group or, for Infoprint Central, the user ID of the user who starts the IBM HTTP Server—Powered by Apache must have permission to write to the specified trace directory.
- This parameter takes the place of the AOPTRACEDIR environment variable.

- If you use the **tracedirectory** attribute, you can specify a different directory for each daemon that uses dynamic tracing. If you use the **Trace directory name** field on the ISPF System Configuration panel, you can specify a single directory for all daemons that use dynamic tracing.

traceexit

This single-valued attribute specifies whether IP PrintWay extended mode exit data is traced for a daemon.

ISPF field name

Trace type: Exit

Allowed values

You can enter one of these fixed values:

yes
    Exit data is traced.

no
    Exit data is not traced.

Default value

no

Usage guidelines

This parameter takes the place of the AOPTRACEON_EXITMAP environment variable.

tracefiles

The number of trace files that are kept for a daemon.

ISPF field name

Number of files

Allowed values

An integer 1–9999.

Default value

2

Usage guidelines

- The trace data is appended to the file in the order it is traced.
- If the number of trace files exceeds the number that is specified, Infoprint Server deletes the oldest file.
- This attribute takes the place of the AOPTRACEMAXFILES environment variable.

tracefilter

This single-valued attribute specifies whether IP PrintWay extended mode filter data is traced for a daemon.

ISPF field name

Trace type: Filter

Allowed values

You can enter one of these fixed values:

yes
Filter data is traced.

no
Filter data is not traced.

Default value

no

Usage guidelines

This parameter takes the place of the AOPTRACEON_FILTER environment variable.

tracemegabytes

The maximum size in megabytes (MBs) of trace files that are created for a daemon.

ISPF field name

Trace type: Trace size (MBs)

Allowed values

An integer 1–9999.

Default value

50

Usage guidelines

- When the maximum size is reached, Infoprint Server creates a new trace file.
- This parameter takes the place of the AOPTRACEBYTES environment variable.

tracemsg

This single-valued attribute specifies whether message logging data is traced for a daemon.

ISPF field name

Trace type: Message log

Allowed values

You can enter one of these fixed values:

yes
Message logging data is traced.

no
Message logging data is not traced.

Default value

no

Usage guidelines

This parameter takes the place of the AOPTRACEON_MSGLOG environment variable.

traceon

This single-valued attribute specifies whether a general trace is done on an Infoprint Server daemon.

ISPF field name

Trace type: General

Allowed values

You can enter one of these fixed values:

yes
    A general trace is done on an Infoprint Server daemon.

no
    A general trace is not done on an Infoprint Server daemon.

Default value

no

Usage guidelines

This parameter takes the place of the AOPTRACEON environment variable.

Chapter 18. Using accounting information in SMF type 6 records

IP PrintWay and PSF write SMF type 6 records for data sets that Infoprint Server processes. For the formats of the SMF type 6 records that IP PrintWay and PSF write, see *z/OS MVS System Management Facilities (SMF)*. Additional information that can help you interpret these SMF type 6 records is provided here.

Interpreting the job name, job ID, and user ID fields in the SMF type 6 record

Table 55 on page 475 describes the contents of the SMF6JBN (job name), SMF6JBID (job ID), and SMF6USID (user ID) fields in the SMF type 6 record. The contents of these fields varies depending on how the print request was submitted to Infoprint Server and whether IP PrintWay or PSF writes the record. However, the contents are the same whether IP PrintWay basic mode or IP PrintWay extended mode writes the record.

Table 55. Contents of fields SMF6JBN, SMF6JBID, and SMF6USID in SMF type 6 record

If the print request was submitted in this way:	SMF6JBN field contains	SMF6JBID field contains	SMF6USID field contains
z/OS UNIX **lp** command or AOPPRINT JCL procedure.	The value in the optional **sysout-job-name** job attribute. If not specified, the z/OS user ID of the job submitter.	The value in the optional **sysout-job-id** job attribute. If not specified, the Infoprint Server job ID.[1]	The z/OS user ID of the job submitter.
Batch job, including batch jobs that use the Print Interface subsystem or IP PrintWay basic mode resubmit for filtering function.	The name of the batch job.	The z/OS job ID assigned to the data set.	IP PrintWay: The z/OS user ID of the job submitter. PSF: The z/OS user ID of the user who started the Infoprint Server daemons.
Print command or application on a remote system. Print commands include **enq**, **LPR**, and **print**. Applications include the Infoprint Port Monitor and SAP R/3.	The first 8 characters of the name of the remote job submitter.[2]	The value in the optional **sysout-job-id** job attribute. If not specified, the Infoprint Server job ID.[1]	IP PrintWay: The first 8 characters of the name of the remote job submitter.[2] PSF: The z/OS user ID of the user who started the Infoprint Server daemons.
VTAM applications, such as CICS and IMS applications.	The owner of the print job.[3] If no owner is specified, the member name of the NetSpool startup procedure.	The value in the optional **sysout-job-id** job attribute. If not specified, the Infoprint Server job ID.[1]	IP PrintWay: The owner of the print job.[3] If no owner is specified, the z/OS user ID of the user who started the Infoprint Server daemons. PSF: The z/OS user ID of the user who started the Infoprint Server daemons.

Table 55. Contents of fields SMF6JBN, SMF6JBID, and SMF6USID in SMF type 6 record (continued)			
If the print request was submitted in this way:	SMF6JBN field contains	SMF6JBID field contains	SMF6USID field contains

Notes:

1. The Infoprint Server job ID starts with the 2–character job prefix that is specified in the system configuration definition. The default prefix is PS.

2. The name of the remote job submitter in field SMF6JBN is in uppercase characters and might contain a #. A # replaces any character that JES does not allow in a job name. The name of the remote job submitter in field SMF6USID can be in uppercase and lowercase characters because the original case of the name is maintained. For print requests submitted from a Windows workstation, this is the Windows logon name. For print requests submitted with an LPR command, this is the value in the P control code in the LPD control file.

3. The owner of a print job can be specified in the **owner** job attribute that is embedded in VTAM application data or in the **Default owner** field in the printer definition. The owner in both the SMF6JBN and SMF6USID fields is in uppercase characters.

Related information: For information about the SMF type 6 record for IP PrintWay, see *z/OS MVS System Management Facilities (SMF)*.

Comparing SMF type 6 records written by IP PrintWay basic mode and extended mode

IP PrintWay basic mode and IP PrintWay extended mode write SMF type 6 records in different formats. Some fields are written only by IP PrintWay basic mode, and some fields are written only by IP PrintWay extended mode.

Tip: If you run both basic mode and extended mode (on different z/OS systems), you can use the same SMF accounting program to process both SMF type 6 record formats. To determine whether the SMF record was written by IP PrintWay basic mode or extended mode, your SMF accounting routine can check the SMF6INDC field in the SMF type 6 record:

- IP PrintWay basic mode: SMF6INDC = X'01'
- IP PrintWay extended mode: SMF6INDC = X'07'

IP PrintWay basic mode fields: These fields in the SMF type 6 record contain information only if IP PrintWay basic mode writes the record. If IP PrintWay extended mode writes the record, these fields contain binary zeros.

- SMF6IP1, SMF6IP2, SMF6IP3, SMF6IP4: The dotted decimal IP address of the printer if IP PrintWay basic mode used the LPR or direct sockets protocol to transmit the data set to the printer.

  Tip: IP PrintWay extended mode writes the printer's IP address in field SMF6URI instead.

- SMF6OUT: This field contains the name of the IP PrintWay basic mode FSA. If you run IP PrintWay extended mode, which does not have an FSA, this field contains zeros.

IP PrintWay extended mode fields: These fields in the SMF type 6 record contain information only if IP PrintWay extended mode writes the record. If IP PrintWay basic mode writes the SMF record, these fields (except for the SMF6FTL field) are not present.

- SMF6ACTL: The length of the accounting information in the SMF6ACCT field.
- SMF6ACCT: Accounting information from the JOB JCL statement.
- SMF6BYTD: The total number of bytes transmitted to the printer.

  Tips:

  1. IP PrintWay extended mode also writes the number of bytes in field SMF6BYTE. However, field SMF6BYTE contains a maximum value of 2 gigabytes. Therefore, if your installation prints documents

that contain more than 2 gigabytes, your SMF accounting program must use field SMF6BYTD instead of field SMF6BYTE.

   2. For some printers, IP PrintWay extended mode also writes the number of pages that printed in field SMF6PGE.

- SMF6FTL: The level of the SMF record:

Value
   Meaning

0
   IP PrintWay basic mode wrote the record.

1
   IP PrintWay extended mode wrote the record. Fields SMF6ACTL and SMF6ACCT are not present.

2
   IP PrintWay extended mode wrote the record. Fields SMF6ACTL and SMF6ACCT are present.

- SMF6PGE: The total number of pages that are printed or zero. When IP PrintWay extended mode uses direct socket protocol to a printer that supports Printer Job Language (PJL) and the **Record pages printed for accounting** field is selected in the printer definition, SMF6PGE is the total number of pages that are printed, including the pages in all copies of the document. Otherwise, SMF6PGE is zero because IP PrintWay extended mode does not know how many pages are printed. When IP PrintWay extended mode receives a PAGE mode job from JES, SMF6PGE is set to the value the SSS2PGCT received from SAPI.

Tips:

1. When the printer prints on both sides of a sheet of paper (duplex printing), each side is counted as one page. For more information, see "Tracking the number of printed pages (extended mode)" on page 172.

2. If you do not want the page count to include any duplicate pages that printed during retransmissions, select the **Restart printing after last successful page** field in the printer definition. For more information, see "Tracking the number of printed pages (extended mode)" on page 172.

3. If a document completes with an error, the page count includes only the pages (if any) that printed before the error occurred. Field SMF6DCI indicates that the document completed with an error.

4. When IP PrintWay extended mode is sending data to a remote PSF, the SMF6PGE and SMF6NLR fields can provide useful accounting information.

- SMF6URIL: The length of the SMF6URI field.

- SMF6URI: The type of protocol that IP PrintWay extended mode used to transmit the data set to the printer or email destination, and the address of the printer. The contents of this field vary depending on the protocol.

Tip: The value in this field is case-sensitive. The protocol type is always in lowercase.

Table 56. Contents of field SMF6URI in SMF type 6 record	
When IP PrintWay uses this protocol:	**Field SMF6URI contains:**
LPR	lpr://*hostname*/*queue* **Example:** `lpr://myprinter.xyz.com/RAW` **Tip:** The queue name is also written in field SMF6PRTQ.
Direct sockets	direct_sockets://*hostname*:*port* **Example:** `direct_sockets://myprinter.xyz.com:9100`

Table 56. Contents of field SMF6URI in SMF type 6 record (continued)	
When IP PrintWay uses this protocol:	**Field SMF6URI contains:**

IPP	The printer's URI in either http or ipp format
	
	Examples:
	
	`http://myprinter.xyz.com:631`
	`ipp://myprinter.xyz.com`

Email	mailto: **Example:** `mailto:` **Tip:** The email address is not written in this field.

Related information: For information about the SMF type 6 record for IP PrintWay, see *z/OS MVS System Management Facilities (SMF)*.

Writing an IP PrintWay SMF exit

You can write an IP PrintWay SMF exit to modify or suppress the SMF record before IP PrintWay writes it. You might want to write an SMF exit to:

- Suppress the first SMF record that IP PrintWay basic mode writes when the resubmit for filtering function is used. IP PrintWay basic mode writes one record when it sends the data set to Print Interface, and it writes another record when it sends the data set to the printer.
- Convert the value in the SMF6USID field to uppercase characters.
- Convert the value in the SMF6URI field to uppercase characters.

Related information: For information about:

- The IP PrintWay SMF exit, see *z/OS Infoprint Server Customization*.
- The SMF type 6 record for IP PrintWay, see *z/OS MVS System Management Facilities (SMF)*.

Appendix A. Printer attribute tables

Allocation attributes and corresponding OUTPUT or DD statement parameters

Table 57 on page 479 lists the attributes that you can specify in the Allocation section of a printer definition or in an Allocation component. For each attribute, the ISPF field name is listed and the corresponding parameter on an OUTPUT or DD JCL statement. When you specify a value in a field, Print Interface and NetSpool allocate data sets on the JES spool with the OUTPUT or DD statement parameter that corresponds to the field.

Table 57. Attributes used for job allocation and the corresponding OUTPUT parameters

ISPF field name	OUTPUT (or DD statement**) parameter
Address	ADDRESS
AFP parameters	AFPPARMS
Building	BUILDING
BURST (Yes, No)	BURST (YES, NO)
Character sets	CHARS
Checkpoint pages	CKPTPAGE
Checkpoint seconds	CKPTSEC
CLASS	CLASS
Color map	COLORMAP
Com setup member	COMSETUP
Copies[1]	COPIES *nnn*
Copy group	COPIES *group-value*
Department	DEPT
DEST	DEST *userid*
Duplex (Simplex, Duplex, Tumble)	DUPLEX (NO, YES, TUMBLE)
Error disposition (Default, Hold, Quit)	PRTERROR (DEFAULT, HOLD, QUIT)
FCB	FCB
FLASH count	FLASH *count*
FLASH name	FLASH *overlay-name*
Form definition	FORMDEF
FORMS	FORMS
GROUPID	GROUPID
HOLD (Yes, No)	HOLD ** (YES, NO)
Image shift (x-direction front, y-direction front, x-direction back, y-direction back)	OFFSETXF, OFFSETYF, OFFSETXB, OFFSETYB

Table 57. Attributes used for job allocation and the corresponding OUTPUT parameters (continued)

ISPF field name	OUTPUT (or DD statement**) parameter
Input tray	INTRAY
JES form length	FORMLEN
JES node	DEST *nodename*
Label data pages (Yes, No)	DPAGELBL (YES, NO)
LINECT	LINECT
Name	NAME
Notify (at node)	NOTIFY *userid* (*node*)
OUTDISP (Purge, Leave, Keep, Hold, Write)	OUTDISP (PURGE, LEAVE, KEEP, HOLD, WRITE)
Output bin	OUTBIN
Overlay (Back, Front)	OVERLAYB, OVERLAYF
Page definition	PAGEDEF
Print error messages (Yes, No, Maximum messages)	PIMSG (YES, NO, *msg-count*)
Print error reporting (None, All, Character, Position)	DATACK (BLOCK, UNBLOCK, BLKPOS, BLKCHAR)
PRMODE	PRMODE
PRTY	PRTY
Resolution	RESFMT
Resource directories	USERPATH
Resource library	USERLIB
Restrict printable area (Yes, No)	SYSAREA (YES, NO)
Room	ROOM
Table reference characters	TRC
THRESHLD	THRESHLD
Title	TITLE
UCS	UCS
USERDATA	USERDATA
WRITER	WRITER

1. You can use the **copies** attribute to specify a maximum of 32640 copies for print requests processed by Print Interface, while you can use the COPIES JCL parameter to specify a maximum of 255 copies.

Printer attributes used by Print Interface

lists the attributes that Print Interface uses in each section of a printer definition. For each attribute, the table lists the ISPF panel field name and whether the attribute is required or optional. Use this table to determine which printer attributes to specify when you configure a printer definition for use by Print Interface. Print Interface ignores all fields that are not listed in this table.

Table 58. Printer definition fields used by Print Interface

Section of printer definition	ISPF field name	Condition	Notes
Main section	Printer definition name	Required	
	Description	Optional	This value can help a user select the correct printer.
	Location	Optional	This value can help a user select the correct printer.
Allocation	Spool allocation values	Required	Specify the JES work-selection values for the program that processes output data sets on the JES spool (for example, IP PrintWay basic mode or PSF), or specify the job selection rules for IP PrintWay extended mode. For a list of all fields in the Allocation section, see Table 57 on page 479.
	All other fields	Optional	
Processing	Document code page	Optional	Leave this field blank if you want Print Interface to determine the default dynamically.
	Printer code page	Optional, but suggested	Specify an ASCII or EBCDIC code page.
	Data format	Required	Select at least one data format.
	Filter	Optional	IBM suggests that you specify `aopfiltr.so` for text data in an IP PrintWay printer definition.
	Maximum document size	Optional	If not specified, no limit is enforced for document size.
	Maximum copies	Optional	If not specified, no limit is enforced.
	Forms supported	Optional	If not specified, all forms are allowed.
	Duplex supported	Optional	
	Print-error reporting supported	Optional	
	Input tray name, Number	Optional	If not specified, **input-tray** job attribute is not supported.
	Output bin name, Number	Optional	If not specified, **output-bin** job attribute is not supported.

Printer attributes used by NetSpool

Table 59 on page 482 lists the attributes that NetSpool uses in each section of a printer definition. For each attribute, the table lists the ISPF panel field name and whether the attribute is required or optional. Use this table to determine which printer attributes to specify when you configure a printer definition for use by NetSpool. NetSpool ignores all fields that are not listed in this table.

Table 59. Printer definition fields used by NetSpool

Section of printer definition	ISPF field name	Condition	Notes
Main section	Printer definition name	Required	
	Description	Optional	NetSpool does not use this field. However, this field can help you manage your printer definitions.
	Location	Optional	NetSpool does not use this field. However, this field can help you manage your printer definitions.
	NetSpool LU name	Required	
	LU classes	Optional	Default is class 1.
Allocation	Spool allocation values	Required	Specify the JES work-selection values for the program that processes output data sets on the JES spool (for example, IP PrintWay basic mode or PSF), or specify the job selection rules for IP PrintWay extended mode. For a list of all fields in the Allocation section, see Table 57 on page 479.
	All other fields	Optional	

Table 59. Printer definition fields used by NetSpool (continued)			
Section of printer definition	**ISPF field name**	**Condition**	**Notes**
Processing	Document code page	Optional	Used only when formatting option is **Convert to PCL**.
	Printer code page	Optional	Used only when formatting option is **Convert to PCL**.
	Data format	Required	Select at least one data format.
	Filter	Optional	
	Maximum document size	Optional	If not specified, no limit is enforced for document size.
	Maximum copies	Optional	If not specified, no limit is enforced.
	Forms supported	Optional	If not specified, all forms are allowed.
	Duplex supported	Optional	
	Print-error reporting supported	Optional	
	Input tray name, Number	Optional	If not specified, **input-tray** job attribute is not supported.
	Output bin name, Number	Optional	If not specified, **output-bin** job attribute is not supported.
	SCS Conversion Margins: Top Margins: Bottom Margins: Left Margins: Right Line length Page length	Optional	Default values are: Margins: Top = 1 Margins: Bottom = 1 Margins: Left = 1 Margins: Right = 80 Line length = 80 Page length = 1
	NetSpool PCL Conversion Print density Line density Orientation SCS automatic Page orientation	Optional	No default values. Used only when formatting option is **Convert to PCL**.
NetSpool Options	Formatting	Optional	Default is **Convert to line**.
	Record size	Optional	Applies to formatting option **None**.
	RECFM	Optional	Applies to formatting option **None**.
	Default owner	Optional	Default is the ID of the user who started Infoprint Server daemons.
	Embedded attributes prefix	Optional	Default is that NetSpool does not use job attributes that are specified in the print data.
NetSpool End-of-File Rules	All fields	Optional	Default rule is end-of-bracket for all PLU names and LU types.

Printer attributes used by IP PrintWay

lists the attributes that IP PrintWay uses in each section or component of a printer definition. For each attribute, the table lists the ISPF panel field name and whether the attribute is required or optional. Use this table to determine which printer attributes to specify when you configure a printer definition for use by IP PrintWay. IP PrintWay ignores all fields that are not listed in this table.

Table 60. Printer attributes for IP PrintWay

Section of printer definition	ISPF field name	Condition	Notes
Main section	Printer definition name	Required	
	Description	Optional	IP PrintWay does not use this field, but this field can help you manage your printer definitions.
	Location	Optional	IP PrintWay does not use this field, but this field can help you manage your printer definitions.
	Use DEST, CLASS, and FORMS for IP PrintWay printer selection	Optional	
Allocation	CLASS, DEST, FORMS	(See Notes column)	If **Use DEST, CLASS**, and **FORMS** for IP PrintWay Printer Selection is selected, **CLASS**, **DEST**, or **FORMS** is required.
	Values for Separator Pages	Optional	IP PrintWay exits can access the information in these fields when Print Interface or NetSpool allocates the output data set on the JES spool.
	FCB	Optional	IP PrintWay extended mode uses this field. IP PrintWay basic mode uses it only when Print Interface or NetSpool allocates the output data set on the JES spool.
	Notify	Optional	IP PrintWay extended mode uses this field. IP PrintWay basic mode uses it only when Print Interface or NetSpool allocates the output data set on the JES spool.
	Copies	Optional	IP PrintWay uses this field only when Print Interface or NetSpool allocates the output data set on the JES spool.

Table 60. Printer attributes for IP PrintWay (continued)			
Section of printer definition	**ISPF field name**	**Condition**	**Notes**
Processing	Document code page	Optional	
	Printer code page	Optional	
	Data format	Required	Applies to IP PrintWay extended mode only. Select at least one data format.
	Filter	Optional	IBM suggests that you specify `aopfiltr.so` for text data in an IP PrintWay printer definition.
	Maximum document size	Optional	If not specified, no limit is enforced for document size.
	Maximum copies	Optional	If not specified, no limit is enforced.
	Duplex supported	Optional	Applies to IP PrintWay extended mode only.
	Resubmit for filtering	Optional	Applies to IP PrintWay basic mode only. If this field is selected, **Data format** is required, and these fields are optional: • **Filter** • **Maximum document size** • **Forms supported** • **Duplex supported** • **Print-error reporting supported**

	IP PrintWay Line-to-Text Conversion
	  Pagination
	  Margins: Top
	  Margins: Bottom
	  Page height
	  Print page header
		Optional	

	SOSI mode	Optional	Applies to IP PrintWay basic mode only.
	Translation dataset qualifier	Optional	Applies to IP PrintWay basic mode only.
	Double-byte translate table	Optional	Applies to IP PrintWay basic mode only.
IP PrintWay Options	All fields	Optional	Applies to IP PrintWay basic mode only: • Formatting • PostScript header Applies to IP PrintWay extended mode only: • Automatic dataset grouping • Backup printer • Form feed

Table 60. Printer attributes for IP PrintWay (continued)

Section of printer definition	ISPF field name	Condition	Notes
Protocol	Protocol	Required	Displayed only in the Protocol component.
	Operator security profile	Optional	Applies to IP PrintWay extended mode only.
	Printer IP address	(See Notes column)	Required if protocol is **LPR** or **Direct sockets**.
	Print queue name	(See Notes column)	Required if protocol is **LPR**.
	Port number	(See Notes column)	Required if protocol is **Direct sockets**.
	URL	(See Notes column)	Required if protocol is **IPP**.
	To addresses	(See Notes column)	Required if protocol is **Email**.

	LPR processing options
	  Mode
	  Optimize copies
	  Restrict ports
	  Print banner page
	  Banner class
	  Banner job name
	  Filename
	  Indent
	  Owner
	  Print function
	  Title
	  Width
	  User options
		Optional	Used only if protocol is **LPR**.

	Direct sockets processing options
	  Record pages printed for accounting
	  Restart printing after last successful page
		Optional	Used only if protocol is **Direct sockets**.

	Email processing options
	  CC addresses
	  BCC addresses
	From address
	  From name
	Reply address
	Use reply address as from address
	Embedded headers
	  Inline text and line data
	  Inline text attribute
	  Inline message
		Optional	Used only if protocol is **Email**. Applies to IP PrintWay extended mode only for **Embedded headers**, **Inline text and line date**, **Inline text attribute**, and **Inline message**.

Appendix B. ISPF panels

Infoprint Server provides ISPF panels that you can use to create and edit definitions in the Printer Inventory:

Main ISPF panel for an IP PrintWay printer definition

This is the first ISPF panel for an IP PrintWay printer definition.

```
                    IP PrintWay Printer Definition

 Printer definition name . _____
 Description . _____ (extend)
 Location. . . _____ (extend)


                       Component name        Custom values
 Section               (enter to list)     (enter to customize)
 Allocation         => _____       => __
 Processing         => _____       => *
 NetSpool options   => _____       => __
 NetSpool end-of-file => _____      => __
 IP PrintWay options => _____       => __
 Protocol           => _____       => *

 _ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
 NetSpool LU name . _____    LU classes . . __  __  __  __  __  __   (extend)
```

Main ISPF panel for a PSF printer definition

This is the first ISPF panel for a PSF printer definition.

```
                     PSF Printer Definition

Printer definition name . _____
Description . _____ (extend)
Location. . . _____ (extend)

                     Component name       Custom values
Section              (enter to list)      (enter to customize)
Allocation        => _____       => __
Processing        => _____       => *_
NetSpool options  => _____       => __
NetSpool end-of-file => _____     => __

NetSpool LU name . _____    LU classes . . __  __  __  __  __  __   (extend)
```

Main ISPF panel for a General printer definition

This is the first ISPF panel for a General printer definition.

```
                     General Printer Definition

Printer definition name . _____
Description . _____ (extend)
Location. . . _____ (extend)

                     Component name       Custom values
Section              (enter to list)      (enter to customize)
Allocation        => _____       => __
Processing        => _____       => *_
NetSpool options  => _____       => __
NetSpool end-of-file => _____     => __
IP PrintWay options => _____      => __

NetSpool LU name . _____    LU classes . . __  __  __  __  __  __   (extend)
Spooling mode. . . _   1. Line  2. Stream
```

ISPF panel for the Allocation section or component

This is the ISPF panel for the Allocation section of a printer definition and for the Allocation component.

```
                            Allocation

Spool allocation values:
   CLASS . . . . _              GROUPID . . _____
   DEST. . . . . _____       LINECT. . . ___
   JES node. . . _____       PRMODE  . . _____
   FCB . . . . . ___            PRTY. . . . ___
   FLASH count . ___            THRESHLD. . _____
   FLASH name. . ____           UCS . . . . ____
   FORMS . . . . _____       WRITER. . . _____
   USERDATA
      . . _____ (extend)
   BURST . . . . _  1. Yes  2. No
   HOLD. . . . . _  1. Yes  2. No
   OUTDISP . . . _  1. Purge (without printing)  2. Leave
                    3. Keep  4. Hold  5. Write
Values for Separator Pages:
   Address
      . . _____ (extend)
   Building . . . _____
   Department . _____
   Name . . . . _____
   Room . . . . _____
   Title  . . . _____
Resource Related Values:
   Form definition . _____
   Character sets  . ____   ____  ____  ____
   Overlay front . . _____   Back . . _____
   Input tray  . . . ___
   Output bin  . . . _____
   Page definition . _____
   Resource library. _____ (extend)
   Resource directories. _____ (extend)
   Image shift x-direction front . . _____   Back . . _____
               y-direction front . . _____   Back . . _____
Error Reporting Values:
   Print error reporting. . _  1. None  2. All  3. Character  4. Position
   Error disposition. . . . _  1. Default  2. Hold  3. Quit
   Print error messages . . _  1. No  2. Yes
       Maximum messages. . ___
Other Values:
   Notify . . . . . . . _____  at node . . _____
                        _____  at node . . _____
                        _____  at node . . _____
                        _____  at node . . _____
   Checkpoint pages . . _____
   Checkpoint seconds . _____
   Copies . . . . . . . _____
   Copy group . . . . . ___   ___   ___   ___   ___   ___   ___   ___
   Color map. . . . . . _____
   Com setup member . . _____
   JES form length. . . _____
   Resolution . . . . . ___
   AFP parameters . . . _____
   Duplex . . . . . . . _  1. Simplex  2. Duplex  3. Tumble
   Label data pages . . _  1. Yes  2. No
   Restrict printable area . . _  1. Yes  2. No
    _ Table reference characters
    _ Save AFP statistics
```

ISPF panel for the Processing section or component

This is the ISPF panel for the Processing section of a printer definition and for the Processing component.

```
                            Processing

Document code page . . _____
Printer code page. . . _____

Supported Data Formats and Associated Filters:
Data format:  Filter:
/ Line data   _____(extend)
/ MO:DCA-P    _____(extend)
/ PostScript  _____(extend)
/ Text        _____(extend)
/ PCL         _____(extend)
/ PDF         _____(extend)
/ SAP         _____(extend)
/ XML         _____(extend)
/ TIFF        _____(extend)
/ JPEG        _____(extend)
/ Other       _____(extend)

_ Resubmit for filtering

Transforms to AFP:
  Fail on error . . . .  _   1. No  2. Error  3. Warning
  Trailer error page. .  _   1. No  2. Error  3. Warning

AFP to PDF Transform Encryption:
   User identifier . _____ (extend)
   Owner identifier. _____ (extend)
   Encryption level  2  1. Low (40-bit key)  2. High (128-bit key)
                        3. AES (128-bit key) 4. AES  (256-bit key)
   Protected actions:
      Restrict print. . . 2  1. Yes  2. No
      Restrict copy . . . 2  1. Yes  2. No
      Restrict update . . 2  1. Yes  2. No

Accessible PDF Transform:
   User accessibility control file . _____ (extend)
   Author . . _____ (extend)
   Keywords . _____ (extend)
   Subject. . _____ (extend)
   Title. . . _____ (extend)

Signed PDF Transform:
   Digital certificate name . _____ (extend)
   Signature contact. . _____ (extend)
   Signature location . _____ (extend)
   Signature name . . . _____ (extend)
   Signature reason . . _____ (extend)

SCS Conversion:
   Margins:  Top . . . ___   Bottom . . ___   Left . . ___   Right . . ___
   Line length . . . . ___            Page length . . ___
   Tabs:  Vertical . . ___  ___  ___  ___  ___  (extend)
          Horizontal . ___  ___  ___  ___  ___  (extend)

NetSpool PCL Conversion:
   Print density . . . ___
   Line density. . . . __
   Orientation . . . . 1  1. None  2. Portrait  3. Landscape
   _ SCS automatic page orientation

IP PrintWay Line-to-Text Conversion:
   / Pagination
      Margins:  Top . . _____   Bottom . . _____
      Page height . . . 58_____
      / Print page header
```

```
Maximum document size . _____
Maximum copies. . . . . _____
Forms supported . . . . _____ _____ _____ _____ _____
Duplex supported. . . . / Simplex   / Duplex   / Tumble
Print-error reporting supported . / Character   / Position

Input tray name:   Number: (more)    Output bin name:   Number: (more)
---------------    ---               ---------------    -----
---------------    ---               ---------------    -----

 IP PrintWay Basic Mode Attributes:
   SOSI mode . . . . . . . . . . _   1. None  2. ASCII  3. Space  4. EBCDIC
   Translation dataset qualifier . _____
   Double-byte translate table . __
     1. BIG5            2. EUCKANJI        3. HANGEUL
     4. IBMKANJI        5. JIS78KJ-ASCII   6. JIS78KJ-JISROMAN
     7. JIS83KJ-ASCII   8. JIS83KJ-JISROMAN  9. KSC5601
    10. SCHINESE       11. SJISKANJI       12. TCHINESE
```

ISPF panel for the NetSpool Options section or component

This is the ISPF panel for the NetSpool Options section of a printer definition and for the NetSpool Options component.

```
                    NetSpool Options

Printer definition name . _____


Formatting . . . . 2   1. None  2. Convert to Line  3. Convert to PCL
   Record size . . _____
   RECFM . . . . . _   1. VB  2. VBA  3. VBM

Default owner. . . _____
Embedded attributes prefix . . _____
```

ISPF panel for the NetSpool End-of-File section or component

This is the ISPF panel for the NetSpool End-of-File Rules section of a printer definition and for the NetSpool End-of-File Rules component.

```
                      NetSpool End-of-File Rules
  Option ===> _____

  Default rules           1 All LUs    2 LU0     3 LU1     4 LU3

  PLU name   _____     5 All LUs    6 LU0     7 LU1     8 LU3
  PLU name   _____     9 All LUs   10 LU0    11 LU1    12 LU3
  PLU name   _____    13 All LUs   14 LU0    15 LU1    16 LU3
  PLU name   _____    17 All LUs   18 LU0    19 LU1    20 LU3
  PLU name   _____    21 All LUs   22 LU0    23 LU1    24 LU3
  PLU name   _____    25 All LUs   26 LU0    27 LU1    28 LU3
  PLU name   _____    29 All LUs   30 LU0    31 LU1    32 LU3
  PLU name   _____    33 All LUs   34 LU0    35 LU1    36 LU3
  PLU name   _____    37 All LUs   38 LU0    39 LU1    40 LU3
  PLU name   _____    41 All LUs   42 LU0    43 LU1    44 LU3
  PLU name   _____    45 All LUs   46 LU0    47 LU1    48 LU3
  PLU name   _____    49 All LUs   50 LU0    51 LU1    52 LU3
  PLU name   _____    53 All LUs   54 LU0    55 LU1    56 LU3
  PLU name   _____    57 All LUs   58 LU0    59 LU1    60 LU3
  PLU name   _____    61 All LUs   62 LU0    63 LU1    64 LU3
  PLU name   _____    65 All LUs   66 LU0    67 LU1    68 LU3
  PLU name   _____    69 All LUs   70 LU0    71 LU1    72 LU3
  PLU name   _____    73 All LUs   74 LU0    75 LU1    76 LU3
  PLU name   _____    77 All LUs   78 LU0    79 LU1    80 LU3
  PLU name   _____    81 All LUs   82 LU0    83 LU1    84 LU3
  PLU name   _____    85 All LUs   86 LU0    87 LU1    88 LU3
  PLU name   _____    89 All LUs   90 LU0    91 LU1    92 LU3
  PLU name   _____    93 All LUs   94 LU0    95 LU1    96 LU3
```

This is the ISPF panel for entering the end-of-file rule for a PLU name and LU type.

```
                      NetSpool End of File Rule

  End of file method . _   1. End of bracket  2. End of chain  3. End of session
                           4. String          5. Timer
  Delete form feed . . _   1. None  2. Leading  3. Trailing  4. Both

  String . _____
     / Keep

  Timeout idle interval . . _____    Busy interval . . _____
```

ISPF panel for the IP PrintWay Options section or component

This is the ISPF panel for the IP PrintWay Options section of a printer definition and the IP PrintWay Options component.

```
                    IP PrintWay Options

Retention period:
   Successful. . . . _____   Failure . . _____
Retry time . . . . . _____
Retry limit. . . . . _____

Connection timeout . 30_
Response timeout . . 600__
Backup printer . . . _____   (extended mode)
Exits:
   Begin data set. . _____   End data set. . _____   Record. . _____

Document header  . . _____(extend)
   / Translate document header
Document trailer . . _____(extend)
   / Translate document trailer

Formatting:
   Transparent data char . 35
   Form feed .  .  .  .  .  0D0C_____  (extended mode)
   Delete form feed. . . . 1  1. None  2. Leading  3. Trailing  4. Both
   Carriage control type . _  1. None  2. Machine  3. ANSI
   _ Automatic dataset grouping (extended mode)
   Dataset grouping. . . . 2  1. None  2. Job  3. Concatenate job
   Line termination. . . . _____
   _ Omit line termination at EOF

Basic Mode Formatting:
   Formatting. . . . . . . _  1. None         2. Standard
                              3. Translate only  4. Use FCB
   PostScript header . . . _  1. Add           2. Ignore
                              3. Landscape      4. Always landscape
```

ISPF panels for the Protocol section or component

These are the ISPF panels for the Protocol section of an IP PrintWay printer definition and for the Protocol component. The Protocol section in a printer definition is different for each protocol: LPR, direct sockets, Internet Printing Protocol (IPP), VTAM, and email. The ISPF panel for the Protocol component is the same for all protocols.

Note: The VTAM protocol is listed on the ISPF panel; however, the VTAM protocol is only used if Infoprint Coaxial Printer Support for z/OS is installed. Because Infoprint Coaxial Printer Support for z/OS is not supported in z/OS V2R5, the VTAM protocol is no longer documented.

LPR Protocol panel

This is the ISPF panel for the LPR Protocol section of a printer definition.

```
                        LPR Protocol

  Printer definition name . _____
  Operator security profile
     . . . _____

  Printer IP address . _____(extend)
  Print queue name . . _____(extend)

  LPR Processing Options:
     Mode . . . . . . . . 2  1. Control file first  2. Control file last
                             3. Stream              4. Remote PSF
     _ Optimize copies
     _ Restrict ports
     / Print banner page
          Banner class. . _____
          Banner job name _____(extend)
     Filename . . . . . . _____
     Indent . . . . . . . _____
     Owner. . . . . . . . _____
     Print function . . . f
     Title. . . . . . . . _____(extend)
     Width. . . . . . . . _____
     User options . . . . _____(extend)
```

Direct Sockets Protocol panel

This is the ISPF panel for the Direct Sockets Protocol section of a printer definition.

```
                      Direct Sockets Protocol

  Printer definition name . _____
  Operator security profile
     . . . _____

  Printer IP address . _____(extend)
  Port number. . . . . _____

  Printer Job Language (PJL) options:
     _ Record pages printed for accounting
     _ Restart printing after last successful page
```

IPP Protocol panel

This is the ISPF panel for the IPP Protocol section of a printer definition.

```
                          IPP Protocol

  Printer definition name . _____
  Operator security profile
     . . . _____

  URL. . . . . . . . . _____(extend)
```

VTAM Protocol panel

This is the ISPF panel for the VTAM Protocol section of a printer definition.

Note: The VTAM protocol is listed on the ISPF panel; however, the VTAM protocol is only used if Infoprint Coaxial Printer Support for z/OS is installed. Because Infoprint Coaxial Printer Support for z/OS is not supported in z/OS V2R5, the VTAM protocol is no longer documented.

```
                            VTAM Protocol

   Printer definition name . _____
   Operator security profile
      . . . _____

   Printer LU name. . . _____

   VTAM Processing Options:
      Printer logmode. . . _____
      Checkpoint pages . . 5_
      _ Send as transparent data
```

Email Protocol panel

This is the ISPF panel for the Email Protocol section of a printer definition.

```
                            Email Protocol

   Printer definition name . _____

   To addresses
      . . . _____ (more)
   CC addresses
      . . . _____ (more)
   BCC addresses
      . . . _____ (more)
   From address
      . . . _____
   From name . . ._____
   Reply address ._____
   _ Use reply address as from address

   IP PrintWay Extended Mode:
      _ Embedded headers
      _ Inline text and line data
      Inline text attribute . . _____
      Inline message
      . . . _____ (extend)
```

Protocol component

This is the ISPF panel for the Protocol component.

```
                         Protocol
Component name. . . . . _____
Description . _____
Operator security profile
    . . . _____1 1. LPR  2. IPP  3. Direct sockets 4. VTAM  5. Email
Protocol . . . . . . . 1  1. LPR  2. IPP  3. Direct sockets 4. VTAM  5. Email
Printer IP address . _____(extend)
Print queue name . . _____(extend)
Port number. . . . . _____
URL. . . . . . . . . _____(extend)
Printer LU name. . . _____
To addresses
    . . _____ (more)

LPR Processing Options:
   Mode . . . . . . . . 2  1. Control file first  2. Control file last
                           3. Stream              4. Remote PSF
   _ Optimize copies
   _ Restrict ports
   / Print banner page
         Banner class. . _____
         Banner job name _____(extend)
      Filename . . . . . _____
      Indent . . . . . . _____
      Owner. . . . . . . _____
      Print function . . . f
      Title. . . . . . . _____(extend)
      Width. . . . . . . _____
      User options . . . . _____(extend)

Direct Sockets Processing Options:
   Printer Job Language (PJL) options:
      _ Record pages printed for accounting
      _ Restart printing after last successful page

VTAM Processing Options:
   Printer logmode. . . _____
   Checkpoint pages . . 5
   _ Send as transparent data

Email Processing Options:
   CC addresses
      . . . _____ (more)
   BCC addresses
      . . . _____ (more)
   From address
      . . . _____
   From name . . ._____
   Reply address ._____
   _ Use reply address as from address
   IP PrintWay Extended Mode:
      _ Embedded headers
      _ Inline text and line data
      Inline text attribute . . _____
      Inline message
      . . . _____ (extend)
```

ISPF panel for a printer pool definition

This is the ISPF panel for a printer pool definition.

```
                              Printer Pool

   Pool name . . . _____
   LU name . . . . _____
   Description . _____ (extend)

   LU classes. . . _____ __ __ __ __      (extend)
   NetSpool end-of-file component . . _____   (list)
   Default owner . . . _____
   Embedded attributes prefix . . _____

   Printer definition names . . _____  _____   (list)
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
              _____  _____  _____
```

ISPF panel for an IP PrintWay job selection rule

This is the ISPF panel for an IP PrintWay extended mode job selection rule.

```
                            Job Selection Rule

   Rule name . . _____
   Description . _____(extend)
   Operator security profile
       . . . _____

   DEST. . . _____
   CLASS . . _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
             _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
   FORMS . . _____ _____ _____ _____
             _____ _____ _____ _____
   Creator . _____
   WRITER. . _____

   DEST IP address . 3  1. Include  2. Exclude  3. Ignore

   Record limit . . . . . Lower _____  Upper _____
   Page limit (AFP-only). Lower _____  Upper _____
```

ISPF panel for an IP PrintWay FSS definition

This is the ISPF panel for an IP PrintWay FSS definition.

```
                          IP PrintWay FSS

  FSS name. . . _____
  Description . _____(extend)

    _  Old-style translation
  Hiperspace blocks . . _____
  TCP/IP job name . . . _____
  Document code page. . _____
  Applid. . . . . . . . _____
  National language . . 1   1. English  2. Japanese
  Trace mode. . . . . . 1   1. None  2. Internal  3. No printing  4. Full
      __ Trace prompt
      Trace table size . ___
```

ISPF panel for an IP PrintWay FSA definition

This is the ISPF panel for an IP PrintWay FSA definition.

```
                          IP PrintWay FSA

  FSA Name. . . _____
  Description . _____(extend)

  Trace mode . . 1  1. None  2. Internal  3. No printing  4. Full
```

ISPF panel for a PSF FSS definition

This is the ISPF panel for a PSF FSS definition.

```
                            PSF FSS

  FSS name. . . _____
  Description . _____ (extend)

    TCP/IP job name. . . . _____
    NST trace dsname . . . _____
    PINST trace dsname . . _____
    Trace table size . . 32_
    _ Trace prompt
    _ Unicode enabled
    _ Log messages
    / Blank truncation
    Restore blanks classes . . _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
                               _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
```

ISPF panel for a PSF FSA definition for a channel-attached printer

This is the ISPF panel for a PSF FSA definition for a channel-attached printer.

```
                        PSF FSA, Channel

FSA Name. . . _____
Description . _____ (extend)
Location. . . _____ (extend)
Operator security profile
  . . . _____

Processing Information:
  _ Blank compression
  _ Consolidate IM1 images
  _ Inhibit recovery
  _ Close libraries when idle
  _ Release data set when repositioning
  _ Suppress copy marks
  _ CSE sheet eject
  _ CSE preserve page position
  _ Use Line-Mode Migration LINECT
  Above the bar storage. . . . . _  1. None  2. Inline resources
  Check CSE fit. . . . . . . . . _  1. No  2. First  3. All
  CSE orientation. . . . . . . . _  1. Portrait  2. Landscape
  Eject to front facing. . . . . _  1. None  2. Job  3. Document  4. Both
  Offset stacking. . . . . . . . _  1. None  2. Data set  3. Job
  Auxiliary files MO:DCA level . 1  1. None  2. IS/3  3. BPF match
  Default process mode . . . . . _____
  Resolution . . . . . . . . . . ___    (240, 300)
  Resource deletion ratio. . . . ___    (0–100)

Resources:
  Form definition. . _____
  Page definition. . _____
  Character sets . . ____ ____ ____ ____
  Color map. . . . . _____
  Com setup member . _____
  Overlay. . . . . . _____
  / Prune double-byte fonts
  / Prune single-byte fonts
  _ Map to outline fonts
  _ Recover from font not found
  _ Send default character

Retained Resource Counts:
  Form definitions . _____
  Page definitions . _____
  Page segments. . . _____
  Fonts. . . . . . . _____
  Object containers. _____

Input Tray Substitution:
  Source tray:  Substitute trays:
                Simplex  Duplex

  ---           ---      ---
  ---           ---      ---
  ---           ---      ---
  ---           ---      ---

Error Reporting Values:
  _ Error disposition supported
  _ Send msgs to SYSOUT
  Print error messages . . 2  1. No  2. Yes
       Maximum messages. . 16_    (0-999)
  Print error reporting. . 1  1. NONE  2. All 3. Character  4. Position
Separator page:
  / Interrupt message page
      _ Mark page
      _ Offset page
      Copies . . __  (1-10)
```

```
Connection:
   Connect interval . . . . _____   (0-86400 seconds)
   Acknowledgement level. . 1  1. Page  2. Sheet
   Failure action . . . . . _  1. Stop  2. Wait for connect
   Channel buffer count . . _____   (1-10000)

Printer Sharing:
   Release mode . . . . 3  1. Idle  2. Time  3. None
   Release interval . . _____   (0-86400 seconds)
   Acquire interval . . _____   (0-86400 seconds)

Security Labeling:
   Label data pages. . . . . _  1. Yes  2. No
   Label separator pages . . _  1. Yes  2. No
   Restrict printable area . _  1. Yes  2. No

Debugging:
   Dump:
      Code . . _____   Message ID . . _____   Count . . 1   (1-99)
   Trace:
    _ Trace user data
      Trace mode . . . . 2  1. None  2. Internal  3. Sync
                            4. Full  5. Limit     6. IPDS
      Trace table size . 32   (1-999)
      FSA trace dsname . _____

3800 Compatibility:
   _ Override default font
   Set media origin to 3800 origin for:
      _ Data set
      _ Data set header
      _ Job header
      _ Job trailer
      _ Message data set
```

ISPF panel for a PSF FSA definition for a TCP/IP-attached printer

This is the ISPF panel for a PSF FSA definition for a TCP/IP-attached printer.

```
                       PSF FSA, TCP/IP

FSA Name. . . . _____
Description . _____ (extend)
Location. . . . _____ (extend)
Operator security profile
   . . . _____

Processing Information:
  _ Blank compression
  _ Consolidate IM1 images
  _ Inhibit recovery
  _ SNMP enabled
  _ Close libraries when idle
  _ Capture inline resources
  _ Release data set when repositioning
  _ Suppress copy marks
  / Issue intervention messages
  _ Highlight communications failure message
  _ CSE sheet eject
  _ CSE preserve page position
  _ Use Line-Mode Migration LINECT
  Above the bar storage. . . . . _  1. None  2. Inline resources
  Check CSE fit. . . . . . . . . _  1. No  2. First  3. All
  CSE orientation. . . . . . . . _  1. Portrait  2. Landscape
  Eject to front facing. . . . . _  1. None  2. Job  3. Document  4. Both
  Issue setup messages . . . . . _  1. None  2. Burst  3. Forms  4. All
  Offset stacking. . . . . . . . _  1. None  2. Data set  3. Job
  Auxiliary files MO:DCA level . 1  1. None  2. IS/3  3. BPF match
  Default process mode . . . . . _____
  Resolution . . . . . . . . . . ___   (240, 300)
  Resource deletion ratio. . . . ___   (0–100)

Resources:
  Form definition. . _____
  Page definition. . _____
  Character sets . . ____ ____ ____ ____
  Color map. . . . . _____
  Com setup member . _____
  Overlay. . . . . . _____
  / Prune double-byte fonts
  / Prune single-byte fonts
  _ Map to outline fonts
  _ Recover from font not found
  _ Send default character

Retained Resource Counts:
  Form definitions . _____
  Page definitions . _____
  Page segments. . . _____
  Fonts. . . . . . . _____
  Object containers. _____

Input Tray Substitution:
  Source tray:  Substitute trays:
                Simplex  Duplex

     ---         ---      ---
     ---         ---      ---
     ---         ---      ---
     ---         ---      ---

 Error Reporting Values:
  _ Error disposition supported
  _ Send msgs to SYSOUT
  Print error messages . . 2  1. No  2. Yes
      Maximum messages. . 16_   (0-999)
  Print error reporting. . 1  1. NONE  2. All 3. Character  4. Position

Separator page:
  / Interrupt message page
      _ Mark page
      _ Offset page
      Copies . . __  (1-10)
```

```
   Connection:
      _ TCPIP 64K Buffer Support
      Connect interval . .  600    (0-86400 seconds)
      Failure action. . . . _  1. Stop  2. Wait for connect
      Disconnect action . . 2  1. Stop  2. Redrive
      Disconnect interval . _____   (0-86400)
      Management mode . . . 3  1. Immediate  2. Dial in  3. Output available
      No response action. . _  1. Notify JES      2. Notify user
                               3. Notify operator  4. Terminate
          Notify . . . . . . _____
      Response timeout. . . _____   (0-20864)
      Printer IP address. . _____
      Port number . . . . . 5001

   Printer Sharing:
      Release mode . . . . 3  1. Idle  2. Time  3. None
      Release interval . . _____  (0-86400 seconds)
      Acquire interval . . _____  (0-86400 seconds)

   Security Labeling:
      Label data pages. . . . . _  1. Yes  2. No
      Label separator pages . . _  1. Yes  2. No
      Restrict printable area . _  1. Yes  2. No

   Debugging:
      Dump:
         Code . . _____   Message ID . . _____   Count . . 1    (1-99)
      Trace:
         _ Trace user data
         Trace mode . . . . 2  1. None   2. Internal  3. Sync
                              4. Full  5. Limit    6. IPDS
         Trace table size . 32   (1-999)
         FSA trace dsname . _____

   3800 Compatibility:
      _ Override default font
      Set media origin to 3800 origin for:
         _ Data set
         _ Data set header
         _ Job header
         _ Job trailer
         _ Message data set
```

ISPF panel for a PSF FSA definition for an SNA-attached printer

This is the ISPF panel for a PSF FSA definition for an SNA-attached printer.

```
                    PSF FSA, SNA

FSA Name. . . _____
Description . _____ (extend)
Location. . . _____ (extend)
Operator security profile
   . . . _____

Processing Information:
  _ Blank compression
  _ Consolidate IM1 images
  _ Inhibit recovery
  _ Close libraries when idle
  _ Capture inline resources
  _ Release data set when repositioning
  _ Suppress copy marks
  / Issue intervention messages
  _ CSE sheet eject
  _ CSE preserve page position
  _ Use Line-Mode Migration LINECT
  Above the bar storage. . . . . _  1. None  2. Inline resources
  Check CSE fit. . . . . . . . . _  1. No  2. First  3. All
  CSE orientation. . . . . . . . _  1. Portrait  2. Landscape
  Eject to front facing. . . . . _  1. None  2. Job  3. Document  4. Both
  Issue setup messages . . . . . _  1. None  2. Burst  3. Forms  4. All
  Offset stacking. . . . . . . . _  1. None  2. Data set  3. Job
  Auxiliary files MO:DCA level . 1  1. None  2. IS/3  3. BPF match
  Default process mode . . . . . _____
  Resolution . . . . . . . . . . ___   (240, 300)
  Resource deletion ratio. . . . ___   (0-100)

Resources:
  Form definition. . _____
  Page definition. . _____
  Character sets . . ____ ____ ____ ____
  Color map. . . . . _____
  Com setup member . _____
  Overlay. . . . . . _____
  / Prune double-byte fonts
  / Prune single-byte fonts
  _ Map to outline fonts
  _ Recover from font not found
  _ Send default character

Retained Resource Counts:
  Form definitions . _____
  Page definitions . _____
  Page segments. . . _____
  Fonts. . . . . . . _____
  Object containers. _____

Input Tray Substitution:
  Source tray:  Substitute trays:
                Simplex  Duplex

    ---           ---      ---
    ---           ---      ---
    ---           ---      ---
    ---           ---      ---

Error Reporting Values:
  _ Error disposition supported
  _ Send msgs to SYSOUT
  Print error messages . . 2  1. No  2. Yes
      Maximum messages. . 16   (0-999)
  Print error reporting. . 1  1. NONE  2. All 3. Character  4. Position

Separator page:
  /  Interrupt message page
      _ Mark page
      _ Offset page
      Copies . . __  (1-10)
```

```
Connection:
   Connect Interval. . . _____   (0-86400 seconds)
   Failure action. . . . _  1. Stop  2. Wait for connect
   Applid. . . . . . . . _____
   Disconnect action . . 2  1. Stop  2. Redrive
   Disconnect interval . _____   (0-86400)
   Logmode . . . . . . . _____
   LU name . . . . . . . _____
   Management mode . . . 3  1. Immediate  2. Dial in  3. Output available
   No response action. . _  1. Notify JES      2. Notify user
                            3. Notify operator  4. Terminate
      Notify . . . . . _____
   Response timeout. . . _____   (0-20864)
   _ End SNA conversation

Printer Sharing:
   Release mode . . . . 3  1. Idle  2. Time  3. None
   Release interval . . _____   (0-86400 seconds)
   Acquire interval . . _____   (0-86400 seconds)

Security Labeling:
   Label data pages. . . . . _  1. Yes  2. No
   Label separator pages . . _  1. Yes  2. No
   Restrict printable area . _  1. Yes  2. No

Debugging:
   Dump:
      Code . . _____   Message ID . . _____   Count . . 1   (1-99)
   Trace:
      Trace mode . . . . 2  1. None  2. Internal  3. Sync
                           4. Full  5. Limit    6. IPDS
      Trace table size . 32   (1-999)
      FSA trace dsname . _____

3800 Compatibility:
   _ Override default font
   Set media origin to 3800 origin for:
      _ Data set
      _ Data set header
      _ Job header
      _ Job trailer
      _ Message data set
```

ISPF panel for a PSF FSA definition for AFP Download Plus

This is the ISPF panel for a PSF FSA definition for the AFP Download Plus feature of PSF.

```
                    PSF FSA, AFP Download Plus

  FSA Name. . . _____
  Description . _____ (extend)
  Location. . . _____ (extend)
  Operator security profile
    . . . _____

  Processing Information:
    _ Blank compression
    _ Consolidate IM1 images
    _ Release data set when repositioning
    _ Page accounting supported
    _ Report Line-Mode Conversion paper-length errors
    _ Use Line-Mode Migration LINECT
    _ Save auxiliary files
    Above the bar storage. . . . . _  1. None  2. Inline resources
    Default process mode. .  _____
    Paper width . . . . .  _____
    Paper length. . . . .  _____
    Resolution. . . . . .  ___  (240, 300)
    Image output format. . . . . . . . . 1  1. IOCA  2. Unchanged
    Auxiliary files MO:DCA level . . . . . 1  1. None  2. IS/3  3. BPF match
    Map Coded Font (MCF) Format 2 name . . 1  1. Code page and character set
                                              2. Coded font

    Working directory . . /var/psf_____ (extend)

  Printer Supported Functions:
    _ GOCA Box orders
    _ GOCA Set Fractional Line Width orders
    _ GOCA Set Process Color orders
    _ IOCA replicate and trim function
    _ Object identifier (OID) format

  Resources:
    Form definition. . _____
    Page definition. . _____
    Character sets . . ____ ____ ____ ____
    Color map. . . . . _____
    Com setup member . _____
    _ Map to outline fonts
    _ Recover from font not found

  Resources Included Inline:
    / Bar code objects (BCOCA)
    / Font objects (FOCA)
    / Form definitions
    / Graphics objects (GOCA)
    / Image objects (IOCA)
    / Object containers
    / Overlays
    / Page segments
    / Presentation text objects (PTOCA)
    / TrueType fonts
    Color management resources. . 3  1. None  2. All  3. Generic

   Error Reporting Values:
     _ Error disposition supported
     _ Message files read access
     _ Send msgs to SYSOUT
     Print error messages . . . 2  1. No  2. Yes
          Maximum messages. . . 16_  (0-999)
     Print error reporting. . . 1  1. None  2. All  3. Character  4. Position
     Send messages on failure . 1  1. All   2. Generic only
```

```
Connection:
   Connect Interval  . . 600__   (0-86400 seconds)
   No response action  . _  1. Notify JES      2. Notify user
                            3. Notify operator  4. Terminate
      Notify. . . . . .  _____
   Response timeout . .  _____   (0-86400)
   IP address  . . . . . _____
   Port number . . . . . 5001

Transmission:
   _ Data set grouping
   / Secure transmission
   _ Send separator pages
   _ Display status
   Compression. . . . 1  1. None  2. LZW
   Direct download. . 1  1. None  2. MO:DCA-P
   Recovery pages . . 1000   (0-65535)

Debugging:
   Dump:
      Code . . _____   Message ID . . _____   Count . . 1_   (1-99)
   Trace:
      _ Trace user data
      Trace mode . . . . 2  1. None  2. Internal  3. Sync
                           4. Full  5. Limit     6. IPDS
      Trace table size . 32_   (1-999)
      FSA trace dsname . _____

3800 Compatibility:
   _ Override default font
   Set media origin to 3800 origin for:
      _ Data set
```

ISPF panel for the system configuration definition

This is the ISPF panel for the Infoprint Server system configuration definition and dynamic tracing configuration.

```
                     Infoprint Server: System Configuration

Startup Information:
   / Resolve IP PrintWay printers
   Base directory  . . . . . . . . /var/Printsrv                (extend)
   Printer Inventory name  . . . . AOP1
   JES subsystem name  . . . . . .
   XCF group name  . . . . . . . . AOPAOP1
   Started daemons:
        ippd      / lpd          netd        outd
        ssid        subd         xfd

General:
   Operating mode . . . . . . . . . . . . . 1  1. z/OS 2.1  2. z/OS 2.2
   Job ID prefix . . . . . . . . . . . . . . PS
   _ Allow all characters in line data

Code Pages:
   ASCII  . . ISO8859-1_____
   EBCDIC . . IBM-1047_____

Messages:
   Log retention period (days)  . . . . . . . 1_
   Maximum Historical Inventory size (MBs)  . 10___
   Log stream name  . . . . . . . . . . . . . _____
   Send messages to hardcopy log  . . . . . . 3  1. All  2. List  3. None
   Message list for hardcopy log  . . . . . . _____  _____      (more)

Tracing:
   Daemon type:       AOP  IPP  LPD  NET  OUT  SSI  SUB  WSM  XFD  IPC
   Trace type:
   General  . . . . . /    _    _    _    /    _    _    _    _    /
   Data . . . . . . . _    _    _    _    _    _    _    _    _    _
   Message log  . . . _    _    _    _    _    _    _    _    _    _
   Filter . . . . . . _    _    _    _    _    _    _    _    _    _
   Exit . . . . . . . _    _    _    _    _    _    _    _    _    _
   Trace size (MBs) . 50__ 50__ 50__ 50__ 50__ 50__ 50__ 50__ 50__ 50__
   Number of files  . 2___ 2___ 2___ 2___ 2___ 2___ 2___ 2___ 2___ 2___
   Trace directory name . . . /var/Printsrv/trace_____ (extend)

Infoprint Central:
   _ Use Apache HTTP server user ID (required configuration)
   _ Use output disposition
   _ Use unencrypted connection
   Extended MCS console name . . AOP1xxxx

IP PrintWay (extended mode):
   _ Ignore DEST, CLASS, FORMS routing errors
   / Select work from hold queue
   _ Suppress formatting after UNIX filter
   / Write SMF records
   APPL ID . . . . . . . . . . _____
   Blank truncation classes . . _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
 _
                                _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Email:
     / Send email to address of first document
     _ Do not add suffixes to files
     Preserve suffixes . . . . _____ _____  _____     (more)
     Application path  . . . . /bin/sendmail_____ (extend)
     Application options . . . _____ (extend)

Print Interface:
   IPP port number . . 631__
   LPD port number . . 515__

Other:
   _____ (more)
```

Appendix C. Remote PSF options

The options are listed here that IP PrintWay includes in the LPD control file when you select the **Remote PSF** option in the **Mode** field on the Protocol ISPF panel for a printer definition. For more information, see "Printing with a remote PSF print server (basic and extended mode)" on page 188.

The **Remote PSF** option is intended to be used when you use IP PrintWay to transmit EBCDIC data. Some of the options are meaningful only if the data set contains non-AFP records, and parameters are created only in that case. Of the other parameters that you can create, some are intended to be used in actual processing of the data set, and others are intended to convey information to be used for the eventual distribution of the printed output.

The full option names are described in the next list. Abbreviations that IP PrintWay uses are given in parentheses.

Some option values (such as address values) can contain embedded blanks. Because a blank is a delimiter for options in the control file, each embedded blank is replaced with X'1C'.

Options created if line-mode records exist in the data set

-OFILEFORMAT
Set to "record". Indicates that the records are prefixed with length fields.

-OCHARS
Set to the values of the CHARS or UCS parameter if specified on JCL or defaulted by JES. This value can also be specified in an Infoprint Server job attribute and in the printer definition.

-OCC
Set to "YES" or "NO", depending on whether the data set record format specifies carriage control. This value can also be specified in JCL, in an Infoprint Server job attribute, and in the printer definition.

-OCCTYPE
If the record format specifies carriage control, set to either "a" or "m", indicating ANSI or machine carriage control. This value can also be specified in JCL, in an Infoprint Server job attribute, and in the printer definition.

-OPAGEDEF
Set to the value of the PAGEDEF or FCB parameter if specified on JCL. JES can provide a default value if you run IP PrintWay basic mode. This value can also be specified in an Infoprint Server job attribute and in the printer definition. A "P1" prefix is added to the value if necessary.

-OPRMODE
Set to the value of the PRMODE JCL parameter, only if the value is SOSI1, SOSI2, SOSI3, or SOSI4. Otherwise, this option is not created. This value can also be specified in an Infoprint Server job attribute and in the printer definition.

-OTRC
Set to "YES" or "NO", based on the value of the TRC parameter. This value can be specified on JCL as TRC=YES, or with the DCB specification: OPTCD=J. It can also be specified in an Infoprint Server job attribute and in the printer definition.

Note: IP PrintWay extended mode uses values that are specified in the printer definition. However, IP PrintWay basic mode uses values that are specified in the printer definition only if Print Interface or NetSpool allocated the output data set on the JES spool or the **Resubmit for filtering** field is selected in the printer definition. Values that are specified by a job submitter, either on JCL or in an Infoprint Server job attribute, always override values that are specified in the printer definition.

Processing options created for all data set types

-ODATATYPE (odatat)

Set to "line" (l) if any non-AFP records exist in the data set. (AFP records are identified by the presence of an X'5A' control byte at the beginning of the record.) Otherwise, set to "afp" (a).

-OCOPIES (ocop)

Set to the JCL COPIES transmission count. If COPIES is not specified on JCL, in a job attribute, or in the printer definition, the default is 1.

-ODATACK (odatac)

Set to the value of the DATACK parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-ODUPLEX (odu)

Set to the value of the DUPLEX parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OINTRAY (oin)

Set to the value of the INTRAY parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OFORMDEF (of)

Set to the value of the FORMDEF parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. This option is created even if no form definition is specified. A prefix of X'F1' is added to the value, if necessary, unless the value is "DUMMY".

-OOFFSETXB (ooffxb)

Set to the value of the OFFSETXB parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OOFFSETXF (ooffxf)

Set to the value of the OFFSETXF parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OOFFSETYB (ooffyb)

Set to the value of the OFFSETYB parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OOFFSETYF (ooffyf)

Set to the value of the OFFSETYF parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OOUTBIN (ooutbin)

Set to the value of the OUTBIN parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, this option is not created.

-OPASSTHRU (opa)

This option consists of these suboptions:

-FORMS

Set to the value of the FORMS parameter from JCL or the printer definition. This value can be defaulted by JES.

-CLASS

Set to the value of the CLASS parameter from JCL or the printer definition. This value can be defaulted by JES.

-DESTINATION

Set to the value of the DEST parameter from JCL or the printer definition. This value can be defaulted by JES.

Xpage-definition

Set to the value of the PAGEDEF or FCB parameter if specified on JCL. JES can provide a default value if you run IP PrintWay basic mode. This value can also be specified in an Infoprint Server job attribute

and in the printer definition. A "P1" prefix is added to the value if necessary. This parameter is created only if the data stream does not contain any line-mode records.

Note: Values from the printer definition are used if Print Interface or NetSpool allocated the output data set on the JES spool and in some other cases. Values that are specified by a job submitter always override values that are specified in the printer definition.

Informational options created for all data set types

-OJOBNAME (ojobn)
Set to the JES job name associated with the print data set.

-OUSERID (ous)
Set to the z/OS user id associated with the print data set.

-ONODEID (ono)
Set to the z/OS node id associated with the print data set.

-OPROGRAMMER (opr)
Set to the value of the programmer name from the JCL JOB statement. If not specified, this option is not created.

-OPASSTHRU (opa)
This option can consist of this suboption:

-SEGMENTID
Set to the value of the segment id of the print data set, if one exists. If it does not exist, the SEGMENTID suboption is not included the PASSTHRU option.

-OADDRESS1
Set to the value of the first address subparameter from the ADDRESS parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the OADDRESS1 option is not created.

-OADDRESS2
Set to the value of the second address subparameter from the ADDRESS parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the OADDRESS2 option is not created.

-OADDRESS3
Set to the value of the third address subparameter from the ADDRESS parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the OADDRESS3 option is not created.

-OADDRESS4
Set to the value of the fourth address subparameter from the ADDRESS parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the OADDRESS4 option is not created.

-OBUILDING (obu)
Set to the value of the BUILDING parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the OBUILDING option is not created.

-ODEPARTMENT (ode)
Set to the value of the DEPT parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the ODEPARTMENT option is not created.

-ONAME (ona)
Set to the value of the NAME parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the ONAME option is not created.

-OROOM (oro)

Set to the value of the ROOM parameter on the OUTPUT JCL statement. If not specified, set to the ROOM parameter on the JOB JCL statement. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If no room value is specified, the OROOM option is not created.

-OTITLE (oti)

Set to the value of the TITLE parameter if specified on JCL. This value can also be specified in an Infoprint Server job attribute and in the printer definition. If not specified, the OTITLE parameter is not created.

Appendix D. Sample IP PrintWay printer definitions

You use Infoprint Server ISPF panels to do these tasks:

- "Creating components for IP PrintWay printer definitions" on page 513
- "Creating an IP PrintWay printer definition for the LPR protocol" on page 517
- "Creating an IP PrintWay printer definition for the email protocol" on page 523

For information about how to navigate the Infoprint Server ISPF panels to create components and printer definitions, see:

- "Managing components" on page 228
- "Managing printer definitions" on page 223

Creating components for IP PrintWay printer definitions

You complete ISPF panels to create these components, which are used by the sample IP PrintWay printer definitions:

- Allocation component
- Processing component
- IP PrintWay Options component

In these components, values that might be common to several printer definitions are specified. Values in the sample components are shown in either normal or bold text:

- Normal text indicates a default value. Default values are displayed automatically in the ISPF panels.
- **Bold** text indicates a value that you must explicitly specify in the component.

Allocation component

This component assumes that the IP PrintWay extended mode job selection rule selects output data sets in JES output class K, or the IP PrintWay basic mode functional subsystem (FSA) is defined to JES with a work-selection criterion of class K. Therefore, K is specified in the **CLASS** field. For information about how to define job selection rules and IP PrintWay FSAs, see *z/OS Infoprint Server Customization*.

```
                             Allocation

Component name. . . . . .printway_____
Description . JES allocation values for IP PrintWay_____

Spool allocation values:
   CLASS . . . . . K               GROUPID . . _____
   DEST. . . . . _____          LINECT. . . ___
   JES node. . . _____          PRMODE  . . _____
   FCB . . . . . ____              PRTY. . . . __
   FLASH count . ___               THRESHLD. . _____
   FLASH name. . ____              UCS . . . . ____
   FORMS . . . . _____          WRITER. . . _____
   USERDATA
      . . _____ (extend)
   BURST . . . . _  1. Yes  2. No
   HOLD. . . . . _  1. Yes  2. No
   OUTDISP . . . _  1. Purge (without printing)  2. Leave
                    3. Keep  4. Hold  5. Write
Values for Separator Pages:
   Address
      . . _____ (extend)
   Building . . _____
   Department . _____
   Name . . . . _____
   Room . . . . _____
   Title  . . . _____
Resource Related Values:
   Form definition . _____
   Character sets  . ____  ____  ____  ____
   Overlay front . . _____   Back . . _____
   Input tray  . . . ___
   Output bin  . . . _____
   Page definition . _____
   Resource library. _____ (extend)
   Resource directories. _____ (extend)
   Image shift x-direction front . . _____   Back . . _____
               y-direction front . . _____   Back . . _____
Error Reporting Values:
   Print error reporting. . _  1. None  2. All  3. Character  4. Position
   Error disposition. . . . _  1. Default  2. Hold  3. Quit
   Print error messages . . _  1. No  2. Yes
        Maximum messages. . ___
Other Values:
   Notify . . . . . . _____  at node . . _____
                      _____  at node . . _____
                      _____  at node . . _____
                      _____  at node . . _____
   Checkpoint pages . . _____
   Checkpoint seconds . _____
   Copies . . . . . . . _____
   Copy group . . . . . ___  ___  ___  ___  ___  ___  ___  ___
   Color map. . . . . . _____
   Com setup member . . _____
   JES form length. . . _____
   Resolution . . . . . ___
   AFP parameters . . . _____
   Duplex . . . . . . . _  1. Simplex  2. Duplex  3. Tumble
   Label data pages . . _  1. Yes  2. No
   Restrict printable area . . _  1. Yes  2. No
    _ Table reference characters
    _ Save AFP statistics
```

Processing component for PostScript and PCL printers

Component **postscript/pcl** is suitable for printers that can accept PostScript, PCL, and text data.

This component assumes that you installed IBM Print Transform from AFP to Adobe PostScript for z/OS. If you installed a different transform, specify the filter for the transform in the **Filter** field.

If you did not install an AFP to PostScript or AFP to PCL transform, do not select the **MO:DCA-P** data format, do not specify a transform filter in the **Filter** field, and do not select the **Resubmit for filtering** field. The **Resubmit for filtering** field applies only to IP PrintWay basic mode.

Fields under the **SCS Conversion** and **NetSpool PCL Conversion** headings are used only when NetSpool processes input SCS data. If you do not use NetSpool, these fields are ignored.

```
                            Processing

Component name. . . . . .postscript/pcl___
Description . Data formats and code page for PostScript and PCL pinters

Document code page . . _____
Printer code page. . . ISO8859-1

Print Interface Supported Data Formats and Associated Filters:
Data format:  Filter:
/ Line data    _____ (extend)
/ MO:DCA-P     afpxps.dll -c US                                  (extend)
/ PostScript   _____ (extend)
/ Text         aopfiltr.so                                       (extend)
/ PCL          _____ (extend)
_ PDF          _____ (extend)
_ SAP          _____ (extend)
_ XML          _____ (extend)
_ TIFF         _____ (extend)
_ JPEG         _____ (extend)
_ Other        _____ (extend)

/ Resubmit for filtering

Transforms to AFP:
  Fail on error . . . .  _   1. No  2. Error  3. Warning
  Trailer error page. .  _   1. No  2. Error  3. Warning

AFP to PDF Transform Encryption:
   User identifier . _____ (extend)
   Owner identifier. _____ (extend)
   Encryption level  2  1. Low (40-bit key)  2. High (128-bit key)
                        3. AES (128-bit key) 4. AES  (256-bit key)
   Protected actions:
      Restrict print. . . 2  1. Yes  2. No
      Restrict copy . . . 2  1. Yes  2. No
      Restrict update . . 2  1. Yes  2. No

  Accessible PDF Transform:
    User accessibility control file . _____ (extend)
    Author . . _____ (extend)
    Keywords . _____ (extend)
    Subject. . _____ (extend)
    Title. . . _____ (extend)

  Signed PDF Transform:
    Digital certificate name . _____ (extend)
    Signature contact. . _____ (extend)
    Signature location . _____ (extend)
    Signature reason . . _____ (extend)

  SCS Conversion:
    Margins: Top . . . 6__    Bottom . . 62_   Left . . 11_   Right . . 71_
    Line length . . . . 80_          Page length . . 66_
    Tabs: Vertical . . ___  ___  ___  ___  ___  (extend)
          Horizontal . ___  ___  ___  ___  ___  (extend)

  NetSpool PCL Conversion:
    Print density . . . 10_
    Line density. . . . 6_
    Orientation . . . . 1  1. None  2. Portrait  3. Landscape
    _ SCS automatic page orientation

  IP PrintWay Line-to-Text Conversion:
    / Pagination
      Margins:  Top . . 5   Bottom . . 5
      Page height . . . 66
      / Print page header
```

```
Maximum document size . _____
Maximum copies. . . . . _____
Forms supported . . . . _____ _____ _____ _____ _____
Duplex supported. . . . / Simplex   / Duplex   / Tumble
Print-error reporting supported . / Character   / Position

Input tray name:    Number: (more)    Output bin name:   Number: (more)
----------------    ---               ----------------   -----
----------------    ---               ----------------   -----

IP PrintWay Basic Mode Attributes:
  SOSI mode . . . . . . . . . . _   1. None  2. ASCII  3. Space  4. EBCDIC
  Translation dataset qualifier . _____
  Double-byte translate table . __
    1. BIG5            2. EUCKANJI         3. HANGEUL
    4. IBMKANJI        5. JIS78KJ-ASCII    6. JIS78KJ-JISROMAN
    7. JIS83KJ-ASCII   8. JIS83KJ-JISROMAN 9. KSC5601
   10. SCHINESE       11. SJISKANJI        12. TCHINESE
```

IP PrintWay Options component

This component changes the response timeout value, specifies a retry time and a retry limit for unsuccessful transmissions, and specifies a retain value for failed transmissions.

Tips:

1. IP PrintWay extended mode: Consider specifying a higher value in the **Response timeout** field to give the operator more time to solve a printer problem before IP PrintWay extended mode resends data to the printer. Resending data can result in duplicate pages. A higher value is suitable for IP PrintWay extended mode because it can send data to other printers while it waits for a response from the printer. For more information, see "Handling unsuccessful data transmissions (basic and extended mode)" on page 165.

2. IP PrintWay basic mode: Consider specifying 0D25 in the **Line termination** field because the IP PrintWay basic mode default is not suitable for many ASCII printers. For more information, see "Converting line data to a text data stream (basic and extended mode)" on page 177.

```
                        IP PrintWay Options

Component name. . . . . .retain_____
Description . Retain data sets that fail transmission for one day_____

Retention period:
   Successful. . . . _____    Failure . . 0024:00:00
Retry time . . . . . 0000:10:00
Retry limit. . . . . 3____

Connection timeout . 30_
Response timeout . . 60__
Backup printer . . . _____    (extended mode)
Exits:
   Begin data set. . _____    End data set. . _____    Record. . _____

Document header  . . _____ _____ (extend)
   / Translate document header
Document trailer . . _____ (extend)
   / Translate document trailer

Formatting:
   Transparent data char . 35
   Form feed .  .  .  .  .  0D0C_____ (extended mode)
   Delete form feed. . . . 1  1. None  2. Leading  3. Trailing  4. Both
   Carriage control type . _  1. None  2. Machine  3. ANSI
   _ Automatic dataset grouping (extended mode)
   Dataset grouping. . . . 2  1. None  2. Job  3. Concatenate job
   Line termination. . . . _____
   _ Omit line termination at EOF

Basic Mode Formatting:
   Formatting. . . . . . . _  1. None           2. Standard
                              3. Translate only 4. Use FCB
   PostScript header . . . _  1. Add            2. Ignore
                              3. Landscape      4. Always landscape
```

Creating an IP PrintWay printer definition for the LPR protocol

You complete ISPF panels to create an IP PrintWay printer definition for a remote printer that contains an LPD, for example, an InfoPrint 21 printer. IP PrintWay uses the LPR protocol to transmit data to this printer. This printer definition contains values that are used by Print Interface, NetSpool, and IP PrintWay.

Job submitters can print on this printer by specifying mypsprinter as the name of the print queue or printer definition. JCL users can also print on this printer by specifying CLASS=K and DEST=MYPSPRT on an OUTPUT JCL statement. VTAM applications can print on this printer by specifying LUPRT001 as the secondary LU name.

Values on the printer definition panels contain default values and values from the component that are displayed automatically in the ISPF panels, and values that you must explicitly specify in the printer definition.

This panel includes the Allocation, Processing, and IP PrintWay Options components that were created in "Creating components for IP PrintWay printer definitions" on page 513.

```
                         IP PrintWay Printer Definition
Printer definition name . mypsprinter_____
Description . A PostScript and PCL printer_____ (extend)
Location. . . Building 003, office E9-11_____ (extend)

                          Component name         Custom values
Section                   (enter to list)      (enter to customize)
Allocation        => printway_____     => *_
Processing        => postscript/pcl____     => __
NetSpool options  => _____     => __
NetSpool end-of-file  => _____     => __
IP PrintWay options   => retain_____     => __
Protocol          => _____     => *_

/ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
NetSpool LU name . LUPRT001   LU classes . . 2_ __  __  __  __  __   (extend)
```

```
                             Allocation
Printer definition name . mypsprinter_____

Spool allocation values:
    CLASS . . . . K            GROUPID . . _____
    DEST. . . . . MYPSPRT_     LINECT. . . ___
    JES node. . . _____     PRMODE  . . _____
    FCB . . . . . 8___         PRTY. . . . ___
    FLASH count . ___          THRESHLD. . _____
    FLASH name. . ____         UCS . . . . ____
    FORMS . . . . _____     WRITER. . . _____
    USERDATA
        . . _____ (extend)
    BURST . . . . _  1. Yes  2. No
    HOLD. . . . . _  1. Yes  2. No
    OUTDISP . . . _  1. Purge (without printing)  2. Leave
                     3. Keep  4. Hold  5. Write
Values for Separator Pages:
    Address
        . . _____ (extend)
    Building . . _____
    Department . _____
    Name . . . . _____
    Room . . . . _____
    Title  . . . _____
Resource Related Values:
    Form definition . _____
    Character sets  . ____  ____  ____  ____
    Overlay front . . _____   Back . . _____
    Input tray  . . . ___
    Output bin  . . . _____
    Page definition . _____
    Resource library. _____ (extend)
    Resource directories. _____ (extend)
    Image shift x-direction front . . _____   Back . . _____
                y-direction front . . _____   Back . . _____
Error Reporting Values:
    Print error reporting. . _  1. None  2. All  3. Character  4. Position
    Error disposition. . . . _  1. Default  2. Hold  3. Quit
    Print error messages . . _  1. No  2. Yes
        Maximum messages. . ___
Other Values:
    Notify . . . . . . . _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
    Checkpoint pages . . _____
    Checkpoint seconds . _____
    Copies . . . . . . . _____
    Copy group . . . . . ___  ___  ___  ___  ___  ___  ___  ___
    Color map. . . . . . _____
    Com setup member . . _____
    JES form length. . . _____
    Resolution . . . . . ___
    AFP parameters . . . _____
    Duplex . . . . . . . _  1. Simplex  2. Duplex  3. Tumble
    Label data pages . . _  1. Yes  2. No
    Restrict printable area . . _  1. Yes  2. No
    _ Table reference characters
    _ Save AFP statistics
```

```
                                 Processing
   Printer definition name .mypsprinter_____

   Document code page . . _____
   Printer code page. . . ISO8859-1_____

   Supported Data Formats and Associated Filters:
   Data format:  Filter:
   / Line data   _____ (extend)
   / MO:DCA-P    afpxps.dll -c US_____ (extend)
   / PostScript  _____ (extend)
   / Text        aopfiltr.so_____ (extend)
   / PCL         _____ (extend)
   _ PDF         _____ (extend)
   _ SAP         _____ (extend)
   _ XML         _____ (extend)
   _ TIFF        _____ (extend)
   _ JPEG        _____ (extend)
   _ Other       _____ (extend)

   / Resubmit for filtering

   Transforms to AFP:
     Fail on error . . . .  _   1. No  2. Error  3. Warning
     Trailer error page. .  _   1. No  2. Error  3. Warning

   AFP to PDF Transform Encryption:
     User identifier . _____ (extend)
     Owner identifier. _____ (extend)
     Encryption level  2  1. Low (40-bit key)  2. High (128-bit key)
                          3. AES (128-bit key) 4. AES  (256-bit key)
     Protected actions:
        Restrict print. . . 2  1. Yes  2. No
        Restrict copy . . . 2  1. Yes  2. No
        Restrict update . . 2  1. Yes  2. No

   Accessible PDF Transform:
     User accessibility control file . _____ (extend)
     Author . . _____ (extend)
     Keywords . _____ (extend)
     Subject. . _____ (extend)
     Title. . . _____ (extend)

   Signed PDF Transform:
     Digital certificate name . _____ (extend)
     Signature contact. . _____ (extend)
     Signature location . _____ (extend)
     Signature reason . . _____ (extend)

   SCS Conversion:
     Margins: Top . . . 6__   Bottom . . 62_   Left . . 11_   Right . . 71_
     Line length . . . . 80_           Page length . . 66_
     Tabs:  Vertical . . ___  ___  ___  ___  ___ (extend)
            Horizontal . ___  ___  ___  ___  ___ (extend)

   NetSpool PCL Conversion:
     Print density . . . 10_
     Line density. . . . 6_
     Orientation . . . . 1 1. None  2. Portrait  3. Landscape
     _ SCS automatic page orientation

   IP PrintWay Line-to-Text Conversion:
     / Pagination
        Margins:  Top . . 5_____   Bottom . . 5_____
        Page height . . . 66_____
        / Print page header
```

```
   Maximum document size . _____
   Maximum copies. . . . . _____
   Forms supported . . . . _____ _____ _____ _____ _____
   Duplex supported. . . . / Simplex   / Duplex   / Tumble
   Print-error reporting supported . / Character   / Position

   Input tray name:    Number: (more)    Output bin name:    Number: (more)
   ---------------     ---               ---------------     -----
   ---------------     ---               ---------------     -----

   IP PrintWay Basic Mode Attributes:
     SOSI mode . . . . . . . . . _   1. None  2. ASCII  3. Space  4. EBCDIC
     Translation dataset qualifier . _____
     Double-byte translate table . __
        1. BIG5              2. EUCKANJI          3. HANGEUL
        4. IBMKANJI          5. JIS78KJ-ASCII     6. JIS78KJ-JISROMAN
        7. JIS83KJ-ASCII     8. JIS83KJ-JISROMAN  9. KSC5601
       10. SCHINESE         11. SJISKANJI        12. TCHINESE
```

Note: When you first view the Processing panel, only filter **aopfiltr.so** is displayed in the **Filter** field for the **Text** data format. You must remove (space over) the name of this filter so that the filters that are specified in the Processing component are used. After you remove the filter name, press **Enter**.

```
                        NetSpool Options

Printer definition name . mypsprinter_____


Formatting . . . . 3   1. None  2. Convert to line  3. Convert to PCL
   Record size . . _____
   RECFM . . . . . _   1. VB  2. VBA  3. VBM

Default owner . . . _____
Embedded attributes prefix . . _____
```

```
                     NetSpool End-of-File Rules
 Option === 1

 Printer definition name . mypsprinter

 Default rules        1 All LUs    2 LU0    3 LU1    4 LU3

 PLU name  _____    5 All LUs    6 LU0    7 LU1    8 LU3
 PLU name  _____    9 All LUs   10 LU0   11 LU1   12 LU3
 PLU name  _____   13 All LUs   14 LU0   15 LU1   16 LU3
 PLU name  _____   17 All LUs   18 LU0   19 LU1   20 LU3
 PLU name  _____   21 All LUs   22 LU0   23 LU1   24 LU3
 PLU name  _____   25 All LUs   26 LU0   27 LU1   28 LU3
 PLU name  _____   29 All LUs   30 LU0   31 LU1   32 LU3
 PLU name  _____   33 All LUs   34 LU0   35 LU1   36 LU3
 PLU name  _____   37 All LUs   38 LU0   39 LU1   40 LU3
 PLU name  _____   41 All LUs   42 LU0   43 LU1   44 LU3
 PLU name  _____   45 All LUs   46 LU0   47 LU1   48 LU3
 PLU name  _____   49 All LUs   50 LU0   51 LU1   52 LU3
 PLU name  _____   53 All LUs   54 LU0   55 LU1   56 LU3
 PLU name  _____   57 All LUs   58 LU0   59 LU1   60 LU3
 PLU name  _____   61 All LUs   62 LU0   63 LU1   64 LU3
 PLU name  _____   65 All LUs   66 LU0   67 LU1   68 LU3
 PLU name  _____   69 All LUs   70 LU0   71 LU1   72 LU3
 PLU name  _____   73 All LUs   74 LU0   75 LU1   76 LU3
 PLU name  _____   77 All LUs   78 LU0   79 LU1   80 LU3
 PLU name  _____   81 All LUs   82 LU0   83 LU1   84 LU3
 PLU name  _____   85 All LUs   86 LU0   87 LU1   88 LU3
 PLU name  _____   89 All LUs   90 LU0   91 LU1   92 LU3
 PLU name  _____   93 All LUs   94 LU0   95 LU1   96 LU3
```

```
                      NetSpool End of File Rule

Printer definition name . mypsprinter

End of file method . 1  1. End of bracket  2. End of chain  3. End of session
                        4. String           5. Timer
Delete form feed . . 1  1. None  2. Leading  3. Trailing  4. Both

String . _____
    / Keep

Timeout idle interval . . _____    Busy interval . . _____



                         IP PrintWay Options

Printer definition name . mypsprinter

Retention period:
    Successful. . . . _____    Failure . . 0024:00:00
Retry time . . . . . 0000:10:00
Retry limit. . . . . 3____

Connection timeout . 30_
Response timeout . . 60___
Backup printer . . . _____    (extended mode)
Exits:
    Begin data set. . _____   End data set. . _____    Record. . _____

Document header  . . _____ (extend)
    / Translate document header
Document trailer . . _____ (extend)
    / Translate document trailer

Formatting:
    Transparent data char . 35
    Form feed .  .  .  . . 0D0C_____  (extended mode)
    Delete form feed. . . . 1  1. None  2. Leading  3. Trailing  4. Both
    Carriage control type . _  1. None  2. Machine  3. ANSI
    _ Automatic dataset grouping (extended mode)
    Dataset grouping. . . . 2  1. None  2. Job  3. Concatenate job
    Line termination. . . . _____
    _ Omit line termination at EOF

Basic Mode Formatting:
    Formatting. . . . . . . _  1. None         2. Standard
                               3. Translate only  4. Use FCB
    PostScript header . . . _  1. Add          2. Ignore
                               3. Landscape     4. Always landscape
```

```
                          LPR Protocol

Printer definition name . mypsprinter
Operator security profile
   . . . _____

Printer IP address . printer1.boulder_____ (extend)
Print queue name . . PASS_____ (extend)

LPR Processing Options:
   Mode . . . . . . . . 2  1. Control file first  2. Control file last
                           3. Stream                4. Remote PSF
   _ Optimize copies
   _ Restrict ports
   / Print banner page
        Banner class. . _____
        Banner job name _____ (extend)
   Filename . . . . . . _____
   Indent . . . . . . . _____
   Owner. . . . . . . . _____
   Print function . . . f
   Title. . . . . . . . _____ (extend)
   Width. . . . . . . . _____
   User options . . . . _____ (extend)
```

Creating an IP PrintWay printer definition for the email protocol

You complete Infoprint Server ISPF panels to create a printer definition for email destinations. This printer definition contains values that are used by Print Interface, NetSpool, and IP PrintWay.

Job submitters can print on this printer by specifying **deptmail** as the name of the print queue or printer definition. JCL users can also print on this printer by specifying CLASS=K and DEST=DEPTMAIL on an OUTPUT JCL statement. VTAM applications can print on this printer by specifying LU01MAIL as the secondary LU name.

Values in the sample printer definitions contain default values and values from the component that are displayed automatically in the ISPF panels, and values that you must explicitly specify in the printer definition.

This panel includes an Allocation component that was created in "Allocation component" on page 513. The asterisks next to the Allocation, Processing, and Protocol sections of the printer definition indicate that one or more fields in the sections contain values that are explicitly specified in this printer definition.

```
                    IP PrintWay Printer Definition

Printer definition name . deptmail
Description . Mail list for my department_____ (extend)
Location. . . _____(extend)
                    Component name        Custom values
Section             (enter to list)       (enter to customize)
Allocation       => printway_____       => *
Processing       => _____       => *
NetSpool options => _____       => __
NetSpool end-of-file => _____       => __
IP PrintWay options  => _____       => __
Protocol         => _____       => *

/ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
NetSpool LU name . LU01MAIL   LU classes . .   __  __  __  __  __   (extend)
```

```
                              Allocation

Printer definition name . deptmail

Spool allocation values:
    CLASS . . . . K            GROUPID . . _____
    DEST. . . . . DEPTMAIL     LINECT. . . ___
    JES node. . .  _____    PRMODE  . . _____
    FCB . . . . . 8___         PRTY. . . . ___
    FLASH count . ___          THRESHLD. . _____
    FLASH name. . ____         UCS . . . . ___
    FORMS . . . . _____     WRITER. . . _____
    USERDATA
      . . _____ (extend)
    BURST . . . . _  1. Yes  2. No
    HOLD. . . . . _  1. Yes  2. No
    OUTDISP . . .    1. Purge (without printing)  2. Leave
                     3. Keep  4. Hold  5. Write
Values for Separator Pages:
    Address
      . . _____ (extend)
    Building . . _____
    Department . _____
    Name . . . . _____
    Room . . . . _____
    Title  . . . My default email title_____
Resource Related Values:
    Form definition . _____
    Character sets  . ____  ____  ____  ____
    Overlay front . . _____   Back . . _____
    Input tray  . . . ___
    Output bin  . . . _____
    Page definition . _____
    Resource library. _____ (extend)
    Resource directories. _____ (extend)
    Image shift x-direction front . . _____   Back . . _____
                y-direction front . . _____   Back . . _____
Error Reporting Values:
    Print error reporting. . _  1. None  2. All  3. Character  4. Position
    Error disposition. . . . _  1. Default  2. Hold  3. Quit
    Print error messages . . _  1. No  2. Yes
         Maximum messages. . ___
Other Values:
    Notify . . . . . . . _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
                         _____  at node . . _____
    Checkpoint pages . . _____
    Checkpoint seconds . _____
    Copies . . . . . . _____
    Copy group . . . . . ___  ___  ___  ___  ___  ___  ___  ___
    Color map. . . . . . _____
    Com setup member . . _____
    JES form length. . . _____
    Resolution . . . . . ___
    AFP parameters . . . _____
    Duplex . . . . . . . _  1. Simplex  2. Duplex  3. Tumble
    Label data pages . . _  1. Yes  2. No
    Restrict printable area . . _  1. Yes  2. No
     _ Table reference characters
     _ Save AFP statistics
```

```
                           Processing

Printer definition name . deptmail

Document code page . . _____
Printer code page. . . IBM-1047_____

Print Interface Supported Data Formats and Associated Filters:
Data format:  Filter:
/ Line data    _____ (extend)
/ MO:DCA-P     _____ (extend)
/ PostScript   _____ (extend)
/ Text         _____ (extend)
/ PCL          _____ (extend)
/ PDF          _____ (extend)
_ SAP          _____ (extend)
/ XML          _____ (extend)
/ TIFF         _____ (extend)
/ JPEG         _____ (extend)
/ Other        _____ (extend)

_ Resubmit for filtering

Transforms to AFP:
  Fail on error . . . .  _   1. No  2. Error  3. Warning
  Trailer error page. .  _   1. No  2. Error  3. Warning

AFP to PDF Transform Encryption:
  User identifier . _____ (extend)
  Owner identifier. _____ (extend)
  Encryption level  2  1. Low (40-bit key)  2. High (128-bit key)
                       3. AES (128-bit key) 4. AES  (256-bit key)
  Protected actions:
    Restrict print. . . 2  1. Yes  2. No
    Restrict copy . . . 2  1. Yes  2. No
    Restrict update . . 2  1. Yes  2. No

Accessible PDF Transform:
  User accessibility control file . _____ (extend)
  Author . . _____ (extend)
  Keywords . _____ (extend)
  Subject. . _____ (extend)
  Title. . . _____ (extend)

Signed PDF Transform:
  Digital certificate name . _____ (extend)
  Signature contact. . _____ (extend)
  Signature location . _____ (extend)
  Signature reason . . _____ (extend)

SCS Conversion:
  Margins:  Top . . . ___   Bottom . . ___   Left . . ___   Right . . ___
  Line length . . . . ___            Page length . . ___
  Tabs:  Vertical . . ___  ___  ___  ___  ___  (extend)
         Horizontal . ___  ___  ___  ___  ___  (extend)

NetSpool PCL Conversion:
  Print density . . . ___
  Line density. . . . __
  Orientation . . . . 1  1. None  2. Portrait  3. Landscape
  _ SCS automatic page orientation

IP PrintWay Line-to-Text Conversion:
  / Pagination
    Margins:  Top . . _____   Bottom . . _____
    Page height . . . 58_____
    _ Print page header
```

```
   Maximum document size . _____
   Maximum copies. . . . . __
   Forms supported . . . . _____ _____ _____ _____ _____
   Duplex supported. . . . / Simplex   / Duplex   / Tumble
   Print-error reporting supported . _ Character   _ Position

   Input tray name:   Number: (more)    Output bin name:   Number: (more)
   ---------------    ---               ---------------    -----
   ---------------    ---               ---------------    -----

 IP PrintWay Basic Mode Attributes:
   SOSI mode . . . . . . . . . . _   1. None  2. ASCII  3. Space  4. EBCDIC
   Translation dataset qualifier . _____
   Double-byte translate table . __
     1. BIG5            2. EUCKANJI        3. HANGEUL
     4. IBMKANJI        5. JIS78KJ-ASCII     6. JIS78KJ-JISROMAN
     7. JIS83KJ-ASCII   8. JIS83KJ-JISROMAN  9. KSC5601
    10. SCHINESE       11. SJISKANJI        12. TCHINESE
```

```
                         NetSpool Options

Printer definition name . deptmail


Formatting . . . . 2   1. None  2. Convert to line  3. Convert to PCL
   Record size . . _____
   RECFM . . . . . _   1. VB  2. VBA  3. VBM

Default owner . . . _____
Embedded attributes prefix . . _____
```

```
                    NetSpool End-of-File Rules
 Option === 1

 Printer definition name . deptmail

 Default rules       1 All LUs   2 LU0   3 LU1   4 LU3

 PLU name  _____   5 All LUs   6 LU0   7 LU1   8 LU3
 PLU name  _____   9 All LUs  10 LU0  11 LU1  12 LU3
 PLU name  _____  13 All LUs  14 LU0  15 LU1  16 LU3
 PLU name  _____  17 All LUs  18 LU0  19 LU1  20 LU3
 PLU name  _____  21 All LUs  22 LU0  23 LU1  24 LU3
 PLU name  _____  25 All LUs  26 LU0  27 LU1  28 LU3
 PLU name  _____  29 All LUs  30 LU0  31 LU1  32 LU3
 PLU name  _____  33 All LUs  34 LU0  35 LU1  36 LU3
 PLU name  _____  37 All LUs  38 LU0  39 LU1  40 LU3
 PLU name  _____  41 All LUs  42 LU0  43 LU1  44 LU3
 PLU name  _____  45 All LUs  46 LU0  47 LU1  48 LU3
 PLU name  _____  49 All LUs  50 LU0  51 LU1  52 LU3
 PLU name  _____  53 All LUs  54 LU0  55 LU1  56 LU3
 PLU name  _____  57 All LUs  58 LU0  59 LU1  60 LU3
 PLU name  _____  61 All LUs  62 LU0  63 LU1  64 LU3
 PLU name  _____  65 All LUs  66 LU0  67 LU1  68 LU3
 PLU name  _____  69 All LUs  70 LU0  71 LU1  72 LU3
 PLU name  _____  73 All LUs  74 LU0  75 LU1  76 LU3
 PLU name  _____  77 All LUs  78 LU0  79 LU1  80 LU3
 PLU name  _____  81 All LUs  82 LU0  83 LU1  84 LU3
 PLU name  _____  85 All LUs  86 LU0  87 LU1  88 LU3
 PLU name  _____  89 All LUs  90 LU0  91 LU1  92 LU3
 PLU name  _____  93 All LUs  94 LU0  95 LU1  96 LU3
```

```
                        NetSpool End of File Rule

Printer definition name . deptmail

End of file method . 1  1. End of bracket  2. End of chain  3. End of session
                        4. String          5. Timer
Delete form feed . . 1  1. None  2. Leading  3. Trailing  4. Both

String . _____
    / Keep

Timeout idle interval . . _____   Busy interval . . _____
```

```
                        IP PrintWay Options

Printer definition name . deptmail

Retention period:
    Successful. . . . _____   Failure . . _____
Retry time . . . . . _____
Retry limit. . . . . _____

Connection timeout . 30_
Response timeout . . 60___
Backup printer . . . _____   (extended mode)
Exits:
    Begin data set. . _____   End data set. . _____   Record. . _____

Document header  . . _____ (extend)
    / Translate document header
Document trailer . . _____ (extend)
    / Translate document trailer

Formatting:
    Transparent data char . 35
    Form feed . . . . . 0D0C____  (extended mode)
    Delete form feed. . . 1  1. None  2. Leading  3. Trailing  4. Both
    Carriage control type . _  1. None  2. Machine  3. ANSI
    _ Automatic dataset grouping (extended mode)
    Dataset grouping. . . 2  1. None  2. Job  3. Concatenate job
    Line termination. . . _____
    _ Omit line termination at EOF

Basic Mode Formatting:
    Line termination. . . . _____
    Formatting. . . . . . _  1. None         2. Standard
                             3. Translate only  4. Use FCB
    PostScript header . . . _  1. Add          2. Ignore
                             3. Landscape     4. Always landscape
```

```
                          Email Protocol
Printer definition name . deptmail

To addresses
    . . jose@xyz.com,mary@xyz.com                             (more)

CC addresses
    . . _____ (more)
BCC addresses
    . . _____ (more)
From address
    . . . _____
From name . . ._____
Reply address ._____
_ Use reply address as from address

IP PrintWay Extended Mode:
   _ Embedded headers
   _ Inline text and line data
   Inline text attribute . . name-text_____
   Inline message
     . . . The sales report is attached.<LF>_____ (extend)
```

Appendix E. Accessibility

Accessible publications for this product are offered through IBM Documentation (www.ibm.com/docs/en/zos).

If you experience difficulty with the accessibility of any z/OS information, send a detailed message to the Contact the z/OS team web page (www.ibm.com/systems/campaignmail/z/zos/contact_z) or use the following mailing address.

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United States

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Index

Special Characters

_BPX_UNLIMITED_OUTPUT variable 10, 14
_BPXK_SETIBMOPT_TRANSPORT variable 10, 15
%filter-options option 91, 205, 207, 209
%xf-options option 207

Numerics

3270 data
    converting to line data, in NetSpool 106
    converting to PCL, in NetSpool 110

A

abbreviations for attributes 267
above-the-bar-storage attribute 334
ACBNAME parameter (APPL statement) 218
accessibility
    contact IBM 529
accounting record, SMF
    comparing IP PrintWay basic and extended mode
    records 476
    format 475
    job name, job D and user ID fields 475
    number of pages in SMF record 172
    suppressing or modifying IP PrintWay records 478
acknowledgement-level attribute 334
ADD command 28
adding
    components with ISPF panels 228
    FSA definition with ISPF panels 233
    FSS definition with ISPF panels 232
    job selection rules with ISPF panels 235
    printer definition with ISPF panels 223, 224
    printer LU, NetSpool 28
    printer pool definitions with ISPF panels 230
address-text attribute 287
AFP data, definition 86
AFP Download Plus
    afp-parameters attribute 287
    ISPF panel 504
AFP to PCL transform, specifying 203
AFP to PDF transform, specifying 203
AFP to PostScript transform, specifying 203
afp-parameters attribute 287
afpdp-dataset-grouping attribute 335
afpdp-working-directory attribute 335
AFPDSRECORDLENGTH parameter 207
aliases, using with sendmail bridge 150
allocation object class, attributes
    address-text 287
    afp-parameters 287
    building-text 288
    burster-trimmer-stacker 288
    chars 289
    checkpoint-pages 290

allocation object class, attributes *(continued)*
    checkpoint-seconds 290
    color-map 291
    com-setup-member 291
    copies 291
    copy-group 292
    department-text 293
    description 293
    destination 293
    duplex 294
    error-disposition 294
    flash-count 295
    flash-name 295
    form-definition 296
    forms 296, 297
    group-identifier 297
    hold 298
    input-tray-number 298
    jes-form-length 299
    jes-maximum-line-count 299
    jes-node 300
    jes-priority 300
    jes-threshold 300
    jes-writer 301
    label-data–pages 301
    name 301
    name-text 302
    normal-output-disposition 302
    notify 303
    output-bin-number 304
    output-class 304
    overlay-back 304
    overlay-front 305
    page-definition 306
    print-error-messages 306
    print-error-messages-maximum 307
    print-error-reporting 307
    process-mode 308
    resolution 309
    resource-directories 309
    resource-library 309
    restrict-printable-area 310
    room-text 311
    save-afp-statistics 311
    table-reference-characters 311
    title-text 312
    universal-character-set 313
    userdata 313
    x-image-shift-back 313
    x-image-shift-front 314
    y-image-shift-back 315
    y-image-shift-front 315
Allocation section or component
    ISPF panel for 488
    JES allocation parameters, specifying 83, 105
    overview 75

viewing
    components with ISPF panels 229
    FSA definitions with ISPF panels 234
    FSS definition with ISPF panels 233
    job selection rules with ISPF panels 235
    printer definition with ISPF panels 225
    printer pool definition with ISPF panels 232
    system configuration with ISPF panels 223
    transmission-queue entry, IP PrintWay 39
viewing output data sets on JES spool 60
VTAM applications, printing from
    APPL statement 218
    BIND parameters, specifying 219
    HALT commands 27
    VARY ACT command 28
    VARY INACT command 29
VTAM VARY ACT command 30

W

WAITING parameter (DISPLAY command) 31
WAITING state for printer LUs 29, 30
web browsers, customizing for Infoprint Central 52
where predicate 244
work-selection criteria, specifying in printer definition 83, 105

X

x-image-shift-back attribute 313
x-image-shift-front attribute 314
XML data, definition 86
XT Extended for z/OS transform filter 203

Y

y-image-shift-back attribute 315
y-image-shift-front attribute 315

Z

z/OS UNIX commands
    starting Infoprint Server 7
    stopping Infoprint Server 16

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