Print Services Facility for z/OS
Version 4, Release 6.0

AFP Download Plus

S550-0433-06

Note

Before using this information and the product it supports, read the information in “Notices” on page 193.

This edition applies to the IBM® Print Services Facility™ Version 4 Release 6 Modification 0 for z/OS®, Program Number 5655-M32, and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces S550-0433-05.

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About this publication

This publication provides information about AFP Download Plus, a licensed feature of IBM Print Services Facility (PSF) for z/OS. This publication was written with the assumption that you are familiar with Advanced Function Presentation (AFP), PSF for z/OS, and z/OS UNIX System Services concepts.

Who should read this publication

The information in this publication is directed to several audiences:

- The job submitter on a z/OS system who submits a job for processing by AFP Download Plus.
- The system programmer responsible for customizing AFP Download Plus on the z/OS system.
- The system console operator responsible for starting, stopping, and monitoring AFP Download Plus.
- The diagnostician responsible for diagnosing problems.

How this publication is organized

This publication contains reference and user's guide information. It is organized in parts with information common to the AFP Download Plus sender and receiver components in Part 1, information for using the sender component of AFP Download Plus in Part 2, and information for using the receiver component of AFP Download Plus in Part 3.

Part 1 contains these chapters:

- Chapter 1, "Introducing AFP Download Plus," on page 3 describes how AFP Download Plus differs from other PSF features; describes the AFP Download Plus sender and receiver communication; explains how AFP Download Plus works; lists highlights, limitations, and software requirements; describes performance considerations; and describes considerations for using MO:DCA interchange set compliant files.
- Chapter 2, "Planning the size of the working directory," on page 17 describes how to determine the size of the working directory that AFP Download Plus uses.
- Chapter 3, "Installing AFP Download Plus," on page 23 describes how to install the AFP Download Plus program, including the sender and the receiver components of the program.

Part 2 contains these chapters:

- Chapter 4, "Configuring the AFP Download Plus sender," on page 29 describes the tasks that you do to configure the sender.
- Chapter 5, "Operating the AFP Download Plus sender," on page 113 describes how to start, stop, cancel, restart, and monitor the sender.
- Chapter 6, "Using the AFP Download Plus sender," on page 125 describes how the job submitter uses JCL to direct a data set to the sender. It also describes how to specify the AFPPARMS control statement, direct output to receiver systems, monitor error messages, and recover from errors.
- Chapter 7, "Diagnosing errors with the AFP Download Plus sender," on page 141 describes how to diagnose problems with the sender, including how to use the PSF for z/OS trace and dump facilities.

Part 3 contains these chapters:

- Chapter 8, "Configuring the AFP Download Plus receiver on z/OS," on page 149 describes how to configure the receiver on a secondary z/OS system.
- Chapter 9, "Operating the AFP Download Plus receiver on z/OS," on page 151 describes how to start, stop, and query the status of the receiver, how to locate transmitted files on receiver file systems, and

how to use the apshhsub exit program, the apshhmds exit program, or your own exit program when you start the receiver.

- Chapter 10, "Diagnosing errors with the AFP Download Plus receiver," on page 167 describes how to diagnose problems with the receiver.

Part 4 contains appendixes, notices, a glossary, and a bibliography. The appendixes include:

- Appendix A, "Syntax for file names," on page 169
- Appendix B, "SMF type 6 accounting records," on page 171
- Appendix C, "AFPSTATS report," on page 173
- Appendix D, "Installation verification program example," on page 185
- Appendix E, "Connectivity test for AFP Download Plus," on page 187
- Appendix F, "Accessibility," on page 189

Understanding the syntax notation used in this publication

These rules apply to coding illustrations throughout this publication:

- Bold highlighting identifies commands, keywords, files, directories, and other items whose names are predefined by the system, or items that must be entered as is, such as DUPLEX and BLOCK.
- Variable data is printed in *italics*. Enter specific data to replace the characters in italics; for example, for PRT*nnnn* you might enter PRT0002. Italics also identify the names of publications.
- Type these symbols exactly as they appear in the command syntax:

  Comma ,
  Equal sign =
  Parentheses ( )
  Period .
- Monospacing identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or information that you actually type.
- Do not enter these symbols as part of a parameter or option:

  Vertical Bar |
  Underscore ___
  Brackets [ ]
  Braces { }
  Ellipsis ...
- A vertical bar between two values means that you select only one of the values.
- An underscored value means that if an option is not specified, the underscored value, called the default, is used.
- Brackets around a value mean that you do not have to select the value; the value is optional.
- Braces around a value mean that you must select one of the mutually exclusive values. For example, { THIS | THAT }
- An ellipsis that follows a command or set of commands indicates that the command or set of commands can be repeated.

Related information

Publications that are referred to in this document or that contain more information about AFP and related products are listed in the "Bibliography" on page 213. For information about all z/OS product publications, see *z/OS Information Roadmap*.

For more information about z/OS and PSF for z/OS, see these web pages:

- z/OS home page (www.ibm.com/systems/z/os/zos)
- z/OS Print Management Software (www.ibm.com/systems/z/os/zos/printsoftware)

To obtain the latest documentation updates for z/OS base elements and optional features that result from DOC APARs and PTFs, go to z/OS APAR book (publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/Shelves/ZDOCAPAR).

To obtain the latest documentation updates for PSF for z/OS, see the appropriate SYS1.SAMPLIB members in Table 1 on page xiii.

Table 1: SYS1.SAMPLIB members for PSF documentation updates

Member	Publication
APSGADP6	*PSF for z/OS: AFP Download Plus*
APSGCUS6	*PSF for z/OS: Customization*
APSGDGN6	*PSF for z/OS: Diagnosis*
APSGDLG6	*PSF for z/OS: Download for z/OS*
APSGMAC6	*PSF for z/OS: Messages and Codes*
APSGSEC6	*PSF for z/OS: Security Guide*
APSGUSR6	*PSF for z/OS: User's Guide*

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 xiv.

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 (www.ibm.com/developerworks/rfe/).

Feedback on IBM Knowledge Center function
If your comment or question is about the IBM Knowledge Center functionality, for example search capabilities or how to arrange the browser view, send a detailed email to IBM Knowledge Center Support at ibmkc@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: PSF V4R6 for z/OS: AFP Download Plus, S550-0433-06
- The section title of the specific information to which your comment relates
- The solution title: PSF V4R6 for z/OS: AFP Download Plus
- The text of your comment.

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

Summary of Changes

This content includes terminology, maintenance, and editorial changes to information previously presented in *PSF V4R5 for z/OS: AFP Download Plus*, S550-0433-05. Technical additions or changes to the text and illustrations are indicated by a vertical line to the left of the change.

General changes

- References to AFP Download Plus releases earlier than 4.5 are removed because those releases are no longer in service.
- References to z/OS 1.13 are removed because that release is no longer in service.
- References to Ricoh products, including "InfoPrint Manager" and "Ricoh ProcessDirector" are removed.
- "MO:DCA IS/3 compliant files" is changed to "MO:DCA interchange set compliant files" to include IS/3 and AFP/A interchange sets.
- The release for Content Manager OnDemand for Multiplatforms is updated.

New information

- The MO:DCA AFP/Archive (AFP/A), AFP/A, IS/3, and function set extension to MO:DCA IS/3 are new. See "Support MO:DCA Presentation Interchange Set data streams" on page 11, "Considerations for processing specific MO:DCA interchange set compliant files" on page 14, and "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31.
- A new section , "Updating MAXPROCSYS and MAXPROCUSER" on page 30, is added.
- These AFPPARMS parameters are added to Table 10 on page 44:
  - message-files-read-access
  - trace-user-data
- These Printer Inventory parameters are added to Figure 13 on page 71 and Table 14 on page 74:
  - Message files read access
  - Trace user data
- End-data-set call (EDSC) is added to "Resource-management exit processing" on page 110.
- A new page that lists print file extension information is added to the AFPSTATS report. See Figure 20 on page 176 and Figure 23 on page 178.

Changed information

- "Software requirements" on page 13 are updated with required levels.
- "Differentiating AFP Download Plus from PSF for z/OS" on page 30 clarifies that AFP Download Plus and PSF cannot share FSS and FSA names.
- The note in "Creating a startup procedure" on page 34 is updated.
- The FONTOLN font library is changed to SFNTILIB in Figure 6 on page 35.
- Attribute descriptions in the EXEC statement are updated. See " JCL statements for the startup procedure" on page 38.
- These AFPPARMS parameters are updated in Table 10 on page 44:
  - auxiliary-files-modca-level
  - compression
  - dataset-grouping
  - direct-download

  - save-auxiliary-files
  - secure-transmission
  - send-messages-on-failure
  - send-separator-pages
- Using the Printer Inventory to activate the AFP Download Plus processing status feature is added to "Viewing the operator status message when the processing status feature is activated" on page 59, Display status, and "Reporting AFP Download Plus processing status" on page 118.
- These PRINTDEV parameters are updated in Table 12 on page 61:
  - DSHDR
  - JOBHDR
  - JOBTRLR
  - MAP2OLN
  - MESSAGE
- The **Auxiliary files MO:DCA level** field is updated with the BPF match value in Figure 12 on page 70.
- These Printer Inventory parameters are updated in Table 14 on page 74:
  - Auxiliary files MO:DCA level
  - Compression
  - Data set grouping
  - Direct download
  - Map to outline fonts
  - Resolution
  - Save auxiliary files
  - Secure transmission
  - Send messages on failure
  - Send separator pages
- AFP Download Plus now detects JES commands that are entered when data is transmitted to the sender. Therefore, the term "transformation" is removed or changed to "transmission" in Chapter 5, "Operating the AFP Download Plus sender," on page 113, "Canceling a data set" on page 114, and "Restarting a data set" on page 114.
- "Sending z/OS separator pages" on page 115 is updated.
- "Sending messages to the receiver system" on page 138 is updated.
- "Using the PSF trace facility" on page 141 is updated to include zFS files and Printer Inventory tracing parameters.
- "Using the PSF dump facility" on page 145 is updated to include Printer Inventory tracing parameters.
- "Selecting an exit program" on page 149 and "Using the apshhmds exit program" on page 157 are updated with notes about support for MO:DCA interchange sets.
- New receiver file extensions OPT, TZ, and CONCAT are added to Figure 18 on page 169.
- First extension is added to the list of sections AFP Download Plus creates in the SMF type 6 record. The format of the file-transfer section is also added. See Appendix B, "SMF type 6 accounting records," on page 171.
- The description of the information that is collected in the Appendix C, "AFPSTATS report," on page 173 is updated. "Sample softcopy report" on page 175 and "Sample hardcopy AFPSTATS report" on page 177 are also updated.
- Appendix E, "Connectivity test for AFP Download Plus," on page 187 is updated.
- "Glossary" on page 197 is updated with MO:DCA interchange set definitions.

Deleted information

- The appendix "Download receiver support" is removed. The information is found in “Software requirements” on page 13.

Part 1. Introduction and installation

This information gives an overview of the AFP Download Plus product and explains how to install it:

Chapter 1. Introducing AFP Download Plus

AFP Download Plus is a separately ordered feature of IBM Print Services Facility (PSF) for z/OS (referred to as PSF). AFP Download Plus distributes AFP data from a z/OS system to a program such as:

- Content Manager OnDemand
- PSF for z/OS
- AIX®, Linux, and Windows print servers

AFP Download Plus accepts a data set from the Job Entry Subsystem (JES) spool–line data, XML data, or Mixed Object Document Content Architecture (MO:DCA) data, transforms the data into Mixed Object Document Content Architecture for Presentation (MO:DCA-P), if required, and then distributes the AFP data set and all resources that are required for printing, emailing, faxing, or archiving.

This information describes how AFP Download Plus differs from other PSF features; describes the AFP Download Plus sender and receiver communication; explains how AFP Download Plus works; lists highlights, limitations, and software requirements; describes performance considerations; and describes considerations for using MO:DCA interchange set compliant files.

How AFP Download Plus differs from other PSF features

PSF and three of its features, AFP Download Plus, Download for z/OS, and AFP Conversion and Indexing Facility (ACIF), perform various functions on print data. Each feature has its own specific purpose that depends on where the print data is coming from and where the AFP data is sent.

These descriptions summarize PSF and each of the features:

PSF
PSF is the z/OS printer-driver program that manages and controls data that is transmitted to AFP printers. PSF obtains the print data from the JES spool, combines the data with the necessary resources from system and user resource libraries, transforms the data into the Intelligent Printer Data Stream (IPDS), and sends the result to the printer.

AFP Download Plus
AFP Download Plus sends AFP data and all resources to a receiving system for processing. This feature obtains data from the JES spool, obtains resources from system and user resource libraries, transforms the data to MO:DCA-P (if required), and builds a MO:DCA resource group. AFP Download Plus temporarily stores the resource group in a file in a z/OS File System (zFS) working directory before it sends the resource group to the receiving system. AFP Download Plus can temporarily store the MO:DCA-P data in a file in the working directory before it sends the data to the receiving system or optionally, send the MO:DCA-P data directly to the receiving system without storing it in a temporary file in the working directory. The MO:DCA-P data and resource group can optionally be encoded, compressed, or both before they are sent to the receiving system.

Download for z/OS
Download for z/OS sends data, without transforming it, to a receiving system for printing or archiving. This feature obtains the data from the JES spool (but does not obtain any resources) and requires a routing-control data set to specify where the data is sent.

ACIF
ACIF is a batch utility that formats data from a data set to create documents that you can print, view, or archive. ACIF provides indexing capabilities and packages AFP resources in a separate file so you can view, distribute, archive, and retrieve document files across systems.

AFP Download Plus performs similar functions as Download for z/OS and ACIF, but it is not a replacement for Download for z/OS or ACIF. AFP Download Plus has its own unique capabilities, including these advantages:

- The data is obtained from the JES spool, not a data file as with ACIF.

- The data is downloaded automatically and consists entirely of MO:DCA-P data.
- All required resources for printing can be included in the downloaded file, including PSF and JES default resources.
- Installation exit processing, similar to PSF, is reflected in the downloaded file.
- SMF type 6 records are produced, similar to PSF.
- Resource Access Control Facility (RACF®) checking is done for user resource libraries.
- Distributed data can optionally be protected by secure transmission.

Table 2 on page 4 shows how AFP Download Plus differs from PSF, Download for z/OS, and ACIF.

Table 2: Comparison of AFP Download Plus and other PSF features

Function	AFP Download Plus	PSF	Download for z/OS	ACIF
Obtains input from	JES spool data set	JES spool data set	JES spool data set	User's data set
Transforms data set from	Line data MO:DCA-P XML	Line data MO:DCA-P XML	No transform	Line data MO:DCA-P XML
Transforms data set to	MO:DCA-P	IPDS	No transform	MO:DCA-P
Obtains required resources	Yes	Yes	No	Yes
Puts resources inline	Yes	No	No	No (resources are put inline manually)
Requires receiver resource library synchronization	No	N/A	Yes	N/A
Protects resource libraries with RACF	Yes	Yes	N/A	No
Encodes data and resource group	Yes, optionally	No	No	No
Processes jobs with multiple data sets	Yes	Yes	Yes, with Exit 15	No
Counts pages and sheets	Yes–uses -opagecount, -osheetcount, SMF6IMPS, and SMF6LPGE	Yes–uses SMF6IMPS and SMF6LPGE	No	N/A
Compresses data sets with LZW compression	Yes	No	No	No
Indexes documents	No	No	No	Yes
Connects to	Download receiver	Printer	Download receiver	N/A
Sends data to	z/OS AIX Windows Linux	Printer	z/OS AIX Windows Linux	N/A
Sends messages when errors stop transformation	Yes, optionally	Yes	No	No

Table 2: Comparison of AFP Download Plus and other PSF features (continued)				
Function	**AFP Download Plus**	**PSF**	**Download for z/OS**	**ACIF**
Sends separator pages	Yes, optionally	Yes, optionally	No	No
Uses working directory	Yes–resources; optionally–MO:DCA-P data	No	No	No
Uses routing-control data set	No	No	Yes	No
Creates SMF data (SMF type 6 records can vary)	Yes	Yes	Yes	No
Supports PSF installation exits	1, 2, 3, 4, 5, 6, 7, 8, and 15	1, 2, 3, 4, 5, 6, 7, 8, 14, and 16	15	No

AFP Download Plus system communication

AFP Download Plus uses a sender-receiver model for communication between the z/OS operating system and an AIX, Windows, Linux, or other z/OS system, as shown in Figure 1 on page 6.

- The *sender* initiates the TCP/IP connection and sends data to another system.
- The *receiver* is on the other system where it receives data from the sender and then distributes the data to a print, archive, email, or fax destination.

AFP Download Plus is a sender on the z/OS system where it is installed with PSF. This can be considered the primary z/OS system. AFP Download Plus can also be installed on a secondary z/OS system, in which case it is a receiver.

Keep in mind: When AFP Download Plus is installed on a z/OS system, it can act as both the sender and the receiver. However, in this publication, the sender is always considered to be on the primary z/OS system while the receiver is always considered to be on the secondary z/OS system (also referred to as the remote system), or on an AIX, Windows, or Linux operating system.

Data that is sent to a receiver can be printed by PSF for z/OS (or another z/OS printer-driver program) or an AIX, Linux, or Windows print server, or archived by Content Manager OnDemand. Some AIX, Linux, or Windows receivers can also distribute the data to other output destinations, such as those that email or fax documents.

Each sender with a TCP/IP connection to a receiver is considered a functional subsystem application (FSA). A JES printer definition identifies an FSA with the JES2 PRT statement or the JES3 DEVICE statement. A receiver destination is defined to an FSA with an IP address and a port number.

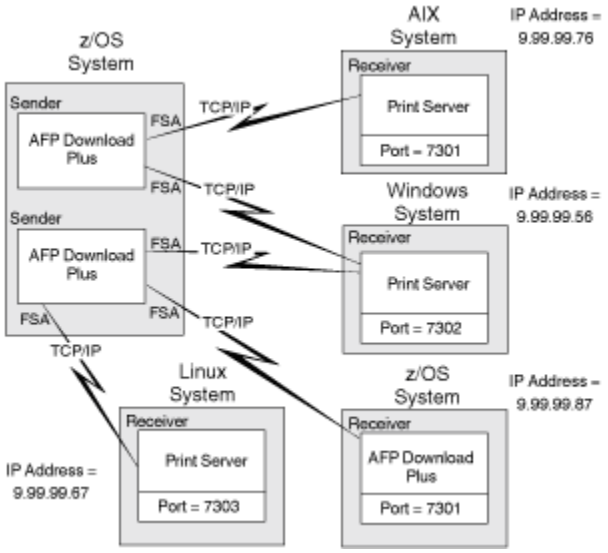

Figure 1: Sender-receiver relationship of AFP Download Plus

As shown in Figure 1 on page 6, a sender can transmit data from multiple FSAs to more than one receiver, although each TCP/IP connection can handle only one file at a time. Multiple receivers can run on the same system, and any one receiver can accept data from more than one sender, again receiving one file at a time.

The IPADDR and PORTNO parameters in the PRINTDEV statement or the IP address and Port number parameters in the Printer Inventory identify the IP address and port number with which the sender establishes a TCP/IP connection to the receiver system. The IP address parameter must specify the TCP/IP address of the system the receiver is running on. The port number parameter must be the same port number that is defined for the receiver.

The sender initiates a TCP/IP connection to the target receiver when AFP Download Plus has data to transmit, and then disconnects after it receives confirmation from the receiver that the data is completely transmitted.

Note: The target receivers must be started before AFP Download Plus attempts to transmit a document; otherwise, the TCP/IP connection cannot be established.

How AFP Download Plus works

AFP Download Plus uses several methods to send AFP data and all resources to a receiving system for processing. AFP Download Plus uses a temporary file in a working directory to store the resource group and either places the MO:DCA-P data in a temporary file in the working directory (non-direct download method) or sends the data directly to the receiving system (direct download method).

The working directory that AFP Download Plus uses is a z/OS File System (zFS). You must allocate and mount a zFS that is large enough to accommodate the temporary UNIX files that are produced by AFP Download Plus. To determine the size of the zFS, see Chapter 2, “Planning the size of the working directory,” on page 17.

This information describes the methods AFP Download Plus uses to send data to the receiver and shows how AFP Download Plus distributes a data set to receivers on different operating systems.

Non-direct download method

The default method that AFP Download Plus uses to send data to the receiver is the non-direct download method. With this method, AFP Download Plus uses temporary files in a working directory to store both the MO:DCA-P data and resources. Figure 2 on page 7 shows these steps in the non-direct download method:

1. AFP Download Plus obtains data from the JES spool and obtains resources from system and user resource libraries.
2. AFP Download Plus transforms the print data set to MO:DCA-P and places the data in a temporary file. Likewise, it identifies every resource that is required by the spool data set and collects them in a second temporary file.
3. AFP Download Plus transmits the two temporary files to the receiving system. Because the resources must be at the front of the document, the resource file is sent first and the MO:DCA-P file is sent second.

After the receiving system confirms that it received all the data, AFP Download Plus deletes the temporary files from the working directory and the print data set from the spool.

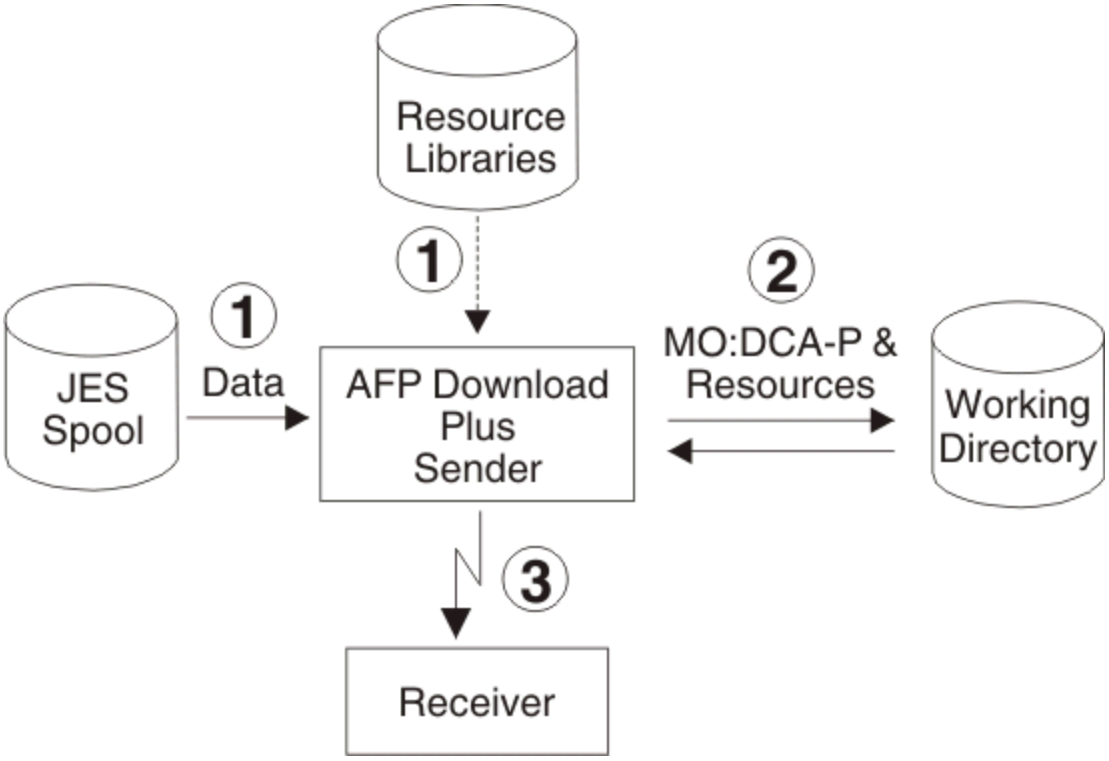

Figure 2: Non-direct download method for sending data to a receiver

Direct download method

An optional method that AFP Download Plus uses to send data to the receiver is the direct download method. With this method, AFP Download Plus transforms the print data set to MO:DCA-P and then sends the data directly to the receiving system. Figure 3 on page 8 shows these steps in the direct download method:

1. AFP Download Plus obtains data from the JES spool and obtains resources from system and user resource libraries.
2. AFP Download Plus transforms the print data set to MO:DCA-P and then sends the data directly to the receiving system. At the same time, it identifies every resource that is required by the spool data set and collects them in a temporary file.
3. AFP Download Plus transmits the resources in the temporary file to the receiving system.

After the receiving system confirms that it received all the data, AFP Download Plus deletes the temporary files from the working directory and the print data set from the spool.

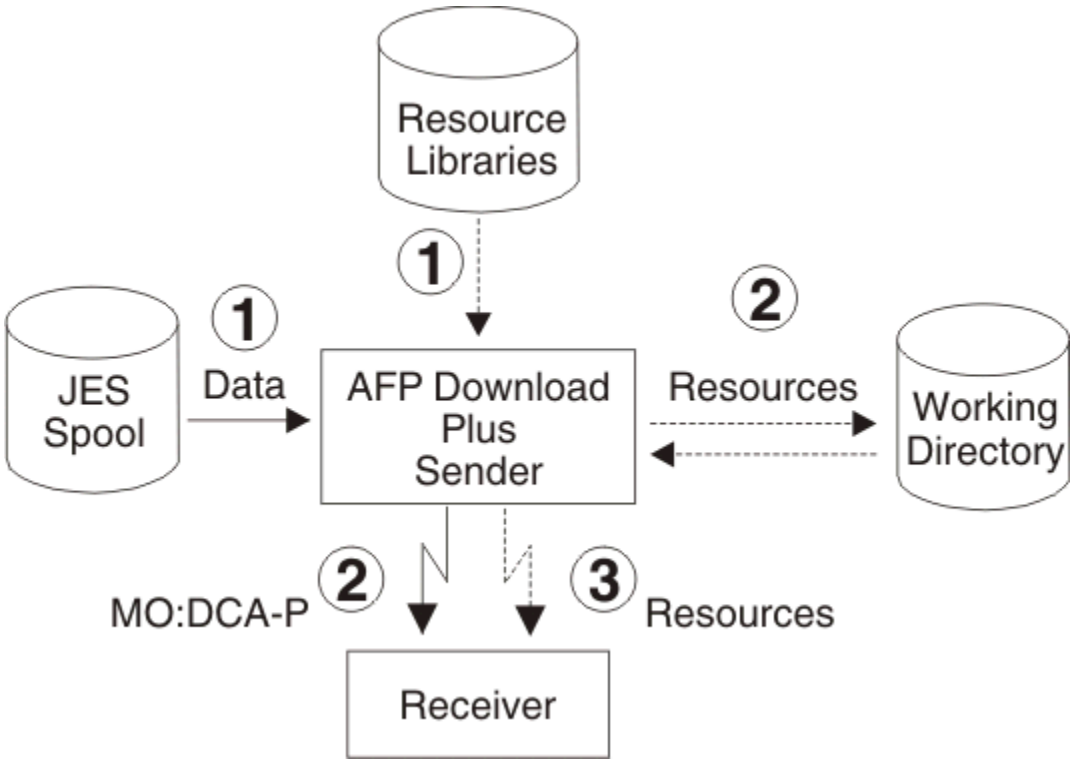

Figure 3: Direct download method for sending data to a receiver

To use the direct download method, you must set a parameter in the AFPPARMS control statement or the Printer Inventory (see direct-download or Direct download). Also, the receiver must support the direct download function.

Data set distribution to receivers

Figure 4 on page 9 shows how AFP Download Plus distributes a data set from the z/OS JES spool for distribution to receivers on different operating systems: z/OS, AIX, Windows, and Linux.

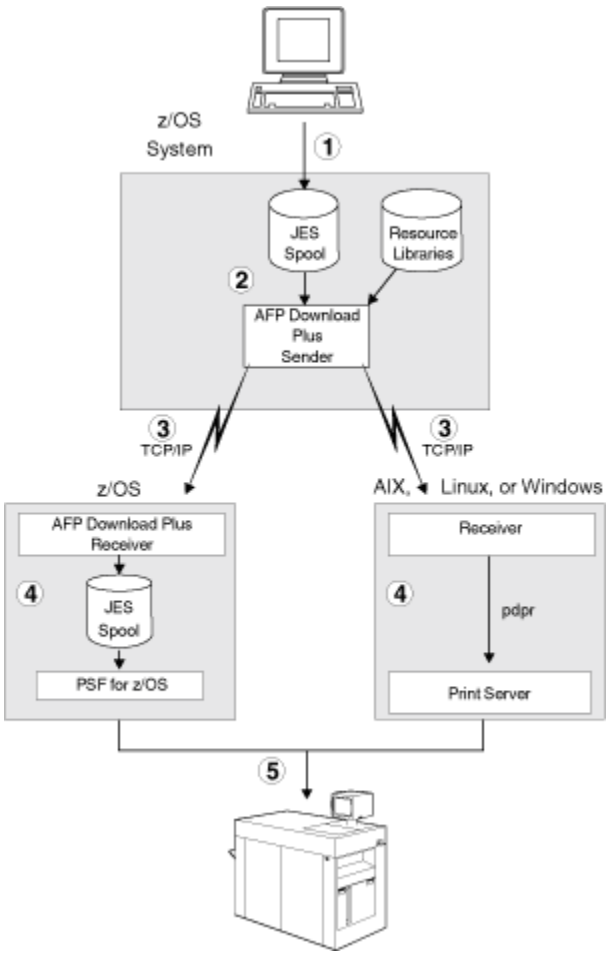

Figure 4: AFP Download Plus data set distribution

This scenario describes the steps that are shown in Figure 4 on page 9:

1. Users submit jobs on a z/OS system, creating system output on the JES spool in either a JES2 or JES3 environment. The job submitters can specify job control language (JCL) parameters that direct the output data sets to AFP Download Plus. The data sets can contain line data, XML data, or MO:DCA-P data streams.
2. The AFP Download Plus sender selects output data sets from the JES spool according to installation-defined JES work-selection criteria that correspond to JCL parameters specified by the job submitters. AFP Download Plus transforms line data and XML data to MO:DCA-P, if required, and collects the resources for the output data set.
3. The AFP Download Plus sender transmits MO:DCA-P data, resources, and information about the job to receiver systems in the Internet Protocol network. The operating systems can be z/OS, AIX, Windows, and Linux.
4. On the receiver system, the AFP Download Plus, AIX, Linux, or Windows receiver saves the transmitted data and resources in a file and then submits it to PSF for z/OS or an AIX, Linux, or Windows print server.
5. PSF for z/OS or another print server sends the data for printing, emailing, or faxing.

Highlights

Some highlights of AFP Download Plus are:

Compress files
The temporary files that are stored in the z/OS File System (zFS) and the data that is transmitted to the receiving system can optionally be compressed by AFP Download Plus with the LZW compression algorithm. Compressing these files minimizes the size requirement on the zFS and reduces TCP/IP transmission time. For more information, see compression or Compression.

Count pages and sheets in data sets
With AFP Download Plus, users can use the page accounting function to count the number of pages and sheets in a data set and send the number to the receiver. For more information, see page-accounting-supported or Page accounting supported.

Define AFP Download Plus FSAs in the Printer Inventory
An ISPF panel in the Infoprint Server Printer Inventory is used to define an FSA specifically for AFP Download Plus. The panel includes parameters that you would otherwise need to define on the PRINTDEV statement or the EXEC PARM statement of the startup procedure, in PSF installation Exit 7, or in the AFPPARMS control statement. For more information, see "Printer Inventory" on page 68.

Distribute data sets automatically
AFP Download Plus distributes data sets the same way PSF does: the IPADDR and PORTNO parameters in the PRINTDEV statement or the IP address and Port number parameters in the Printer Inventory identify the receiver to which the data set is sent. Distribution of data sets can be transparent to the job submitter, requiring little or no modification to existing application JCL statements. AFP Download Plus supports IP addresses as host names, in dotted decimal notation, and in colon hexadecimal notation.

Encode data for secure transmission
AFP Download Plus optionally encodes all data before transmission. The data is then decoded by the receiver. For more information, see secure-transmission or Secure transmission.

Guarantee data transmission
AFP Download Plus guarantees the transmission of data by monitoring the data and retransmitting a document from the last successful recovery point if it detects that bytes are not received. AFP Download Plus also verifies that all data is successfully accepted by the receiver before it deletes a data set from the z/OS system. For information about changing the transmission recovery interval, see transmit-recovery-pages or Recovery pages.

Include resources inline
AFP Download Plus includes all resources that are required for processing inline with the distributed file, including any PSF and JES default resources. The job submitter can choose which type of resources to include inline with the Resources included inline Printer Inventory parameters or with AFPPARMS control statement parameters. You can include one or more of these resources inline: BCOCA, GOCA, IOCA, and PTOCA with OEG objects, color management resources (CMRs), FOCA fonts, form definitions, object containers, overlays, page segments, and TrueType and OpenType fonts. For example, you can choose to include form definitions inline, but not include fonts inline.

Manage system seamlessly
The system operator manages AFP Download Plus with the same JES or System Display and Search Facility (SDSF) commands that are used to manage PSF for z/OS.

Notify job submitter of transmission
When requested with the JCL NOTIFY parameter, AFP Download Plus notifies up to four users when it finishes processing a document. Whenever AFP Download Plus creates a message file, even if you do not request notification, AFP Download Plus sends a notification message. If users are not specified or if those users specified cannot be contacted, AFP Download Plus sends a notification to the job submitter. AFP Download Plus always puts a copy of the notification message in the system log.

Perform RACF validation
AFP Download Plus does RACF validation for user specified resource repositories in a partitioned data set.

Process installation exits
Many of the installation exits supported by PSF are also supported by AFP Download Plus. Exits 1, 2, 3, 4, 5, 6, 7, 8, and 15 are supported.

Process jobs with multiple data sets

An output group on z/OS can contain multiple data sets. With AFP Download Plus, users can use the multiple data set function to send data sets to remote systems so all of the data sets in an output group print in sequence, with no intervening files, no NPRO processing between files, and only one header and trailer page for the set. For information about enabling the multiple data set function, see dataset-grouping or Data set grouping.

Note: Download for z/OS uses the OUTGRP parameter on Exit 15 to process multiple data set jobs. However, AFP Download Plus ignores the OUTGRP parameter on Exit 15 and uses the dataset-grouping AFPPARMS parameter or the Data set grouping Printer Inventory parameter instead.

Process message files

Whenever a data set ends because of an error, AFP Download Plus notifies the receiver about the problem. The receiver might print a message or it might ignore the error.

Produce AFPSTATS audit trail report

When requested, AFP Download Plus produces the AFPSTATS report as an audit trail.

Produce SMF type 6 accounting records

AFP Download Plus produces System Management Facility (SMF) type 6 records with statistics about the job, such as the number of bytes transmitted and other processing information.

Send messages when errors stop transformation

When transformation ends with an error, AFP Download Plus can send the error message data set to the receiver. For more information, see send-messages-on-failure or Send messages on failure. For information about configuring the receiver to receive messages, see Chapter 8, “Configuring the AFP Download Plus receiver on z/OS,” on page 149.

Send MO:DCA-P data directly to the receiver

To reduce the size of the zFS and make fewer I/O calls to the working directory, AFP Download Plus can send the MO:DCA-P data directly to the receiving system without storing it in a temporary file in the working directory. For more information, see direct-download or Direct download.

Send separator pages

AFP Download Plus can be configured to send the active PSF for z/OS separator pages to the receiver. For more information, see send-separator-pages or Send separator pages.

Support MO:DCA Presentation Interchange Set data streams

AFP Download Plus supports MO:DCA Presentation Interchange Set (IS) data streams, including:

MO:DCA AFP/Archive (AFP/A)

MO:DCA AFP/A is an AFP document architecture interchange set that is used for long-term preservation and retrieval. This subset ensures page independence and eliminates images without clearly specified resolution, device default fonts, and external resources.

MO:DCA IS/3

MO:DCA IS/3 is the first interchange set to achieve industry consensus through a rigorous open standards process. It improves existing functions and introduces new functions, such as Begin Print File (BPF) and End Print File (EPF) structured fields, and multiple image TIFF object support.

MO:DCA AFP/A, IS/3

MO:DCA AFP/A, IS/3 is an AFP document architecture interchange set that complies with the rules and restrictions of both the AFP/Archive and IS/3 interchange sets.

MO:DCA Graphic Arts Function Set (GA)

MO:DCA GA is an extension of MO:DCA IS/3 that adds PDF presentation object support.

For more information, see “Considerations for processing specific MO:DCA interchange set compliant files” on page 14.

Transform data to MO:DCA-P

AFP Download Plus converts a z/OS spool data set into MO:DCA-P, if it is not already in that format, and then distributes the MO:DCA-P data. The distributed file is always MO:DCA-P and no other products are needed to convert or distribute the data.

Use multiple FSAs
Multiple AFP Download Plus FSAs can transmit data to the same remote system at the same time, including FSAs that are sending multiple data set jobs.

View messages in the Infoprint Server common message log
If you have a license for the Infoprint Server feature of z/OS, you can use Infoprint Central to view FSA and print job messages that AFP Download Plus writes to the Infoprint Server common message log. With the common message log function, you can also use Infoprint Central to:

- Search for print jobs and view the properties for each job.
- Release held print jobs, delete jobs, change the priority of jobs, and move jobs (if AFP Download Plus is not processing the jobs)

For more information, see "Printer Inventory" on page 68.

Limitations

AFP Download Plus has these functional limitations:

ACIF user exits
AFP Download Plus does not recognize user exits previously written for and used with ACIF.

Direct-printing support
AFP Download Plus is not supported in direct-printing mode. AFP Download Plus is supported only in deferred-printing mode.

Line data indexing
AFP Download Plus does not index line data.

Message files
When AFP Download Plus sends messages to the receiver, these are the limitations:

- When message APS8239I is sent to the receiver for errors that caused processing to stop (see send-messages-on-failure or Send messages on failure), resources that are specified on the startup procedure are not sent inline. Printing the message causes "resource not found" error messages unless the resources are already available to the receiving system or are manually made available.
- Message files are not compliant with a specific MO:DCA interchange set unless you make them compliant. See "Considerations for processing specific MO:DCA interchange set compliant files" on page 14.

Printer-resident only fonts
The 4028 printer and printers that emulate the 4028 use a set of fonts that are only resident in the printer. Host versions of these fonts exist, but they contain only formatting information for an application, not the actual raster font pattern data. Without the font pattern data, these fonts cannot be put inline and are not supported by AFP Download Plus. If any of these fonts are used, AFP Download Plus issues message APS279I and stops processing the job.

Separator page support
When AFP Download Plus generates and sends separator pages to the receiver, these are the limitations:

- Only one data set header is sent to the receiver when multiple copies of a print job are requested. The receiver then prints only one copy of the data set header even though multiple copies of the job are printed. This limitation differs from PSF, which prints a data set header with each copy of the print data set.
- The receiver spools the separator pages with the rest of the job (as if they are part of the user's job); this limitation means that they are no longer recognized as separator pages. Therefore, any separator page functions (such as offset stacking, edge marks, and mark forms) are not done by the print server on the receiving system (such as PSF for z/OS).
- Separator pages are not compliant with a specific MO:DCA interchange set unless you make them compliant. See "Considerations for processing specific MO:DCA interchange set compliant files" on page 14.

Software requirements

You install and configure AFP Download Plus on a z/OS system to send data. In addition, you can install and configure AFP Download Plus on a z/OS system to receive data. In both cases, before you install the AFP Download Plus feature, ensure that you meet these software requirements:

- Communications Server element of z/OS with IP Services
- PSF Version 4 Release 6.0 for z/OS (Program Number 5655–M32).

  See *PSF for z/OS: Introduction* for the PSF software requirements.

Ensure that the remote system servers that are receiving data from AFP Download Plus are at or above the levels that AFP Download Plus supports. For example, Content Manager OnDemand for Multiplatforms must be at Version 9 Release 0.0 or later (Program Number 5724–J33).

The AFP Download Plus feature of PSF 4.5.0 or later is required to use these AFP Download Plus functions:

- Direct download
- Extended receiver information
- Internet Protocol Version 6 (colon hexadecimal notation)
- LZW compression
- MO:DCA IS/3 files
- Multiple data set
- Page accounting
- Secure transmission
- Separator pages

The AFP Download Plus feature of PSF 4.6.0 is required to use these AFP Download Plus functions:

- MO:DCA AFP/A files
- MO:DCA AFP/A, IS/3
- MO:DCA IS/3 with function sets

Performance considerations

AFP Download Plus runs as a JES functional subsystem (FSS). AFP Download Plus reads resources from libraries and obtains records from the JES spool. AFP Download Plus then transforms the records to a MO:DCA-P data stream and stores it in temporary files in a z/OS File System (zFS) working directory with the resource group data or optionally, immediately transmits the MO:DCA-P data to the receiving system. When the transform processing is complete, AFP Download Plus transmits the data in the temporary files to the receiving system.

If allowed, AFP Download Plus uses a large amount of the available processor while it reads the resources and transforms the data. It is possible to see AFP Download Plus use 70% or more of the processor during the transform phase of processing, if that much is available. If a spike in processor usage causes system workload balancing problems, you can refer to the Workload Manager (WLM) documentation for information about limiting AFP Download Plus. You might want to create a resource group, service class, and classification rules in WLM to limit the AFP Download Plus started task (APSHPOSE) processor use by service unit or time.

Place AFP Download Plus in a separate WLM service class from PSF for z/OS because they have dissimilar performance characteristics. Limiting PSF can cause the printers that are driven by PSF to pause because they must wait for data.

Also, follow these guidelines:

- For TCP/IP-attached receivers that use a 1000Base-T Ethernet connection, make sure the speed on both the z/OS host system and the receiver is set to 1000 megabits per second (Mbps)/full duplex operation. If the 1000Base-T Ethernet connection on the receiver does not have a 1000 Mbps/full duplex setting, make sure that it is set to auto-negotiation and the host system is set to 1000 Mbps/full duplex.
- For TCP/IP-attached receivers that use a 100Base-T Ethernet connection, make sure both the z/OS host system and the receiver are set to 100 Mbps/full duplex operation.
- Turn off all tracing for the receiver.
- If you are using a Windows receiver, be aware that your antivirus program might increase processor use, which reduces AFP Download Plus performance.

To reduce the size of the zFS, reduce I/O calls to the working directory, and possibly reduce processor usage, AFP Download Plus can send the MO:DCA-P data directly to the receiving system without storing it in a temporary file in the working directory. The receiver takes over some of the processing rather than AFP Download Plus doing it all. For more information, see direct-download or Direct download.

AFP Download Plus sends recovery points to verify the transmission byte count. If the byte count does not match the current recovery point, AFP Download Plus retransmits a document from the last successful recovery point. AFP Download Plus synchronizes transmitted data with the receiver based on the AFPPARMS parameter (see transmit-recovery-pages), the Printer Inventory parameter (see Recovery pages), or at the end of a file. You can use the transmit-recovery-pages or Recovery pages parameter to change the synchronization frequency, which might improve AFP Download Plus performance. Setting the transmit-recovery-pages or Recovery pages parameter to 0 gives the best performance because AFP Download Plus only synchronizes the transmitted data with the receiver at the end of a file. The worst performance is obtained when you set the transmit-recovery-pages or Recovery pages parameter to 1.

Several other AFP Download Plus functions can affect performance:

- Encoding all data before transmission can reduce performance. For more information, see secure-transmission or Secure transmission.
- Compressing data before transmission decreases the amount of data that is sent to the receiver, thus reducing the transmission time. However, because of the time that is required to compress and decompress the data, the overall performance might not be improved.

For more information about establishing performance goals and processing capacity boundaries, see *z/OS MVS Initialization and Tuning Guide* and *z/OS MVS Programming: Workload Management Services*.

Considerations for processing specific MO:DCA interchange set compliant files

AFP Download Plus supports MO:DCA Presentation Interchange Set data streams, including:

MO:DCA AFP/Archive (AFP/A)
MO:DCA AFP/A is an AFP document architecture interchange set that is used for long-term preservation and retrieval. This subset ensures page independence and eliminates images without clearly specified resolution, device default fonts, and external resources.

MO:DCA Interchange Set 3 (IS/3)
MO:DCA IS/3 is the first interchange set to achieve industry consensus through a rigorous open standards process. It improves existing functions and introduces new functions, such as Begin Print File (BPF) and End Print File (EPF) structured fields, and multiple image TIFF object support.

MO:DCA AFP/A, IS/3
MO:DCA AFP/A, IS/3 is an AFP document architecture interchange set that complies with the rules and restrictions of both the AFP/Archive and IS/3 interchange sets.

MO:DCA Graphic Arts Function Set (GA)
MO:DCA GA is an extension of MO:DCA IS/3 that adds PDF presentation object support.

To correctly process a MO:DCA IS/3 file, you must use applications that claim support for MO:DCA IS/3; otherwise, you have no assurance that the file is processed correctly. For example, when an application concatenates two MO:DCA IS/3 compliant print files, the EPF structured field in the first file and the BPF structured field in the second file must be removed to create a single MO:DCA IS/3 compliant file that is enclosed by a BPF and EPF structured field pair. See *Mixed Object Document Content Architecture Reference* for more information about IS/3.

MO:DCA IS/3 data streams can use only TrueType and OpenType fonts; FOCA fonts are not allowed. AFP Download Plus might add auxiliary files, such as separator pages and message files, to a job. Typically, these auxiliary files use FOCA fonts and do not contain BPF and EPF structured fields; therefore, they are not MO:DCA IS/3 compliant. If AFP Download Plus processes a MO:DCA IS/3 data stream with non-MO:DCA IS/3 auxiliary files and sends the job to a receiver that concatenates the files into a single file, the resulting file is not MO:DCA IS/3 compliant. To prevent this problem, the auxiliary files must be MO:DCA IS/3 compliant.

The AFP Download Plus receiver on z/OS uses the `afpconcat` exit program to concatenate a multiple data set job to a single data set. This concatenation process preserves the files as MO:DCA IS/3 compliant. If you send MO:DCA IS/3 files as a group to any other receiver that concatenates multiple data sets, make sure that the concatenation process does not remove all BPF and EPF structured fields. Otherwise, the resulting single data set print file is no longer MO:DCA IS/3 compliant.

MO:DCA AFP/A data streams allow FOCA fonts but they require page independence and might use metadata objects. AFP/A print files specify the AFP/A MO:DCA interchange set on the BPF and BDT structured fields. An AFP/A, IS/3 interchange set also exists. This interchange set is an intersection of AFP/A and IS/3. For more information about AFP/A and AFP/A, IS/3, see *Mixed Object Document Content Architecture Reference*.

To ensure that the files AFP Download Plus transmits remain compliant with the interchange set of the print file, you must make sure that these guidelines are followed:

- When AFP Download Plus processes MO:DCA IS/3 data streams, use only TrueType and OpenType fonts, not FOCA fonts.
- If the receiver is concatenating the auxiliary files to the user data set, any auxiliary files that AFP Download Plus might add to a job must match the interchange set and any function sets specified on the user's data set.
- The receiver and applications that process the print file must support the specified MO:DCA interchange set and any specified function sets.
- If you have a multiple data set job with one or more specific MO:DCA interchange set compliant files and you want the data sets and any auxiliary files to remain compliant, you must make sure that the MO:DCA interchange set specification is preserved if the receiver concatenates the data sets.

See “Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31 for more information.

Chapter 2. Planning the size of the working directory

AFP Download Plus uses a working directory to store two types of files:

Permanent error message files
: These files remain in the file system until you delete them. Error message files are created by AFP Download Plus when a processing error occurs. The files are in the *workdirectory*/userinfo directory, where *workdirectory* is the name of the working directory that is specified by a parameter in the AFPPARMS control statement or the Printer Inventory (see working-directory or Working directory). *workdirectory* is set to a default value of /var/psf/.

  See "Monitoring error messages" on page 137 for more information about error message files and how to delete them.

Temporary files for transformed data and resources
: These are files that AFP Download Plus creates and then deletes when it finishes processing a data set. Temporary files are in the *workdirectory*/afpdp/*fsaname* directory, where *workdirectory* is the name of the working directory that is specified by a parameter in the AFPPARMS control statement or the Printer Inventory and *fsaname* specifies the name of the FSA associated with the sender. *workdirectory* is set to a default value of /var/psf/.

Because error message files are small and not many exist, this information only describes how to estimate the size of the working directory for the temporary files that AFP Download Plus creates. However, allocate at least one cylinder of space for the error message files.

AFP Download Plus uses a temporary file in the working directory to store the resources and either places the MO:DCA-P data in a temporary file in the working directory before it sends the resources and data to the receiving system or, if a parameter in the AFPPARMS control statement or the Printer Inventory is set (see direct-download or Direct download), sends the MO:DCA-P data directly to the receiving system.

Because the working directory contains all the resources that are required by the print data set and might contain the entire print data set in its MO:DCA-P form, you must allocate and mount a z/OS File System (zFS) that is large enough to hold the temporary files that AFP Download Plus creates. If the file system you allocate is too small, an AFP Download Plus abend leaves partial temporary files in the zFS. These partial temporary files are deleted by AFP Download Plus the next time that the FSA is successfully started. When you are planning for the working directory, overestimating the size is better than underestimating.

The performance of the working directory is also an important consideration when you are planning for the file system. In addition to the physical disk subsystem that is selected for the file system, the file structure (zFS or HFS) has an impact on file system performance. Because a z/OS File System (zFS) has higher performance characteristics than a Hierarchical File System (HFS) and is the strategic file system for z/OS, allocate a zFS rather than an HFS.

When you are planning the size of the zFS for the AFP Download Plus sender, keep in mind that the AFP Download Plus receiver (z/OS, AIX, Windows, or Linux operating system) needs a file system of a comparable or larger size to receive the data from the AFP Download Plus sender. See "Creating working directories" on page 149.

For information about using zFS, see *z/OS UNIX System Services Planning* and *z/OS Distributed File Service zFS Administration*.

The factors to consider when you are estimating the size of the working directory are:

- Compression
- Concurrent FSAs
- Direct download of data
- Non-direct download of data

Compression factor

AFP Download Plus can optionally compress the MO:DCA-P data and resources before temporarily storing them in the zFS or sending the data to the receiver. You use a parameter in the AFPPARMS control statement or the Printer Inventory to compress data (see compression or Compression).

Not all data compresses at the same rate, but generally you can expect a compression rate of about 50% and a reduction in the size requirement for the working directory.

Some data does not compress well and some data is larger after compression. These types of data do not compress well:

- Input data with large amounts of data that is already compressed, such as image data
- Small input data sets (5 KB or less)
- TrueType and outline fonts

Also, keep in mind that more processor capacity is required to run the compression and extraction algorithms.

Concurrent FSAs factor

Concurrent FSAs are FSAs that run AFP Download Plus senders and z/OS receivers at the same time.

Running many concurrent FSAs can cause conflict for the file system. Therefore, if performance is slow, consider allocating several zFSs (one for each of the concurrent FSAs) as opposed to a single zFS for all the FSAs.

Note:

Allocate separate zFSs for AFP Download Plus senders and receivers that are running on the same z/OS system.

Direct download factor

AFP Download Plus can use the optional direct download function to send MO:DCA-P data directly to the receiving system without storing it in a temporary file in the zFS. You set a parameter in the AFPPARMS control statement or the Printer Inventory (see working-directory or Working directory) to use the direct download function.

When AFP Download Plus is using the direct download function, the working directory contains only resources and not MO:DCA-P data. Based on the job that requires the largest number of resource bytes, estimate the size of the working directory. The working directory size must be larger than the resource bytes required.

By using the direct download function, you might see a reduction of up to 90% in the size of the zFS. For example, as the size of the MO:DCA-P data increases compared to the size of the resources, you see more of a reduction in the size of the zFS. Also, with a reduction in I/O calls to the working directory, you might see less processor use than you are typically used to.

Non-direct download factor

By default, AFP Download Plus uses temporary files in the working directory to store the resources and MO:DCA-P data before it sends them to the receiving system. When AFP Download Plus is using this non-direct download method, consider these factors for estimating and calculating the correct size of a working directory:

- Print data set size
- Expansion factor with required resources

This information also explains how to calculate the size of the zFS when you are using the non-direct download method.

Print data set size

To estimate the working directory size, you must understand the size of the largest print data set to be processed by AFP Download Plus. You can estimate the largest print data set size from:

- Pages produced
- Lines or records
- Byte count

Estimation from pages produced

Some print applications produce approximately the same number of pages each time. Therefore, you can use the number of pages that are produced to estimate the size for the print data set that is processed.

To do this estimation, you must determine a page size in bytes for the number of pages produced. Pages can vary greatly in size from a few hundred bytes to thousands of bytes. You must understand your own print application enough to determine the appropriate page size. Keep in mind that the page size can vary greatly from print data set to print data set. For example, the average page size for one data set might be 0.7 KB while another is 27 KB.

Use the formula (*Pages* x *PageSize*) to estimate the print data set size to use in calculating the size for the zFS. Remember, it is better to overestimate and adjust later than it is to underestimate.

If you do not know the number of pages a print application produces, or the print data set is a MO:DCA-P file and you are a JES2 user, you can use SDSF to determine the number of pages in the print data set. After the print data set is on the JES spool, look at the Tot-Page column on the SDSF output panel.

If you are a JES3 user, you can use the `*I,J=jobname,E` command to display the pages for a MO:DCA-P format print data set that is on the JES spool.

Estimation from lines or records

If you know the logical record length (LRECL) of a print job, you can use the metrics, lines or records, to estimate the print data set size. When the record format is fixed, you can use the number of lines (or records) with the record length to compute the size of the print data set in bytes.

Use the formula (*Lines* x *LRECL*) to estimate the print data set size to use in calculating the size for the zFS.

For line data files in the JES2 spool, you can use SDSF to determine the number of records in the print data set. Look at the Tot-Rec column on the SDSF output panel.

If you are a JES3 user, you can use the `*I,J=jobname,E` command to determine the number of lines in a print data set on the JES spool.

Estimation from byte count

You can inspect the individual print data sets in the JES spool to get the most accurate estimate of the print data set size. You use the byte count value as the size for a print data set. Remember to figure the size of the largest print data set that the AFP Download Plus FSA processes.

You can use SDSF to determine the byte count of jobs in the JES2 spool:

1. Enter ? next to your print job on the SDSF output panel. You see the SDSF Job Data Set Display panel.
2. Look at the Byte-Cnt column.

If you are a JES3 user, you can use the `*I,J=jobname,E` command to display the bytes for a MO:DCA-P format print data set that is on the JES spool.

Expansion factor

You use the expansion factor for estimating the working directory size. The expansion factor is the amount the transformation and resource collection processes cause the data to grow.

During print data set processing, the spool data set is transformed from its original format to MO:DCA-P. Also, AFP Download Plus collects all the resources that are required to print the data set (such as fonts, page segments, and overlays) and includes them inline in the document sent to the receiver. The number and size of the resources have a bearing on the size of the working directory that is needed to process the print data set.

When you are calculating the size of the zFS, an expansion factor is multiplied by the largest print data set size to allow for transforming the print data set and including the resources inline. The suggested expansion factor is 20% or a value of 1.2; however, because not all print data sets have the same characteristics, you might need to adjust the value of the expansion factor. Also, for small print data sets, print data sets requiring many resources, or print data sets that use large resources, the resources might require more space in the zFS.

Sample calculations for directory size

This information shows how to calculate the size of the zFS when AFP Download Plus is using the non-direct download method. The formula that you use considers the print data set size, expansion factor, and concurrent FSAs. The formula is:

DataSetSize x *ExpFactor* x *FSAs* = *FileSysSize*

The values are:

DataSetSize
Size of the largest print data set.

ExpFactor
Expansion factor of 20% or 1.2.

FSAs
Number of concurrent FSAs.

FileSysSize
Size of the zFS in bytes.

Keep in mind: If you are using data compression and the files compress well, you reduce the calculated zFS size by 50% with this calculation:

```
FileSysSize x 50%
```

Calculation examples

The tables here show calculation examples that depend on whether you are estimating the print data set size from pages (Table 3 on page 21), lines or records (Table 4 on page 21), or byte count (Table 5 on page 21). The values in the tables are rounded up because it is better to overestimate.

The calculations in these tables assume that each active FSA is simultaneously processing the largest sized print data set (the most demanding scenario). If not, you might need to adjust the calculations.

Calculations when estimating from pages

Table 3 on page 21 shows calculation examples when you are estimating from pages with this formula:

```
[(Pages x PageSize) = DataSetSize] x ExpFactor x FSAs = FileSysSize
```

Note: The average page size can vary greatly from print data set to print data set.

Table 3: Estimating from pages. M = 10^6

Print job	Largest print data set size			Expansion Factor (*ExpFactor*)	Number of concurrent FSAs (*FSAs*)	z/OS File System size (*FileSysSize*)
	Number of pages (*Pages*)	Average page size (*PageSize*)	Largest Size (*DataSetSize*)			
Test1	65,000	27,000	1,755 M	1.2 (= 2,106 M)	3	6,318 M
Test2	100,000	660	66 M	1.2 (= 79.2 M)	3	238 M

Calculations when estimating from lines or records

Table 4 on page 21 shows calculation examples when you are estimating from lines or records with this formula:

```
[(Lines x LRECL) = DataSetSize] x ExpFactor x FSAs = FileSysSize
```

Note: The print jobs in this table are simple line data jobs.

Table 4: Estimating from lines or records. M = 10^6; G = 10^9

Print job	Largest print data set size			Expansion Factor (*ExpFactor*)	Number of concurrent FSAs (*FSAs*)	z/OS File System size (*FileSysSize*)
	Number of lines (*Lines*)	Record length (*LRECL*)	Largest Size (*DataSetSize*)			
Test3	5,000,000	133	665 M	1.2 (= 798 M)	5	3,990 M
Test4	25,000,000	133	3,325 M	1.2 (= 3,990 M)	5	20 G

Calculations when estimating from byte count

Table 5 on page 21 shows calculation examples when you are estimating from byte count with this formula:

```
[ByteCount = DataSetSize] x ExpFactor x FSAs = FileSysSize
```

Note: This calculation method is the most accurate.

Table 5: Estimating from byte count. M = 10^6

Print job	Largest print data set size (*ByteCount*)	Expansion Factor (*ExpFactor*)	Number of concurrent FSAs (*FSAs*)	z/OS File System size (*FileSysSize*)
Test1	1,656 M	1.2 (= 1,988 M)	3	5,954 M
Test2	65 M	1.2 (= 78 M)	3	234 M

Table 5: Estimating from byte count. M = 10^6 *(continued)*				
Print job	**Largest print data set size (*ByteCount*)**	**Expansion Factor (*ExpFactor*)**	**Number of concurrent FSAs (*FSAs*)**	**z/OS File System size (*FileSysSize*)**
Test3	619 M	1.2 (= 743 M)	5	3,715 M
Test4	2,148 M	1.2 (= 2,578 M)	5	12,890 M

Calculation scenario

An application that is called RACER is processed by AFP Download Plus. AFP Download Plus reads the print data set from the JES spool and sends it to another system for printing. These factors are known:

- The print data set produced by RACER is the largest print data set that this AFP Download Plus FSA must process.
- The average byte size of the RACER application's print data set on the JES spool is 110 M, where M = 10^6.
- Only one FSA is running AFP Download Plus.

These are the steps for calculating the size of the zFS in bytes:

1. Because you know the byte count, use the formula for estimating from byte count:

   ```
   ByteCount x ExpFactor x FSAs = FileSysSize
   ```

   See Table 5 on page 21 for examples.
2. Calculate the file system size with *ByteCount* = 110 M and *FSAs* = 1:

   ```
   110 M x 1.2 x 1 = 132 M
   ```

3. Convert 132 M to megabytes (MB), where 1 MB = 1,048,576:

   ```
   132,000,000 / 1,048,576 = 125 MB
   ```

   Note: For allocation purposes, it is better to have a value in gigabytes (GB) or megabytes (MB), where 1 GB = 1,073,741,824.

In this scenario, the zFS must be allocated with a size of 125 MB or larger in order for AFP Download Plus to process RACER. If you are using data compression and the files compress well (see “Compression factor” on page 18), you can reduce the 125 MB or larger size by 50%.

Chapter 3. Installing AFP Download Plus

The AFP Download Plus feature includes software for both the sender and receiver. You can configure your system to use just the sender or the receiver, or you can use both components on the same system. If you are using AFP Download Plus to send jobs from one z/OS operating system to another, you must install AFP Download Plus on both z/OS systems.

Note: Each AFP Download Plus installation requires a separate IBM license.

This information describes how to install the AFP Download Plus feature. If you are migrating from Download for z/OS to AFP Download Plus, you might want to do a connectivity test to an existing receiver before you do a complete, customized installation. If so, see Appendix E, "Connectivity test for AFP Download Plus," on page 187.

To install AFP Download Plus, do these steps:

1. Make sure that you are at the correct program levels. See "Software requirements" on page 13.
2. Install AFP Download Plus on the z/OS operating system. See the *Program Directory for AFP Download Plus* for instructions.
3. Establish security with group and user profiles. See "Establishing security " on page 23.
4. Change directory ownership. See "Changing directory ownership" on page 24.
5. Create a working directory. See "Creating a working directory" on page 24.
6. Set the PATH environment variable. See "Setting the PATH environment variable" on page 25.
7. Configure the SYS1.PARMLIB member for AFP Download Plus. See "Enabling AFP Download Plus in the SYS1.PARMLIB member" on page 26.
8. Configure the AFP Download Plus sender on the z/OS operating system. See Chapter 4, "Configuring the AFP Download Plus sender," on page 29.
9. Configure a receiver. Do one of these:
   - Configure the AFP Download Plus receiver on the secondary z/OS operating system. See Chapter 8, "Configuring the AFP Download Plus receiver on z/OS," on page 149.
   - Configure a download receiver on an AIX, Windows, or Linux operating system to receive data from the AFP Download Plus sender.

Establishing security

To establish security for AFP Download Plus, you must create a group profile, such as APSADMIN, which defines the users who are authorized to control and use various functions of AFP Download Plus. You must also create a user profile, such as APS, which gives the sender authority to access the group profile.

To create the group profile and user profile, you can use the Resource Access Control Facility (RACF) or another program that follows System Authorization Facility (SAF) protocol to establish security. Do this:

1. Create a group profile with an OMVS group identifier (GID). For example, this RACF command defines group APSADMIN:

   ```
   ADDGROUP APSADMIN OMVS(GID(number))
   ```

   where *number* is a unique GID number with values 1 - 2147483647.
2. Define a user profile with an OMVS user identifier (UID). For example, these RACF commands create the user APS and grant access to the APSADMIN group:

   ```
   ADDUSER APS DFLTGRP(APSADMIN) OMVS(UID(number)) NOPASSWORD
   ```

   where *number* is a unique UID number with values 1 - 2147483647.

Note: NOPASSWORD defines the user ID as a protected user ID.

3. Define the startup procedure that you are using to the RACF STARTED class. If you want to use the RACF Started Procedures Table (ICHRIN03) instead, see *z/OS Security Server RACF Security Administrator's Guide*. For example, these RACF commands define the startup procedure, AFPPLUS and relate the user ID, APS, and group ID, APSADMIN:

```
SETOPTS GENERIC(STARTED)
REDEFINE STARTED AFPPLUS.* STDATA(USER(APS) GROUP(APSADMIN))
SETROPTS CLASSACT(STARTED) RACLIST(STARTED)
SETROPTS RACLIST(STARTED) REFRESH
```

4. Grant READ access to this privilege profile to be able to change the ownership of any file that is used by AFP Download Plus. For example, these RACF commands grant READ access to user APS:

```
SETROPTS CLASSACT(UNIXPRIV)
SETROPTS RACLIST(UNIXPRIV)
RDEFINE UNIXPRIV SUPERUSER.FILESYS.CHOWN UACC(NONE)
PERMIT SUPERUSER.FILESYS.CHOWN CLASS(UNIXPRIV) ID(APS)  ACCESS(READ)
SETROPTS RACLIST(UNIXPRIV) REFRESH
```

5. Set up a RACF data set profile definition for each resource library data set listed in the startup procedure (such as FONTLIB, PDEFLIB, and FDEFLIB). Also, use the RACF PERMIT command to give the user ID from the RDEFINE command access to the data set. For example:

```
ADDSD 'dsn.*' OWNER(xx) UACC(NONE) GENERIC
PERMIT 'dsn.*' GENERIC ID(APS) ACC(READ)
```

6. Create user IDs with OMVS segments for each user you want included in the group. Each OMVS segment must have a unique UID number with values 1 - 2147483647.
7. Connect the user IDs to the group. For example, this RACF command connects a user ID to the APSADMIN group:

```
CONNECT (userid) GROUP(APSADMIN)
```

Changing directory ownership

After you create the APSADMIN group, you must change ownership of the AFP Download Plus installation directories and files (`/usr/lpp/psf`) to APSADMIN group ownership. Do this:

1. Mount in read/write mode the file system that contains `/usr/lpp/psf`.
2. Run this command from an `rlogin` shell or from an OMVS session:
   `chgrp -R APSADMIN /usr/lpp/psf`

Creating a working directory

To use AFP Download Plus, you need a z/OS File System (zFS) that is set up as a working directory. To create the working directory, you must:

1. Allocate the zFS.
2. Set up the working directory.
3. Mount the zFS.

This information summarizes the steps for creating the working directory. It also describes how to monitor the zFS. See *z/OS Distributed File Service zFS Administration* for complete instructions about creating a working directory and estimating, allocating, and mounting a zFS.

Allocating the z/OS File System

To allocate a z/OS File System (zFS) that AFP Download Plus can use as the working directory:

1. Calculate the size of the zFS. See Chapter 2, “Planning the size of the working directory,” on page 17.
2. Allocate a zFS based on the size you calculated. The data set you allocate must be large enough to contain, on one or more volumes, data that equals the megabytes (MB) or gigabytes (GB) you calculated.

Setting up the working directory

AFP Download Plus uses a working directory to save data before it sends print data sets to the receiving system. You specify the working directory name with a parameter in the AFPPARMS control statement or the Printer Inventory (see working-directory or Working directory), or you can use the default value of `/var/psf/`.

To set up the working directory:

1. Create the working directory in your file system or as a separate file system in its own zFS data set (it is recommended that you use a separate file system).

   Sysplex users: The working directory file system must be system-specific. If the working directory is defined in the BPXPRM*xx* SYS1.PARMLIB member, it must be designated NOAUTOMOVE.
2. Change the group owner of the working directory with this command, where *workdirectory* is the working directory name:
   `chgrp APSADMIN` *workdirectory*
3. Change the permissions of the working directory with this command:
   `chmod 775` *workdirectory*

Mounting the z/OS File System

To mount the z/OS File System (zFS):

1. Use TSO or z/OS UNIX System Services to mount the new zFS to the working directory (see “Setting up the working directory” on page 25).
2. If you are using multiple mounts within the file system, mount each file at the mount points with settings such as these:

   - */workdirectory*`/afpdp`
   - */workdirectory*`/afpdp/`*fsaname*

   workdirectory is the working directory name and *fsaname* is the FSA name that is specified with the PRT(*nnnn*) parameter in the JES2 PRT statement (see “PRT statement” on page 103) or the JNAME parameter in the JES3 DEVICE statement (see “DEVICE statement” on page 106).

   Tip: To make the mount point permanent, specify it in the BPXPRM*xx* SYS1.PARMLIB member.

For more information, see *z/OS MVS Initialization and Tuning Reference*.

Monitoring the z/OS File System

You can monitor the z/OS File System (zFS) usage and adjust the size when appropriate. For information about monitoring zFS, see *z/OS UNIX System Services Planning* and *z/OS Distributed File Service zFS Administration*.

Tip: Use the zFS threshold monitoring function `aggrfull` to report space usage that is based on total aggregate disk size.

Setting the PATH environment variable

You must change the PATH environment variable in the `/etc/profile` file to include the directories for the AFP Download Plus executable files. Do this:

1. Edit `/etc/profile`.

Notes:

a. You must have authority to edit the `/etc/profile` file.

b. The environment variables are case-sensitive; therefore, enter the values exactly as shown.

2. Add this to the PATH environment variable:

```
/usr/lpp/psf/local:/usr/lpp/psf/bin
```

3. Log out and then log in again for the new PATH to become available.

Enabling AFP Download Plus in the SYS1.PARMLIB member

After you install AFP Download Plus, ensure that SYS1.PARMLIB contains member IFAPRD*xx* and that AFP Download Plus is enabled in the member. Figure 5 on page 26 shows the PRODUCT entry that IFAPRD*xx* must contain for AFP Download Plus.

Note: The STATE value is set to ENABLED.

```
PRODUCT OWNER('IBM CORP')
        NAME('PSF for z/OS')
        ID(5655-M32)
        VERSION(*)
        RELEASE(*)
        MOD(*)
        FEATURENAME('Download Plus')
        STATE(ENABLED)
```

Figure 5: PRODUCT entry for AFP Download Plus in your IFAPRDxx member of SYS1.PARMLIB

Part 2. Using AFP Download Plus to transform and send data

This information contains tasks for working with the sender component of AFP Download Plus:

Chapter 4. Configuring the AFP Download Plus sender

This information describes the tasks that you must do to configure the sender after you install AFP Download Plus on your z/OS operating system. See Chapter 3, “Installing AFP Download Plus,” on page 23 for information about installing the feature.

The tasks for configuring the AFP Download Plus sender on the z/OS operating system are:

1. Plan for AFP Download Plus.
2. Configure TCP/IP.
3. Create the AFP Download Plus startup procedure.
4. Define JES initialization statements.
5. Write installation exits.
6. Review the program properties table (PPT) entry.

Planning considerations

AFP Download Plus operates as a JES functional subsystem (FSS). An FSS is an extension of JES, which runs in its own address space. Within the FSS, the AFP Download Plus program runs as a functional subsystem application (FSA) by using the support facilities of the FSS to communicate with JES. Several AFP Download Plus FSAs can run in the same FSS.

This information describes the planning decisions to consider before you write a startup procedure and code the JES2 or JES3 initialization statements:

- How many FSSs and FSAs to define
- What region size to define for each FSS
- What JES work-selection criteria to specify for each FSA
- How to differentiate AFP Download Plus from PSF for z/OS
- What to do so the output from AFP Download Plus remains compliant with specified MO:DCA interchange sets

Deciding how many FSSs and FSAs to define

For improved throughput and more efficient use of system resources, you can define more than one FSA within an FSS. You also can define more than one FSS. Table 6 on page 29 lists the maximum number of FSSs and FSAs you can define.

Table 6: Number of FSSs and FSAs supported

Number of FSSs	Number of FSAs per FSS
32767 maximum for JES2 2000 maximum for JES3	128 maximum (see Note)

Note: The actual number of FSAs per FSS might be limited by the amount of storage each AFP Download Plus FSA requires below the 16 MB line. See “Determining FSS region size” on page 30 to determine how much virtual storage size each FSA requires.

Determining FSS region size

The region-size requirements for each AFP Download Plus FSS depend on:

- Whether the trace option is active
- The number of FSAs supported by the FSS

An installation option that can affect storage requirements is the size of the trace table. The default is 128 KB per FSA. See *PSF for z/OS: Diagnosis* for more information about tracing.

You specify the amount of storage that is required by each AFP Download Plus FSS on the EXEC JCL statement of the startup procedure (see " JCL statements for the startup procedure" on page 38). Table 7 on page 30 shows the minimum storage that is required for AFP Download Plus. The storage includes all subpools that are associated with each of the AFP Download Plus-related task control blocks.

Table 7: Minimum storage required for FSS and FSAs

FSA	Below 16 Megabytes	Above 16 Megabytes
The first FSA in an FSS	0.6 MB below 16 MB	8.2 MB above 16 MB
Each additional FSA in the FSS	0.2 MB below 16 MB	1.4 MB above 16 MB

Updating MAXPROCSYS and MAXPROCUSER

The operator command D OMVS,O displays the current values for the MAXPROCSYS and MAXPROCUSER BPXPRMxx parameters in the SYS1.PARMLIB member. To update the MAXPROCSYS and MAXPROCUSER parameters, increase the value by 2 for each FSS and by 1 for each FSA.

See *z/OS MVS Initialization and Tuning Reference* for information about setting the MAXPROCUSER and MAXPROCSYS parameters.

Defining work-selection criteria

You define work-selection criteria for each AFP Download Plus FSA during JES initialization. These criteria determine which output data sets the AFP Download Plus FSA selects from the JES2 or JES3 spool.

You can use JES2 and JES3 to specify numerous work-selection criteria, which correspond to JCL parameters. See the appropriate *JES Initialization and Tuning Guide* and *JES Initialization and Tuning Reference* for your system for information about the possible criteria. Some work-selection criteria that you might consider for data sets to be processed by AFP Download Plus are:

- Output class of the data set
- Form name
- Destination name

You specify the work-selection criteria for each AFP Download Plus FSA on a parameter of a JES initialization statement:

- WS parameter of the JES2 PRT(*nnnn*) statement
- WS parameter of the JES3 DEVICE statement

Differentiating AFP Download Plus from PSF for z/OS

The FSS for AFP Download Plus is similar to the FSS that might be defined for PSF for z/OS. Thus, you can use similar JES initialization statements to define the AFP Download Plus FSS and FSAs, and your AFP Download Plus startup procedure can be similar to the existing PSF startup procedure.

You must give the AFP Download Plus FSS a name that is different than the PSF FSS name because they cannot share the FSS. Also, the AFP Download Plus FSA names cannot be the same as the PSF FSA names. Make modifications in these areas:

JES work-selection criteria
You must specify different JES work-selection criteria for the AFP Download Plus FSA than for the PSF for z/OS FSA. For example, if class A is specified for the PSF for z/OS FSA, you must specify a different class or a different work-selection criteria, such as destination, for the AFP Download Plus FSA.

Printing defaults
When you define an FSA, you can specify defaults for several printing options. However, to transmit a data set to an AIX, Windows, or Linux operating system for printing, you might not want to specify defaults on the z/OS system. See "Specifying defaults in JES2" on page 104 and "Specifying defaults in JES3" on page 109.

Startup procedure
The startup procedure must specify a different program entry point for AFP Download Plus. Some of the parameters on the PRINTDEV statement do not apply to AFP Download Plus. See "PRINTDEV parameters" on page 61 for the PRINTDEV parameters that do apply to AFP Download Plus.

Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set

AFP Download Plus accepts input files with these interchange sets:

- MO:DCA AFP Archive (AFP/A)
- MO:DCA AFP/A, IS/3
- MO:DCA IS/3
- MO:DCA IS/3 with function sets (MO:DCA GA)

AFP Download Plus preserves the MO:DCA interchange set and function set specifications when it transmits the files. For the files to remain compliant, AFP Download Plus must transmit them to receivers that support the same MO:DCA interchange set and function sets. All applications that process the print file must also support the MO:DCA interchange set and function sets to preserve the MO:DCA specification on the transmitted files

For example, even though a receiver supports MO:DCA IS/3 and a certain function set level, you must still make sure that it preserves that level on output. For example, the AFP Download Plus receiver on z/OS uses the `afpconcat` exit program to concatenate a multiple data set job to a single data set. This concatenation process preserves the files as MO:DCA IS/3 compliant. However, another receiver might use an exit program that concatenates multiple data sets and removes all Begin Print File (BPF) and End Print File (EPF) structured fields, resulting in a single data set print file that is no longer MO:DCA IS/3 compliant.

To ensure that all transmitted input files remain compliant with the specified interchange set, follow the guidelines for the type of interchange set.

Input files with MO:DCA IS/3; IS/3 with function sets; and AFP/A, IS/3

- To make sure the auxiliary files that AFP Download Plus sends to the receiver, such as separator pages and message files, are MO:DCA IS/3 compliant, do these:
  1. Create or update a PRINTDEV statement in the startup procedure that specifies a message OUTPUT statement with these entries:
     - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statement can specify the P1TT6462 sample page definition that is included with PSF. P1TT6462 is equivalent to the P1A06462 default message page definition, except that it uses TrueType and OpenType fonts.
     - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

     See PRT004 in Figure 9 on page 38 for more information.

2. When you are sending separator pages, create or update a PRINTDEV statement in the startup procedure that specifies separator OUTPUT statements with these entries:
   - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statements can specify the P1TT6483 sample page definition that is included with PSF. P1TT6483 is equivalent to the P1V06483 default separator page definition, except that it uses TrueType and OpenType fonts.
   - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

   See PRT004 in Figure 9 on page 38 for more information.
3. If the files to be transmitted all specify a MO:DCA interchange set level of IS/3, set a parameter in the AFPPARMS control statement to `is3` or the Printer Inventory parameter to `IS/3`. If the files to be transmitted are a mix of MO:DCA IS/3, IS/3 with function sets, and AFP/A, IS/3, set the AFPPARMS parameter to `bpf-match` or the Printer Inventory parameter to `BPF match`. See auxiliary-files-modca-level or Auxiliary files MO:DCA level.
4. Test that the auxiliary files are MO:DCA IS/3 compliant by doing these:
   a. Set a parameter in the AFPPARMS control statement or the Printer Inventory to `Yes` (see save-auxiliary-files or Save auxiliary files) and then run AFP Download Plus. During processing, AFP Download Plus ignores the parameters for compression, direct download, and send messages on failure; saves the auxiliary files in the job submitter's default message directory, `/var/psf/userinfo/`*`userid`*; and does not send any files to the receiver.
   b. Run the MO:DCA validation tool of your choice on the saved auxiliary files to determine whether your files are compliant. The AFP Consortium (www.afpcinc.org), provides an IS/3 validation tool that you can use. The validation tool indicates whether MO:DCA errors are present in the file. See *Mixed Object Document Content Architecture Reference* for more information about resolving IS/3-related errors.
   c. Fix the files if they contain errors, run AFP Download Plus, and then run the MO:DCA validation tool. Do this until the files are compliant. The saved auxiliary files are replaced each time that you run AFP Download Plus.
   d. When testing is complete, set the parameter for saving auxiliary files to `No`.

- If you have a multiple data set job with one or more data sets that specify a MO:DCA interchange set level and you want the data sets and any auxiliary files to remain compliant, do one of these:
  - Send the job to a receiver that does not concatenate data sets.
  - Send the job to a receiver that preserves the MO:DCA interchange level during the concatenation process.
  - Set an AFPPARMS parameter or Printer Inventory parameter to `No` (see dataset-grouping or Data set grouping), and send the job to a receiver that does not preserve MO:DCA IS/3 files during the concatenation process.

Input files without IS/3 interchange sets

For input files with interchange sets that are not IS/3, such as MO:DCA AFP/A, add as few auxiliary data sets as possible to the output to ensure that all print files in the job are compliant with the specified interchange set. TrueType and OpenType fonts are compliant with all MO:DCA interchange sets, so auxiliary files must be set up to use them. Follow these guidelines:

- To make sure the message files that AFP Download Plus sends to the receiver use TrueType or OpenType fonts, create or update a PRINTDEV statement in the startup procedure that specifies a message OUTPUT statement with these entries:
  - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statement can specify the P1TT6462 sample page definition that is included with PSF. P1TT6462 is equivalent to the P1A06462 default message page definition, except that it uses TrueType and OpenType fonts.

  - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF works for MO:DCA AFP/A data streams and might work for others. You need to verify the output for other interchange sets. The sample IS/3 form definitions are: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

  See PRT004 in Figure 9 on page 38 for more information.

- Send separator pages to the receiver only if necessary. If you need to, create or update a PRINTDEV statement in the startup procedure that specifies separator OUTPUT statements with these entries:
  - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statements can specify the P1TT6483 sample page definition that is included with PSF. P1TT6483 is equivalent to the P1V06483 default separator page definition, except that it uses TrueType and OpenType fonts.
  - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF works for MO:DCA AFP/A data streams and might work for others. You need to verify the output for other interchange sets. The sample IS/3 form definitions are: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

  See PRT004 in Figure 9 on page 38 for more information.
- Set the AFPPARMS parameter to `bpf-match` or the Printer Inventory parameter to BPF `match` to generate the matching interchange set specification on the BPF and BDT structured fields of the auxiliary files as are specified on the user's print file. See auxiliary-files-modca-level or Auxiliary files MO:DCA level.
- Test that the auxiliary files are compliant with the interchange set of your input print files by doing these:
  1. Set a parameter in the AFPPARMS control statement or the Printer Inventory to `Yes` (see save-auxiliary-files or Save auxiliary files) and then run AFP Download Plus. During processing, AFP Download Plus ignores the parameters for compression, direct download, and send messages on failure; saves the auxiliary files in the job submitter's default message directory, `/var/psf/userinfo/`*`userid`*; and does not send any files to the receiver.
  2. Manually verify or run the MO:DCA validation tool of your choice on the saved auxiliary files to determine whether your files are compliant. See *Mixed Object Document Content Architecture Reference* for more information about resolving IS/3-related errors.
  3. Fix the files if they contain errors, run AFP Download Plus, and verify the output files. Do this until the files are compliant. The saved auxiliary files are replaced each time that you run AFP Download Plus.
  4. When testing is complete, set the parameter for saving auxiliary files to `No`.
- If you have a multiple data set job with one or more data sets that specify a MO:DCA interchange set level and you want the data sets and any auxiliary files to remain compliant, do one of these:
  - Send the job to a receiver that does not concatenate data sets.
  - Send the job to a receiver that preserves the MO:DCA interchange level during the concatenation process.
  - Set an AFPPARMS parameter or Printer Inventory parameter to `No` (see dataset-grouping or Data set grouping), and send the job to a receiver that does preserve MO:DCA files during the concatenation process.

Configuring TCP/IP

AFP Download Plus uses TCP/IP to send data to a receiver, and supports IPv4 and IPv6. TCP/IP configuration parameters, in addition to other network considerations, can affect how fast data is sent. For information about configuring TCP/IP, see *z/OS Communications Server: IP System Administrator's Commands*. For AFP Download Plus, also check the recommendations that are listed in *PSF for z/OS: Customization*.

For TCPRCVBUFRSIZE and TCPSENDBFRSIZE, use a buffer size of 256 KB. You can specify these parameters in the TCPCONFIG statement in the hlq.PROFILE.TCPIP data set. See *z/OS Communications Server: IP Configuration Reference* for information about the TCPCONFIG statement and the PROFILE.TCPIP search order.

Creating a startup procedure

Before you start the AFP Download Plus sender, create a cataloged startup procedure to define FSAs for the sender and indicate how the job is to be processed. The startup procedure identifies:

- Program name and region size.
- AFP Download Plus resources.
- Defaults for processing with different FSA destinations. You can define different defaults for each FSA.

Include the startup procedure in a library that is known to either JES2 or JES3. See the appropriate *JES Initialization and Tuning Guide* for your installation for more information about startup procedure libraries.

Notes:

1. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the changes you need to make in the startup procedure when you are generating compliant auxiliary files, such as separator pages and message files.
2. You can define initialization parameters in the Infoprint Server Printer Inventory instead of the startup procedure. Using the Printer Inventory is more efficient than using the startup procedure because when you change parameters in the Printer Inventory, you do not need to restart all the FSAs in the startup procedure; you need to restart only the FSA for which you changed parameters. See "Printer Inventory" on page 68 for information about how to use parameters in the Printer Inventory instead of the startup procedure. For more information about the Printer Inventory, see *PSF for z/OS: Customization*.

This information describes sample startup procedures, JCL statements for the startup procedure, the AFPPARMS control statement, PRINTDEV parameters, and Printer Inventory parameters.

Sample startup procedure

Table 8 on page 34 lists the sample startup procedures that are provided with AFP Download Plus in SYS1.PROCLIB.

Table 8: Sample startup procedure members in SYS1.PROCLIB

Member name	Description
APSWAFPP	Startup procedure for AFP Download Plus, which includes the use of Quick Response (QR) Code bar codes with SOSI data, extended code pages that are stored in UNIX files, RAT-installed resources, such as TrueType and OpenType fonts and data object resources, and an IS/3-defined FSA.
APSWAFP2	Startup procedure for AFP Download Plus.

Figure 6 on page 35 - Figure 9 on page 38 shows an example of an AFP Download Plus sender startup procedure with four FSAs that send data to different receivers that are running on the same system. The startup procedure name is AFPPLUS and the FSA names are PRT001, PRT002, PRT003, and PRT004.

The JES2 initialization statements for this sender are shown in Figure 14 on page 102; the JES3 initialization statements are shown in Figure 15 on page 105.

```
//AFPPLUS    PROC
//*****************************************************************************
//*  This sample startup procedure defines the DD, OUTPUT, and
//*  PRINTDEV JCL for four AFP Download Plus destinations.
//*
//*****************************************************************************
//STEP01   EXEC PGM=APSHPOSE,REGION=4M,PARM=(,,,,TCPIP,)
//*****************************************************************************
//AFPSTATS DD DSN=INST.AFPPLUS.AFPSTATS,DISP=SHR
//AFPPARMS DD DSN=FSS.PDS.AFPPARMS,DISP=SHR
//*
//MSGDSR   OUTPUT PAGEDEF=A06462,
//          FORMDEF=A10110,
//          PIMSG=NO,
//          CLASS=M
//JOBHDR   OUTPUT PAGEDEF=V06483,      /* JOB HEADER PAGE  */
//         FORMDEF=A10120,CHARS=60D8   /* FORMDEF: ALTERNATIVE BIN  */
//JOBHIS3  OUTPUT PAGEDEF=TT6483       /* JOB HEADER SEPARATOR USING TRUETYPE */
//         FORMDEF=I30110              /* FONTS SPECIFIED IN THE PAGEDEF */
//JOBTLR   OUTPUT PAGEDEF=V06483,      /* JOB TRAILER PAGE  */
//         FORMDEF=A10110,CHARS=60D8   /* FORMDEF: MAIN BIN  */
//JOBTIS3  OUTPUT PAGEDEF=TT6483       /* JOB TRAILER SEPARATOR USING TRUETYPE */
//         FORMDEF=I30110              /* FONTS SPECIFIED IN THE PAGEDEF */
//DSHDR    OUTPUT PAGEDEF=V06483,      /* DATA SET SEPARATOR  */
//         FORMDEF=A10110,CHARS=60D8   /* FORMDEF: MAIN BIN  */
//DSHIS3   OUTPUT PAGEDEF=TT6483       /* JOB DATA SET SEPARATOR USING TRUETYPE*/
//         FORMDEF=I30110              /* FONTS SPECIFIED IN THE PAGEDEF */
//MSGDS    OUTPUT PAGEDEF=A08682,      /* MESSAGE DATA SET FOR ERRORS  */
//         FORMDEF=A10110,CHARS=60D8
//MSGIS3   OUTPUT PAGEDEF=TT6462,      /* MESSAGE DATA SET USING TRUETYPE   */
//         FORMDEF=I30110              /* FONTS SPECIFIED IN THE PAGEDEF */
//*****************************************************************************
//* AFP Download Plus RESOURCES:
//*****************************************************************************
//* 240-pel raster font and outline font library
//FONT01   DD DSN=INST.FONT240,DISP=SHR
//         DD DSN=SYS1.FONTLIBB,DISP=SHR
//         DD DSN=SYS1.SFNTILIB,DISP=SHR        /*SYSTEM OUTLINE FONTS
*/
//* 300-pel raster font and outline font library
//FONT02   DD DSN=INST.FONT300,DISP=SHR
//         DD DSN=SYS1.FONT300,DISP=SHR
//         DD DSN=SYS1.SFNTILIB,DISP=SHR        /*SYSTEM OUTLINE FONTS
*/
//*
//TTFONT01 DD PATH='/usr/lpp/fonts/worldtype'
//         DD PATH='/usr/lpp/PSF/fonts/ttf/'
//*
//OBJ01    DD PATH='/u/objc/dataobjresource/'
//         DD PATH='/u/objc/colormgmtresource/'
//*
```

Figure 6: Example of an AFP Download Plus startup procedure (Part 1 of 4)

```
//PSEG01   DD DSN=INST.R240.PSEGLIB,DISP=SHR
//         DD DSN=SYS1.PSEGLIB,DISP=SHR
//PSEG02   DD DSN=INST.R300.PSEGLIB,DISP=SHR
//*
//OLAY01   DD DSN=INST.R240.OVERLIB,DISP=SHR
//         DD DSN=SYS1.OVLYLIB,DISP=SHR
//OLAY02   DD DSN=INST.R300.OVERLIB,DISP=SHR
//*
//PDEF01   DD DSN=INST.PDEFLIB,DISP=SHR
//         DD DSN=SYS1.PDEFLIB,DISP=SHR
//*
//FDEF01   DD DSN=INST.FDEFLIB,DISP=SHR
//         DD DSN=SYS1.FDEFLIB,DISP=SHR
//*
//OC01     DD DSN=INST.OCLIB,DISP=SHR
//         DD DSN=SYS1.OCLIB,DISP=SHR
//*************************************************************************
//*  This FSA defines a destination that:
//*     - Writes transform messages to a zFS file. When errors stop
//*       transformation, sends messages to the receiver system using the
//*       resources specified on the MESSAGE OUTPUT statement.
//*     - Passes the default of block data check reporting to the destination.
//*     - Attempts connection forever.
//*     - Connects to PORT 6100.
//*     - Defaults to using the 240-pel raster font library.
//*************************************************************************
//PRT001   CNTL
//PRT001   PRINTDEV FONTDD=*.FONT01,
//          FONT240=*.FONT01,
//          FONT300=*.FONT02,
//          FONTPATH=*.TTFONT01,
//          OVLYDD=*.OLAY01,
//          OVLY240=*.OLAY01,
//          OVLY300=*.OLAY02,
//          PSEGDD=*.PSEG01,
//          PSEG240=*.PSEG01,
//          PSEG300=*.PSEG02,
//          PDEFDD=*.PDEF01,
//          FDEFDD=*.FDEF01,
//          MESSAGE=*.MSGDS,
//          OBJCONDD=*.OC01,
//          PAGEDEF=A06462,
//          FORMDEF=A10110,
//          JOBHDR=*.JOBHDR,           /* JOB HDR OUTPUT   */
//          JOBTRLR=*.JOBTLR,          /* JOB TLR OUTPUT   */
//          DSHDR=*.DSHDR,             /* DS SEPARATOR     */
//          CHARS=60DB,
//          TRACE=YES,
//          DATACK=BLOCK,
//          PIMSG=YES,
//          CONNINTV=0,
//          IPADDR=9.99.999.9,
//          PORTNO=6100
//PRT001   ENDCNTL
```

Figure 7: Example of an AFP Download Plus startup procedure (Part 2 of 4)

```
//*****************************************************************************
//*  This FSA defines a destination that:
//*     - Redirects transform messages to spool. When errors stop transformation,
//*       sends messages to the receiver system using the resources specified on
//*       the MESSAGE OUTPUT statement.
//*     - Passes the default of block data check reporting to the destination.
//*     - Attempts connection forever.
//*     - Connects to PORT 8500.
//*     - Defaults to using the 300-pel raster font library.
//*****************************************************************************
//PRT002   CNTL
//PRT002   PRINTDEV FONTDD=*.FONT02,
//         FONT240=*.FONT01,
//         FONT300=*.FONT02,
//         FONTPATH=*.TTFONT01,
//         OVLYDD=*.OLAY02,
//         OVLY240=*.OLAY01,
//         OVLY300=*.OLAY02,
//         PSEGDD=*.PSEG02,
//         PSEG240=*.PSEG01,
//         PSEG300=*.PSEG02,
//         PDEFDD=*.PDEF01,
//         FDEFDD=*.FDEF01,
//         MESSAGE=*.MSGDSR,
//         PAGEDEF=A06462,
//         FORMDEF=A10110,
//         JOBHDR=*.JOBHDR,           /* JOB HDR OUTPUT   */
//         JOBTRLR=*.JOBTLR,          /* JOB TLR OUTPUT   */
//         DSHDR=*.DSHDR,             /* DS SEPARATOR     */
//         CHARS=60DB,
//         TRACE=YES,
//         DATACK=BLOCK,
//         PIMSG=YES,
//         CONNINTV=0,
//         IPADDR=9.99.999.9,
//         PORTNO=8500
//PRT002   ENDCNTL
//*****************************************************************************
//*  This FSA defines a destination that:
//*     - Writes transform messages to a zFS file. When errors stop
//*       transformation, sends messages to the receiver system using the
//*       resources specified on the MESSAGE OUTPUT statement.
//*     - Maps raster font references to outline font references.
//*     - Uses object container libraries that contain data object resources
//*       and color management resources.
//*     - Passes the default of allow data check reporting to the destination.
//*     - Attempts connection for 10 minutes.
//*     - Connects to PORT 7200.
//*****************************************************************************
//PRT003   CNTL
//PRT003   PRINTDEV FONTDD=*.FONT02,
//          FONT240=*.FONT01,
//          FONT300=*.FONT02,
//          FONTPATH=*.TTFONT01,
//          OBJCPATH=*.OBJ01,
//          OVLYDD=*.OLAY02,
//          OVLY240=*.OLAY01,
//          OVLY300=*.OLAY02,
//          PSEGDD=*.PSEG02,
//          PSEG240=*.PSEG01,
//          PSEG300=*.PSEG02,
//          PDEFDD=*.PDEF01,
```

Figure 8: Example of an AFP Download Plus startup procedure (Part 3 of 4)

```
//          FDEFDD=*.FDEF01,
//          MESSAGE=*.MSGDS,
//          OBJCONDD=*.OC01,
//          PAGEDEF=A06462,
//          FORMDEF=A10110,
//          JOBHDR=*.JOBHDR,           /* JOB HDR OUTPUT   */
//          JOBTRLR=*.JOBTLR,          /* JOB TLR OUTPUT   */
//          DSHDR=*.DSHDR,             /* DS SEPARATOR     */
//          CHARS=60DB,
//          TRACE=YES,
//          MAP2OLN=YES,
//          DATACK=UNBLOCK,
//          PIMSG=YES,
//          CONNINTV=600,
//          IPADDR=9.99.999.9,
//          PORTNO=7200
//PRT003   ENDCNTL
//*************************************************************************
//*  This FSA defines a destination that:
//*     - Generates separator pages and message data sets that use only TrueType
//*       and OpenType fonts so the files are MO:DCA IS/3 compliant. The AFPPARMS
//*       data set or the Printer Inventory specifies an entry for PRT004 with
//*       Yes for send separator pages and IS/3 for auxiliary files MO:DCA level.
//*     - Writes transform messages to a zFS file. When errors stop
//*       transformation, sends messages to the receiver system using the
//*       resources specified on the MESSAGE OUTPUT statement, which only
//*       uses TrueType and OpenType fonts for print files that are MO:DCA
//*       IS/3 compliant.
//*     - Passes the default of block data check reporting to the destination.
//*     - Attempts connection forever.
//*     - Connects to PORT 8500.
//*     - Defaults to using the 300-pel raster font library for data sets that
//*       are not MO:DCA IS/3 compliant.
//*     - Does not use the CHARS parameter; for print files that are not MO:DCA
//*       IS/3 compliant, you can specify CHARS to include raster fonts.
//*************************************************************************
//PRT004   CNTL
//PRT004   PRINTDEV FONTDD=*.FONT02,
//          FONT240=*.FONT01,
//          FONT300=*.FONT02,
//          FONTPATH=*.TTFONT01,
//          OVLYDD=*.OLAY02,
//          OVLY240=*.OLAY01,
//          OVLY300=*.OLAY02,
//          PSEGDD=*.PSEG02,
//          PSEG240=*.PSEG01,
//          PSEG300=*.PSEG02,
//          PDEFDD=*.PDEF01,
//          FDEFDD=*.FDEF01,
//          MESSAGE=*.MSGIS3,
//          FORMDEF=I30110,
//          JOBHDR=*.JOBHIS3,           /* JOB HDR OUTPUT   */
//          JOBTRLR=*.JOBTIS3,          /* JOB TLR OUTPUT   */
//          DSHDR=*.DSHIS3,             /* DS SEPARATOR     */
//          TRACE=YES,
//          DATACK=BLOCK,
//          PIMSG=YES,
//          CONNINTV=0,
//          IPADDR=9.99.999.9,
//          PORTNO=8500
//PRT004    ENDCNTL
//*
```

Figure 9: Example of an AFP Download Plus startup procedure (Part 4 of 4)

Note: This sample JCL assumes that the AFP Download Plus programs are in a data set that is part of the standard system search order; if not, include a STEPLIB statement to identify the data set.

JCL statements for the startup procedure

This information describes the statements and parameters that are shown in Figure 6 on page 35 - Figure 9 on page 38.

***proc_name* PROC**
Specifies the name of the startup procedure. *proc_name* must be specified in the JES2 FSS or the JES3 FSSDEF initialization statement.

EXEC PGM=APSHPOSE[,REGION=*nnnn*{K | M}] [,TIME=NOLIMIT] [,PARM=({'INV=*piname*' | *NSTddname,trace_type,prompt,trace_size,tcpip_name,*UNICODE})]
Specifies the name of the AFP Download Plus program and identifies any special processing parameters. This statement is required.

PGM=APSHPOSE
Specifies the name of the AFP Download Plus executable program.

REGION=*nnnn*{K | M}
Specifies the amount of storage that is required by the sender. Value range: 0 - 9999 K or 0 - 2047 M, where:

K
Kilobytes

M
Megabytes

See Table 7 on page 30 for the minimum storage that is required for AFP Download Plus.

TIME=NOLIMIT
Specifies NOLIMIT to prevent TIMEOUT abends.

PARM=({'INV=*piname*' | *NSTddname,trace_type,prompt,trace_size, tcpip_name,*UNICODE})
Specifies parameters for using the Infoprint Server Printer Inventory or PSF tracing values. See "Using the PSF trace facility" on page 141 for more information about tracing.

INV=*piname*
Specifies the 4-character name of the Printer Inventory that is specified in the Infoprint Server configuration file. This parameter indicates that AFP Download Plus uses the Printer Inventory and obtains parameters from the specified Printer Inventory for each FSA in the startup procedure.

For more information about using the Printer Inventory, see "Printer Inventory" on page 68.

NSTddname
Specifies the name of a DD statement that defines the output data set in which to record the NST trace output. This name must conform to the standard JCL DD naming conventions.

This parameter specifies that the NST trace is to start during AFP Download Plus initialization if you specified TRACE=YES on the PRINTDEV statement and defined the NST trace data set in a DD statement. If you want the NST trace to be started dynamically, do not specify *NSTddname*.

The equivalent parameter in the Printer Inventory is the NST trace dsname parameter.

trace_type
Specifies which FSA trace to start:

FULL
Specifies an FSA full external trace.

INTR
Specifies an FSA internal trace. INTR is the default value.

IPDS
Specifies an FSA Intelligent Printer Data Stream (IPDS) external trace.

LIMIT
Specifies a shortened FSA external trace.

SYNC
Specifies an FSA SYNC external trace.

The equivalent parameter in the Printer Inventory is the Trace mode parameter.

prompt
Specifies whether an operator response is required to initialize the AFP Download Plus operator interface:

PROMPT
Specifies that each time the sender is initialized, the operator is to receive a message, APS620A. The message prompts the operator to enter a response, which notifies AFP Download Plus to initialize the AFP Download Plus operator interface. The response can be any AFP Download Plus operator interface command; it is directed to all FSAs or to the notify subtask.

Thereafter, the operator can type commands, such as those to start functional subsystem interface (FSI) or FSA component traces, before AFP Download Plus starts processing data sets. Prompting occurs even if the startup procedure does not include tracing specifications.

NOPROMPT
Specifies that the AFP Download Plus operator interface is to be initialized automatically. No operator response is required. NOPROMPT is the default value.

The equivalent parameter in the Printer Inventory is the Trace prompt parameter.

trace_size
Specifies the number of 4 KB pages of storage to allocate for each internal FSA trace table. Valid values are 1 - 999. The default is 32 (128 KB) per FSA. This allocation occurs only if PSF internal tracing is active.

Note: When the number of pages that are specified is more than 32, and the specified region is greater than 32 MB, increase the REGION size. To determine how large an increase is needed, use this equation where *number of FSAs active* is the maximum number of FSAs active while the sender is running:

```
REGION increase = (# of FSAs active) x 4 KB x (pgcount - 32)
```

The equivalent parameter in the Printer Inventory is the Trace table size parameter.

tcpip_name
Specifies the name of the TCP/IP address space. If this parameter is not specified, AFP Download Plus uses the default name of TCPIP.

The equivalent parameter in the Printer Inventory is the TCP/IP job name parameter.

UNICODE
Specifies that AFP Download Plus is enabled to use the system conversion services that z/OS provides. This parameter is ignored because AFP Download Plus with PSF 4.5 or later is always Unicode-enabled.

The equivalent parameter in the Printer Inventory is the Unicode enabled parameter.

OUTPUT
Specifies the page definitions, form definitions, and fonts that are used to format the different pages in a job or data set, including job header pages, data set header pages, job-trailer pages, and pages that are used for formatting messages.

To redirect messages for viewing or processing by another FSA, you use these parameters on OUTPUT statements for message pages: CHARS, CLASS, COLORMAP, COMSETUP, DEST, FORMDEF, PAGEDEF, PIMSG, RESFMT, and TRC. All other parameters are ignored.

For information about how to specify OUTPUT so that the messages are redirected for viewing or processing by another FSA, see “Redirecting messages” on page 137.

DD
Identifies the system libraries that contain:

- Resources that are used for processing (fonts, page segments, overlays, page definitions, form definitions, and object containers)
- Traces and reports (AFP Download Plus external trace data set and AFP Download Plus AFPSTATS report)

Note: If specified, AFP Download Plus ignores the PRTINFO DD statement.

CNTL
Indicates the beginning of program control statements for each FSA.

The FSA name on the CNTL statement must match the label on the subsequent PRINTDEV and ENDCNTL statements. For JES3, the FSA name must match the name that is specified on the JNAME parameter on the JES3 DEVICE initialization statement. For JES2, the FSA name must match the name on the PRT*nnnn* initialization statement.

PRINTDEV
Specifies default FSA-initialization parameters. A PRINTDEV statement is entered for each FSA defined in an AFP Download Plus startup procedure.

The FSA name on the PRINTDEV statement must match the label on the CNTL and ENDCNTL statements, and the JES2 PRT*nnnn* initialization statement or the JNAME parameter on the JES3 DEVICE initialization statement.

See Table 12 on page 61 for a description of the PRINTDEV parameters. Many of the PRINTDEV parameters can be defined in the Printer Inventory. For more information about using Printer Inventory parameters instead of PRINTDEV parameters, see “Printer Inventory” on page 68.

ENDCNTL
Specifies the end of the program control statements for the FSA. This statement is specified only when you specify PRINTDEV parameters.

The FSA name on the ENDCNTL statement must match the label on the preceding CNTL and PRINTDEV statements, and the JES2 PRT*nnnn* initialization statement or the JNAME parameter on the JES3 DEVICE initialization statement.

AFPPARMS control statement in the startup procedure

Additional parameters that AFP Download Plus uses to transform and distribute JES spool data sets are contained in an AFPPARMS control statement. You can specify this control statement with the AFPPARMS DD name in the startup procedure and on a job-by-job basis with the AFPPARMS parameter on the OUTPUT JCL statement (see “Specifying the AFPPARMS control statement on the OUTPUT statement” on page 134).

This is an example of the AFPPARMS DD statement in the startup procedure:

```
//AFPPARMS   DD DSN=FSS.PDS.AFPPARMS,DISP=SHR
```

The AFPPARMS control statement that is specified with the AFPPARMS DD name is a partitioned data set; the data set name ends with a qualifier of AFPPARMS. Also, DISP=SHR is used so that AFP Download Plus processes the spool data sets for multiple FSAs.

How the AFPPARMS data set is allocated

Table 9 on page 42 shows how to allocate the AFPPARMS data set that is specified with the AFPPARMS DD name in the startup procedure or the AFPPARMS parameter on the OUTPUT JCL statement.

Table 9: Allocation of AFPPARMS data set attributes			
Attribute	**Value**	**Type**	**Description**
DCB=DSORG=	PO or PS	Required	Data set organization (see Note “1” on page 42)
DSNTYPE=	LIBRARY	Required	Data set defined as PDSE
DCB=RECFM=	*xx*	Required	Any value except U
DCB=LRECL=	*nnnn*	Required	Maximum bytes in the record (see Note “2” on page 42)
DISP=	SHR	Required	Data set can be shared
SPACE=	(CYL,(*nn*,1,10))	Required	Direct access storage device (DASD) cylinders that are required to process data (see Note “3” on page 42)

Notes:

1. The data set organization for the AFPPARMS data set on the OUTPUT statement can be PO or PS. The data set organization for the AFPPARMS in the startup procedure must be PO.
2. Any record size is valid; however, use a small record size, such as `DCB=LRECL=120`, to conserve DASD space.
3. Space requirements depend on the type of DASD that is used and on the number of FSAs that are specified in the startup procedure.

How members in the data set are specified

The parameters in the AFPPARMS control statement are used by AFP Download Plus as defaults to process the spool data sets for each FSA. The AFPPARMS control statement can contain a defaults member, named either DEFAULTS or AFPDPDEF, and members with the same names as the FSA names specified in the startup procedure. These members are optional, but you can use them to associate AFPPARMS parameters to specific FSAs.

Note: The AFPPARMS control statement can contain only one defaults member, DEFAULTS or AFPDPDEF, not both.

You can use an FSA member name to specify parameters that apply to that FSA. For example, if you want to associate AFPPARMS parameters to an FSA named PRT619, which is specified in the startup procedure, you specify the parameters in a member that is named PRT619 in the AFPPARMS control statement. AFP Download Plus finds the member in the data set and uses the AFPPARMS parameters to process the spool data sets for the PRT619 FSA.

You can also use the defaults member to specify default parameters that apply to all FSAs in the FSS. However, if a member for a specific FSA is specified, it is also used and overrides the same parameters that are specified in the defaults member. For example:

- The DEFAULTS member specifies these parameters:

```
overlays = inline
foca-fonts = inline
```

- The PRT619 member specifies these parameters:

```
foca-fonts = not-inline
object-containers = inline
```

- Therefore, the parameter values AFP Download Plus uses are:

```
overlays = inline
foca-fonts = not-inline
object-containers = inline
```

Notice that the foca-fonts value is overridden by the value in the PRT619 member, but the overlays value remains the same.

Selection hierarchy for AFPPARMS parameters

This hierarchy shows the order that AFP Download Plus uses to select AFPPARMS parameters:

1. AFPPARMS control statement on the OUTPUT JCL statement
2. Printer Inventory
3. FSA member name in the AFPPARMS control statement that is specified in AFP Download Plus startup procedure
4. Defaults member name, either DEFAULTS or AFPDPDEF, in the AFPPARMS control statement that is specified in AFP Download Plus startup procedure

Syntax of the AFPPARMS control statement

The syntax guidelines for the AFP Download Plus control statement are:

- A parameter is a *keyword=value* pair.
- Spaces are allowed after the keyword and before the value (on either side of the =).
- Only one parameter is allowed on a line.
- A parameter can span multiple lines. For example, the keyword can be on the first line, = can be on the next line, and the value can be on the third line.
- Parameter keywords and values can be specified in uppercase, lowercase, or mixed case.
- Comments are delimited with #. AFP Download Plus ignores everything on a line after the # character.

Figure 10 on page 43 shows an example of the AFPPARMS control statement syntax.

```
#------------------------------------------------------------------------#
#  This is an example AFPPARMS control statement that demonstrates       #
#  the syntax rules for specifying the control statements                #
#------------------------------------------------------------------------#
goca-box=yes                    # A simple control parameter
GOCA-frac-Line=Yes              # Different cases
pass-oid = allow                # Blanks before and after =
     formdefs                   # A keyword preceded by spaces
                                # A blank line
              =                 # = on its own line
                                # A blank line
               inline           # The value for the "formdefs" keyword
mcf2-format=CF overlays=inline  # Not allowed--two parameters on one line
```

Figure 10: Sample AFP Download Plus control statement

Parameters for the AFPPARMS control statement

Table 10 on page 44 shows the parameters that are valid in the AFPPARMS control statement. An X in a column indicates that the parameter can be specified by the:

- AFPPARMS DD name in the startup procedure
- AFPPARMS parameter on the OUTPUT JCL statement

Notes:

1. If you specify parameters in the AFPPARMS control statement when you are using the Printer Inventory, the parameters in the AFPPARMS control statement are ignored.
2. When you change parameters for the defaults member in the AFPPARMS control statement, you must restart all the FSAs in the startup procedure.

Table 10: AFPPARMS control statement parameters

Parameter	Description	Startup Proc	OUTPUT JCL
auxiliary-files-modca-level={bpf-match | is3 | none}	Specifies the MO:DCA interchange set level that auxiliary files, such as separator pages and message files, support. The values are: **bpf-match** Auxiliary files contain the same BPF MO:DCA Interchange Set triplet and Function Set triplets that are specified on the BPF structured field in the user's data set. **is3** Auxiliary files are MO:DCA IS/3 compliant. **none** Auxiliary files do not support a MO:DCA IS level. This is the default. **Notes:** 1. Make sure that changes are made to the PRINTDEV statement for this FSA so that auxiliary files are generated correctly. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 2. Do not use JESNEWS when you are specifying `bpf-match` for this parameter because 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. See Auxiliary files MO:DCA level for the parameter you specify when you are using the Printer Inventory.	X	
bcoca={inline | not-inline}	Specifies whether all BCOCA objects required to print or view the output file are included inline. The default is `inline`. See Resources Included Inline: Bar code objects (BCOCA) for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
cmr-objects={inline-all | inline-generic | not-inline}	Specifies whether color management resource (CMR) objects required to print or view the output file are included inline. The values are: **inline-all** These objects are included inline: • All CMR objects that are referenced in the data stream. • All CMR objects for all device types and models that are referenced by data object or CMR resource access tables (RATs) and mapped to a generic instruction CMR. **Note:** Link CMR objects are not included inline. **inline-generic** These objects are included inline: • All CMR objects that are referenced in the data stream. • All non-device specific CMR objects that are referenced by data object or CMR RATs. This is the default. **Note:** Link CMR objects are not included inline. **not-inline** No CMR objects are included inline. See Resources Included Inline: Color management resources for the parameter you specify when you are using the Printer Inventory.	X	X
compression={none | lzw}	Specifies whether the compression function is used to compress the transformed data before it is sent to the remote system. When `lzw` is specified, the data is compressed with the LZW compression algorithm. The default is none, which indicates that the data is not compressed. **Notes:** 1. AFP Download Plus ignores this parameter when `yes` is specified for the save-auxiliary-files parameter. 2. See Compression for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
dataset-grouping={yes | no}	Specifies whether the multiple data set function is used when the job is sent to the remote system. This parameter is only valid in the data set specified by the AFPPARMS DD name in the startup procedure. The default is no. **Note:** When this parameter is set to yes: 1. Ensure that the download receiver is at the correct level. Also, if you use the AFP Download Plus receiver, ensure that you specify the apshhmds exit program (see "Using the apshhmds exit program" on page 157). 2. When the job contains print files that specify a MO:DCA interchange set level, ensure that your receiver supports and preserves that MO:DCA interchange set. See Data set grouping for the parameter you specify when you are using the Printer Inventory.	X	
direct-download={none | modca}	Indicates whether AFP Download Plus stores data in a temporary directory or sends it directly to the receiver. The values are: **none** AFP Download Plus stores the MO:DCA-P and resource data that is created from the JES spool print data in temporary UNIX files until transmission to the receiver. This is the default. **modca** AFP Download Plus sends the MO:DCA-P data that is created from the JES spool print data directly to the receiver. The resource data is stored in a temporary UNIX file until transmission to the receiver. **Notes:** 1. AFP Download Plus ignores this parameter when yes is specified for the save-auxiliary-files parameter. 2. See Direct download for the parameter you specify when you are using the Printer Inventory.	X	

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
display-afpdp-status={yes | no}	Indicates whether AFP Download Plus activates the processing status feature. The values are: **yes** AFP Download Plus processing status is activated and stays activated for the life of the FSA or until the DISPLAY,STATUS=AFPDP operator interface MODIFY command is issued. Processing status is reported at the end of the spool data set in message APS8559I for both the spool data set transformation to MO:DCA-P and the transformed document transmission. See "Viewing the operator status message when the processing status feature is activated" on page 59. **no** AFP Download Plus processing status is not activated. This is the default. See Display status for the parameter you specify when you are using the Printer Inventory. Also, see "Reporting AFP Download Plus processing status" on page 118 for information about activating the status feature with the operator interface.	X	
foca-fonts={inline | not-inline}	Specifies whether all font character sets and code pages that are required to print or view the output file are included inline. If `mcf2ref=cf` is specified, AFP Download Plus also includes coded fonts inline; otherwise, coded fonts are not included inline. The default is `inline`. See Resources Included Inline: Font objects (FOCA) for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL

formdefs={inline | not-inline}	Specifies whether the form definition that is used in processing the file is included inline. The default is `inline`.
	Note: The job that is sent to the receiver might fail to print or be archived, without any error messages, in these situations:
	• You set these parameters for a job that is sent with separator pages:
	`formdefs=not-inline`
	`dataset-grouping=yes`
	`send-separator-pages=yes`
	• You set these parameters for a job that is sent with multiple data sets:
	`formdefs=not-inline`
	`dataset-grouping=yes`
	See Resources Included Inline: Form definitions for the parameter you specify when you are using the Printer Inventory.
		X	X

goca={inline | not-inline}	Specifies whether all GOCA objects required to print or view the output file are included inline. The default is `inline`. See Resources Included Inline: Graphics objects (GOCA) for the parameter you specify when you are using the Printer Inventory.	X	X
goca-box={yes | no}	Specifies whether GOCA box drawing orders are supported by the printer on the receiver system. The default is no. **Notes:** 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify `yes` for this parameter. See GOCA Box orders for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
goca-frac-line={yes | no}	Specifies whether GOCA fractional line width drawing orders are supported by the printer on the receiver system. The default is no. **Notes:** 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify yes for this parameter. See GOCA Set Fractional Line Width orders for the parameter you specify when you are using the Printer Inventory.	X	X
goca-process-color={yes | no}	Specifies whether GOCA process color drawing orders are supported by the printer on the receiver system. The default is no. **Notes:** 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify yes for this parameter. See GOCA Set Process Color orders for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
image-output-format={asis | ioca}	Specifies the image data format AFP Download Plus produces in the output document. IM1 images can be saved in the same format as in the input file or converted to uncompressed Image Object Content Architecture (IOCA) images. Most printers support both IM1 and IOCA image formats, but IM1 images cannot be rotated or rescaled correctly at different printer resolutions. Print servers, such as PSF, convert IM1 images to uncompressed IOCA when the IM1 image resolution differs from the actual printer resolution. Because AFP Download Plus does not know what printer the output might be printed on, by default it converts IM1 images to uncompressed IOCA. Because uncompressed IOCA images are often greater in size than the original IM1 images, printer performance can be slower. If you have problems with printer performance, specify `image-output-format=asis` so the IM1 images are not converted to IOCA. The values are: **asis** All image data is produced in the same format as in the input file. **ioca** All image data is produced in uncompressed IOCA format. This is the default. See Image output format for the parameter you specify when you are using the Printer Inventory.	X	X
ioca={inline | not-inline}	Specifies whether all IOCA objects required to print or view the output file are included inline. The default is `inline`. See Resources Included Inline: Image objects (IOCA) for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
ioca-replicate-trim-func={yes | no}	Specifies whether the IOCA Replicate and Trim function is used when you are converting IM1 celled images. This parameter might reduce the number of bytes needed for a raster image, allowing it to display or print faster. When set to `yes`, this parameter is only accepted if the image-output-format parameter is set to `ioca`. The default is no. **Note:** The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. See IOCA replicate and trim function for the parameter you specify when you are using the Printer Inventory.	X	X
mcf2-format={cpcs | cf}	Specifies the way AFP Download Plus builds the Map Coded Font Format 2 (MCF-2) structured field. The values are: **cpcs** AFP Download Plus uses the names of the code page and character set to build the MCF-2 structured field. AFP Download Plus opens and reads the contents of all coded fonts that are specified in MCFs in the input file or input resources. This is the default. **cf** AFP Download Plus uses the name of the coded font to build the MCF-2 structured field. This is recommended when double-byte character set (DBCS) fonts are processed. See Map Coded Font (MCF) Format 2 name for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
message-files-read-access={yes | no}	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. The values are: **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). **Notes:** 1. When you specify this attribute, it does not change the permissions that are set for existing message files. 2. This attribute does not apply to PSF V4R5. See Message files read access for the parameter you specify when you are using the Printer Inventory.	X	
object-containers={inline | not-inline}	Specifies whether all object container files that are requested by the input data stream are included inline. The default is `inline`. See Resources Included Inline: Object containers for the parameter you specify when you are using the Printer Inventory.	X	X
overlays={inline | not-inline}	Specifies whether all overlays required to print or view the output document file are included inline. The default is `inline`. See Resources Included Inline: Overlays for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
page-accounting-supported={yes | no}	Specifies whether AFP Download Plus supports the page accounting function. When set to `yes`, AFP Download Plus counts the number of pages and sheets in the data set. The number of pages and sheets is sent to the receiver in the -o attributes, -opagecount and -osheetcount. This parameter is only valid in the data set specified by the AFPPARMS DD name in the startup procedure. The default is no. See Page accounting supported for the parameter you specify when you are using the Printer Inventory.	X	
page-segments={inline | not-inline}	Specifies whether all page segments required to print or view the output document file are included inline. The default is `inline`. See Resources Included Inline: Page segments for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
paper-length=*nnnn*[*.mmm*]*unit*	Specifies the actual paper length to be used for Line-Mode Migration or Line-Mode Conversion. The default is 14IN. The values are: ***nnnn*** Specifies the 1 - 4 digit decimal number that indicates the paper length. ***mmm*** Specifies the 1 - 3 digit decimal number that indicates the paper length. ***unit*** Specifies one of these measurement units: **IN** Inches **CM** Centimeters **MM** Millimeters **PELS** Picture elements (1/240 inch) **POINTS** Points (1/72 inch) **Note:** If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point. See Paper length for the parameter you specify when you are using the Printer Inventory. See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in *PSF for z/OS: Customization*.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
paper-width=*nnnn*[.*mmm*]*unit*	Specifies the actual paper width to be used for Line-Mode Migration or Line-Mode Conversion. This value does not include the carrier strips. The default is 13.2IN. The values are: ***nnnn*** Specifies the 1 - 4 digit decimal number that indicates the paper width. ***mmm*** Specifies the 1 - 3 digit decimal number that indicates the paper width. ***unit*** Specifies one of these measurement units: **IN** Inches **CM** Centimeters **MM** Millimeters **PELS** Picture elements (1/240 inch) **POINTS** Points (1/72 inch) **Note:** If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point. See Paper width for the parameter you specify when you are using the Printer Inventory. See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in *PSF for z/OS: Customization*.	X	X

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
pass-oid={allow | disallow}	Specifies whether AFP Download Plus passes OID information from the resource access table (RAT) to the Begin Object Container (BOC) structured field when it places TrueType and OpenType fonts inline. The values are: **allow** Allows OID information to be passed when it includes TrueType and OpenType fonts. **disallow** Does not allow OID information to be included with TrueType and OpenType fonts inline. This is the default. **Note:** The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. See Object identifier (OID) format for the parameter you specify when you are using the Printer Inventory.	X	X
ptoca={inline | not-inline}	Specifies whether all PTOCA objects required to print or view the output file are included inline. The default is `inline`. See Resources Included Inline: Presentation text objects (PTOCA) for the parameter you specify when you are using the Printer Inventory.	X	X
save-auxiliary-files={yes | no}	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. Before they are used in production, the system programmer can validate that these files are compliant with the MO:DCA interchange set level for auxiliary files that are specified in the AFPPARMS control statement or the Printer Inventory (see auxiliary-files-modca-level or Auxiliary files MO:DCA level). When this parameter is specified, AFP Download Plus ignores the compression, direct-download, and send-messages-on-failure parameters if they are specified. The default is no. See Save auxiliary files for the parameter you specify when you are using the Printer Inventory.	X	

Table 10: AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
secure-transmission={yes | no}	Specifies whether data is encoded before transmission. This parameter is only valid in the data set specified by the AFPPARMS DD name in the startup procedure. The default is yes. **Note:** If standardized Internet security protocols are required to use secure communications for print files, IBM suggests that you use the IPSec protocol. See *z/OS Communications Server: IP Configuration Guide* for information about IPSec. See Secure transmission for the parameter you specify when you are using the Printer Inventory.	X	
send-messages-on-failure={all | generic-only}	Specifies which messages are sent to the receiver system when the print job has errors that stop transformation. The values are: **all** AFP Download Plus transforms the messages for the data set that has errors and sends them to the receiver system as a MO:DCA-P file. This is the default. **Note:** Use this value when you want to send a MO:DCA interchange set compliant message file to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make. **generic-only** AFP Download Plus generates message APS8239I and sends it to the receiver system as line data. **Note:** This value must not be specified when you are using dataset-grouping=yes to send multiple data set jobs to the z/OS receiver system because the receiving system cannot receive jobs with both line data and MO:DCA-P data sets. **Notes:** 1. AFP Download Plus ignores this parameter when yes is specified for the save-auxiliary-files parameter. 2. See Send messages on failure for the parameter you specify when you are using the Printer Inventory.	X	

Table 10: AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
send-separator-pages={yes | no}	Specifies whether AFP Download Plus sends the separator pages for a job. The default is no. **Notes:** 1. Specify this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make. 2. See Send separator pages for the parameter you specify when you are using the Printer Inventory. 3. For more information, see "Sending z/OS separator pages" on page 115.	X	
transmit-recovery-pages=*nnnnn*	Specifies a number that indicates how often AFP Download Plus synchronizes with the receiving system to determine whether the transmitted data is received and if not, retransmits the data from the last successful recovery point. **Values:** 0 - 65535; the default is 1000. When 0 is specified, AFP Download Plus does not synchronize the transmitted data with the receiver until the end of a file. See Recovery pages for the parameter you specify when you are using the Printer Inventory.	X	
trace-user-data={yes | no}	Specifies whether user data is traced when a trace function is requested with AFP Download Plus. User data is traced when yes is specified and user data is available. For more information about using traces, see *PSF for z/OS: Diagnosis*. The default is yes. See Trace user data for the parameter you specify when you are using the Printer Inventory.	X	

Table 10: AFPPARMS control statement parameters (continued)			
Parameter	**Description**	**Startup Proc**	**OUTPUT JCL**
truetype-fonts={inline | not-inline}	Specifies whether all TrueType and OpenType base fonts, linked fonts, and font collections that are required to print or view the output file are included inline. The default is `inline`. **Note:** When each TrueType or OpenType font is processed, if the value in a Data-Object Font Descriptor triplet (X'8B') is set to ON to indicate that a font is inline, it overrides `truetype-fonts=not-inline` and includes that font, and all linked fonts, inline. See Resources Included Inline: TrueType fonts for the parameter you specify when you are using the Printer Inventory.	X	X
working-directory=*pathname*	Specifies the name of the working directory that AFP Download Plus uses to store error messages files and temporary files for transformed data and inline resources. The *pathname* can be 1 - 256 characters in length; the default is `/var/psf/`. AFP Download Plus adds the beginning and ending slashes if they are missing and uses the name as an absolute path. See Working directory for the parameter you specify when you are using the Printer Inventory.	X	

APSHPRM1 sample member for AFPPARMS

The APSHPRM1 sample member, which contains the AFPPARMS parameters, is in SYS1.SAMPLIB. You can either view the sample online or print it. You can also copy the sample to your AFPPARMS data set to use as the defaults member or as the member for one of your FSAs.

After you modify it to contain only control statement parameters that are valid for OUTPUT JCL, you can also use the sample member as the member for the AFPPARMS data set or as the sequential data set specified on the OUTPUT statement for the job.

Viewing the operator status message when the processing status feature is activated

The display-afpdp-status parameter in the AFPPARMS control statement or the Display Status parameter in the Printer Inventory activates the AFP Download Plus processing status feature. You can also activate the status feature with the operator interface. For more information, see “Reporting AFP Download Plus processing status” on page 118.

When the status feature is activated, AFP Download Plus issues status report message, APS8559I, to the operator's console and the JES log. The message is issued at the end of the spool data set for both the spool data set transformation to MO:DCA-P and transformed document transmission. This report message is only displayed when the FSA is active. The format of the message is:

APS8559I *jobname, jobid, stepname, ddname, jobpart, eventdata*.

The values are:

jobname
Specifies the name of the job that is being processed.

jobid
Specifies the job identifier of the spool data set that is being processed.

stepname
Specifies the step name of the job that is being processed.

ddname
Specifies the DD name for the step name that is being processed.

jobpart
Specifies the part of the job that is being processed.

eventdata
Specifies a combination of these:

Transformed bytes=*nnnnnnn*
The number of bytes that result from AFP Download Plus transforming data to MO:DCA-P format. This value is always displayed.

Transmitted=*ppppp*
The percentage of the total number of transformed bytes that AFP Download Plus transmitted to the receiving system.

Transmitted bytes=*gggggggg*
The number of bytes that AFP Download Plus transmitted to the receiving system.

Compressed bytes=*ccccccc*
When compression is activated for the FSA or data set, the number of bytes that result from AFP Download Plus compressing the data.

Table 11 on page 60 shows how the AFP Download Plus mode determines what other event data the message displays.

Table 11: Event data displayed in APS8559I message when AFPPARMS activates the status feature

AFP Download Plus Mode	Message Displays

Compression off
Direct download off
	Transformed bytes=*nnnnnnn*, Transmitted=*ppppp*
	For example:
	`APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K,`
	`JOB00722, STEP1, SYSUT2, USER, Transformed bytes=  647MB,`
	`Transmitted=  58%.`

Compression on
Direct download off
	Transformed bytes=*nnnnnnn*, Compressed bytes=*ccccccc*, Transmitted=*ppppp*
	For example:
	`APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K,`
	`JOB00728, STEP1, SYSUT2, USER, Transformed bytes= 1312KB,`
	`Compressed bytes= 203363, Transmitted= 100%.`

Compression off
Direct download on
	Transformed bytes=*nnnnnnn*, Transmitted bytes=*gggggggg*
	For example:
	`APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K,`
	`JOB00724, STEP1, SYSUT2, USER, Transformed bytes= 1312KB,`
	`Transmitted bytes= 1312KB.`

Compression on
Direct download on
	Transformed bytes=*nnnnnnn*, Compressed bytes=*ccccccc*, Transmitted bytes=*gggggggg*
	For example:
	`APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K,`
	`JOB00726, STEP1, SYSUT2, USER, Transformed bytes= 1312KB,`
	`Compressed bytes= 203348, Transmitted bytes= 203348.`

If AFP Download Plus is still transforming the data, you can see 0% for the transmitted percentage. For example:

```
APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00728, STEP1, SYSUT2, USER,
Transformed bytes=    405KB, Transmitted=  0%.
```

PRINTDEV parameters

You can use PRINTDEV parameters to define default FSA-initialization options for all data sets transmitted by the AFP Download Plus sender. Table 12 on page 61 describes the parameters that can be included in a PRINTDEV statement. All parameters are optional unless specified otherwise.

Notes:

1. Many of the parameters in this table can be defined in the Infoprint Server Printer Inventory. When that is the case, the parameter is marked with an X and you are referred to Table 13 on page 72 or Table 14 on page 74.
2. If you specify parameters that are marked with an X in the PRINTDEV statement when you are using the Printer Inventory, the parameters in the PRINTDEV statement are ignored.
3. If you specify parameters in the PRINTDEV statement and do not use the Printer Inventory, you must restart all the FSAs in the startup procedure when you change a parameter in the PRINTDEV for an existing FSA.

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory.

Parameter	Ignored	Description
CHARS	X	Specifies the last 4 characters of up to four default coded font names. AFP Download Plus adds the coded font names to the page definition and the inline resource group. See Character sets for the Printer Inventory parameter. **Syntax:** CHARS=(*fontname1*[, *fontname2*][,*fontname3*][,*fontname4*]) **Note:** When it processes a MO:DCA IS/3 print file, AFP Download Plus does not add the specified coded fonts to the inline resource group because raster fonts cannot be used in a MO:DCA IS/3 file.
COLORMAP	X	Specifies the member name of the printer default color mapping table on the receiver system. AFP Download Plus puts the table in the inline resource group and exports this parameter for use by the printer on the receiver system. See Color map for the Printer Inventory parameter. **Syntax:** COLORMAP=(*membername*)
COMPRESS	X	Specifies whether AFP Download Plus compresses data (blanks) in line data before it transforms the data to MO:DCA-P. See Blank compression for the Printer Inventory parameter. **Syntax:** COMPRESS=YES|NO

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. *(continued)*

Parameter	Ignored	Description
COMSETUP (required for microfilm device only)	X	Specifies the member name of the printer default microfilm setup resource object container on the receiver system that is generated with the utility provided with your microfilm device. AFP Download Plus puts the object container in the inline resource group and exports this parameter for use by the microfilm device on the receiver system. See Com setup member for the Printer Inventory parameter. **Syntax:** COMSETUP=*membername*
CONNINTV	X	Specifies the connect interval, in seconds, during which AFP Download Plus attempts to start a connection with the receiver system. When the connect interval expires and the connection is not complete, AFP Download Plus issues a message and stops the FSA. See Connect interval for the Printer Inventory parameter. **Syntax:** CONNINTV=*nnnnn*, where *nnnnn* is a value 0 - 86400.
DATACK	X	Specifies the character and position errors the printer reports. AFP Download Plus exports this parameter for use by the printer on the receiver system. See Print error reporting for the Printer Inventory parameter. **Syntax:** DATACK=BLOCK|UNBLOCK|BLKCHAR|BLKPOS **DATACK=BLOCK** Specifies that the printer is not to report character or position errors. BLOCK is the default. **DATACK=UNBLOCK** Specifies that the printer is to report all character and position errors. **DATACK=BLKCHAR** Specifies that the printer is not to report character errors. (The destination reports only position errors.) **DATACK=BLKPOS** Specifies that the printer is not to report position errors. (The destination reports only character errors.)
DSHDR		Identifies the OUTPUT statement that specifies the form definition and page definition that are used to format and print data set header pages. **Syntax:** DSHDR=**.label* **Note:** Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make.
DUMP	X	Specifies that a conditional memory dump of the sender address space is produced when a specific reason code, restartable abend, or message occurs. See Dump: Code, Dump: Count, and Dump: Message ID for the Printer Inventory parameters. **Syntax:** DUMP= ([*reasoncode*|ABD0*nnn*] [,*msgid*,*count*]) **Note:** For a description of the syntax of this parameter and an explanation of restartable abends, see *PSF for z/OS: Diagnosis*.

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. *(continued)*

Parameter	Ignored	Description
FDEFDD (required)		Identifies the DD statement that specifies the form definition libraries. **Syntax:** FDEFDD=**.label*
FONTDD (required)		Identifies the DD statement that specifies the default font libraries for Font Object Content Architecture (FOCA) fonts (the default library is used when the data does not indicate a resolution). **Syntax:** FONTDD=**.label*
FONTPATH		Identifies the DD statement that specifies the paths for font libraries, which contain extended code pages or TrueType and OpenType fonts. **Syntax:** FONTPATH=**.label* **Note:** For more information about extended code pages, see *PSF for z/OS: User's Guide*.
FONT240		Identifies the DD statement that specifies the 240-pel font libraries. **Syntax:** FONT240=**.label*
FONT300		Identifies the DD statement that specifies the 300-pel font libraries. **Syntax:** FONT300=**.label*
FORMDEF (required)	X	Specifies a default form definition. See Form definition for the Printer Inventory parameter. **Syntax:** FORMDEF=*fdefname*
IPADDR (required)	X	Identifies the Internet Protocol (IP) address or host name of the TCP/IP-attached receiver system. See IP address for the Printer Inventory parameter. **Syntax:** IPADDR='*ip-address*' or '*host-name*'
JOBHDR		Identifies the OUTPUT statement that specifies the form definition and page definition that are used to format and print job-header separator pages. **Syntax:** JOBHDR=**.label* **Note:** Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make.
JOBTRLR		Identifies the OUTPUT statement that specifies the form definition and page definition that are used to format and print job-trailer separator pages. **Syntax:** JOBTRLR=**.label* **Note:** Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make.

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. *(continued)*

Parameter	Ignored	Description
MAP2OLN	X	Indicates whether AFP Download Plus maps fonts to outline fonts and places outline fonts in the inline resource group. Use this parameter if the printer on the receiver system supports outline fonts, you have existing applications that use raster fonts, and you want to use outline fonts without changing the applications. Also, see Map to outline fonts and Recover from font not found for Printer Inventory parameters. For more information about mapping to outline fonts, including limitations, see *PSF for z/OS: Customization*. **Syntax:** `MAP2OLN=YES|(YES,CONT)|(YES,QUIT)|NO` **MAP2OLN=YES** AFP Download Plus maps raster fonts to outline fonts and stops processing the job if a requested raster font cannot be mapped to an outline font. **MAP2OLN=(YES,CONT)** AFP Download Plus maps raster fonts to outline fonts and continues processing a job if a requested raster font cannot be mapped to an outline font. AFP Download Plus sends the original raster font to the receiver destination. **MAP2OLN=(YES, QUIT)** AFP Download Plus maps raster fonts to outline fonts and stops processing the job if a requested raster font cannot be mapped to an outline font. **MAP2OLN=NO** AFP Download Plus does not map raster fonts to outline fonts (default).
MESSAGE		Identifies the OUTPUT statement that specifies the options that are used to format and print messages that are redirected to a spool data set or another FSA for processing, sent to the receiver system, or both. For more information about redirecting messages, see "Redirecting messages" on page 137. **Syntax:** `MESSAGE=*.`*label* **Note:** Use this parameter when you want to send a MO:DCA interchange set compliant message file to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make.

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. *(continued)*

Parameter	Ignored	Description
NORESP	X	Specifies the action that AFP Download Plus takes when the time that is specified by the RESPTIME parameter expires before a response is received from the download receiver. See No response action and No response action: Notify for Printer Inventory parameters. **Syntax:** `NORESP=NOTIFY|NOTIFY(`*node.userid*`)|NOTIFY(OPERATOR)|TERMINATE` **NORESP=NOTIFY** AFP Download Plus notifies JES that an expected response was not received from the download receiver. This condition is also displayed by SDSF. NOTIFY is the default. **NORESP=NOTIFY(*node.userid*)** AFP Download Plus sends a message to the specified user ID and JES indicating that an expected response was not received from the download receiver. The node and period can be omitted if the user ID is on the node on which AFP Download Plus is running. **NORESP=NOTIFY(OPERATOR)** AFP Download Plus sends a message to the system operator and JES indicating that an expected response was not received from the download receiver. **NORESP=TERMINATE** AFP Download Plus stops the FSA. The system operator must issue a command to restart the FSA. The data set that is active when the FSA is stopped is restarted from the last checkpoint.
OBJCONDD (required with COLORMAP and COMSETUP)		Identifies the DD statement that specifies the object container library. **Syntax:** `OBJCONDD=*.`*label*
OBJCPATH		Identifies the 1 - 8 character name of the DD statement that specifies the paths for object container libraries, which contain data object resources, including color management resources (CMRs). **Syntax:** `OBJCPATH=*.`*label*
OVLYDD		Identifies the DD statement that specifies the default overlay libraries. Required if OVLY240 or OVLY300 is specified (the default library is used when data does not indicate a resolution); otherwise, optional if no attempt is made to process an overlay from the system overlay library. **Syntax:** `OVLYDD=*.`*label*
OVLY240		Identifies the DD statement that specifies the 240-pel overlay libraries. **Syntax:** `OVLY240=*.`*label*
OVLY300		Identifies the DD statement that specifies the 300-pel overlay libraries. **Syntax:** `OVLYDD=*.`*label*

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. *(continued)*

Parameter	Ignored	Description
PAGEDEF (required)	X	Specifies the default page definition. See Page definition for the Printer Inventory parameter. **Syntax:** PAGEDEF=*pdefname*
PDEFDD (required)		Identifies the DD statement that specifies the page definition libraries. **Syntax:** PDEFDD=**.label*
PIMSG	X	Indicates whether all message groups that are generated in the processing of a data set are reported. Also indicates the maximum number of message groups that are written. See Print error messages and Print error messages: Maximum messages for the Printer Inventory parameters. **Syntax:** PIMSG=(YES [,*nnn*] |NO [,*nnn*]) *nnn* indicates the maximum number of messages and specifies that after AFP Download Plus has generated *nnn* message groups, it is to end processing of the data set and purge the data set from the spool. The final count of written messages might be more than *nnn* message groups if the message groups are generated for errors that are reported during processing for data that is transmitted before the message count is reached. With a value of 0, data set processing continues, regardless of the number of message groups that are generated, unless an error that stops processing occurs. The default is YES,16.
PORTNO	X	Specifies the port number with which AFP Download Plus is to establish a connection and transmit data. See Port number for the Printer Inventory parameter. **Syntax:** PORTNO=*nnnnn*, where *nnnnn* is a value 5001 - 65535. The default value is 5001.

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. *(continued)*

Parameter	Ignored	Description
PRMODE	X	Indicates the default processing mode AFP Download Plus uses to process data sets that contain both single-byte and double-byte fonts. See Default process mode for the Printer Inventory parameter. **Syntax:** PRMODE=SOSI1|SOSI2|SOSI3|SOSI4 PRMODE=SOSI1 specifies that each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control. PRMODE=SOSI2 specifies that each shift-out, shift-in code is converted to a Set Coded Font Local text control. PRMODE=SOSI3 specifies that the shift-in code is converted to a Set Coded Font Local text control and two blanks. A shift-out code is converted to a Set Coded Font Local text control. PRMODE=SOSI4 specifies that each shift-out, shift-in code is to be skipped and not counted when offsets are calculated for the data set. SOSI4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC. When SOSI4 is specified, the page definition offsets are correct after conversion; therefore, the user does not need to account for SOSI characters when FIELD offsets are computed. The data conversion that AFP Download Plus makes for SOSI4 is the same as for SOSI2. **Notes:** 1. AFP Download Plus uses this parameter only if you are not using the Printer Inventory or Exit 7 and the PRMODE keyword is not specified on the OUTPUT JCL statement. 2. If this parameter is not specified in the PRINTDEV statement, the Printer Inventory, or Exit 7, and the PRMODE keyword is not specified on the OUTPUT JCL statement, AFP Download Plus defaults to either line data or MO:DCA-P, depending on the type of data stream.
PRTERROR	X	Controls whether the PRTERROR parameter is accepted on the OUTPUT JCL statement. See Error disposition supported for the Printer Inventory parameter. **Syntax:** PRTERROR=HONOR|NOTHONOR PRTERROR=HONOR specifies that AFP Download Plus accepts PRTERROR if specified on the OUTPUT JCL statement for data sets processed at this destination. PRTERROR=NOTHONOR specifies that AFP Download Plus ignores PRTERROR if specified on the OUTPUT JCL statement for data sets processed at this destination. This is the default.

Table 12: Initialization parameters for the PRINTDEV statement. An X in the Ignored column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. *(continued)*

Parameter	Ignored	Description
PSEGDD		Identifies the DD statement that specifies the default page segment libraries. In addition to page segments, the page segment library might contain Bar Code Object Content Architecture (BCOCA), Graphics Object Content Architecture (GOCA), and Image Object Content Architecture (IOCA) resources. Required if PSEG240 or PSEG300 is specified (the default library is used when data does not indicate a resolution); otherwise, optional if no attempt is made to process a page segment from the system page segment library. **Syntax:** PSEGDD=**.label*
PSEG240		Identifies the DD statement that specifies the 240-pel page segment libraries. **Syntax:** PSEG240=**.label*
PSEG300		Identifies the DD statement that specifies the 300-pel page segment libraries. **Syntax:** PSEG300=**.label*
RESPTIME	X	Specifies the maximum number of seconds AFP Download Plus waits for a response from the download receiver. See Response timeout for the Printer Inventory parameter. **Syntax:** RESPTIME=*nnnnn*, where *nnnnn* is a value 0 - 86400. The default value is 0, which means AFP Download Plus waits indefinitely for a response. **Note:** When the RESPTIME parameter is specified, the NORESP parameter must also be specified to tell AFP Download Plus what action to take when no response is received within the time specified.
TRACE	X	Specifies AFP Download Plus tracing. For more information about using traces, see *PSF for z/OS: Diagnosis*. See FSA trace dsname, NST trace dsname, Trace mode, Trace prompt, and Trace table size Printer Inventory parameters in Table 13 on page 72 and Table 14 on page 74 for more information. **Syntax:** TRACE=YES|NO

Printer Inventory

With AFP Download Plus you can use default FSA-initialization, tracing, and execution option parameters that are defined in the Printer Inventory instead of those defined in:

- PRINTDEV statement (see "PRINTDEV parameters" on page 61) or the EXEC statement (see " JCL statements for the startup procedure" on page 38) of the AFP Download Plus startup procedure
- AFPPARMS control statement (see "Parameters for the AFPPARMS control statement" on page 43)
- Exit 7 initialization (INIT) call (see Table 18 on page 111)

With the Printer Inventory, you can define an FSA in the AFP Download Plus startup procedure and JES initialization statements before the FSA is used. When the new FSA is added, you can assign variable parameters for it in the Printer Inventory. This saves you time because you do not need to restart all the FSAs in a startup procedure when you add an FSA or change parameters for an existing FSA. The Printer Inventory also makes it much easier to define parameters than through the AFP Download Plus startup

procedure, the AFPPARMS control statement, or Exit 7. See *PSF for z/OS: Customization* for more information about the Printer Inventory.

You can use the Printer Inventory component of Infoprint Server to define an FSS and AFP Download Plus FSAs without licensing the Infoprint Server feature of z/OS. For more information, see *z/OS Infoprint Server Printer Inventory for PSF*. If you want to use Infoprint Central, you must have a license for the Infoprint Server feature.

Infoprint Central and common message log

When you define an FSS and AFP Download Plus FSAs in the Printer Inventory, you can use Infoprint Central to start, stop, and view properties of each AFP Download Plus FSA. If AFP Download Plus is writing messages to the Infoprint Server common message log, you can also:

- View FSA and print job messages that AFP Download Plus has written to the common message log.
- Search for print jobs and view the properties for each job.
- Release held print jobs, delete jobs, change the priority of jobs, and move jobs (if AFP Download Plus is not processing the jobs).

To enable AFP Download Plus to write messages to the common message log, you must customize AFP Download Plus and select the Log messages parameter in the Printer Inventory. See *PSF for z/OS: Customization* for information about customizing AFP Download Plus to use the common message log with the Printer Inventory.

Specifying Printer Inventory parameters

To use the Printer Inventory, you must:

1. Specify the Printer Inventory name on the INV parameter in the PARM field of the EXEC statement for the startup procedure:

   // EXEC PGM=APSHPOSE,PARM=('INV=*piname*')
   where *piname* is the 4-character name of the Printer Inventory that is specified in the Infoprint Server configuration file. For example, `// EXEC PGM=APSHPOSE,PARM='INV=AOP1'` specifies the default name of the Printer Inventory.
2. Specify the parameters that you want to use in the Printer Inventory:
   - Use the `aopmig` Printer Inventory migration program to copy parameters from the PRINTDEV statement, the EXEC PARM statement, and the AFPPARMS control statement into the Printer Inventory (see *PSF for z/OS: Customization*). You must manually migrate parameters from Exit 7.
   - Use the Printer Inventory Definition Utility (PIDU) or Infoprint Server ISPF panels to define parameters in the Printer Inventory.

   Note: When you use the Printer Inventory, do not specify the parameters in the PRINTDEV statement or the AFPPARMS control statement because AFP Download Plus ignores them. You must specify the parameters in the Printer Inventory if you want to use them.
3. Select the Log messages parameter in the Printer Inventory to use the Infoprint Server common message log.

Figure 11 on page 70 shows a sample ISPF panel for defining an FSS for AFP Download Plus.

```
Add                                   PSF FSS
 Command ==> ____________________________________________________________

 FSS Name. . . AFPFSS____
 Description . AFP Download Plus_____________________________________ (extend)

   TCP/IP job name. . . . ________
   NST trace dsname . . . _____________________________________________
   PINST trace dsname . . _____________________________________________
   Trace table size . . 32_
   _ Trace prompt
   _ Unicode enabled
   / Log messages
```

Figure 11: Sample ISPF Printer Inventory panel for defining an FSS for AFP Download Plus

Figure 12 on page 70 shows sample pages of ISPF panels that are used to define the parameters for an AFP Download Plus FSA.

```
Add                              PSF FSA, AFP Download Plus
 Command ==> ____________________________________________________________

 FSA Name. . . AFPDP2____
 Description . AFP Download Plus_____________________________________ (extend)
 Location. . . Building 001__________________________________________ (extend)
                                                                    More:     +
 Operator security profile
     . . . AFP2PROF_____________________________________________________
 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
    Default process mode. . . ________
    Paper width . . . . . . . 13.2IN_____
    Paper length. . . . . . . 14IN______
    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. . A10110__
    Page definition. . A08682__
    Character sets . . 60D8  ____  ____  ____
    Color map. . . . . ________
    Com setup member . ________
    _ Map to outline fonts
    _ Recover from font not found
```

Figure 12: Sample ISPF Printer Inventory panel for defining an AFP Download Plus FSA (Page 1 of 2)

```
Add                              PSF FSA, AFP Download Plus
 Command ==> ____________________________________________________________

 FSA Name. . . AFPDP2____
 Description . AFP Download Plus __________________________________________ (extend)
 Location. . . Building 001 ________________________________________________ (extend)
                                                                          More:   -
 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  1. Notify JES       2. Notify user
                             3. Notify operator  4. Terminate
       Notify . . . . . . ________________
    Response timeout. . . _____   (0-86400)
    IP address  . . . . . 9.99.99.87___________________________________ (extend)
    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
```

Figure 13: Sample ISPF Printer Inventory panel (Page 2 of 2)

Table 13 on page 72 and Table 14 on page 74 describe the Functional Subsystem (FSS) and Functional Subsystem Application (FSA) parameters that you can define in the Printer Inventory and compares them to the parameters you can define on the PRINTDEV statement or the EXEC PARM statement of the startup procedure, in PSF installation Exit 7, or in the AFPPARMS control statement. All parameters are optional unless specified otherwise.

When you are defining parameters on the ISPF panels, see the online help for information about each parameter. For more information about the Printer Inventory and Exit 7 parameters, see *PSF for z/OS: Customization*.

Table 13: FSS Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. If you change the value for an FSS parameter, you must restart the FSS to pick up the new value.

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Log messages **Values:** / = Yes Blank = No	log-messages **Values:** yes no		Indicates whether AFP Download Plus writes messages to the Infoprint Server common message log. The default is No.
NST trace dsname	nst-trace-dsname	PARM=(*NSTddname*)	Specifies the name of the data set that AFP Download Plus directs a notify subtask (NST) trace to. This name must be different from both the data set name AFP Download Plus directs an FSA external trace to and the PINST trace data set name. The trace data set must exist and be cataloged before the first sender FSA is started. **Note:** 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. For more information about using traces, see *PSF for z/OS: Diagnosis*.
PINST trace dsname	pinst-trace-dsname		Specifies the name of the data set that AFP Download Plus directs a Printer Inventory notify subtask (PINST) trace to. This name must be different from both the data set name AFP Download Plus directs an FSA external trace to and the NST trace data set name. The trace data set must exist and be cataloged before the first sender FSA is started. **Note:** 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. For more information about using traces, see *PSF for z/OS: Diagnosis*.
TCP/IP job name	tcpip-job-name	PARM=(,,,,*tcpip_name*)	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 parameter. If you do not use this parameter, the FSA uses the default TCP/IP startup procedure name of TCPIP.
Trace prompt **Values:** / = Yes Blank = No	trace-prompt **Values:** yes no	PARM=(,,*prompt*)	Indicates whether an operator response is required each time the FSS starts to initialize the AFP Download Plus operator interface. The default is No. For more information about using traces, see *PSF for z/OS: Diagnosis*.

Table 13: FSS Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. If you change the value for an FSS parameter, you must restart the FSS to pick up the new value. *(continued)*

Printer Inventory		**Equivalent Parameter**	**Description**
ISPF Panel	**PIDU**		
Trace table size	trace-table-size	PARM=(,,,*trace_size*)	Specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table. This allocation occurs only if Trace mode is Full, Internal, Limit, or Sync. **Values:** 1 - 999 The default is 32. For more information about using traces, see *PSF for z/OS: Diagnosis*.
Unicode enabled **Values:** / = Yes Blank = Yes	unicode-enabled **Values:** yes no	PARM=(,,,,,UNICODE)	Specifies that AFP Download Plus is enabled to use the system conversion services that z/OS provides. This parameter is ignored because AFP Download Plus with PSF 4.5 or later is always Unicode-enabled.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters.

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Auxiliary files MO:DCA level **Values:** 1 = None 2 = IS/3 3 = BPF match	auxiliary-files-modca-level **Values:** none is3 bpf-match	auxiliary-files-modca-level	Specifies the MO:DCA interchange set level that auxiliary files, such as separator pages and message files, support. **Values:** None: Auxiliary files do not support a MO:DCA IS level (default). IS/3: Auxiliary files are MO:DCA IS/3 compliant. BPF match: Auxiliary files contain the same BPF MO:DCA Interchange Set triplet and Function Set triplets that are specified on the BPF structured field in the user's data set. **Notes:** 1. Make sure that changes are made to the PRINTDEV statement for this FSA so that auxiliary files are generated correctly. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31. 2. Do not use JESNEWS when you are specifying BPF match for this parameter because 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.
Blank compression **Values:** / = Yes Blank = No	blank-compression **Values:** yes no	COMPRESS	Specifies whether AFP Download Plus compresses data (blanks) in line data before it transforms the data to MO:DCA-P. **Values:** Yes: Causes AFP Download Plus to compress contiguous blanks. No: AFP Download Plus does not compress blanks (default). **Notes:** 1. Blank compression is a data-compression function in AFP Download Plus. It reduces the amount of data that must be sent through the TCP/IP attachment and might improve the throughput. 2. AFP Download Plus compresses any string of more than five contiguous blanks within line data.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Character sets	chars	CHARS	Specifies the last 4 characters of the coded font name. A font name must contain 1 - 4 alphanumeric or national characters; up to four default font names can be specified. AFP Download Plus adds the coded font names to the page definition and the inline resource group. **Note:** When AFP Download Plus processes a MO:DCA IS/3 print file, it does not add the specified coded fonts to the inline resource group because raster fonts cannot be used in a MO:DCA IS/3 file.
Color map	color-map	COLORMAP	Specifies the member name (1 - 8 alphanumeric or national characters) of the printer default color mapping table. The color mapping table is an object container resource that is used to tell the printer what colors to use for various identifiable parts of the data stream. AFP Download Plus puts the table in the inline resource group and exports this parameter for use by the printer. Use a prefix of M1 for color mapping table resources. The full member name must be specified, such as M1SYSTEM. **Note:** For printers not supporting color mapping table object container resources, this parameter is ignored.
Compression **Values:** 1 = None 2 = LZW	compression **Values:** none lzw	compression	Indicates whether the LZW compression algorithm is used to compress the transformed data before it is sent to the remote system. The default is None. **Note:** AFP Download Plus ignores this parameter when Yes is specified for the Save auxiliary files parameter.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Com setup member	com-setup-member	COMSETUP	Specifies the member name (1 - 8 alphanumeric or national characters) of the printer default microfilm setup resource object container that is generated with the utility provided with your microfilm device. AFP Download Plus puts the object container in the inline resource group and exports this parameter for use by the microfilm device. This parameter is used only when output is sent to a microfilm device. Use a prefix of H1 for microfilm setup resources. The full member name must be specified, such as H1SETUPS. **Note:** Required for microfilm devices only; for non-microfilm devices, this parameter is ignored.
Connect interval	printer-connect-interval	CONNINTV	Specifies the number of seconds during which AFP Download Plus attempts to connect to the receiver system. When the connect interval expires and the connection is not complete, AFP Download Plus issues a message and stops the FSA. If Connect interval=0, AFP Download Plus attempts to connect for an unlimited time. The connect interval is set when AFP Download Plus attempts to connect to the receiver system (connect). **Values:** 0 - 86400 The default value is 600, which indicates that AFP Download Plus attempts the connection for 10 minutes.
Consolidate IM1 images **Values:** / = Yes Blank = No	consolidate-im1-images **Values:** yes no	XTP7C2SI	Indicates whether AFP Download Plus consolidates a multiple-celled IM1 image into a single IOCA image. The default is No, which indicates that AFP Download Plus converts a multiple-celled IM1 image to multiple IOCA images. This change improves performance only if the image is a 240-pel IM1 celled image that requests replication. For any other case, this change might degrade performance.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Data set grouping **Values:** / = Yes Blank = No	afpdp-dataset-grouping **Values:** yes no	dataset-grouping	Indicates whether the multiple data set function is used when the job is sent to the remote system. The default is No. **Note:** When this parameter is set to Yes: 1. Ensure that the download receiver is at the correct level. Also, if you use the AFP Download Plus receiver, ensure that you specify the apshhmds exit program (see "Using the apshhmds exit program" on page 157). 2. When the job contains print files that specify a MO:DCA interchange set, ensure that your receiver supports and preserves that level.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Default process mode	default-process-mode	PRMODE XTP7PRMD	Indicates the default processing mode AFP Download Plus uses to transform data sets containing both single-byte and double-byte fonts. **Values:** AFP Download Plus ignores all values but these: **SOSI1** Each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control. **SOSI2** Each shift-out, shift-in code is converted to a Set Coded Font Local text control. **SOSI3** The shift-in code is converted to a Set Coded Font Local text control and two blanks. A shift-out code is converted to a Set Coded Font Local text control. **SOSI4** Each shift-out, shift-in code is to be skipped and not counted when offsets are calculated for the data set. SOSI4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC. When SOSI4 is specified, the page definition offsets are correct after conversion; therefore, the user does not need to account for SOSI characters when FIELD offsets are computed. The data conversion that AFP Download Plus makes for SOSI4 is the same as for SOSI2. **Notes:** 1. AFP Download Plus uses this parameter only if the PRMODE keyword is not specified on the OUTPUT JCL statement. 2. If this parameter is not specified in the Printer Inventory, Exit 7, or the PRINTDEV statement, and the PRMODE parameter is not specified on the OUTPUT JCL statement, AFP Download Plus defaults to MO:DCA-P.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Direct download **Values:** 1 = None 2 = MO:DCA-P	direct-download **Values:** none modca-p	direct-download	Indicates whether AFP Download Plus stores data in a temporary directory or sends it directly to the receiver. The values are: **Values:** None: AFP Download Plus stores the MO:DCA-P and resource data that is created from the JES spool print data in temporary UNIX files until transmission to the receiver. This is the default. MO:DCA-P: AFP Download Plus sends the MO:DCA-P data that is created from the JES spool print data directly to the receiver. The resource data is stored in a temporary UNIX file until transmission to the receiver. **Note:** AFP Download Plus ignores this parameter when Yes is specified for the Save auxiliary files parameter.
Display status **Values:** / = Yes Blank = No	display-afpdp-status **Values:** yes no	display-afpdp-status	Indicates whether AFP Download Plus activates the processing status feature. **Values:** Yes: AFP Download Plus processing status is activated and stays activated for the life of the FSA or until the DISPLAY,STATUS=AFPDP operator interface MODIFY command is issued. Processing status is reported at the end of the spool data set in message APS8559I for both the spool data set transformation to MO:DCA-P and the transformed document transmission. See "Viewing the operator status message when the processing status feature is activated" on page 59. No: AFP Download Plus processing status is not activated (default). See "Reporting AFP Download Plus processing status" on page 118 for information about activating the status feature with the operator interface.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		

Dump: Code	dump-code	DUMP	Identifies a reason code that causes a conditional memory dump of the sender address space when the reason code occurs. The reason code can be:
			• A 7-character hexadecimal abend reason code for an abend for which AFP Download Plus does not typically produce a memory dump, such as a restartable abend; the first 3 characters of an abend reason code are always ABD. For example:
			`ABD011C`
			See *PSF for z/OS: Messages and Codes* for a list of abend reason codes.
			• An 8-character hexadecimal PSF reason code; you can enter the hexadecimal characters only or the hexadecimal characters with a prefix of `0x`. For example:
			`09600c00`
			`0x09600c00`
			See *PSF for z/OS: Diagnosis* for a list of PSF reason codes.
			• An integer 0 - 2147483647. For example:
			`157289480`
			Notes:
			1. If both a reason code and a message ID are specified, a dump occurs at the first occurrence of either one.
			2. For an explanation of restartable abends, see *PSF for z/OS: Diagnosis*.

Dump: Count	message-count-before-dump	DUMP	Specifies the number of times the message that is specified by the Dump: Message ID parameter is issued before AFP Download Plus produces a conditional memory dump. **Values:** 1 - 99 The default is 1.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Dump: Message ID	dump-message-id	DUMP	Identifies an AFP Download Plus message that causes a conditional memory dump of the sender address space when the message occurs. The dump occurs after the message is issued for the number of times specified by the Dump: Count parameter. **Syntax:** APS*nnnnt* ***nnnn*** 3 - 4 digit message number. ***t*** One of these type codes: **A** Message requiring operator action. **I** Information message. **Examples:** APS896I, APS2001A **Note:** If both a reason code and a message ID are specified, a dump occurs at the first occurrence of either one.
Error disposition supported **Values:** / = Yes Blank = No	error-disposition-supported **Values:** yes no	PRTERROR	Indicates whether AFP Download Plus accepts the error disposition that is specified on the OUTPUT JCL statement when AFP Download Plus stops processing a data set because an error occurs during processing. The default is No. **Note:** The Printer Inventory values are equivalent to these PRTERROR values in the PRINTDEV statement: Yes = HONOR No = NOTHONOR

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Form definition (required)	form-definition	FORMDEF	Specifies a required 1 - 8 character default form definition. Form definition names in AFP Download Plus must begin with an F1 prefix or AFP Download Plus adds the prefix. If the name is 3 or more characters and the first 2 characters are the F1 prefix, AFP Download Plus uses the name as is. Otherwise, if the name does not begin with the F1 prefix and is a maximum of 6 characters, AFP Download Plus adds the F1 prefix to the name. However, if the form definition name begins with F1, which is part of the name and not the prefix, and is a maximum of 6 characters, you must include the prefix in the form definition name. For example, if the form definition name is F1A20, you must code F1F1A20 as the form definition.
FSA trace dsname	fsa-trace-dsname	*ddname*	Specifies the data set that AFP Download Plus directs an FSA trace to when the trace mode is Full, Limit, or Sync. The trace data set must exist and be cataloged before the sender FSA is started. For more information about using traces, see *PSF for z/OS: Diagnosis*.
GOCA Box orders **Values:** / = Yes Blank = No	goca-box-supported **Values:** yes no	goca-box	Indicates whether GOCA box drawing orders are supported by the printer on the receiver system. The default is No. **Notes:** 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify Yes for this parameter.
GOCA Set Fractional Line Width orders **Values:** / = Yes Blank = No	goca-fractional-line-supported **Values:** yes no	goca-frac-line	Indicates whether GOCA fractional line width drawing orders are supported by the printer on the receiver system. The default is No. **Notes:** 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify Yes for this parameter.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
GOCA Set Process Color orders **Values:** / = Yes Blank = No	goca-process-color-supported **Values:** yes no	goca-process-color	Indicates whether GOCA process color drawing orders are supported by the printer on the receiver system. The default is No. **Notes:** 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify Yes for this parameter.
Image output format **Values:** 1 = IOCA 2 = Unchanged	image-output-format **Values:** ioca unchanged	image-output-format	Indicates the image data format AFP Download Plus produces in the output document. IM1 images can be saved in the same format as in the input file or converted to uncompressed Image Object Content Architecture (IOCA) images. Most printers support both IM1 and IOCA image formats, but IM1 images cannot be rotated or rescaled correctly at different printer resolutions. Print servers, such as PSF, convert IM1 images to uncompressed IOCA when the IM1 image resolution differs from the actual printer resolution. Because AFP Download Plus does not know what printer the output might be printed on, by default it converts IM1 images to uncompressed IOCA. Because uncompressed IOCA images are often greater in size than the original IM1 images, printer performance can be slower. If you have problems with printer performance, specify `Image output format=Unchanged` so the IM1 images are not converted to IOCA. **Values:** `IOCA`: All image data is produced in uncompressed IOCA format. This is the default. `Unchanged`: All image data is produced in the same format as in the input file.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
IOCA replicate and trim function **Values:** / = Yes Blank = No	ioca-replicate-trim-supported **Values:** yes no	ioca-replicate-trim-func	Indicates whether the IOCA Replicate and Trim function is used when IM1 celled images are converted. This parameter might reduce the number of bytes needed for a raster image, allowing it to display or print faster. When set to Yes, this parameter is only accepted if Image output format=IOCA. The default is No. **Note:** The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.
IP address	printer-ip-address	IPADDR	Identifies the 1 - 250 character Internet Protocol (IP) address or host name of the TCP/IP-attached receiver system. Specify one of these: • Host name; for example, `denver.mysystem` • Dotted decimal address in the format *nnn.nnn.nnn.nnn*; for example, `20.97.8.201` • Colon hexadecimal address in the format: *nnnn*:*nnnn*:*nnnn*:*nnnn*:*nnnn*:*nnnn*:*nnnn*:*nnnn* For example, `2001:0db8:85a3:0000:0000:8a2e:0c22:384e`. These restrictions apply: – Leading zeros in each hexadecimal value can be omitted. For example: `2001:db8:85a3:0:0:8a2e:c22:384e` – One sequence of repeat zero values can be omitted. For example: `2001:db8:85a3::8a2e:c22:384e` – The last 2 hexadecimal digits can be in dotted decimal notation. For example: `2001:db8:85a3::8a2e:12.34.56.78`
Map Coded Font (MCF) Format 2 name **Values:** 1 = Code page and character set 2 = Coded font	mcf2-format **Values:** codepage-character-set coded-font	mcf2-format	Indicates whether AFP Download Plus uses the names of the code page and character set to build the MCF-2 structured field or the name of the coded font. **Values:** `Code page and character set`: AFP Download Plus opens and reads the contents of all coded fonts that are specified in MCFs in the input file or input resources. This is the default. `Coded font`: Recommended when DBCS fonts are processed.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Map to outline fonts **Values:** / = Yes Blank = No	map-to-outline-fonts **Values:** yes no	MAP2OLN XTP7MTOF	Indicates whether AFP Download Plus maps fonts to outline fonts. Use this parameter 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. The default is No. For more information about mapping to outline fonts, including limitations, see *PSF for z/OS: Customization*.
Message files read access **Values:** / = Yes Blank = No	message-files-read-access **Values:** yes no	message-files-read-access	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. **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). **Notes:** 1. When you specify this attribute, it does not change the permissions that are set for existing message files. 2. This attribute does not apply to PSF V4R5.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
No response action **Values:** 1 = Notify JES 2 = Notify user 3 = Notify operator 4 = Terminate	no-response-action **Values:** notify-jes notify-user notify-operator terminate	NORESP	Specifies what action AFP Download Plus takes when the time that is specified by the Response timeout parameter expires and a response is not received from the download receiver. **Values:** `Notify JES`: AFP Download Plus notifies JES that an expected response was not received from the download receiver. This condition is also displayed by SDSF (default). `Notify user`: AFP Download Plus sends a message to the user ID specified by the No response action: Notify parameter and to JES indicating that an expected response was not received from the download receiver. `Notify operator`: AFP Download Plus sends a message to the system operator and to JES indicating that an expected response was not received from the download receiver. `Terminate`: AFP Download Plus stops the FSA. The system operator must issue a command to restart the FSA. The data set that is active when the FSA is stopped is restarted from the last checkpoint. **Note:** When the No response action parameter is specified, the Response timeout parameter must also be specified.
No response action: Notify	no-response-notify	NORESP	Specifies the user ID that AFP Download Plus sends a message to when an expected response is not received from the download receiver before time expires. This parameter is used when Notify user is specified by the No response action parameter.
Object identifier (OID) format **Values:** / = Yes Blank = No	oid-format-supported **Values:** yes no	pass-oid	Indicates whether AFP Download Plus passes OID information when TrueType and OpenType fonts are placed inline. The default is No. **Note:** The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Page accounting supported **Values:** / = Yes Blank = No	page-accounting-supported **Values:** yes no	page-accounting-supported	Indicates whether AFP Download Plus supports the page accounting function. When set to Yes, AFP Download Plus counts the number of pages and sheets in the data set. The number of pages and sheets is sent to the receiver in the -o attributes, -opagecount and -osheetcount. The default is No.
Page definition (required)	page-definition	PAGEDEF	Specifies a required 1 - 8 character default page definition. Page definition names in AFP Download Plus must begin with a P1 prefix or AFP Download Plus adds the prefix. If the name is 3 or more characters and the first 2 characters are the P1 prefix, AFP Download Plus uses the name as is. Otherwise, if the name does not begin with the P1 prefix and is a maximum of 6 characters, AFP Download Plus adds the P1 prefix to the name. However, if the page definition name begins with P1, which is part of the name and not the prefix, and is a maximum of 6 characters, you must include the prefix in the page definition name. For example, if the page definition name is P1011, you must specify P1P1011 as the page definition.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Paper length	paper-length	paper-length	Specifies the actual paper length to be used for Line-Mode Migration or Line-Mode Conversion. The default is 14IN. **Syntax:** *nnnn[mmm]unit* ***nnnn*** 1 - 4 digit decimal number that indicates the paper length. ***mmm*** 1 - 3 digit decimal number that indicates the paper length. ***unit*** One of these measurement units: **CM** Centimeters **IN** Inches **MM** Millimeters **PELS** Picture elements (1/240 inch) **POINTS** Points (1/72 inch) If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point. See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in *PSF for z/OS: Customization*.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Paper width	paper-width	paper-width	Specifies the actual paper width to be used for Line-Mode Migration or Line-Mode Conversion. This value does not include the carrier strips. The default is 13.2IN. **Syntax:** *nnnn[.mmm]unit* ***nnnn*** 1 - 4 digit decimal number that indicates the paper width. ***mmm*** 1 - 3 digit decimal number that indicates the paper width. ***unit*** One of these measurement units: **CM** Centimeters **IN** Inches **MM** Millimeters **PELS** Picture elements (1/240 inch) **POINTS** Points (1/72 inch) If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point. See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in *PSF for z/OS: Customization*.
Port number	port-number	PORTNO	Specifies the port number with which AFP Download Plus is to establish a connection. The port number identifies the appropriate internal process in the receiver system. The port number must match the TCP/IP port number for the receiver. **Values:** 5001 - 65535 The default port is 5001.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Print error messages **Values:** 1 = No 2 = Yes	print-error-messages **Values:** no yes	PIMSG	Indicates whether all message groups that are generated in the processing of a data set are written to a file. **Values** No: Specifies that no message groups are to be written unless an error occurs that forces a premature end to the processing of the data set. If that happens, the message group that describes the error that stopped processing is written. Yes: Specifies that all message groups that are generated in the processing of a data set are to be written to a file (default). If a data set is not completed because of an error, message groups that are generated up to this error are written, including the message group that describes the error that stopped processing. **Notes:** 1. Reaching the message count value that is specified by the Print error messages: Maximum message parameter is one error that forces a premature end to processing. 2. The PIMSG parameter that is specified on the OUTPUT statement in the startup procedure for the message data set, referenced by the MESSAGE keyword, also affects the rerouting of messages.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Print error messages: Maximum messages	print-error-messages-maximum	PIMSG	Indicates the maximum number of message groups that are written to a file when a value is specified for the Print error messages parameter. When the maximum number is reached, processing of the data set stops and the data set is purged from the spool. The final count of written messages might be more than the value for maximum messages if the message groups are generated for errors that are reported during processing for data that is transmitted before the message count is reached. **Values:** 0 - 999 A value of 0 means that the data set is processed until complete and all message groups are written unless an error occurs that stops processing. The default is 16. **Note:** Messages are written depending on whether Yes or No is specified for the Print error messages parameter.
Print error reporting **Values:** 1 = None 2 = All 3 = Character 4 = Position	print-error-reporting **Values:** none all character position	DATACK	Specifies whether the printer reports character and position errors. AFP Download Plus exports this parameter for use by the printer. 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 valid printable area or off the logical page. Some printers use exception highlighting to mark position errors on the printed page. **Values:** None: Do not report any character or position errors (default). This is equivalent to BLOCK in the PRINTDEV DATACK parameter. `All`: Report all character and position errors. This is equivalent to UNBLOCK in the PRINTDEV DATACK parameter. `Character`: Report only character errors. This is equivalent to BLKPOS in the PRINTDEV DATACK parameter. `Position`: Report only position errors. This is equivalent to BLKCHAR in the PRINTDEV DATACK parameter. **Note:** This parameter also produces error messages, unless Print error messages=No.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Recover from font not found **Values:** / = Yes Blank = No	recover-from-font-not-found **Values:** yes no	MAP2OLN XTP7RFNF	Indicates whether AFP Download Plus makes sure that the outline font that is derived from the mapped font exists before proceeding. Use this parameter if your printer supports outline fonts, you requested that AFP Download Plus 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. The default is No.
Recovery pages	transmit-recovery-pages	transmit-recovery-pages	Specifies a number that indicates how often AFP Download Plus synchronizes with the receiving system to determine whether the transmitted data is received and if not, retransmits the data from the last successful recovery point. **Values:** 0 - 65535 The default is 1000. When 0 is specified, AFP Download Plus does not synchronize the transmitted data with the receiver until the end of a file.
Release data set when repositioning **Values:** / = Yes Blank = No	release-ds-when-repositioning **Values:** yes no	XTP7RDSR	Indicates whether AFP Download Plus releases spool data sets it obtained from JES when it is repositioning to handle an exception that is reported during transformation. Releasing data sets might reorder the data sets when transformation resumes. The default is No.
Report Line-Mode Conversion paper-length errors **Values:** / = Yes Blank = No	report-line-mode-conversion-paper-length-errors **Values:** yes no	XTP7LMCM	Indicates whether AFP Download Plus reports message APS973I for Line-Mode Conversion paper-length errors. **Values:** **Yes** The message is reported. **No** The message is suppressed. This is the default. For more information about 3800 Line-Mode Conversion considerations for AFP Download Plus, see *PSF for z/OS: Customization*.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Resolution	resolution	XTP7FMT	Indicates the resolution at which the output is formatted. AFP Download Plus uses this value to choose the associated resolution system library that is previously defined by the system programmer. If this parameter is blank, AFP Download Plus uses the default system library. **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. **Note:** The resolution value that is specified is used for all jobs unless you override it with the Exit 7 BDSC or EDSC.
Resources Included Inline: Bar code objects (BCOCA) **Values:** / = Inline Blank = Not inline	inline-bcoca-objects **Values:** yes no	bcoca	Indicates whether all BCOCA objects required to print or view the output file are included inline. The default is Inline.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Resources Included Inline: Color management resources **Values:** 1 = None 2 = All 3 = Generic	inline-color-management-resources **Values:** none all generic	cmr-objects	Specifies whether color management resource (CMR) objects required to print or view the output file are included inline. **Values:** **None** No CMR objects are included inline. **All** These objects are included inline: • All CMR objects that are referenced in the data stream. • All CMR objects for all device types and models that are referenced by data object or CMR resource access tables (RATs) and mapped to a generic instruction CMR. **Generic** These objects are included inline: • All CMR objects that are referenced in the data stream. • All non-device specific CMR objects that are referenced by data object or CMR RATs. This is the default. **Note:** Link CMR objects are not included inline.
Resources Included Inline: Font objects (FOCA) **Values:** / = Inline Blank = Not inline	inline-foca-objects **Values:** yes no	foca-fonts	Indicates whether all font character sets and code pages that are required to print or view the output file are included inline. If Map Coded Font (MCF) Format 2 name=2 is specified, AFP Download Plus also includes coded fonts inline; otherwise, coded fonts are not included inline. The default is Inline.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		

Resources Included Inline: Form definitions
Values:
/ = Inline
Blank = Not inline
	inline-form-definitions
	Values:
	yes
	no
		formdefs	Indicates whether the form definition that is used in processing the file is included inline. The default is Inline.
			Note: The job that is sent to the receiver might fail to print or be archived, without any error messages, in these situations:
			• You set these parameters for a job that is sent with separator pages:
			`Resources Included Inline: Form definitions=Not inline`
			`Data set grouping=Yes`
			`Send separator pages=Yes`
			• You set these parameters for a job that is sent with multiple data sets:
			`Resources Included Inline: Form definitions=Not inline`
			`Data set grouping=Yes`

Resources Included Inline: Graphics objects (GOCA) **Values:** / = Inline Blank = Not inline	inline-goca-objects **Values:** yes no	goca	Indicates whether all GOCA objects required to print or view the output file are included inline. The default is Inline.
Resources Included Inline: Image objects (IOCA) **Values:** / = Inline Blank = Not inline	inline-ioca-objects **Values:** yes no	ioca	Indicates whether all IOCA objects required to print or view the output file are included inline. The default is Inline.
Resources Included Inline: Object containers **Values:** / = Inline Blank = Not inline	inline-object-containers **Values:** yes no	object-containers	Indicates whether all object container files that are requested by the input data stream are included inline. The default is Inline.
Resources Included Inline: Overlays **Values:** / = Inline Blank = Not inline	inline-overlays **Values:** yes no	overlays	Indicates whether all overlays required to print or view the output document file are included inline. The default is Inline.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Resources Included Inline: Page segments **Values:** / = Inline Blank = Not inline	inline-page-segments **Values:** yes no	page-segments	Indicates whether all page segments required to print or view the output document file are included inline. The default is Inline.
Resources Included Inline: Presentation text objects (PTOCA) **Values:** / = Inline Blank = Not inline	inline-ptoca-objects **Values:** yes no	ptoca	Indicates whether all PTOCA objects required to print or view the output file are included inline. The default is Inline.
Resources Included Inline: TrueType fonts **Values:** / = Inline Blank = Not inline	inline-truetype-fonts **Values:** yes no	truetype-fonts	Indicates whether all TrueType and OpenType base fonts, linked fonts, and font collections that are required to print or view the output file are included inline. The default is Inline. **Note:** When each TrueType or OpenType font is processed, if the value in a Data-Object Font Descriptor triplet (X'8B') is set to ON to indicate that a font is inline, it overrides Not inline and includes that font, and all linked fonts, inline.
Response timeout	response-timeout	RESPTIME	Specifies the maximum number of seconds AFP Download Plus waits for a response from the download receiver. **Values:** 0 - 86400 The default is 0, which means AFP Download Plus waits indefinitely for a response. **Note:** When the Response timeout parameter is specified, the No response action parameter must also be specified to tell AFP Download Plus what action to take when no response is received within the time specified.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Save auxiliary files **Values:** / = Yes Blank = No	save-auxiliary-files **Values:** yes no	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. Before they are used in production, the system programmer can validate that these files are compliant with the MO:DCA interchange set level for auxiliary files that are specified in the AFPPARMS control statement or the Printer Inventory (see auxiliary-files-modca-level or Auxiliary files MO:DCA level). When this parameter is specified, AFP Download Plus ignores the Compression, Direct download, and Send messages on failure parameters if they are specified. The default is No.
Secure transmission **Values:** / = Yes Blank = No	secure-transmission **Values:** yes no	secure-transmission	Indicates whether data is encoded before transmission. The default is Yes. **Note:** If standardized Internet security protocols are required to use secure communications for print files, IBM suggests that you use the IPSec protocol. See *z/OS Communications Server: IP Configuration Guide* for information about IPSec.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Send messages on failure **Values:** 1 = All 2 = Generic only	send-messages-on-failure **Values:** all generic-only	send-messages-on-failure	Specifies which messages AFP Download Plus sends to the receiver when an error stops transformation of the print job or the operator cancels processing. **Values:** **All** AFP Download Plus sends all messages for the data set to the receiver in a MO:DCA-P file (default). **Note:** Use this value when you want to send a MO:DCA interchange set compliant message file to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make. **Generic only** AFP Download Plus sends message APS8239I to the receiver as line data to indicate that the data set cannot be sent. **Note:** This value must not be specified when you are using Data set grouping to send multiple data set jobs to the z/OS receiver system because the receiver system cannot receive jobs with both line data and MO:DCA-P data sets. **Note:** AFP Download Plus ignores this parameter when Yes is specified for the Save auxiliary files parameter.
Send msgs to SYSOUT **Values:** / = Yes Blank = No	send-messages-to-sysout **Values:** yes no	XTP7MDSD	Indicates whether AFP Download Plus redirects a message data set as a SYSOUT data set to another CLASS or DEST for viewing or printing.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Send separator pages **Values:** / = Yes Blank = No	send-separator-pages **Values:** yes no	send-separator-pages	Indicates whether AFP Download Plus sends the separator pages for a job to the receiver. The default is No. **Notes:** 1. Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the other changes you need to make. 2. For more information, see "Sending z/OS separator pages" on page 115.
Set media origin to 3800 origin for: Data set **Values:** / = Yes Blank = No	set-3800-dataset-origin **Values:** yes no	XTP738MO	Indicates whether AFP Download Plus sets the user's data set media origin on continuous-forms printers to the 3800 media origin (upper left corner). The default is No.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Trace mode **Values:** 1 = None 2 = Internal 3 = Sync 4 = Full 5 = Limit 6 = IPDS	trace-mode **Values:** none internal sync full limit ipds	PARM=(,*trace_type*) **Note:** Applies to all FSAs in the FSS.	Specifies the type of AFP Download Plus tracing that is started during FSA initialization. For more information about using traces, see *PSF for z/OS: Diagnosis*. **Values:** **None** No AFP Download Plus tracing is started during AFP Download Plus initialization. **Internal** An internal trace is started (default). It reflects only the most recent history of AFP Download Plus processing. **Sync** An FSA SYNC external trace is started. An internal trace is also started. **Full** An FSA full external trace is started. An internal trace is also started. **Limit** A shortened FSA external trace is started along with an internal trace. **IPDS** An FSA IPDS trace is started along with an internal trace. This value is not used in AFP Download Plus. **Note:** The FSA trace dsname parameter is required when the trace mode is Full, Limit, or Sync.
Trace table size	trace-table-size	PARM=(,,,*trace_size*) **Note:** Applies to all FSAs in the FSS.	Specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table. This allocation occurs only if the trace mode is Full, Internal, Limit, or Sync. **Values:** 1 - 999 The default is 32. For more information about using traces, see *PSF for z/OS: Diagnosis*.

Table 14: FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. (continued)

Printer Inventory		Equivalent Parameter	Description
ISPF Panel	**PIDU**		
Trace user data **Values:** / = Yes Blank = No	trace-user-data **Values:** yes no	trace-user-data	Specifies whether user data is traced when a trace function is requested with AFP Download Plus. **Values:** **Yes** User data is traced when user data is available. This is the default. **No** User data is not included during trace processing. For more information about using traces, see *PSF for z/OS: Diagnosis*.
Use Line-Mode Migration LINECT **Values:** / = Yes Blank = No	use-line-mode-migration-linect **Values:** yes no	XTP7LCNT	Indicates whether AFP Download Plus uses line count (LINECT) in Line-Mode Migration for calculating the number of lines on a page. **Values:** **Yes** LINECT is used. **No** LINECT is not used. This is the default.
Working directory	working-directory	working-directory	Specifies the 1 - 256 character name of the working directory that AFP Download Plus uses to store error messages files and temporary files for transformed data and resources. The default is `/var/psf/`. AFP Download Plus adds the beginning and ending slashes if they are missing and uses the name as an absolute path.
3800 compatibility: Override default font **Values:** / = Yes Blank = No	override-3800-default-font **Values:** yes no	XTP7HDF	Indicates whether AFP Download Plus tells the 3800 to replace the hardware default font with the first font in the current font list. The default is No.

Defining a JES2 functional subsystem

To define an AFP Download Plus sender in a JES2 environment, code these JES2 initialization statements as part of JES2 initialization:

- One FSS statement to define each sender
- One PRT statement (also called a printer definition) for each sender FSA

In addition to the FSS and PRT statements, these JES2 initialization statements have considerations for AFP Download Plus:

- On the JES2 SPOOLDEF statement, specify TRKCELL=5 for improved performance. Also, specify TRKCELL=YES on the PRT statement.
- On the JES2 OUTCLASS statement, specify BLNKTRNC=NO if you do not want JES2 to truncate trailing blanks for data sets in an output class that AFP Download Plus processes. The setting of this parameter can affect the formatting of the output. The default is BLNKTRNC=YES, which can cause problems with MO:DCA-P data.

Sample JES2 initialization statements

Figure 14 on page 102 shows sample JES2 statements for one AFP Download Plus sender and its associated FSA named PRT001.

```
FSS(AFPPLUS) PROC=AFPPLUS,HASPFSSM=HASPFSSM,AUTOSTOP=YES

PRT(001)  CKPTSEC=30,CLASS=A,START=NO,
           FSS=AFPPLUS,MODE=FSS,PRESELCT=YES,
           PRMODE=(LINE,PAGE,SOSI1,SOSI2),
           TRKCELL=YES,UCS=0,WS=(Q)
```

Figure 14: Sample JES2 initialization statements

"FSS statement" on page 102 describes the JES2 initialization statements that are shown in Figure 14 on page 102, including some additional parameters that you might want to specify for an AFP Download Plus sender and FSA.

Note: For detailed descriptions of each of the parameters, see *z/OS JES2 Initialization and Tuning Reference*.

FSS statement

The FSS initialization statement defines the sender to JES2. The FSS statement is associated with one or more PRT statements that define each FSA. The FSS initialization statement is optional but recommended. If you omit it, JES2 generates a default FSS when an FSA is started.

The FSS statement contains these parameters for AFP Download Plus:

FSS(*fssname*)
Specifies the 1 - 8 character name of the sender. The FSS name must match the FSS name in the PRT(*nnnn*) statement for each associated FSA.

PROC=*procedurename*
Specifies the name of the procedure for starting this sender. This parameter is required. The procedure must be defined before the sender is started (see "Creating a startup procedure" on page 34). A sample AFP Download Plus startup procedure is named AFPPLUS in Figure 6 on page 35.

HASPFSSM=__HASPFSSM__
Specifies the 1 - 8 character JES load module to be loaded into the sender address space.

This parameter is optional. For AFP Download Plus, either omit the parameter or specify the default value of HASPFSSM.

AUTOSTOP={YES | NO}
Specifies whether the sender address space (FSS) is to be stopped automatically if all FSAs under control of the sender are stopped.

This parameter is optional; if you omit it, the default is NO.

PRT statement

A PRT statement (also called a printer definition) is required to define each FSA.

The PRT(*nnnn*) statement contains these parameters:

PRT(*nnnn*)
Specifies the name of an FSA that is associated to the sender, where *nnnn* is 1 - 5 digits. In addition to the PRT(*nnnn*) format, AFP Download Plus accepts the PRINT*nnn* and PRINTER*n* formats, if the name is no more than 8 characters. In this publication, PRT(*nnnn*) is used to represent the FSA definition statement.

CKPTMODE={PAGE | SEC}
Specifies whether checkpointing of a data set that is transformed is based on the number of pages or on time. If you specify both CKPTPAGE and CKPTSEC, the CKPTMODE parameter determines which value is used. This parameter is optional.

Note: AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

CKPTPAGE=*nnn*
Specifies the number of pages between checkpoints of a data set that is transformed.

Note: AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

CKPTSEC={*nnnnn* | 0}
Specifies the seconds between checkpoints of a data set that is transformed. The value must be 0 - 32767.

The default is 0, which means AFP Download Plus only checkpoints a data set if a checkpoint value is specified on the OUTPUT JCL statement for the data set.

Note: AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

CLASS=*n*
Specifies the output class that is processed by this FSA. List all classes to be selected by this FSA; do not separate each class with a comma.

This parameter is optional. If you omit it, this FSA selects data sets with any output class.

FCB=*pdefname*
Specifies the 1 - 4 character name of a default page definition. Do not code the P1 prefix of the page definition. This name is converted to uppercase.

This parameter is optional. If you omit it, JES2 determines the default page definition from the NIFCB parameter of the JES2 PRINTDEF statement. If no default is specified on the PRINTDEF statement, the default is that specified on the PRINTDEV statement in the FSS startup procedure.

FORMS=(*formnames*)
Specifies the 1 - 8 character form names processed by this FSA. List 1 - 8 different form names that can be selected by this FSA; separate each form name with a comma.

If you designate F as a work-selection criterion on the WS parameter, the FSA selects data sets whose form name matches one of the values specified here.

This parameter is optional. If you omit it and do not specify F as a work-selection criterion, this FSA selects data sets with any form name.

FSS=*fssname*
Specifies the name of the sender FSS associated with this FSA. This parameter is required.

MODE=FSS
Specifies that the FSA is managed by an AFP Download Plus sender. This parameter is optional. The default is FSS if you do not code the FSS parameter.

PRESELCT={YES | NO}
Specifies whether output data sets are preselected for this FSA. This parameter is optional. If you omit it, the default is YES.

PRMODE=(*processingmodes*)
Specifies the data set processing modes that are supported by this FSA. Separate the modes with commas. List all PRMODE values to be accepted by this FSA, because the FSA processes only data sets with a mode that matches one of the values specified in this parameter:

LINE
Specifies that data sets containing line data are selected.

PAGE
Specifies that data sets containing MO:DCA-P data are selected.

SOSI*n*
Specifies that data sets with the shift-out, shift-in processing mode of SOSI1, SOSI2, SOSI3, or SOSI4 for double-byte fonts are selected.

installation-defined
Specifies any mode that your installation defined.

Specify both LINE and PAGE for FSAs that are to transmit both types of data sets.

This parameter is optional. If you omit it, the default is LINE.

SEP={YES | NO}
Specifies whether this FSA produces job-header and job-trailer separator pages. The default is YES.

SEPDS={YES | NO}
Specifies whether this FSA produces formatted data set header separator pages. The default is NO.

START={YES | NO}
Specifies whether JES2 is to automatically start this FSA whenever JES2 starts. If you specify NO, the operator must start the FSA.

This parameter is optional. If you omit it, YES is the default.

TRKCELL={YES | NO}
Specifies whether track-cell despooling is to be used with this FSA. You specify the size of the track cell, in terms of buffers, in the TRKCELL parameter of the JES2 SPOOLDEF statement. For improved performance, specify TRKCELL=YES on this statement and TRKCELL=5 on the JES2 SPOOLDEF statement.

This parameter is optional. If you omit it, the default is NO.

UCS={*fontname* | 0}
Specifies the 1 - 4 character default font name. 0 specifies that no default font is passed to AFP Download Plus.

This parameter is optional. If you omit it, JES2 determines the default font from the NIUCS parameter of the PRINTDEF statement or, if NIUCS is not specified, from the PRINTDEV statement of the startup procedure.

WS=(*criteria*)
Specifies the work-selection criteria for this FSA; separate each value with a comma. See the *z/OS JES2 Initialization and Tuning Reference* for the valid values and defaults.

This parameter is optional but recommended. If you omit it, the FSA selects output data sets for processing according to default work-selection criteria.

Specifying defaults in JES2

You can specify defaults for processing options on JES2 initialization statements PRINTDEF and PRT(*nnnn*) and on the PRINTDEV statement of the AFP Download Plus startup procedure.

To specify no defaults in a JES2 environment, code the JES2 and PRINTDEV statements as shown in Table 15 on page 105.

Table 15: Specifying no defaults in JES2.			
Option	**PRT(*nnnn*) Statement**	**PRINTDEF Statement**	**PRINTDEV Statement**
Data Check Blocking	Not applicable	Not applicable	Omit DATACK parameter
Fonts	UCS=0	Omit NIUCS parameter	Omit CHARS parameter
Form Definition	Not applicable	Not applicable	Omit FORMDEF parameter
Page Definition	Omit FCB parameter	Omit NIFCB parameter	Omit PAGEDEF parameter

Defining a JES3 functional subsystem

To define a sender for AFP Download Plus in a JES3 environment, code these JES3 initialization statements as part of the JES3 initialization processing for the z/OS system:

- One FSSDEF statement to define each sender
- One DEVICE statement (also called a printer definition) to define each sender FSA

Sample JES3 initialization statements

Figure 15 on page 105 shows sample JES3 statements for an AFP Download Plus sender and its associated FSA named PRT001.

```
FSSDEF,FSSNAME=AFPPLUS,PNAME=AFPPLUS,TYPE=WTR

DEVICE,CARRIAGE=(YES,6),CHARS=(YES,60D8),
       CKPNTSEC=30,DTYPE=PRTAFP1,
       FSSNAME=AFPPLUS,
       JNAME=PRT001,JUNIT=(,SYS1,UR,ON),
       MODE=FSS,PM=(LINE,PAGE,SOSI1,SOSI2),
       WC=(R),WS=(CL)
```

Figure 15: Sample JES3 initialization statements

"FSSDEF statement" on page 105 describes the JES3 initialization statements that are shown in Figure 15 on page 105, including some additional parameters that you might want to specify to define a sender.

Note: For detailed descriptions of each of the parameters, see *z/OS JES3 Initialization and Tuning Reference*.

FSSDEF statement

The FSSDEF initialization statement is optional but recommended. If you omit it, JES3 generates a default sender when an FSA is started. The FSSDEF statement contains these parameters:

FSSNAME=*fssname*
Specifies the name of this sender. Each sender must have a unique 1 - 8 character name. This sender name must match the sender name in the DEVICE statement for each associated FSA.

This parameter is required.

PNAME=*procedurename*
Specifies the name of the procedure for starting this sender. The procedure must be defined before the sender is started (see "Creating a startup procedure" on page 34). A sample AFP Download Plus startup procedure is named AFPPLUS in Figure 6 on page 35.

SYSTEM=*systemname*
Specifies the JES3 processor on which the sender runs. This parameter is optional. JES determines the default from the DEVICE statement.

TERM={YES | NO}
Specifies whether the sender stops if the JES3 global address space is stopped by a *RETURN or *DUMP operator command. This parameter is optional; if you omit it, the default is NO.

TYPE=WTR
Specifies that the sender is an output writer. This parameter is required.

DEVICE statement

A DEVICE statement (also called a printer definition) is required to define each FSA. The DEVICE statement contains these parameters:

CARRIAGE=({YES | NO},*pdefname*)
Specifies the JES default page definition.

YES
Specifies that the page definition can be changed during the startup procedure.

NO
Specifies that the page definition cannot be changed during the startup procedure.

pdefname
Specifies the 1 - 4 character name of the page definition be used as a default. Do not code the P1 prefix of the page definition.

This parameter is optional. If you omit it, JES3 determines the default page definition from the CARRIAGE parameter of the JES3 OUTSERV initialization statement. If you omit the CARRIAGE parameter in the OUTSERV statement, the default is 6; that is, page definition P16. If you do not want JES3 to supply a default page definition to AFP Download Plus, specify PDEFAULT=FCB.

CHARS=({YES | NO},*fontname*)
Specifies a 1 - 4 character default font name. NO specifies that no default font is passed to AFP Download Plus.

This parameter is optional. If you omit it, JES3 determines the default font from the CHARS parameter of the JES3 OUTSERV initialization statement. If you omit the CHARS parameter of the OUTSERV statement, the default is GS10. If you do not want JES3 to supply a default font value to AFP Download Plus, specify PDEFAULT=CHARS.

CKPNTPG=*nnn*
Specifies the number of pages between checkpoints of a data set that is transformed.

Note: AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

CKPNTSEC=*nnnnn*
Specifies the seconds between checkpoints of a data set that is transformed. The value must be 0 - 32767.

This parameter is optional. If not specified, AFP Download Plus only checkpoints a data set if a checkpoint value is specified on the OUTPUT JCL statement for the data set.

Note: AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

DTYPE=PRT*nnnn*
Specify the device type for an FSA. This parameter is required.

DYNAMIC={YES | NO}
Specifies whether JES3 is to start and stop this FSA dynamically.

YES
Specifies that JES3 is to start this FSA whenever work is available for it. JES3 stops this FSA, and deactivates the address space when no work is available.

NO
Specifies that the operator is to start and stop this FSA. Specify NO to keep the address space active between transmission of data sets.

This parameter is optional. If you omit it, the default is NO.

FORMS=({YES | NO},*formname*)
Specifies the form name that is processed by this FSA.

YES
Specifies that the form name can be changed during the startup procedure.

NO
Specifies that the form name cannot be changed during the startup procedure.

formname
Specifies the 1 - 8 character name of the form to be processed by this FSA. If you designate FORMS as a work-selection criterion on the WS parameter, the FSA selects data sets whose form name matches the value specified here.

This parameter is optional. If you omit it and do not specify forms as a work-selection criteria, this FSA selects data sets with any form name.

FSSNAME=*fssname*
Specifies a unique sender FSS associated with this FSA. This value must match the value that is coded for the FSSNAME parameter in the corresponding FSSDEF statement.

This parameter is optional. If you omit it, the default is the name of this FSA, as specified with the JNAME parameter.

HEADER={YES | NO}
Specifies whether this FSA produces job-header and data set header separator pages. The default is YES.

JNAME=*fsaname*
Specifies the unique 1 - 8 character name of this FSA. This parameter is required.

JUNIT=(,*main*,*msgdest*[,{ON | OFF}])
Specifies information for the FSA:

main
The name of the processor to which the FSA is attached.

msgdest
Destination information for messages about the FSA.

ON | OFF
Indicator of whether the FSA is initially online or offline.

This parameter is required.

MODE=FSS
Specifies that this FSA is managed by an AFP Download Plus sender. This parameter is required.

PDEFAULT={NONE | CHARS | FCB | CHARS,FCB}
Specifies whether JES3 is to use certain JES3 default values during sender processing or ignore them. If JES3 ignores the default values, AFP Download Plus uses default values for CHARS, PAGEDEF, or both, that are defined in the PRINTDEV statement. See Table 12 on page 61 for information about the PRINTDEV statement.

NONE
Specifies that JES3 is to use JES3 default values for font name (UCS or train) and page definition name (FCB or CARRIAGE); AFP Download Plus does not use the CHARS and PAGEDEF values specified in the PRINTDEV statement.

CHARS
Specifies that JES3 is to ignore the JES3 default value for font name (UCS or train); AFP Download Plus uses the CHARS value that is specified in the PRINTDEV statement when the WS=U parameter is specified on the DEVICE statement.

FCB
Specifies that JES3 is to ignore the JES3 default value for page definition name (FCB or CARRIAGE); AFP Download Plus uses the PAGEDEF value that is specified in the PRINTDEV statement when the WS=C parameter is specified on the DEVICE statement.

CHARS,FCB
Specifies that JES3 ignores the JES3 defaults for both font name (UCS or train) and page definition name (FCB or CARRIAGE); AFP Download Plus uses the PRINTDEV value for CHARS when the WS=U parameter is specified on the DEVICE statement and the PRINTDEV value for PAGEDEF when the WS=C parameter is specified on the DEVICE statement.

This parameter is optional. The default is NONE.

PM=(*processingmodes*)
Specifies the data set processing modes that are supported by this FSA. Separate the modes with commas. List all processing mode values to be accepted by this FSA because the FSA processes only data sets with a mode that matches one of the values specified in this parameter:

LINE
Specifies that line-format data sets are selected.

PAGE
Specifies that composed-page data sets are selected.

SOSI*n*
Specifies that data sets with the shift-out, shift-in processing mode of SOSI1, SOSI2, SOSI3, SOSI4 for double-byte fonts are selected.

installation-defined
Specifies any mode that your installation defined.

This parameter is optional. If you omit it, the default is LINE,PAGE.

WC=(*classes*)
Specifies the output classes that are processed by this FSA. List all classes to be selected by this FSA; separate each class with a comma. If you designate CLASS as a work-selection criterion on the WS parameter, this FSA selects data sets that match the values specified here.

This parameter is optional. If you omit it, this FSA selects data sets with any output class.

WS=(*criteria*)
Specifies the work-selection criteria for this FSA; separate each value with a comma. See the *z/OS JES3 Initialization and Tuning Reference* for the valid values and the default.

For an AFP Download Plus FSA, consider these values:

C
Causes JES3 to pass the FCB name that is specified on the OUTPUT JCL statement to the FSA.

CL
Specifies that the FSA selects only those data sets with the same class as specified in the WC parameter of this statement.

D
Specifies that the FSA selects only those data sets with the same destination name as in the DGROUP parameter of this statement.

F
Causes JES3 to pass the form name that is specified as a JCL parameter to the FSA.

U
Causes JES3 to pass the font name that is specified as a JCL parameter to the FSA.

Notes:

1. This parameter is optional but recommended. If you omit it, the FSA selects output data sets for processing according to default work-selection criteria.
2. If you want AFP Download Plus to use the FCB specified in the FCB JCL parameter to format output, specify WS=C as one of the work-selection criteria. Otherwise, JES3 does not pass the FCB name that is specified in JCL to the FSA.
3. If you want AFP Download Plus to use the form name that is specified in the FORMS JCL parameter to select printer definitions in the Printer Inventory, specify WS=F as one of the work-selection criteria. Otherwise, JES3 does not pass the form name that is specified in JCL to the FSA.
4. If you want AFP Download Plus to use the page definition that is specified in the PAGEDEF (or FCB) JCL parameter, specify WS=C as one of the work-selection criteria. Otherwise, JES3 does not pass the page definition name that is specified in JCL to the FSA.
5. If you want AFP Download Plus to use the font that is specified in the CHARS (or UCS) JCL parameter, specify WS=U as one of the work-selection criteria. Otherwise, JES3 does not pass the font name that is specified in JCL to the FSA.

Specifying defaults in JES3

You can specify defaults on JES3 initialization statements (OUTSERV and DEVICE) and on the PRINTDEV statement of the AFP Download Plus startup procedure.

To specify no defaults in a JES3 environment, code the JES3 and PRINTDEV statements as shown in Table 16 on page 109.

Table 16: Specifying no defaults in JES3.

Option	DEVICE Statement	OUTSERV Statement	PRINTDEV Statement
Data Check Blocking	Not applicable	Not applicable	Omit DATACK parameter
Fonts	Specify PDEFAULT CHARS and omit CHARS parameter	Omit CHARS parameter	Omit CHARS parameter
Form Definition	Not applicable	Not applicable	Omit FORMDEF parameter
Page Definition	Specify PDEFAULT FCB and omit CARRIAGE parameter	Omit CARRIAGE parameter	Omit PAGEDEF parameter

Writing installation exits

AFP Download Plus supports PSF for z/OS installation exits that you can use to code and install modifications to AFP Download Plus functions. Table 17 on page 110 describes the PSF installation exits that AFP Download Plus supports.

Table 17: PSF installation exits for AFP Download Plus		
Exit	**Name**	**CSECT**
1	Job header	APSUX01/APSUC01
2	Job trailer	APSUX02/APSUC02
3	Data set header	APSUX03/APSUC03
4	Logical-record processing	APSUX04/APSUC04
5	SMF type 6 record	APSUX05/APSUC05
6	Message	APSUX06/APSUC06 **Note:** AFP Download Plus produces some messages that are not produced by PSF.
7	Resource-management	APSUX07/APSUC07 **Note:** Some Exit 7 options are not supported in AFP Download Plus. See Table 18 on page 111 for the options that are supported.
8	Line-mode migration	APSUX08/APSUC08
15	Print parameter	APSUX15/APSUC15 **Note:** AFP Download Plus uses Exit 15 the same way Download for z/OS does, except AFP Download Plus ignores the OUTGRP parameter because it is not supported by the receiver. Instead, to process jobs with multiple data sets, use the multiple data set function available in AFP Download Plus (see dataset-grouping or Data set grouping).

For information about PSF installation exits, see *PSF for z/OS: Customization*.

Resource-management exit processing

AFP Download Plus supports all Exit 7 subroutine calls, including:

- Initialization call (INIT)
- Begin-data-set call (BDSC)
- Resource access call (RAC)
- Resource load call (RLC)
- Resource deletion call (RDC)

  Note: No resources are deleted for AFP Download Plus.
- End-data-set call (EDSC)
- Termination call (TERM)

Table 18 on page 111 shows the APSUX07 or APSUC07 options that AFP Download Plus supports. For more information about the Exit 7 Resource Management options, see *PSF for z/OS: Customization*.

Table 18: Exit 7 options supported by AFP Download Plus	
Exit 7 option	**Description**
XTP7ASAP	Gather AFP statistics about the output file: 0 = No, do not gather AFP statistics for this output file (default). 1 = Yes, gather AFP statistics for this output file.
XTP7C2SI	Convert a multiple-celled IM1 image to a single IOCA image: 0 = No, do not convert to single IOCA image (default). 1 = Yes, convert to single IOCA image.
XTP7FMT	Specify resolution at which the data set is formatted: 0 = No format resolution is specified (default). 240 = Data is formatted at 240 pels per inch resolution. 300 = Data is formatted at 300 pels per inch resolution.
XTP7HDF	Override the 3800 default font: 0 = No, use the 3800 default font (default). 1 = Yes, replace the 3800 default font with the first font in the current font list.
XTP7HQUE	Send data set to JES and mark it as unprintable: 0 = No, delete the data set (default). 1 = Yes, mark the data set as unprintable.
XTP7LCNT	Use line count (LINECT) in Line-Mode Migration to calculate the number of lines on a page: 0 = No, do not use LINECT (default). 1 = Yes, use LINECT.
XTP7LMCM	Report message APS973I for Line-Mode Conversion paper-length errors in AFP Download Plus: 0 = No, suppress the message (default). 1 = Yes, report the message.
XTP7MDSD	Send messages to the SYSOUT data set: 0 = No, the message data set is not sent to SYSOUT (default). 1 = Yes, the message data set is sent to SYSOUT.
XTP7MTOF	Map fonts to outline fonts: 0 = No, do not map to outline fonts (default). 1 = Yes, map to outline fonts.
XTP7PRMD	Specify the default processing mode PSF uses to process data sets containing both single-byte and double-byte fonts: S0SI1, S0SI2, S0SI3, S0SI4.
XTP7RDSR	Release data set when repositioning: 0 = No, do not release data sets when repositioning (default). 1 = Yes, release data sets when repositioning.
XTP7RFNF	Recover from font not found: 0 = No, do not query the host font libraries to ensure that the mapped font exists (default). 1 = Yes, query the host font libraries for the mapped font.
XTP7RSTR	Control whether AFP Download Plus is automatically restarted after an abend: 0 = No, do not restart after an abend. 1 = Yes, restart after an abend (default).
XTP7TDS	Stop processing the current data set: 0 = No, do not stop processing the data set (default). 1 = Yes, stop processing the data set.

Table 18: Exit 7 options supported by AFP Download Plus (continued)	
Exit 7 option	**Description**
XTP738MO	Set the user's data set media origin to the 3800 media origin: 0 = No, the data set media origin is not set to the 3800 media origin (default). 1 = Yes, the data set media origin is set to the 3800 media origin.

Reviewing default program properties table entries

z/OS supplies an internal default program properties table (PPT) entry for AFP Download Plus. The internal default values are:

```
PPT     PGMNAME(APSHPOSE)
        KEY(1)
        NOSWAP
        NOPRIV
        CANCEL
        SYST
        NODSI
        PASS
        AFF(NONE)
        NOPREF
```

These are the recommended values and no changes are required. However, you can change them by specifying a PPT entry in the SCHEDxx member in the system PARMLIB with overriding values for APSHPOSE. For more details, see *z/OS MVS Initialization and Tuning Reference*. Modification of any values other than NODSI might cause a JES abend, or other unexpected results to occur.

By specifying NODSI (nonexclusive use of data sets) in the PPT, other programs, such as OGL and PPFA, can change the resources while AFP Download Plus is running. When NODSI is specified, Data Management functions, such as compression and library migration, can occur. However, these functions can cause problems for AFP Download Plus if they run while AFP Download Plus is active. Therefore, you must manually exclude AFP Download Plus resource libraries from the Data Management functions. If you do not want to manually exclude the resource libraries, you must use DSI in the PPT entry.

Specifying DSI and running AFP Download Plus with DISP=SHR causes other programs to wait until AFP Download Plus no longer has the resource libraries open. Therefore, DSI prevents programs from updating or changing the resource libraries while AFP Download Plus is active. Typically, AFP Download Plus has the resource libraries open as long as any FSA is running.

Chapter 5. Operating the AFP Download Plus sender

This information describes how to operate the AFP Download Plus sender, including how to:

- Start a sender and its FSAs.
- Cancel the current transmission on an FSA.
- Restart the current transmission on an FSA.
- Stop a sender and its FSAs.
- Set up AFP Download Plus to send z/OS separator pages.
- Use operator interface commands for AFP Download Plus.

You operate an AFP Download Plus sender just as you operate a PSF FSS and FSA, or any other JES output writer. For more information about the JES2 and JES3 commands that are described here and additional JES commands that you can use to manage an output writer, see *z/OS JES2 Commands* or *z/OS JES3 Commands*. For more information about the MVS™ commands that are described here, see *z/OS MVS System Commands*.

Although this information shows only MVS and JES commands, you can also use System Display and Search Facility (SDSF) commands or the commands of a comparable product to start and stop FSAs and to display and cancel data sets. See *z/OS SDSF Operation and Customization* for more information about SDSF commands.

Starting the sender and FSAs

Before you start an AFP Download Plus sender, you must:

- Create a cataloged startup procedure for the FSS.
- Define one or more FSAs.
- Start the AFP Download Plus receiver or equivalent receiver on the receiver system (see "Starting the receiver manually" on page 151). You must start the receiver before the FSA attempts to transmit any data to it; otherwise, a TCP/IP error occurs.

The first two tasks are described in Chapter 4, "Configuring the AFP Download Plus sender," on page 29.

After the required tasks are accomplished, you can enter commands at the operator console to start each FSA. You do not need to enter a special command to start the sender because JES starts the sender automatically when you start the first FSA.

In JES2, if the FSA was defined with the START=YES parameter on the JES2 PRT(*nnnn*) statement, JES2 automatically starts the FSA when you start the z/OS operating system. JES3 does not support the automatic start option.

Starting an FSA requires some coordination with TCP/IP and the receiver on the z/OS, AIX, Windows, or Linux operating system. To start an FSA:

1. Verify that TCP/IP is started on the z/OS operating system. You can start TCP/IP by entering this MVS command:

   ```
   S tcpip_name
   ```

   Replace *tcpip_name* with the job name of the TCP/IP address space. The job name of the address space is TCPIP, unless changed by your installation.
2. Verify that the receiver on the receiver system is started. See "Starting the receiver manually" on page 151.
3. Start the FSA by entering this JES2 or JES3 start command:

- JES2:

  ```
  $S fsa_name [,fsa_name … ]
  ```

  where *fsa_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.
- JES3:

  ```
  *START fsa_name
  ```

  where *fsa_name* is the JNAME parameter of the DEVICE statement.

Canceling a data set

Use the JES `cancel` command to stop processing an active data set. The data set is removed from the JES spool.

Enter this JES2 or JES3 command to cancel a data set:

- JES2:

  ```
  $C fsa_name [,fsa_name … ]
  ```

  where *fsa_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.
- JES3:

  ```
  *CANCEL fsa_name
  ```

  where *fsa_name* is the JNAME parameter of the DEVICE statement.

Restarting a data set

Use the JES `restart` command to stop processing an active data set and requeue it for processing from the beginning.

Enter this JES2 or JES3 command to restart a data set:

- JES2:

  ```
  $E fsa_name [,fsa_name … ]
  ```

  where *fsa_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.
- JES3:

  ```
  *RESTART fsa_name
  ```

  where *fsa_name* is the JNAME parameter of the DEVICE statement.

Stopping the sender and FSAs

Before you stop the AFP Download Plus sender, stop each FSA. You can stop an FSA after it finishes transmitting the current data set to the receiver system, or you can stop it immediately.

Stopping an FSA after the current data set is transmitted

Use this JES2 or JES3 command to stop an FSA after transmission of the current data set is complete:

- JES2:

  ```
  $P fsa_name [,fsa_name … ]
  ```

where *fsa_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.

- JES3:

```
*CANCEL,fsa_name
```

where *fsa_name* is the JNAME parameter of the DEVICE statement.

Stopping an FSA immediately

Use these JES2 or JES3 commands to stop an FSA immediately:

- JES2:

```
$P fsa_name [,fsa_name … ]
$C fsa_name [,fsa_name … ]
```

or

```
$P fsa_name [,fsa_name … ]
$E fsa_name [,fsa_name … ]
```

where *fsa_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.

The $P command followed by the $C command cancels processing of the current data set, purges it from the spool, and stops the FSA. If the current data set cannot be canceled, the FSA does not stop. You can use the MVS Cancel command to stop the FSA in that case.

The $P command followed by the $E command interrupts processing of the current data set, returns it to the spool to be restarted from the beginning, and stops the FSA.

- JES3:

```
*CANCEL,fsa_name,T
```

where *fsa_name* is the JNAME parameter of the DEVICE statement.

The *CANCEL command cancels the current data set; the T option stops the FSA after the current data set is canceled. If the current data set cannot be canceled, the FSA does not stop. You can use the MVS Cancel command to stop the FSA in this case.

Stopping the sender

Remember: Before you stop the sender, you must stop all sender FSAs.

In a JES2 environment, if the sender was configured with the AUTOSTOP=YES option on the JES2 FSS(*fss_name*) statement, JES2 stops the sender automatically after you stop all FSAs. If AUTOSTOP=YES was not specified, you must stop the sender with an MVS operator command.

In a JES3 environment, JES automatically stops the sender after you stop all FSAs under its control; therefore, you do not need to stop the sender by using an MVS operator command.

If JES does not automatically stop the sender, use this MVS operator command after you stop all sender FSAs:

```
C fss_name
```

where *fss_name* is the name on the FSS(*fss_name*) statement in JES2 or the name in the FSSNAME parameter of the FSSDEF statement in JES3.

Sending z/OS separator pages

AFP Download Plus can be configured to send z/OS separator pages for a job to the receiver.

To set up AFP Download Plus to send separator pages:

1. Specify YES for the Send separator pages parameter in the Printer Inventory or the send-separator-pages parameter in the AFPPARMS control statement.
2. Specify YES for the Data set grouping parameter in the Printer Inventory or the dataset-grouping parameter in the AFPPARMS control statement because when a separator page is sent to the receiver with a job, the job becomes a multiple data set job.
3. For the appropriate separator page, ensure that an installation exit is in a data set pointed to in a STEPLIB DD statement in the AFP Download Plus startup procedure or in a LINKLIB in the standard MVS search order:

   Job header separator page
   APSUX01 or APSUC01

   Job trailer separator page
   APSUX02 or APSUC02

   Data set header separator page
   APSUX03 or APSUC03
4. Specify the appropriate JOBHDR, JOBTRLR, and DSHDR PRINTDEV parameters that identify the OUTPUT statement to be used for the separator pages.
5. When you want to send MO:DCA interchange set compliant separator pages to the receiver, see "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the changes you need to make.
6. Specify YES for the appropriate JES initialization statements:

   JES2
   SEP and SEPDS

   JES3
   HEADER

Using the AFP Download Plus operator interface

The AFP Download Plus operator interface can be used to:

- Initialize the operator interface.
- Start traces dynamically.
- Stop traces.
- Stop FSAs.
- Report AFP Download Plus processing status.
- Display TCP/IP status.

This information describes the operator interface commands that can be used with AFP Download Plus. The MVS MODIFY command can be used as an AFP Download Plus operator interface.

Operator interface commands can be entered at any time while AFP Download Plus is running. However, if a command is directed to a specific FSA, that FSA must be up and running at the time when the command is issued or the command is rejected.

Initializing the operator interface

The AFP Download Plus operator interface must be initialized before any AFP Download Plus operator interface commands are processed.

Be aware: Before the AFP Download Plus operator interface is initialized, enter only parameters on the MODIFY command that do not require an *fsa_name*, such as TRACEON or TRACEOFF; otherwise, the command fails. After the AFP Download Plus operator interface is initialized, you can enter any MODIFY parameter.

You can use the Printer Inventory or the AFP Download Plus startup procedure to indicate whether the operator interface is initialized automatically or whether you are prompted to issue a command to initialize the operator interface:

- To initialize the operator interface automatically without prompting from AFP Download Plus, do one of these:
  - In the Printer Inventory, set the Trace prompt parameter to No (see Trace prompt for more information).
  - In the AFP Download Plus startup procedure, use the PARM parameter in the EXEC statement. For example:

    ```
    //  EXEC PGM=APSHPOSE,PARM=(,,NOPROMPT)
    ```

    See “ JCL statements for the startup procedure” on page 38 for more information about the PARM parameters.
- To initialize the operator interface after you are prompted from AFP Download Plus to issue a command:
  1. Do one of these to prompt for operator interface initialization:
     - In the Printer Inventory, set the Trace prompt parameter to Yes (see Trace prompt for more information).
     - In the AFP Download Plus startup procedure, use the PARM parameter in the EXEC statement. For example:

       ```
       //  EXEC PGM=APSHPOSE,PARM=(,,PROMPT)
       ```

       See “ JCL statements for the startup procedure” on page 38 for more information about the PARM parameters.
  2. At the prompt, type the MODIFY (or F) command with the U parameter to initialize the AFP Download Plus operator interface. The syntax of the command is:

     ```
     {MODIFY | F} fss_name,U
     ```

     The parameters are:

     fss_name
     Specifies the name of the AFP Download Plus sender that is initialized. This parameter is required.

     U
     Specifies that the AFP Download Plus operator interface is to be initialized.

Starting and stopping traces

An AFP Download Plus operator interface command can affect one of these trace environments:

- An NST trace
- An FSA external trace for an active FSA
- FSA external traces for all FSAs that are not yet active
- An FSI trace
- An internal trace

To start a trace dynamically, type the MODIFY (or F) command with the TRACEON parameter. The syntax of the command is:

```
{MODIFY | F} fss_name,TRACEON[,fsa_name]
```

To stop a trace, type the MODIFY (or F) command with the TRACEOFF parameter. The syntax of the command is:

```
{MODIFY | F} fss_name,TRACEOFF[,fsa_name]
```

For more detailed information about using the operator interface command to affect a trace environment, see *PSF for z/OS: Diagnosis*.

Stopping FSAs

If you cannot stop or cancel an FSA by using a JES command, you can use the AFP Download Plus operator interface to stop the FSA.

To stop an FSA, type the MODIFY (or F) command with the FORCE parameter. The syntax of the command is:

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

For more information about stopping FSAs with the operator interface, see *PSF for z/OS: Diagnosis*.

Reporting AFP Download Plus processing status

You can use the AFP Download Plus operator interface, AFPPARMS control statement, or Printer Inventory to activate and control the AFP Download Plus status feature, which produces a message that reports the processing status for the current spool data set.

Note: This status feature can cause longer processing time for jobs and affect performance. The performance can be affected by the size of your job and the status interval you choose. For example, if a job is several gigabytes (GBs) in size and the status interval is set to kilobytes (KBs), the job takes longer to process because the status is issued in frequent intervals.

This information describes how to use the operator interface to activate the AFP Download Plus status feature. To use the AFPPARMS control statement, see display-afpdp-status. To use the Printer Inventory, see Display status.

Activating the AFP Download Plus status feature with the operator interface

To activate the status feature with the operator interface, type the MODIFY (or F) command with the DISPLAY and STATUS parameters. The syntax of the command is:

```
{MODIFY | F} fss_name,DISPLAY,fsa_name,STATUS=AFPDP
[,SCOPE={OFF | ONCE | SF | FSA }]
[,EVENT={XFORM | XMIT | BOTH }]
[,INTV={SFEND | nnn{KB | MB | GB | S | M }|500KB}]
```

The required parameters that are used with the MODIFY command to control the AFP Download Plus status feature are:

fss_name
Specifies the name of the FSS for which the AFP Download Plus status is displayed. This parameter must match the FSSNAME parameter of the JES FSSDEF statement for the FSS.

DISPLAY
Specifies that information is displayed on a display console and the system log.

fsa_name
Specifies the name of the FSA for which the AFP Download Plus status is displayed.

STATUS=AFPDP
Specifies that status for AFP Download Plus is displayed on a display console and the system log.

The optional parameters are:

SCOPE={OFF | ONCE | SF | FSA}

The SCOPE parameter specifies the scope of the AFP Download Plus status feature request, including how long the request is active. The values are:

OFF
Indicates that the status feature is inactive.

ONCE
Indicates that the status feature is active for one occurrence when the command is entered (default).

SF
Indicates that the status feature is active until the current spool data set completes processing, at which time the status feature is turned off. This value can be used when the INTV parameter is used.

If a STATUS=AFPDP,SCOPE=OFF parameter is issued before the spool data set completes processing, the status feature is turned off early.

FSA
Indicates that the status feature is active until this FSA session is stopped. This value can be used when the INTV parameter is used.

If a STATUS=AFPDP,SCOPE=OFF parameter is issued before the FSA is stopped, the status feature is turned off early.

EVENT={XFORM | XMIT | BOTH }

The EVENT parameter specifies which events are to be included in the AFP Download Plus status feature request. The values are:

XFORM
Generates status feature message APS8559I for the spool data set transformation to MO:DCA-P.

XMIT
Generate status feature message APS8559I for the transformed document destination transmission.

BOTH
Generate status message APS8559I for both the spool data set transformation to MO:DCA-P and the transformed document transmission (default).

INTV={SFEND | *nnn*{KB | MB | GB | S | M } | 500KB}

The INTV parameter specifies how often AFP Download Plus reports processing status in message APS8559I. This parameter can be used when SCOPE values SF and FSA are used.

SFEND
Report processing status only at the end of the spool data set.

***nnn*{KB | MB | GB | S | M }**
Report processing status in an interval of 1 to 999 kilobytes, megabytes, gigabytes, seconds, or minutes, where:

KB
Kilobytes (32 KB is the minimum interval)

MB
Megabytes

GB
Gigabytes

S
Seconds

M
Minutes

500KB
Report processing status every 500,000 bytes that are processed (default).

This example shows the MODIFY command that is used to display AFP Download Plus status for the current spool data set, reporting only transmission activity, at an interval of 500 KB, when the FSS name is WTRES600 and the FSA name is PRT619:

```
MODIFY WTRES600,DISPLAY,PRT619,STATUS=AFPDP,SCOPE=SF,EVENT=XMIT
```

Viewing the operator status message when the operator interface activates the status feature

When the status feature is activated, AFP Download Plus issues status report message, APS8559I, to the operator's console and the JES log. The message is issued at the end of each page or resource that is processed in a job. This report message is only displayed when the FSA is active. The format of the message is:

APS8559I *jobname, jobid, stepname, ddname, jobpart, eventdata*.

The values are:

jobname
Specifies the name of the job that is being processed.

jobid
Specifies the job identifier of the spool data set that is being processed.

stepname
Specifies the step name of the job that is being processed.

ddname
Specifies the DD name for the step name that is being processed.

jobpart
Specifies the part of the job that is being processed.

eventdata
Depending on the EVENT value that is specified with the DISPLAY,STATUS=AFPDP parameters and the AFP Download Plus mode, specifies one or more of these:

Transformed bytes=*nnnnnnn*
The number of bytes that result from AFP Download Plus transforming data to MO:DCA-P format. This value is always displayed.

Transmitted=*ppppp*
The percentage of the total number of transformed bytes that AFP Download Plus transmitted to the receiving system.

Transmitted bytes=*gggggggg*
The number of bytes that AFP Download Plus transmitted to the receiving system.

Compressed bytes=*ccccccc*
When compression is activated for the FSA or data set, the number of bytes that result from AFP Download Plus compressing the data.

Table 19 on page 120 shows how the EVENT parameter value and the AFP Download Plus mode determine what other event data the message displays.

Table 19: Event data displayed in APS8559I message when the operator interface activates the status feature

EVENT=	AFP Download Plus Mode	Message Displays
XFORM	No effect	Transformed bytes=*nnnnnnn*

Table 19: Event data displayed in APS8559I message when the operator interface activates the status feature (continued)

EVENT=	AFP Download Plus Mode	Message Displays
BOTH XMIT	Compression off Direct download off	Transformed bytes=*nnnnnnn*, Transmitted=*ppppp* For example: `APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00722, STEP1, SYSUT2, USER, Transformed bytes=  647MB, Transmitted=  58%.` **Note:** With XMIT, the message is not displayed until transmission starts.
BOTH XMIT	Compression on Direct download off	Transformed bytes=*nnnnnnn*, Compressed bytes=*ccccccc*, Transmitted=*ppppp* For example: `APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00728, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Compressed bytes= 203363, Transmitted= 100%.` **Note:** With XMIT, the message is not displayed until transmission starts.
BOTH XMIT	Compression off Direct download on	Transformed bytes=*nnnnnnn*, Transmitted bytes=*gggggggg* For example: `APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00724, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Transmitted bytes= 1312KB.` **Note:** With XMIT, the message is not displayed until transmission starts.
BOTH XMIT	Compression on Direct download on	Transformed bytes=*nnnnnnn*, Compressed bytes=*ccccccc*, Transmitted bytes=*gggggggg* For example: `APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00726, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Compressed bytes= 203348, Transmitted bytes= 203348.` **Note:** With XMIT, the message is not displayed until transmission starts.

If AFP Download Plus is transforming the data, you can see 0% for the transmitted percentage. For example:

```
APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00728, STEP1, SYSUT2, USER,
Transformed bytes=    405KB, Transmitted=  0%.
```

Displaying TCP/IP Status

You can use the AFP Download Plus operator interface to dynamically display the status of a TCP/IP connection on the console and system log.

To display TCP/IP status, type the MODIFY (or F) command with the DISPLAY and STATUS=TCPIP parameters. The syntax of the command is:

```
{MODIFY | F}  fss_name,DISPLAY,[fsa_name],STATUS=TCPIP
```

The display TCP/IP status command is the same as the display TCP/IP status command for PSF. For more information about the command parameters, see *PSF for z/OS: Diagnosis*.

Figure 16 on page 122 shows a sample of the TCP/IP status output displayed on the system log with the APS699I message when the MVS MODIFY command is entered with the DISPLAY and STATUS=TCPIP parameters.

```
F WTRES600,DISPLAY,PRT619,STATUS=TCPIP
APS639I  WTRES600 WTRES600 ***  COMMAND (DISPLAY) ACCEPTED.
APS699I  TCP/IP   DISPLAY  STATUS 645
                                                    PENDING
FSANAME........... TCP/IP STATUS.....................  COMMANDS.....
PRT619  READY      TCP/IP IS ACTIVE
                   DESTINATION CONNECTED
```

Figure 16: Status output displayed on the system log (sample)

The TCP/IP status output displayed on the console and system log consists of a primary TCP/IP status and might consist of one or two sub-statuses and a pending command. The primary TCP/IP statuses, sub-statuses, and pending commands that might be displayed on the console and system log for AFP Download Plus are described in Table 20 on page 122.

Table 20: TCP/IP status, sub-status, and pending command descriptions.

Status Type	Status Name	Description
Primary Status	INITIALIZING TCP/IP	AFP Download Plus is in the process of initializing the TCP/IP interface. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. Additional messages have already been or will be issued describing the problem in more detail."1" on page 124
	TCP/IP IS ACTIVE	AFP Download Plus has initialized the TCP/IP interface and is ready to start transmitting a job or is actively transmitting a job. This is the normal status for the TCP/IP interface.
	TCP/IP IS INACTIVE	The TCP/IP interface between AFP Download Plus and TCP/IP is inactive because either: • The interface has not started yet (INITAPI). This can occur when there is no work for AFP Download Plus or when AFP Download Plus is in the process of transforming the data and has not started transmitting data; therefore, AFP Download Plus is not connected to the receiver destination. • The interface has stopped (TERMAPI) and has not restarted yet (INITAPI). This can occur when there is no more work for AFP Download Plus after transmitting the previous data set; therefore, AFP Download Plus is not connected to the receiver destination.
	TERMINATING TCP/IP	AFP Download Plus is in the process of stopping the TCP/IP interface. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. Additional messages have already been or will be issued describing the problem in more detail."1" on page 124

Table 20: TCP/IP status, sub-status, and pending command descriptions. (continued)

Status Type	Status Name	Description
Sub-Status	TCP/IP INTERFACE CONNECTED	When AFP Download Plus is initializing the TCP/IP interface, this sub-status indicates that INITAPI has successfully completed. When AFP Download Plus is stopping the TCP/IP interface, this sub-status indicates that CLOSE has successfully completed but TERMAPI has not. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface."1" on page 124
	DESTINATION CONNECTED	When TCP/IP is active, this sub-status indicates that CONNECT has successfully completed. This is the normal sub-status for the TCP/IP interface.
	READY	This sub-status indicates that AFP Download Plus is connected to the receiver destination.
Pending Command	CLOSE	Issue the MODIFY command again and if the CLOSE command is still pending, there is most likely a problem with the interface."1" on page 124
	CONNECT	Whenever this command is pending, AFP Download Plus is unable to connect with the receiver destination. An APS6513I message either has already been issued or will be issued with more details, including the TCP/IP error number (errno) received."1" on page 124
	FREEADDRINFO	Issue the MODIFY command again and if the FREEADDRINFO command is still pending, there is most likely a problem with the interface.
	GETADDRINFO	Issue the MODIFY command again and if the GETADDRINFO command is still pending, there is most likely a problem with the interface.
	INITAPI	Issue the MODIFY command again and if the INITAPI command is still pending, there is most likely a problem with the interface."1" on page 124
	IOCTL	Issue the MODIFY command again and if the IOCTL command is still pending, there is most likely a problem with the interface."1" on page 124
	PTON	Issue the MODIFY command again and if the PTON command is still pending, there is most likely a problem with the interface.
	RECV	Issue the MODIFY command again and if the RECV command is still pending, there is most likely a problem with the interface."1" on page 124
	SELECT READ	Select was issued for a Read operation only. Whenever this command is pending, AFP Download Plus is waiting for a response from the receiver destination, which is not responding.
	SEND	Issue the MODIFY command again and if the SEND command is still pending, there is most likely a problem with the interface."1" on page 124
	SHUTDOWN	Issue the MODIFY command again and if the SHUTDOWN command is still pending, there is most likely a problem with the interface."1" on page 124
	SOCKET	Issue the MODIFY command again and if the SOCKET command is still pending, there is most likely a problem with the interface."1" on page 124
	TERMAPI	Issue the MODIFY command again and if the TERMAPI command is still pending, there is most likely a problem with the interface."1" on page 124

Table 20: TCP/IP status, sub-status, and pending command descriptions. (continued)		
Status Type	**Status Name**	**Description**
Note: 1. If the problem is only occurring on one TCP/IP-attached destination, it is most likely a receiver problem. If the problem is occurring on all or multiple TCP/IP-attached destinations, it is most likely a problem with TCP/IP and you need to contact your TCP/IP administrator.		

When the TCP/IP status is displayed on the console and system log, it might be displayed in combination with a sub-status or a pending command. Each sub-status might have another sub-status, pending command, or both that is displayed with it. Table 21 on page 124 shows the possible combinations of TCP/IP statuses, sub-statuses, and pending commands that can be displayed on the console and system log.

Table 21: TCP/IP status combinations displayed on the console.

TCP/IP Status	Sub-Status	Pending Command
TCP/IP IS INACTIVE	None	None
INITIALIZING TCP/IP One sub-status or pending command might be displayed with this status.		INITAPI
	TCP/IP INTERFACE CONNECTED	One of these might be displayed with the sub-status: • CONNECT • FREEADDRINFO • GETADDRINFO • IOCTL • PTON • SOCKET
TCP/IP IS ACTIVE The sub-status is always displayed with this status.	DESTINATION CONNECTED READY is displayed.	One of these might be displayed with the sub-status: • RECV • SELECT READ • SEND
TERMINATING TCP/IP One sub-status is always displayed with this status.	DESTINATION CONNECTED	One of these might be displayed with the sub-status: • CLOSE • SHUTDOWN
	TCP/IP INTERFACE CONNECTED	One of these might be displayed with the sub-status: • FREEADDRINFO • TERMAPI

Chapter 6. Using the AFP Download Plus sender

This information describes how a job submitter uses job control language (JCL) to direct a data set to AFP Download Plus, which then transmits the data set to a receiver system. At the receiver system, the data set can be printed, emailed, or faxed. If you are using PSF for z/OS, you need to be familiar with concepts of AFP, such as form definitions, page definitions, and fonts. See *PSF for z/OS: User's Guide* for an introduction to AFP and the JCL used to print with PSF for z/OS.

This information also describes how to specify the AFPPARMS control statement, direct output to receiver systems, monitor error messages, and recover from errors.

Using JCL Parameters

Table 22 on page 125 lists all of the JCL parameters that you might specify in the DD or OUTPUT JCL statements when you submit a data set for processing with AFP Download Plus. In the table, an X in a column indicates that the parameter can be:

- Specified in the DD statement
- Specified in the OUTPUT statement
- Sent to the receiver system

The parameters that are required for submitting the data set to the receiver system are contained in -o attributes. The -o attributes are derived from parameters that are specified in z/OS, including the DD and OUTPUT JCL statements.

Note: In JES3, many JCL parameters, such as CHARS, FCB, and FORMS, do not override the JES defaults unless the parameter is included as a writer-selection criteria for the device (see "WS=(criteria)" on page 108).

AFP Download Plus sends -o attributes to the receiver system during processing. See Table 23 on page 132 for the JCL parameters that are sent as -o attributes.

Table 22: JCL parameters for AFP Download Plus

JCL parameter	DD	OUTPUT	Recvr	Description
ADDRESS=('*address1*'[,'*address2*'] [,'*address3*'] [,'address4'])		X	X	Indicates 1 - 4 address lines to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
AFPPARMS='*dsname*[(*membername*)]'		X		Indicates the name of the AFPPARMS control statement that contains additional AFP Download Plus parameters. See "Specifying the AFPPARMS control statement on the OUTPUT statement" on page 134.
AFPSTATS={YES | NO}		X		Indicates whether an AFPSTATS report is generated. See Appendix C, "AFPSTATS report," on page 173
BUILDING=*building*		X	X	Indicates the building identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.

Table 22: JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
BURST={YES | NO}	X	X	X	Indicates whether continuous-forms paper is separated into single sheets at the receiver destination. This parameter is not always accepted by print servers at receiver destinations. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
CHARS=(*fontname1*[,*fontname2*][,*fontname3*][,*fontname4*])	X	X		Indicates 1 - 4 coded fonts that AFP Download Plus integrates into the MO:DCA-P data set. AFP Download Plus puts this parameter in the inline resource group. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. **Note:** When AFP Download Plus is processing a MO:DCA IS/3 print file, it does not add the specified coded fonts to the inline resource group because raster fonts cannot be used in a MO:DCA IS/3 file.
CKPTPAGE=*pages*		X		Indicates the number of pages between data set checkpoints, which is the interval at which AFP Download Plus checkpoints the spool data set with JES.
CKPTSEC=*seconds*		X		Indicates the number of seconds between data set checkpoints, which is the interval at which AFP Download Plus checkpoints the spool data set with JES.
CLASS=*class*		X	X	Indicates the output class that is assigned to the output data set at the receiver destination. If the class is specified on the SYSOUT parameter in the DD statement, it overrides the CLASS parameter in the OUTPUT statement. AFP Download Plus forwards this parameter for use on the receiver system.
COLORMAP=*membername*		X	X	Specifies the object container member name of the color mapping table resource at the receiver destination. AFP Download Plus puts the table in the inline resource group and forwards this parameter for use by the printer on the receiver system.
COMSETUP=*membername*		X	X	Specifies the object container member name of the microfilm setup resource at the receiver destination. AFP Download Plus puts the object container in the inline resource group and forwards this parameter for use by the microfilm device on the receiver system.

Table 22: JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
CONTROL={PROGRAM | SINGLE | DOUBLE | TRIPLE}		X		Indicates the line spacing AFP Download Plus uses when it transforms line data to MO:DCA-P.
COPIES= **(*nnn*,** **(*groupvalue1*,...*groupvalue8*))**	X	X	X	Indicates the number of copies that are printed at the receiver destination (when the receiver destination supports this parameter). If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
DATACK={BLOCK | UNBLOCK | BLKCHAR | BLKPOS}		X	X	Specifies the character and position errors the printer reports at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
DCB=OPTCD=J	X			Indicates that the data set contains table reference characters (TRCs). You can also specify table reference characters in the TRC parameter on the OUTPUT statement; however, if DCB=OPTCD=J is specified, it overrides the TRC parameter on the OUTPUT statement.
DCB=RECFM={*recordformat*}[A | M]	X			Indicates whether ANSI or machine carriage-control characters exist in a data set with line data. See *z/OS MVS JCL Reference* for *recordformat* values you can use, such as FB, V, or VB. A for ANSI control characters or M for machine-code control characters can be specified with any record format, such as: RECFM=FBA.
DEPT=*department*		X	X	Indicates the department identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.

Table 22: JCL parameters for AFP Download Plus (continued)				
JCL parameter	**DD**	**OUTPUT**	**Recvr**	**Description**
DEST= **[*node*.]*name* |** **'[*node*.]IP:*ipaddress*'**	X	X	X	Specifies an IP address for the output data set. This IP address does not affect the transmission of the data set to a receiver system. AFP Download Plus always uses the IP address that is specified on the PRINTDEV statement for the FSA to transmit a data set to a receiving system. This parameter provides an extra value, which a shell script, destination control file, or exit routine on the receiving system can optionally use to route a file to a particular device attached to the receiving system. The administrator must modify the IBM-supplied shell script, destination control file, or exit routine to use this parameter. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. **Note:** If you specify the DEST=IP parameter, you cannot also specify a destination name in the DEST JCL parameter. Therefore, if your system programmer configured the AFP Download Plus startup procedure to select jobs that are based on destination name (that is, WS=R is specified as JES work-selection criteria), you must specify a destination name and you cannot specify the DEST=IP parameter. Or, you can remove the destination name from the JES work-selection criteria for the FSA you are using.
DUPLEX={NO | NORMAL | TUMBLE}		X	X	Indicates whether printing is done on both sides of each sheet at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
FCB=*pdefname*	X	X		Indicates the name of the page definition AFP Download Plus uses to format line data to MO:DCA-P. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used.
FLASH=(*flashname*,[*count*])	X	X	X	Indicates the name of the forms flash that is printed at the receiver destination and the number of copies. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
FORMDEF=*fdefname*		X	X	Indicates the name of the form definition that is used for processing the data set. AFP Download Plus puts this parameter in the inline resource group.

Table 22: JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
FORMLEN=*xx.yyy*IN | *xx.yyy*CM		X	X	Indicates the paper length in inches or centimeters that is used to print the data set at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
FORMS=*formname*		X	X	Indicates the name of the form that the print operator is notified to load at the receiver destination. If you specify the form name on the SYSOUT parameter in the DD statement, it overrides the FORMS parameter in the OUTPUT statement. AFP Download Plus forwards this parameter for use on the receiver system.
INTRAY=*nnn*		X	X	Indicates the tray number from which paper is selected at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
LINECT=*nnn*		X		Indicates the maximum number of lines that are processed on each output page.
NAME=*name*		X	X	Indicates a name identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
NOTIFY=(*node.userid1*[,*node.userid2*] [,*node.userid3*] [,*node.userid4*])		X		Indicates up to four users who are notified when AFP Download Plus finishes processing the data set. If users are not specified or if those users specified cannot be contacted, AFP Download Plus sends a notification to the job submitter. Whenever AFP Download Plus creates a message file, even if you do not request notification, AFP Download Plus sends a notification message. AFP Download Plus always puts a copy of the notification message in the system log. See “Specifying message notification” on page 138.
OFFSETXB=*nnnn*[.*mmm*]*unit*		X	X	Indicates the offset in the x direction of the logical page origin from the media origin for the backside of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
OFFSETXF=*nnnn*[.*mmm*]*unit*		X	X	Indicates the offset in the x direction of the logical page origin from the media origin for the front side of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.

Table 22: JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
OFFSETYB=*nnnn*[.*mmm*]*unit*		X	X	Indicates the offset in the y direction of the logical page origin from the media origin for the backside of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
OFFSETYF=*nnnn*[.*mmm*]*unit*		X	X	Indicates the offset in the y direction of the logical page origin from the media origin for the front side of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
OUTBIN=*nnnnn*		X	X	Indicates the number of the output bin into which the print job is placed at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
OVERLAYB=*overlayname*		X	X	Indicates the member name of a medium overlay that is placed on the backside of each sheet. AFP Download Plus puts this parameter in the inline resource group.
OVERLAYF=*overlayname*		X	X	Indicates the member name of a medium overlay that is placed on the front side of each sheet. AFP Download Plus puts this parameter in the inline resource group.
PAGEDEF=*pdefname*		X		Indicates the member name of the page definition AFP Download Plus uses to format line data to MO:DCA-P.
PIMSG={YES | NO | (YES,*nnn*) | (,*nnn*)		X		Indicates whether all message groups generated in the processing of a data set are written to a file.
PRMODE={SOSI1 | SOSI2 | SOSI3 | SOSI4 | *aaaaaaaa*}		X		Indicates the default processing mode AFP Download Plus uses to process data sets containing both single-byte and double-byte fonts.
PRTERROR=HOLD | QUIT | DEFAULT		X		Indicates whether AFP Download Plus accepts the error disposition that is specified when AFP Download Plus stops processing a data set because an error occurs during processing.
PRTQUEUE='*printqueuename*'		X	X	Indicates the name of the target print queue at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
RESFMT={P240|P300}		X		Indicates the resolution at which the output is formatted.

Table 22: JCL parameters for AFP Download Plus (continued)				
JCL parameter	**DD**	**OUTPUT**	**Recvr**	**Description**
ROOM=*room*		X	X	Indicates the room identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
SEGMENT=*pagecount*	X		X	Indicates that part of the output for a job is spooled to print while the job is still running, or indicates that different segments of a job are printed simultaneously on different printers at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
SYSOUT=(*class,,formname*)	X		X	Indicates the output class and the form name that is assigned to the output data set at the receiver destination. You can also specify the output class and form name in the CLASS and FORMS parameters of the OUTPUT statement. However, if you specify the SYSOUT, it overrides the CLASS and FORMS parameters in the OUTPUT statement. AFP Download Plus forwards this parameter for use on the receiver system.
TITLE=*title*		X	X	Indicates the description to be put on the output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
TRC={YES|NO}		X		Indicates that the data set contains table reference characters. If you also specify table reference characters with the DCB=OPTCD=J parameter in the DD statement, it overrides the TRC parameter.
UCS=*fontname*	X	X		Indicates the name of the coded font that AFP Download Plus integrates into the MO:DCA-P data set. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used.
USERLIB=('*libname1*','*libname2*...,'*libname8*')		X		Indicates the name of the user libraries that contain AFP resources for processing the data set.
USERPATH=('*libpath1*','*libpath2*...,'*libpath8*')		X		Indicates the name of the UNIX file resource path libraries that contain TrueType and OpenType fonts.

Syntax for JCL parameters

The syntax for the JCL parameters in Table 22 on page 125 is described in detail in *PSF for z/OS: User's Guide*.

For more details about how to code the parameter values, see the *JCL Reference* for your operating system.

JCL parameters sent as -o attributes

Just before AFP Download Plus transmits the MO:DCA-P file to the receiver system, it forwards JCL parameters, which are required to submit the file for printing on the receiver system. The JCL parameters that are forwarded are called -o attributes and contain the original z/OS JCL parameters for the print file, the PSF defaults, and the JES defaults. AFP Download Plus uses the -o attributes to schedule the MO:DCA-P file for printing on the receiver system.

Table 23 on page 132 lists the -o attributes that might be sent to the receiver system. All -o attributes that are required or are specified on the JCL OUTPUT statement are sent to the receiver system for each data set type (data set header, job header, job trailer, message, and user), unless otherwise noted. If the attribute is derived from more than one statement, the order of the statements indicates their priority. For example, if the BURST parameter is specified in both the DD statement and the OUTPUT statement, AFP Download Plus forwards the attribute from the DD statement because it has a priority of 1.

Notes:

1. AFP Download Plus replaces nulls (X'00') and blanks (X'40') in the values of text parameters with X'1C' to make it possible for AIX and Linux to parse the text string.
2. The OUTPUT statement that is listed in the Location column always refers to the user's JCL OUTPUT statement, unless otherwise noted.

Table 24 on page 160 describes the syntax for the -o attributes.

Table 23: -o attributes AFP Download Plus sends to the receiver system.

-o attribute	Description	Required	Derived from	
			Location	**Parameter**
-oaddress1 **-oaddress2** **-oaddress3** **-oaddress4**	Address		OUTPUT	ADDRESS
-obu	Building		OUTPUT	BUILDING
-oburst	Burst		1. DD 2. OUTPUT	BURST
-occ={yes | no} [1]	Carriage control	✓	Sender	
-occtype=m [2]	Carriage control type	✓	Sender	
-ochars[3]	Character sets		1. OUTPUT (for data set type) 2. PRINTDEV (user data set only)	CHARS
-ocolormap	Color mapping table		1. OUTPUT (for data set type) 2. PRINTDEV (user data set only)	COLORMAP
-ocomsetup	Microfilm setup		1. OUTPUT (for data set type) 2. PRINTDEV (user data set only)	COMSETUP
-ocop [2]	Transmissions		1. DD 2. OUTPUT (for data set type)	COPIES=*nnn*

Table 23: -o attributes AFP Download Plus sends to the receiver system. (continued)				
-o attribute	**Description**	**Required**	**Derived from**	
			Location	**Parameter**
-odatac [4]	Data check handling	✓	1. OUTPUT 2. PRINTDEV	DATACK
-odatat=af | line	Data type	✓	Sender	
-ode	Department		OUTPUT	DEPT
-odu [2]	Duplexing		OUTPUT	DUPLEX
-ofiletype={dshdr | jobhdr | jobtrl | message} [5]	File type	✓	Sender	
-of	Form definition	✓	1. OUTPUT (for data set type) 2. PRINTDEV	FORMDEF
-ofileformat={record | stream}	File format	✓	Sender	
-oflash	Forms flash		1. DD 2. OUTPUT 3. JES	1. FLASH 2. FLASH 3. DEVFLASH
-oformlength [2]	Form length		OUTPUT	FORMLEN
-oin [6]	Input tray		OUTPUT	INTRAY
-oipdest	Destination IP address		1. DD 2. OUTPUT	DEST=IP
-ojobn	Job name	✓	JOB	
-ona	Name		OUTPUT	NAME
-ono	Node ID	✓	z/OS system	
-ooffxb [6]	X offset, back overlay		OUTPUT	OFFSETXB
-ooffxf [6]	X offset, front overlay		OUTPUT	OFFSETXF
-ooffyb [6]	Y offset, back overlay		OUTPUT	OFFSETYB
-ooffyf [6]	Y offset, front overlay		OUTPUT	OFFSETYF
-ooutbin [6]	Output bin		OUTPUT	OUTBIN
-oovlyb [6]	Backside overlay		OUTPUT	OVERLAYB
-oovlyf [6]	Front side overlay		OUTPUT	OVERLAYF
-opa class	Output class	✓	1. DD 2. OUTPUT 3. JES	1. SYSOUT 2. CLASS 3. CLASS=*default*
-opa destination	Output destination	✓	1. DD 2. OUTPUT	DEST

Table 23: -o attributes AFP Download Plus sends to the receiver system. (continued)				
-o attribute	**Description**	**Required**	**Derived from**	
			Location	**Parameter**
-opa forms	Output forms name		1. DD 2. OUTPUT 3. JES	1. SYSOUT 2. FORMS 3. FORMS
-opa jobid	Output job ID	✓	JES	
-opa segmentid	Output segment ID		DD	SEGMENT
-opagecount	Page count			
-opagedef [7]	Page definition		1. OUTPUT (Message) 2. PRINTDEV	PAGEDEF
-oprtqueue	Print queue		OUTPUT	PRTQUEUE
-opr	Programmer name		JOB	
-ore	Resolution		OUTPUT (for the data set type)	RESFMT
-oro	Room		1. OUTPUT 2. JOBPARM	ROOM
-osheetcount	Sheet count			
-otrc [7]	Table reference characters		1. DD 2. OUTPUT	TRC
-oti	Title		OUTPUT	TITLE
-ous	User ID	✓	z/OS system	

Table footnotes:

1. No is only used when AFP Download Plus sends the APS8239I message.
2. This attribute is not sent when AFP Download Plus sends the APS8239I message.
3. This attribute is only sent to the receiver system when generic only is specified on the send-messages-on-failure parameter in the AFPPARMS control statement or the Send messages on failure parameter in the Printer Inventory and AFP Download Plus sends the APS8239I message.
4. For separators and messages, this attribute is always set to `block`.
5. AFP Download Plus does not send this attribute for the user data set.
6. AFP Download Plus sends only this attribute for the user data set.
7. AFP Download Plus sends only this attribute for message APS8239I.

Specifying the AFPPARMS control statement on the OUTPUT statement

Additional parameters that AFP Download Plus uses to transform and distribute JES spool data sets are contained in an AFPPARMS control statement. You specify this control statement with the AFPPARMS parameter on the OUTPUT JCL statement at job submission. The parameters in the AFPPARMS control

statement are associated with a current JES spool data set and used by AFP Download Plus to process the spool data set. For example:

```
//OUT1 OUTPUT PAGEDEF=MYDEF,
//            AFPPARMS='MY.PDS.PARMS(MEMBER)',
//            USERLIB='MY.RESOURCE.DATASET'
```

The AFPPARMS parameter has this syntax:

AFPPARMS='*dsname*[(*membername*)]'

The values are:

dsname
Specifies the 1 - 44 character data set name that contains AFP Download Plus parameters. Data set names can contain alphanumeric (0-9, A-Z) and national (@,#,$) characters.

membername
Specifies an optional 1 - 8 character member name within the data set that contains AFP Download Plus parameters. The data set and member name can be 4 - 54 characters. Member names can contain alphanumeric (0-9, A-Z) and national (@,#,$) characters.

AFPPARMS data set allocation

Table 9 on page 42 shows how to allocate the AFPPARMS data set that is specified with the AFPPARMS parameter on the OUTPUT JCL statement.

AFPPARMS parameter selection hierarchy

This hierarchy shows the order that AFP Download Plus uses to select AFPPARMS parameters:

1. AFPPARMS control statement on the OUTPUT JCL statement
2. Printer Inventory
3. FSA member name in the AFPPARMS control statement that is specified in the AFP Download Plus startup procedure
4. Defaults member name, either DEFAULTS or AFPDPDEF, in the AFPPARMS control statement that is specified in the AFP Download Plus startup procedure

AFPPARMS control statement syntax and parameters

See “Syntax of the AFPPARMS control statement” on page 43 for the syntax guidelines to use with the AFPPARMS control statement.

See “Parameters for the AFPPARMS control statement” on page 43 for the parameters that are valid in the AFPPARMS control statement that is specified by the AFPPARMS parameter on the OUTPUT JCL statement.

Directing output to a receiver system

To transmit your output to a receiver system, you must direct the output to the AFP Download Plus sender. To do this, you specify the JES work-selection criteria that is defined by your installation for the AFP Download Plus sender on either the DD or OUTPUT JCL statements for the data set. For example, you might need to specify a particular output class to direct output to the AFP Download Plus sender in your installation. Consult your system programmer for the appropriate values to specify.

To direct an output data set to a particular receiver system and to a particular destination on that system, you specify the appropriate routing criteria on either the DD or OUTPUT JCL statements for the data set. The routing criteria can include one or more of these JCL parameters:

- Output class
- Destination name

- Form name

Each combination of class, destination, and form name you specify can direct the data set to a different receiver system and to a different destination on that system.

The examples here show how to specify the class, destination, and form name in JCL statements to direct an output data set to a particular receiver system, such as PSF for z/OS.

Consult with your z/OS system programmer to determine the appropriate values to specify for the class, destination, and form name in your installation. You might not need to specify all three parameters. For example, by specifying only a particular class, you can direct the output data set to the AFP Download Plus sender and also to a particular system and destination.

Examples:

1. This example shows how to direct an output data set to a receiver system and destination by specifying output class R, which is a JES work-selection criterion for the AFP Download Plus sender.

```
//AFPUSERA JOB …
//STEP1    EXEC PGM=USERA
//DD1      DD SYSOUT=R
```

2. This example shows how to direct an output data set to a receiver system and destination by specifying output class R, destination ZOSPHX, and form name PSF6. This example shows how to specify these values on a DD statement.

```
//AFPUSERA JOB …
//STEP1    EXEC PGM=USERA
//DD1      DD SYSOUT=(R,,PSF6),DEST=ZOSPHX
```

   Note: If the form name is more than 4 characters, you must specify the name on an OUTPUT statement. Example "3" on page 136 shows an OUTPUT statement.

3. This example shows how to direct an output data set to the same system and destination as in the second example. However, this example shows how to specify these values on an OUTPUT statement. Note that the DD statement must refer to the OUTPUT statement. Also, the DD statement must include a null class value when you specify the class on the OUTPUT statement.

```
//AFPUSERA JOB …
//STEP1    EXEC PGM=USERA
//OUTDS    OUTPUT CLASS=R,FORMS=PSF6,DEST=ZOSPHX
//DD1      DD SYSOUT=(,),OUTPUT=(*.OUTDS)
```

Directing output to multiple receiver systems

To transmit an output data set to more than one system or to more than one destination on the same system, you can create multiple output data sets. You do this by using multiple OUTPUT JCL statements. On each OUTPUT statement, specify the class, form, or destination name that corresponds to the receiver system and the destination to which you want that data set transmitted.

This example shows how to specify multiple OUTPUT statements to transmit an output data set to different systems or to different destinations on one system at the same time.

Note: Contact your system programmer to determine the appropriate values to specify for the class, destination, and form name in your installation.

This example shows how to request that AFP Download Plus transmit an output data set three times:

1. The first transmission is to the AIX system identified with destination AIXDEN.
2. The second transmission is to the Windows system identified with destination WINSEAT1.
3. The third transmission is to the z/OS system identified with destination ZOSPHX.

The OUTPUT parameter on the DD statement references three OUTPUT JCL statements; therefore, AFP Download Plus transmits the data set three times. Because class R is the class for all three transmissions,

this example specifies the class in the DD statement. However, because the destination name is different for each transmission, this example specifies the destination on the three OUTPUT statements.

```
//AFPUSERA JOB …
//STEP1    EXEC PGM=USERA
//OUTDS1   OUTPUT DEST=AIXDEN
//OUTDS2   OUTPUT DEST=WINSEAT1
//OUTDS3   OUTPUT DEST=ZOSPHX
//DD1      DD SYSOUT=(R),OUTPUT=(*.OUTDS1,*.OUTDS2,*.OUTDS3)
```

Monitoring error messages

During processing, AFP Download Plus collects and writes messages to a zFS file when errors occur, and then notifies the job submitter and the operator about the location of the messages. The messages are written to a file in the `/var/psf/userinfo/`*`userid`* directory, where *userid* is the job submitter's system user ID. The job submitter owns the *userid* directory and can delete any of the message files in the directory.

The message file name has an extension of MSG. See Figure 18 on page 169 for the format of the rest of the file name.

Because AFP Download Plus does not delete the message files that it creates, periodically delete the message files to conserve disk space. AFP Download Plus provides a sample script, `apshhcln.sh`, that you can use to delete the message files. The sample script is in the `/usr/lpp/psf/samples` directory and the prolog indicates how to use the script.

You can decide to redirect the messages to a new spool data set on AFP Download Plus or to an FSA for printing. Keep in mind though, redirecting messages can make it more difficult to locate and associate the messages with the print application.

You can also decide to notify users other than the job submitter that errors occurred and where the error messages are located.

By default, when errors cause transformation to stop, AFP Download Plus transforms the message data set to a MO:DCA-P file. Then, rather than sending the data set with errors, AFP Download Plus sends the message data set MO:DCA-P file with associated resources to the receiver system. If the messages are only informational, the data set is sent to the receiver but the message data set is not.

Redirecting messages

Instead of AFP Download Plus writing the transform error messages to a zFS file, you can redirect the processing of error messages to a new spool data set on AFP Download Plus or to an FSA for printing. Do one of these:

- To redirect to a new spool data set, specify `CLASS=`*`n`* and `PIMSG=NO` on the OUTPUT JCL statement that is specified on the MESSAGE parameter in the PRINTDEV statement. For example,

  ```
  //MSGDSR OUTPUT CLASS=n,PIMSG=NO
  .
  .
  .
  //PRT001  PRINTDEV MESSAGE=*.MSGDSR
  ```

- To redirect to an FSA for printing, specify `DEST=`*`fsaname`* (where *fsaname* is the name of the FSA) on the OUTPUT JCL statement that is specified on the MESSAGE parameter in the PRINTDEV statement. For example,

  ```
  //MSGDSR OUTPUT DEST=fsaname
  .
  .
  .
  //PRT001  PRINTDEV MESSAGE=*.MSGDSR
  ```

Specifying message notification

You can specify that AFP Download Plus notify up to four users when it finishes processing a data set. A notification message advises a user that the job is completed, successfully or unsuccessfully, indicates which output is finished, incomplete, or unprintable, and indicates the location of the message file. Whenever AFP Download Plus creates a message file, even if you do not request notification, AFP Download Plus sends a notification message. If users are not specified or if those users specified cannot be contacted, AFP Download Plus sends a notification to the job submitter. AFP Download Plus always puts a copy of the notification message in the system log.

To use message notification in AFP Download Plus, specify the NOTIFY parameter in an OUTPUT statement. For example:

```
//OUTPUT1 OUTPUT NOTIFY=(DEST01.USERID1)
//DD1 DD SYSOUT=N,OUTPUT=(*.OUTPUT1)
```

The NOTIFY parameter has this syntax:

NOTIFY=(*node.userid1*[, *node.userid2*][,*node.userid3*][,*node.userid4*])

The values are:

node
Specifies a 1 - 8 alphanumeric character node for a system where the notification is to be sent. The node is optional if it is the same as the system that processes the job.

userid
Specifies a 1 - 8 alphanumeric character user ID of the person who is to receive the notification.

For more information about the NOTIFY parameter and examples of using the parameter, see *PSF for z/OS: User's Guide*.

Keep in mind: Notification messages are placed in the TSO BROADCAST data set structure. If AFP Download Plus sends numerous notification messages, the data set might fill up. If you see a console message, such as IKJ579I CANNOT EXECUTE SEND, you must increase the size of the BROADCAST data set. See *z/OS TSO/E Customization*.

Sending messages to the receiver system

When errors cause transformation to stop, AFP Download Plus, by default, transforms the message data set into a MO:DCA-P file and sends it to the receiver system. To specify which resources to use to transform the message data set, you must specify these:

- A corresponding message data set OUTPUT statement
- A MESSAGE PRINTDEV parameter for each FSA defined in your startup procedure

For example:

```
//MSGDS    OUTPUT PAGEDEF=A08682,FORMDEF=A10110,CHARS=60D8
  .
  .
  .
//PRT001 PRINTDEV MESSAGE=*.MSGDS
```

If a MESSAGE PRINTDEV parameter is not specified or a required resource is not specified on the message data set OUTPUT statement, a default resource that is specified in the PRINTDEV statement is used.

Message files that are sent to the receiver system are designated with -ofiletype=message. The AFP Download Plus receiver on z/OS submits the message file to the spool just as it does for other files it receives.

By default, when a message file or message APS8239I is received, some receivers either discard the print job or hold the print job without printing it. To change the default so that the receiver prints the job, see the receiver documentation.

If you do not want the message data set transformed and sent to the receiver system, you can specify generic only on the send-messages-on-failure parameter in the AFPPARMS control statement or the Send messages on failure parameter in the Printer Inventory. Specifying generic only causes AFP Download Plus to send message APS8239I to the receiver system as line data without sending inline resources.

Notes:

1. You must not specify generic only when you are using the dataset-grouping or Data set grouping parameter to send multiple data set jobs to the z/OS receiver system because the receiver system cannot receive jobs with both line data and MO:DCA-P.
2. When you want to send a MO:DCA interchange set compliant message file to the receiver, see "Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set" on page 31 for the changes you need to make.

Recovering from errors

During data set transmission to the receiver, AFP Download Plus creates recovery points that are based on the setting of the AFPPARMS parameter (see transmit-recovery-pages) or the parameter in the Printer Inventory (see Recovery pages). If a transmission error occurs, AFP Download Plus retransmits the data set from the last successful recovery point. AFP Download Plus also retransmits a document from the last successful recovery point if it detects that all the data is not received. AFP Download Plus verifies that all data is successfully received by the system before it deletes a data set from the z/OS system.

Chapter 7. Diagnosing errors with the AFP Download Plus sender

This information contains information to help the diagnostician identify a problem with the sender component of AFP Download Plus and report it to IBM. The information describes:

- How to use the PSF for z/OS trace facility with the sender
- How to use the PSF for z/OS dump facility with the sender

Before you use the PSF trace and dump facilities, determine whether the problem you encountered is one that other users reported and that is fixed. See the *PSF for z/OS: Diagnosis* for information about how to construct a keyword string to search in IBMLink. If you determine that your problem is not already reported, see the *PSF for z/OS: Diagnosis* for information about how to report a problem.

The messages and abend codes that are issued by the sender are described in *PSF for z/OS: Messages and Codes*. The modules that produce each AFP Download Plus message are listed in *PSF for z/OS: Diagnosis*.

Using the PSF trace facility

You can use the same trace facilities that you use with PSF for z/OS. These facilities are described in detail in *PSF for z/OS: Diagnosis*. This information provides an overview of the trace facilities available for the sender.

You specify trace parameters in one of these places:

- The Infoprint Server Printer Inventory:
  - Printer Inventory Definition Utility (PIDU)
  - ISPF panels
- The AFP Download Plus startup procedure:
  - TRACE parameter on the PRINTDEV statement
  - PARM parameters on the EXEC statement
  - DD statements for trace data sets
- The MVS MODIFY command, which serves as a PSF operator interface

If you suspect the problem is in the sender component of AFP Download Plus, request an FSA full external trace, tracing all components. An FSA full external trace includes an internal wrap trace and a recording of all events that occur on the FSI. The sender does not have a separate component identifier.

The parameters that activate tracing in the Printer Inventory or the AFP Download Plus startup procedure take effect when AFP Download Plus is initialized. By using the PSF operator interface, you can control traces dynamically while AFP Download Plus is running.

When you use the Printer Inventory to specify trace parameters, the trace data set must exist and be cataloged before AFP Download Plus is started. For an FSA trace, the trace data set must exist and be cataloged before the AFP Download Plus FSA is started. For an NST trace and a Printer Inventory notify subtask (PINST) trace, the trace data set must exist and be cataloged before the first AFP Download Plus FSA in the FSS is started.

Examples of traces

This information shows examples of traces you can do.

Starting a trace while the sender is running

To obtain a full external trace and direct the trace data to a Generalized Trace Facility (GTF) data set, follow this procedure:

1. Start GTF, requesting USR records of type FD0 and FD4.
2. Do one of these:
   - In the Printer Inventory, specify `Trace mode=Internal`. See Trace mode parameter in Table 14 on page 74 for more information.
   - In the AFP Download Plus startup procedure, specify `PARM=(,INTR)` on the EXEC statement and TRACE=YES on the PRINTDEV statement for the FSA you want to trace so that you obtain an internal trace that starts when the sender is initialized. These are the default values, so you can omit the PARM parameter and the TRACE parameter. For information about tracing parameters in the startup procedure, see " JCL statements for the startup procedure" on page 38.
3. Start the sender FSA.
4. Enter this PSF operator interface command to start a full external trace:

   ```
   MODIFY fss_name,TRACEON,fsa_name,FORMAT=GTF,MODE=FULL
   ```

   where *fss_name* is the name of the sender, and *fsa_name* is the name of the FSA you want to trace.
5. Run the failing job.
6. Enter this AFP Download Plus operator interface command to end the trace:

   ```
   MODIFY fss_name,TRACEOFF,fsa_name
   ```

7. Stop GTF.

Starting a trace at initialization of the sender

To obtain a full external trace that begins during initialization of the sender and then direct the trace output to a PSF trace data set or zFS file, follow this procedure:

1. Do one of these:
   - In the Printer Inventory:
     a. Specify `Trace mode=Full` and a PSF data set name or zFS file in the FSA trace dsname parameter. See Table 14 on page 74 for information about the FSA tracing parameters.
     b. Allocate the PSF trace data set or zFS file. See "Allocating a PSF trace data set or zFS file" on page 143 for more information.
   - In the AFP Download Plus startup procedure:
     a. Specify `PARM=(,FULL)` on the EXEC statement and TRACE=YES on the PRINTDEV statement for the FSA you want to trace. TRACE=YES is the default, so you can omit the TRACE parameter. For information about tracing parameters in the startup procedure, see " JCL statements for the startup procedure" on page 38.
     b. Specify a DD statement to allocate a PSF trace data set or zFS file. The name of the DD statement must match the name of the FSA to be traced. See "Allocating a PSF trace data set or zFS file" on page 143 for more information.
2. For some problems, IBM support might ask you to also specify an FSS trace data set or zFS file (also called a notify subtask (NST) trace data set or zFS file). Do one of these:
   - In the Printer Inventory:
     a. Specify an FSS data set name or zFS file in the NST trace dsname parameter for the FSS. See Table 13 on page 72 for information about FSS tracing parameters.
     b. Allocate the FSS trace data set or zFS file. See "Allocating an FSS trace data set or zFS file" on page 143 for more information.

- In the AFP Download Plus startup procedure, specify a DD statement in the PARM parameter to allocate an FSS trace data set or zFS file. For example:

  ```
  //stepname EXEC PGM=APSHPOSE,PARM=(NSTddname,FULL)
  ```

  where *NSTddname* is the name of the DD statement for the FSS trace in the startup procedure. See "Allocating an FSS trace data set or zFS file" on page 143 for more information.

3. Run the failing job.
4. Enter this PSF operator interface command to end the trace:

   ```
   MODIFY fss_name,TRACEOFF,fsa_name
   ```

   where *fss_name* is the name of the sender, and *fsa_name* is the name of the FSA.

Allocating a PSF trace data set or zFS file

You can direct trace output to a GTF data set, a PSF trace data set, or a PSF trace zOS File System (zFS) file. However, if you start tracing during initialization of the sender, you must direct trace output to either a PSF trace data set or a PSF trace zFS file. To direct the trace to a PSF trace data set or a PSF trace zFS file, do one of these:

- Specify the FSA trace dsname parameter in the Printer Inventory.
- Specify a DD statement for the PSF trace in the AFP Download Plus startup procedure. The name of this DD statement must be the name of the FSA that you want to trace, which means that the name must match the name on the PRINTDEV statement. Include a DD statement for each FSA that you want to trace.

When you allocate a PSF trace data set, specify these DCB parameters:

- Record length of 80
- Block size that is a multiple of 80; for better performance, 27920 is recommended
- Record format of either F, U, or FB
- Sequential organization (PS)

The size of the trace data set depends on the size of the data sets that are transmitted because the transmitted data is part of the trace. You must allocate larger trace data sets for larger data sets.

This example allocates a trace data set with a record format of FB, a record length of 80, a block size of 27920, a primary space allocation of 5 cylinders, and a secondary space allocation of 10 cylinders:

```
//ddname  DD  DSNAME=DOWNLOAD.TRACE,UNIT=3390,VOL=SER=SYS000,
//            DISP=(NEW,KEEP,CATLG),SPACE=(CYL,(5,10),RLSE)
//            DCB=BLKSIZE=27920
```

where *ddname* is the name of the FSA you want to trace.

When you allocate a PSF trace zFS file, specify the following parameters:

- PATHOPTS=(OCREAT,OWRONLY,OTRUNC)
- PATHMODE=(SIRWXU,SIRWXG,SIRWXO)

In this example of allocating a zFS file, *ddname* is the name of the FSA you want to trace:

```
//ddname  DD  PATH='var/psf/trace.afpdp',
//            PATHOPTS=(OCREAT,OWRONLY,OTRUNC),
//            PATHMODE=(SIRWXU,SIRWXG,SIRWXO)
```

Allocating an FSS trace data set or zFS file

AFP Download Plus makes more trace entries during the initialization of the sender than PSF does, and AFP Download Plus directs these trace entries to an FSS trace data set or zFS file (also called an NST

trace data set or zFS file). This means that to trace some problems, you might need to allocate an FSS trace data set or zFS file, and a PSF trace data set or zFS file.

To direct the trace to an FSS trace data set or zFS file, do one of these:

- Specify the NST trace dsname parameter in the Printer Inventory.
- Specify the name of the DD statement for the FSS trace data set or zFS file in the EXEC statement of the AFP Download Plus startup procedure. For example:

```
//stepname EXEC PGM=APSHPOSE,PARM=(fss_ddname,FULL)
```

  where *fss_ddname* is the name of the DD statement that allocates the FSS trace data set or zFS file.

When you allocate an FSS trace data set, specify these DCB parameters:

- Record length of 80
- Block size that is a multiple of 80; for better performance, 27920 is recommended
- Record format of either F, U, or FB
- Sequential organization (PS)

When you allocate an FSS trace zFS file, specify these parameters:

- PATHOPTS=(OCREAT,OWRONLY,OTRUNC)
- PATHMODE=(SIRWXU,SIRWXG,SIRWXO)

Formatting trace data in a PSF trace data set or zFS file

The trace output contains unformatted data. You can format the PSF trace data set or zFS file by using the PSF trace post formatter program, APSTRFMT, which is included in SYS1.SAMPLIB. You must stop the sender before formatting the trace data. Figure 17 on page 144 shows a sample JCL for starting the PSF trace post formatter.

```
//APSWTRCF JOB 'ACCOUNT #','NAME',MSGLEVEL=(1,1)
//*****************************************************************
//* PSF TRACE FORMATTER INVOCATION JCL
//*****************************************************************
//STEP01   EXEC PGM=APSTRFMT,REGION=100K
//*                           /* REGION = (3 * BLKSIZE) + 20K
//*                           /* BLKSIZE = TRACEIN BLOCKSIZE
//SYSUDUMP DD SYSOUT=*
//*TRACEIN  DD PATH='tracein' /* SET TO PSF GENERATED z/FS FILE NAME
//TRACEIN  DD UNIT=unit,      /* UNIT CAN BE TAPE OR DASD
//            DSN=tracein,    /* SET TO PSF TRACE DATA SET NAME
//            DISP=SHR,
//            VOL=SER=volser  /* SERIAL NUMBER OF VOLUME
//TRACEOUT DD UNIT=unit,      /* UNIT MIGHT BE TAPE OR DASD
//            DSN=traceout,   /* SET TO DATA SET NAME WHERE
//*                              FORMATTED RECORDS ARE PLACED
//            DISP=disp,      /* DISPOSITION OF TRACE OUT
//            VOL=SER=volser  /* SERIAL NUMBER OF VOLUME
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
       TYPE=SHORT
/*
//
```

Figure 17: Sample JCL for starting the PSF trace formatter

The TRACEIN DD statement identifies the trace data set that contains the trace data; therefore, specify the attributes of that data set in the DD statement.

The TRACEOUT DD statement identifies the data set into which the formatted trace output is stored. The parameters that are specified on the DD statement are device-dependent. Specify these DCB parameters:

- Record length of 117, which is the default.
- Block size that is a multiple of 117. If it is not specified, or is not a multiple of 117, it defaults to 1287.
- Record format of FBA, U, or FB. The default is FBA.
- Sequential organization (PS).

You can specify three TYPE options on the SYSIN DD statement:

SHORT
Excludes some PSF data, specifically PPCC trace entries. For some entries, only the first 32 bytes of data are traced. In a truncated entry, a '<' is placed in the space between the address and the start of the data in the trace output data set. This is the default.

TITLES
Only headers are printed for the trace entry that is formatted.

LONG
All data is included in the trace data set.

Formatting and printing GTF trace data

You can print GTF trace data sets by using the Interactive Problem Control System (IPCS). You can also use IPCS with the COMMANDS parameter GTF USR(FD1) to view the data at a display terminal. For more information about using IPCS, see *z/OS MVS IPCS User's Guide*.

Using the PSF dump facility

You can use the same dump facilities that you use with PSF for z/OS. These facilities are described in detail in *PSF for z/OS: Diagnosis*.

As with PSF for z/OS, you can request a conditional dump of PSF control blocks by specifying a dump parameter on one of these:

- Infoprint Server Printer Inventory. See Dump parameters in Table 14 on page 74.
- PRINTDEV statement in the AFP Download Plus startup procedure. See the DUMP parameter in Table 12 on page 61.

You can request that a conditional dump occur when:

- A PSF reason code or restartable abend reason code occurs.
- A specific AFP Download Plus message is issued.

A conditional dump causes an AFP Download Plus abend to occur. The dump goes directly to SYS1.DUMPxx; you can print or view it by using IPCS.

In these examples, a dump occurs the second time message APS8000I is issued:

Printer Inventory

```
Dump: Message ID=APS8000I
Dump: Count=2
```

PRINTDEV statement

```
DUMP=(,APS8000I,2)
```

Part 3. Using AFP Download Plus to receive and process data

This information contains tasks for working with the receiver component of AFP Download Plus on z/OS:

The AFP Download Plus receiver runs on z/OS under z/OS UNIX System Services. All of the commands in this environment are case-sensitive.

Chapter 8. Configuring the AFP Download Plus receiver on z/OS

This information describes the tasks that you must do to configure the AFP Download Plus receiver after you install AFP Download Plus on a z/OS system. See Chapter 3, “Installing AFP Download Plus,” on page 23 for information about installing the feature.

The tasks for configuring the AFP Download Plus receiver on the z/OS system are:

1. Create working directories.
2. Select an exit program.
3. Set up the receiver to handle APS8239I messages, if necessary.

Creating working directories

The AFP Download Plus receiver uses a working directory to store a temporary copy of the job data it receives from the sender. You must create the working directory and have write access to it before you start the receiver. The size of the z/OS File System (zFS) on the receiver depends on these:

- When AFP Download Plus is using the non-direct download method (storing MO:DCA-P data in a temporary file on the sender), the size of the file system on the receiver must be comparable to the file system on the sender.
- When AFP Download Plus is using the direct download method (sending MO:DCA-P data directly to the receiver system), the size of the file system on the receiver must be larger than the file system on the sender. This is because when the receiver receives the data file and the resource file, it creates one file by copying the data file to the end of the resource file. Therefore, the zFS must be large enough to contain the resource file, the data file, and a copy of the data file.

  Keep in mind: The receiver must support the direct download function to receive files when AFP Download Plus is using the direct download method.
- When AFP Download Plus is using compression, the size of the file system on the receiver must be larger than the file system on the sender to contain both compressed and uncompressed data.

See Chapter 2, “Planning the size of the working directory,” on page 17 for information about determining the size of the zFS on the sender.

When you create the working directory, use this directory scheme and characteristics so that all users in the APSADMIN group have access to the receiver:

- Directory: `/var/psf/download/`*`portnumber`*
- Group owner: APSADMIN
- Permissions: 770

Selecting an exit program

The receiver calls an exit program to process jobs after it receives the transformed file from the sender. The exit program can be `apshhsub` or `apshhmds`, which are provided with AFP Download Plus, or it can be an exit program that you create.

You use the `apshhsub` exit program to submit individual jobs to the spool on the receiving system with the same characteristics as from the spool on the sending system. With `apshhsub`, you can automatically reassign job attributes that are based on criteria you specify in an attribute mapping file.

The apshhmds exit program processes multiple data sets into a single data set and then uses the apshhsub exit program to put the individual job on the JES spool.

Notes:

1. In this release of AFP Download Plus, the apshhmds exit program concatenates multiple data sets that all specify the same supported MO:DCA interchange set (IS/3, IS/3 with function sets, AFP/A, or AFP/A, IS/3), which results in a file that is compliant with that interchange set. In AFP Download Plus releases that are earlier than PSF 4.5, the apshhmds exit program removes the BPF and EPF structured fields when it is concatenating multiple data set jobs that are MO:DCA IS/3 compliant, which creates a new file that is not MO:DCA IS/3 compliant.
2. AFP Download Plus supports MO:DCA IS/3 with function sets. Before you transmit files with this designation on the BPF structured field of the print file, be sure that the receiver supports the same level of MO:DCA IS/3 with function sets.

For information about using apshhsub, apshhmds, or creating your own exit program, see Chapter 9, “Operating the AFP Download Plus receiver on z/OS,” on page 151.

Setting up the receiver to handle APS8239I messages

When the AFPPARMS send-messages-on-failure=generic-only parameter or the Printer Inventory Send messages on failure=Generic only parameter is specified, AFP Download Plus sends an APS8239I message file to the receiver for errors that caused processing to stop. Any resources that are specified on the message data set OUTPUT statement in the AFP Download Plus startup procedure are sent to the receiver in -o attributes (see Table 23 on page 132). However, the resources themselves are not sent inline.

To avoid receiving "resource not found" error messages when you print the message file, you must:

- Manually make the resources available to the receiving system, if they are not already available.
- Place the resources in the appropriate libraries.

Chapter 9. Operating the AFP Download Plus receiver on z/OS

The AFP Download Plus receiver uses a working directory to store a temporary copy of the job data that it receives from the sender. When all the data is received, the receiver calls an exit program and passes the file name to the exit program for processing of the data.

Before the sender can transmit transformed data to the receiver system, you must start the receiver. When you start the receiver, you tell it the name of the working directory that you want it to use. You must create the directory before you start the receiver, and you must have write access to the directory when you start the receiver (see "Creating working directories" on page 149).

This information describes how to operate the AFP Download Plus receiver on z/OS, including how to:

- Start the receiver manually, including using the `apshhsub` exit program, using the `apshhmds` exit program, creating and using your own exit program, and using the attributes from the sender.
- Start the receiver automatically.
- Stop and query the status of the receiver.
- Locate transmitted files on receiver file systems.

Keep in mind: The sender and the receiver must be operating in the same system locale. If they are not, unpredictable results can occur.

Starting the receiver manually

To start the AFP Download Plus receiver manually, use this command from an `rlogin` shell or an OMVS session:

apshhrcd -p *PortNum* -d *Directory* -x *ExitProg* [-X *ExitParms*] [-n 1] [-k] [-q *Queue*] [-t] [-m 1] [-w]

This command causes the receiver to monitor the specified port number, receive a transformed file and write it to the specified directory, and call the specified exit program as jobs are received.

The command options are:

-p *PortNum*

Specifies the port number that the receiver monitors. This is a required option and must match the port number that is specified in the sender configuration.

-d *Directory*

Specifies the name of the working directory where the receiver saves the file that it receives. This is a required option.

Note: The user who starts `apshhrcd` must have permission to write to the specified directory (the user must be in the APSADMIN group and the directory must be writable by the APSADMIN group).

-x *ExitProg*

Specifies the exit program that the receiver calls to process jobs after it receives the file. This is a required option. The exit programs that are provided with AFP Download Plus are `apshhsub`, which spools the job (see "Using the apshhsub exit program" on page 153), and `apshhmds`, which groups multiple data sets into a single data set (see "Using the apshhmds exit program" on page 157).

Note: The `apshhmds` exit program supports only MO:DCA-P data. If you are processing multiple data set jobs that contain line data, you must use `apshhsub`.

-X *ExitParms*
Specifies additional parameters for the exit program that the receiver calls. The exit program that is provided with AFP Download Plus provides a number of functions by using these additional parameters (see “Using the apshhsub exit program” on page 153). If you create your own exit program, you can specify additional parameters for other functions (see “Creating your own exit program” on page 159).

-n 1
Specifies that the receiver receives and processes one job at a time. If you do not specify this option, the receiver starts the exit program in the background, causing jobs to be received and processed concurrently. This option is required when the `apshhmds` exit program is specified.

-k
Specifies that the receiver saves a copy of the options string from the sender in a file. The file name has the same syntax as the syntax for Parameter 1 in “Creating your own exit program” on page 159. See Appendix A, “Syntax for file names,” on page 169.

-q *Queue*
Specifies the queue name to be passed to the exit program.

-t
Specifies that the trace mechanism for `apshhrcd` is turned on. See “Diagnosing problems with apshhrcd” on page 167.

-m 1
Specifies that the receiver receives and processes multiple data sets. This option is required when the `apshhmds` exit program is specified.

-w
Specifies that a return code is issued to indicate whether a single data set created from multiple data sets was successfully spooled. The return code values are:

0
The data set was successfully spooled.

Non-zero
The data set was not spooled.

This option is only used when the `apshhmds` exit program is specified.

The command in this example shows how to start the receiver so it uses the `apshhsub` exit program to process jobs:

```
apshhrcd -p 6001 -d /var/psf/download/6001 -x apshhsub -X afpstats=yes -n 1 &
```

The command options indicate:

-p
The receiver monitors port 6001.

-d
The receiver uses `/var/psf/download/6001` for its working directory.

-x
The receiver calls the `apshhsub` exit program.

-X
The exit program requests an AFPSTATS report.

-n 1
The receiver receives and processes one job at a time.

&
The shell environment runs the receiver as a background process so you can enter other commands on the command line while the receiver is running.

Note: Access permissions for files that are created by the receiver are controlled by the file mode creation mask. The `umask` command displays or sets the file mode creation mask. In most cases, set the file mode creation mask to a value of `0007`. With this value, files that are created by the receiver are accessible by

the owning user and group. See the chmod and umask commands in *z/OS UNIX System Services Command Reference* for information about file permissions and the file mode creation mask.

Using the apshhsub exit program

The receiver can call the apshhsub exit program to process jobs that it receives from the sender. You can specify apshhsub in these cases:

- You are processing individual jobs from the sender.
- You have a multiple data set job that contains line data.

  Note: If you have a multiple data set job that contains MO:DCA-P data only, specify the apshhmds exit program (see "Using the apshhmds exit program" on page 157).

You can specify special parameters for apshhsub to use, specify an attribute mapping file so apshhsub can reassign job attributes, and monitor messages from apshhsub.

Specifying special parameters

The apshhsub exit program uses special parameters to control its operation. You specify these special parameters with the -X option on the apshhrcd command. For example:

```
apshhrcd -p PortNum -d Directory -x apshhsub -X "afpstats=yes sdsname=nodeid"
```

These are the special parameters that you can specify for the apshhsub exit program:

afpstats={yes | no}
Indicates whether the exit program requests an AFPSTATS report for the file that is processed (see Appendix C, "AFPSTATS report," on page 173). The default is no.

debug={yes | no}
Indicates whether the exit program is run in debug mode. In debug mode, the exit program keeps the original data file for the job and a messages file in the working directory. The messages file has the same name syntax as the syntax for Parameter 1 in "Creating your own exit program" on page 159 (see Appendix A, "Syntax for file names," on page 169). The default is no.

intids={yes | no}
Indicates whether the exit program adds internal message identifiers to the beginning of messages that it writes to the log file. Internal message identifiers contain the source file name and line number for where the message was issued. The default is no.

jobhold={yes | no}
Indicates whether the exit program holds the job after it is spooled. The default is no.

jobinfo={sender | generate}
Indicates whether the job name and job identifier the exit program assigns to the job it submits are from the sender or generated from the system.

The values are:

sender
The exit program uses the original job name and job identifier that is passed by the sender. This is the default unless either the job name or job identifier is missing, in which case the exit program uses the job name and job identifier that the system generates.

generate
The exit program uses the job name and job identifier that the system generates.

log={error | all | none}
Indicates which messages the exit program saves to the log file when it processes jobs.

The values are:

error
The exit program saves messages only for jobs for which it finds problems. This is the default.

all
The exit program saves messages for every job it processes.

none
The exit program does not save any messages.

See "Viewing messages issued from apshhsub" on page 156 for an example of the message log file.

mapfile=*FileName*
Indicates the directory and file name of the attribute mapping file that the exit program uses to reassign job attributes when it submits a job. For example:

```
mapfile=/var/psf/xyz.map
```

If the file is in the receiver working directory, you only need to specify the file name. For example:

```
mapfile=xyz.map
```

See "Specifying mapping attributes" on page 154 for more information about the attribute mapping file.

sdsname={userid | nodeid | segmentid}
Indicates which 1 - 8 character identifier the exit program appends to the end of the spool data set name.

The values are:

userid
The exit program appends the user ID that is received from the sender. This is the default.

nodeid
The exit program appends the node ID that is received from the sender.

segmentid
The exit program appends the segment ID that is received from the sender.

For example, if sdsname=userid, the user ID from the sender is JOEDOE, and the data set name is MYJOB.SIMPLE.STC02523.D0000103, the exit program appends the user ID to the end of the spool data set name, like this:

```
MYJOB.SIMPLE.STC02523.D0000103.JOEDOE
```

Notes:

1. Each special parameter must be entered in lowercase with no blank spaces before or after the equal sign.
2. If you separate two or more special parameters with blank spaces, the special parameters must be enclosed in double quotation marks.

Specifying mapping attributes

The apshhsub exit program typically uses the original attributes from the sender when it submits the job. However, because work-selection criteria can vary between systems, apshhsub can use an attribute mapping file to modify job attributes for the receiving system.

With an attribute mapping file, you can specify that jobs that match certain criteria are assigned new job attributes. For example, you can specify that jobs from a certain user ID on one system are sent to a particular destination on the receiver system. Based on the criteria you specify in the attribute mapping file, the apshhsub exit program automatically reassigns the job attributes. The mapfile special parameter identifies the name of the attribute mapping file to apshhsub (see "Specifying special parameters" on page 153).

The attribute mapping file lists criteria values that map to one or more attributes. The criteria values start in the first column of the file. Each attribute is placed on its own line after the criteria values and is preceded by one or more blank spaces. If a job meets the criteria, apshhsub uses the attributes on the next lines.

In this example, `class=T` and `class=R` are criteria values, while `destination=PRT007` and `destination=PRT016` are attributes. Class T jobs are assigned the destination PRT007 and class R jobs are assigned the destination PRT016:

```
class=T
   destination=PRT007

class=R
   destination=PRT016
```

Notes:

1. Because `apshhsub` checks all criteria values in the file, more than one criteria value can apply to a specific job. Therefore, the associated mapping attributes can complement or override each other.
2. `apshhsub` does not validate the attribute values from the mapping file. If you provide a value that is not valid, `apshhsub` either assigns a default value or ignores the entry.

Formatting conventions

The criteria values and attributes are simple keyword=value pairs. The keywords are the -o attributes that are passed from the sender to the receiver (see "JCL parameters sent as -o attributes" on page 132). The exception is that instead of the -opa attributes, the keywords class, destination, forms, jobid, and segmentid are used. Spaces are not allowed between the keyword and its value.

Conventions specific for criteria are:

- Values can be any string of characters, but cannot contain spaces.
- Values can contain the wildcard characters ? and *, where ? matches any single character and * matches any number of characters.
- The keyword=value pair, *=*, can be used for criteria that applies to all jobs.
- Two or more keyword=value pairs on the same line that are separated by a blank space, indicate an AND condition. A job must meet all the criteria to map to the attribute.
- Two or more keyword=value pairs on separate, consecutive lines indicate an OR condition. A job can meet any of the criteria to map to the attribute.

Conventions specific for attributes are:

- Multiple attributes can be listed for a criteria value. The attributes are on separate, consecutive lines that follow the criteria value.
- Values can be any string of characters if they conform to the syntax rules for the attribute.
- Values for -o attributes can be substituted by delimiting the keyword with two leading and two trailing percent signs. For example, to add the sender's node at the end of the title for all jobs, use this:

  ```
  *=*
     -oti=My node is %%-ono%%
  ```

  If the job was sent from node ACME, the title on the receiving system becomes `My node is ACME`.

  Keep in mind: If `apshhsub` does not recognize the substitution keyword, it cannot substitute the value. For example, if you typed -omo instead of -ono, the title becomes `My node is %%-omo%%`.

The attribute mapping file can contain comments and blank lines; however, lines with criteria values or attributes cannot contain comments. A comment line starts with #.

Attribute mapping file example

This example shows different mapping criteria in an attribute mapping file:

```
#-----------------------------------------------------#
# Example of a simple attribute assignment:           #
# Jobs from userid SMITH are sent to the              #
# destination "PRT123".                               #
#-----------------------------------------------------#
-ous=SMITH
   destination=PRT123

#-----------------------------------------------------#
# Example of a *=* wildcard:                          #
# All jobs are redirected to class A.                 #
#-----------------------------------------------------#
*=*
   class=A

#-----------------------------------------------------#
# Example of an OR condition with wildcards:          #
# Jobs whose name starts with INV* or ACCT* are       #
# redirected to class J.                              #
#-----------------------------------------------------#
-ojobn=INV*
-ojobn=ACCT*
   class=J

#-----------------------------------------------------#
# Example of AND condition & multiple attributes:     #
# Jobs from node ACME with forms INSURE are           #
# redirected to class L and the FORMS value is        #
# changed to ACINSURE.                                #
#-----------------------------------------------------#
-ono=ACME forms=INSURE
   class=L
   forms=ACINSURE
```

```
#-----------------------------------------------------#
# Example of substitution:                            #
# Add the sender's node and user ID to the            #
# beginning of the title for all jobs. If the job     #
# is sent from node ACME by user SMITH, and the       #
# title is "TEST JOB", the title becomes              #
# "ACME.SMITH.TEST JOB".                              #
#-----------------------------------------------------#
*=*
   -oti=%%-ono%%.%%-ous.%%.%%-oti%%
```

Viewing messages issued from apshhsub

When the apshhsub exit program finishes processing the job, apshhsub either saves the messages to a log file in the receiver working directory or it discards all the messages. The log special parameter determines whether apshhsub saves all messages to the log file, saves only messages for problems, or discards all messages (see "Specifying special parameters" on page 153).

The log file in which apshhsub saves the messages is named apshhsub.*PortNum*.log, where *PortNum* is the port number that the receiver monitors. For example, assume that you start the receiver with this command:

```
apshhrcd –p 6250 –d /var/psf/myreceiver –x apshhsub
```

The message log file for apshhsub is:

```
/var/psf/myreceiver/apshhsub.6250.log
```

You can view the messages in the log file. The messages for a successfully processed job look like this:

```
APSH0007 2005-08-25 10:14:21 MDT - submit started.
APSH0009 Parameters:
APSH0009    Input file:      'AFPDP.BLDPSRV5.PRT660.COBRYJ.JOB04740.COBRY521.STE
     P1.SYSUT2.STD.2005237.10142007473.PRD'
APSH0009    Options:         '-odatat=af -oburst=no -occ=yes -occtype=m -ocop=1
     -odatac=unblock -ofileformat=stream -of=F1A10110 -ojobn=PAYROLL -ono=ACME
     -opr=AFPRM521 -ous=SMITH
     -opa=class=L,destination=LOCAL,forms=STD,jobid=JOB04740'
```

```
APSH0009    Queue:           ''
APSH0009    Port:            '6250'
APSH0009    Extra arguments: 'afpstats=yes log=all mapfile=6250.map'
APSH0009    Trace:           '0'
APSH0011 Options mapped from attrib.map:
APSH0012    Line 2: 'class=J'
APSH0019 The SYSOUT data set contains 500 records.
APSH0021 The final disposition is NORMAL.
APSH0008 2005-08-25 10:14:21 MDT - submit ended (rc 0).
```

Messages APSH0007 and APSH0008 show the start and end time for the submit process, along with the return code. If an error occurs during processing, the file contains a message specific to the problem and the return code is a number other than 0.

Message APSH0009 shows the input parameters that were passed from the receiver (`apshhrcd`). These parameters include the -o attributes from the sender.

Messages APSH0011 and APSH0012 show an attribute that `apshhsub` reassigned from the attribute mapping file, `attrib.map`.

Messages APSH0019 and APSH0021 show the number of records and the final data set disposition.

Using the apshhmds exit program

The receiver can call the `apshhmds` exit program to process multiple data set jobs that it receives from the sender, put the data sets into a single data set, and place the job on the JES spool. You specify `apshhmds` when you have a multiple data set job that contains MO:DCA-P data only; otherwise, if the multiple data set job contains line data, you must use `apshhsub` (see "Using the apshhsub exit program" on page 153).

Use `apshhmds` when you want to:

- Process all the data sets as one data set.
- Print the data sets in the order they are transmitted.
- Generate copies of one or more data sets in the job.

`apshhmds` uses the `afpconcat` program to put multiple data sets into a single data set, and then uses the `apshhsub` exit program to put the job on the JES spool. The `afpconcat` program can support MO:DCA-P data only and might fail if a data set contains line data. The `afpconcat` program supports these MO:DCA interchange sets:

- IS/3
- IS/3 with function sets
- AFP/A
- AFP/A, IS/3

Notes:

1. In this release of AFP Download Plus, the `apshhmds` exit program concatenates multiple data sets that all specify the same supported MO:DCA interchange set, which results in a file that is compliant with that interchange set. In AFP Download Plus releases that are earlier than PSF 4.5, the `apshhmds` exit program removes the BPF and EPF structured fields when it is concatenating multiple data set jobs that are MO:DCA IS/3 compliant, which creates a new file that is not MO:DCA IS/3 compliant.
2. AFP Download Plus supports MO:DCA IS/3 with function sets. Before you transmit files with this designation on the BPF structured field of the print file, be sure that the receiver supports the same level of MO:DCA IS/3 with function sets.

Because `apshhmds` uses `apshhsub` during processing, you can specify `apshhsub` special parameters, including an attribute mapping file, with the -X option on the `apshhrcd` command. For example:

```
apshhrcd -p PortNum -d Directory -x apshhmds -X "debug=yes log=all" -n 1 -m 1 &
```

Important: When you specify the `apshhmds` exit program on the `apshhrcd` command, be sure to:

- Make sure afpconcat and apshhsub are in the same directory as apshhmds.
- Specify the -n 1 and -m 1 options.
- Specify the & option if you want to run the receiver as a background process.

See "Specifying special parameters" on page 153 and "Specifying mapping attributes" on page 154 for more information.

Keep in mind:

1. When PSF prints a multiple data set job that AFP Download Plus processed with the apshhmds exit program and you specified that PSF produce a data set header page for each data set, only one data set header page is printed.
2. If you want data set separator pages in between each data set, you must enable them on AFP Download Plus. See "Sending z/OS separator pages" on page 115.
3. -o attributes are not derived from each data set in a multiple data set job. Instead, -o attributes are selected from the first user data set and are used in all other data sets, including the data sets for header and trailer pages.

Viewing messages issued from apshhmds

When the apshhmds exit program finishes processing the job, apshhmds either saves the messages to a log file in the receiver working directory or it discards all the messages. The log special parameter determines whether apshhmds saves all messages to the log file (log=all), saves only messages for problems (log=error), or discards all messages (log=none). See "Specifying special parameters" on page 153.

The log file in which apshhmds saves the messages is named apshhmds.*PortNum*.log, where *PortNum* is the port number that the receiver monitors. For example, assume that you start the receiver with this command:

```
apshhrcd –p 6250 –d /var/psf/myreceiver –x apshhmds -X log=all -n 1 -m 1 &
```

The message log file for apshhmds is:

```
/var/psf/myreceiver/apshhmds.6250.log
```

When messages are saved to a log file with log=error or log=all, apshhmds also creates a file that contains status information for each job that is processed. Each file is appended to the apshhmds.*PortNum*.log file with the name *JobName*.MDSLOG, where *JobName* is the file name for the job.

You can view the messages in the log file. When you use debug=no, the messages apshhmds saves to the log for a successfully processed job look like this:

```
APSH0049 2006-11-19 13:55:33 EST - submit started.
APSH0062 Processing completed successfully for job

AFPDP.BLDPTCP5.PRT660.JULMER.JOB00141.MULTI5.STEP1.SYSUT2.STD.2006323.13553138861.JOB
.
```

apshhmds saves more information to the log when you use debug=yes. For example, the messages for a successfully processed job look like this:

```
APSH0049 2006-11-19 13:31:48 EST - submit started.
APSH0064 Parmlist:
  Base: /usr/lpp/psf/bin/
  Parm list file:

AFPDP.BLDPTCP5.PRT660.JULMER.JOB00139.MULTI5.STEP1.SYSUT2.STD.2006323.13314647129.JOB
  Queue:
  Null parm:
  Port: 6100
  -X arguments: debug=yes log=all
  Trace: 1
```

```
APSH0064 Parmlist:
  /usr/lpp/psf/bin/apshhsub

AFPDP.BLDPTCP5.PRT660.JULMER.JOB00139.MULTI5.STEP1.SYSUT2.STD.2006323.13314647129.PRD

  '"-odatat=af -oburst=no -occ=yes -occtype=m -ocop=1 -odatac=block -
ofileformat=stream
  -of=F1A10110 -ojobn=MULTI5 -ono=BLDPTCP5 -opagecount=5 -opr=1EMRFF -osheetcount=5
  -ous=JULMER -opa=class=S,destination=LOCAL,forms=STD,jobid=JOB00139 "' " " " 6100
  'debug=yes log=all' 1
APSH0062 Processing completed successfully for job

AFPDP.BLDPTCP5.PRT660.JULMER.JOB00139.MULTI5.STEP1.SYSUT2.STD.2006323.13314647129.JOB
.
```

Message APSH0049 shows the start time for the submit process and message APSH0062 shows that processing completed successfully. If an error occurs during processing, message APSH0063 indicates that processing failed for the job.

Message APSH0064 shows the input parameters that were passed from the receiver (`apshhrcd`). These parameters include the -o attributes from the sender.

Creating your own exit program

You can create your own exit program to use with the receiver. The exit program can be a script or an executable file. When the receiver calls the exit program, the current working directory is the value that is specified for `apshhrcd -d` when the receiver was started. All files that are associated with the job are in the current working directory.

Notes:

1. When you are using an exit program that you created, make sure that you do not specify the m -1 option with the `apshhrcd` startup command.

The receiver passes a positional parameter list to the exit program. The parameter list consists of these items:

Parameter 1
Specifies the name of the file that contains the job data. See Appendix A, “Syntax for file names,” on page 169 for the file name syntax.

Parameter 2
Specifies the attribute list that goes with the job data. The attribute list contains information from the sending z/OS system and the JCL that was used to submit the job to the sender. See “Using the attributes from the sender” on page 159 for details.

Parameter 3
Specifies the queue name that was specified when the receiver was started (`apshhrcd -q`).

Parameter 4
Reserved for future use.

Parameter 5
Reserved for future use.

Parameter 6
Specifies the port number that was specified when the receiver was started (`apshhrcd -p`).

Parameter 7
Specifies the extra arguments that were specified when the receiver was started (`apshhrcd -X`).

Parameter 8
Specifies 1 if `apshhrcd -t` is used; otherwise, specifies 0.

Using the attributes from the sender

The sender passes a number of attributes through `apshhrcd` to the exit program. The sender components of AFP Download Plus and Download for z/OS send similar attributes; however, they are not

identical. Table 24 on page 160 shows the attributes, their descriptions, which senders pass them (AFP Download Plus or Download for z/OS), and a description of how the exit program uses them.

Table 24: Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only)

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
-oaddress1=*string1* **-oaddress2=*string2*** **-oaddress3=*string3*** **-oaddress4=*string4***	These attributes come from the ADDRESS parameter of the OUTPUT JCL statement. The values are strings of up to 60 characters.	Yes	Yes	ADDRESS text unit
-obu=*string*	This attribute comes from the BUILDING parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	BUILDING text unit
-oburst=yes | no	This attribute comes from the BURST parameter of the OUTPUT JCL statement. The value is either yes or no.	Yes	No	BURST text unit
-occ=yes | no **-occtype=m | a | z**	These attributes come from the input data set. If -occ=yes, then -occtype is one of these: • m for machine • a for ANSI-EBCDIC • z for ANSI-ASCII	Yes	Yes	Data set attribute
-ochars=*list*	This attribute comes from the CHARS parameter of the OUTPUT JCL statement. The value is a list of fonts. Each font name is separated by a comma.	MFP only [1]	Yes	CHARS text unit
-ocolormap=*name*	This attribute comes from the COLORMAP parameter of the OUTPUT JCL statement. The value is the name of a color map resource.	Yes	No	COLORMAP text unit
-ocomsetup=*name*	This attribute comes from the COMSETUP parameter of the OUTPUT JCL statement. The value is the name of a microfilm setup resource.	Yes	No	COMSETUP text unit
-ocop=*nnn*	This attribute comes from the COPIES parameter of the OUTPUT JCL statement. The value is the number of copies to print.	Yes	Yes	COPIES text unit
-odatac=unblock | blkpos | blkchar | block	This attribute comes from the DATACK parameter of the OUTPUT JCL statement.	Yes	Yes	DATACK text unit

Table 24: Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) *(continued)*

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
-odatat=af | line	This attribute is generated by the sender. For AFP Download Plus, the value is af, which means the input is MO:DCA-P. For Download for z/OS, the value is line, which means the input is line data.	Yes	Yes	Determine type of I/O for AFP versus line data
-ode=*string*	This attribute comes from the DEPT parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	DEPT text unit
-odu=tumble | normal | no	This attribute comes from the DUPLEX parameter of the OUTPUT JCL statement.	Yes	Yes	DUPLEX text unit
-of=*name*	This attribute comes from the FORMDEF parameter of the OUTPUT JCL statement. The value name is the name of a form definition.	Yes	Yes	FORMDEF text unit
-ofileformat=stream | record	This attribute is generated by the sender. For AFP Download Plus, the value is stream. For Download for z/OS, the value is record.	Yes	Yes	Not used
-ofiletype=dshdr | jobhdr | jobtrl | message	This attribute specifies that the file sent is a separator page file or a message file. Message files are sent when an error stops transformation.	Yes (separators and messages)	No	Determine type of file received
-oflash=*name,n* -oflash=*name* -oflash=*,n*	This attribute comes from the FLASH parameter of the OUTPUT JCL statement. The value name is the name of an overlay. The value *n* is the number of copies to flash with the overlay.	Yes	No	FLASH text unit
-oformlength=*nn*[.*mmm*]IN | CM	This attribute comes from the FORMLEN parameter of the OUTPUT JCL statement. The value specifies the length of pages to print.	Yes	Yes	FORMLEN text unit
-oin=*nnn*	This attribute comes from the INTRAY parameter of the OUTPUT JCL statement. The value is the number of the input tray to use.	Yes	Yes	INTRAY text unit
-oipdest=*string*	This attribute comes from the DEST parameter of the OUTPUT JCL statement. The value is the text that comes after the string IP: in the value of the original DEST parameter.	Yes	Yes	DEST text unit (when -opa destination=<IP>)
-ojobn=*jobname*	This attribute comes from the JOB JCL statement. The value is the job name.	Yes	Yes	Job scheduler block

Table 24: Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) *(continued)*

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
-ona=*string*	This attribute comes from the NAME parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	NAME text unit
-ono=*nodeid*	This attribute comes from the sender. The value is the name of the system where the job was submitted.	Yes	Yes	Optionally reused in short data set name
-ooffxb=*offset* **-ooffxf=*offset*** **-ooffyb=*offset*** **-ooffyf=*offset***	These attributes come from the OFFSET*xx* parameters of the OUTPUT JCL statement. The value that is offset is the offset amount and units that were specified in the job.	Yes	Yes	OFFSET*xx* text units
-ooutbin=*nnnnn*	This attribute comes from the OUTBIN parameter of the OUTPUT JCL statement. The value is the number of the input tray to use.	Yes	Yes	OUTBIN text unit
-oovlyb=*name* **-oovlyf=*name***	These attributes come from the OVERLAY*x* parameter of the OUTPUT JCL statement. The value is the name of an overlay.	Yes	Yes	OVERLAY*x* text units
-opa class=*class*	This attribute comes from the CLASS parameter of the OUTPUT JCL statement.	Yes	Yes	CLASS text unit
-opa destination=*dest* **-opa destination=<IP>**	This attribute comes from the DEST parameter of the OUTPUT JCL statement. A value of <IP> indicates -oipdest contains a TCP/IP routing destination.	Yes	Yes	DEST text unit; see -oipdest.
-opa forms=*formname*	This attribute comes from the FORMS parameter of the OUTPUT JCL statement.	Yes	Yes	FORMS text unit
-opa jobid=*jobid*	This attribute is generated by the sending system. The value is the job identifier for the job.	Yes	Yes	Job scheduler block

Table 24: Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) *(continued)*

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
-opa OUTGRP=FIRST | NEXT | LAST	This attribute comes from Exit 15. It indicates the sequence for a multiple data set job. **Note:** Download for z/OS uses the OUTGRP parameter on Exit 15 to process multiple data set jobs. However, AFP Download Plus ignores the OUTGRP parameter on Exit 15 and uses the parameter in the AFPPARMS control statement or Printer Inventory instead (see dataset-grouping or Data set grouping).	No	Yes	Not used
-opa segmentid=*segment*	This attribute is generated based on the SEGMENT parameter of the DD JCL statement. The sending system generates segment identifiers as it segments the job.	Yes	Yes	Optionally reused in short data set name
-opagecount=*nnn*	This attribute specifies the number of pages in the data set.	Yes	No	Not used
-opagedef=*name*	This attribute comes from the PAGEDEF parameter of the OUTPUT JCL statement. The value is the name of a page definition.	MFP only [1]	Yes	PAGEDEF text unit
-opr=*string*	This attribute comes from the JOB JCL statement. The value is a string of up to 20 characters.	Yes	Yes	Not used
-oprmode=LINE | PAGE | *mode*	This attribute comes from the PRMODE parameter of the OUTPUT JCL statement. The value can be LINE, PAGE, or a 1 - 8 character process mode.	No	Yes	PRMODE text unit
-oprtqueue=*string*	This attribute comes from the PRTQUEUE parameter of the OUTPUT JCL statement. The value is a string of up to 127 characters.	Yes	Yes	PRTQUEUE text unit
-ore=240 | 300	This attribute comes from the RESFMT parameter of the OUTPUT JCL statement.	Yes	Yes	RESFMT text unit
-oro=*string*	This attribute comes from the ROOM parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	ROOM text unit
-osheetcount=*nnn*	This attribute specifies the number of sheets in the data set.	Yes	No	Not used

Table 24: Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) *(continued)*				
Attribute	**Description**	**From AFPDP**	**From Downld**	**Exit Program Usage**
-oti=*string*	This attribute comes from the TITLE parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters in length.	Yes	Yes	TITLE text unit
-otrc=yes | no	This attribute comes from the TRC parameter of the OUTPUT JCL statement.	MFP only [1]	Yes	TRC text unit
-ous=*userid*	This attribute comes from the sender. The value is the user ID of the person who submitted the job.	Yes	Yes	Optionally reused in short data set name

Table footnotes:

1. When send-messages-on-failure=generic-only.
2. Some translation occurs with string values. Blank spaces in the original string are translated to 0X'FF'. Also, any single or double quotation marks (' or ") are translated to accent characters (`).

Starting the receiver automatically

You can start the AFP Download Plus receiver automatically during system initialization. Do this:

1. Edit `/etc/rc`, which is a script that z/OS runs whenever the system is started.
2. Add the `apshhrcd` command at the end of the script. If timing issues exist with the startup of TCP/IP (for example, `apshhrcd` starts before TCP/IP is ready), place a sleep command just before the `apshhrcd` command.

Note: To save any error messages that might be written by the receiver, redirect `stderr` to a file.

Stopping and querying the receiver

When you start the AFP Download Plus receiver, it creates a script file that you can use to stop the receiver or check its status. The script file contains a comment with the `apshhrcd` command that was issued so you can see how the receiver was started.

Keep in mind: Only the user who started the receiver or a superuser can use the script file.

Stopping the receiver

To stop the receiver, run this script file:

```
/tmp/apshhrcd.PortNum.sh
```

where *PortNum* is the port number you specified to start the receiver. The file contains a command that stops the receiver process.

Querying the status of the receiver

To determine whether the receiver is running, do one of these:

- Enter the UNIX `fuser` command with the script file to list which processes have a file open:

  ```
  fuser /tmp/apshhrcd.PortNum.sh
  ```

  where *PortNum* is the port number you specified to start the receiver. When the receiver creates the script, the file is left open. If the receiver stops, the system closes the file. Therefore, if the `fuser` command reports a process identifier, the receiver is running. Otherwise, the receiver is stopped.
- Enter the UNIX `ps` and `grep` commands to query the processes on the system and report the ones that correspond to the receiver:

  ```
  ps -ef | grep "apshhrcd"
  ```

Locating files on the receiver

When the receiver stores data from the sender, it uses a file name that is based on information from the sender. The format of the file name depends on the sender. Appendix A, “Syntax for file names,” on page 169 shows the file format for AFP Download Plus and Download for z/OS files to help you locate files on the receiver.

Chapter 10. Diagnosing errors with the AFP Download Plus receiver

This information helps the diagnostician identify a problem with the receiver component of AFP Download Plus on z/OS and report it to IBM. The information describes:

- Diagnosing problems with the `apshhrcd` command
- Diagnosing problems with the `apshhsub` or `apshhmds` exit program

Diagnosing problems with apshhrcd

If you have problems while you are using `apshhrcd`, rerun the command with these changes:

- Redirect `stderr` to a file. This example tells the shell that `stderr` is redirected to a file that is called `some.file`:

  ```
  apshhrcd... 2> some.file &
  ```

  This might work to find messages that cannot be written to the message log file.
- Specify the -t option to enable the `apshhrcd` trace mechanism. This option writes a file called `trace.log.`*`PortNum`* to the receiver's working directory. This trace can get as large as 10 KB. After it reaches that level, the file is renamed `trace.log.`BAK`.`*`PortNum`* and the receiver creates a new `trace.log.`*`PortNum`* file.

Diagnosing problems with an exit program

If you have problems while you are using the `apshhsub` or `apshhmds` exit program, try these suggestions:

- Look at messages in the message log. See "Viewing messages issued from apshhsub" on page 156 or "Viewing messages issued from apshhmds" on page 158.
- Rerun the `apshhrcd` command with these changes:
  - Redirect `stderr` to a file. This example tells the shell that `stderr` is redirected to a file called `some.file`:

    ```
    apshhrcd... 2> some.file &
    ```

    This might work to find messages that cannot be written to the message log file.
  - Use -X debug=yes to keep and examine the original data file and a message file for the job in the working directory.
  - Use -X jobhold=yes to hold the job on the spool so you can look at it before it is released to its destination.
  - Use -X intids=yes to add internal message identifiers to the beginning of the messages that indicate where the messages are issued.

  See "Specifying special parameters" on page 153 for information about specifying the -X options.

Appendix A. Syntax for file names

Figure 18 on page 169 shows the file name syntax for AFP Download Plus and Download for z/OS files.

```
AFP Download Plus:

        AFPDP.system.fsa.userid.jobid.jobname.step.dd.form.ccyyddd.time.ext

Download for z/OS:

      system.jobname[.step][.form].[cc]yyddd.time.ext

Where:
    system    = Name of the z/OS system
    fsa       = Name of the FSA that processed the data set
    userid    = User who submitted the job
    jobid     = Job identifier that was assigned by the z/OS system
    jobname   = Job name from the job
    step      = Step name from the job
    dd        = DD name from the job
    form      = FORMS name from the job
    cc        = Century the job was processed
    yyddd     = Julian date the job was processed
    time      = Time the job was processed in the form hhmmsstuvwx where:
                                          hh: hours
                                             mm: minutes
                                          ss: seconds
                                          t:  tenths of a second
                                          u:  hundredths of a second
                                             v:  thousandths of a second
                                          w:  ten-thousandths of a second
                                          x:  hundred-thousandths of a second.
   ext       = Extension:
                  Receiver files--
                    PRD:     Data files
                    JOB:     PRD file names in multiple data set job
                    JCL/OPT: JCL parameters
                    LOG:     Message log files
                    MDSLOG:  Temporary message log for apshhmds
                    TZ:      Compressed files
                    CONCAT:  afpconcat parameter file
                    CNTL:    Control file (internal use only)
                  Sender files--
                    MSG:  Message files
                    AFP:  MO:DCA-P data files
                    RGP:  Resource group files
                    RVF:  Recovery files
                    JCL:  JCL parameters
```

Figure 18: File format for file names

All of the components of the file name come from the sender's z/OS system. For example, the *userid* is that of the user who originally submitted the job. These characters in the file name are converted to an underscore:

```
$  *  #  %  &  |  ,  >  <  (  )  \  "   '  @  ?  =  ; ~ ` blank (X'40') null (X'00')
```

Note: These are working files; therefore, the receiver typically deletes them after they are processed.

Appendix B. SMF type 6 accounting records

AFP Download Plus creates a System Management Facility (SMF) type 6 record for each data set it processes, even if an error prevents transmission of the data. For example, AFP Download Plus writes a record even if a problem connecting to the receiver system exists. If AFP Download Plus releases the data set to the system and then processes the same data set again, AFP Download Plus writes another SMF record for the data set.

The mapping of the record is the same as the mapping of the SMF type 6 record for PSF. AFP Download Plus creates these sections in the SMF type 6 record:

- Base section
- First extension
- Common section
- Second extension
- Enhanced SYSOUT Support (ESS) section
- File-transfer section

See *PSF for z/OS: Customization* or *z/OS MVS System Management Facilities (SMF)* for the format of the SMF type 6 record for PSF.

Note: AFP Download Plus supports Exit 5 to allow modification of the SMF record.

Field SMF6PAD1 indicates whether the file-transfer section is present, as shown in Table 25 on page 171.

Table 25: SMF type 6 record—Section Indicator Field

Offsets	Name	Length	Format	Description
61 3D	SMFPAD1	1	binary	**Bit** **Meaning** **4** File-transfer section present.

The file-transfer section for AFP Download Plus has the format that is shown in Table 26 on page 171.

Table 26: SMF type 6 File-Transfer Section

Offsets	Name	Length	Format	Description
0 0	SMF6LN6	2	binary	Length of file-transfer section, including this field.
2 2	SMF6BYTE	4	binary	This field contains the total number of bytes that AFP Download Plus transmitted or attempted to transmit. If AFP Download Plus tried a transmission attempt again, this field contains the total number of bytes in all retry attempts. If AFP Download Plus detected an error and did not attempt to transmit any data, this field contains 0. If the total number of bytes transmitted is greater than or equal to 4 gigabytes (GB), this field contains X'FFFFFFFF'.
6 6	SMF6IPV4	4	binary	Formatted IPv4 address of the target system.
10 A	SMF6FTL	1	binary	Level indicator for file-transfer section. This field contains X'02'.
11 B		37		Reserved.

Table 26: SMF type 6 File-Transfer Section (continued)

Offsets	Name	Length	Format	Description
48 30	SMF6HWRD	4	binary	This field contains the high word of the total number of bytes that AFP Download Plus transmitted or attempted to transmit. If AFP Download Plus tried a transmission attempt again, this field contains the high word of the total number of bytes in all retry attempts. If AFP Download Plus detected an error and did not attempt to transmit any data, this field contains 0. If the total number of bytes transmitted is less than 4 GB, this field contains 0.
52 34	SMF6LWRD	4	binary	This field contains the low word of the total number of bytes that AFP Download Plus transmitted or attempted to transmit. If AFP Download Plus tried a transmission attempt again, this field contains the low word of the total number of bytes in all retry attempts. If AFP Download Plus detected an error and did not attempt to transmit any data, this field contains 0. If the total number of bytes transmitted is less than 4 GB, this field contains the total number of bytes transmitted or attempted to transmit.
56 38	SMF6IPV6	16	binary	Formatted IPv6 address of the target system.

Appendix C. AFPSTATS report

While AFP Download Plus is processing a print file, it can collect detailed information about the file, such as:

- The MO:DCA interchange set level, which is indicated by the value specified in the MO:DCA Interchange Set triplet (X'18') and MO:DCA Function Set triplet (X'8F'). See *Mixed Object Document Content Architecture Reference* for more information.
- What resources are used.
- How the resources are referenced in the job.
- The data sets from which the resources are obtained.

AFP Download Plus writes the information to a file, and then presents it in an AFP Download Plus Statistics (AFPSTATS) report, which you can view online or print.

The AFPSTATS report summarizes these resource types:

- Character set
- Coded font
- Code page
- Form definition
- Object container
- Overlay
- Page definition
- Page segment
- TrueType and OpenType fonts

The AFPSTATS repository

Before an AFPSTATS report can be generated, the system programmer must change the AFP Download Plus startup procedure to define the AFPSTATS repository (the file where AFPSTATS reports are written) and then allocate the data set. This repository must be an existing PDSE data set. For information about defining the AFPSTATS repository, see *PSF for z/OS: Customization*.

AFP Download Plus adds a member to this data set for every request it gets to produce an AFPSTATS report. AFP Download Plus generates the member name and records this name in the zFS message file with message APS4001I. See the messages in the zFS message file to determine where AFP Download Plus placed the AFPSTATS report.

Requesting an AFPSTATS report

You can request an AFPSTATS report for any AFP Download Plus file you own. However, the AFPSTATS report option is only activated if the system programmer adds the appropriate AFPSTATS DD statement to the AFP Download Plus startup procedure, such as:

```
//AFPSTATS DD DSN=INST.AFPPLUS.AFPSTATS,DISP=SHR
```

These are the ways that you can request an AFPSTATS report:

- To request a report from the sender, use the AFPSTATS keyword on the OUTPUT JCL statement (see Table 22 on page 125):

```
//OUT1 OUTPUT AFPSTATS=YES,...
//PRINT1   DD SYSOUT=A,OUTPUT=*.OUT1...
//
```

  The valid values for AFPSTATS are YES, Y, NO, and N. NO is the default.
- To request a report from the AFP Download Plus receiver, use the `afpstats` special parameter with the `apshhsub` exit program to specify whether an AFPSTATS report is generated (see "Using the apshhsub exit program" on page 153).
- To request a report from the sender or the AFP Download Plus receiver, use XTP7ASAP in installation Exit 7 to specify whether an AFPSTATS report is generated. For information about using Exit 7 to request an AFPSTATS report, see *PSF for z/OS: Customization*.

Note: Any value that you specify for AFPSTATS in the OUTPUT JCL or the `apshhsub` exit program can be overridden by XTP7ASAP in Exit 7. If the value is overridden by Exit 7, message APS7004I is printed in the message data set.

This example shows a job stream that produces a file and an AFPSTATS report.

```
//JOB1     JOB    ...
//STEP1    EXEC   PGM=MYAPPL
//OUTMP    OUTPUT AFPSTATS=YES
//MYPRINT  DD     SYSOUT=A,OUTPUT=*.OUTMP
//
```

The softcopy AFPSTATS report is stored on your system in the AFPSTATS repository. You can view the report online or you can format it and print a hardcopy version.

AFPSTATS report details

The AFPSTATS report that AFP Download Plus generates is similar to the AFPSTATS report that PSF generates. The information in this publication describes the softcopy record format for the SUMM-AFPDP record and the AFP Download Plus Summary section in the softcopy and hardcopy reports, which are specific to AFP Download Plus. For detailed information about other parts of the report, including the softcopy record format, descriptions of the individual report records, and descriptions of sections in a hardcopy report, see *PSF for z/OS: User's Guide*.

Softcopy report

The softcopy version of the AFPSTATS report is stored on your system in the AFPSTATS repository and can be viewed or formatted and printed. AFP Download Plus generates a unique member name for the report and records this name in message APS4001I in the zFS message file. The softcopy report is composed of variable-length records, with a maximum length of 512 characters per record. All records begin with a 10-character Layout ID or format identifier.

SUMM-AFPDP record format

The SUMM-AFPDP record is specific for the AFP Download Plus AFPSTATS report and summarizes statistics about AFP Download Plus processing, including sheet count, index counts, and data set processing speed. Figure 19 on page 175 shows the format and description of the SUMM-AFPDP record.

```
    SUMM-AFPDP record contains statistics about AFP Download Plus processing
================================================================================

 OFFSET   OFFSET
 DECIMAL     HEX  TYPE        LENGTH  NAME (DIM)     DESCRIPTION
======== ======== ================  ============== ==============================
      13       (D) STRUCTURE      208  ASP_SUMMAFPDP
      13       (D) CHARACTER        8   ASPA_JOBID    Jes job identifier
      21     (15) CHARACTER         1   *             Column separator
      22     (16) CHARACTER         8   ASPA_JOBNAME  Job name from JCL
      30     (1E) CHARACTER         1   *             Column separator
      31     (1F) CHARACTER         8   ASPA_USERID   Job user ID
      39     (27) CHARACTER         1   *             Column separator
      40     (28) CHARACTER         8   ASPA_SUBDATE  Job submission date
      48     (30) CHARACTER         1   *             Column separator
      49     (31) CHARACTER         8   ASPA_SUBTIME  Job submission time
      57     (39) CHARACTER         1   *             Column separator
      58     (3A) CHARACTER        10   ASPA_STRTDATE Job start date
      68     (44) CHARACTER         1   *             Column separator
      69     (45) CHARACTER        10   ASPA_ENDDATE  Job end date
      79     (4F) CHARACTER         1   *             Column separator
      80     (50) CHARACTER        10   ASPA_STRTTIME Job start time
      90     (5A) CHARACTER         1   *             Column separator
      91     (5B) CHARACTER        10   ASPA_ENDTIME  Job end time
     101     (65) CHARACTER         1   *             Column separator
     102     (66) CHARACTER        14   ASPA_LOGICPAGE
                                         Logical pages in print file
     116     (74) CHARACTER         1   *             Column separator
     117     (75) CHARACTER        14   ASPA_SHEETCNT Sheet count in print file
     131     (83) CHARACTER         1   *             Column separator
     132     (84) CHARACTER        14   ASPA_TRANSBYTE
                                         Number of bytes transformed
     146     (92) CHARACTER         1   *             Column separator
     147     (93) CHARACTER        14   ASPA_TRANSBPS Transformed bytes per second
     161     (A1) CHARACTER         1   *             Column separator
     162     (A2) CHARACTER        14   ASPA_SENTBYTES
                                         Number of bytes sent
     176     (B0) CHARACTER         1   *             Column separator
     177     (B1) CHARACTER        14   ASPA_SENTBPS  Bytes sent per second
     191     (BF) CHARACTER         1   *             Column separator
     192     (C0) CHARACTER        14   ASPA_TOTALBPS Total bytes proc per second
     206     (CE) CHARACTER         1   *             Column separator
     207     (CF) CHARACTER        14   ASPA_INDEXCNT Existing index counts
```

Figure 19: SUMM-AFPDP record format for summary of AFP Download Plus processing statistics

For detailed information about the softcopy record format and descriptions of other report records in the AFPSTATS report, see *PSF for z/OS: User's Guide*.

Sample softcopy report

Because each record in the softcopy AFPSTATS report can be 512 characters wide, you might need to scroll to see all of the information. The example in Figure 20 on page 176 - Figure 21 on page 177 is truncated to fit on the page. The SUMM-AFPDP record that is specific for AFP Download Plus is at the end of the softcopy report.

Note: This sample report is an example of an AFPSTATS report that you might see but it does not represent actual data.

```
REPORTLVL    AFPSTATS 4.6.0    0001 AFPDP Statistics Report
TITLE        Print File Information.
PAGEFOOTER   Print File Information.
HEADING      Job ID   Jobname  Stepname Data Source        Trans Date Trans Time Level              FSA Attachment     FSA     Printer Title           System   CPU ID
PRINTFILE    JOB00117 DCMR103  STEP1    Deferred-spool     12/15/2017 15:11:57   AFPDP 4.6.0 FOR z/OS Deferred-printing  PRT660  AFP DOWNLOAD PLUS       DEV5     FF0218
COMMENT

TITLE        Print File Extension Information.
PAGEFOOTER   Print File Extension Information.
HEADING      BPF Interchange Set  MO:DCA Function Set
PRTFILEX     Not Specified        Not Specified
COMMENT
TITLE        Processing Detail.
PAGEFOOTER   Processing Detail.
HEADING      Res Name Resource Type      Lib Type  Resource Size  Relative Page Data Set Name                            Volume Disposition          Transmission
RESOURCE     P1CMR103 Page Definition    User             1,298              1 PSFMVS.USER.RESOURCE                      USR085 PSF memory                      1
RESOURCE     F1OFF0   Form Definition    User               331              1 PSFMVS.USER.RESOURCE                      USR085 PSF memory                      1
RESOURCE     T1D0BASE Code Page          System           1,400              1 PSFDAT.RMARK.RESOURCE                     PSFC01 Download                        1
RESOURCE     C0D0GT12 Character Set      System          39,640              1 PSFDAT.RMARK.RESOURCE                     PSFC01 Download                        1
RESOURCE     B1IOB3   Page Segment       User               253              3 PSFMVS.USER.RESOURCE                      USR085 Integrated into page            1
EVENT        Event=Processing Complete      Page=              4                  Transmission=            1 Page number=            4
COMMENT
NOTE         The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
COMMENT
TITLE        Resource Summary by Name.
PAGEFOOTER   Resource Summary by Name.
HEADING      Res Name Resource Type      Lib Type              Total         Mapped       Included            JCL          Other           Soft        Inlined
Ignored
SUMM-NAME    B1IOB3   Page Segment       User                      1              0              1              0              0              1
0              0
SUMM-NAME    C0D0GT12 Character Set      System                    4              0              0              0              4              0
1              0
SUMM-NAME    F1OFF0   Form Definition    User                      1              0              0              1              0              0
0              0
SUMM-NAME    P1CMR103 Page Definition    User                      1              0              0              1              0              0
0              0
SUMM-NAME    T1D0BASE Code Page          System                    4              0              0              0              4              0
1              0
NOTE         The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
COMMENT
TITLE        Resource Summary by Data Set.
PAGEFOOTER   Resource Summary by Data Set.
COMMENT
SECTION      User Libraries.
SUMM-DSN     Data set=PSFMVS.USER.RESOURCE                              VOL=SER=USR085
SUMM-DSN-R   B1IOB3      F1OFF0      P1CMR103
COMMENT
SECTION      System Libraries.
SUMM-DSN     Data set=PSFDAT.RMARK.RESOURCE                             VOL=SER=PSFC01
SUMM-DSN-R   C0D0GT12    T1D0BASE
COMMENT
NOTE         The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
COMMENT
TITLE        Resource Summary by Resource Type.
PAGEFOOTER   Resource Summary by Resource Type.
COMMENT
SECTION      Reference Summary.
HEADING-RF   Resource Type              Unique            JCL         Mapped       Included          Other          Total
SUMM-REF     Page Definition                1              1              0              0              0              1
SUMM-REF     Form Definition                1              1              0              0              0              1
SUMM-REF     Coded Font                     1              0              4              0              0              4
SUMM-REF     Character Set                  1              0              0              0              4              4
SUMM-REF     Code Page                      1              0              0              0              4              4
SUMM-REF     Page Segment                   2              0              0              2              0              2
SUMM-REF     Overlay                        0              0              0              0              0              0
SUMM-REF     Object Container               0              0              0              0              0              0
SUMM-REF     True/Open Type                 0              0              0              0              0              0
COMMENT
SUMM-REF     All resource types             7              2              4              2              8             16
COMMENT
SECTION      Location Summary.
HEADING-LC   Resource Type              Unique         Inline           User       Security         System    PSF Default
SUMM-LOC     Page Definition                1              0              1              0              0              0
SUMM-LOC     Form Definition                1              0              1              0              0              0
SUMM-LOC     Coded Font                     1              0              0              0              1              0
SUMM-LOC     Character Set                  1              0              0              0              1              0
SUMM-LOC     Code Page                      1              0              0              0              1              0
SUMM-LOC     Page Segment                   2              0              2              0              0              0
SUMM-LOC     Overlay                        0              0              0              0              0              0
SUMM-LOC     Object Container               0              0              0              0              0              0
SUMM-LOC     True/Open Type                 0              0              0              0              0              0
COMMENT
SUMM-LOC     All resource types             7              0              4              0              3              0
COMMENT
SECTION      Disposition Summary.
HEADING-DP   Resource Type              Unique           Soft        Inlined        Ignored         Memory         Exists
SUMM-DISP    Page Definition                1              0              0              0              1              0
SUMM-DISP    Form Definition                1              0              0              0              1              0
SUMM-DISP    Coded Font                     1              0              0              0              1              3
SUMM-DISP    Character Set                  1              0              1              0              0              3
SUMM-DISP    Code Page                      1              0              1              0              0              3
SUMM-DISP    Page Segment                   2              2              0              0              0              0
SUMM-DISP    Overlay                        0              0              0              0              0              0
SUMM-DISP    Object Container               0              0              0              0              0              0
SUMM-DISP    True/Open Type                 0              0              0              0              0              0
COMMENT
SUMM-DISP    All resource types             7              2              2              0              3              9
COMMENT
NOTE         The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
COMMENT
TITLE        Processing Summary.
PAGEFOOTER   Processing Summary.
COMMENT
SECTION      Summary of Pages.
HEADING-SP      Total Pages          Records        File Size     Avg Page Size         Smallest          Largest       Small Page       Large Page      Xform
Bytes
SUMM-PAGE              4               35            1,269              317              262              376               3               4
837920
COMMENT
NOTE         The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
```

Figure 20: AFPSTATS softcopy report (Part 1 of 2)

```
COMMENT
SECTION      Significant Events.
HEADING-EL      Page number Event type              Resource
EVENT-LIST               4 Processing complete
COMMENT
SECTION      Unused Inline Resource.
HEADING-UU   Resource Type      Res Name
UIR-LIST     NONE
COMMENT
SECTION      Inline Metadata.
HEADING-PM   Name
META-LIST    NONE
TITLE        AFP Download Plus Summary.
PAGEFOOTER   AFP Download Plus Summary.
COMMENT
HEADING-DL   Job ID   Jobname  User ID  Sub Date Sub Time Start Date End Date   Start Time End Time  Logical Pages  Sheet Count Transform Byte  Transform BPS  Sent Bytes
SUMM-AFPDP   JOB00117 DCMR103  JDOE       14032 15:10:00 12/15/2017 12/15/2017 15:11:00   15:11:57             4            4         837920          14700      837920
COMMENT
NOTE         The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
```

Figure 21: AFPSTATS softcopy report (Part 2 of 2)

Hardcopy report

The hardcopy report contains the same information as the softcopy report, but it is formatted in sections and has page numbers. Each section is formatted to 8.5 x 11 inches in a combination of landscape and portrait orientation. Table 27 on page 177 shows the summary section in the hardcopy report that is specific for the AFP Download Plus AFPSTATS report.

Table 27: AFP Download Plus summary section in the AFPSTATS Report

Report Section Title	Description	Corresponding Softcopy Record
AFP Download Plus Summary	Summarizes statistics about AFP Download Plus processing, including sheet count, index counts, and data set processing speed.	SUMM-AFPDP

For information about the other sections that make up a hardcopy report, see *PSF for z/OS: User's Guide*.

Generating a hardcopy AFPSTATS report

To generate a hardcopy AFPSTATS report, use this PSF-supplied page definition and form definition to format the softcopy report:

- Page definition: P1ASAP03
- Form definition: F1ASAP01

The page definition, P1ASAP03, uses PPFA record formatting and conditional processing constructs to define the resulting AFPSTATS report. It uses proportional spaced, sans-serif fonts from AFP Font Collection, Program Number 5648–B33, or z/OS Font Collection, a base element of z/OS V2R1, Program Number 5650–ZOS.

This example shows a job stream that formats an existing AFPSTATS report for printing:

```
//JOB1      JOB    ...
//STEP1     EXEC   PGM=IEBGENER
//SYSPRINT  DD     SYSOUT=*
//SYSIN     DD     DUMMY
//OUTRL     OUTPUT PAGEDEF=ASAP03,FORMDEF=ASAP01
//SYSUT2    DD     SYSOUT=*, OUTPUT=*.OUTRL
//SYSUT1    DD     DSN=WRTES600.AFPSTATS(A0317900),DISP=SHR
//
```

Sample hardcopy AFPSTATS report

The sample hardcopy AFPSTATS report contains the same information as in Figure 20 on page 176 - Figure 21 on page 177 but in printable format.

Notes:

1. The fonts in the printed version of your AFPSTATS might be different than the fonts shown in the following figures.

2. This sample report is an example of an AFPSTATS report that you might see but it does not represent actual data.

```
                                AFPDP Statistics Report - 4.6.0 Level
0001

                                        Print File Information

Print File Information           Sender                                  Receiver
Job ID            JOB00117       Level           AFPDP 4.6.0 for z/OS  Type             AFPD-00
Jobname           DCMR103        FSA             PRT660                Printer Title    AFP
Download Plus
Stepname          STEP1          System          DEV5                  Intm Device      None
Data Source       Deferred-spool CPU ID          FF0218A52064          Attachment       TCP/IP
Trans Date        12/15/2017     FSA Attachment  Deferred-printing     Port Number      06250
Trans Time        15:11:57                                             Identifier
192.17.164.215
BPF Interchange   Not Specified                                        Remote System
PSFforZOS

                                                                       Operating System OS/390
SRV2 24.00
                                                                       Version
psf.10.0.ul
                                                                       Compile Date     Nov 29
2016









Print File
Information                                                                        Page - 1
```

Figure 22: AFPSTATS report (Page 1 of 8)

```
                                        Print File Extension Information

BPF Interchange Set                     MO:DCA Function Sets
Not Specified                           Not Specified









Print File Extension
Information                                                                Page - 2
```

Figure 23: AFPSTATS report (Page 2 of 8)

```
                                    Processing Detail

P1CMR103
  Resource type=Page Definition   Library type=User    Relative page= 1  Disposition=PSF memory
  Size= 1,298                     Volume=USR085        DSN=PSFMVS.USER.RESOURCE
  Transmission Count= 1           Page number= 1
F1OFF0
  Resource type=Form Definition   Library type=User    Relative page= 1  Disposition=PSF memory
  Size= 331                       Volume=USR085        DSN=PSFMVS.USER.RESOURCE
  Transmission Count= 1           Page number= 1
T1D0BASE
  Resource type=Code Page         Library type=System  Relative page= 1  Disposition=Download
  Size= 1,400                     Volume=PSFC01        DSN=PSFDAT.RMARK.RESOURCE
  Transmission Count= 1           Page number= 1
C0D0GT12
  Resource type=Character Set     Library type=System  Relative page= 1  Disposition=Download
  Size= 39,640                    Volume=PSFC01        DSN=PSFDAT.RMARK.RESOURCE
  Transmission Count= 1           Page number= 1
B1IOB3
  Resource type=Page Segment      Library type=User    Relative page= 3  Disposition=Integrated
into page
  Size= 253                       Volume=USR085        DSN=PSFMVS.USER.RESOURCE
  Transmission Count= 1           Page number= 3
Event= Processing complete     Page= 4
  Transmission Count= 1           Page number= 4




Note: The statistics in this report may contain inaccuracies caused by error recovery and
operator
actions making it unsuitable for accounting purposes.


Processing
Detail                                                                              Page - 3
```

Figure 24: AFPSTATS report (Page 3 of 8)

Resource Summary by Name

Res Name	Resource Type	Lib Type	Reference Total	Mapped	Included	JCL	Other	Disposition Soft	Inlined	Ignored	Memory	Exists
B1IOB3	Page Segment	User	1	0	1	0	0	1	0	0	0	0
C0D0GT12	Character Set	System	4	0	0	0	4	0	1	0	0	3
F1OFF0	Form Definition	User	1	0	0	1	0	0	0	0	1	0
P1CMR103	Page Definition	User	1	0	0	1	0	0	0	0	1	0
T1D0BASE	Code Page	System	4	0	0	0	4	0	1	0	0	3

Note: The statistics in this report may contain inaccuracies caused by error recovery and operator
actions making it unsuitable for accounting purposes.

Figure 25: AFPSTATS report (Page 4 of 8)

```
                                    Resource Summary by Data Set

User Libraries
                    Data set=PSFMVS.USER.RESOURCE
VOL=SER=USR085
                    B1IOB3          F1OFF0          P1CMR103
System Libraries
                    Data set=PSFDAT.RMARK.RESOURCE
VOL=SER=PSF000
                    C0D0GT12        T1D0BASE



Note: The statistics in this report may contain inaccuracies caused by error recovery and
operator
actions making it unsuitable for accounting purposes.




Resource Summary by Data
Set                                                                  Page - 5
```

Figure 26: AFPSTATS report (Page 5 of 8)

Resource Summary by Resource Type

Reference Summary

Resource Type	Unique	JCL	Mapped	Included	Other	Total
Page Definition	1	1	0	0	0	1
Form Definition	1	1	0	0	0	1
Coded Font	1	0	4	0	0	4
Character Set	1	0	0	0	4	4
Code Page	1	0	0	0	4	4
Page Segment	2	0	0	2	0	2
Overlay	0	0	0	0	0	0
Object Container	0	0	0	0	0	0
True/Open Type	0	0	0	0	0	0
All resource types	7	2	4	2	8	16

Location Summary

Resource Type	Unique	Inline	User	Security	System	PSF Default
Page Definition	1	0	1	0	0	0
Form Definition	1	0	1	0	0	0
Coded Font	1	0	0	0	1	0
Character Set	1	0	0	0	1	0
Code Page	1	0	0	0	1	0
Page Segment	2	0	2	0	0	0
Overlay	0	0	0	0	0	0
Object Container	0	0	0	0	0	0
True/Open Type	0	0	0	0	0	0
All resource types	7	0	4	0	3	0

Disposition Summary

Resource Type	Unique	Soft	Inlined	Ignored	Memory	Exists
Page Definition	1	0	0	0	1	0
Form Definition	1	0	0	0	1	0
Coded Font	1	0	0	0	1	3
Character Set	1	0	1	0	0	3
Code Page	1	0	1	0	0	3
Page Segment	2	2	0	0	0	0
Overlay	0	0	0	0	0	0
Object Container	0	0	0	0	0	0
True/Open Type	0	0	0	0	0	0
All resource types	7	2	2	0	3	9

Note: The statistics in this report may contain inaccuracies caused by error recovery and operator
actions making it unsuitable for accounting purposes.

Resource Summary by Resource Type Page - 6

Figure 27: AFPSTATS report (Page 6 of 8)

Processing Summary

Summary of Pages

Total pages	4	
Records	35	
File size	1,269	
Average page size	317	
Smallest page size	262	Page number= 3
Largest page size	376	Page number= 4
Transformed bytes	837920	

Note: The statistics in this report may contain inaccuracies caused by error recovery and operator actions
making it unsuitable for accounting purposes.

Significant Events

Page number	**Event type**	**Resource**
4	Processing complete	

Unused Inline Resources

Resource Type	**Resource Name**
NONE	

Inline Metadata

Name
NONE

Figure 28: AFPSTATS report (Page 7 of 8)

AFP Download Plus Summary

Print File Information

Job ID JOB00117 **Jobname** DCMR103 **User ID** JDOE
Job submission: Date 171215 Time 15:11:30

AFP Download Plus Information

Processing: Start Date 12/15/2017 End Date 12/15/2017
Processing: Start Time 15:11:57 End Time 15:12:03
AFP Download Plus Logical Pages 4
AFP Download Plus Sheet Count 4
Transformed Bytes 28665030 **Transformed Bytes per Second** 4777505
Sent Bytes 28665030 **Sent Bytes per Second** 3185003
Total Processing Bytes per Second 3822004
Existing Index Count 25

Note: The statistics in this report may contain inaccuracies caused by error recovery and operator actions
making it unsuitable for accounting purposes.

AFP Download Plus
Summary Page - 8

Figure 29: AFPSTATS report (Page 8 of 8)

Appendix D. Installation verification program example

Figure 30 on page 185 is a sample of the printed installation verification program (IVP) for AFP Download Plus.

Figure 30: IVP Example for AFP Download Plus

Appendix E. Connectivity test for AFP Download Plus

When you install AFP Download Plus for the first time, you might want to do a connectivity test to an existing receiver before you do a complete, customized installation. A connectivity test installs AFP Download Plus with all defaults, provided samples, and minimal space allocations to verify communication with the receiver.

To do a connectivity test for AFP Download Plus:

1. Make sure that the existing receiver is at the appropriate support level for AFP Download Plus.
2. Follow Steps "2" on page 23 through "8" on page 23 in Chapter 3, "Installing AFP Download Plus," on page 23 and make these changes:
   - Create the default `/var/psf/` working directory with a size of 1 MB.
   - Configure the AFP Download Plus sender with these suggestions:
     a. Define only one FSA.
     b. If you already have PSF or Download for z/OS installed, use the same work-selection criteria or change the class.
     c. Do not configure for MO:DCA interchange set compliant files.
     d. If Download for z/OS is installed, update the EXEC statement to specify PGM=APSHPOSE; otherwise, do these to create a startup procedure:
        1) Copy and use the APSWAFPP sample startup procedure in SYS1.PROCLIB.
        2) Follow the Required Actions in the sample prolog to change the procedure to run on your system.
        3) Comment out the AFPPARMS DD statement so you can use all the default AFPPARMS values.
        4) Delete all but one FSA.
        5) Do not create an AFPPARMS data set or use the Printer Inventory.
     e. Define either JES2 or JES3 initialization statements.
     f. Do not use any installation exits.
     g. Use the default program properties table (PPT) entry.
   - Start the sender. See "Starting the sender and FSAs" on page 113.
   - Update the APSIVPAJ sample installation verification program (IVP) to use the class that is defined for your AFP Download Plus FSA.
   - Submit the job to verify that no terminating errors are issued and the job is successfully processed by the receiver.

Appendix F. Accessibility

Accessible publications for this product are offered through IBM Knowledge Center (www.ibm.com/support/knowledgecenter/SSLTBW/welcome).

If you experience difficulty with the accessibility of any z/OS information, send a detailed email message to mhvrcfs@us.ibm.com.

Accessibility features

Accessibility features help users who have physical disabilities such as restricted mobility or limited vision use software products successfully. The accessibility features in z/OS can help users do the following tasks:

- Run assistive technology such as screen readers and screen magnifier software.
- Operate specific or equivalent features by using the keyboard.
- Customize display attributes such as color, contrast, and font size.

Consult assistive technologies

Assistive technology products such as screen readers function with the user interfaces found in z/OS. Consult the product information for the specific assistive technology product that is used to access z/OS interfaces.

Keyboard navigation of the user interface

You can access z/OS user interfaces with TSO/E or ISPF. The following information describes how to use TSO/E and ISPF, including the use of keyboard shortcuts and function keys (PF keys). Each guide includes the default settings for the PF keys.

- *z/OS TSO/E Primer*
- *z/OS TSO/E User's Guide*
- *z/OS ISPF User's Guide Vol I*

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users who access IBM Knowledge Center with a screen reader. In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always present together (or always absent together), they can appear on the same line because they are considered a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or `3.1` or `3.1.1`. To hear these numbers correctly, make sure that the screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number `3.1`) are mutually exclusive alternatives. If you hear the lines `3.1 USERID` and `3.1 SYSTEMID`, your syntax can include either `USERID` or `SYSTEMID`, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The * symbol is placed next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element *FILE with dotted decimal number 3 is given the format 3 * FILE. Format 3* FILE indicates that syntax element FILE repeats. Format 3* * FILE indicates that syntax element * FILE repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol to provide information about the syntax elements. For example, the lines 5.1*, 5.1 LASTRUN, and 5.1 DELETE mean that if you use more than one of the LASTRUN and DELETE syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, it indicates a reference that is defined elsewhere. The string that follows the % symbol is the name of a syntax fragment rather than a literal. For example, the line 2.1 %OP1 means that you must refer to separate syntax fragment OP1.

The following symbols are used next to the dotted decimal numbers.

? indicates an optional syntax element
The question mark (?) symbol indicates an optional syntax element. A dotted decimal number followed by the question mark symbol (?) indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example 5? NOTIFY). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines 5 ?, 5 NOTIFY, and 5 UPDATE, you know that the syntax elements NOTIFY and UPDATE are optional. That is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.

! indicates a default syntax element
The exclamation mark (!) symbol indicates a default syntax element. A dotted decimal number followed by the ! symbol and a syntax element indicate that the syntax element is the default option for all syntax elements that share the same dotted decimal number. Only one of the syntax elements that share the dotted decimal number can specify the ! symbol. For example, if you hear the lines 2? FILE, 2.1! (KEEP), and 2.1 (DELETE), you know that (KEEP) is the default option for the FILE keyword. In the example, if you include the FILE keyword, but do not specify an option, the default option KEEP is applied. A default option also applies to the next higher dotted decimal number. In this example, if the FILE keyword is omitted, the default FILE(KEEP) is used. However, if you hear the lines 2? FILE, 2.1, 2.1.1! (KEEP), and 2.1.1 (DELETE), the default option KEEP applies only to the next higher dotted decimal number, 2.1 (which does not have an associated keyword), and does not apply to 2? FILE. Nothing is used if the keyword FILE is omitted.

*** indicates an optional syntax element that is repeatable**
The asterisk or glyph (*) symbol indicates a syntax element that can be repeated zero or more times. A dotted decimal number followed by the * symbol indicates that this syntax element can be used zero or more times; that is, it is optional and can be repeated. For example, if you hear the line 5.1* data area, you know that you can include one data area, more than one data area, or no data area. If you hear the lines 3* , 3 HOST, 3 STATE, you know that you can include HOST, STATE, both together, or nothing.

Notes:

1. If a dotted decimal number has an asterisk (*) next to it and there is only one item with that dotted decimal number, you can repeat that same item more than once.
2. If a dotted decimal number has an asterisk next to it and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the previous example, you can write HOST STATE, but you cannot write HOST HOST.

3. The * symbol is equivalent to a loopback line in a railroad syntax diagram.

+ indicates a syntax element that must be included

The plus (+) symbol indicates a syntax element that must be included at least once. A dotted decimal number followed by the + symbol indicates that the syntax element must be included one or more times. That is, it must be included at least once and can be repeated. For example, if you hear the line `6.1+ data area`, you must include at least one data area. If you hear the lines `2+, 2 HOST,` and `2 STATE`, you know that you must include `HOST, STATE,` or both. Similar to the * symbol, the + symbol can repeat a particular item if it is the only item with that dotted decimal number. The + symbol, like the * symbol, is equivalent to a loopback line in a railroad syntax diagram.

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Glossary

This glossary defines technical terms and abbreviations used in PSF for z/OS documentation. If you do not find the term you are looking for, see IBM Glossary of Computing Terms (www.ibm.com/software/globalization/terminology).

These cross-references are used in this glossary:

See
Refers to preferred synonyms or to defined terms for acronyms and abbreviations.

See also
Refers to related terms that have similar, but not synonymous, meanings, or to contrasted terms that have opposite or substantively different meanings.

A

abend
See abnormal end of task.

abnormal end of task (abend)
The termination of a task, job, or subsystem because of an error condition that recovery facilities cannot resolve during processing

ACIF
See AFP Conversion and Indexing Facility.

Advanced Function Presentation (AFP)
A set of licensed programs, together with user applications, that use the all-points-addressable concept to print data on a wide variety of printers or to display data on a variety of display devices. AFP includes creating, formatting, archiving, retrieving, viewing, distributing, and printing information.

Advanced Interactive Executive (AIX)
A UNIX operating system developed by IBM that is designed and optimized to run on POWER® microprocessor-based hardware, such as servers, workstations, and blades.

AFP
See Advanced Function Presentation.

AFP Conversion and Indexing Facility (ACIF)
An optional feature of PSF for z/OS that converts a print file into a MO:DCA document, creates an index file for later retrieval and viewing, and retrieves resources used by an AFP document into a separate file.

AFP Download Plus
An optional feature of PSF for z/OS that distributes AFP data from a z/OS operating system to an AIX, Linux, Windows, or other z/OS operating system for printing, emailing, or faxing, or to an OnDemand server for archiving.

AFP Download Plus receiver
The component of AFP Download Plus that receives data from the sender and then distributes the data to a printer, email, or fax destination.

AFP Download Plus sender
The component of AFP Download Plus that initiates a TCP/IP connection and sends data to a receiver.

AFP Font Collection
An IBM licensed product that includes a set of utilities, and a single font source for all AFP operating systems.

AFP Statistics (AFPSTATS) report
Contains summary data about the resources used to print a document. The AFPSTATS report is used to indicate in which libraries AFP Download Plus found a resource, diagnose some resource selection

problems, obtain statistical data about how a print file is printed, and diagnose some print file printing performance problems.

AFPSTATS report
See AFP Statistics report.

AFPSTATS repository
A data set where AFP Statistics (AFPSTATS) reports are written.

AIX
See Advanced Interactive Executive.

alphanumeric
Pertaining to a character set that contains letters, digits, and other characters, such as punctuation marks.

American National Standards Institute (ANSI)
A private, nonprofit organization whose membership includes private companies, US government agencies, and professional, technical, trade, labor, and consumer organizations. ANSI coordinates the development of voluntary consensus standards in the US.

American Standard Code for Information Interchange (ASCII)
A standard code used for information exchange among data processing systems, data communication systems, and associated equipment. ASCII uses a coded character set consisting of 7-bit coded characters. See also Extended Binary Coded Decimal Interchange Code.

ANSI
See American National Standards Institute.

ASCII
See American Standard Code for Information Interchange.

B

bar code
An array of elements, such as bars, spaces, and two-dimensional modules, that encode data in a particular symbology. The elements are arranged in a predetermined pattern following unambiguous rules defined by the symbology.

Bar Code Object Content Architecture (BCOCA)
An architected collection of constructs used to interchange and present bar code data.

BCOCA
See Bar Code Object Content Architecture.

bin
An enclosure on a printer that contains source or destination media, including paper, foils, labels, card stock, or microfilm.

C

carriage control character
A character that is used to specify a write, space, or skip operation. See also control character.

case-sensitive
Pertaining to the ability to distinguish between uppercase and lowercase letters.

character

1. Any symbol that can be entered on a keyboard, printed, or displayed. For example, letters, numbers, and punctuation marks are all characters.
2. In a computer system, a member of a set of elements that is used for the representation, organization, or control of data. See also control character.
3. In bar codes, a single group of bars and spaces that represent an individual number, letter, punctuation mark, or other symbol.

character set
A defined set of characters that can be recognized by a configured hardware or software system. A character set can be defined by alphabet, language, script, or any combination of these items. See also font character set.

checkpoint
A place in a program at which a check is made, or at which a recording of data is made to allow the program to be restarted in case of interruption.

CMR
See color management resource.

coded font
A font file that associates a code page and a font character set. For double-byte fonts, a coded font associates multiple pairs of code pages and font character sets.

code page
A particular assignment of code points to graphic characters. Within a given code page, a code point can only represent one character. A code page also identifies how undefined code points are handled. See also coded font.

colon hexadecimal notation
The syntactical representation for a 128-bit integer that consists of eight groups of four hexadecimal numbers, separated by colons. IP addresses can be represented in colon hexadecimal notation. See also dotted decimal notation and host name.

color management resource (CMR)
An object that provides color management in presentation environments.

color mapping table
A MO:DCA object that is used to map color values specified in a source color space to color values specified in a target color space. This object is loaded into printers that support the color mapping table.

command
A request from a terminal or automated operator for the performance of an operation or service, or a request in a batch-processing job or print file for the operation or execution of a particular program.

communication
See data communication.

complex text
Unicode-encoded text that cannot be rendered in the traditional one-code-point to one-glyph fashion, such as bidirectional Arabic text or combined Hindi characters.

connection
In data communication, an association established between entities for conveying information.

console
A display station from which an operator can control and observe the system operation.

continuous forms
A series of connected forms that feed continuously through a printing device. The connection between the forms is perforated so that the user can tear them apart. Before printing, the forms are folded in a stack, with the folds along the perforations.

control character

1. A character that represents a command that is sent to an output device, such as a printer or monitor. Examples are line-feed, shift-in, shift-out, carriage return, font change, and end of transmission. See also carriage control character.
2. A character whose occurrence in a particular context initiates, modifies, or stops a control function.

copy group
An internal object in a form definition or a print data set that controls such items as modifications to a form, page placement, and overlays.

D

DASD
See direct access storage device.

data check
A synchronous or asynchronous indication of a condition caused by erroneous data or incorrect positioning of data. Some data checks can be suppressed.

data communication
Transfer of data among functional units by means of data transmission protocols.

data control block (DCB)
A control block used by access method routines in storing and retrieving data.

data object resource
An object container resource or IOCA image resource that is either printer resident or downloaded. Data object resources can be:

- Used to prepare for the presentation of a data object, such as with a resident color profile resource object
- Included in a page or overlay through the Include Object (IOB) structured field; for example, PDF single-page and multiple-page objects, Encapsulated PostScript (EPS) objects, and IOCA images
- Called from within a data object; for example, PDF resource objects

data set
The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access. See also file.

data stream
The commands, control codes, data, or structured fields that are transmitted between an application program and a device, such as printer or nonprogrammable display station.

DCB
See data control block.

default
Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

deferred-printing mode
A printing mode that spools output through JES to a data set instead of printing it immediately. Output is controlled by using JCL statements. See also direct-printing mode.

destination control file
In a Windows environment, a user-modifiable file for simpler mapping of JCL to the print server parameters.

direct access storage device (DASD)
A device that allows storage to be directly accessed, such as a disk drive.

direct-printing mode
A printing mode that gives PSF exclusive use of a channel-attached printer. Output is printed immediately and is not spooled through JES. See also deferred-printing mode.

document

1. A machine-readable collection of one or more objects that represent a composition, a work, or a collection of data.
2. Data that has already been composed into pages and that contains a Begin Document and an End Document structured field.

dotted decimal notation
The syntactical representation for a 32-bit integer that consists of four 8-bit numbers written in base 10 and separated by periods (dots). IP addresses can be represented in dotted decimal notation. See also colon hexadecimal notation and host name.

double-byte coded font
A font in which the characters are defined by 2 bytes. The first byte defines the coded font section; the second byte defines the code point in the code page specified for that section. See also single-byte coded font.

download
To transfer data from a computer to a connected device, such as a workstation or a printer. Typically, users download from a large computer to a diskette or fixed disk on a smaller computer or from a system unit to an adapter.

Download for z/OS
An optional feature of PSF for z/OS that uses TCP/IP to automatically send data sets from the JES spool, without formatting them, directly to a PSF for z/OS, OnDemand, AIX, Linux, or Windows server.

duplex
Pertaining to printing on both sides of a sheet of paper.

E

EBCDIC
See Extended Binary Coded Decimal Interchange Code.

exception highlighting
The markings placed on the printed page to indicate the location of a data-stream error.

execution
The process of carrying out an instruction or instructions of a computer program by a computer.

exit
An instruction in an application, routine, or subroutine that causes control to pass to another application, routine, or subroutine. See also installation exit.

exit routine
A program that receives control from another program in order to perform specific functions.

Extended Binary Coded Decimal Interchange Code (EBCDIC)
A coded character set of 256 eight-bit characters developed for the representation of textual data. EBCDIC is not compatible with ASCII character coding. See also American Standard Code for Information Interchange.

extended code page
A code page that is stored in a partitioned data set (PDS or PDSE) in a font resource library or in a UNIX file in a font path library. Extended code pages might contain Unicode values that a printer uses to print EBCDIC or ASCII encoded text strings with TrueType and OpenType fonts.

F

file

1. A collection of related data that is stored and retrieved by an assigned name. A file can include information that starts a program (program-file object), contains text or graphics (data-file object), or processes a series of commands (batch file).
2. See also data set.

flash
See forms flash.

FOCA
See Font Object Content Architecture.

font

1. A family or assortment of characters of a given size and style, for example, 9-point Bodoni modern. A font has a unique name and might have a registry number.
2. A particular type style (for example, Bodoni or Times Roman) that contains definitions of character sets, marker sets, and pattern sets. See also coded font and double-byte coded font.

font character set

1. Part of an AFP font that contains the raster patterns, identifiers, and descriptions of characters. See also character set.
2. A Font Object Content Architecture (FOCA) resource containing descriptive information, font metrics, and the digital representation of character shapes for a specified graphic character set.

Font Object Content Architecture (FOCA)
An architecture that defines the content of digital font resources by means of a set of parameter definitions.

form

1. A physical piece of paper or other medium on which data is printed. See also medium, page, and sheet.
2. A display screen, printed document, or file with defined spaces for information to be inserted.

form definition
An AFP resource object used by PSF that defines the characteristics of the form or printed media, including: overlays to be used, duplex printing, text suppression, the position of composed-text data on the form, and the number and modifications of a page.

forms flash
In AFP support on the 3800 Printing Subsystem, a means of printing an overlay by using a negative plate projected on a form.

FSA
See functional subsystem application.

FSI
See functional subsystem interface.

FSS
See functional subsystem.

functional subsystem (FSS)
An extension of JES that runs in an address space separate from the JES address space. An FSS provides support for an auxiliary function to JES processing, such as a peripheral device or other component.

functional subsystem application (FSA)

1. An area within the functional subsystem (FSS) that drives and manages a single printer. FSAs are identified with JES printer definitions.
2. An application that uses the support facilities of the functional subsystem (FSS) to communicate with JES.

functional subsystem interface (FSI)
A set of services that allows communication between the JES address space or DPSS and the PSF functional subsystem.

G

generalized trace facility (GTF)
A z/OS service program that records significant system events such as I/O interrupts, SVC interrupts, program interrupts, or external interrupts.

GOCA
See Graphics Object Content Architecture.

Graphics Object Content Architecture (GOCA)
An architecture that provides a collection of graphics values and control structures used to interchange and present graphics data.

GTF
See generalized trace facility.

H

hexadecimal
Pertaining to a numbering system that has a base of 16.

HFS
See hierarchical file system.

hierarchical file system (HFS)
A system for organizing files in a hierarchy, as in a UNIX system.

host address
See Internet Protocol address.

host name
The network name given to a computer. Sometimes, host name is used to mean the fully qualified domain name; other times, it is used to mean the most specific subname of a fully qualified domain name. For example, if `mycomputer.city.company.com` is the fully qualified domain name, either of these host names can be used: `mycomputer.city.company.com` or `mycomputer`. See also colon hexadecimal notation and dotted decimal notation.

I

Image Object Content Architecture (IOCA)
An architecture that provides a collection of constructs used to interchange and present images, such as printing image data on a page, page segment, or overlay.

Infoprint Server
An element of z/OS that supports printing on local printers and remote printers in an Internet Protocol or SNA network. With Infoprint Server, users can submit print requests from remote workstations in an Internet Protocol network, from z/OS UNIX System Services applications, from batch applications, from VTAM® applications (such as CICS® or IMS™), and from SAP R/3.

inline
Pertaining to spooled input data that is read into a job by a reader. See also inline resource.

inline resource
A resource contained in a print file or a print data set.

input/output (I/O)
Pertaining to a device, process, channel, or communication path involved in data input, data output, or both.

installation exit
The means specifically described in an IBM software product's documentation by which an IBM software product can be modified by a customer's system programmers to change or extend the functions of the IBM software product. Such modifications consist of exit routines written to replace one or more existing modules of an IBM software product, or to add one or more modules or subroutines to an IBM software product.

Intelligent Printer Data Stream (IPDS)
An all-points-addressable data stream that lets users position text, images, graphics, and bar codes at any defined point on a printed page. IPDS is the strategic AFP printer data stream generated by PSF.

Internet Protocol (IP)
A protocol that routes data through a network or interconnected networks. This protocol acts as an intermediary between the higher protocol layers and the physical network. See also Transmission Control Protocol and Transmission Control Protocol/Internet Protocol.

Internet Protocol (IP) address
A unique address for a device or logical unit on a network that uses the IP standard. See also colon hexadecimal notation, dotted decimal notation, and host name.

I/O
See input/output.

IOCA
See Image Object Content Architecture.

IP
See Internet Protocol.

IP address
See Internet Protocol address.

IPDS
See Intelligent Printer Data Stream.

J

JCL
See job control language.

JES
See Job Entry Subsystem.

JES2
An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for processing, processes their output, and purges them from the system. In an installation with more than one processor, each JES2 processor independently controls its job input, scheduling, and output processing. See also Job Entry Subsystem and JES3.

JES3
An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for processing, processes their output, and purges them from the system. In complexes that have several loosely coupled processing units, the JES3 program manages processors so that the global processor exercises centralized control over the local processors and distributes jobs to them by using a common job queue. See also Job Entry Subsystem and JES2.

JES spool
A program that performs a peripheral operation, such as printing, while the computer is busy with other work. A common name for the JES2 or JES3 spool.

job control language (JCL)
A command language that identifies a job to an operating system and describes the job's requirements.

Job Entry Subsystem (JES)
An IBM licensed program that receives jobs into the system and processes all output data that is produced by jobs. See also JES2 and JES3.

L

library

1. A system object that serves as a directory to other objects. A library groups related objects, and allows the user to find objects by name.
2. A data file that contains copies of a number of individual files and control information that allows them to be accessed individually.
3. A partitioned data set or a series of concatenated partitioned data sets.

licensed program
A separately priced program and its associated materials that bear a copyright and are offered to customers under the terms and conditions of a licensing agreement.

line data
Data prepared for printing on a line printer without any data placement or presentation information. Line data can contain carriage-control characters and table-reference characters (TRC) for spacing and font selections.

logical page
The defined presentation space on the physical form. All the text and images in the print data must fit within the boundaries of the logical page, which has specified characteristics, such as size, shape, orientation, and offset. See also form and physical page.

M

medium

1. The material on which computer information is stored. Examples of media are diskettes, CDs, DVDs, and tape.
2. The physical material, such as paper, on which data is printed. See also form, page, and sheet.

medium overlay
An electronic overlay that is called by the medium map of a form definition for printing at a fixed position on the form. See also page overlay.

microfilm
A film containing a photographic record of printed matter, on a reduced scale.

microfilm device
An output device that presents a hardcopy on microfilm.

microfilm setup resource
A setup file that contains information used to present AFP data on microfilm. See also object container.

Mixed Object Document Content Architecture (MO:DCA)
An architected, device-independent data stream for interchanging documents.

Mixed Object Document Content Architecture for Presentation (MO:DCA-P)
The subset of MO:DCA that defines presentation documents. PSF supports MO:DCA Presentation Interchange Set data streams.

MO:DCA
See Mixed Object Document Content Architecture.

MO:DCA AFP/Archive (MO:DCA AFP/A)
An AFP document architecture interchange set that is used for long-term preservation and retrieval. This subset ensures page independence and eliminates images without clearly specified resolution, device default fonts, and external resources.

MO:DCA AFP/A
See MO:DCA AFP/Archive.

MO:DCA AFP/A, IS/3
An AFP document architecture interchange set that complies with the rules and restrictions of both the AFP/Archive and IS/3 interchange sets.

MO:DCA data
Print data that has been composed into pages. Text-formatting programs (such as DCF) can produce composed text data consisting entirely of structured fields. ACIF or AFP Download Plus can transform line data or XML data to MO:DCA data.

MO:DCA GA
See MO:DCA Graphic Arts Function Set.

MO:DCA Graphic Arts Function Set (MO:DCA GA)
An extension of MO:DCA IS/3 that provides support for PDF presentation object containers.

MO:DCA IS/1
See MO:DCA Presentation Interchange Set 1.

MO:DCA IS/3
See MO:DCA Presentation Interchange Set 3.

MO:DCA-P
See Mixed Object Document Content Architecture for Presentation.

MO:DCA Presentation Interchange Set 1 (MO:DCA IS/1)
A subset of MO:DCA that defines an interchange format for presentation documents.

MO:DCA Presentation Interchange Set 3 (MO:DCA IS/3)
A subset of MO:DCA that defines an interchange format for presentation documents. The MO:DCA IS/3 data stream includes structured fields that are not found in MO:DCA IS/1.

mount
To make a file system accessible.

Multiple Virtual Storage (MVS)
An IBM operating system that accesses multiple address spaces in virtual storage.

MVS
See Multiple Virtual Storage.

O

object container
A MO:DCA structure that carries object data, which might or might not be defined by a presentation architecture.

OpenType font
An extension of the TrueType font format that adds support for PostScript outlines and more support for international character sets and advanced typographic control.

option
A specification in a statement that can influence the running of the statement.

outline font
A font whose graphic character shapes are defined by mathematical equations rather than by raster patterns. See also raster font.

output writer
A part of JES that receives job output from the system spool.

overlay

1. A resource object that contains predefined presentation data, such as text, image, graphics, and bar code data, that can be merged with variable data on a page or form while printing. See also page overlay and medium overlay.
2. The final representation of a collection of predefined presentation data on a physical medium.

P

page

1. A collection of data that can be printed on one side of a sheet of paper or a form.
2. A data stream object delimited by a Begin Page structured field and an End Page structured field. A page can contain presentation data such as text, image, graphics, and bar code data. See also logical page and physical page.

page definition
An AFP resource object used by PSF that defines the rules for transforming line data and XML data into MO:DCA data and text controls, such as width of margins and text orientation.

page overlay
An electronic overlay that can be called for printing and positioned at any point on the page by an Invoke Page Overlay structured field in the print data. See also medium overlay.

Page Printer Formatting Aid (PPFA)
An IBM licensed program with which to create and store form definitions and page definitions, which are resource objects used for print-job management. These stored objects are used to format printed output.

page segment
An AFP resource object containing text, image, graphics, or bar code data that can be positioned on any addressable point on a page or an electronic overlay.

parameter
A value or reference passed to a function, command, or program that serves as input or controls actions. The value is supplied by a user or by another program or process.

physical page
A single surface (front or back) of a form. See also form, logical page, and page.

port

1. A hardware interface to which an I/O device is attached for the purpose of sending and receiving data.
2. An end point for communication between applications, generally referring to a logical connection. A port provides queues for sending and receiving data. Each port has a port number for identification.

PPFA
See Page Printer Formatting Aid.

Presentation Text Object Content Architecture (PTOCA)
An architecture that provides a collection of constructs used to interchange and present presentation text data, such as printing text data on a page, page segment, or overlay.

print data set
A data set created by an application program that contains the actual information to be printed and, optionally, some of the data that controls the format of the printing. The types of print data sets are composed text, line format, XML data, and mixed format. See also print file.

Printer Control Language (PCL)
The Hewlett Packard page description language that is used in laser and ink-jet printers.

Printer Inventory
In Infoprint Server, a set of files that contain information about printers. The Printer Inventory includes such objects as printer definitions, functional subsystem (FSS) definitions, and job selection rules for IP PrintWay™.

print file
A file that is created for the purpose of printing data. A print file includes information to be printed and, optionally, some of the data that controls the format of the printing. See also print data set.

print job
One or more documents submitted in the same job to be printed on the same printer.

print queue
A list of print jobs waiting to be printed.

Print Services Facility (PSF)
An IBM licensed program that manages and controls the input data stream and output data stream required by supported page printers.

processor
In a computer, the part that interprets and processes instructions. Two typical components of a processor are a control unit and an arithmetic logic unit.

program temporary fix (PTF)
For System i®, System p, and IBM Z products, a package containing individual or multiple fixes that is made available to all licensed customers. A PTF resolves defects and might provide enhancements.

protocol
A set of rules controlling the communication and transfer of data between two or more devices or systems in a communications network.

PSF
See Print Services Facility.

PTF
See program temporary fix.

PTOCA
See Presentation Test Object Content Architecture.

R

RACF
See Resource Access Control Facility.

raster font
A font in which the characters are defined directly by the raster bit map. See also outline font.

RAT
See resource access table.

recovery point
The number of pages or buffers from which AFP Download Plus retransmits data.

resolution
A measure of the sharpness of an image, expressed as the number of lines per unit of length or the number of points per unit of area discernible in that image.

resource
A collection of printing instructions used, in addition to the print data set, to produce the printed output. Resources include coded fonts, font character sets, code pages, page segments, overlays, form definitions, and page definitions.

Resource Access Control Facility (RACF)
An IBM licensed program that provides for access control by identifying users to the system, verifying users of the system, authorizing access to protected resources, logging unauthorized attempts to enter the system, and logging accesses to protected resources.

resource access table (RAT)
An array of data that is used to map a resource name specified in the MO:DCA data stream to information used to find and process the resource on a given system.

resource name
The name under which an AFP resource object is stored, the first 2 characters of which indicate the resource type.

S

SDSF
See System Display and Search Facility.

sheet
A division of the physical medium; multiple sheets can exist on a physical medium. For example, a roll of paper might be divided by a printer into rectangular pieces of paper, each representing a sheet. Envelopes are an example of a physical medium that comprises only one sheet. The IPDS architecture defines four types of sheets: cut-sheets, continuous forms, envelopes, and computer output on microfilm. Each type of sheet has a top edge. A sheet has two sides, a front side and a back side. See also form.

shell script
A program or script, that is interpreted by the shell of an operating system.

shift-out, shift-in (SOSI)
Special EBCDIC or ASCII characters that exist in the data stream to indicate the switches between double-byte fonts and single-byte fonts.

Simple Network Management Protocol (SNMP)
A set of protocols for monitoring systems and devices in complex networks. Information about managed devices is defined and stored in a Management Information Base (MIB).

single-byte coded font
A font in which the characters are defined by a 1-byte code point. A single-byte coded font has only one coded font section. See also double-byte coded font.

SMF
See System Management Facilities.

SMF type 6 record
A record that AFP Download Plus uses to record data for each data set.

SNMP
See Simple Network Management Protocol.

SOSI
See shift-out, shift-in.

spool
The system function of putting files or jobs into disk storage for later processing or printing. An abbreviation for *simultaneous peripheral operations online.*

startup procedure
A program used to start an application and to specify initialization parameters, libraries that contain system resources, and routing-control information.

structured field

1. A self-identifying string of bytes and its data or parameters.
2. A mechanism that permits variable length data to be encoded for transmission in the data stream.

syntax
The rules for the construction of a command or statement.

SYSIN
See system input stream.

SYSOUT
See system output stream.

System Display and Search Facility (SDSF)
An IBM licensed program that provides a menu-driven, full-screen interface that is used to obtain detailed information about jobs and resources in a system.

system input stream (SYSIN)
A data definition (DD) statement used to begin an in-stream data set. See also system output stream.

system library
A collection of data sets or files in which one or more system resources are stored.

System Management Facilities (SMF)
A component of z/OS that collects and records a variety of system and job-related information. Examples of information collected by SMF are statistics, accounting information, and performance data.

system output stream (SYSOUT)
A data definition (DD) statement used to identify a data set as a system output data set. See also system input stream.

T

table reference character (TRC)
A numeric character corresponding to the order in which font character sets have been specified. The TRC is used to select a font character set during printing.

TCP/IP
See Transmission Control Protocol/Internet Protocol.

TCP/IP-attached
Pertaining to a device that is linked to an operating system through an Internet Protocol network and receives data from the system by using an application-layer protocol for IPDS printers. Some TCP/IP-attached printers require the i-data 7913 IPDS Printer LAN Attachment.

trace

1. A record of the processing of a computer program or transaction. The information collected from a trace can be used to assess problems and performance.

2. A Db2® for z/OS facility that provides the ability to collect monitoring, auditing, performance, accounting, statistics, and serviceability (global) data.

transmission
The sending of data from one place for reception elsewhere.

Transmission Control Protocol (TCP)
A communications protocol used in the Internet and in any network that follows the Internet Engineering Task Force (IETF) standards for internetwork protocol. TCP provides a reliable host-to-host protocol in packet-switched communications networks and in interconnected systems of such networks. See also Internet Protocol.

Transmission Control Protocol/Internet Protocol (TCP/IP)
An industry-standard, nonproprietary set of communications protocols that provide reliable end-to-end connections between applications over interconnected networks of different types.

TRC
See table reference character.

TrueType font
A font format based on scalable outline technology in which the graphic character shapes are based on quadratic curves. The font is described with a set of tables contained in a TrueType font file.

U

UCS
See universal character set.

Unicode
A character encoding standard that supports the interchange, processing, and display of text that is written in the common languages around the world, plus some classical and historical texts. For example, the text name for $ is *dollar sign* and its numeric value is X'0024'. The Unicode standard has a 16-bit character set defined by ISO 10646.

universal character set (UCS)
A printer feature that permits the use of a variety of character arrays. See font.

UNIX file
An object that exists in a hierarchical file system. Examples of UNIX files are a DFSMS Hierarchical File System (HFS), a Network File System (NFS), a temporary file system (TFS), and the z/OS File System (zFS).

UNIX System Services
See z/OS UNIX System Services.

V

value
In programming, the alphabetic or numeric contents of a variable, parameter, special register, field, or storage location.

X

XML data
Data identified with the Extensible Markup Language (XML), which is a standard metalanguage for defining markup languages that is based on Standard Generalized Markup Language (SGML). For printing on page printers, a page definition is required to provide the data placement and presentation information. The XML data processed by PSF can be encoded in EBCDIC, ASCII, UTF-8 or UTF-16.

Z

zFS
See z/OS File System.

z/OS
An IBM mainframe operating system that uses 64-bit real storage.

z/OS File System (zFS)
A type of file system that resides in a Virtual Storage Access Method (VSAM) linear data set (LDS). zFS contains files and directories that can be used by z/OS UNIX System Services to provide data access over IP networks.

z/OS Font Collection
A base element of z/OS V2R1 or later that contains a comprehensive set of fonts, including AFP outline fonts, AFP raster fonts, and WorldType fonts (TrueType and OpenType fonts).

z/OS UNIX System Services
An element of z/OS that creates a UNIX environment which conforms to the XPG4 UNIX 1995 specifications and provides two open systems interfaces on the z/OS operating system: an application program interface (API) and an interactive shell interface.

Bibliography

This bibliography lists the titles of publications containing additional information about PSF, AFP, the z/OS operating system, and related products.

The titles and order numbers might change from time to time. To verify the current title or order number, consult your IBM marketing representative.

You can obtain many of the publications listed in this bibliography from the AFP Consortium Publications (afpcinc.org/publications) and the z/OS Internet Library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary).

Advanced Function Presentation (AFP)

Publication	Order Number
Advanced Function Presentation: Programming Guide and Line Data Reference	S544-3884
AFP Consortium: AFP Color Management Architecture (ACMA)	AFPCC
AFP Toolbox User's Guide	S544-5292
Bar Code Object Content Architecture Reference	AFPC-0005
Color Management Object Content Architecture Reference	AFPC-0006
Font Object Content Architecture Reference	AFPC-0007
Graphics Object Content Architecture for AFP Reference	AFPC-0008
Guide to Advanced Function Presentation	G544-3876
IBM AFP Fonts: Font Summary for AFP Font Collection	S544-5633
IBM Infoprint Fonts: Font Summary	G544-5846
Image Object Content Architecture Reference	AFPC-0003
Intelligent Printer Data Stream Reference	AFPC-0001
Mixed Object Document Content Architecture Reference	AFPC-0004
Overlay Generation Language/370 User's Guide and Reference	S544-3702
Presentation Text Object Content Architecture Reference	AFPC-0009
Using OpenType Fonts in an AFP System	G544-5876
z/OS Font Collection	GA32-1048

Content Manager OnDemand

Publication	Order Number
IBM Content Manager OnDemand for Multiplatforms: Administration Guide	SC19-3352
IBM Content Manager OnDemand for Multiplatforms: Indexing Reference	SC19-3354
IBM Content Manager OnDemand for Multiplatforms: Installation and Configuration Guide	GC19-3342
IBM Content Manager OnDemand for Multiplatforms: Introduction and Planning Guide	SC19-3351

Publication	Order Number
IBM Content Manager OnDemand: Messages and Codes	SC19-3356
IBM Content Manager OnDemand: User's Guide	SC27-0836
IBM Content Manager OnDemand for Multiplatforms: Web Enablement Kit Implementation Guide	SC19-3353
IBM Content Manager OnDemand: Windows Client Customization Guide	SC27-0837

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