z/OS

IBM

Infoprint Server Printer Inventory for PSF

This edition applies to Version 2 Release 1 of z/OS (5650-ZOS) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this publication

This publication contains information about the Printer Inventory for Print Services Facility™ (PSF) – a function that z/OS® Infoprint Server provides for PSF customers who have not purchased an Infoprint Server license. This function lets administrators specify PSF configuration information in the Infoprint Server Printer Inventory.

This publication describes how to use the Infoprint Server Printer Inventory for PSF. It provides an overview of the Printer Inventory for PSF, including its benefits for PSF customers. It also describes how to:

- Customize Infoprint Server to use the Printer Inventory for PSF
- Start and stop Infoprint Server
- Administer the Printer Inventory for PSF
- Diagnose errors

Who should read this publication

This publication is for PSF customers who have not purchased an Infoprint Server license.

Note: If you have purchased an Infoprint Server license, use the other publications in the Infoprint Server library instead of this publication. The other publications in the library describe how to use all the functions that Infoprint Server provides.

How to read syntax diagrams

This section explains the general notations that this document uses in syntax diagrams. For ease of reading, this document breaks some examples into several lines. However, when you enter a command, enter it all on one line. Do not press Enter until you have typed the entire command.

This notation:	Means:	You enter:	For example:	
			This document shows:	You enter:
Apostrophes	String	As shown	`SEND '123'`	`SEND '123'`
Bold	Keyword	As shown	**CLASS**	`CLASS`
Braces	List of items	The braces and one or more items from the list	`{GT10 GT12}`	`{GT10 GT12}`
Brackets	Optional item	One item or no items	`aopstop [now]`	`aopstop`
Comma	Separator	As shown	`DISPLAY C,K`	`DISPLAY C,K`
Ellipsis	Repeatable item	One or more items	*filename ...*	`file1 file2`
Lowercase	Item the system defines	As shown, in lowercase	`lp`	`lp`

This notation:	Means:	You enter:	For example:	
			This document shows:	You enter:
Lowercase italics	Variable item	A value for the item	MOUNT *devnum*	MOUNT A30
Parentheses	List of items	The parentheses and one or more items from the list	(GT10,GT12)	(GT10,GT12)
Special characters	Various symbols	As shown	%filter-options	%filter-options
Underline	Default	The item, or you can omit it	K T <u>REF</u>	K T
Uppercase	Item the system defines	As shown, in uppercase	PRMODE	PRMODE
Vertical bar	UNIX pipe (the output of the first is input to the second)	As shown	ls | lp	ls | lp
Vertical bar in braces	Required choice	One item	{NOW|FOREVER}	FOREVER
Vertical bar in brackets	Optional choice	One item or no items	[PORTNO|PRTQUEUE]	PORTNO

Where to find more information

This section describes where to find information related to z/OS and Infoprint Server.

Preventive Service Planning information

Before installing Infoprint Server, you should review the current Preventive Service Planning (PSP) information, also called the *PSP bucket*. You should also periodically review the current PSP information. The PSP upgrade ID is the ID for the z/OS operating system, for example ZOSV2R1. The subset for Infoprint Server is: INFOPRINT.

To obtain the current PSP bucket, contact the IBM® Support Center or use z/OS SoftwareXcel (IBMLink). If you obtained z/OS as part of a CBPDO, HOLDDATA and PSP information is included on the CBPDO tape. However, this information might not be current if the CBPDO tape was shipped several weeks prior to installation.

Infoprint Server publications

Table 1 on page xiii lists publications that can help you use Infoprint Server. These publications are intended for customers who have purchased Infoprint Server.

For publications for all z/OS products, see *z/OS Information Roadmap*.

Table 1. Infoprint Server

Publications	Form number
z/OS Infoprint Server Introduction Introduces Infoprint Server. This publication contains printing scenarios that show how you can use Infoprint Server in your installation.	SA38-0692
z/OS Infoprint Server Customization Describes customization tasks for Infoprint Server.	SA38-0691
z/OS Infoprint Server Operation and Administration Describes operator procedures and administrative tasks for Infoprint Server. It describes how administrators can create entries in the Printer Inventory using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program.	SA38-0693
z/OS Infoprint Server User's Guide Describes user tasks for Infoprint Server. This publication describes how to submit print jobs from remote systems (including Windows systems), the local z/OS system, and Virtual Telecommunications Access Method (VTAM®) applications.	SA38-0695
z/OS Infoprint Server Messages and Diagnosis Describes messages from Infoprint Server. This publication also describes how to use Infoprint Server tracing facilities to diagnose and report errors.	GA32-0927

Infoprint Server online help

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

How to send your comments to IBM

We appreciate your input on this publication. Feel free to comment on the clarity, accuracy, and completeness of the information or provide any other feedback that you have.

Use one of the following methods to send your comments:

1. Send an email to mhvrcfs@us.ibm.com.

2. Send an email from http://www.ibm.com/systems/z/os/zos/webqs.html

3. Mail the comments to the following address:
   IBM Corporation
   Attention: MHVRCFS Reader Comments
   Department H6MA, Building 707
   2455 South Road
   Poughkeepsie, NY 12601-5400
   US

4. Fax the comments to us, as follows:
   From the United States and Canada: 1+845+432-9405
   From all other countries: Your international access code +1+845+432-9405

Include the following information:
- Your name and address
- Your email address
- Your telephone or fax number
- The publication title and order number:
    z/OS V2R1.0 Infoprint Server Printer Inventory for PSF
    SA38-0694-00
- The topic and page number related to your comment.
- The text of your comment.

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

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

If you have a technical problem

Do not use the feedback methods that are listed for sending comments. Instead, take one of the following actions:
- Contact your IBM service representative.
- Call IBM technical support.
- Visit the IBM Support Portal at http://www.ibm.com/systems/z/support/.

Summary of changes

This section describes the release enhancements that were made.

z/OS Version 2 Release 1

Refer to the following publications for specific enhancements for z/OS Version 2
Release 1:

- *z/OS Summary of Message and Interface Changes*, SA23-2300
- *z/OS Introduction and Release Guide*, GA32-0887
- *z/OS Planning for Installation*, GA32-0890
- *z/OS Migration*, GA32-0889

Chapter 1. Introducing the Printer Inventory for PSF

The Printer Inventory for Print Services Facility (PSF) is a function of Infoprint Server, an element of z/OS. PSF for z/OS customers can use the Printer Inventory for PSF if they have not purchased an Infoprint Server license.

The Printer Inventory for PSF supports both PSF and the AFP Download Plus feature of PSF. However, it does not support the Download for z/OS feature of PSF.

Note: In this information, the term *PSF* refers to PSF for z/OS, AFP Download Plus, or both.

Printer Inventory overview

The Printer Inventory is a set of files in a z/OS UNIX file system. The file system cannot be shared by other systems.

The Printer Inventory contains PSF FSS and FSA definitions, which contain configuration information about PSF functional subsystems (FSSs) and functional subsystem applications (FSAs). The configuration information includes some of the information that the PSF system programmer can specify in the PSF startup procedure, in the optional AFPPARMS data set, and in the PSF Exit 7 initialization (INIT) call.

Infoprint Server administrators create and manage the Printer Inventory using one of these methods or a combination of these methods:

- **ISPF panels:** The Infoprint Server ISPF panels let you add, list, browse, copy, edit, and delete PSF FSS and FSA definitions in the Printer Inventory.
- **Printer Inventory Definition Utility (PIDU):** PIDU lets you create, list, display, edit, delete, export, and dump PSF FSS and FSA definitions in the Printer Inventory. PIDU is useful for creating a large number of definitions at one time and for making the same change to many definitions. It is also useful for backing up and restoring the Printer Inventory. You can run the z/OS UNIX **pidu** command from the z/OS UNIX command line or as a batch program.
- **Migration program:** The Infoprint Server migration program for PSF creates PSF FSS and FSA definitions by copying configuration parameters in existing PSF startup procedures.

The Printer Inventory for PSF provides these benefits for PSF customers:

- It is easier for the administrator to use the Infoprint Server ISPF panels to specify PSF configuration information than to specify the same information in a PSF startup procedure or write a PSF Exit 7.
- After the administrator creates an FSA definition or changes information in an FSA definition, you only need to start (or restart) the affected PSF FSA for PSF to use the new configuration information. You do not need to restart all FSAs in the FSS.
- You can use RACF®, or a similar product, to control who can view and update the Printer Inventory.

Related information:

PSF FSS definitions

A PSF FSS definition contains configuration information, such as the TCP/IP address space name, that applies to all FSAs in the FSS. The administrator must create one FSS definition for each PSF FSS that uses the Printer Inventory.

FSS definitions in the Printer Inventory are separate from JES FSS definitions. The administrator can create FSS definitions in the Printer Inventory before or after the JES FSS definitions are created.

If the administrator changes information in a PSF FSS definition, you must restart the PSF FSS for PSF to use the new information.

Related information:
- Appendix A, "Infoprint Server ISPF panels," on page 113

PSF FSA definitions

A PSF FSA definition contains configuration information that applies to one FSA. If the PSF FSS is configured to use the Printer Inventory, the administrator must create one FSA definition for each FSA in the FSS.

FSA definitions in the Printer Inventory are separate from JES FSA definitions. The administrator can create FSA definitions in the Printer Inventory before or after the JES definitions are created.

The type of FSA definition identifies how the printer is attached to the z/OS system. An AFP Download Plus sender is a separate type. These are the valid types:
- **Channel:** The printer is channel-attached to the z/OS system.
- **SNA:** The printer is SNA-attached to the z/OS system.
- **TCP/IP:** The printer is TCP/IP-attached to the z/OS system.
- **AFP Download Plus:** The AFP Download Plus sender on the z/OS system sends documents to a receiver running on a TCP/IP-attached system. The receiver can print, fax, or email the documents.

Each type of FSA definition can contain different configuration information, such as:
- Processing values
- Supported functions in AFP Download Plus printers
- Resource information, such as the default form definition and page definition
- Input tray substitution values
- Error reporting values
- Separator page information
- Connection and transmission values
- Printer sharing values
- Security labeling information
- Debugging parameters
- 3800 compatibility parameters

If the administrator changes information in an FSA definition, you must restart the affected PSF FSA so that PSF uses the new information. However, you do not need to restart all FSAs in the FSS.

Related information:
- Appendix A, "Infoprint Server ISPF panels," on page 113

How the Printer Inventory for PSF works

Figure 1 shows how the Printer Inventory for PSF works.
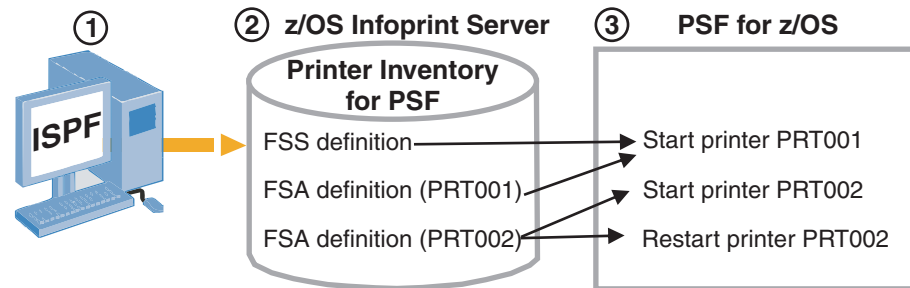
Figure 1. How the Printer Inventory for PSF works

Figure 1 shows this process:

1. The Infoprint Server administrator uses Infoprint Server ISPF panels to specify configuration information for PSF functional subsystems (FSSs) and functional subsystem applications (FSAs):
   - The FSS definition contains configuration information that applies to all FSAs in the PSF FSS. The name of the FSS definition is the same as the JES FSS name.
   - The FSA definition contains configuration information that applies to one FSA. The name of the FSA definition is the same as the JES FSA name (for example, PRT001 or PRT002).

   Tip: The Infoprint Server Printer Inventory Definition Utility (PIDU) provides a command line interface that the administrator can use in addition to the Infoprint Server ISPF panels.

2. Infoprint Server stores the PSF FSS and FSA definitions in the Printer Inventory.

3. PSF uses the configuration information in the Printer Inventory when an FSA is started:
   - When you start the first FSA (a printer or an AFP Download Plus sender) in the FSS (for example PRT001), PSF retrieves configuration information from the FSS definition and from the FSA definition.
   - When you start another FSA in the FSS (for example, PRT002), PSF retrieves configuration information from the FSA definition, but not from the FSS definition.
   - When you restart an FSA (for example, PRT002) PSF retrieves configuration information from the FSA definition. If any configuration information has changed in the FSA definition, PSF uses the new information.

   Tip: PSF must be configured to use the Printer Inventory. When PSF uses the Printer Inventory, it ignores the configuration information specified in the PSF

startup procedure, in the optional AFPPARMS data set, and in the PSF Exit 7 initialization (INIT) call if the same information can be specified in the Printer Inventory.

Related information:
- Chapter 4, "Using Infoprint Server ISPF panels," on page 37
- Chapter 5, "Using the Printer Inventory Definition Utility (PIDU)," on page 47
- For information about how to customize PSF to use the Printer Inventory, see:
  - *PSF for z/OS: Customization*
  - *PSF for z/OS: AFP Download Plus*

Chapter 2. Customizing the Printer Inventory for PSF

To use the Printer Inventory for PSF, you must customize Infoprint Server. You must also configure the PSF startup procedure to use the Printer Inventory.

These sections describe how to customize Infoprint Server:

- "Verifying software requirements"
- "Making Language Environment and C++ runtime libraries available"
- "Allocating the Infoprint Server base directory" on page 7
- "Setting up security" on page 8
- "Creating the Infoprint Server configuration file" on page 11
- "Setting permissions for directories and files" on page 14
- "Setting environment variables" on page 16
- "Creating Infoprint Server startup and shutdown procedures" on page 23
- "Enabling ISPF panels" on page 26
- "Backing up the Printer Inventory" on page 28
- "Restoring the Printer Inventory" on page 31

Related information: For information about how to customize PSF to use the Printer Inventory, see:

- *PSF for z/OS: Customization*
- *PSF for z/OS: AFP Download Plus*

Verifying software requirements

This IBM software is required:

- Any supported release of z/OS
- PSF V4R3 for z/OS or later (5655-M32)
- z/OS Security Server Resource Access Control Facility (RACF) or another access control manager with equivalent function

Tip: The z/OS ServerPac installs Infoprint Server on every z/OS system, but Infoprint Server is enabled only if you have purchased an Infoprint Server license. You can use the Printer Inventory for PSF when Infoprint Server is not enabled.

Making Language Environment and C++ runtime libraries available

These Language Environment® and C++ runtime libraries must be available to Infoprint Server:

- CEE.SCEERUN
- CEE.SCEERUN2
- CBC.SCLBDLL

The SCEERUN and SCLBDLL data sets must reside in an APF-authorized library.

To make Language Environment and C++ runtime libraries available:

1. Add the SCEERUN, SCEERUN2, and SCLBDLL libraries to the system
   LNKLST. Also, consider placing the SCEELPA data set (which contains key
   modules) in LPA for better performance.

   Some installations choose not to add the SCEERUN and SCLBDLL libraries to
   LNKLST because these libraries contain module names that might intersect
   with names in other libraries. The module names in SCEERUN2 do not
   intersect with module names in other libraries, so you can add SCEERUN2 to
   LNKLST with no adverse effects.

   _____

2. If you did not add the SCEERUN and SCLBDLL libraries to the system
   LNKLST (step 1), add them to these system files. If you did not add
   SCEERUN2 to the system LNKLST, add SCEERUN2 in the same places as you
   add SCEERUN.

   a. Add the SCEERUN and SCLBDLL libraries to the STEPLIBLIST facility of
      the BPXPRMxx PARMLIB member.

      _____

   b. Add this statement to the **/etc/rc** file:

      ```
      export STEPLIB=hlq.SCEERUN:hlq.SCLBDLL
      ```

      For example, if you use the standard high-level qualifiers, add this
      statement:

      ```
      export STEPLIB=CEE.SCEERUN:CBC.SCLBDLL
      ```

      _____

   c. Remove these statements from the **/etc/profile** file:

      ```
      if [-z "$STEPLIB"] && tty -s;
      then
        export STEPLIB=none
        exec sh -L
      fi
      ```

      Replace these statements in the **/etc/profile** file with this statement:

      ```
      export STEPLIB=hlq.SCEERUN:hlq.SCLBDLL
      ```

      For example, if you use the standard high-level qualifiers, add this
      statement:

      ```
      export STEPLIB=CEE.SCEERUN:CBC.SCLBDLL
      ```

      _____

   d. Create an **aopstart** EXEC for your installation. In the **aopstart** EXEC,
      uncomment and edit this statement:

      ```
      /*n=n+1;env.n='STEPLIB=hlq.SCEERUN:hlq.SCLBDLL'          */
      ```

      For example, if you use the standard high-level qualifiers, code this
      statement:

      ```
      n=n+1;env.n='STEPLIB=CEE.SCEERUN:CBC.SCLBDLL'
      ```

      _____

   e. Add the SCEERUN and SCLBDLL libraries to the AOPSTART JCL
      procedure. AOPSTART is shipped in SYS1.IBM.PROCLIB. However,
      during install it might have been copied to another data set in the
      PROCLIB concatenation.

      _____

f. Add the SCEERUN and SCLBDLL libraries to the TSO logon procedures for Infoprint Server administrators who use Infoprint Server ISPF panels.

_____

Related information:
- "Creating the aopd.conf configuration file" on page 12
- "Editing the AOPSTART JCL procedure" on page 25
- "Defining libraries in the TSO logon procedure" on page 26
- For information about how to access the Language Environment run-time libraries and improve the performance of run-time libraries, see *z/OS UNIX System Services Planning*.

Allocating the Infoprint Server base directory

You must allocate the Infoprint Server base directory. Infoprint Server creates the Printer Inventory files and other Infoprint Server files in the base directory.

Infoprint Server base directory (/var/Printsrv)

The Infoprint Server base directory contains:
- Printer Inventory files **master.v2db**, **jestoken.v2db**, and **pwjestoken.v2db**.
- Language Environment dumps (CEEDUMPs).
- Trace files in the **/var/Printsrv/trace** subdirectory. However, you can specify an alternate trace directory in the AOPTRACEDIR environment variable.

The default base directory name is **/var/Printsrv**. However, you can specify an alternate base directory in the Infoprint Server configuration file (**aopd.conf**) in the **base-directory** attribute.

The base directory (**/var/Printsrv**) can be in a Hierarchical File System (HFS) or a z/OS File System (zFS) that is HFS-compatible. IBM suggests that you create a separate mount point for the base directory (**/var/Printsrv**) file system and that you allocate 100 MB of DASD space for the file system.

The **aopsetup** shell script, which you run in a later step, creates the base directory and sets the appropriate permissions. For a secure environment, you should not change the permissions after you run **aopsetup**.

Related information:
- "Allocating the base directory (/var/Printsrv)"
- "Running aopsetup" on page 15
- For information about zFS, see *z/OS Distributed File Service zFS Administration*.

Allocating the base directory (/var/Printsrv)

This section shows how to allocate the Infoprint Server base directory named **/var/Printsrv**.

To allocate the base directory:

1. Mount a separate file system at the **/var** mount point. **/var** is a symbolic link to a system-specific data set.

Sysplex users:

- The **/var** file system must be system-specific and designated NOAUTOMOVE in the BPXPRMxx parmlib member.
- If you specify a different base directory in the **base-directory** attribute in the Infoprint Server configuration file, the file system that contains this directory must be system-specific and designated NOAUTOMOVE.

_____

2. Mount a separate file system at the **/var/Printsrv** mount point.

   Example: This example shows a sample BPXPRMxx member in SYS1.PARMLIB:

```
MOUNT FILESYSTEM('my.var.printsrv.filesystem')
      TYPE(ZFS)
      MODE(RDWR)
      NOAUTOMOVE
      MOUNTPOINT('/&SYSNAME./var/Printsrv')
```

_____

3. Allocate at least 100 MB of DASD space for the **/var/Printsrv** file system.

_____

Related information:
- "Infoprint Server base directory (/var/Printsrv)" on page 7
- "Running aopsetup" on page 15
- For information about zFS, see *z/OS Distributed File Service zFS Administration*.

Setting up security

You must set up security to control access to the Printer Inventory and to Infoprint Server operator commands. You can use the z/OS Security Server Resource Access Control Facility (RACF) or another program that follows system authorization facility (SAF) protocol to create the required profiles and groups.

RACF profiles and groups for Infoprint Server

The AOP.ADMINISTRATOR RACF profile in the RACF PRINTSRV class controls access to the Printer Inventory:
- READ access to this profile lets users view the Printer Inventory.
- UPDATE access lets users update the Printer Inventory.

Rule: RACF profiles with the prefix AOP in the PRINTSRV class are reserved by IBM. Do not create profiles for other purposes that start with AOP in the PRINTSRV class.

These RACF groups control access to the Printer Inventory and to Infoprint Server operator commands:
- AOPADMIN: A group for Infoprint Server administrators who can view and update the Printer Inventory.
- AOPOPER: A group for Infoprint Server operators who can start and stop Infoprint Server.

You can choose any names for these groups.

Table 2 on page 9 summarizes the RACF access that is required to do different functions.

Table 2. RACF access

Function	Access to AOP.ADMINISTRATOR profile	Member of AOPADMIN group	Member of AOPOPER group	Access to data sets with a high-level qualifier of AOP
View and update the Printer Inventory using ISPF panels	• READ access to view • UPDATE access to view and update	Not required	Not required	READ access
View and update the Printer Inventory using the Printer Inventory Definition Utility (PIDU)	• READ access to view • UPDATE access to view and update	Required	Not required	Not required
Start and stop Infoprint Server	Not required	Not required	Required	Not required
View trace information written to the default trace directory	Not required	Required	Not required	Not required

Related information:

- "Steps for setting up security"
- For information about RACF, see *z/OS Security Server RACF Security Administrator's Guide*.

Steps for setting up security

This section shows the RACF commands you can use to set up security for the Printer Inventory for PSF.

Tip: The sample CLIST in SYS1.SAMPLIB(AOPRACF) contains the RACF commands that are described in this section.

To set up security:

1. Define RACF groups for Infoprint Server administrators and operators:

   - Infoprint Server administrators can view and update the Printer Inventory. The suggested RACF group name for administrators is AOPADMIN. However, you can use any name. The group profile must have an OMVS segment and an OMVS group identifier (GID).
   - Infoprint Server operators can start and stop Infoprint Server. The suggested RACF group name for Infoprint Server operators is AOPOPER. However, you can use any name. The group profile must have an OMVS segment and a group identifier (GID).

   Example: These RACF ADDGROUP commands define groups AOPADMIN and AOPOPER. For *yy* and *zz*, specify an integer between 00 and 2147483647 that is different from other GIDs in your installation:

   ```
   ADDGROUP (AOPADMIN) OMVS(GID(yy))
   ADDGROUP (AOPOPER) OMVS(GID(zz))
   ```

   _____

2. Activate the PRINTSRV class and, to improve performance, copy profiles in the PRINTSRV class into virtual storage. If you copy profiles into virtual storage, you must use the SETROPTS command to refresh the PRINTSRV class after you define new profiles or permit new users to profiles in the class.

   Example: This RACF SETROPTS command activates the PRINTSRV class and copies profiles into virtual storage.

```
SETROPTS CLASSACT(PRINTSRV) RACLIST(PRINTSRV)
```

_____

3. Define a resource profile to RACF named AOP.ADMINISTRATOR in the PRINTSRV class.

   Example: This RACF RDEFINE command defines resource profile AOP.ADMINISTRATOR:

   ```
   RDEFINE PRINTSRV (AOP.ADMINISTRATOR) UACC(NONE)
   SETROPTS RACLIST(PRINTSRV) REFRESH
   ```

   Guideline: If you want RACF to notify the security administrator (by a message) when a user tries to read or update the Printer Inventory and is not authorized, specify the NOTIFY parameter on the RDEFINE command. Otherwise, Infoprint Server suppresses RACF messages when it checks the AOP.ADMINISTRATOR profile.

   _____

4. Give the Infoprint Server administrator group UPDATE access to the AOP.ADMINISTRATOR profile.

   You can permit group AOPADMIN to the AOP.ADMINISTRATOR resource profile or you can permit each user separately.

   Example: This RACF PERMIT command permits the AOPADMIN group to the AOP.ADMINISTRATOR profile in the PRINTSRV class:

   ```
   PERMIT AOP.ADMINISTRATOR CLASS(PRINTSRV) ACCESS(UPDATE) ID(AOPADMIN)
   SETROPTS RACLIST(PRINTSRV) REFRESH
   ```

   _____

5. Create a separate z/OS user ID to be associated with the Infoprint Server startup and shutdown procedures (AOPSTART and AOPSTOP). The user ID must be connected to the AOPOPER group.

   You can select any name for this user ID. For *dd*, specify an integer that is different from other UIDs in your installation.

   Example: This ADDUSER RACF command creates user ID AOPSTC in default group AOPOPER:

   ```
   ADDUSER AOPSTC OMVS(UID(dd) HOME('/tmp')
       PROGRAM('/bin/sh')) DFLTGRP(AOPOPER) NOPASSWORD
   ```

   The NOPASSWORD operand defines the user ID as a *protected* user ID. Protected user IDs cannot log on to the z/OS system, and they cannot be revoked due to incorrect password attempts.

   _____

6. Make sure that all user IDs for Infoprint Server administrators and operators are defined as z/OS UNIX users. The user ID must have an OMVS segment, and the user's default group must have an OMVS segment with a group identifier (GID). You can specify any home directory including the default directory. If a user ID is not a z/OS UNIX user, modify the user ID to add an OMVS segment and a default group that has an OMVS GID.

   Example: This RACF ALTUSER command modifies an existing user ID. For *userid*, specify an existing user ID. For *uu*, specify an integer that is different from other UIDs in your installation. For *group*, specify AOPOPER, AOPADMIN, or another group that has an OMVS GID. The user ID must be connected to the default group.

   ```
   ALTUSER userid OMVS(UID(uu) HOME('/tmp')
       PROGRAM('/bin/sh')) DFLTGRP(group)
   ```

   _____

7. Connect the Infoprint Server administrator user IDs to the AOPADMIN group.

   Example: This RACF CONNECT command connects the user ID for an administrator to the AOPADMIN group:

   ```
   CONNECT (userid) GROUP(AOPADMIN)
   ```

   _____

8. Define profiles for the Infoprint Server startup and shutdown procedures (AOPSTART and AOPSTOP) in the RACF STARTED class.

   Example: These commands assign the AOPSTC user ID to the AOPSTART and AOPSTOP procedures.

   ```
   RDEFINE STARTED AOPSTART.* STDATA(USER(AOPSTC) GROUP(AOPOPER))
   RDEFINE STARTED AOPSTOP.* STDATA(USER(AOPSTC) GROUP(AOPOPER))
   SETROPTS RACLIST(STARTED) REFRESH
   ```

   Tip: You can instead use the started procedure table (ICHRIN03).

   _____

9. Give universal RACF access to the Infoprint Server ISPF data sets. This lets all users view the Infoprint Server ISPF panels.

   Example: The RACF ADDGROUP command creates a group named AOP to own the data set resource profile. The RACF ADDSD command creates a generic data set resource profile that gives universal read access to data sets that start with AOP.SAOP:

   ```
   ADDGROUP (AOP) SUPGROUP(SYS1) OWNER(SYS1)
   ADDSD 'AOP.SAOP*' GENERIC OWNER(AOP) UACC(READ)
   ```

   _____

Related information:
- "RACF profiles and groups for Infoprint Server" on page 8
- "AOPSTART JCL procedure" on page 23
- "AOPSTOP JCL procedure" on page 24
- For information about how to define z/OS UNIX users to RACF, see *z/OS UNIX System Services Planning*.
- For information about the z/OS started procedure table (ICHRIN03), see *z/OS Security Server RACF Security Administrator's Guide* for more information.

Creating the Infoprint Server configuration file

In the Infoprint Server configuration file, **aopd.conf**, you specify the base directory for Infoprint Server files and the name of the Printer Inventory. This configuration file is required.

Configuration file aopd.conf

You can set these attributes in the **aopd.conf** configuration file:

base-directory = *path*
>   The directory path in which Infoprint Server creates Printer Inventory files and other files. The name of the directory path is case-sensitive. This attribute is required.
>
>   **Example:** To use the default name for the base directory, specify:
>
>   ```
>   base-directory = /var/Printsrv
>   ```
>
>   **Rule:** Do *not* change this attribute while Infoprint Server is running.
>
>   **Default:** None.

inventory = *inventory*

> The name of the Printer Inventory. Specify exactly 4 uppercase or lowercase letters or numbers. The inventory name is case-sensitive. This attribute is optional.
>
> If you want PSF to use the Printer Inventory, specify this name in the PSF startup procedure.
>
> **Rule:** If you change this attribute while Infoprint Server is running, stop and restart Infoprint Server. Also, restart all PSF FSSs that use the Printer Inventory.
>
> **Default:** `inventory = AOP1`

Related information:

- "Creating the aopd.conf configuration file"

Creating the aopd.conf configuration file

You must create the **aopd.conf** configuration file. These steps show how to create the **aopd.conf** configuration file in the **/etc/Printsrv** directory. If you want to create this file in a different directory, you must specify the full path name of the file in the AOPCONF environment variable.

To create the aopd.conf file:

1. On the z/OS UNIX command line, switch to an effective UID of 0:

   ```
   su
   ```

   To use the **su** command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

   _____

2. Copy the sample configuration file, **/usr/lpp/Printsrv/samples/aopd.conf**, to **/etc/Printsrv/aopd.conf**:

   ```
   cp /usr/lpp/Printsrv/samples/aopd.conf  /etc/Printsrv/aopd.conf
   ```

   If you copy the sample configuration file to a different location, specify the full path name of the configuration file in the AOPCONF environment variable in the **aopstart** EXEC and in the **/etc/profile** file.

   _____

3. Change the owner of the file to UID 0:

   ```
   chown 0 /etc/Printsrv/aopd.conf
   ```

   _____

4. Change the group owner to AOPADMIN. AOPADMIN is the suggested RACF group name for Infoprint Server administrators. However, you might have used a different name for this group.

   ```
   chgrp AOPADMIN /etc/Printsrv/aopd.conf
   ```

   _____

5. Change the permissions of the file so that it is readable by everyone and writeable only by UID 0 and members of the AOPADMIN group:

   ```
   chmod 664 /etc/Printsrv/aopd.conf
   ```

   _____

6. Edit the configuration file using your preferred editor and save your changes. For example:

```
oedit /etc/Printsrv/aopd.conf
```

The sample configuration file, **/usr/lpp.Printsrv/samples/aopd.conf**, also contains attributes that apply to customers who have purchased an Infoprint Server license. You should specify only these attributes:

- base-directory
- inventory

Edit this file using the IBM-1047 code page.

_____

7. Switch back to your own UID:

```
exit
```

_____

Syntax rules:
- Use lowercase characters for the attributes, and use uppercase or lowercase characters for the values.
- Use blank characters before or after the equal sign, if desired.
- Start comments with a pound sign (#).
- Include blank lines, if desired.

Related information:
- "Configuration file aopd.conf" on page 11
- "Setting environment variables" on page 16

Editing the aopd.conf configuration file

If you have already created the **aopd.conf** file, you can edit it to change values.

To edit the aopd.conf file:

1. On the z/OS UNIX command line, switch to an effective UID of 0:

```
su
```

To use the **su** command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

_____

2. Edit the configuration file using your preferred editor and save your changes. For example:

```
oedit /etc/Printsrv/aopd.conf
```

Edit this file using the IBM-1047 code page.

_____

3. Switch back to your own UID:

```
exit
```

_____

4. If Infoprint Server is running, stop and restart it. Enter these MVS™ commands:

```
START AOPSTOP
START AOPSTART
```

5. If you added or changed the **inventory** attribute, restart all PSF FSSs that use the Printer Inventory.

Syntax rules:
- Use lowercase characters for the attributes, and use uppercase or lowercase characters for the values.
- Use blank characters before or after the equal sign, if desired.
- Start comments with a pound sign (#).
- Include blank lines, if desired.

Related information:
- "Configuration file aopd.conf" on page 11
- "Creating the aopd.conf configuration file" on page 12

Setting permissions for directories and files

Before you start Infoprint Server for the first time, you must run the **aopsetup** shell script to create the **/var/Printsrv** directory and set the appropriate z/OS UNIX permissions for Infoprint Server directories and executable files. You must also run **aopsetup** when you move to a new z/OS release.

aopsetup shell script

The **aopsetup** shell script creates the **/var/Printsrv** directory if it does not already exist. If you specified a different directory in the **base-directory** attribute in the Infoprint Server configuration file (**aopd.conf**), **aopsetup** creates that directory instead of the **/var/Printsrv** directory.

aopsetup also sets the appropriate z/OS UNIX permissions for these Infoprint Server directories and files:

- **/var/Printsrv** directory:

  This directory contains the Printer Inventory files and other Infoprint Server files. **aopsetup** sets permissions so that this directory is:
  - Owned by UID of 0
  - Readable and writeable by members of the AOPADMIN group and users with an effective UID of 0
  - Executable by everyone

- Files in the **/usr/lpp/Printsrv/bin** directory:

  This directory contains Infoprint Server executable files. **aopsetup** sets file permissions for these commands and processes:
  - Administrative commands: Sets permissions so that commands (such as **pidu**) are executable only by members of the RACF group for Infoprint Server administrators (AOPADMIN) and users with an effective UID of 0.
  - Operator commands: Sets permissions so that commands (such as **aopstart**) are executable only by members of the RACF group for Infoprint Server operators (AOPOPER) and users with an effective UID of 0.
  - **aopd**: Sets the set-group-ID bit on.

  Tip: aopsetup does not set permissions for all files in this directory. Therefore, you cannot copy this directory to another system and use **aopsetup** to restore all the original permissions.

The **aopsetup** shell script requires two positional arguments:

```
aopsetup operator-group administrator-group
```

operator-group
> The name of the RACF group you created for Infoprint Server operators. The suggested RACF group name is AOPOPER. However, you might have used a different name for this group. This argument is required.

administrator-group
> The name of the RACF group you created for Infoprint Server administrators. The suggested RACF group name is AOPADMIN. However, you might have used a different name for this group. This argument is required.

Related information:
- "Steps for setting up security" on page 9
- "Running aopsetup"

Running aopsetup

You must run **aopsetup** before you start Infoprint Server for the first time. Also, you must run **aopsetup** whenever you move to a new z/OS release.

Before you begin:
- Define the RACF groups for Infoprint Server operators and administrators.
- Create the Infoprint Server configuration file (**aopd.conf**) and specify the **base-directory** attribute in it.
- Make sure that the file systems that contain the **/usr/lpp/Printsrv/bin** and **/var** or **/var/Printsrv** directories are mounted read/write.
- You should run **aopsetup** before you start Infoprint Server. However, if you attempted to start Infoprint Server before running **aopsetup**, stop Infoprint Server before doing this step.

To run aopsetup:

1. On the z/OS UNIX command line, switch to an effective UID of 0:
   ```
   su
   ```

   To use the z/OS UNIX **su** command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

   _____

2. Run **aopsetup**. You can run **aopsetup** from an rlogin shell or from an OMVS session.

   Examples:
   - If you defined group AOPOPER for operators and group AOPADMIN for administrators, enter:
     ```
     /usr/lpp/Printsrv/bin/aopsetup AOPOPER AOPADMIN
     ```
   - If you want to run **aopsetup** while the **/usr/lpp/Printsrv** directory is mounted at a **/service** mount point, specify the service directory in the INSTALL_DIR environment variable. For example, enter:
     ```
     INSTALL_DIR=/service/usr/lpp/Printsrv aopsetup AOPOPER AOPADMIN
     ```

   _____

3. Switch back to your own UID:
   ```
   exit
   ```

Results: If you specified the AOPOPER and AOPADMIN groups as arguments to **aopsetup**, output from the z/OS UNIX **ls** command should look similar to the sample output shown. Also, the owner ID of the **/var/Printsrv** directory and the executable files, shown as ROOT in the sample output, should have a UID of 0.

- `ls -d -E /var/Printsrv`

```
drwxrwx--x      11 ROOT   AOPADMIN ... ... /var/Printsrv
```

- `ls -E /usr/lpp/Printsrv/bin`

```
...
-rwx--S--- a---  2 ROOT   AOPADMIN ... ... aopd
-rwxr-x--- --s-  2 ROOT   AOPADMIN ... ... aoplogu
-rwxr-x--- a-s-  2 ROOT   AOPOPER  ... ... aopsend
-rwsr-xr-- --s-  2 ROOT   AOPOPER  ... ... aopstart
-rwxr-x--- a-s-  2 ROOT   AOPOPER  ... ... aopstat
-rwsr-x--- a-s-  2 ROOT   AOPOPER  ... ... aopstop
-rwxr-x--- a-s-  2 ROOT   AOPADMIN ... ... hinvu
-rwxr-x--- --s-  2 ROOT   AOPADMIN ... ... pidu
-rwxr-x--- a-s-  2 ROOT   AOPADMIN ... ... sdbu
```

Tip: To display the UID of the owner ID, you can use the **-n** option on the **ls** command.

Related information:
- "Creating the aopd.conf configuration file" on page 12
- "aopsetup shell script" on page 14
- "Setting up security" on page 8
- "Checking permissions settings" on page 108

Setting environment variables

Environment variables define the Infoprint Server environment in the z/OS system. You can specify environment variables for Infoprint Server in these places:

- **/etc/profile file:** Infoprint Server commands, such as the **pidu** command, use environment variables set in this file.
- **aopstart EXEC:** For a secure environment, Infoprint Server daemons use environment variables set in this EXEC.
- **STDENV data set:** Infoprint Server daemons can use certain environment variables (such as environment variables that control tracing and locale) set in the STDENV data set of the AOPSTART and AOPSTOP JCL procedures.

Environment variables

Table 3 lists the environment variables that affect the behavior of Infoprint Server and where you set each variable. **Required** variables are required in all installations. **Optional** variables are required only if the default value is not suitable for your installation.

Table 3. Environment variables

Environment variable	Location where set		
	/etc/profile file	aopstart EXEC	STDENV data set (AOPSTART JCL procedure)
_BPX_SHAREAS	No	Required [1]	No

Table 3. Environment variables (continued)

Environment variable	Location where set		
	/etc/profile file	aopstart EXEC	STDENV data set (AOPSTART JCL procedure)
AOPCONF	Optional	Optional	No
AOPTRACEON	Optional	Optional	Optional
AOPTRACEDIR	No	Optional	No
AOPVALIDATEDB	No	Optional	Optional
LANG	Optional	Optional	Optional
LC_ALL	Optional	Optional	Optional
LC_CTYPE	Optional	Optional	Optional
LC_TIME	Optional	Optional	Optional
LIBPATH	Required	Required [1]	No
NLSPATH	Required	Required [1]	No
PATH	Required	Required [1]	No
1. The default **aopstart** EXEC sets these required environment variables to the default values. You do not need to set them in the **aopstart** EXEC if the default values are suitable.			

The environment variables are:

_BPX_SHAREAS
> Causes the spawn() callable service to create some Infoprint Server subtasks in the parent's address space. This variable is set to _BPX_SHAREAS=YES in the **aopstart** EXEC. Do not remove this variable or change its value.

AOPCONF   The full path name of the Infoprint Server configuration file (**aopd.conf**). This environment variable is optional. If you created the configuration file in **/etc/Printsrv/aopd.conf**, you do not need to set this environment variable.

> Set this environment variable in both the **/etc/profile** file and in the **aopstart** EXEC.

> **Default:** /etc/Printsrv/aopd.conf

AOPTRACEDIR
> The name of the trace directory. This environment variable is optional. Specify it only if you set the AOPTRACEON environment variable and the default trace directory is not suitable. The AOPADMIN group must have permission to write to the specified trace directory.

> Set this environment variable in the **aopstart** EXEC.

> **Default:** *base-directory*/trace

> If you use the default base directory, the default is **/var/Printsrv/trace**.

> **Example:** AOPTRACEDIR=/mydirectory/trace

AOPTRACEON

If this environment variable is set to any value, Infoprint Server traces processing. This environment variable is optional. Specify it only if instructed to do so by IBM service personnel.

To trace Infoprint Server commands, such as the **pidu** command, set this environment variable in the **/etc/profile** file. To trace Infoprint Server daemons, set this environment variable in either the **aopstart** EXEC or in the STDENV data set.

To turn tracing off, restart Infoprint Server without specifying this environment variable.

Default: The environment variable is not set.

Examples:
```
AOPTRACEON=1
AOPTRACEON=ON
```

AOPVALIDATEDB

If this environment variable is set to any value, Infoprint Server checks internal databases for validity when it starts. This environment variable is optional. Specify it only if an Infoprint Server message indicates that the databases might be corrupted or if instructed to do so by IBM service personnel.

Set this environment variable in either the **aopstart** EXEC or in the STDENV data set.

Default: The environment variable is not set.

Example: `AOPVALIDATEDB=yes`

LANG
The language used for messages. Infoprint Server provides messages in English and Japanese. Specify `En_US` for English messages, or `Ja_JP` for Japanese messages. This environment variable is optional. Specify it only if the default value is not suitable.

Set this environment variable in the **/etc/profile** file. Also, set this environment variable in either the **aopstart** EXEC or the STDENV data set.

Default: `C` (equivalent to En_US)

LC_ALL
The locale used to format time and date information in messages. This locale overrides the locale in the LC_TIME variable. This environment variable is optional. Specify it only if the default value is not suitable.

Set this environment variable in the **/etc/profile** file. Also, set this environment variable in either the **aopstart** EXEC or the STDENV data set.

Example: `LC_ALL=Fr_FR.IBM-297`

Default: `C` (also called POSIX)

LC_CTYPE
The locale that determines the EBCDIC code page used to validate Infoprint Server attribute values. This environment variable is optional. Specify it only if the default value is not suitable.

Set this environment variable in the **/etc/profile** file. Also, set this environment variable in either the **aopstart** EXEC or the STDENV data set.

Example: `LC_CTYPE=Fr_FR.IBM-297`

Default: `C` (also called POSIX). The default code page is IBM-1047.

LC_TIME   The locale used to format time and date information in messages. This environment variable is optional. Specify it only if the default value is not suitable.

Set this environment variable in the **/etc/profile** file. Also, set this environment variable in either the **aopstart** EXEC or the STDENV data set.

Default: `C` (also called POSIX)

LIBPATH   The path used to find Infoprint Server dynamic link library (DLL) files. This environment variable is required.

If you installed Infoprint Server files in the default directory, add **/usr/lpp/Printsrv/lib** to existing values in the **/etc/profile** file.

If you installed Infoprint Server files in a non-default directory, add the directory to existing values in the **/etc/profile** file and in the **aopstart** EXEC.

Default: `/usr/lpp/Printsrv/lib` (default set in **aopstart** EXEC only)

NLSPATH   The path of directories that contain message catalogs. This environment variable is required.

If you installed Infoprint Server files in the default directory and the LANG environment variable identifies the language in which you want to receive Infoprint Server messages, add **/usr/lpp/Printsrv/%L/%N** to the existing values in the **/etc/profile** file. Otherwise, add one of these values:

English: `/usr/lpp/Printsrv/En_US/%N`

Japanese: `/usr/lpp/Printsrv/Ja_JP/%N`

%L represents the value of the LANG environment variable. **%N** is the catalog file name.

If you installed Infoprint Server files in a non-default directory, add the directory to the existing values in the **/etc/profile** file and in the **aopstart** EXEC.

Default: `/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv/En_US/%N:/usr/lib/nls/msg/%L/%N` (default set in **aopstart** EXEC only)

PATH   The path used to locate executables. This environment variable is required.

If you installed Infoprint Server executables in the default directory, add **/usr/lpp/Printsrv/bin** to the existing values in the **/etc/profile** file.

If you installed Infoprint Server executables in a non-default directory, add the directory to existing values in the **/etc/profile** file and in the **aopstart** EXEC.

Default: `/usr/lpp/Printsrv/bin:/bin` (default set in **aopstart** EXEC only)

Related information:
- "Editing the /etc/profile file"
- "Creating an aopstart EXEC"
- For information about environment variables, see *z/OS UNIX System Services User's Guide*.
- For information about the LANG, LC_ALL, LC_CTYPE, and LC_TIME environment variables, see *z/OS UNIX System Services Command Reference*.

Editing the /etc/profile file

Infoprint Server commands, such as the **pidu** command, use environment variables set in the **/etc/profile** file. You must edit the **/etc/profile** file to set the required environment variables.

To edit the /etc/profile file:

1. On the z/OS UNIX command line, switch to an effective UID of 0:

   ```
   su
   ```

   To use the **su** command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

   _____

2. Edit the **/etc/profile** file using your preferred editor and save your changes. For example:

   ```
   oedit /etc/profile
   ```

   If you installed Infoprint Server libraries in the default locations, add these statements to set the required environment variables:

   ```
   export LIBPATH=/usr/lpp/Printsrv/lib:$LIBPATH
   export NLSPATH=/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv/En_US/%N:$NLSPATH
   export PATH=/usr/lpp/Printsrv/bin:$PATH
   ```

   _____

3. Switch back to your own UID:

   ```
   exit
   ```

   _____

Related information:
- "Environment variables" on page 16

Creating an aopstart EXEC

Infoprint Server provides an **aopstart** EXEC in **/usr/lpp/Printsrv/bin** that sets the required environment variables to the default values and starts Infoprint Server. If you need to change the value of the environment variables or specify additional ones, or if you installed Infoprint Server files in a non-default directory, you must create an **aopstart** EXEC for your installation.

In the **aopstart** EXEC, you can:
- Change the value of any environment variable that is set in the EXEC.
- Set a new environment variable in this format:

   ```
   n=n+1;env.n='environment_variable=value'
   ```

Specify all environment variables before this statement that is in the EXEC:

```
env.0=n
```

Example:

```
n=n+1;env.n='AOPTRACEDIR=/mydirectory/trace'
env.0=n
```

- Edit this statement to change the name of the directory where Infoprint Server files are installed:

```
install_path='/usr/lpp/Printsrv'
```

Rule: The owner of the **aopstart** file must be UID 0. In addition, for a secure environment, only users with a UID of 0 should be permitted to write the file.

To create an aopstart EXEC;

1. Switch to an effective UID of 0:

```
su
```

To use the z/OS UNIX **su** command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

_____

2. Copy the default **aopstart** EXEC to another directory, such as **/usr/local/bin/**:

```
cp /usr/lpp/Printsrv/bin/aopstart /usr/local/bin/
```

You must copy the file because you should not modify the directory that contains Infoprint Server executable files.

_____

3. Change to the directory where the **aopstart** EXEC exists:

```
cd /usr/local/bin
```

_____

4. Change the owner of the **aopstart** file to UID 0:

```
chown 0 aopstart
```

_____

5. Change the group owner of the **aopstart** file to AOPOPER. AOPOPER is the suggested RACF group name for Infoprint Server operators. However, you might have used a different name for this group.

```
chgrp AOPOPER aopstart
```

_____

6. Edit the new **aopstart** file using your preferred editor and save your changes. For example:

```
oedit aopstart
```

Edit this file using the IBM-1047 code page. For additional instructions, see the comments in the **aopstart** EXEC.

_____

7. Change the permissions for the file. Make the file writeable by only UID 0, readable by everyone, and executable only by UID 0 and members of the AOPOPER group. Also, set the **set-uid-flag** on. For example:

```
chmod 4754 aopstart
```

> **Tip:** Do this step after you edit the file because the **set-uid-flag** is turned off when you edit a file.

8. Switch back to your own UID:

   ```
   exit
   ```

9. Specify the full path name of the **aopstart** EXEC on the PARM parameter in the AOPSTART JCL procedure. For example:

   ```
   //AOPSTART EXEC PGM=AOPBATCH,PARM='//usr/local/bin/aopstart',
   //    TIME=NOLIMIT
   ```

Related information:
- "Environment variables" on page 16
- "Editing the AOPSTART JCL procedure" on page 25

Editing an aopstart EXEC

If you have previously created an **aopstart** EXEC for your installation, you can edit it to change the environment variables. After you edit this file, you must restart Infoprint Server so that it uses the new values.

To edit the aopstart EXEC:

1. Switch to an effective UID of 0:

   ```
   su
   ```

   To use the z/OS UNIX **su** command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

2. Change to the directory where you have copied the **aopstart** EXEC. For example:

   ```
   cd /usr/local/bin
   ```

3. Edit the **aopstart** file using your preferred editor and save your changes. For example:

   ```
   oedit aopstart
   ```

   Edit this file using the IBM-1047 code page. For additional instructions, see the comments in the **aopstart** EXEC.

4. Set the **set-uid-flag** on. For example:

   ```
   chmod 4754 aopstart
   ```

   > **Tip:** Do this step after you edit the file because the **set-uid-flag** is turned off when you edit a file.

5. Switch back to your own UID:

   ```
   exit
   ```

Related information:
- "Environment variables" on page 16
- "Creating an aopstart EXEC" on page 20

Creating an STDENV data set

You can specify any of these environment variables in a z/OS UNIX file or MVS data set that the STDENV DD statement of the AOPSTART JCL procedure points to:
- AOPTRACEON
- AOPVALIDATEDB
- LANG
- LC_ALL, LC_CTYPE, LC_TIME

For security purposes, you can specify only a limited set of environment variables in the STDENV data set. You must specify all other environment variables in the **aopstart** EXEC, which only authorized users can edit.

Tip: If you specify an environment variable in the **aopstart** EXEC, you do not need to specify it in the STDENV data set.

In the STDENV data set, specify each environment variable in the format *variable=value*. Specify one environment variable per line or record, starting in column 1. For example:

```
AOPTRACEON=1
```

The MVS data set must have these DCB attributes:
- RECFM=VB
- LRECL=255

The user ID associated with the AOPSTART procedure must be authorized to read the STDENV data set or file. To authorize the user ID:
- **MVS data set:** Give the AOPOPER group RACF authorization to read the data set.
- **UNIX file:** Make group AOPOPER the owner of the file. Set the z/OS UNIX permission bits to let the group read the file.

Related information:
- "Environment variables" on page 16
- "Editing the AOPSTART JCL procedure" on page 25

Creating Infoprint Server startup and shutdown procedures

To start and stop Infoprint Server, you use the AOPSTART and AOPSTOP JCL procedures. You might need to edit the procedures. In addition, you must create a z/OS UNIX user ID that is assigned to the procedures and define the procedures to RACF.

AOPSTART JCL procedure

The AOPSTART JCL procedure invokes the **aopstart** command to start Infoprint Server. AOPSTART is shipped in SYS1.IBM.PROCLIB. However, during install it might have been copied to another data set in the PROCLIB concatenation.

Figure 2 shows the AOPSTART procedure that Infoprint Server provides in
SYS1.IBM.PROCLIB.

```
//*------------------------------------------------------------------
//*
//*  AOPSTART - This procedure starts the Infoprint Server daemons.
//*             The USERID assigned to this proc must be a member of
//*             the AOPOPER group.
//*
//*------------------------------------------------------------------
//AOPSTART PROC
//*------------------------------------------------------------------
//*  AOPBATCH PARM specifies the path of the program to be run.
//*  If Infoprint Server was not installed in /usr/lpp/Printsrv,
//*  then this path must be changed as required for the installation
//*  directory.
//*------------------------------------------------------------------
//AOPSTART EXEC PGM=AOPBATCH,PARM='//usr/lpp/Printsrv/bin/aopstart',
//         REGION=512M,
//         TIME=NOLIMIT
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
//*------------------------------------------------------------------
//*  STDENV is optionally used to specify environment variables.
//*
//*  A Unix System Services file can be specified, for example:
//*    //STDENV  DD  PATH='/etc/Printsrv/env.conf',PATHOPTS=ORDONLY
//*
//*  or an MVS data set, for example:
//*    //STDENV  DD  DISP=SHR,DSN=hlq.stdenv
//*
//*  This file or data set should contain VARIABLE=VALUE pairs
//*  starting in column 1, for example:
//*
//*  AOPTRACEON=1
//*------------------------------------------------------------------
```

Figure 2. AOPSTART startup procedure — SYS1.IBM.PROCLIB(AOPSTART)

Related information:
- "Editing the AOPSTART JCL procedure" on page 25
- "Starting Infoprint Server with the AOPSTART JCL procedure" on page 35

AOPSTOP JCL procedure

The AOPSTOP procedure invokes the **aopstop** command to stop Infoprint Server.
AOPSTOP is shipped in SYS1.IBM.PROCLIB. However, during install it might have
been copied to another data set in the PROCLIB concatenation.

Figure 3 on page 25 shows the AOPSTOP procedure provided in
SYS1.IBM.PROCLIB.

```
//*-------------------------------------------------------------------
//*
//*  AOPSTOP - This procedure stops the Infoprint Server daemons.
//*            The USERID assigned to this proc should be a member
//*            of the AOPOPER group.
//*
//*-------------------------------------------------------------------
//AOPSTOP  PROC OPTIONS=
//*-------------------------------------------------------------------
//*  AOPBATCH PARM specifies the path of the program to be run.
//*  If Infoprint Server was not installed in /usr/lpp/Printsrv,
//*  then this path should be changed as required for the installation
//*  directory.
//*-------------------------------------------------------------------
//AOPSTOP  EXEC PGM=AOPBATCH,
//    PARM='//usr/lpp/Printsrv/bin/aopstop &OPTIONS'
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
//*-------------------------------------------------------------------
//*  STDENV is optionally used to specify environment variables.
//*
//*  A Unix System Services file can be specified, for example:
//*    //STDENV  DD  PATH='/etc/Printsrv/env.conf',PATHOPTS=ORDONLY
//*
//*  or an MVS data set, for example:
//*    //STDENV  DD  DISP=SHR,DSN=hlq.stdenv
//*
//*  This file or data set should contain VARIABLE=VALUE pairs
//*  starting in column 1, for example:
//*
//*  AOPCONF=/etc/Printsrv/aopd.conf
//*-------------------------------------------------------------------
```

Figure 3. AOPSTOP shutdown procedure — SYS1.IBM.PROCLIB(AOPSTOP)

Related information:
- "Editing the AOPSTOP JCL procedure" on page 26
- "Stopping Infoprint Server with the AOPSTOP JCL procedure" on page 36

Editing the AOPSTART JCL procedure

You must edit the AOPSTART JCL procedure in these situations:

- You want to specify a different region size in the EXEC statement.
- You need to specify the directory path for the **aopstart** EXEC you created for your installation in the PARM parameter of the EXEC statement.
- You need to set environment variables in the STDENV data set.

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

- Read the data set or file specified in the STDENV DD statement.
- Read and write to the data set or file specified in the STDOUT and STDERR DD statements.

To authorize the user ID:

- **MVS data set:** Give the AOPOPER group RACF authorization to read or write to the data set.
- **UNIX file:** Make group AOPOPER the owner of the file and set the UNIX permission bits to let the group read the file.

Editing the AOPSTOP JCL procedure

You must edit the AOPSTOP JCL procedure if any of these conditions apply to your installation:

- If the **aopstop** command is not in the default directory **/usr/lpp/Printsrv/bin**, specify the directory in the PARM parameter on the EXEC statement.
- If the Infoprint Server configuration file is not in the default location **/etc/Printsrv/aopd.conf**, specify the location of the file in the AOPCONF environment variable in a data set referred to by the STDENV DD statement.

  The AOPSTOP JCL procedure does not use environment variables that are set elsewhere, for example in the **/etc/profile** file.

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

- Read the data set or file specified in the STDENV DD statement.
- Read and write to the data set or file specified in the STDOUT and STDERR DD statements.

To authorize the user ID:

- **MVS data set:** Give the AOPOPER group RACF authorization to read or write to the data set.
- **z/OS UNIX file:** Make group AOPOPER the owner of the file and set the UNIX permission bits to let the group read the file.

Starting Infoprint Server automatically

To start Infoprint Server automatically during system initialization, you can use z/OS automation tools to execute the AOPSTART procedure.

Rule: Start Infoprint Server before you start any PSF printers in a PSF FSS that uses the Printer Inventory.

Enabling ISPF panels

You must enable the Infoprint Server ISPF panels so that administrators can work with PSF FSS and PSF FSA definitions in the Printer Inventory. Administrators can view Infoprint Server ISPF panels in English or Japanese.

Note: Not all Infoprint Server ISPF panels have been translated into Japanese.

Defining libraries in the TSO logon procedure

You must define the Infoprint Server ISPF panel libraries in the TSO logon procedure.

To define libraries in the TSO logon procedure:

1. Concatenate one of these panel libraries to DD statement ISPPLIB, depending on the language in which you want to view the panels:

   English   AOP.SAOPPENU
   Japanese   AOP.SAOPPJPN

   _____

2. Concatenate one of these message libraries to DD statement ISPMLIB, depending on the language in which you want to receive messages:

   English   AOP.SAOPMENU
   Japanese   AOP.SAOPMJPN

   _____

3. Concatenate library AOP.SAOPEXEC to DD statement SYSPROC or SYSEXEC.

   _____

4. (Optional) If you did not add the Language Environment runtime libraries (CEE.SCEERUN and SCEERUN2) or the C++ runtime library (CBC.SCLBDLL) to the system LNKLST, concatenate them to the ISPLLIB DD statement, or concatenate them to STEPLIB. You can use the TSOLIB function of TSO/E to do this.

   _____

Displaying the Infoprint Server panel option

ISPF provides sample ISPF panels to enable panels for most z/OS elements. The system programmer panel, ISR@390S, includes an entry for Infoprint Server. If you are not using the default ISPF panels, customize ISPF to display the **Infoprint Server** option. For information about how to use these sample panels to customize ISPF, see _z/OS Program Directory_.

AOPINIT EXEC

The AOPINIT EXEC in AOP.SAOPEXEC(AOPINIT) sets default values for the Infoprint Server ISPF panels. Table 4 shows the values that you can change in AOPINIT if they are not suitable for your installation.

Table 4. AOPINIT EXEC values

Value	Description
Base directory	The directory where Infoprint Server programs are installed. The default directory is **/usr/lpp/Printsrv**.
Configuration file	The full path name of the Infoprint Server configuration file. The default name is **/etc/Printsrv/aopd.conf**.
Language	The value of the LANG and LC_ALL environment variables. The default is **En_US** (equivalent to C).
NLS path	The directory where the Infoprint Server message catalog is installed. If the LANG environment variable identifies the language in which you want to receive Infoprint Server messages, specify **/usr/lpp/Printsrv/%L/%N**. Otherwise, add one of these values: **English:** /usr/lpp/Printsrv/En_US/%N **Japanese:** /usr/lpp/Printsrv/Ja_JP/%N The default is **/usr/lpp/Printsrv/%L/%N**.
Trace file	The path name of the file where Infoprint Server writes a trace of the ISPF panels. The default file name is **/var/Printsrv/trace**.

Related information:
- "Editing the AOPINIT file"

Editing the AOPINIT file

You can edit the AOPINIT file to change the default configuration for Infoprint Server ISPF panels.

Tip: ISPF users can change most of these values on the ISPF Configuration panel. However, ISPF users cannot change the base directory.

To edit the AOPINIT file:

1. Copy AOPINIT from AOP.SAOPEXEC(AOPINIT) to a local library.

   _____

2. Follow the instructions in the comments in AOPINIT to make your changes.

   _____

3. Add the local library that contains AOPINIT to the SYSPROC or SYSEXEC DD statement of each user's TSO logon procedure at the beginning of the search order.

   _____

Related information:
- "AOPINIT EXEC" on page 27

Backing up the Printer Inventory

You should back up the Printer Inventory on a regular basis. You can use the Infoprint Server Printer Inventory Definition Utility (PIDU) to back up and restore the Printer Inventory to one of these types of files:
- A UNIX file
- A data set in a generation data group (GDG)

Backing up the Printer Inventory to a UNIX file

You can back up the Printer Inventory to a UNIX file. This section shows how to back up the Printer Inventory at 3 AM each day to file:

/var/Printsrv.backups/inventory.backup.*yymmdd*

The date of the backup is *yymmdd*.

Rule: Do not use copy commands to create a backup copy of the Printer Inventory because the copy might contain inconsistent data that makes the Printer Inventory unusable.

Before you begin:
- Create a separate file system mounted at **/var/Printsrv.backups**. Do not back up the Printer Inventory to files in the **/var/Printsrv** file system because the backup files can be large.
- Make sure that you are a member of the AOPADMIN group and have READ access to the AOP.ADMINISTRATOR resource profile in the PRINTSRV class.

To back up the Printer Inventory to a UNIX file:

1. Create a file to contain a short shell script, such as **/u/**_userid_**/do.backup**. Your login user ID is _userid_.

   If you set the PATH, NLSPATH, and optional AOPCONF environment variables with the values required by Infoprint Server in **/etc/profile** or **/u/**_userid_**/.profile**, put these lines in the file:

   ```
   . /etc/profile
   . /u/userid/.profile
   export extension=$(date "+%y%m%d")
   pidu -c "export /var/Printsrv.backups/inventory.backup.$extension;"
   ```

   Otherwise, put the following lines in the file to export the environment variables. You can omit the AOPCONF variable if the Infoprint Server configuration file is **/etc/Printsrv/aopd.conf**.

   ```
   export PATH=/usr/lpp/Printsrv/bin:/bin:$PATH
   export NLSPATH=/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv/En_US/%N:$NLSPATH
   export AOPCONF=/etc/Printsrv/aopd.conf
   export extension=$(date "+%y%m%d")
   pidu -c "export /var/Printsrv.backups/inventory.backup.$extension;"
   ```

   To automatically delete all files in the **/var/Printsrv.backups** directory that were created more than five days ago, add this command to the shell script:

   ```
   rm $(find /var/Printsrv.backups -ctime "+5")
   ```

   Tip: When the **cron** daemon runs the commands in your **crontab** entry, it does not first run your **.profile** to establish environment variables.

   _____

2. Set the execute permission bit for the **/u/**_userid_**/do.backup** shell script. For example:

   ```
   chmod +x /u/userid/do.backup
   ```

   _____

3. Use the **crontab** command with the **-e** option to insert this line into the **crontab** entry:

   ```
   00 03 * * * /u/userid/do.backup
   ```

   _____

Related information:
- "Setting up security" on page 8
- Chapter 5, "Using the Printer Inventory Definition Utility (PIDU)," on page 47
- For information about the **crontab** command and the **cron** daemon, see _z/OS UNIX System Services Command Reference_.

Backing up the Printer Inventory to a GDG

You can back up the Printer Inventory to a generation data group (GDG). This section shows how to back up the Printer Inventory at 3 AM each day.

Rule: Do not use copy commands to create a backup copy of the Printer Inventory because the copy might contain inconsistent data that makes the Printer Inventory unusable.

Before you begin: Make sure that you are a member of the AOPADMIN group and have READ access to the AOP.ADMINISTRATOR resource profile in the PRINTSRV class.

To back up the Printer Inventory to a GDG:

1. Create a GDG. This sample JCL creates a GDG for which five generation data sets are maintained:

```
//AOPGDG    JOB   MSGLEVEL=(1,1)
//STEP1     EXEC  PGM=IDCAMS
//SYSPRINT  DD    SYSOUT=*
//SYSIN     DD    *
  DEFINE GDG (NAME(hlq.INV.BACKUPS) NOEMPTY SCRATCH LIMIT(5))
/*
```

———

2. Use one of these methods to run the **pidu export** command to back up the Printer Inventory to a new data set in GDG *hlq*.INV.BACKUPS:

   - Run the **pidu export** command as a batch job:

```
//AOPBINV  JOB  MSGLEVEL=(1,1)
//STEP1    EXEC PGM=AOPBATCH,PARM='/pidu -c "export //DD:INVENT;"'
//INVENT   DD   DISP=(NEW,CATLG),DSN=hlq.INV.BACKUPS(+1),
//              DCB=(RECFM=VB,LRECL=32756,BLKSIZE=32760),
//              UNIT=SYSDA,SPACE=(TRK,(50,10),RLSE)
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
//STDENV   DD   *
NLSPATH=/usr/lpp/Printsrv/En_US/%N
AOPCONF=/etc/Printsrv/aopd.conf
/*
```

   If Infoprint Server files are located in the default locations, you can omit the STDENV DD statement.

   - Run the **pidu export** command as a **cron** job:

     a. Create a file to contain a short shell script, such as **/u/***userid***/do.backup**. Your login user ID is *userid*.

        If you set the PATH, NLSPATH, and optional AOPCONF environment variables with the values required by Infoprint Server in **/etc/profile** or **/u/***userid***/.profile**, put these lines in the file:

```
. /etc/profile
. /u/userid/.profile
pidu -c "export //\'hlq.INV.BACKUPS\(\+1\)\';"
```

        Otherwise, put the following lines in the file to export the variables. You can omit the AOPCONF variable if the Infoprint Server configuration file is **/etc/Printsrv/aopd.conf**.

```
export PATH=/usr/lpp/Printsrv/bin:/bin:$PATH
export NLSPATH=/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv/En_US/%N:$NLSPATH
export AOPCONF=/etc/Printsrv/aopd.conf
pidu -c "export //\'hlq.INV.BACKUPS\(\+1\)\' ;"
```

        Tip: When the **cron** daemon runs the commands in your **crontab** entry, it does not first run your **.profile** to establish environment variables.

        ———————————————————————————————————————

     b. Set the execute permission bit for the **/u/***userid***/do.backup** shell script. For example:

```
chmod +x /u/userid/do.backup
```

        ———————————————————————————————————————

     c. Use the **crontab** command with the **-e** option to insert this line into the **crontab** entry to back up the Printer Inventory at 3 AM each day.

```
00 03 * * * /u/userid/do.backup
```

        ———————————————————————————————————————

Related information:
- "Setting up security" on page 8
- Chapter 5, "Using the Printer Inventory Definition Utility (PIDU)," on page 47
- For information about the **crontab** command and the **cron** daemon, see *z/OS UNIX System Services Command Reference*.

Restoring the Printer Inventory

You might need to restore the Printer Inventory if the Printer Inventory has an error. You can use the Infoprint Server Printer Inventory Definition Utility (PIDU) to restore the Printer Inventory from one of these types of files:
- A UNIX file
- A data set in a generation data group (GDG)

Restoring the Printer Inventory from a UNIX file

You can restore the Printer Inventory from a UNIX file. This section describes how to restore the Printer Inventory from a specified date and time.

Rule: Do not use copy commands to restore the Printer Inventory because the copy might contain inconsistent data that makes the Printer Inventory unusable.

Before you begin: Make sure that you are a member of the AOPADMIN group and have UPDATE access to the AOP.ADMINISTRATOR resource profile in the PRINTSRV class.

To restore the Printer Inventory from a UNIX file:

1. Stop Infoprint Server. For example, enter this MVS command to run the AOPSTOP JCL procedure:

   ```
   START AOPSTOP
   ```

   _____

2. Move the **/var/Printsrv/master.v2db**, **/var/Printsrv/jestoken.v2db**, and **pwjestoken.v2db** files to another directory. Save these files until you have restored the Printer Inventory, restarted Infoprint Server, and run with the restored Printer Inventory for a few days.

   _____

3. Start Infoprint Server. For example, enter this MVS command to run the AOPSTART JCL procedure:

   ```
   START AOPSTART
   ```

   Do the next step immediately after you start Infoprint Server.

   _____

4. Run the **pidu** command to restore the Printer Inventory. This example shows how to restore the Printer Inventory from file:

   /var/Printsrv.backups/inventory.backup.*yymmdd*

   This command uses the UNIX redirection symbols (> for **stdout** and 2> for **stderr**) to redirect command output to file **pidu.output,** and command errors to file **pidu.errors**:

   ```
   pidu /var/Printsrv.backups/inventory.backup.yymmdd >pidu.output 2>pidu.errors
   ```

Restoring the Printer Inventory from a GDG

You can restore the Printer Inventory from a generation data group (GDG). These steps show how to restore the latest data set in the GDG.

Rule: Do not use copy commands to restore the Printer Inventory because the copy might contain inconsistent data that makes the Printer Inventory unusable.

Before you begin: Make sure that you are a member of the AOPADMIN group and have UPDATE access to the AOP.ADMINISTRATOR resource profile in the PRINTSRV class.

To restore the Printer Inventory from a GDG:

1. Stop Infoprint Server. For example, enter this MVS command to run the AOPSTOP JCL procedure:

   ```
   START AOPSTOP
   ```

2. Move the **/var/Printsrv/master.v2db**, **/var/Printsrv/jestoken. v2db**, and **pwjestoken.v2db** files to another directory. Save these files until you have restored the Printer Inventory, restarted Infoprint Server, and run with the restored Printer Inventory for a few days.

3. Start Infoprint Server. For example, enter this MVS command to run the AOPSTART JCL procedure:

   ```
   START AOPSTART
   ```

   Do the next step immediately after you start Infoprint Server.

4. Use one of these methods to restore the Printer Inventory from the most recent generation data set of a GDG named *hlq*.INV.BACKUPS:

   - Run the **pidu** command as a batch job:

     ```
     //AOPRINV  JOB  MSGLEVEL=(1,1)
     //STEP1    EXEC PGM=AOPBATCH,PARM='/pidu //DD:INVENT'
     //INVENT   DD   DISP=SHR,DSN=hlq.INV.BACKUPS(0)
     //STDOUT   DD   SYSOUT=*
     //STDERR   DD   SYSOUT=*
     //STDENV   DD   *
     NLSPATH=/usr/lpp/Printsrv/En_US/%N
     AOPCONF=/etc/Printsrv/aopd.conf
     /*
     ```

     If Infoprint Server files are located in the default locations, you can omit the STDENV DD statement.

   - Run the **pidu** command from the **sh** command:

     a. Create a file to contain a short shell script, such as **/u/**_userid_**/do.restore**. Your login user ID is *userid*. This example shows how to restore the Printer Inventory from the most recent generation data set of a GDG

named *hlq*.INV.BACKUPS. This example uses the UNIX redirection symbols (> for **stdout** and 2> for **stderr**) to redirect command output to file **pidu.output** and command errors to file **pidu.errors**:

```
pidu //\'hlq.INV.BACKUPS\(0\)\' >pidu.output 2>pidu.errors
```

---

b. Run the **sh** command to restore the Printer Inventory by running the **pidu** command in the **/u/***userid***/do.restore** shell script:

```
sh /u/userid/do.restore
```

Tip: Use the **sh** command to run the **pidu** command in the **/u/userid/do.restore** shell script instead of running the **pidu** command directly. GDG relative generations are maintained for the duration of the UNIX shell created when you log in to z/OS UNIX System Services. Using the **sh** command to create a new shell ensures that the current generation is always 0. For example, these commands create a new generation data set and then display the generation data set prior to the newly created data set:

```
pidu -c "export //\'hlq.INV.BACKUPS\(\+1\)\';"
cat //\'hlq.INV.BACKUPS\(0\)\'
```

To create a new generation data set and then display that data set, you would need to run this command:

```
pidu -c "export //\'hlq.INV.BACKUPS\(\+1\)\';"
cat //\'hlq.INV.BACKUPS\(\+1\)\'
```

Related information:
- Chapter 5, "Using the Printer Inventory Definition Utility (PIDU)," on page 47

Chapter 3. Starting and stopping Infoprint Server

You must start Infoprint Server before you can create PSF FSS and PSF FSA definitions in the Printer Inventory. These sections describes how to start and stop Infoprint Server:

- "Starting Infoprint Server with the AOPSTART JCL procedure"
- "Stopping Infoprint Server with the AOPSTOP JCL procedure" on page 36

Starting Infoprint Server with the AOPSTART JCL procedure

To start Infoprint Server, you use the AOPSTART JCL procedure, which runs the **aopstart** REXX EXEC.

When you start Infoprint Server, these daemons start:

- aopd
- aophinvd
- aoplogd
- aopsdbd

To restart Infoprint Server, you must stop it and start it again.

Tip: The AOPSTART JCL procedure can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. Your installation can suppress these abends in the IEASLP00 member of SYS1.PARMLIB. This statement in the IEASLP00 member suppresses EC6 abends:

```
SLIP SET,C=EC6,RE=0000FFXX,ID=XEC6,A=NODUMP,END
```

Before you begin: You must be authorized to start and stop Infoprint Server.

To start Infoprint Server:

1. Run the AOPSTART JCL procedure. Enter this MVS START command:

```
START AOPSTART
```

Result: You see one or more messages in the STDOUT or STDERR data set, or in the console log. The messages for each Infoprint Server daemon can include:

```
AOP075I Daemon name was started successfully.
AOP076E Start of daemon name failed.
AOP077I Daemon name is already started.
AOP134E The stop of daemon name failed.
AOP137E Required Infoprint Server daemon name is not running. Stop all
        daemons and restart.
```

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

```
$HASP395 AOPSTART ENDED
```

Related information:

- "Setting up security" on page 8
- "Creating Infoprint Server startup and shutdown procedures" on page 23

Stopping Infoprint Server with the AOPSTOP JCL procedure

To stop Infoprint Server, you use the AOPSTOP JCL procedure, which runs the z/OS UNIX **aopstop** command. AOPSTOP stops all Infoprint Server daemons after current activity ends.

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

Before you begin: You must be authorized to start and stop Infoprint Server.

To stop Infoprint Server:

1. Enter this MVS START command:

   ```
   START AOPSTOP[,OPTIONS='{now|force}']
   ```

   You can specify one of the following values in the OPTIONS parameter. If you do not specify the OPTIONS parameter, Infoprint Server stops after current activity ends.

   now   Stops Infoprint Server immediately.

   force   Stops Infoprint Server immediately using a "destructive" shutdown. Infoprint Server database might be corrupted.

   > **Tips**:
   > - Use the **force** option with extreme caution.
   > - Before you use the **force** option, back up the Printer Inventory.
   > - When you start Infoprint Server again, specify the AOPVALIDATEDB environment variable to validate internal databases.

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

```
AOP078W Daemon name is not running.
AOP079I A shutdown of daemon name has been initiated.
AOP134E The stop of daemon name failed.
AOP135I An abrupt shutdown of daemon name has been initiated.
AOP136I A destructive shutdown of daemon name has been initiated.
```

When all Infoprint Server daemons have ended, you see this message:

```
$HASP395 AOPD  ENDED
```

Examples:

1. To stop Infoprint Server after current activity ends, enter:
   ```
   START AOPSTOP
   ```
2. To stop Infoprint Server immediately, enter:
   ```
   START AOPSTOP,OPTIONS='now'
   ```

Related information:
- "Setting up security" on page 8
- "Creating Infoprint Server startup and shutdown procedures" on page 23
- "Backing up the Printer Inventory" on page 28

Chapter 4. Using Infoprint Server ISPF panels

Infoprint Server administrators can use Infoprint Server ISPF panels to create and update FSS definitions and FSA definitions in the Printer Inventory for PSF.

These sections describe how to use the ISPF panels:
- "Starting an Infoprint Server ISPF session"
- "Using the ISPF help system"
- "Configuring the ISPF panels" on page 38
- "Using ISPF panels to work with FSS definitions" on page 38
- "Using ISPF panels to work with FSA definitions" on page 42

Starting an Infoprint Server ISPF session

Infoprint Server administrators can start an ISPF session from the ISPF main panels. The Infoprint Server ISPF panels are available in English and Japanese.

Before you begin: Infoprint Server must be running. Also, you must be authorized to read or update the Printer Inventory.

To start an Infoprint Server ISPF session:

1. Log in to ISPF.

   To view the Japanese panels:
   - Define the code page to your 3270 emulator as IBM-939.
   - When you start ISPF, enter: ISPF Japanese.
   - Define the terminal type as 3270KN on the ISPF Settings panel.

   _____

2. On the ISPF Primary panel, select the **12 OS/390® System** option.

   _____

3. On the z/OS System Programmer Primary Option panel, select the **8 Infoprint Server** option. The first panel is called the Infoprint Server: Printer Inventory Manager panel.

   If the z/OS System Programmer Primary Option panel does not contain the **Infoprint Server** option, ask your system programmer to customize the ISPF panels.

   _____

Related information:
- "Setting up security" on page 8

Using the ISPF help system

The ISPF online help system provides information about how to use each panel, and detailed information about each field on the panel.

To use the ISPF help system:

1. To display help information about an ISPF panel, place the cursor on the ISPF command line and press the HELP function key.

   _____

2. To display help information about each field, place the cursor on the input area of the field and press the HELP function key.

   _____

3. To validate the fields before you save a definition, press Enter. If a required field is missing or if a field contains an incorrect value, you see an error message in the upper right corner of the panel. Press the HELP function key for more information about the error. If all required fields contain values and all fields contain valid values, you do not see an error message.

   _____

Configuring the ISPF panels

Before you use the Infoprint Server ISPF panels, check the configuration of the ISPF panels.

To configure the ISPF panels:

1. Start an Infoprint Server ISPF session.

   _____

2. On the Infoprint Server: Printer Inventory Manager panel, select **7 Configure** and press Enter.

   _____

3. On the Configuration panel, fill in the fields to configure your panels. For information about any field, use the ISPF online help system.

   _____

4. To save any changed values and exit the panel, press the END function key.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Using the ISPF help system" on page 37

Using ISPF panels to work with FSS definitions

These sections describe how to use the Infoprint Server ISPF panels to work with PSF FSS definitions.

Adding PSF FSS definitions

You must add an FSS definition for each PSF FSS that uses the Printer Inventory. You must add the FSS definition before you start the first PSF printer in the FSS.

Tip: You can add an FSS definition by copying an existing FSS definition.

To add a PSF FSS definition:

1. Start an Infoprint Server ISPF session.

   _____

2. On the Infoprint Server: Printer Inventory Manager panel, select **4 Add** and press Enter.

   _____

3. On the PSF FSS panel, fill in the FSS name field and any other fields. For information about a field, use the ISPF online help system.

   _____

4. Do one of these:
   - To add the definition but keep the panel on the screen, type SAVE on the command line and press Enter. Type SAVE on the command line to easily add more than one FSS definition of the same type.
   - To add the definition and exit the panel, press the END function key.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Copying PSF FSS definitions" on page 40
- "Using the ISPF help system" on page 37

Listing PSF FSS definitions

You must list FSS definitions before you can browse, copy, edit, or delete a definition.

You can list all PSF FSS definitions, or you can select FSS definitions to list based on one or more criteria. FSS definitions are listed if they meet all of the criteria you specify. The criteria you can specify are:
- FSS name
- Description of the FSS definition

To list all PSF FSS definitions:

1. Start an Infoprint Server ISPF session.

   _____

2. On the Infoprint Server: Printer Inventory Manager panel, select **5 List** and press Enter.

   _____

3. On the FSS List panel, you can type one of the actions to browse, copy, edit, or delete a definition. Press Enter at any time to refresh the list.

   _____

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

   _____

To list selected PSF FSS definitions:

1. Start an Infoprint Server ISPF session.

   _____

2. On the Infoprint Server: Printer Inventory Manager panel, select **6 Select** and press Enter.

   _____

3. On the FSS Select panel, type values in one or more fields to specify selection criteria and press Enter. The online help for each field tells you how to use an * or ? to represent one or more variable characters.

   _____

4. On the FSS List panel, you can type an action in front of one or more definitions and press Enter. Press Enter at any time to refresh the list.

   _____

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

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37

Browsing PSF FSS definitions

You can browse a PSF FSS definition.

To browse a PSF FSS definition:

1. Start an Infoprint Server ISPF session.

   _____

2. List the FSS definition that you want to browse.

   _____

3. On the FSS List panel, type B in the **A** column in front of the FSS definition you want to browse and press Enter.

   _____

4. To return to the FSS List panel, press the END function key.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSS definitions" on page 39

Copying PSF FSS definitions

You can copy a PSF FSS definition to add another FSS definition.

To copy a PSF FSS definition:

1. Start an Infoprint Server ISPF session.

   _____

2. List the FSS definition that you want to copy.

   _____

3. On the FSS List panel, type C in the **A** column in front of the FSS definition you want to copy and press Enter.

   _____

4. On the PSF FSS panel, change the name of the FSS in the FSS name field. Change the values in any other fields. For information about each field, use the ISPF online help system.

_____

5. Do one of these:
   - To create the new definition but keep the panel on the screen, type SAVE on the command line and press Enter. Type SAVE on the command line to easily add more than one FSS definition of the same type.
   - To create the new definition and exit the panel, press the END function key.

_____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSS definitions" on page 39
- "Using the ISPF help system" on page 37

Editing PSF FSS definitions

You can edit a PSF FSS definition to change values. After you edit an FSS definition, restart the PSF FSS so that PSF uses the new values.

To edit a PSF FSS definition:

1. Start an Infoprint Server ISPF session.

_____

2. List the FSS definition that you want to edit.

_____

3. On the FSS List panel, type E in the **A** column in front of the FSS definition you want to edit and press Enter.

_____

4. On the PSF FSS panel, change any fields. For information about each field, use the ISPF online help system.

_____

5. To save the changes to the FSS definition, press the END function key.

_____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSS definitions" on page 39
- "Using the ISPF help system" on page 37

Deleting PSF FSS definitions

You can delete a PSF FSS definition.

To delete a PSF FSS definition:

1. Start an Infoprint Server ISPF session.

_____

2. List the FSS definition that you want to delete.

_____

3. On the FSS List panel, type D in the **A** column in front of the FSS definition you want to delete and press Enter.

_____

4. On the Confirm Delete panel, press Enter.

_____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSS definitions" on page 39

Using ISPF panels to work with FSA definitions

These sections describe how to use the Infoprint Server ISPF panels to work with PSF FSA definitions.

Adding PSF FSA definitions

You must add an FSA definition for each PSF FSA that uses the Printer Inventory. You must add the FSA definition before you start the PSF printer. You can also add an FSA definition by copying an existing FSA definition of the same type.

To add a PSF FSA definition:

1. Start an Infoprint Server ISPF session.

_____

2. On the Infoprint Server: Printer Inventory Manager panel, select **1 Add** and press Enter.

_____

3. On the Choose an FSA type to add panel, select the type of FSA definition and press Enter. Types are: PSF channel, PSF SNA, PSF TCP/IP, and PSF AFP Download Plus. Depending on the type you select, different ISPF panels are displayed.

_____

4. On the PSF FSA panel, fill in the FSA name field and other fields on this panel. For information about any field, use the ISPF online help system.

_____

5. Do one of these:
- To create the definition but keep the panel on the screen, type SAVE on the command line and press Enter. Type SAVE on the command line to easily add more than one FSA definition of the same type.
- To create the definition and exit the panel, press the END function key.

_____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Copying PSF FSA definitions" on page 44
- "Using the ISPF help system" on page 37

Listing PSF FSA definitions

You must list FSA definitions before you can browse, copy, edit, or delete a definition.

You can list all PSF FSA definitions, or you can select PSF FSA definitions to list based on one or more criteria. FSA definitions are listed if they meet all of the criteria you specify. The criteria you can specify are:

- FSA name
- Description of the FSA definition
- Type of FSA definition: PSF channel, PSF SNA, PSF TCP/IP, or PSF AFP Download Plus

To list all PSF FSA definitions:

1. Start an Infoprint Server ISPF session.

   _____

2. On the Infoprint Server: Printer Inventory Manager panel, select **2 List** and press Enter.

   _____

3. On the FSA List panel, you can type one of the actions to browse, copy, delete, edit, or change the type of the definition. Press Enter at any time to refresh the list.

   _____

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

   _____

To list selected PSF FSA definitions:

1. Start an Infoprint Server ISPF session.

   _____

2. On the Infoprint Server: Printer Inventory Manager panel, select **3 Select** and press Enter.

   _____

3. On the FSA Select panel, type values in one or more fields to specify selection criteria and press Enter. The online help for each field tells you how to use an * or ? to represent one or more variable characters.

   _____

4. On the FSA List panel, you can type an action in front of one or more FSA definitions and press Enter. Press Enter at any time to refresh the list.

   _____

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

   _____

Related information:

- "Starting an Infoprint Server ISPF session" on page 37

Browsing PSF FSA definitions

You can browse a PSF FSA definition.

To browse a PSF FSA definition:

1. Start an Infoprint Server ISPF session.

   _____

2. List the PSF FSA definition that you want to browse.

   _____

3. On the FSA List panel, type B in the **A** column in front of the FSA definition you want to look at and press Enter.

   _____

4. To return to the FSA List panel, press the END function key.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSA definitions" on page 42

Copying PSF FSA definitions

You can copy a PSF FSA definition to create a new FSA definition of the same type.

To copy a PSF FSA definition:

1. Start an Infoprint Server ISPF session.

   _____

2. List the FSA definition that you want to copy.

   _____

3. On the FSA List panel, type C in the **A** column in front of the FSA definition you want to copy and press Enter.

   _____

4. On the PSF FSA panel, change the name of the FSA in the FSA name field. Change the values in any other fields. For information about each field, use the ISPF online help system.

   _____

5. Do one of these:
   - To create the new definition but keep the panel on the screen, type SAVE on the command line and press Enter. Type SAVE on the command line to easily add more than one FSA definition of the same type.
   - To create the new definition and exit the panel, press the END function key.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSA definitions" on page 42
- "Using the ISPF help system" on page 37

Editing PSF FSA definitions

You can edit a PSF FSA definition to change values. After you edit an FSA definition, restart the PSF printer or AFP Download Plus sender so that PSF uses the new values.

To edit a PSF FSA definition:

1. Start an Infoprint Server ISPF session.

   _____

2. List the FSA definition that you want to edit.

   _____

3. On the FSA List panel, type E in the **A** column in front of the FSA definition you want to edit and press Enter.

   _____

4. On the PSF FSA panel, change any fields. For information about each field, use the ISPF online help system.

   _____

5. To save the changes to the FSA definition, press the END function key.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSA definitions" on page 42
- "Using the ISPF help system" on page 37

Deleting PSF FSA definitions

You can delete a PSF FSA definition.

To delete a PSF FSA definition:

1. Start an Infoprint Server ISPF session.

   _____

2. List the FSA definition that you want to delete.

   _____

3. On the FSA List panel, type D in the **A** column in front of the FSA definition you want to delete and press Enter.

   _____

4. On the Confirm Delete panel, press Enter.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37

Changing the type of PSF FSA definitions

You can change the type of a PSF FSA definition. The FSA types are: PSF channel, PSF SNA, PSF TCP/IP, and PSF AFP Download Plus.

To change the type of a PSF FSA definition:

1. Start an Infoprint Server ISPF session.

   _____

2. List the FSA definition that you want to change.

   _____

3. On the FSA List panel, type X in the **A** column in front of the definition you want to change and press Enter.

   _____

4. On the Choose an FSA type to add panel, select the type and press Enter. You see the panel for the new type of FSA definition with only the fields that apply to the new FSA type. However, all values that were specified in the original FSA definition are saved in the Printer Inventory so that if you change the type back to the original type, you do not lose any values. PSF uses only the values that apply to the FSA type and ignore any values specified in the FSA definition that do not apply to the FSA type.

   _____

5. On the panel for the new type of FSA definition, fill in any fields. For information about each field, use the ISPF online help system.

   _____

6. To save the changes to the definition, press the END function key.

   _____

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSA definitions" on page 42
- "Using the ISPF help system" on page 37

Chapter 5. Using the Printer Inventory Definition Utility (PIDU)

Infoprint Server administrators can use the Printer Inventory Definition Utility (PIDU) to create and update FSS definitions and FSA definitions in the Printer Inventory. In most situations, it is easier to use the Infoprint Server ISPF panels. However, PIDU can be useful for creating and editing a large number of definitions. It is also useful for backing up and restoring the Printer Inventory.

PIDU lets you create, list, display, edit, delete, export, and dump definitions (also called *objects*) in the Printer Inventory. You can run the z/OS UNIX **pidu** command from the z/OS UNIX command line or as a batch program.

These sections describe how to administer the Printer Inventory for PSF:
- "pidu command"
- "Running the pidu command as a batch job" on page 50
- "PIDU commands" on page 52
- "Attribute characteristics" on page 60
- "PSF FSA attributes" on page 61
- "PSF FSS attributes" on page 97

pidu command

You can use the z/OS UNIX **pidu** command to run the Printer Inventory Definition Utility (PIDU).

Format

pidu [-qv] [-c "*command; ...*"]... [*filename*]...

Description

The **pidu** command lets you specify one or more of the PIDU commands to manage objects in the Printer Inventory. You can specify PIDU commands in the **-c** option or in a file. The **pidu** command writes a report of errors to standard error (**stderr**) and writes informational messages and command output to standard output (**stdout**).

Options

-c "*command; ...*"

Specifies one or more PIDU commands. Enclose the commands in single or double quotation marks, and end each statement with a semicolon. If a command contains a value that requires single quotation marks, such as a hexadecimal value, enclose the commands in double quotation marks. You can repeat the **-c** option.

If you do not specify the **-c** option or the name of a file, **pidu** reads the commands from standard input (**stdin**), which can be either keyboard data or output from another command.

You can specify these PIDU commands:
- create

- delete
- display
- dump
- export
- force-create
- list
- modify
- rename

-q   Suppresses informational messages that the **pidu** command writes to **stdout**.

-v   Writes the name of the Printer Inventory to **stderr**. Also provides additional informational messages.

Operands

filename   The name of a UNIX file or sequential MVS data set that contains the commands. You can repeat this option.

If the data set is an MVS data set, specify **//** before the file name. If you specify a fully-qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output file is named USERID.MYFILE, enter:

```
//\'USERID.MYFILE\'
```

If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

To specify commands from **stdin**, omit the file name and the **-c** option.

Usage notes

- You can specify PIDU commands interactively from your keyboard.
- When you specify PIDU commands in a UNIX file (such as a z/FS file) or an MVS data set, you can:
  - Start comments with a pound sign (#).
  - Include blank lines if desired.
  - Specify the PIDU command names, attribute names, and attribute values on separate lines:
    - In a UNIX file, an attribute value can span lines provided that all lines other than the last line end with a backslash. Be sure that no blank characters are present after the backslash. For example:

      ```
      attribute1 =
      'A very, very, very long \
      value'
      ```

    - In an MVS data set, the entire attribute value must be on one line. To specify a very long attribute value, allocate a data set that has a logical record length of 255 (LRECL=255) and a variable blocked record format (RECFM=VB). Then specify the entire value on one line. For example:

      ```
      attribute1 =
      'A very, very, very long value'
      ```

Examples -- pidu

Entering PIDU commands interactively

To enter one or more PIDU commands interactively from your keyboard:

1. On the z/OS UNIX command line, type pidu and press Enter.

   _____

2. Type a PIDU command and press Enter. For example, to create an FSA definition, type:

   ```
   create fsa PRT001 fsa-type = psf-tcpip form-definition = A10110
   page-definition = A08682 printer-ip-address = 9.99.12.33;
   ```

   _____

3. After the command is processed, type another command and press Enter. For example, to display the attributes of the FSA definition just created, enter:

   ```
   display fsa PRT001;
   ```

   _____

4. After the command is processed, use **Ctrl-D** or type exit to end the **pidu** command.

   _____

Specifying PIDU commands on the command line

To specify two PIDU **list** commands with the **-c** option, enter:

```
pidu -c "list fsa; list psf-fss;"
```

Specifying PIDU commands in a file

To specify a UNIX file named **pidu.commands** that contains PIDU commands, enter:

```
pidu pidu.commands
```

To use the < symbol to redirect **stdin** to file **pidu.commands**, enter:

```
pidu <pidu.commands
```

To specify a fully-qualified MVS data set named MARY.PIDU.CMDS, enter:

```
pidu //\'MARY.PIDU.CMDS\'
```

To prefix your TSO user ID to the data set name, enter:

```
pidu //PIDU.CMDS
```

File **pidu.commands** (or data set PIDU.CMDS) contains the PIDU commands. For example:

```
create fsa PRT001 fsa-type = psf-tcpip form-definition = A10110
 page-definition = A08682 printer-ip-address = 9.99.12.33;
 list fsa;  # list all FSAs
```

Environment variables

AOPCONF   Names the Infoprint Server configuration file. The file named in this variable takes precedence over the user-specific configuration file (**$HOME/.aopconf**) and the system default configuration file (**/etc/Printsrv/aopd.conf**).

LIBPATH   The path used to locate dynamic link libraries (DLL).

NLSPATH	Lists the directory where the Infoprint Server message catalogs are located.
PATH	Lists the directory where the Infoprint Server executables are located.

Files

$HOME/.aopconf

Contains the user-specific Infoprint Server configuration file. This file takes precedence over **/etc/Printsrv/aopd.conf**.

/etc/Printsrv/aopd.conf

The default Infoprint Server configuration file.

Exit values

0 The PIDU commands were done successfully.

>0 An error occurred that prevented one or more PIDU commands from being done successfully.

Running the pidu command as a batch job

You can run the **pidu** command as a batch job from TSO using the AOPBATCH or BPXBATCH program. This section describes how to use the AOPBATCH program because the AOPBATCH program sets default environment variables that PIDU requires.

Using AOPBATCH

You can invoke AOPBATCH in JCL with this EXEC statement:

//stepname `EXEC PGM=AOPBATCH,PARM='pidu [-v] [-q]'`

-q Suppresses informational messages that the **pidu** command writes to the output data set named in the STDOUT DD statement.

-v Writes the name of the Printer Inventory to the output data set named in the STDERR DD statement. Also provides additional informational messages.

You can specify these DD statements:

STDENV	Specifies environment variables that PIDU uses. You can specify the environment variables in-stream or in a UNIX file or MVS data set. When you use AOPBATCH, you need to specify the PATH, LIBPATH, and NLSPATH environment variables only if your installation did not install Infoprint Server files in the default directories. Specify the AOPCONF environment variable if the Infoprint Server configuration file is not in **/etc/Printsrv/aopd.conf** or in **$HOME/.aopconf**. Specify the environment variables in the format *variable = value*.
STDERR	Specifies a SYSOUT data set, a UNIX file, or an MVS data set. PIDU writes error messages to this file or data set.
STDIN	Specifies PIDU commands in-stream or names a UNIX file or MVS data set that contains the commands.
	Tip: If any attribute value is greater than 80 characters, you cannot specify the PIDU commands in-stream because an attribute value cannot span lines and the SYSIN DD * statement lets you specify a

maximum of 80 characters on one line. Instead, specify the PIDU commands in an MVS data set that has a logical record length (LRECL) of 255 and a variable blocked (VB) blocksize (BLKSIZE).

STDOUT Specifies a SYSOUT data set, a UNIX file, or an MVS data set. PIDU writes its output and informational messages to this file or data set.

IBM provides sample JCL in the AOPPIDU member of SYS1.SAMPLIB for running PIDU using the AOPBATCH utility. Figure 4 shows member AOPPIDU.

```
//AOPPIDU  JOB ,'pidu'
//*
//PIDU     EXEC PGM=AOPBATCH,PARM='pidu'
//*
//STDIN    DD  DSN=hlq.INVDEFS,DISP=SHR
//*
//STDOUT   DD  SYSOUT=*
//STDERR   DD  SYSOUT=*
//*
//* STDENV may point to a dataset containing environment variables.
//*        Builtin values will work for the default installation.
//*STDENV   DD  DSN=environment,DISP=SHR
```

Figure 4. Sample JCL for running PIDU as a batch job — SYS1.SAMPLIB(AOPPIDU)

Example

This example lists all FSA and FSS definitions, and specifies environment variables in-stream in the JCL:

```
//AOPPIDU  JOB ...
//PIDU     EXEC PGM=AOPBATCH,PARM='pidu'
//STDIN    DD  *
list fsa;
list psf-fss;/*
//STDOUT   DD  SYSOUT=*
//STDERR   DD  SYSOUT=*
//STDENV   DD *
PATH=/usr/mylib/Printsrv/bin
LIBPATH=/usr/mylib/Printsrv/lib
NLSPATH=/usr/mylib/Printsrv/%L/%N:/usr/mylib/Printsrv/En_US/%N
/*
```

Tip: If your installation installed Infoprint Server files in default directories, you can omit the STDENV DD statement.

Using BPXBATCH

If you use the BPXBATCH utility program to run the **pidu** command, you must always set the PATH, LIBPATH, and NLSPATH environment variables, even if your installation installed Infoprint Server files in default locations. Specify the AOPCONF environment variable if the Infoprint Server configuration file is not in **/etc/Printsrv/aopd.conf** or in **$HOME/.aopconf**.

For information about the BPXBATCH utility program, see *z/OS UNIX System Services Command Reference*.

PIDU commands

As input to PIDU, you must specify one or more PIDU commands. Table 5 summarizes the PIDU commands, the function of each command, and where to find more information about the command.

Table 5. Summary of PIDU commands

PIDU command	Function of command	See Page
create	Create a new object.	54
delete	Delete an object.	55
display	Display the attributes of an object.	55
dump	Dump all objects.	56
export	Generate **create** commands for all objects or only objects that meet certain criteria.	56
force-create	Create an object and replace an object of the same name and in the same object class if it exists.	54
list	List all objects or only objects that meet certain criteria.	57
modify	Modify attributes of an object.	58
rename	Rename an object.	59

Tip: To abbreviate command names, use enough characters to make the command name unique. For example, you can abbreviate **display** as **di**.

PIDU object classes

Most PIDU commands require that you identify the *object class* of the Printer Inventory object you want to work with. Table 6 lists the object classes.

Table 6. Object classes

Object class	Description of object
fsa	A definition for a PSF functional subsystem application
psf-fss	A definition for a PSF functional subsystem

Where predicate

The PIDU **export** and **list** commands let you construct a **where** predicate to select the objects you want to export or list. In the **where** predicate, you can specify one or more conditions.

The **where** predicate has this format:

where *condition* [and|or *condition*]...

A condition has this format:

[not] *attribute operator value*

not   Indicates that the evaluation of the condition is to be reversed.

attribute   Specifies the name of a **single-valued** attribute that is valid for the object class. Note that **multi-valued** attributes are not supported.

You can specify any attribute that is valid for the object class. You can also specify the attribute **name** to limit definitions by name.

operator   Specifies one of the operators shown in Table 7.

value   Specifies the value of the attribute. All values are case-sensitive. Therefore, be sure to type the same uppercase and lowercase letters as are stored in the Printer Inventory. The special value **null** means that an attribute is not specified.

If you use the **match** operator, you must specify a regular expression as defined in the "Regular Expressions" in *z/OS UNIX System Services Command Reference*.

If the value contains special characters (such as * { } - >), enclose the value in quotation marks.

Table 7 shows the operators that you can use when you construct a condition. Some operators are valid only for certain types of attribute values, as indicated in the table. For example, you can use the **match** operator only for attributes that accept strings values.

Table 7. Operators for attributes

Operator	Operation	String values	Fixed values	Integer values
=	Equal	Yes	Yes	Yes
!=	Not equal	Yes	Yes	Yes
>	Match a value greater than the specified value	Yes[1]	No	Yes
<	Match a value less than the specified value	Yes[1]	No	Yes
<=	Match a value less than or equal to the specified value	Yes[1]	No	Yes
>=	Match a value greater than or equal to the specified value	Yes[1]	No	Yes
match	Match the specified regular expression	Yes[1]	No	No
1. A string value is evaluated using binary collation.				

To specify an expression with multiple conditions, separate the conditions with one of these operators:

and   The expression is true only if both conditions are true.

or   The expression is true if either condition is true.

Multiple conditions are evaluated using an order of precedence, with **and** conditions evaluated before **or** conditions. You can override the order by using parentheses. Expressions in parentheses are evaluated first.

Example: This example lists FSA definitions for PSF printers that are TCP/IP-attached:

```
pidu -c 'list fsa where fsa-type=psf-tcpip;'
```

create and force-create—create an object in the Printer Inventory

Format

create *objectclass name* [*attribute = value*]... ;

force-create *objectclass name* [*attribute = value*]... ;

Description

The **create** command creates an object in the Printer Inventory. The object must not already exist in the Printer Inventory.

The **force-create** command does the same function as the **create** command except that if an object of the same name and in the same object class exists, it is replaced.

Operands

objectclass The class of the object that you want to create. Valid values are **fsa** and **psf-fss**.

name A name to identify the object. Objects in the same object class cannot have the same name.

When you create an FSS or FSA definition, this name must match the name used to define the FSA or FSS to JES. Specify a valid combination of 1-8 letters, numbers, and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase.

If the name contains special characters, enclose the name in single or double quotation marks.

attribute = value
One or more attributes and values. Separate attributes with spaces.

Usage notes

- To help you specify a valid **create** statement, first use the ISPF panels to create the object in the Printer Inventory and then use the PIDU **display** or **export** command to list the attributes for the object.
- If you repeat the same attribute in a **create** statement, PIDU uses the last specification.

Examples -- create and force-create

Creating a PSF FSS definition: This example creates an FSS definition for a PSF functional subsystem (FSS) named PSFFSS:

```
pidu -c 'create psf-fss PSFFSS
        tcpip-job-name = TCPIP;'
```

Creating a PSF FSA definition: This example creates an FSA definition for a PSF functional subsystem application (FSA) named PRT003:

```
pidu -c 'create fsa PRT003
        fsa-type = psf-tcpip
        form-definition = A10110
        location = "Bldg 3"
        page-definition = A08682
        printer-ip-address = 9.99.12.33;'
```

The attributes set in this definition are:

- **fsa-type**: The printer is a TCP/IP-connected PSF printer.
- **form-definition**: This attribute names the default form definition for the printer.
- **location**: This attribute describes the location of the printer.
- **page-definition**: This attribute names the default page definition for the printer.
- **printer-ip-address**: This attribute identifies the IP address of the printer.

delete—delete an object in the Printer Inventory

Format

delete *objectclass name* ;

Description

The **delete** command deletes an object from the Printer Inventory.

Operands

objectclass   The class of the object that you want to delete. Valid values are **fsa** and **psf-fss**.

name   The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

Example -- delete

This example deletes the FSA definition named PRT001:

```
pidu -c 'delete fsa PRT001;'
```

display—show attributes of an object in the Printer Inventory

Format

display *objectclass name* ;

Description

The **display** command lists the attributes for one object in the Printer Inventory. This command writes the attributes to **stdout**. The attributes are displayed in the format required by the **create** command.

Operands

objectclass   The class of the object that you want to display. Valid values are **fsa** and **psf-fss.**

name   The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

Usage notes

- The **display** command might *not* list attributes that you have set to default values. This is because, to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Example -- display

This example displays all attributes for an FSA definition:

```
pidu -c 'display fsa PRT001;'
```

dump—dump the Printer Inventory to a file

Format
dump *filename* ;

Description
The **dump** command writes the contents of the Printer Inventory to the named file. Your IBM service representative might ask you to use the **dump** command to assist IBM in diagnosing problems in the Printer Inventory.

Operands

filename   The name of the output file, which can be a UNIX file or an MVS data set. The output file does not need to exist. However, if the file already exists, the contents are overwritten.

If the data set is an MVS data set, specify // before the file name. If you specify a fully-qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output file is named USERID.MYFILE, enter:

```
//\'USERID.MYFILE\'
```

If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

Usage notes
- If you allocate an MVS data set for the output file, IBM suggests that you use RECFM=VB and LRECL=8192. However, other values might be suitable as well.
- To write the contents of the Printer Inventory to a file in a more readable format, or to back up the Printer Inventory, use the **export** command.

Examples -- dump
This example writes the contents of the Printer Inventory to file named `inventory.dump`:

```
pidu -c 'dump inventory.dump;'
```

This example writes the contents of the Printer Inventory to an MVS data set named USER1.INVENT.DUMP:

```
pidu -c "dump //\'USER1.INVENT.DUMP\';"
```

export—export objects in the Printer Inventory to a file

Format
export *filename* [*objectclass* [where *condition* [and|or *condition*]...]];

Description
The **export** command exports all objects in the Printer Inventory or only those objects that meet specified conditions. You can use the **export** command to back up the Printer Inventory. Also, the statements in the output file can be used as input to PIDU on another z/OS system.

The **export** command writes a **create** statement for each exported object to an output file. The output file does not need to exist. However, if the file already exists, the file is replaced.

Tip: Use the **export** command to back up the Printer Inventory. Do not use ordinary copy commands to create a backup copy of the Printer Inventory because the copy might contain inconsistent data.

Operands

filename   The name of the output file, which can be a UNIX file or an MVS data set.

If the data set is an MVS data set, specify // before the file name. If you specify a fully-qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output data set is named USERID.MYFILE, enter:

```
//\'USERID.MYFILE\'
```

If you want your TSO user ID prefixed to the data set name, specify:

```
//MYFILE
```

objectclass   The class of the objects that you want to export. Valid values are **fsa** and **psf-fss**. If you omit this operand, all objects are exported.

where *condition* **[and|or** *condition***]...**

One or more conditions, which can limit the objects that are exported. Only objects that are in the specified object class and that meet the conditions are exported. If you omit the **where** predicate, all objects in the specified object class are exported.

For information about how to specify conditions, see "Where predicate" on page 52.

Usage notes

- If you allocate an MVS data set for the output file, IBM suggests that you use RECFM=VB and LRECL=8192. However, other values might be suitable as well.
- The **export** command might not export attributes that you have set to default values. This is because, to save space in the Printer Inventory, the Infoprint Server ISPF panels do not generally store attributes with default values.

Related information:

- "Backing up the Printer Inventory" on page 28

Examples -- export

This example exports all objects in the Printer Inventory to UNIX file `inventory.export`:

```
pidu -c 'export inventory.export;'
```

This example exports all objects in the Printer Inventory to MVS data set `USER1.INVENT.EXPORT`:

```
pidu -c "export //\'USER1.INVENT.EXPORT\';"
```

list—list names of objects in the Printer Inventory

Format

list *objectclass* [where *condition* [and|or *condition*]...] ;

Description

The **list** command lists the names of all objects in a specified object class or only objects that meet certain criteria.

Operands

objectclass   The class of the objects that you want to list. Valid values are **fsa** and **psf-fss**.

where *condition* **[and|or** *condition***...]**

    Conditions that can limit the objects that are listed. Only objects that meet the conditions are listed. If you omit the **where** predicate, all objects in the specified object class are listed.

    For information about how to specify a condition, see "Where predicate" on page 52.

Usage notes

You can use the **list** command in combination with the **modify** command to list all or selected objects in an object class and then modify one or more attributes. For an example, see "Example -- modify" on page 59.

Example -- list

Listing FSA definitions:

- This example lists all FSA definitions in the Printer Inventory:

  ```
  pidu -c 'list fsa;'
  ```

- This example lists FSA definitions for PSF printers that are TCP/IP-attached:

  ```
  pidu -c 'list fsa where fsa-type=psf-tcpip;'
  ```

modify—change attributes of an object in the Printer Inventory

Format

modify *objectclass name* [*attribute = value*]... ;

Description

The **modify** command modifies attributes for an object in the Printer Inventory. The object must already exist in the Printer Inventory.

Changes you make to attributes for an FSA definition take effect only when you restart the PSF FSA. Changes you make to attributes for an FSS definition take effect when you restart the FSS.

Operands

objectclass   The class of the object that you want to modify. Valid values are **fsa** and **psf-fss**.

name   The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

attribute = value

    One or more attributes and values. Separate attributes with spaces.

Usage notes

- To remove an attribute, type `null` as the value for the attribute.

- If you repeat the same attribute in a **modify** statement, PIDU uses the last specification.
- You can use the **list** command with the **modify** command to modify all or selected objects in an object class.

Example -- modify
This example, entered as one command on the z/OS UNIX command line, lists selected FSA definitions and changes an attribute in those FSA definitions. This example uses these PIDU commands and the **awk** command:

1. The PIDU **list** command lists the names of all FSA definitions with **form-definition=F1OLD**.
2. These names are input to the **awk** program, which writes PIDU **modify** commands to modify the **form-definition** attribute.
3. The output from the **awk** program is input to the **pidu** command:

```
pidu -qc "list fsa where form-definition = F1OLD ; " |
    awk '{ print "modify fsa " $1 " form-definition = \"F1NEW\";" }' |
    pidu
```

For information about the **awk** program, see *z/OS UNIX System Services Command Reference*.

rename—rename an object in the Printer Inventory

Format
rename *objectclass name newname* ;

Description
The **rename** command renames an object in the Printer Inventory.

Operands

objectclass   The class of the object that you want to rename. Valid values are **fsa** and **psf-fss**.

name   The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

newname   The new name to identify the object. This name must be a unique name for the class of object in the Printer Inventory.

When you create an FSS or FSA definition, this name must match the name used to define the FSA or FSS to JES. Specify a valid combination of 1-8 letters, numbers, and special characters (# $ @). The first character cannot be numeric. Lowercase letters are converted to uppercase.

If the name contains special characters, enclose the name in single or double quotation marks.

Example -- rename
This example renames the FSA named PRT001 to new name PRT002:

```
pidu -c 'rename fsa PRT001 PRT002;'
```

Attribute characteristics

This section describes these characteristics of the attributes that you can specify in PIDU commands:
- Valid abbreviations for attribute names and values
- Default values for attributes
- Single-valued and multi-valued attributes
- Types of values: integers, strings, and fixed values

Abbreviations

The attributes listed in this section show attribute names and values in their complete form. Often, you can abbreviate attribute names and values by using the first letter of each word in the name or value. For example, you can use the abbreviation **f-d** for the **form-definition** attribute.

Sometimes specifying only the first letter in each word is ambiguous. For example, c might stand for **chars** or **compression**. Here, specify enough of the name so that it is unique, as in ch or co. If the values are ambiguous, PIDU rejects the command with an error message.

Default values

When you create an object and omit an attribute, no value is assigned to that attribute in the Printer Inventory. For attributes that have no value, Infoprint Server takes a default action, which is described in the heading "Default value".

If you do specify a value for an attribute and later want to remove the attribute so that Infoprint Server does the default action, use the **modify** command and specify **null** as the attribute value.

For example, to remove the value for the **chars** attribute, you could specify:

```
chars = null
```

Single-valued and multi-valued attributes

Specify attributes in this format, with or without spaces on either side of the equal sign:

```
attribute=value
attribute = value
```

Attributes can be either *single-valued* or *multi-valued*.

Single-valued attributes: Single-valued attributes accept only one value. The syntax is:

```
attribute = value
attribute = "value with spaces"
```

Multi-valued attributes: Multi-valued attributes accept one or more values separated with spaces and enclosed in braces. Multi-valued attributes can contain a *list* of values or a *value-map*:

- A **list** assigns one or more values to the attribute. The syntax is:

  ```
  attribute = {value1 value2 value3}
  ```

  Example:

  ```
  resource-directories={/u/myserid/truetype /u/myuserid/opentype}
  ```

- A **value-map** assigns one value to another. The syntax is:

```
attribute = {value1 -> value2 value3 -> value4}
```
Example:
```
input-tray-map = {top -> 1 bottom -> 2}
```

Types of values

You can specify these types of values:
- Integer values
- String values
- Fixed values, also known as enumerated values

Integer values

Some attributes accept integer values. You can specify integer values in either decimal or hexadecimal format. Begin a hexadecimal value with 0 (zero) followed by the letter x. After the 0x, type any number (0-9) or a letter (A-F or a-f). Lowercase letters are equivalent to uppercase letters. The **display** command always displays the decimal equivalent of hexadecimal values.

For example, these integer values are equivalent:
```
dump-code = 0x09600c00
dump-code = 157289480
```

String values

Some attributes accept a string of printable characters. Enclose a string value in double or single quotation marks if it includes blanks or special characters (such as #, (,), or $). For example:
```
description = "My printer"
```

Most string values are stored in the Printer Inventory with the same uppercase and lowercase letters that you type when you specify the value. However, in some cases, lowercase letters are converted to uppercase letters. For example, the value you enter for the **output-class** attribute is converted to uppercase because JES accepts only uppercase letters for the JES output class.

Fixed values (enumerated values)

Some attributes accept one or more keywords as values. These keywords are called *fixed values*. The **pidu** command calls these values *enumerated values*. Fixed values are case-sensitive. Always use lowercase characters when typing fixed values.

PSF FSA attributes

Tip: In this topic, *PSF* refers to PSF for z/OS, the AFP Download Plus feature of PSF, or both.

This topic lists attributes that are valid when you create PSF FSA definitions, which are in object class **fsa**. PSF uses only a subset of the attributes for each type of FSA definition: PSF channel, PSF TCP/IP, PSF SNA, and PSF AFP Download Plus. For information about which attributes PSF uses, see:
- *PSF for z/OS: Customization*
- *PSF for z/OS: AFP Download Plus*

PSF requires these attributes:
- **applid** (when **fsa-type=psf-sna**)
- **form-definition**
- **fsa-type**

- **luname** (when **fsa-type=psf-sna**)
- **page-definition**
- **printer-ip-address** (when **fsa-type=psf-tcpip** or **fsa-type=afp-download-plus**)

acknowledgement-level

This **single-valued** attribute specifies whether PSF requests an acknowledgement every sheet or every page.

ISPF field name
Acknowledgement level

Allowed values
You can enter one of these fixed values:

page   An acknowledgement is requested for every page that is printed (default).

sheet   An acknowledgement is requested for every sheet that is printed.

afpdp-dataset-grouping

This **single-valued** attribute indicates whether output data sets in the same job are grouped together when sending them to the AFP Download Plus receiver.

ISPF field name
Data set grouping

Allowed values
You can enter one of these fixed values:

yes   PSF groups output data sets into jobs. The AFP Download Plus receiver prints the data sets in the same job in sequence with one set of separator pages for the job.

no   PSF does not group output data sets into jobs (default). The AFP Download Plus receiver treats each data set as a separate job.

afpdp-working-directory

This **single-valued** attribute specifies the name of the UNIX directory that AFP Download Plus uses as its working directory.

ISPF field name
Working directory

Allowed values
You can enter a directory name of up to 255 characters. PSF adds the beginning and ending forward slashes if they are missing from the directory name. If the value contains special characters other than slashes or periods, enclose the value in double quotation marks. This attribute is case-sensitive.

Default value
PSF uses directory **/var/psf/**.

Usage guidelines
The directory must exist before you start AFP Download Plus.

applid

This **single-valued** attribute specifies the name of the VTAM application-program node for an FSA when PSF is printing to an SNA-attached printer in deferred-printing mode.

ISPF field name
Applid

Allowed values
You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks.

blank-compression

This **single-valued** attribute specifies whether PSF compresses blanks in line data. Blank compression is a data-compression function in PSF that reduces the amount of data sent through the attachment. PSF compresses blanks in line data that contains more than five contiguous blanks.

ISPF field name
Blank compression

Allowed values
You can enter one of these fixed values:

yes   PSF compresses blanks.

no   PSF does not compress blanks (default).

Usage guidelines
Blank compression for host-connected, channel-attached printers most likely does not improve data transmission.

capture-inline-resources

This **single-valued** attribute specifies whether PSF tells a connected DPF to capture and store inline resources.

ISPF field name
Capture inline resources

Allowed values
You can enter one of these fixed values:

yes   DPF captures inline resources.

no   DPF does not capture inline resources (default).

channel-buffer-count

This **single-valued** attribute specifies the number of 32 KB (32768 bytes) buffers that are needed for processing jobs on a channel-attached printer.

ISPF field name
Channel buffer count

Allowed values

You can enter an integer from 1 to 10000. This value is multiplied by 32 KB (32768 bytes) to determine the total amount of reserved storage.

chars

This **multi-valued,** list attribute specifies the names of the coded fonts that are used to print a data set on a printer.

ISPF field name

Character sets

Allowed values

You can enter 1–4 coded font names. Each name can be any combination of 1–4 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For valid coded font names, see *IBM AFP Fonts: Font Summary for AFP Font Collection*.

If you specify more than one value, separate the values by spaces and enclose the list of values in braces. For example:

```
chars={GT12 GB12 GI12}
```

close-libraries-when-idle

This **single-valued** attribute specifies whether PSF closes the resource libraries when there is no print activity for 60 seconds.

ISPF field name

Close libraries when idle

Allowed values

You can enter one of these fixed values:

yes   PSF closes resource libraries.

no   PSF does not close resource libraries (default).

Usage guidelines

Closing the resource libraries causes the operating system to free the fixed storage below the 16 MB line that is required for I/O to the resource libraries. However, this function adds the overhead of closing and reopening the libraries between print activity.

color-map

This **single-valued** attribute specifies the name of the object container for the color mapping table resource that PSF uses to print a data set containing color translation information. This attribute is only used when the printer supports color mapping table resources.

ISPF field name

Color map

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

Default value

If a color map is not specified for the print job or printer, PSF uses an internal color mapping table.

com-setup-member

This **single-valued** attribute specifies the name of the object container for the microfilm setup resource that PSF uses to print data on a microfilm device. This attribute is only used when sending output to a microfilm device.

ISPF field name

Com setup member

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks.

compression

This **single-valued** attribute indicates whether PSF compresses data before sending it to the AFP Download Plus receiver.

ISPF field name

Compression

Allowed values

You can enter one of these fixed values:

lzw PSF uses the LZW compression algorithm to compress data.

none PSF does not compress data (default).

consolidate-im1-images

This **single-valued** attribute specifies whether PSF consolidates a multiple-celled IM1 image into a single Image Object Content Architecture (IOCA) image.

ISPF field name

Consolidate IM1 images

Allowed values

You can enter one of these fixed values:

yes PSF consolidates a multiple-celled IM1 image into a single IOCA image.

no PSF converts a multiple-celled IM1 image to multiple IOCA images (default).

cse-check-fit

This **single-valued** attribute specifies how PSF checks the pages for cut-sheet emulation (CSE) mode.

ISPF field name

Check CSE fit

Allowed values

You can enter one of these fixed values:

no PSF does not check to see whether the page fits 2 up on the sheet (default).

first PSF only checks the first page printed for a new copy group to see if it fits 2 up on the sheet.

all PSF checks front side of all pages to see if they fit 2 up on the sheet.

cse-orientation

This **single-valued** attribute specifies whether PSF generates portrait or landscape pages for printing in cut-sheet emulation (CSE) mode.

ISPF field name
CSE orientation

Allowed values
You can enter one of these fixed values:

portrait PSF generates portrait pages (default).

landscape PSF generates landscape pages.

cse-preserve-page-position

This **single-valued** attribute indicates whether PSF preserves page placement when it repositions because of error recovery or an operator command. This attribute applies only when PSF is printing in cut-sheet emulation (CSE) mode.

If you specify **yes**, you must also specify **cse-sheet-eject=yes**.

ISPF field name
CSE preserve page position

Allowed values
You can enter one of these fixed values:

yes Page placement is preserved.

no Page placement is not preserved (default).

cse-sheet-eject

This **single-valued** attribute indicates whether PSF starts printing each data set and each copy of a data set on a new sheet of paper when PSF is printing in cut-sheet emulation (CSE) mode.

ISPF field name
CSE sheet eject

Allowed values
You can enter one of these fixed values:

yes PSF starts printing on a new sheet. PSF also starts printing on a new sheet whenever it does offset stacking. For example, when the form definition requests separation for a new copy group.

no PSF starts printing on the next sheet or, in N_UP printing, on the next front-side partition. The next front-side partition might occur on the same sheet. This is the default.

default-process-mode

This **single-valued** attribute specifies the default processing mode PSF uses to print data sets containing both single-byte and double-byte fonts.

ISPF field name
Default process mode

Allowed values
PSF ignores all values but these fixed values:

SOSI1 Each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control (default).

SOSI2 Each shift-out, shift-in code is converted to a Set Coded Font Local text control.

SOSI3 The shift-out code is converted to a Set Coded Font Local text control. The shift-in code is converted to a Set Coded Font Local text control and two blanks.

SOSI4 Each shift-out, shift-in code is skipped and not counted when calculating offsets for the print data set. SOSI4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC.

description

This **single-valued** attribute describes the FSA definition. The description can help you select an FSA definition from a list.

ISPF field name
Description

Allowed values
You can enter any combination of 1–256 letters (a-z, A-Z), numbers (0–9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose the value in quotation marks.

direct-download

This **single-valued** attribute indicates whether PSF sends MO:DCA-P data directly to the AFP Download Plus receiver without first storing the data in a temporary file on the z/OS system.

ISPF field name
Direct download

Allowed values
You can enter one of these fixed values:

none   PSF does not send MO:DCA-P data directly to the AFP Download Plus receiver (default).

modca–p   PSF sends MO:DCA-P data directly to the AFP Download Plus receiver.

Usage guidelines
- The **modca-p** value can improve performance.
- If **direct-download=modca-p**, the AFP Download Plus receiver must support the direct download method of receiving MO:DCA-P data.

- This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

disconnect-action

This **single-valued** attribute specifies the action that PSF takes when the time specified by the **printer-disconnect-interval** attribute expires and no output is available from JES. This attribute is only for SNA-attached and TCP/IP-attached printers.

ISPF field name
Disconnect action

Allowed values
You can enter one of these fixed values:

stop　　　　PSF stops the printer FSA, which can then be restarted only by an operator command.

redrive　　PSF redrives the printer FSA according to the value specified by the **printer-management-mode** attribute (default).

display-afpdp-status

This **single-valued** attribute specifies whether PSF displays the processing and transmission status of AFP Download Plus on the console.

ISPF field name
Display status

Allowed values
You can enter one of these fixed values:

yes　　PSF displays the status.

no　　PSF does not display the status (default).

Usage guidelines
This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

dump-code

This **single-valued** attribute specifies a PSF reason code or a restartable abend reason code that causes a conditional dump of the PSF address space when the reason code occurs.

ISPF field name
Dump: Code

Allowed values
You can enter an integer from 0 to 2147483647 or a 7–8 character hexadecimal value. A PSF reason code is an 8-character hexadecimal value. An abend reason code is a 7-character hexadecimal value. The first three characters are always **ABD**. When you enter a hexadecimal value (which is suggested), you can enter the hexadecimal characters only or the hexadecimal characters with a prefix of **0x**. For example, enter the dump-code attribute in one of these ways:

```
dump-code=09600c00
dump-code=0x09600c00
dump-code=157289480
```

dump-message-id

This **single-valued** attribute specifies a PSF message that causes a conditional dump of the PSF address space when the message occurs.

ISPF field name
Dump: Message ID

Allowed values
You can enter a value in the format **APS***nnnnt*:

nnnn   Three to four digit message number

t   One of these type codes:

      A   Message requiring operator action

      I   Information message

eject-to-front-facing

This **single-valued** attribute specifies whether PSF is to tell your continuous-forms printer to do an eject to front facing before the job-header page, before the start of a new document, or both.

ISPF field name
Eject to front facing

Allowed values
You can enter one of these fixed values:

none   Eject to front facing is not done (default).

job   Eject to front facing is done before the job-header page.

document   Eject to front facing is done between documents in a data set.

both   Eject to front facing is done before the job-header page and between documents.

end-sna-conversation

This **single-valued** attribute specifies whether PSF ends the SNA LU1 conversation between print jobs while maintaining the SNA session with the printer when the NPRO timer expires or after no job is available for one minute and the last page printed has been stacked.

ISPF field name
End SNA conversation

Allowed values
You can enter one of these fixed values:

yes   PSF ends the SNA LU1 conversation with the printer.

no   PSF maintains the SNA LU1 conversation between print jobs (default).

error-disposition-supported

This **single-valued** attribute specifies whether PSF honors the error disposition requested for a data set when PSF ends a data set because an error occurs during processing.

ISPF field name
Error disposition supported

Allowed values
You can enter one of these fixed values:

yes   PSF honors the requested error disposition.

no   PSF does not honor the requested error disposition (default).

failure-action

This **single-valued** attribute specifies the PSF action after a printer failure, an SNA session failure, or a TCP/IP network failure.

ISPF field name
Failure action

Allowed values
You can enter one of these fixed values:

stop   PSF must be restarted by an operator command.

connect   PSF establishes a connection or waits for the printer (default).

form-definition

This **single-valued** attribute specifies the name of the default form definition that defines how a data set is printed. This attribute is required; however, if the job submitter specifies a form definition, it overrides the form definition in this attribute.

ISPF field name
Form definition

Allowed values
You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

You can specify the form definition name with or without the F1 prefix. However, if the name of the form definition, without the F1 prefix, starts with F1, specify the full name. For example, F1F1USER.

fsa-trace-dsname

This **single-valued** attribute specifies the data set to which PSF directs an FSA trace when **trace-mode=full**, **trace-mode=ipds**, **trace-mode=limit**, or **trace-mode=sync**.

ISPF field name
FSA trace dsname

Allowed values
You can enter a valid data set name that is allocated before the PSF FSA is started.

fsa-type

This **single-valued** attribute specifies the type of FSA.

Allowed values

You can enter one of these fixed values:

afp-download-plus

> An FSA for the AFP Download Plus feature of PSF.

psf-channel   An FSA for a channel-attached printer controlled by PSF.

psf-sna   An FSA for an SNA-attached printer controlled by PSF.

psf-tcpip   An FSA for a TCP/IP-attached printer controlled by PSF.

global-overlay

This **single-valued** attribute specifies the member name of a medium overlay that the printer places on every sheet of output, including separator pages and message pages.

ISPF field name

Overlay

Allowed values

You can enter a combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

goca-box-supported

This **single-valued** attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Box drawing orders.

ISPF field name

GOCA Box orders

Allowed values

You can enter one of these fixed values:

yes   The printer supports the orders.

no   The printer does not support the orders (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

goca-fractional-line-supported

This **single-valued** attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Set Fractional Line Width drawing orders.

ISPF field name

GOCA Set Fractional Line Width orders

Allowed values

You can enter one of these fixed values:

yes   The printer supports the orders.

no   The printer does not support the orders (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

goca-process-color-supported

This **single-valued** attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Set Process Color drawing orders.

ISPF field name

GOCA Set Process Color orders

Allowed values

You can enter one of these fixed values:

yes The printer supports the orders.

no The printer does not support the orders (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

highlight-communications-failure-message

This **single-valued** attribute specifies whether PSF highlights the message that it writes to the z/OS console when a communications failure occurs with the printer (message APS6501A). Highlighting the communications failure message can help you detect a problem that requires attention because the message remains on the console until the operator deletes it. This attribute applies to TCP/IP-attached printers.

ISPF field name

Highlight communications failure message

Allowed values

You can enter one of these fixed values:

yes PSF highlights the communications failure message.

no PSF does not highlight the communications failure message (default).

image-output-format

This **single-valued** attribute indicates the format that PSF uses for all image data that it sends to the AFP Download Plus receiver.

ISPF field name

Image output format

Allowed values

You can enter one of these fixed values:

ioca Image data is in uncompressed Image Object Content Architecture (IOCA) format (default).

unchanged
     Image data is in the same format as in the input document.

Usage guidelines
This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

inhibit-recovery

This **single-valued** attribute indicates whether PSF inhibits error recovery for a job so that data is only resent to the printer if it has not already printed.

ISPF field name
Inhibit recovery

Allowed values
You can enter one of these fixed values:

yes   Error recovery is inhibited and data is only resent if it has not printed.

no   Recovery is not inhibited and data is resent from the point of the error (default).

inline-bcoca-objects

This **single-valued** attribute indicates whether PSF includes Bar Code Object Content Architecture (BCOCA) objects inline with the documents it send to the AFP Download Plus receiver.

ISPF field name
Bar code objects (BCOCA)

Allowed values
You can enter one of these fixed values:

yes   PSF includes BCOCA objects inline (default).

no   PSF does not include BCOCA objects inline.

inline-color-management-resources

This **single-valued** attribute indicates whether PSF includes color management resources (CMRs) inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Color management resources

Allowed values
You can enter one of these fixed values:

all   PSF includes all CMRs that are on the sending system. If you specify this value, transmission time is longer because CMRs can be quite large. Specify this value if the receiving system does not contain CMRs.

generic   PSF includes all generic CMRs and all CMRs that the data stream references. Specify this value if any documents use CMRs that are not on the receiving system. Device-specific CMRs must reside on the receiving system or in the printer. This value is the default.

none   PSF does not include any CMRs inline. Specify this value if the CMRs reside on the receiving system.

inline-foca-objects

This **single-valued** attribute indicates whether PSF includes Font Object Content Architecture (FOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Font objects (FOCA)

Allowed values
You can enter one of these fixed values:

yes   PSF includes FOCA objects inline (default).

no   PSF does not include FOCA objects inline.

inline-form-definitions

This **single-valued** attribute indicates whether PSF includes form definitions inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Form definitions

Allowed values
You can enter one of these fixed values:

yes   PSF includes form definitions inline (default).

no   PSF does not include form definitions inline.

inline-goca-objects

This **single-valued** attribute indicates whether PSF includes Graphics Object Content Architecture (GOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Graphics objects (GOCA)

Allowed values
You can enter one of these fixed values:

yes   PSF includes GOCA objects inline (default).

no   PSF does not include GOCA objects inline.

inline-ioca-objects

This **single-valued** attribute indicates whether PSF includes Image Object Content Architecture (IOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Image objects (IOCA)

Allowed values
You can enter one of these fixed values:

yes   PSF includes IOCA objects inline (default).

no   PSF does not include IOCA objects inline.

inline-object-containers

This **single-valued** attribute indicates whether PSF includes object containers inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Object containers

Allowed values
You can enter one of these fixed values:

yes   PSF includes object containers inline (default).

no   PSF does not include object containers inline.

inline-overlays

This **single-valued** attribute indicates whether PSF includes overlays inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Overlays

Allowed values
You can enter one of these fixed values:

yes   PSF includes overlays inline (default).

no   PSF does not include overlays inline.

inline-page-segments

This **single-valued** attribute indicates whether PSF includes page segments inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Page segments

Allowed values
You can enter one of these fixed values:

yes   PSF includes page segments inline (default).

no   PSF does not include page segments inline.

inline-ptoca-objects

This **single-valued** attribute indicates whether PSF includes Presentation Text Object Content Architecture (PTOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Presentation text objects (PTOCA)

Allowed values
You can enter one of these fixed values:

yes   PSF includes PTOCA objects inline (default).

no   PSF does not include PTOCA objects inline.

Usage guidelines
This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

inline-truetype-fonts

This **single-valued** attribute indicates whether PSF includes TrueType and OpenType fonts inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

TrueType fonts

Allowed values

You can enter one of these fixed values:

yes   PSF includes TrueType and OpenType fonts fonts inline (default).

no   PSF does not include TrueType and OpenType fonts fonts inline.

input-tray-substitutions

This **multi-valued**, **value-map** attribute associates one input tray number with two substitute tray numbers: one tray number for jobs that print on a single side of the paper and another tray number for jobs that print on both sides of the paper.

ISPF field name

Input Tray Substitutions

Allowed values

One to four sets of values in the format: *input_tray -> {simplex_tray duplex_tray}*:

input_tray   An integer from 1–255 that identifies the tray specified for the job in the INTRAY JCL parameter, the **input-tray-number** job attribute, or the form definition PSF uses to print the job.

simplex_tray   An integer from 1–255 that identifies the tray PSF is to use for jobs printed on a single side of the paper.

duplex_tray   An integer from 1–255 that identifies the tray PSF is to use for jobs printed on both sides of the paper.

To determine the tray numbers for your printer, see the printer documentation.

Enclose the entire values in braces. For example:

```
input-tray-substitutions = { 1 ->{1 3} 2 -> {2 4} }
```

In this example:
- When the job submitter specifies tray 1, PSF uses tray 1 for jobs that print on a single side of the paper and tray 3 for jobs that print on both sides of the paper.
- When the job submitter specifies tray 2, PSF uses tray 2 for jobs that print on a single side of the paper and tray 4 for jobs that print on both sides of the paper.

Default value

PSF does not use substitute tray numbers.

Usage guidelines

Specify this attribute when the same side-sensitive or edge-sensitive paper is loaded in different trays in two different directions. That is, in one direction for printing on a single side of the paper and in another direction for printing on both sides of the paper.

interrupt-message-page

This **single-valued** attribute specifies whether the interrupt message page that PSF inserts in your printed output is printed.

ISPF field name
Interrupt message page

Allowed values
You can enter one of these fixed values:

`print`   An interrupt message page is printed (default).

`suppress`   An interrupt message page is not printed.

interrupt-message-page-copies

This **single-valued** attribute specifies the number of copies PSF produces of the interrupt message page when the mark-interrupt-message-page attribute is specified.

ISPF field name
Interrupt message page: Copies

Allowed values
You can enter an integer from 1 (default) to 10.

ioca-replicate-trim-supported

This **single-valued** attribute indicates whether the printer supports the Image Object Content Architecture (IOCA) Replicate and Trim function.

ISPF field name
IOCA replicate and trim function

Allowed values
You can enter one of these fixed values:

`yes`   The printer supports the function.

`no`   The printer does not support the function (default).

Usage guidelines
This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

issue-intervention-messages

This **single-valued** attribute specifies whether PSF displays intervention messages on the z/OS system console. An intervention message means that a printer has a physical problem, such as a paper jam or an open paper tray. After an operator fixes the problem, the printer starts printing again. This attribute applies to SNA-attached and TCP/IP-attached printers.

ISPF field name
Issue intervention messages

Allowed values
You can enter one of these fixed values:

`yes`   Intervention messages are displayed.

no   Intervention messages are not displayed.

Default value
Intervention messages are not displayed.

issue-setup-messages

This **single-valued** attribute specifies the setup parameters for which JES should display setup messages on the z/OS system console when an SNA-attached or TCP/IP-attached printer is initialized and at the start of any job that specifies a change in a setup parameter from what is active for the printer.

ISPF field name
Issue setup messages

Allowed values
You can enter one of these fixed values:

none   Do not display setup messages (default).

burst   Display setup messages for the BURST setup parameter.

forms   Display setup messages for the FORMS setup parameter.

all   Display setup messages for both BURST and FORMS setup parameters.

label-data-pages

This **single-valued** attribute specifies whether the security label is printed on each page of printed output. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name
Label data pages

Allowed values
You can enter one of these fixed values:

yes   The security label determined by SECLABEL is printed.

no   The security label is not printed.

Default value
If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

label-separator-pages

This **single-valued** attribute specifies whether the security label is printed on a separator page. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name
Label separator pages

Allowed values
You can enter one of these fixed values:

yes   The security label determined by SECLABEL is printed.

no   The security label is not printed.

Default value

If this attribute is not specified, PSF sets the value to `yes` if PSFMPL is active (default) or to `no` if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

location

This **single-valued** attribute lets you specify the location of the printer or the AFP Download Plus receiver. The location can help users find printers or AFP Download Plus receivers.

ISPF field name

Location

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If a value contains blanks or special characters, enclose the value in quotation marks.

Default value

None.

Usage guidelines

If you use the same format to specify the location in all FSA definitions (for example: Bldg 3/Col 2), users can find all printers or AFP Download Plus receivers with similar locations, such as all printers in building 3.

logmode

This **single-valued** attribute specifies the name of the VTAM logon-mode table entry, which defines the session parameters for an SNA-attached printer.

ISPF field name

Logmode

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

luname

This **single-valued** attribute specifies the unique, logical-unit name of an SNA-attached printer.

ISPF field name

LU name

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

map-to-outline-fonts

This **single-valued** attribute specifies whether PSF maps fonts to outline fonts.

ISPF field name
Map to outline fonts

Allowed values
You can enter one of these fixed values:

yes PSF uses system and user mapping tables to map fonts to corresponding outline fonts.

no PSF does not map fonts to outline fonts (default).

Usage guidelines
Specify **map-to-outline-fonts=yes** if your printer supports outline fonts, you have existing applications that use raster fonts, and you want to use outline fonts without changing the applications.

mark-interrupt-message-page

This **single-valued** attribute specifies whether PSF marks the interrupt message page with form marks.

ISPF field name
Interrupt message page: Mark page

Allowed values
You can enter one of these fixed values:

yes PSF marks the interrupt message page with form marks.

no PSF does not mark the interrupt message page (default).

mcf-name

This **single-valued** attribute specifies how PSF builds the Map Coded Font (MCF) Format 2 structured field in the data it sends to the AFP Download Plus receiver.

ISPF field name
Map Coded Font (MCF) Format 2 Name

Allowed values
You can enter one of these fixed values:

coded-font
PSF uses the name of the coded font to build the MCF structured field. Specify this value for documents that contain double-byte character set (DBCS) fonts.

codepage-character-set
PSF uses the names of the code page and character set to build the MCF structured field (default).

Usage guidelines
This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

message-count-before-dump

This **single-valued** attribute specifies the number of times the message specified by the **dump-message-id** attribute is sent before PSF produces a conditional dump.

ISPF field name

Dump: Count

Allowed values

You can enter an integer from 1 (default) to 99.

name

This **single-valued** attribute specifies the name of the FSA. This name must be a unique name in the Printer Inventory and it must match the name on the JES initialization statement.

Note: This is a *non-settable* attribute. Do not specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name

FSA name

Allowed values

None.

no-response-action

This **single-valued** attribute specifies what action PSF takes when the time specified by the **response-timeout** attribute expires and a response has not been received from the printer or from the AFP Download Plus receiver.

ISPF field name

No response action

Allowed values

You can enter one of these fixed values:

`notify-jes`	PSF notifies JES that an expected response was not received (default).
`notify-user`	PSF sends a message to the user ID specified by the **no-response-notify** attribute and to JES indicating that an expected response was not received.
`notify-operator`	
	PSF sends a message to the system operator and to JES indicating that an expected response was not received.
`terminate`	PSF stops the printer FSA or the AFP Download Plus FSA. The system operator must issue a command to restart the FSA. The active data set is restarted from the last checkpoint.

Usage guidelines

This attribute applies to AFP Download Plus V4R4 or later. Earlier releases ignore it.

no-response-notify

This **single-valued** attribute specifies the user ID to which PSF sends a message when an expected response is not received from the printer or from the AFP Download Plus receiver before time expires. This attribute is used when **no-response-action=notify-user**.

ISPF field name

No response action: Notify

Allowed values

Specify the value in the format *node.userid*:

node　　　　　The node associated with the user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. Lowercase letters are converted to uppercase.

　　　　　　　　The node is required.

userid　　　　The user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. The first character must be alphabetic or national. Lowercase letters are converted to uppercase.

Usage guidelines

This attribute applies to AFP Download Plus V4R4 or later. Earlier releases ignore it.

offset-interrupt-message-page

This **single-valued** attribute specifies whether offset stacking is required for the interrupt message page.

ISPF field name

Interrupt message page: Offset page

Allowed values

You can enter one of these fixed values:

yes　　The printed output is offset stacked, beginning at the interrupt message page.

no　　No offset stacking is done for the interrupt message page (default).

offset-stacking

This **single-valued** attribute controls when PSF does offset stacking. You can use offset stacking to separate printed output on cut-sheet printers and on continuous-forms printers that support offset stacking.

ISPF field name

Offset stacking

Allowed values

You can enter one of these fixed values:

dataset
　　　　　　PSF does offset stacking at the start of a new data set or copy of a data set.

job　　PSF does offset stacking at the start of a new job.

none　　PSF does not do offset stacking.

Usage guidelines

- This attribute lets you control offset stacking separately from copy marking. If you select a value in this attribute for a printer that supports offset stacking, the COPYMARK parameter (in the JES initialization statement) and the **suppress-copy-marks** attribute control only copy marking and not offset stacking.
- If you do not specify this attribute, the COPYMARK parameter and the **suppress-copy-marks** attribute control both copy marking and offset stacking.
- PSF uses the value in this attribute for all jobs unless you override the value in a PSF Exit 7 Begin Data Set (BDS) call.

oid-format-supported

This **single-valued** attribute indicates whether the printer supports the Object Identifier (OID) format for TrueType and OpenType fonts.

ISPF field name

Object identifier (OID) format

Allowed values

You can enter one of these fixed values:

yes   The printer supports the OID format.

no   The printer does not support the OID format (default).

Usage guidelines

This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

override-3800-default-font

This **single-valued** attribute specifies whether PSF tells the 3800 to replace the hardware default font with the first font in the current font list.

ISPF field name

3800 compatibility: Override default font

Allowed values

You can enter one of these fixed values:

yes   PSF lets the printer replace the hardware default font.

no   The printer uses the hardware default font (default).

page-accounting-supported

This **single-valued** attribute indicates whether PSF sends information, such as the number of pages and sheets in a data set, to the AFP Download Plus receiver. The AFP Download Plus receiver can use the information to provide more accurate accounting information.

ISPF field name

Page accounting supported

Allowed values

You can enter one of these fixed values:

yes   PSF sends accounting information to the AFP Download Plus receiver.

no PSF does not send accounting information (default).

Usage guidelines

Select this option if the AFP Download Plus receiver supports the **-opagecount** and **-osheetcount** parameters.

page-definition

This **single-valued** attribute specifies the name of the default page definition that defines how a data set is printed. This attribute is required; however, if the job submitter specifies a page definition, it overrides the page definition in this attribute.

ISPF field name

Page definition

Allowed values

You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.

You can specify the page definition name with or without the P1 prefix. However, if the name of the page definition, without the P1 prefix, starts with P1, specify the full name. For example, P1P1USER.

paper-length

This **single-valued** attribute specifies the length of the paper that is loaded in the printer. The 3800 Line-Mode Conversion and Line-Mode Migration functions in AFP Download Plus can use this value to format line data.

ISPF field name

Paper length

Allowed values

A value in the format *nnnn.mmmuu*:

nnnn	A number from 0 to 9999. You must specify at least one digit to the left of the decimal point.
mmm	A number from 0 to 999. The decimal point and the digits after it are optional.
uu	One of these fixed values:

IN	Inches
CM	Centimeters
MM	Millimeters
PELS	Picture elements (1/240 inch)
POINTS	Points (1/72 inch)

The default is 14IN.

Usage guidelines

- If you specify the unit as PELS or POINTS, specify the value as a whole number with no decimal point.

- This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

paper-width

This **single-valued** attribute specifies the width of the paper that is loaded in the printer. The 3800 Line-Mode Conversion and Line-Mode Migration functions in AFP Download Plus can use this value to format line data.

ISPF field name
Paper width

Allowed values
A value in the format *nnnn.mmmuu*:

nnnn	A number from 0 to 9999. You must specify at least one digit to the left of the decimal point.
mmm	A number from 0 to 999. The decimal point and the digits after it are optional.
uu	One of these fixed values:

IN	Inches
CM	Centimeters
MM	Millimeters
PELS	Picture elements (1/240 inch)
POINTS	Points (1/72 inch)

The default is 13.2IN.

Usage guidelines
- If you specify the unit as PELS or POINTS, specify the value as a whole number with no decimal point.
- This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

port-number

This **single-valued** attribute specifies the port number with which PSF is to establish a connection to a TCP/IP-attached printer or to an AFP Download Plus receiver. The value in this attribute must match the TCP/IP port number in the printer or the AFP Download Plus receiver.

ISPF field name
Port number

Allowed values
You can enter an integer from 1 to 65535. The default is 5001.

print-error-messages

This **single-valued** attribute specifies whether PSF should print error messages at the end of a data set. If **fsa-type=afp-download-plus**, PSF saves all messages in a file on the z/OS system instead of printing them.

ISPF field name
Print error messages

Allowed values

You can enter one of these fixed values:

yes   PSF prints or saves error messages until an error occurs that ends processing (default).

no   PSF does not print or save error messages unless an error occurs that ends processing. If that happens, only the message group describing the last error is printed or saved.

print-error-messages-maximum

This **single-valued** attribute specifies the maximum number of message groups that PSF generates when **print-error-messages=yes**. When the maximum number is reached, PSF stops processing the data set and deletes it from the JES spool.

ISPF field name

Print error messages: Maximum messages

Allowed values

You can enter an integer from 0 to 999. A value of 0 means the data set is processed until it completes or an error occurs that ends processing of the data set. The default is 16.

print-error-reporting

This **single-valued** attribute specifies whether the printer reports character and position errors to PSF. Character errors are caused by trying to use a code point that is not assigned to a character in a font. Position errors are caused by trying to print outside the printable area.

ISPF field name

Print error reporting

Allowed values

You can enter one of these fixed values:

none   Do not report any character or position errors (default).

all   Report all character and position errors.

character   Report only character errors.

position   Report only position errors.

printer-acquire-interval

This **single-valued** attribute specifies the number of seconds between the time PSF releases a printer and when PSF tries to acquire it again. This attribute is only used when **printer-release-mode=time**.

ISPF field name

Acquire interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-connect-interval

This **single-valued** attribute specifies the number of seconds during which PSF attempts to connect to a printer or to an AFP Download Plus receiver. When the connect interval expires and the connection is not complete, PSF ends the FSA.

ISPF field name
Connect interval

Allowed values
You can enter an integer from 0 to 86400. 0 means PSF attempts to connect for an unlimited time.

Default value
For channel-attached and SNA-attached printers, if this attribute is not specified blank, PSF attempts to connect for an unlimited time. For TCP/IP-attached printers and for AFP Download Plus receivers, PSF attempts to connect for 600 seconds (10 minutes).

printer-disconnect-interval

This **single-valued** attribute specifies the number of seconds until PSF ends the session with an SNA-attached or TCP/IP-attached printer.

ISPF field name
Disconnect interval

Allowed values
You can enter an integer from 0 (default) to 86400.

printer-ip-address

This **single-valued** attribute specifies the Internet Protocol (IP) address or host name of the TCP/IP-attached printer or the AFP Download Plus receiver.

ISPF field name
IP address

Allowed values
Specify a valid IP address or host name. You can specify the IP address in dotted-decimal or colon-hexadecimal format. Blanks are not allowed. If the value contains special characters, enclose it in quotation marks. Examples of printer IP addresses are:

```
printer-ip-address = 9.99.176.133
printer-ip-address = prt009.net.xyz.com
printer-ip-address = PRT009
printer-ip-address = 2001:0db8:85a3:0000:0000:8a2e:0370:7334
```

Usage guidelines
If you specify a colon-hexadecimal IP address:
- PSF V4R4 or later is required.
- You can omit leading zeroes in each hexadecimal value.
- You can omit one sequence of repeat zero values.
- You can specify the last two hexadecimal values in dotted-decimal notation.

printer-management-mode

This **single-valued** attribute specifies how PSF controls an SNA-attached or TCP/IP-attached printer in deferred-printing mode.

ISPF field name

Management mode

Allowed values

You can enter one of these fixed values:

immediate   PSF starts a communication session with the printer immediately and then looks for output available on the JES spool.

dialin   PSF starts a session with the printer when the switched line is connected.

outavail   PSF starts a communication session with the printer only when output is available on the JES spool (default).

printer-release-interval

This **single-valued** attribute specifies the number of seconds after which PSF responds to a request to release a printer in the method specified by the **printer-release-mode** attribute.

ISPF field name

Release interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-release-mode

This **single-valued** attribute specifies how PSF is to respond to a request to release the printer.

ISPF field name

Release mode

Allowed values

You can enter one of these fixed values:

idle   PSF releases the printer when a request to release has been received and the time specified by the **printer-release-interval** attribute has expired with no output on the spool for the printer.

time   PSF starts the timer for the release interval when a release request is received, even when there is more output on the spool.

none   PSF does not release the printer (default).

prune-double-byte-fonts

This **single-valued** attribute specifies whether PSF prunes double-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name

Prune double-byte fonts

Allowed values

You can enter one of these fixed values:

yes PSF prunes double-byte raster fonts (default).

no PSF does not prune double-byte fonts.

prune-single-byte-fonts

This **single-valued** attribute specifies whether PSF prunes single-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name
Prune single-byte fonts

Allowed values
You can enter one of these fixed values:

yes PSF prunes single-byte raster fonts (default).

no PSF does not prune single-byte fonts.

psf-send-default-character

This **single-valued** attribute specifies whether PSF passes the default character information to the printer by fully populating the outline single-byte code page.

ISPF field name
Send default character

Allowed values
You can enter one of these fixed values:

yes PSF passes the default character information to the printer.

no PSF does not pass the default character information to the printer (default).

recover-from-font-not-found

This **single-valued** attribute specifies whether PSF should make sure the outline font derived from the mapped font exists before proceeding.

ISPF field name
Recover from font not found

Allowed values
You can enter one of these fixed values:

yes PSF should do library queries to make sure the mapped font exists before loading it.

no PSF does not need to make sure that the mapped font exists (default).

Usage guidelines
- Specify **recover-from-font-not-found=yes** if your printer supports outline fonts, you have requested that PSF map to outline fonts, and you do not want pages in your job ended because the outline font identified through the mapped font did not exist on the host.
- When you specify **recover-from-font-not-found=yes**, the performance of PSF is degraded because of additional library queries for every mapped font resource.

release-ds-when-repositioning

This **single-valued** attribute specifies whether PSF should release data sets to JES when PSF repositions.

ISPF field name

Release data set when repositioning

Allowed values

You can enter one of these fixed values:

yes   PSF releases the data sets when repositioning. The data sets might be reselected in a different order.

no   PSF retains data sets during repositioning (default).

report-line-mode-conversion-paper-length-errors

This **single-valued** attribute indicates whether the 3800 Line-Mode Conversion function in AFP Download Plus reports an error when the paper length in the FCB does not match the value in the **paper-length** attribute.

ISPF field name

Report Line-Mode Conversion paper length errors

Allowed values

You can enter one of these fixed values:

yes   The Line-Mode Conversion function reports an error. It puts the print job on the hold queue and issues message APS973I.

no   The Line-Mode Conversion function does not report an error. It uses the value in the **paper-length** attribute (default).

Usage guidelines

This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

resolution

This **single-valued** attribute specifies the resolution at which the output was formatted. PSF uses this value to choose the associated resolution system library that has previously been defined by the system programmer.

ISPF field name

Resolution

Allowed values

You can enter one of these fixed values:

240   The data was formatted with resources at 240 pels per inch.

300   The data was formatted with resources at 300 pels per inch.

Default value

PSF uses the default system library.

Usage guidelines

The resolution in this attribute is used for all jobs unless the Exit 7 BDSC call overrides it.

response-timeout

This **single-valued** attribute specifies maximum number of seconds PSF waits for a response from the printer or from the AFP Download Plus receiver.

ISPF field name
Response timeout

Allowed values
You can enter an integer from 0 (default) to 86400.

Usage guidelines
This attribute applies to AFP Download Plus V4R4 or later. Earlier releases ignore it.

restrict-printable-area

This **single-valued** attribute specifies whether an area on each page of printed output is reserved for the security label.

ISPF field name
Restrict printable area

Allowed values
You can enter one of these fixed values:

yes   An area on each page is reserved for the security label.

no   An area is not reserved for the security label.

Default value
If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

retained-fonts

This **single-valued** attribute specifies the maximum number of fonts that PSF retains in printer storage between print jobs.

ISPF field name
Retained fonts

Allowed values
You can enter a value from 0 to 32767. The default value depends on the type of printer and the amount of storage available in the printer.

Usage guidelines
- When PSF retains fonts, PSF does not need to reload the same fonts for subsequent jobs. However, retaining fonts requires additional printer storage.
- This value overrides the reasonable resource loading value (RRLV) for fonts that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-form-definitions

This **single-valued** attribute specifies the maximum number of form definitions that PSF retains in virtual storage between print jobs.

ISPF field name
Retained form definitions

Allowed values
You can enter a value from 0 to 32767. The default value is 6.

Usage guidelines

- When PSF retains form definitions, PSF does not need to reload the same form definitions for subsequent jobs. However, retaining form definitions requires additional virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for form definitions that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-object-containers

This **single-valued** attribute specifies the maximum number of object containers that PSF retains in printer storage between print jobs.

ISPF field name

Retained object containers

Allowed values

You can enter a value from 0 to 32767.

Default value

The default value is 0 for 3800 and 3820 printers. The default value is 200 for all other printers.

Usage guidelines

- When PSF retains object containers, PSF does not need to reload the same object containers for subsequent jobs. However, retaining object containers requires additional virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for object containers that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-page-definitions

This **single-valued** attribute specifies the maximum number of page definitions that PSF retains in virtual storage between print jobs.

ISPF field name

Retained page definitions

Allowed values

You can enter a value from 0 to 32767. The default value is 6.

Usage guidelines

- When PSF retains page definitions, PSF does not need to reload the same page definitions for subsequent jobs. However, retaining page definitions requires additional virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for page definitions that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-page-segments

This **single-valued** attribute specifies the maximum number of page segments that PSF retains in printer storage between print jobs.

ISPF field name

Retained page segments

Allowed values

You can enter a value from 0 (default) to 32767.

Usage guidelines

- When PSF retains page segments, PSF does not need to reload the same page segments for subsequent jobs. However, retaining page segments requires additional printer storage.
- This value overrides the reasonable resource loading value (RRLV) for page segments that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

secure-transmission

This **single-valued** attribute indicates whether PSF encodes data before sending it to the AFP Download Plus receiver.

ISPF field name

Secure transmission

Allowed values

You can enter one of these fixed values:

yes   PSF encodes data (default).

no   PSF does not encode data.

send-messages-on-failure

This **single-valued** attribute indicates whether PSF sends all messages to the AFP Download Plus receiver when it cannot send an output data set because of an error or because the operator canceled processing of the data set. The receiver can print the messages to help diagnose errors detected on the sending system, such as data stream errors.

ISPF field name

Send messages on failure

Allowed values

You can enter one of these fixed values:

all   PSF sends all messages to the receiver in a message data set in MO:DCA-P format (default).

generic-only

PSF sends a generic message in line data format to the receiver to indicate that the output data was not sent.

send-messages-to-sysout

This **single-valued** attribute specifies whether PSF sends a message data set to a SYSOUT data set for redirection to another CLASS or DEST for viewing or printing.

ISPF field name

Send msgs to SYSOUT

Allowed values

You can enter one of these fixed values:

yes   PSF sends the message data set to a SYSOUT data set.

no   PSF does not send the message data set to a SYSOUT data set.

send-separator-pages

This **single-valued** attribute indicates whether PSF sends the job and data set separator pages for each output data set to the AFP Download Plus receiver.

ISPF field name

Send separator pages

Allowed values

You can enter one of these fixed values:

yes   PSF sends separator pages to the receiver.

no   PSF does not send separator pages to the receiver (default).

set-3800-dataset-header-origin

This **single-valued** attribute specifies whether PSF sets the data set header media origin on continuous-forms printers to the top left corner.

ISPF field name

Set media origin to 3800 origin for: Data set header

Allowed values

You can enter one of these fixed values:

yes   PSF sets the data set header media origin to the top left corner.

no   PSF does not set the data set header media origin to the top left corner (default).

set-3800-dataset-origin

This **single-valued** attribute specifies whether PSF sets the data set media origin on continuous-forms printers to the top left corner.

ISPF field name

Set media origin to 3800 origin for: Data set

Allowed values

You can enter one of these fixed values:

yes   PSF sets the data set media origin to the top left corner.

no   PSF does not set the data set media origin to the top left corner (default).

set-3800-job-header-origin

This **single-valued** attribute specifies whether PSF sets the job header media origin on continuous-forms printers to the top left corner.

ISPF field name

Set media origin to 3800 origin for: Job header

Allowed values

You can enter one of these fixed values:

yes   PSF sets the job header media origin to the top left corner.

no   PSF does not set the job header media origin to the top left corner (default).

set-3800-job-trailer-origin

This **single-valued** attribute specifies whether PSF sets the job trailer media origin on continuous-forms printers to the top left corner.

ISPF field name

Set media origin to 3800 origin for: Job trailer

Allowed values

You can enter one of these fixed values:

yes   PSF sets the job trailer media origin to the top left corner.

no   PSF does not set the job trailer media origin to the top left corner (default).

set-3800-messages-origin

This **single-valued** attribute specifies whether PSF sets the message data set media origin on continuous-forms printers to the top left corner.

ISPF field name

Set media origin to 3800 origin for: Message data set

Allowed values

You can enter one of these fixed values:

yes   PSF sets the message data set media origin to the top left corner.

no   PSF does not set the message data set media origin to the top left corner (default).

snmp-reporting

This **single-valued** attribute specifies whether PSF supplies printer status information to the z/OS Simple Network Management Protocol (SNMP) agent.

ISPF field name

SNMP reporting

Allowed values

You can enter one of these fixed values:

yes   SNMP reporting is done.

no   SNMP reporting is not done (default).

suppress-copy-marks

This **single-valued** attribute specifies whether PSF should not print copy marks or do offset stacking. This attribute overrides the COPYMARK parameter of the JES initialization statement for the printer.

ISPF field name

Suppress copy marks

Allowed values

You can enter one of these fixed values:

yes Copy marks are not printed and offset stacking is not done.

no Copy marks are printed and offset stacking is done if requested in the COPYMARK parameter (default).

Usage guidelines

If you specify **suppress-copy-marks=yes** and also specify any value in the **offset-stacking** attribute, PSF suppresses only the printing of copy marks, while the **offset-stacking** attribute controls when PSF does offset stacking.

trace-mode

This **single-valued** attribute specifies the type of tracing that is started during FSA initialization. If the FSA has already started, a new trace mode takes effect the next time the FSA starts.

ISPF field name

Trace mode

Allowed values

You can enter one of these fixed values:

none No tracing is started during PSF initialization.

internal An internal trace is started (default).

ipds An external trace containing only IPDS data is started. An internal trace is also started.

limit An external trace like the full trace is started. However, information in some data buffers is truncated. An internal trace is also started.

sync An FSA SYNC external trace is started. An internal trace is also started.

no-printing

 PSF ignores this value and starts only an internal trace.

full An FSA full external trace is started. An internal trace is also started.

trace-table-size

This **single-valued** attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table.

ISPF field name

Trace table size

Allowed values

You can enter an integer from 1 to 999. The default is 32.

transmit-recovery-pages

This **single-valued** attribute specifies how often PSF synchronizes with the AFP Download Plus receiver to determine if the transmitted data has been received and, if necessary, retransmit data from the recovery point. The recovery point is the last time that PSF successfully synchronized with the AFP Download receiver.

ISPF field name

Recovery pages

Allowed values

A value from 0 to 65535; the default is 1000. When 0 is specified, PSF does not synchronize the transmitted data with the receiver until the end of a file.

Usage guidelines

This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

use-line-mode-migration-linect

This **single-valued** attribute indicates whether the PSF Line-Mode Migration function uses the number of lines specified in the LINECT parameter when the LINECT value is smaller than the number of lines specified in the FCB.

ISPF field name

Use Line-Mode Migration LINECT

Allowed values

You can enter one of these fixed values:

yes   The Line-Mode Migration function uses the LINECT parameter.

no   The Line-Mode Migration function does not use the LINECT parameter. It uses the FCB value (default).

Usage guidelines

- If the LINECT value is larger than the FCB value, the Line-Mode Migration function uses the FCB value whether or not this attribute is specified.
- This attribute applies to PSF V4R4 or later. Earlier releases ignore it.

PSF FSS attributes

This section lists the attributes that are valid when you create PSF FSS definitions, which are in object class **psf-fss**.

description

This **single-valued** attribute describes the FSS definition. The description can help you select the FSS definition from a list.

ISPF field name

Description

Allowed values

Any combination of 1–256 letters (a-z, A-Z), numbers (0-9), blanks, and special characters (such as # $ @ ! = / -). If the value contains blanks or special characters, enclose the value in quotation marks.

Default value

None.

name

This **single-valued** attribute specifies the name of the FSS definition.

Note: This is a *non-settable* attribute. Do *not* specify the **name** attribute on the PIDU **create**, **force-create**, or **modify** command. Instead, specify the name as

an operand on the command. However, you can specify the **name** attribute when you construct a condition for the **where** predicate on the **list** and **export** commands.

ISPF field name
FSS name

Allowed values
None.

Default value
None.

nst-trace-dsname

This **single-valued** attribute specifies the name of the data set that PSF directs a notify subtask (NST) trace to. This name must be different than the data set name PSF directs an FSA external trace to. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name
NST trace dsname

Allowed values
You can enter a valid data set name.

Default value
None.

Usage guidelines
An NST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.

tcpip-job-name

This **single-valued** attribute specifies the name of the TCP/IP startup procedure. If you have changed the name of the TCP/IP startup procedure, specify the new name for this attribute. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name
TCP/IP job name

Allowed values
You can enter a valid job name. The letters you type are converted to uppercase.

Default value
TCPIP

trace-prompt

This **single-valued** attribute specifies whether the operator is prompted with message APS620A each time the FSS starts. Prompting lets the operator start tracing all FSAs before the FSA starts processing any data sets. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name
Trace prompt

Allowed values

You can enter one of these fixed values:

yes   The operator is prompted when the FSS starts.

no   The operator is not prompted.

Default value

no

trace-table-size

This **single-valued** attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the PSF FSA trace table. This allocation occurs only if the **trace-mode** attribute is **internal**, **ipds**, **limit**, **full**, or **sync**. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name

Trace table size

Allowed values

You can enter an integer from 1 to 999.

Default value

32

unicode-enabled

This **single-valued** attribute specifies whether PSF is Unicode-enabled for TrueType and OpenType fonts. When PSF is Unicode-enabled, you can use TrueType and OpenType fonts, and these interfaces are enabled: Unicode encoding transform, UNIX System Services C, and file system.

ISPF field name

Unicode enabled

Allowed values

You can enter one of these fixed values:

yes   PSF is Unicode-enabled.

no   PSF is not Unicode-enabled.

Default value

no

Chapter 6. Using the Infoprint Server migration program

The Infoprint Server migration program for PSF (**aopmig**) copies configuration information in PSF startup procedures to PSF FSS and FSA definitions in the Printer Inventory. You can use the migration program to create initial PSF FSS and FSA definitions in the Printer Inventory. After you use the migration program, you can use the Infoprint Server ISPF panels or PIDU to create new FSS and FSA definitions or to edit the FSS and FSA definitions that the migration program created.

Limitation: The migration program does not examine the PSF Exit 7 initialization (INIT) call. Therefore, if your installation has written a PSF Exit 7 INIT call, you might need to edit the PSF FSA definitions that the migration program creates in the Printer Inventory to specify these fields:

- Default process mode
- Issue intervention messages
- Map to outline fonts
- Recover from font not found

The migration program migrates parameters specified in the AFPPARMS control statement. (The AFPPARMS control statement is specified in an AFP Download Plus startup procedure.) It also migrates additional configuration information specified in the PRINTDEV statement of the PSF startup procedure. The migration program can set these ISPF panel fields on the FSS and FSA definition panels. (The PIDU attribute name for each ISPF field is in parentheses.)

- Compression (compression)
- Data set grouping (afpdp-dataset-grouping)
- Default process mode (default-process-mode)
- Direct download (direct-download)
- Display status (display-afpdp-status)
- GOCA Box orders (goca-box-supported)
- GOCA Set Fractional Line Width orders (goca-fractional-line-supported)
- GOCA Set Process Color orders (goca-process-color-supported)
- Image output format (image-output-format)
- IOCA replicate and trim function (ioca-replicate-trim-supported)
- Issue intervention messages (issue-intervention-messages)
- Map Coded Font (MCF) Format 2 name (mcf-name)
- Map to outline fonts (map-to-outline-fonts)
- Object identifier (OID) format (oid-format-supported)
- Page accounting supported (page-accounting-supported)
- Paper length (paper-length)
- Paper width (paper-width)
- Recover from font not found (recover-from-font-not-found)
- Recovery pages (transmit-recovery-pages)
- Report Line-Mode Conversion paper-length errors (report-line-mode-conversion-paper-length-errors)
- Resources Included Inline:

- – Bar code objects (inline-bcoca-objects)
- – Color management resources (inline-color-management-resources)
- – Font objects (inline-foca-objects)
- – Form definitions (inline-form-definitions)
- – Graphics objects (inline-goca-objects)
- – Image objects (inline-ioca-objects)
- – Object containers (inline-object-containers)
- – Overlays (inline-overlays)
- – Page segments (inline-page-segments)
- – Presentation text objects (inline-ptoca-objects)
- – TrueType fonts (inline-truetype-fonts)
- Secure transmission (secure-transmission)
- Send messages on failure (send-messages-on-failure)
- Send separator pages (send-separator-pages)
- Unicode enabled (unicode-enabled)
- Use Line Mode Migration LINECT (use-line-mode-migration-linect)
- Working directory (afpdp-working-directory)

Related information:
- For information about how to run the migration program, see *PSF for z/OS: Customization*.

Chapter 7. Diagnosing errors in the Printer Inventory for PSF

These sections describe how to diagnose problems with the Printer Inventory for PSF:

- "Submitting APARs"
- "Tracing Infoprint Server"
- "Using database diagnostic tools" on page 107
- "Finding abend information, system dumps, and messages" on page 107
- "Checking permissions settings" on page 108

Submitting APARs

Report any difficulties using Infoprint Server to your IBM Support Center. If an APAR is required, the Support Center can tell you where to send the required diagnostic information. When submitting an APAR, use this component ID: **5647A01OP**.

Tracing Infoprint Server

The service representative in the IBM Support Center might ask you to run a trace to aid in diagnosing a problem. If so, the representative will tell you how and where to send the trace information. You do not have to interpret the trace. Send it to your service representative.

Environment variables for tracing

These environment variables control tracing:

AOPTRACEON

If this environment variable is set to any value, Infoprint Server traces processing. This environment variable is optional. Specify it only if instructed to do so by IBM service personnel.

To trace Infoprint Server commands, such as the **pidu** command, set this environment variable in the **/etc/profile** file. To trace Infoprint Server daemons, set this environment variable in either the **aopstart** EXEC or in the STDENV data set.

To turn tracing off, restart Infoprint Server without specifying this environment variable.

Default: The environment variable is not set.

Examples:
```
AOPTRACEON=1
AOPTRACEON=YES
```

AOPTRACEDIR

The name of the trace directory. This environment variable is optional. Specify it only if you set the AOPTRACEON environment variable and the default trace directory is not suitable. The AOPADMIN group must have permission to write to the specified trace directory.

Set this environment variable in the **aopstart** EXEC.

Default: *base-directory*/trace

If you use the default base directory, the default is **/var/Printsrv/trace**.

Example: `AOPTRACEDIR=/mydirectory/trace`

Related information:
- "Turning tracing on"
- "Turning tracing off" on page 105

Turning tracing on

You turn tracing on by setting the AOPTRACEON environment variable. This section shows how to set the AOPTRACEON environment variable in an STDENV data set that the AOPSTART JCL procedure points to.

Tracing slows performance considerably. You should turn tracing on for only as long as necessary to capture the error.

Tip: To find out if the AOPTRACEON environment variable is set in the z/OS UNIX shell, use the z/OS UNIX **export** and **grep** commands to look at the value of the AOPTRACEON variable:

`export | grep AOPTRACEON`

Result:
- If AOPTRACEON is not set, the **export** and **grep** commands do not return any output.
- If AOPTRACEON is set, the **export** and **grep** commands return the AOPTRACEON value or `AOPTRACEON=""`.

To turn tracing on:

1. Specify the AOPTRACEON environment variable in the STDENV data set of the AOPSTART JCL procedure:

   a. Create an MVS data set, such as TRACE.ENV, with these DCB attributes:
      - RECFM=VB
      - LRECL=255

      _____

   b. In the data set, specify the AOPTRACEON variable. Start in the first column, and do not code any blank characters in the string or at the end of the line:

      `AOPTRACEON=1`

      _____

   c. Specify the TRACE.ENV data set in the AOPSTART JCL procedure:

      `///STDENV DD DSN=TRACE.ENV,DISP=SHR`

      _____

2. (Optional) Change the name of the trace directory in the AOPTRACEDIR environment variable in the **aopstart** EXEC. The AOPADMIN group must have permission to write to the specified trace directory.

   _____

3. Enter the MVS START command to run the AOPSTOP JCL procedure to stop Infoprint Server:

   `START AOPSTOP`

   _____

4. Enter the MVS START command to run the AOPSTART JCL procedure to restart Infoprint Server:

    `START AOPSTART`

    _____

Related information:
- "Environment variables for tracing" on page 103
- "Creating an STDENV data set" on page 23
- "Editing the AOPSTART JCL procedure" on page 25

Turning tracing off

You turn tracing off by unsetting the AOPTRACEON environment variable. This section shows how to unset the AOPTRACEON environment variable if you set the AOPTRACEON environment variable in the STDENV data set of the AOPSTART JCL procedure.

To turn tracing off:

1. Comment out the AOPTRACEON variable from the STDENV data set.

    _____

2. Enter the MVS START command to run the AOPSTOP JCL procedure to stop Infoprint Server:

    `START AOPSTOP`

    _____

3. Enter the MVS START command to run the AOPSTART JCL procedure to restart Infoprint Server:

    `START AOPSTART`

    _____

Related information:
- "Environment variables for tracing" on page 103
- "Editing the AOPSTART JCL procedure" on page 25

Finding the trace file

The trace facility creates a separate trace file for each Infoprint Server process traced:
- Infoprint Server daemon trace files are named:

    userid.daemon_name.process_id.uniqueidentifier.tracefile#

    For example:

    `MACBETH.aopd.pid66297.BA71F05F29707301.1`
- Infoprint Server command trace files (for example, the trace file for the **pidu** command) are named:

    userid.process_id.uniqueidentifier.tracefile#

    For example:

    `MACBETH.pid50397251.BA71F08C5514A644.1`

The variables in the trace file names are:

userid

   The TSO user ID of the person who initiated the trace.

daemon_name
The name of the daemon being traced, if applicable.

process_id
The ID of the process created in z/OS UNIX to create the trace.

unique identifier
The time the trace was created. This value is the result of the Store Clock (STCK) processing instruction. The value is displayed as a character string in hexadecimal format.

tracefile#
The number of the trace file.

Tracing ISPF panels

You can trace the processing in the Infoprint Server ISPF panels during an interactive ISPF session. Tracing is usually used only for short periods of time to diagnose problems and collect information to forward to your service representative at the IBM Support Center.

Infoprint Server writes the ISPF trace to a separate UNIX file for each ISPF session. If you turn tracing on and off during the same ISPF session, the Infoprint Server appends trace records to the UNIX file. Infoprint Server creates the trace file in directory **/var/Printsrv/trace** unless you specify a different directory name when you start the trace. The name of the trace file that Infoprint Server creates is *userid.process_ID*:

userid   Specifies the TSO user ID of the person who initiated the ISPF session.

process_ID   Specifies the ID of the UNIX process that is started for the ISPF panel session.

To trace ISPF panels:

1. On the Infoprint Server: Printer Inventory Manager panel, select **7 Configure**.

2. On the Configuration panel:

   a. Select the **Trace Printer Inventory ISPF internals** field.

   b. Specify the fully qualified name of an existing directory in the **ISPF trace directory** field. You can return to the default directory by clearing the **ISPF trace directory** field.

   c. To save the trace option and name of the directory, and exit the panel, press the END function key or enter END on the command line.

```
                            Configuration
  /  Confirm delete requests
  7  Trace Printer Inventory ISPF internals
  ISPF trace directory. . /var/Printsrv/trace

  Printer Inventory:
     Configuration file . /etc/Printsrv/aopd.conf
     NLS path . . . . . . /usr/lpp/Printsrv/%L/%N
     Language . . . . . . En_US
```

3. When you are done tracing, turn tracing off by deselecting the **Trace Printer Inventory ISPF internals** field. Tracing remains on during your next Infoprint Server ISPF session unless you turn tracing off.

Using database diagnostic tools

You can use the **pidu** command to write the definitions in the Printer Inventory to a file. The **pidu** dump command writes to a UNIX file or to an MVS data set. It does not write to **stdout**.

To dump all the PSF FSS and PSF FSA definitions in the Printer Inventory to the file you specify, enter this command on the z/OS UNIX command line:

```
pidu -c 'dump filename; '
```

Example:

```
pidu -c 'dump /tmp/inventory.dump;'
```

Note: The service representative in the IBM Support Center might ask you to set the AOPDUMPON environment variable to capture more detailed dump information for an internal error. If so, the representative will tell you how and where to set the variable, and where to send the dump information.

Related information:
- Chapter 5, "Using the Printer Inventory Definition Utility (PIDU)," on page 47

Finding abend information, system dumps, and messages

This section shows, in general, where to find abend information, system dumps, and messages that the IBM service representative might ask you to locate. The exact locations depend on your particular installation.

Table 8 shows where to find the abend information and system dumps that the IBM service representative might ask you to locate. However, dumps might not be available if Dump Analysis and Elimination (DAE) suppressed them.

Table 9 on page 108 shows where to find the messages that the IBM service representative might ask you to locate.

Table 8. General location of abend information and system dumps

General location of abend information and system dumps	Areas and conditions	Notes®
Console log	All Infoprint Server components.	
/var/Printsrv directory	This is the default base directory for Infoprint Server.	Your installation might have specified a different base directory in the **base-directory** attribute in the Infoprint Server configuration file, **aopd.conf**.
The current working directory	You entered a z/OS UNIX command.	For example, you entered the **pidu** command.

Table 8. General location of abend information and system dumps (continued)

General location of abend information and system dumps	Areas and conditions	Notes®
The home directory	You ran the AOPBATCH program.	
The Language Environment CEEDUMP directory	Language Environment writes CEEDUMPs to one of these directories, in the specified order: 1. The directory found in the _CEE_DMPTARG environment variable, if found 2. The current working directory, if the directory is not the root directory (/) and if the Language Environment can write to the directory 3. The directory found in the TMPDIR environment variable, which indicates the location of a temporary directory if it is not **/tmp** 4. The **/tmp** directory For more information about CEEDUMPs, see *z/OS Language Environment Debugging Guide*.	You can specify the _CEE_DMPTARG and TMPDIR environment variables in these locations: • The aopstart EXEC • Your **.profile** or the **/etc/profile** file, if you entered a z/OS UNIX command • The data set indicated in the STDENV DD statement for the AOPBATCH program

Table 9. General location of messages

Component	General location of messages
All components	Console log
ISPF panels	Messages displayed on ISPF panel

Related information:
• For Infoprint Server messages, see *z/OS Infoprint Server Messages and Diagnosis* or use the z/OS LookAt online facility.

Checking permissions settings

In some cases, you might encounter problems that you can solve by checking permissions settings and by running **aopsetup** to correct some of the settings. For example, you might have problems with permissions settings when you are moving from a test system to a production system, or when you are reinstalling Infoprint Server. Most permissions are set during the installation process.

In addition, you *must* run **aopsetup** in these situations:
• Before you start Infoprint Server daemons for the first time
• Whenever you move to a new z/OS release

If your IBM service representative asks you to check permissions settings, you can use these commands:
- `ls -E /usr/lpp/Printsrv/bin`
- `ls -nE /usr/lpp/Printsrv/bin`
- `ls -E /usr/lpp/Printsrv/lib`
- `ls -nE /usr/lpp/Printsrv/lib`

Figure 5 and Figure 6 on page 110 show sample output from the commands. The sample output shows the normal permissions settings of Infoprint Server directories and the files that user ID 0 should own. If you specified the AOPOPER and AOPADMIN groups in **aopsetup**, your output from the commands should look similar to the sample output.

In the sample output:
- OMVSKERN is the owner ID. This name might be different in your installation.
- OMVSGRP is the group ID. This name might be different in your installation.
- AOPOPER is the RACF group for operators.
- AOPADMIN is the RACF group for administrators.

Rule: The owner ID must have a UID of 0 (root). The **-n** option on the **ls** command shows the UID of the owner ID.

```
drwxr-xr-x        2 OMVSKERN OMVSGRP    1376 ... ...    IBM
-rwxr-xr-x  a-s-  2 OMVSKERN OMVSGRP 2158592 ... ...    aopchkinv
-rwx------  --s-  2 OMVSKERN OMVSGRP   20480 ... ...    aopcstart
-rwx--S---  a---  2 OMVSKERN AOPADMIN  483328 ... ...   aopd
-rwx------  a-s-  2 OMVSKERN OMVSGRP  626688 ... ...    aophinvd
-rwx------  a-s-  2 OMVSKERN OMVSGRP 1531904 ... ...    aopippdxp
-rwx------  a-s-  2 OMVSKERN OMVSGRP  802816 ... ...    aoplogd
-rwxr-x---  --s-  2 OMVSKERN AOPADMIN 1372160 ... ...   aoplogu
-rwx------  a-s-  2 OMVSKERN OMVSGRP  311296 ... ...    aoplpd
-rwxr-xr-x  --s-  2 OMVSKERN OMVSGRP 3899392 ... ...    aopmig
-rwxr-xr-x  --s-  2 OMVSKERN OMVSGRP 1773568 ... ...    aopmigns
-rwxr-xr-x  --s-  2 OMVSKERN OMVSGRP 1159168 ... ...    aopmigpw
-rwx------  a-s-  2 OMVSKERN OMVSGRP  212992 ... ...    aopnetd
-rwxr-xr-x  a-s-  2 OMVSKERN OMVSGRP 3362816 ... ...    aopoms
-rwx------  a-s-  2 OMVSKERN OMVSGRP 2195456 ... ...    aopoutd
-rwsr-xr-x  a-s-  2 OMVSKERN OMVSGRP 2453504 ... ...    aopsapd
-rwx------  a-s-  2 OMVSKERN OMVSGRP 3620864 ... ...    aopsdbd
-rwxr-x---  a-s-  2 OMVSKERN AOPOPER 2625536 ... ...    aopsend
-rwxr-xr-x  --s-  2 OMVSKERN OMVSGRP    4710 ... ...    aopsetup
-rwx------  a-s-  2 OMVSKERN OMVSGRP 1257472 ... ...    aopsnmpd
-rwx------  a-s-  2 OMVSKERN OMVSGRP  950272 ... ...    aopssid
-rwsr-xr--  --s-  2 OMVSKERN AOPOPER   13941 ... ...    aopstart
-rwxr-x---  a-s-  2 OMVSKERN AOPOPER 2625536 ... ...    aopstat
-rwsr-x---  a-s-  2 OMVSKERN AOPOPER 1490944 ... ...    aopstop
-rwx------  a-s-  2 OMVSKERN OMVSGRP  704512 ... ...    aopsubd
-rwx------  a-s-  2 OMVSKERN OMVSGRP  376832 ... ...    aopwsmd
-rwx------  a-s-  2 OMVSKERN OMVSGRP  512000 ... ...    aopxfd
-rwxr-xr-x  a-s-  2 OMVSKERN OMVSGRP 3194880 ... ...    cancel
-rwxr-xr-x  a-s-  2 OMVSKERN OMVSGRP 2224128 ... ...    filter
-rwxr-x---  a-s-  2 OMVSKERN AOPADMIN 1523712 ... ...   hinvu
-rwxr-xr-x  a-s-  2 OMVSKERN OMVSGRP 3203072 ... ...    lp
-rwxr-xr-x  a-s-  2 OMVSKERN OMVSGRP 3272704 ... ...    lpstat
-rwxr-x---  --s-  2 OMVSKERN AOPADMIN 3391488 ... ...   pidu
-rwxr-xr-x  --s-  2 OMVSKERN OMVSGRP    2223 ... ...    remotexf
-rwxr-x---  a-s-  2 OMVSKERN AOPADMIN 1576960 ... ...   sdbu
```

Figure 5. Sample output from command ls -E /usr/lpp/Printsrv/bin

```
drwxr-xr-x          2 0         1            1376 ... ...   IBM
-rwx------  --s-  2 0         1           20480 ... ...   aopcstart
-rwx--S---  a---  2 0      4000          483328 ... ...   aopd
-rwx------  a-s-  2 0         1          626688 ... ...   aophinvd
-rwx------  a-s-  2 0         1         1531904 ... ...   aopippdxp
-rwx------  a-s-  2 0         1          802816 ... ...   aoplogd
-rwxr-x---  --s-  2 0      4000         1372160 ... ...   aoplogu
-rwx------  a-s-  2 0         1          311296 ... ...   aoplpd
-rwxr-xr-x  --s-  2 0         1         3899392 ... ...   aopmig
-rwxr-xr-x  --s-  2 0         1         1773568 ... ...   aopmigns
-rwxr-xr-x  --s-  2 0         1         1159168 ... ...   aopmigpw
-rwx------  a-s-  2 0         1          212992 ... ...   aopnetd
-rwxr-xr-x  a-s-  2 0         1         3362816 ... ...   aopoms
-rwx------  a-s-  2 0         1         2195456 ... ...   aopoutd
-rwsr-xr-x  a-s-  2 0         1         2453504 ... ...   aopsapd
-rwx------  a-s-  2 0         1         3620864 ... ...   aopsdbd
-rwxr-x---  a-s-  2 0      4001         2625536 ... ...   aopsend
-rwxr-xr-x  --s-  2 0         1            4710 ... ...   aopsetup
-rwx------  a-s-  2 0         1         1257472 ... ...   aopsnmpd
-rwx------  a-s-  2 0         1          950272 ... ...   aopssid
-rwsr-xr--  --s-  2 0      4001           13941 ... ...   aopstart
-rwxr-x---  a-s-  2 0      4001         2625536 ... ...   aopstat
-rwsr-x---  a-s-  2 0      4001         1490944 ... ...   aopstop
-rwx------  a-s-  2 0         1          704512 ... ...   aopsubd
-rwx------  a-s-  2 0         1          376832 ... ...   aopwsmd
-rwx------  a-s-  2 0         1          512000 ... ...   aopxfd
-rwxr-xr-x  a-s-  2 0         1         3194880 ... ...   cancel
-rwxr-xr-x  --s-  2 0         1         2224128 ... ...   filter
-rwxr-x---  a-s-  2 0      4000         1523712 ... ...   hinvu
-rwxr-xr-x  a-s-  2 0         1         3203072 ... ...   lp
-rwxr-xr-x  a-s-  2 0         1         3272704 ... ...   lpstat
-rwxr-x---  --s-  2 0      4000         3391488 ... ...   pidu
-rwxr-xr-x  --s-  2 0         1            2223 ... ...   remotexf
-rwxr-x---  a-s-  2 0      4000         1576960 ... ...   sdbu
```

Figure 6. Sample output from command ls -nE /usr/lpp/Printsrv/bin

```
drwxr-xr-x        2 OMVSKERN OMVSGRP       928 ... ...   IBM
-rwxr-xr-x  apsl  2 OMVSKERN OMVSGRP   4022272 ... ...   aop.so
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP   3526656 ... ...   aopapi.dll
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP   3526656 ... ...   aopapi2.dll
-rwxr-xr-x  -ps-  2 OMVSKERN OMVSGRP   3878912 ... ...   aopcentral.so
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP    352256 ... ...   aopcop.dll
-rwxr-xr-x  apsl  2 OMVSKERN OMVSGRP    987136 ... ...   aopdb.so
-rwxr-xr-x  -ps-  2 OMVSKERN OMVSGRP   2023424 ... ...   aopeapi.dll
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP     16384 ... ...   aopfiltr.so
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP    229376 ... ...   aoprform.dll
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP   1097728 ... ...   aoprxf.so
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP    290816 ... ...   itm_client.so
-rw-r--r--  --s-  2 OMVSKERN OMVSGRP     19962 ... ...   libaopapi.a
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP   3158016 ... ...   libaopjnixp.so
-rwxr-xr-x  -ps-  2 OMVSKERN OMVSGRP   4132864 ... ...   libipa.so
-rwxr-xr-x  aps-  2 OMVSKERN OMVSGRP     24576 ... ...   lpd_compat.so
```

Figure 7. Sample output from command ls -E /usr/lpp/Printsrv/lib

```
drwxr-xr-x        2 0        1             928 ... ...    IBM
-rwxr-xr-x  apsl  2 0        1         4022272 ... ...    aop.so
-rwxr-xr-x  aps-  2 0        1         3526656 ... ...    aopapi.dll
-rwxr-xr-x  aps-  2 0        1         3526656 ... ...    aopapi2.dll
-rwxr-xr-x  -ps-  2 0        1         3878912 ... ...    aopcentral.so
-rwxr-xr-x  aps-  2 0        1          352256 ... ...    aopcop.dll
-rwxr-xr-x  apsl  2 0        1          987136 ... ...    aopdb.so
-rwxr-xr-x  -ps-  2 0        1         2023424 ... ...    aopeapi.dll
-rwxr-xr-x  aps-  2 0        1           16384 ... ...    aopfiltr.so
-rwxr-xr-x  aps-  2 0        1          229376 ... ...    aoprform.dll
-rwxr-xr-x  aps-  2 0        1         1097728 ... ...    aoprxf.so
-rwxr-xr-x  aps-  2 0        1          290816 ... ...    itm_client.so
-rw-r--r--  --s-  2 0        1           19962 ... ...    libaopapi.a
-rwxr-xr-x  aps-  2 0        1         3158016 ... ...    libaopjnixp.so
-rwxr-xr-x  -ps-  2 0        1         4132864 ... ...    libipa.so
-rwxr-xr-x  aps-  2 0        1           24576 ... ...    lpd_compat.so
```

Figure 8. Sample output from command ls -nE /usr/lpp/Printsrv/lib

Related information:
- "Running aopsetup" on page 15

Appendix A. Infoprint Server ISPF panels

This section shows the Infoprint Server ISPF panels for the Printer Inventory for PSF. You use these ISPF panels to define PSF functional subsystems (FSSs) and functional subsystem applications (FSAs) in the Printer Inventory.

PSF FSS definition

This is the ISPF panel you use to create a PSF FSS definition.

```
                              PSF FSS

FSS name. . .  _____
Description . _____  (extend)

  TCP/IP job name. . .  _____
  NST trace dsname . .  _____
  Trace table size . .  32_
  _ Trace prompt
  _ Unicode enabled
```

PSF FSA definition for a channel-attached printer

This is the ISPF panel you use to create a PSF FSA definition for a channel-attached printer.

```
                        PSF FSA, Channel

FSA Name. . . _____
Description . _____ (extend)
Location. . . _____ (extend)

Processing Information:
  _ Blank compression
  _ Consolidate IM1 images
  _ Inhibit recovery
  _ SNMP reporting
  _ Close libraries when idle
  _ Release data set when repositioning
  _ Suppress copy marks
  _ CSE sheet eject
  _ CSE preserve page position
  _ Use Line-Mode Migration LINECT
  Check CSE fit . . . . . .    1. No  2. First  3. All
  CSE orientation . . . . .    1. Portrait  2. Landscape
  Eject to front facing . .    1. None  2. Job  3. Document  4. Both
  Offset stacking . . . . .    1. None  2. Data set  3. Job
  Default process mode. . . _____
  Resolution. . . . . . . . ___    (240, 300)

Resources:
  Form definition. . _____
  Page definition. . _____
  Character sets . . ____ ____ ____ ____
  Color map. . . . . _____
  Com setup member . _____
  Overlay. . . . . . _____
  / Prune double-byte fonts
  / Prune single-byte fonts
  _ Map to outline fonts
  _ Recover from font not found
  _ Send default character

Retained Resource Counts:
  Form definitions . _____
  Page definitions . _____
  Page segments. . . _____
  Fonts. . . . . . . _____
  Object containers. _____

Input Tray Substitution:
  Source tray:  Substitute trays:
                Simplex  Duplex

  ___            ___      ___
  ___            ___      ___
  ___            ___      ___
  ___            ___      ___

Error Reporting Values:
  _ Error disposition supported
  _ Send msgs to SYSOUT
  Print error messages . . 2  1. No  2. Yes
       Maximum messages. . 16    (0-999)
  Print error reporting. . 1  1. NONE  2. All  3. Character  4. Position
```

```
Separator page:
   / Interrupt message page
        _ Mark page
        _ Offset page
        Copies . . __   (1-10)

Connection:
   Connect Interval . . . . _____    (0-86400 seconds)
   Acknowledgement level. . 1  1. Page  2. Sheet
   Failure action . . . . . _  1. Stop  2. Wait for connect
   Channel buffer count . . _____    (1-10000)

Printer Sharing:
   Release mode . . . . 3  1. Idle  2. Time  3. None
   Release interval . . _____  (0-86400 seconds)
   Acquire interval . . _____  (0-86400 seconds)

Security Labeling:
   Label data pages. . . . . _  1. Yes  2. No
   Label separator pages . . _  1. Yes  2. No
   Restrict printable area . _  1. Yes  2. No

Debugging:
   Dump:
      Code . . _____    Message ID . . _____    Count . . 1    (1-99)
    Trace:
        Trace mode . . . . 2  1. None  2. Internal  3. Sync
                           _   4. Full  5. Limit     6. IPDS
        Trace table size . 32   (1-999)
        FSA trace dsname . _____

3800 Compatibility:
   _ Override default font
   Set media origin to 3800 origin for:
     _ Data set
     _ Data set header
     _ Job header
     _ Job trailer
     _ Message data set
```

PSF FSA definition for a TCP/IP-attached printer

This is the ISPF panel you use to create a PSF FSA definition for a
TCP/IP-attached printer.

```
                        PSF FSA, TCP/IP

 FSA Name. . . _____
 Description . _____  (extend)
 Location. . . _____  (extend)

 Processing Information:
   _ Blank compression
   _ Consolidate IM1 images
   _ Inhibit recovery
   _ SNMP reporting
   _ Close libraries when idle
   _ Capture inline resources
   _ Release data set when repositioning
   _ Suppress copy marks
   _ Issue intervention messages
   _ Highlight communications failure message
   _ CSE sheet eject
   _ CSE preserve page position
   _ Use Line-Mode Migration LINECT
   Check CSE fit . . . . . . _  1. No  2. First  3. All
   CSE orientation . . . . . _  1. Portrait  2. Landscape
   Eject to front facing . . _  1. None  2. Job  3. Document  4. Both
   Issue setup messages. . . 1  1. None  2. Burst  3. Forms  4. All
   Offset stacking . . . . . _  1. None  2. Data set  3. Job
   Default process mode. . . _____
   Resolution. . . . . . . . ___   (240, 300)

 Resources:
   Form definition. . _____
   Page definition. . _____
   Character sets . . ___ ___ ___ ___
   Color map. . . . . _____
   Com setup member . _____
   Overlay. . . . . . _____
   / Prune double-byte fonts
   / Prune single-byte fonts
   _ Map to outline fonts
   _ Recover from font not found
   _ Send default character

 Retained Resource Counts:
   Form definitions . _____
   Page definitions . _____
   Page segments. . . _____
   Fonts. . . . . . . _____
   Object containers. _____

 Input Tray Substitution:
   Source tray:  Substitute trays:
                 Simplex  Duplex

   ___           ___      ___
   ___           ___      ___
   ___           ___      ___
   ___           ___      ___

 Error Reporting Values:
   _ Error disposition supported
   _ Send msgs to SYSOUT
   Print error messages . . 2  1. No  2. Yes
        Maximum messages. . 16   (0-999)
   Print error reporting. . 1  1. NONE  2. All  3. Character  4. Position
```

```
Separator page:
   / Interrupt message page
        _ Mark page
        _ Offset page
        Copies . . __   (1-10)

Connection:
   Connect Interval . . 600_    (0-86400 seconds)
   Failure action. . . . _  1. Stop  2. Wait for connect
   Disconnect action . . 2  1. Stop  2. Redrive
   Disconnect interval . ____   (0-86400)
   Management mode . . . 3  1. Immediate  2. Dial in  3. Output available
   No response action. . _  1. Notify JES      2. Notify user
                              3. Notify operator  4. Terminate

        Notify . . . . . . _____
   Response timeout. . . ____    (0-20864)
   Printer IP address. . _____
   Port number . . . . . 5001_

Printer Sharing:
   Release mode . . . . 3  1. Idle  2. Time  3. None
   Release interval . . _____   (0-86400 seconds)
   Acquire interval . . _____   (0-86400 seconds)

Security Labeling:
   Label data pages. . . . . _  1. Yes  2. No
   Label separator pages . . _  1. Yes  2. No
   Restrict printable area . _  1. Yes  2. No

Debugging:
   Dump:
      Code . . _____   Message ID . . _____   Count . . 1_   (1-99)
   Trace:
        Trace mode . . . . 2  1. None  2. Internal  3. Sync
                              4. Full  5. Limit     6. IPDS
        Trace table size . 32_   (1-999)
        FSA trace dsname . _____

3800 Compatibility:
   _ Override default font
   Set media origin to 3800 origin for:
      _ Data set
      _ Data set header
      _ Job header
      _ Job trailer
      _ Message data set
```

PSF FSA definition for an SNA-attached printer

This is the ISPF panel you use to create a PSF FSA definition for an SNA-attached printer.

```
                          PSF FSA, SNA

  FSA Name. . . _____
  Description . _____ (extend)
  Location. . . _____ (extend)

  Processing Information:
   _ Blank compression
   _ Consolidate IM1 images
   _ Inhibit recovery
   _ SNMP reporting
   _ Close libraries when idle
   _ Capture inline resources
   _ Release data set when repositioning
   _ Suppress copy marks
   _ Issue intervention messages
   _ CSE sheet eject
   _ CSE preserve page position
   _ Use Line-Mode Migration LINECT
   Check CSE fit . . . . . . _  1. No  2. First  3. All
   CSE orientation . . . . . _  1. Portrait  2. Landscape
   Eject to front facing . . _  1. None  2. Job  3. Document  4. Both
   Issue setup messages. . . 1  1. None  2. Burst  3. Forms  4. All
   Offset stacking . . . . . _  1. None  2. Data set  3. Job
   Default process mode. . . _____
   Resolution. . . . . . . . ___    (240, 300)

  Resources:
   Form definition. . _____
   Page definition. . _____
   Character sets . . ____ ____ ____ ____
   Color map. . . . . _____
   Com setup member . _____
   Overlay. . . . . . _____
   / Prune double-byte fonts
   / Prune single-byte fonts
   _ Map to outline fonts
   _ Recover from font not found
   _ Send default character

  Retained Resource Counts:
   Form definitions . _____
   Page definitions . _____
   Page segments. . . _____
   Fonts. . . . . . . _____
   Object containers. _____

  Input Tray Substitution:
    Source tray:  Substitute trays:
                  Simplex  Duplex

     ___           ___     ___
     ___           ___     ___
     ___           ___     ___
     ___           ___     ___

  Error Reporting Values:
   _ Error disposition supported
   _ Send msgs to SYSOUT
   Print error messages . . 2  1. No  2. Yes
        Maximum messages. . 16   (0-999)
   Print error reporting. . 1  1. NONE  2. All  3. Character  4. Position
```

```
Separator page:
  / Interrupt message page
      _ Mark page
      _ Offset page
      Copies . . __   (1-10)

Connection:
  Connect Interval . . . . _____    (0-86400 seconds)
  Failure action. . . . . _  1. Stop  2. Wait for connect
  Applid. . . . . . . _____
  Disconnect action . . 2  1. Stop  2. Redrive
  Disconnect interval . _____    (0-86400)
  Logmode . . . . . . . _____
  LU name . . . . . . . _____
  Management mode . . . 3  1. Immediate  2. Dial in  3. Output available
  No response action. . _  1. Notify JES       2. Notify user
                           3. Notify operator  4. Terminate

      Notify . . . . . . _____
  Response timeout. . . _____    (0-20864)
  _ End SNA conversation

Printer Sharing:
  Release mode . . . . 3  1. Idle  2. Time  3. None
  Release interval . . _____   (0-86400 seconds)
  Acquire interval . . _____   (0-86400 seconds)

Security Labeling:
  Label data pages. . . . . _  1. Yes  2. No
  Label separator pages . . _  1. Yes  2. No
  Restrict printable area . _  1. Yes  2. No

Debugging:
  Dump:
    Code . . _____   Message ID . . _____   Count . . 1   (1-99)
  Trace:
      Trace mode . . . . 2  1. None  2. Internal  3. Sync
                           4. Full  5. Limit     6. IPDS
      Trace table size . 32   (1-999)
      FSA trace dsname . _____

3800 Compatibility:
  _ Override default font
  Set media origin to 3800 origin for:
    _ Data set
    _ Data set header
    _ Job header
    _ Job trailer
    _ Message data set
```

PSF FSA definition for AFP Download Plus

This is the ISPF panel you use to create a PSF FSA definition for an AFP Download Plus sender.

```
                         PSF FSA, AFP Download Plus

  FSA Name. . . _____
  Description . _____ (extend)
  Location. . . _____ (extend)


  Processing Information:
    _ Blank compression
    _ Consolidate IM1 images
    _ Close libraries when idle
    _ Release data set when repositioning
    _ Page accounting supported
    _ Report Line-Mode Conversion paper-length errors
    _ Use Line-Mode Migration LINECT
    Default process mode. . . _____
    Paper width . . . . . . _____
    Paper length. . . . . . _____
    Resolution. . . . . . . . ___  (240, 300)
    Image output format . . . . . 1  1. IOCA  2. Unchanged
    Map Coded Font (MCF) Format 2 name . . 1  1. Code page and character set
                                              2. Coded font
    Working directory . . /var/psf_____ (extend)

  Printer Supported Functions:
    _ GOCA Box orders
    _ GOCA Set Fractional Line Width orders
    _ GOCA Set Process Color orders
    _ IOCA replicate and trim function
    _ Object identifier (OID) format

  Resources:
    Form definition. . _____
    Page definition. . _____
    Character sets . . ____ ____ ____ ____
    Color map. . . . . _____
    Com setup member . _____
    _ Map to outline fonts
    _ Recover from font not found

  Resources Included Inline:
    / Bar code objects (BCOCA)
    / Font objects (FOCA)
    / Form definitions
    / Graphics objects (GOCA)
    / Image objects (IOCA)
    / Object containers
    / Overlays
    / Page segments
    / Presentation text objects (PTOCA)
    / TrueType fonts
    Color management resources. . 3  1. None  2. All  3. Generic

  Error Reporting Values:
    _ Error disposition supported
    _ Send msgs to SYSOUT
    Print error messages . . . 2  1. No    2. Yes
        Maximum messages. . 16   (0-999)
    Print error reporting. . . 1  1. None  2. All  3. Character  4. Position
    Send messages on failure . 1  1. All   2. Generic only
```

```
  Connection:
     Connect Interval  . . 600___  (0-86400 seconds)
     No response action  . _  1. Notify JES      2. Notify user
                             3. Notify operator  4. Terminate
            Notify. . . . . . _____
     Response timeout . .  _____  (0-86400)
     IP address  . . . . . _____
     Port number . . . . . 5001 Transmission:
   _ Data set grouping
   / Secure transmission
   _ Send separator pages
   _ Display status
   Compression. . . . 1  1. None  2. LZW
   Direct download. . 1  1. None  2. MO:DCA-P
   Recovery pages . . 1000  (0-65535)

Debugging:
  Dump:
     Code . . _____    Message ID . . _____    Count . . 1   (1-99)
  Trace:
        Trace 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
```

Appendix B. Accessibility

Accessible publications for this product are offered through the z/OS Information Center, which is available at http://www.ibm.com/systems/z/os/zos/bkserv/. If you experience any accessibility problems with the z/OS Information Center, send an email to mhvrcfs@us.ibm.com or write to the following address:

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Attention: MHVRCFS Reader Comments
Department H6MA, Building 707
2455 South Road
Poughkeepsie, NY 12601-5400
US

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size.

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Vol I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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