z/OS

Infoprint Server Printer Inventory for PSF

Version 2 Release 2.0

SA38-0694-01

Note
Before using this information and the product it supports, read the information in "Notices" on page 127.

This edition applies to Version 2 Release 2 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), which is 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 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 type the entire command.

Table 1. Syntax notation

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`

Table 1. Syntax notation (continued)

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 REF`	`K T`
Uppercase	Item the system defines	As shown, in uppercase	`PRMODE`	`PRMODE`
Vertical bar	UNIX pipe (the output of the first is input to the second)	As shown	`ls | lp`	`ls | lp`
Vertical bar in braces	Required choice	One item	`{NOW|FOREVER}`	`FOREVER`
Vertical bar in brackets	Optional choice	One item or no items	`[PORTNO|PRTQUEUE]`	`PORTNO`

Where to find more information

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

Preventive Service Planning information

Before you install Infoprint Server, review the current Preventive Service Planning (PSP) information, also called the *PSP bucket*. You also periodically review the current PSP information. The PSP upgrade ID is the ID for the z/OS operating system; for example, ZOSV2R2. 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 before installation.

Infoprint Server publications

Table 2 lists publications that can help you use Infoprint Server. These publications are intended for customers who purchased Infoprint Server. For publications for all z/OS products, see *z/OS Information Roadmap*.

Table 2. Publications for Infoprint Server

Publication	Form number	Description
z/OS Infoprint Server Introduction	SA38-0692	Introduces Infoprint Server. This publication contains printing scenarios that show how you can use Infoprint Server in your installation.

Table 2. Publications for Infoprint Server (continued)

Publication	Form number	Description
z/OS Infoprint Server Customization	SA38-0691	Describes customization tasks for Infoprint Server.
z/OS Infoprint Server Operation and Administration	SA38-0693	Describes operator procedures and administrative tasks for Infoprint Server. It describes how administrators can create entries in the Printer Inventory by using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program.
z/OS Infoprint Server User's Guide	SA38-0695	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.
z/OS Infoprint Server Messages and Diagnosis	GA32-0927	Describes messages from Infoprint Server. This publication also describes how to use Infoprint Server tracing facilities to diagnose and report errors.

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).

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

man *command_name*

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 the "Contact us" web page for z/OS (http://www.ibm.com/systems/z/os/zos/webqs.html).

Include the following information:

- Your name and address.
- Your email address.
- Your telephone or fax number.
- The publication title and order number:
  z/OS V2R2 Infoprint Server Printer Inventory for PSF
  SA38-0694-01
- The topic and page number that is 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 the comments in any way appropriate without incurring any obligation to you.

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

If you have a technical problem

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 z/OS Support Portal (http://www-947.ibm.com/systems/support/z/zos/).

Summary of changes

This section describes the release enhancements that were made.

z/OS Version 2 Release 2

The following changes are made for z/OS Version 2 Release 2.

New

- These new PIDU attributes are added:
  - "auxiliary-files-modca-level" on page 59
  - "save-auxiliary-files" on page 91
  - "pinst-trace-dsname" on page 97
- These ISPF fields are new:
  - **PINST trace dsname** on "PSF FSS definition" on page 113.
  - **Auxiliary files MO:DCA level** on:
    - "PSF FSA definition for a channel-attached printer" on page 114
    - "PSF FSA definition for a TCP/IP-attached printer" on page 116
    - "PSF FSA definition for an SNA-attached printer" on page 118
    - "PSF FSA definition for AFP Download Plus" on page 120
  - **Save auxiliary files** on "PSF FSA definition for AFP Download Plus" on page 120.

Changed

- Information is added to "Infoprint Server base directory (/var/Printsrv)" on page 7 about not placing user directories or files in the base directory and about using a z/OS File System (zFS) instead of a Hierarchical File System (HFS).
- A note that PSF V4R5 and later always enables Unicode support is added to "Usage guidelines" on page 99 and Chapter 6, "Using the Infoprint Server migration program," on page 101.
- **`aopippdxp`** has been changed to **`aopippd`** in Figure 5 on page 109 and Figure 6 on page 110.
- The **Operator security profile** field is added to the ISPF panels for PSF FSA definitions. See:
  - "PSF FSA definition for a channel-attached printer" on page 114
  - "PSF FSA definition for a TCP/IP-attached printer" on page 116
  - "PSF FSA definition for an SNA-attached printer" on page 118
  - "PSF FSA definition for AFP Download Plus" on page 120

Deleted

- The "snmp-reporting" section is removed from "PSF FSA attributes" on page 57
- References to "snmp-reporting", "aopsnmpd", and "SNMP reporting" are removed from:
  - Figure 5 on page 109 and Figure 6 on page 110
  - "PSF FSA definition for a channel-attached printer" on page 114, "PSF FSA definition for a TCP/IP-attached printer" on page 116, and "PSF FSA definition for an SNA-attached printer" on page 118

- "Close libraries when idle" is removed from "PSF FSA definition for AFP Download Plus" on page 120.
- **aophinvd**, **aoplogd**, and **aopsdbd** are removed from "Starting Infoprint Server with the AOPSTART JCL procedure" on page 33, Figure 5 on page 109, and Figure 6 on page 110.

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*
- *z/OS Introduction and Release Guide*
- *z/OS Planning for Installation*
- *z/OS Migration*

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 even 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 by 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 many 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:

- Chapter 4, “Using Infoprint Server ISPF panels,” on page 35
- Chapter 5, “Using the Printer Inventory Definition Utility (PIDU),” on page 43
- Chapter 6, “Using the Infoprint Server migration program,” on page 101

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 that runs 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.

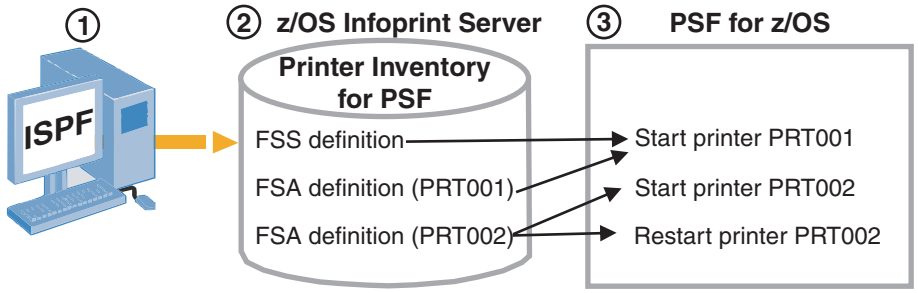


Figure 1. How the Printer Inventory for PSF works

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 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 that is 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 35
- Chapter 5, "Using the Printer Inventory Definition Utility (PIDU)," on page 43
- 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:

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 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

Note: The SCEERUN and SCLBDLL partitioned data sets must be APF-authorized libraries.

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 included in SYS1.IBM.PROCLIB. However, during installation it might be 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 24
- "Defining libraries in the TSO logon procedure" on page 26

- For information about how to access the Language Environment runtime libraries and improve the performance of runtime 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 alternative trace directory in the AOPTRACEDIR environment variable.

Attention: The base directory is a working directory for Infoprint Server. Do not place any user directories or files in the base directory.

The default base directory name is `/var/Printsrv`. However, you can specify an alternative 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. Because a zFS has higher performance characteristics than an HFS and is the strategic file system for z/OS, you should allocate a zFS rather than an HFS. 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 must not change the permissions after you run **`aopsetup`**.

Related information:

- "Allocating the base directory (/var/Printsrv)"
- "Running aopsetup" on page 14
- For information about zFS, see *z/OS Distributed File Service zFS Administration*.

Allocating the base directory (/var/Printsrv)

To allocate the Infoprint Server base directory named `/var/Printsrv`:

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 14
- 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 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 3 summarizes the RACF access that is required to do different functions.

Table 3. 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 with ISPF panels	• READ access to view • UPDATE access to view and update	Not required	Not required	READ access
View and update the Printer Inventory with the Printer Inventory Definition Utility (PIDU)	• READ access to view • UPDATE access to view and update	Required	Not required	Not required

Table 3. RACF access (continued)

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
Start and stop Infoprint Server	Not required	Not required	Required	Not required
View trace information that is 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 that 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 - 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 authorize 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 authorize group AOPADMIN to the AOP.ADMINISTRATOR resource profile or you can authorize each user separately.

   Example: This RACF PERMIT command authorizes 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 because of 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 that includes 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 that is 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 23
- 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 four 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 authorized 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 use 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 writable only by UID 0 and members of the AOPADMIN group:

   ```
   chmod 664 /etc/Printsrv/aopd.conf
   ```
6. Edit the configuration file with 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 purchased an Infoprint Server license. You specify only these attributes:

   - **base-directory**
   - **inventory**

   Edit this file by using the IBM-1047 code page.
7. Switch back to your own UID:

   ```
   exit
   ```

Syntax rules:

1. Use lowercase characters for the attributes, and use uppercase or lowercase characters for the values.
2. Use blank characters before or after the equal sign, if wanted.
3. Start comments with a number sign (#).
4. Include blank lines, if wanted.

Related information:

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

Editing the aopd.conf configuration file

If you 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 authorized to the BPX.SUPERUSER profile in the FACILITY class in RACF.
2. Edit the configuration file with your preferred editor and save your changes. For example:

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

   Edit this file by 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:

1. Use lowercase characters for the attributes, and use uppercase or lowercase characters for the values.
2. Use blank characters before or after the equal sign, if wanted.
3. Start comments with a number sign (#).
4. Include blank lines, if wanted.

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 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 writable 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 use 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 use 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 must run **aopsetup** before you start Infoprint Server. However, if you attempted to start Infoprint Server before you ran **aopsetup**, stop Infoprint Server before you do 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 authorized 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:

   a. If you defined group AOPOPER for operators and group AOPADMIN for administrators, enter:

      ```
      /usr/lpp/Printsrv/bin/aopsetup AOPOPER AOPADMIN
      ```

   b. 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 looks similar to the sample output shown. Also, the owner ID of the /var/Printsrv directory and the executable files, which are shown as ROOT in the sample output, 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 13
- "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 4 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 4. Environment variables

	Location where set		
Environment variable	**/etc/profile file**	**aopstart EXEC**	**STDENV data set (AOPSTART JCL procedure)**
_BPX_SHAREAS	No	Required [1]	No
AOPCONF	Optional	Optional	No
AOPTRACEDIR	No	Optional	No
AOPTRACEON	Optional	Optional	Optional
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 file 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 that is 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 that is 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 that is 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 that is 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 that is 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 only in **aopstart** EXEC)

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 only in **aopstart** EXEC)

PATH The path that is used to locate executable files. This environment variable is required.

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

If you installed Infoprint Server executable 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/bin:/bin (default set only in **aopstart** EXEC)

Related information:

- "Editing the /etc/profile file"
- "Creating an aopstart EXEC" on page 20
- "Creating an STDENV data set" on page 22
- For information about environment variables, see *z/OS V2R2.0 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 authorized to the BPX.SUPERUSER profile in the FACILITY class in RACF.
2. Edit the /etc/profile file with 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 more, 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 are authorized 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 authorized 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 cannot 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 use a different name for this group.

   ```
   chgrp AOPOPER aopstart
   ```

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

   ```
   oedit aopstart
   ```

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

7. Change the permissions for the file. Make the file writable 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 24

Editing an aopstart EXEC

If you 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 authorized to the BPX.SUPERUSER profile in the FACILITY class in RACF.

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

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

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

   ```
   oedit aopstart
   ```

   Edit this file by using the IBM-1047 code page. For more 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. See "Creating an aopstart EXEC" on page 20.

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 so the group can read the file.

Related information:

- "Environment variables" on page 16
- "Editing the AOPSTART JCL procedure" on page 24

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 and its daemons. AOPSTART is included in SYS1.IBM.PROCLIB. However, during installation, it might be 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 24
- "Starting Infoprint Server with the AOPSTART JCL procedure" on page 33

AOPSTOP JCL procedure

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

Figure 3 on page 24 shows the AOPSTOP procedure that is 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 25
- "Stopping Infoprint Server with the AOPSTOP JCL procedure" on page 33

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 so the group can read, or read and write, the file.

Related information:

- "Creating an STDENV data set" on page 22
- "AOPSTART JCL procedure" on page 23
- "Starting Infoprint Server with the AOPSTART JCL procedure" on page 33

Editing the AOPSTOP JCL procedure

You must edit the AOPSTOP JCL procedure in these situations:

- 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 shutdown 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 so the group can read the file.

Related information:

- "Creating an STDENV data set" on page 22
- "AOPSTOP JCL procedure" on page 23
- "Stopping Infoprint Server with the AOPSTOP JCL procedure" on page 33

Starting Infoprint Server automatically

To start Infoprint Server automatically during system initialization, you can use z/OS automation tools to run 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 are 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 V2R2 Program Directory*.

AOPINIT EXEC

The AOPINIT EXEC in AOP.SAOPEXEC(AOPINIT) sets default values for the Infoprint Server ISPF panels. Table 5 shows the values that you can change in AOPINIT if they are not suitable for your installation.

Table 5. 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).

Table 5. AOPINIT EXEC values (continued)

Value	Description

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 26

Backing up the Printer Inventory

You need to back up the Printer Inventory regularly. 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 that is 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 43
- 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 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 43
- 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)

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.

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.

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 restore 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
   ```

Related information:

- "Setting up security" on page 8
- Chapter 5, "Using the Printer Inventory Definition Utility (PIDU)," on page 43

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.

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 restore 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 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 that is 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 before 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 43

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 describe how to start and stop Infoprint Server:

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

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, the **aopd** daemon starts.

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 start, you see this message:

```
$HASP395 AOPSTART ENDED
```

Related information:

- "Setting up security" on page 8
- "Creating Infoprint Server startup and shutdown procedures" on page 22

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 with a "destructive" shutdown. Infoprint Server database might be corrupted.

   Tips:

   a. Use the **force** option with extreme caution.
   b. Before you use the **force** option, back up the Printer Inventory.
   c. 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 are 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 22
- "Backing up the Printer Inventory" on page 27

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

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, complete 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 35
- "Using the ISPF help system" on page 35

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, complete 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 35
- "Copying PSF FSS definitions" on page 37
- "Using the ISPF help system" on page 35

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 that 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 explains how to use an * or ? to represent one or more variable characters.
4. On the FSS List panel, you can type an action in front of one or more 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 35

Browsing PSF FSS definitions

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 35
- "Listing PSF FSS definitions"

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 35
- "Listing PSF FSS definitions" on page 37
- "Using the ISPF help system" on page 35

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 35
- "Listing PSF FSS definitions" on page 37
- "Using the ISPF help system" on page 35

Deleting PSF FSS definitions

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 35
- "Listing PSF FSS definitions" on page 37

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, complete 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 35
- "Copying PSF FSA definitions" on page 40
- "Using the ISPF help system" on page 35

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 that 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 explains how to use an * or ? to represent one or more variable characters.
4. On the FSA List panel, you can type an action in front of one or more 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 35

Browsing PSF FSA definitions

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 35
- "Listing PSF FSA definitions" on page 39

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 35
- "Listing PSF FSA definitions" on page 39
- "Using the ISPF help system" on page 35

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 35
- "Listing PSF FSA definitions" on page 39
- "Using the ISPF help system" on page 35

Deleting PSF FSA definitions

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 35

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 that are specified in the FSA definition that do not apply to the FSA type.
5. On the panel for the new type of FSA definition, complete 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 35
- "Listing PSF FSA definitions" on page 39
- "Using the ISPF help system" on page 35

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 many 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

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 more informational messages.

Operands

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

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

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

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

```
//MYFILE
```

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

Usage notes

- You can specify PIDU commands interactively from your keyboard.
- 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 number sign (#).
  - Include blank lines, if wanted.
  - Specify the PIDU command names, attribute names, and attribute values on separate lines:
    - In a UNIX file, an attribute value can span lines if all lines other than the last line end with a backslash. Be sure that no blank characters are present after the backslash. For example:

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

    - In an MVS data set, the entire attribute value must be on one line. To specify a 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 that you 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 that is named `pidu.commands` and 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 that is named in this variable takes precedence over the user-specific configuration file (`$HOME/.aopconf`) and the system default configuration file (`/etc/Printsrv/aopd.conf`).

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

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

PATH
: Lists the directory where the Infoprint Server executable files 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 by 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 more 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 with 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 6 summarizes the PIDU commands, the function of each command, and where to find more information about the command.

Table 6. Summary of PIDU commands

PIDU command	Function of command	See page
create	Create an object.	50
delete	Delete an object.	51
display	Display the attributes of an object.	51
dump	Dump all objects.	52
export	Generate **create** commands for all objects or only objects that meet certain criteria.	52
force-create	Create an object and replace an object of the same name and in the same object class if it exists.	50
list	List all objects or only objects that meet certain criteria.	54
modify	Modify attributes of an object.	54
rename	Rename an object.	55

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 7 lists the object classes.

Table 7. 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. 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 that are shown in Table 8.

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 8 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 8. 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 by 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 by 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 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 that is used to define the FSA or FSS to JES. Specify a valid combination of 1-8 letters, numbers, and national characters (# $ @). The first character cannot be numeric. Blanks and other special characters are not allowed. Lowercase letters are converted to uppercase.

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

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 that is 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 note

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

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 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 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 48.

Usage notes

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

Related information:

- "Backing up the Printer Inventory" on page 27

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 48.

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 55.

Examples -- list

- 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 exist in the Printer Inventory.

Changes that you make to attributes for an FSA definition take effect only when you restart the PSF FSA. Changes that 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. It 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 that is used to define the FSA or FSS to JES. Specify a valid combination of 1-8 letters, numbers, and special characters (# $ @). The first character cannot be numeric. Lowercase letters are converted to uppercase.

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

Example -- rename

This example renames the 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 that are 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 can 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 that are separated with spaces and enclosed in braces. Multi-valued attributes can contain a list of values or a value-map:

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

attribute = {*value1 value2 value3*}

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 you are typing fixed values.

PSF FSA attributes

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*

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

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 acknowledgment every sheet or every page.

ISPF field name

Acknowledgement level

Allowed values

You can enter one of these fixed values:

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

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

afpdp-dataset-grouping

This single-valued attribute indicates whether output data sets in the same job are grouped when they are sent to the AFP Download Plus receiver.

ISPF field name

Data set grouping

Allowed values

You can enter one of these fixed values:

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

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

afpdp-working-directory

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

ISPF field name

Working directory

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

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

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

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

ISPF field name
Applid

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

auxiliary-files-modca-level
This single-valued attribute specifies the MO:DCA Interchange Set level that auxiliary pages, such as separator pages and message files, support.

ISPF field name
Auxiliary files MO:DCA level

Allowed values
You can enter one of these fixed values:

is3
Auxiliary pages are MO:DCA IS/3 compliant.

none
Auxiliary pages do not support a MO:DCA IS level (default).

Usage guidelines
- This field applies only to PSF V4R5 and later.
- Make sure that changes are made to the PRINTDEV statement for this FSA so that auxiliary pages are generated correctly. See *PSF for z/OS: Customization*.

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

ISPF field name
Blank compression

Allowed values
You can enter one of these fixed values:

yes
PSF compresses blanks.

no PSF does not compress blanks (default).

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

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

ISPF field name
Capture inline resources

Allowed values
You can enter one of these fixed values:

yes
DPF captures inline resources.

no DPF does not capture inline resources (default).

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

ISPF field name
Channel buffer count

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

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

ISPF field name
Character sets

Allowed values
You can enter 1 - 4 coded font names. Each name can be any combination of 1 - 4 letters (a-z, A-Z), numbers (0 - 9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase. For valid coded font names, see *z/OS 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 increases processor usage for closing and reopening the libraries between print activity.

color-map

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

ISPF field name

Color map

Allowed values

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

Default value

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

com-setup-member

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

ISPF field name

Com setup member

Allowed values

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

compression

This single-valued attribute indicates whether PSF compresses data before it sending the data 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 checks only the first page that is printed for a new copy group to see whether it fits 2 up on the sheet.

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

cse-orientation

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

ISPF field name

CSE orientation

Allowed values

You can enter one of these fixed values:

portrait
PSF generates portrait pages (default).

landscape
PSF generates landscape pages.

cse-preserve-page-position

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

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

ISPF field name

CSE preserve page position

Allowed values

You can enter one of these fixed values:

yes
Page placement is preserved.

no Page placement is not preserved (default).

cse-sheet-eject

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

ISPF field name

CSE sheet eject

Allowed values

You can enter one of these fixed values:

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

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

default-process-mode

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

ISPF field name

Default process mode

Allowed values

PSF ignores all values but these fixed values:

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

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

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

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

description

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

ISPF field name

Description

Allowed values

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

direct-download

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

ISPF field name

Direct download

Allowed values

You can enter one of these fixed values:

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

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

Usage guidelines

- The **modca-p** value can improve performance.
- If **direct-download=modca-p**, the AFP Download Plus receiver must support the direct download method of receiving MO:DCA-P data.
- 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 memory dump of the PSF address space when the reason code occurs.

ISPF field name

Dump: Code

Allowed values

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

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

dump-message-id

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

ISPF field name

Dump: Message ID

Allowed values

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

nnnn
Three to four-digit message number

t One of these type codes:

A Message requiring operator action

I Information message

eject-to-front-facing

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

ISPF field name

Eject to front facing

Allowed values

You can enter one of these fixed values:

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

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

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

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

end-sna-conversation

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

ISPF field name

End SNA conversation

Allowed values

You can enter one of these fixed values:

yes
PSF ends the SNA LU1 conversation with the printer.

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

error-disposition-supported

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

ISPF field name

Error disposition supported

Allowed values

You can enter one of these fixed values:

yes
PSF accepts the requested error disposition.

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

failure-action

This single-valued attribute specifies the PSF action after a printer failure, an SNA session failure, or an Internet Protocol network failure.

ISPF field name

Failure action

Allowed values

You can enter one of these fixed values:

stop
PSF must be restarted by an operator command.

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

form-definition

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

ISPF field name

Form definition

Allowed values

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

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

fsa-trace-dsname

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

ISPF field name

FSA trace dsname

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

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

Allowed values
You can enter one of these fixed values:

afp-download-plus
An FSA for the AFP Download Plus feature of PSF.

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

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

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

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

ISPF field name
Overlay

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

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

ISPF field name
GOCA Box orders

Allowed values
You can enter one of these fixed values:

yes
The printer supports the orders.

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

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

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

ISPF field name
GOCA Set Fractional Line Width orders

Allowed values
You can enter one of these fixed values:

yes
The printer supports the orders.

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

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

goca-process-color-supported
This single-valued attribute indicates whether the printer supports Graphics Object Content Architecture (GOCA) Set Process Color drawing orders.

ISPF field name
GOCA Set Process Color orders

Allowed values
You can enter one of these fixed values:

yes
The printer supports the orders.

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

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

highlight-communications-failure-message
This single-valued attribute specifies whether PSF highlights the message that it writes to the z/OS console when a communications failure occurs with the printer (message APS6501A). Highlighting the communications failure message can help you detect a problem that requires attention because the message remains on the console until the operator deletes it. This attribute applies to TCP/IP-attached printers.

ISPF field name
Highlight communications failure message

Allowed values
You can enter one of these fixed values:

yes
PSF highlights the communications failure message.

no PSF does not highlight the communications failure message (default).

image-output-format
This single-valued attribute indicates the format that PSF uses for all image data that it sends to the AFP Download Plus receiver.

ISPF field name
Image output format

Allowed values
You can enter one of these fixed values:

ioca
Image data is in uncompressed Image Object Content Architecture (IOCA) format (default).

unchanged
Image data is in the same format as in the input document.

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

inhibit-recovery
This single-valued attribute indicates whether PSF inhibits error recovery for a job so that data is resent to the printer only if it is not printed.

ISPF field name
Inhibit recovery

Allowed values
You can enter one of these fixed values:

yes
Error recovery is inhibited and data is resent only if it is not printed.

no Recovery is not inhibited and data is resent from the point of the error (default).

inline-bcoca-objects
This single-valued attribute indicates whether PSF includes Bar Code Object Content Architecture (BCOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Bar code objects (BCOCA)

Allowed values
You can enter one of these fixed values:

yes
PSF includes BCOCA objects inline (default).

no PSF does not include BCOCA objects inline.

inline-color-management-resources
This single-valued attribute indicates whether PSF includes color management resources (CMRs) inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Color management resources

Allowed values

You can enter one of these fixed values:

all
PSF includes all CMRs that are on the sending system. If you specify this value, transmission time is longer because CMRs can be large. Specify this value if the receiving system does not contain CMRs.

generic
PSF includes all generic CMRs and all CMRs that the data stream references. Specify this value if any documents use CMRs that are not on the receiving system. Device-specific CMRs must be on the receiving system or in the printer. This value is the default.

none
PSF does not include any CMRs inline. Specify this value if the CMRs are on the receiving system.

inline-foca-objects

This single-valued attribute indicates whether PSF includes Font Object Content Architecture (FOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Font objects (FOCA)

Allowed values

You can enter one of these fixed values:

yes
PSF includes FOCA objects inline (default).

no PSF does not include FOCA objects inline.

inline-form-definitions

This single-valued attribute indicates whether PSF includes form definitions inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Form definitions

Allowed values

You can enter one of these fixed values:

yes
PSF includes form definitions inline (default).

no PSF does not include form definitions inline.

inline-goca-objects

This single-valued attribute indicates whether PSF includes Graphics Object Content Architecture (GOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name

Graphics objects (GOCA)

Allowed values
You can enter one of these fixed values:

yes
PSF includes GOCA objects inline (default).

no PSF does not include GOCA objects inline.

inline-ioca-objects
This single-valued attribute indicates whether PSF includes Image Object Content Architecture (IOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Image objects (IOCA)

Allowed values
You can enter one of these fixed values:

yes
PSF includes IOCA objects inline (default).

no PSF does not include IOCA objects inline.

inline-object-containers
This single-valued attribute indicates whether PSF includes object containers inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Object containers

Allowed values
You can enter one of these fixed values:

yes
PSF includes object containers inline (default).

no PSF does not include object containers inline.

inline-overlays
This single-valued attribute indicates whether PSF includes overlays inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Overlays

Allowed values
You can enter one of these fixed values:

yes
PSF includes overlays inline (default).

no PSF does not include overlays inline.

inline-page-segments
This single-valued attribute indicates whether PSF includes page segments inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Page segments

Allowed values
You can enter one of these fixed values:

yes
PSF includes page segments inline (default).

no PSF does not include page segments inline.

inline-ptoca-objects
This single-valued attribute indicates whether PSF includes Presentation Text Object Content Architecture (PTOCA) objects inline with the documents it sends to the AFP Download Plus receiver.

ISPF field name
Presentation text objects (PTOCA)

Allowed values
You can enter one of these fixed values:

yes
PSF includes PTOCA objects inline (default).

no PSF does not include PTOCA objects inline.

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 inline (default).

no PSF does not include TrueType and OpenType 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 that is specified for the job in the INTRAY JCL parameter, the **input-tray-number** job attribute, or the form definition PSF uses to print the job.

simplex_tray
An integer from 1 - 255 that identifies the tray PSF is to use for jobs that are printed on a single side of the paper.

duplex_tray
An integer from 1 - 255 that identifies the tray PSF is to use for jobs that are printed on both sides of the paper.

To determine the tray numbers for your printer, see the printer documentation.

Enclose the entire values in braces. For example:

```
input-tray-substitutions = { 1 ->{1 3} 2 -> {2 4} }
```

In this example:

- When the job submitter specifies tray 1, PSF uses tray 1 for jobs that print on a single side of the paper and tray 3 for jobs that print on both sides of the paper.
- When the job submitter specifies tray 2, PSF uses tray 2 for jobs that print on a single side of the paper and tray 4 for jobs that print on both sides of the paper.

Default value
PSF does not use substitute tray numbers.

Usage guidelines
Specify this attribute when the same side-sensitive or edge-sensitive paper is loaded in different trays in two different directions. That is, in one direction for printing on a single side of the paper and in another direction for printing on both sides of the paper.

interrupt-message-page
This single-valued attribute specifies whether the interrupt message page that PSF inserts in your printed output is printed.

ISPF field name
Interrupt message page

Allowed values
You can enter one of these fixed values:

print
An interrupt message page is printed (default).

suppress
An interrupt message page is not printed.

interrupt-message-page-copies
This single-valued attribute specifies the number of copies PSF produces of the interrupt message page when the mark-interrupt-message-page attribute is specified.

ISPF field name
Interrupt message page: Copies

Allowed values
You can enter an integer from 1 (default) to 10.

ioca-replicate-trim-supported
This single-valued attribute indicates whether the printer supports the Image Object Content Architecture (IOCA) Replicate and Trim function.

ISPF field name
IOCA replicate and trim function

Allowed values
You can enter one of these fixed values:

yes
The printer supports the function.

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

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

issue-intervention-messages
This single-valued attribute specifies whether PSF displays intervention messages on the z/OS system console. An intervention message means that a printer has a physical problem, such as a paper jam or an open paper tray. After an operator fixes the problem, the printer starts printing again. This attribute applies to SNA-attached and TCP/IP-attached printers.

ISPF field name
Issue intervention messages

Allowed values
You can enter one of these fixed values:

yes
Intervention messages are displayed.

no Intervention messages are not displayed.

Default value
Intervention messages are not displayed.

issue-setup-messages
This single-valued attribute specifies the setup parameters for which JES displays setup messages on the z/OS system console when an SNA-attached or TCP/IP-attached printer is initialized and at the start of any job that specifies a change in a setup parameter from what is active for the printer.

ISPF field name
Issue setup messages

Allowed values
You can enter one of these fixed values:

none
Do not display setup messages (default).

burst
Display setup messages for the BURST setup parameter.

forms
Display setup messages for the FORMS setup parameter.

all
Display setup messages for both BURST and FORMS setup parameters.

label-data-pages

This single-valued attribute specifies whether the security label is printed on each page of printed output. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name

Label data pages

Allowed values

You can enter one of these fixed values:

yes
The security label that is determined by SECLABEL is printed.

no The security label is not printed.

Default value

If this attribute is not specified, PSF sets the value to `yes` if PSFMPL is active (default) or to `no` if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

label-separator-pages

This single-valued attribute specifies whether the security label is printed on a separator page. The security label is determined by the SECLABEL parameter of the JOB JCL statement.

ISPF field name

Label separator pages

Allowed values

You can enter one of these fixed values:

yes
The security label that is determined by SECLABEL is printed.

no The security label is not printed.

Default value

If this attribute is not specified, PSF sets the value to `yes` if PSFMPL is active (default) or to `no` if PSFMPL is not active. For more information, see *PSF for z/OS: Security Guide*.

location

This single-valued attribute 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 that is specified by the **dump-message-id** attribute is sent before PSF produces a conditional memory 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 is not received from the printer or from the AFP Download Plus receiver.

ISPF field name

No response action

Allowed values

You can enter one of these fixed values:

notify-jes
PSF notifies JES that an expected response was not received (default).

notify-user
PSF sends a message to the user ID specified by the **no-response-notify** attribute and to JES indicating that an expected response was not received.

notify-operator
PSF sends a message to the system operator and to JES indicating that an expected response was not received.

terminate
PSF stops the printer FSA or the AFP Download Plus FSA. The system operator must enter 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 that is 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 0 - 9999. You must specify at least one digit to the left of the decimal point.

mmm A number 0 - 999. The decimal point and the digits after 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 0 - 9999. You must specify at least one digit to the left of the decimal point.

mmm A number 0 - 999. The decimal point and the digits after 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 1 - 65535. The default is 5001.

print-error-messages

This single-valued attribute specifies whether PSF prints error messages at the end of a data set. If **fsa-type=afp-download-plus**, PSF saves all messages in a file on the z/OS system instead of printing them.

ISPF field name

Print error messages

Allowed values

You can enter one of these fixed values:

yes
PSF prints or saves error messages until an error occurs that ends processing (default).

no PSF does not print or save error messages unless an error occurs that ends processing. If that happens, only the message group that describes the last error is printed or saved.

print-error-messages-maximum

This single-valued attribute specifies the maximum number of message groups that PSF generates when **print-error-messages=yes**. When the maximum number is reached, PSF stops processing the data set and deletes it from the JES spool.

ISPF field name

Print error messages: Maximum messages

Allowed values

You can enter an integer 0 - 999. A value of 0 means the data set is processed until it completes or an error occurs that ends processing of the data set. The default is 16.

print-error-reporting

This single-valued attribute specifies whether the printer reports character and position errors to PSF. Character errors are caused by trying to use a code point that is not assigned to a character in a font. Position errors are caused by trying to print outside the printable area.

ISPF field name

Print error reporting

Allowed values

You can enter one of these fixed values:

none
Do not report any character or position errors (default).

all
Report all character and position errors.

character
Report only character errors.

position
Report only position errors.

printer-acquire-interval

This single-valued attribute specifies the number of seconds between the time PSF releases a printer and when PSF tries to acquire it again. This attribute is only used when **printer-release-mode=time**.

ISPF field name

Acquire interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-connect-interval

This single-valued attribute specifies the number of seconds during which PSF attempts to connect to a printer or to an AFP Download Plus receiver. When the connect interval expires and the connection is not complete, PSF ends the FSA.

ISPF field name

Connect interval

Allowed values

You can enter an integer 0 - 86400. 0 means PSF attempts to connect for an unlimited time.

Default value

For channel-attached and SNA-attached printers, if this attribute is not specified blank, PSF attempts to connect for an unlimited time. For TCP/IP-attached printers and for AFP Download Plus receivers, PSF attempts to connect for 600 seconds (10 minutes).

printer-disconnect-interval

This single-valued attribute specifies the number of seconds until PSF ends the session with an SNA-attached or TCP/IP-attached printer.

ISPF field name

Disconnect interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-ip-address

This single-valued attribute specifies the Internet Protocol (IP) address or host name of the TCP/IP-attached printer or the AFP Download Plus receiver.

ISPF field name

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 zeros in each hexadecimal value.
- You can omit one sequence of repeat zero values.
- You can specify the last two hexadecimal values in dotted decimal notation.

printer-management-mode

This single-valued attribute specifies how PSF controls an SNA-attached or TCP/IP-attached printer in deferred-printing mode.

ISPF field name

Management mode

Allowed values

You can enter one of these fixed values:

immediate
PSF starts a communication session with the printer immediately and then looks for output available on the JES spool.

dialin
PSF starts a session with the printer when the switched line is connected.

outavail
PSF starts a communication session with the printer only when output is available on the JES spool (default).

printer-release-interval

This single-valued attribute specifies the number of seconds after which PSF responds to a request to release a printer in the method that is specified by the **printer-release-mode** attribute.

ISPF field name

Release interval

Allowed values

You can enter an integer from 0 (default) to 86400.

printer-release-mode

This single-valued attribute specifies how PSF is to respond to a request to release the printer.

ISPF field name

Release mode

Allowed values

You can enter one of these fixed values:

idle
PSF releases the printer when a request to release is received and the time that is specified by the **printer-release-interval** attribute expires with no output on the spool for the printer.

time
PSF starts the timer for the release interval when a release request is received, even when there is more output on the spool.

none
PSF does not release the printer (default).

prune-double-byte-fonts

This single-valued attribute specifies whether PSF prunes double-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name
Prune double-byte fonts

Allowed values
You can enter one of these fixed values:

yes
PSF prunes double-byte raster fonts (default).

no PSF does not prune double-byte fonts.

prune-single-byte-fonts
This single-valued attribute specifies whether PSF prunes single-byte raster fonts to reduce the amount of font data sent to the printer.

ISPF field name
Prune single-byte fonts

Allowed values
You can enter one of these fixed values:

yes
PSF prunes single-byte raster fonts (default).

no PSF does not prune single-byte fonts.

psf-send-default-character
This single-valued attribute specifies whether PSF passes the default character information to the printer by fully populating the outline single-byte code page.

ISPF field name
Send default character

Allowed values
You can enter one of these fixed values:

yes
PSF passes the default character information to the printer.

no PSF does not pass the default character information to the printer (default).

recover-from-font-not-found
This single-valued attribute specifies whether PSF makes sure the outline font that is derived from the mapped font exists before proceeding.

ISPF field name
Recover from font not found

Allowed values
You can enter one of these fixed values:

yes
PSF does library queries to make sure that the mapped font exists before it loads 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 requested that PSF map to outline fonts, and you do not want pages in your job to end 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 more library queries for every mapped font resource.

release-ds-when-repositioning

This single-valued attribute specifies whether PSF releases data sets to JES when PSF repositions.

ISPF field name

Release data set when repositioning

Allowed values

You can enter one of these fixed values:

yes
PSF releases the data sets when repositioning. The data sets might be reselected in a different order.

no PSF retains data sets during repositioning (default).

report-line-mode-conversion-paper-length-errors

This single-valued attribute indicates whether the 3800 Line-Mode Conversion function in AFP Download Plus reports an error when the paper length in the FCB does not match the value in the **paper-length** attribute.

ISPF field name

Report Line-Mode Conversion paper length errors

Allowed values

You can enter one of these fixed values:

yes
The Line-Mode Conversion function reports an error. It puts the print job on the hold queue and issues message APS973I.

no The Line-Mode Conversion function does not report an error. It uses the value in the **paper-length** attribute (default).

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 is previously defined by the system programmer.

ISPF field name

Resolution

Allowed values

You can enter one of these fixed values:

240
The data was formatted with resources at 240 pels per inch.

300
The data was formatted with resources at 300 pels per inch.

Default value
PSF uses the default system library.

Usage guidelines
The resolution in this attribute is used for all jobs unless the Exit 7 BDSC call overrides it.

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 0 - 32767. The default value depends on the type of printer and the amount of storage available in the printer.

Usage guidelines

- When PSF retains fonts, PSF does not need to reload the same fonts for subsequent jobs. However, retaining fonts requires more printer storage.
- This value overrides the reasonable resource loading value (RRLV) for fonts that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-form-definitions

This single-valued attribute specifies the maximum number of form definitions that PSF retains in virtual storage between print jobs.

ISPF field name

Retained form definitions

Allowed values

You can enter a value 0 - 32767. The default value is 6.

Usage guidelines

- When PSF retains form definitions, PSF does not need to reload the same form definitions for subsequent jobs. However, retaining form definitions requires more virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for form definitions that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-object-containers

This single-valued attribute specifies the maximum number of object containers that PSF retains in printer storage between print jobs.

ISPF field name

Retained object containers

Allowed values

You can enter a value 0 - 32767.

Default value

The default value is 0 for 3800 and 3820 printers. The default value is 200 for all other printers.

Usage guidelines

- When PSF retains object containers, PSF does not need to reload the same object containers for subsequent jobs. However, retaining object containers requires more virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for object containers that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-page-definitions

This single-valued attribute specifies the maximum number of page definitions that PSF retains in virtual storage between print jobs.

ISPF field name

Retained page definitions

Allowed values

You can enter a value 0 - 32767. The default value is 6.

Usage guidelines

- When PSF retains page definitions, PSF does not need to reload the same page definitions for subsequent jobs. However, retaining page definitions requires more virtual storage.
- This value overrides the reasonable resource loading value (RRLV) for page definitions that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

retained-page-segments

This single-valued attribute specifies the maximum number of page segments that PSF retains in printer storage between print jobs.

ISPF field name

Retained page segments

Allowed values

You can enter a value from 0 (default) to 32767.

Usage guidelines

- When PSF retains page segments, PSF does not need to reload the same page segments for subsequent jobs. However, retaining page segments requires more printer storage.
- This value overrides the reasonable resource loading value (RRLV) for page segments that you can specify in the PSF Exit 7 initialization call.
- For information about RRLVs, see *PSF for z/OS: Customization*.

save-auxiliary-files

This single-valued attribute specifies whether AFP Download Plus saves all auxiliary files, such as separator pages and message files, in the job submitter's default message directory, `/var/psf/userinfo/userid`. AFP Download Plus never transmits these files to the receiver.

ISPF field name

Save auxiliary files

Allowed values

You can enter one of these fixed values:

yes
All auxiliary files are saved.

no Auxiliary files are not saved (default).

Usage guidelines

- This field applies only to PSF V4R5 and later.
- The system programmer can validate that these files are IS/3 compliant before they are used in production.
- When this field is specified, AFP Download Plus ignores the **compression**, **direct-download**, and **send-messages-on-failure** fields if they are specified.

secure-transmission

This single-valued attribute indicates whether PSF encodes data before it sends it to the AFP Download Plus receiver.

ISPF field name

Secure transmission

Allowed values

You can enter one of these fixed values:

yes
PSF encodes data (default).

no PSF does not encode data.

send-messages-on-failure

This single-valued attribute indicates whether PSF sends all messages to the AFP Download Plus receiver when it cannot send an output data set because of an error or because the operator canceled processing of the data set. The receiver can print the messages to help diagnose errors that are detected on the sending system, such as data stream errors.

ISPF field name

Send messages on failure

Allowed values

You can enter one of these fixed values:

all
PSF sends all messages to the receiver in a message data set in MO:DCA-P format (default).

generic-only
PSF sends a generic message in line data format to the receiver to indicate that the output data was not sent.

send-messages-to-sysout

This single-valued attribute specifies whether PSF sends a message data set to a SYSOUT data set for redirection to another CLASS or DEST for viewing or printing.

ISPF field name

Send msgs to SYSOUT

Allowed values

You can enter one of these fixed values:

yes
PSF sends the message data set to a SYSOUT data set.

no PSF does not send the message data set to a SYSOUT data set.

send-separator-pages

This single-valued attribute indicates whether PSF sends the job and data set separator pages for each output data set to the AFP Download Plus receiver.

ISPF field name

Send separator pages

Allowed values

You can enter one of these fixed values:

yes
PSF sends separator pages to the receiver.

no PSF does not send separator pages to the receiver (default).

set-3800-dataset-header-origin

This single-valued attribute specifies whether PSF sets the data set header media origin on continuous-forms printers to the upper left corner.

ISPF field name

Set media origin to 3800 origin for: Data set header

Allowed values

You can enter one of these fixed values:

yes
PSF sets the data set header media origin to the upper left corner.

no PSF does not set the data set header media origin to the upper left corner (default).

set-3800-dataset-origin

This single-valued attribute specifies whether PSF sets the data set media origin on continuous-forms printers to the upper left corner.

ISPF field name

Set media origin to 3800 origin for: Data set

Allowed values

You can enter one of these fixed values:

yes
PSF sets the data set media origin to the upper left corner.

no PSF does not set the data set media origin to the upper left corner (default).

set-3800-job-header-origin

This single-valued attribute specifies whether PSF sets the job header media origin on continuous-forms printers to the upper left corner.

ISPF field name

Set media origin to 3800 origin for: Job header

Allowed values

You can enter one of these fixed values:

yes
PSF sets the job header media origin to the upper left corner.

no PSF does not set the job header media origin to the upper left corner (default).

set-3800-job-trailer-origin

This single-valued attribute specifies whether PSF sets the job trailer media origin on continuous-forms printers to the upper left corner.

ISPF field name
Set media origin to 3800 origin for: Job trailer

Allowed values
You can enter one of these fixed values:

yes
PSF sets the job trailer media origin to the upper left corner.

no PSF does not set the job trailer media origin to the upper left corner (default).

set-3800-messages-origin
This single-valued attribute specifies whether PSF sets the message data set media origin on continuous-forms printers to the upper left corner.

ISPF field name
Set media origin to 3800 origin for: Message data set

Allowed values
You can enter one of these fixed values:

yes
PSF sets the message data set media origin to the upper left corner.

no PSF does not set the message data set media origin to the upper left corner (default).

suppress-copy-marks
This single-valued attribute specifies whether PSF does not print copy marks or do offset stacking. This attribute overrides the COPYMARK parameter of the JES initialization statement for the printer.

ISPF field name
Suppress copy marks

Allowed values
You can enter one of these fixed values:

yes
Copy marks are not printed and offset stacking is not done.

no Copy marks are printed and offset stacking is done if requested in the COPYMARK parameter (default).

Usage guidelines
If you specify **suppress-copy-marks=yes** and also specify any value in the **offset-stacking** attribute, PSF suppresses only the printing of copy marks, while the **offset-stacking** attribute controls when PSF does offset stacking.

trace-mode
This single-valued attribute specifies the type of tracing that is started during FSA initialization. If the FSA is 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 that contains 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 1 - 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 whether the transmitted data is received and, if necessary, retransmit data from the recovery point. The recovery point is the last time that PSF successfully synchronized with the AFP Download receiver.

ISPF field name

Recovery pages

Allowed values

A value 0 - 65535; the default is 1000. When 0 is specified, PSF does not synchronize the transmitted data with the receiver until the end of a file.

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 that are specified in the LINECT parameter when the LINECT value is smaller than the number of lines that are specified in the FCB.

ISPF field name
Use Line-Mode Migration LINECT

Allowed values
You can enter one of these fixed values:

yes
The Line-Mode Migration function uses the LINECT parameter.

no The Line-Mode Migration function does not use the LINECT parameter. It uses the FCB value (default).

Usage guidelines
- If the LINECT value is larger than the FCB value, the Line-Mode Migration function uses the FCB value whether this attribute is specified.
- 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.

pinst-trace-dsname

This single-valued attribute specifies the name of the data set that PSF or AFP Download Plus directs a Printer Inventory notify subtask (PINST) trace to. This name must be different from both the NST trace data set name and the data set name that an FSA external trace is directed to.

ISPF field name

PINST trace dsname

Allowed values

You can enter a valid data set name.

Default value

None.

Usage guidelines

A PINST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.

tcpip-job-name

This single-valued attribute specifies the name of the TCP/IP startup procedure. If you changed the name of the TCP/IP startup procedure, specify the new name for this attribute. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

ISPF field name

TCP/IP job name

Allowed values

You can enter a valid job name. The letters that you type are converted to uppercase.

Default value

TCPIP

trace-prompt

This single-valued attribute specifies whether the operator is prompted with message APS620A each time the FSS starts. 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 1 - 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

Usage guidelines

This attribute does not apply to PSF V4R5 and later. PSF V4R5 always enables Unicode.

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 wrote 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 that are 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 that is 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)

  Note: This field does not apply to PSF V4R5 and later because Unicode support is always 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

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 you are 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 tells 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 on tracing 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 turn on tracing only while necessary to capture the error.

Tip: To find out whether 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
```

- 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 on tracing:

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 22
- "Editing the AOPSTART JCL procedure" on page 24

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 24

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 that is being traced, if applicable.

process_id
: The ID of the process that is 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 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 then exit the panel, press the END function key or enter `END` on the command line.

```
                                Configuration
/  Confirm delete requests
/  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 clearing 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 memory dump information for an internal error. If so, the representative tells 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 43

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 9 shows where to find the abend information and system dumps that the IBM service representative might ask you to locate. However, memory dumps might not be available if Dump Analysis and Elimination (DAE) suppressed them.

Table 10 on page 108 shows where to find the messages that the IBM service representative might ask you to locate.

Table 9. 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 specify 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.
The home directory	You ran the AOPBATCH program.	

Table 9. General location of abend information and system dumps (continued)

General location of abend information and system dumps	Areas and conditions	Notes
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 10. 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 owns. If you specified the AOPOPER and AOPADMIN groups in **aopsetup**, your output from the commands looks 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  1531904 ... ...   aopippd
-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
-rwxr-x---  a-s-  2 OMVSKERN AOPOPER  2625536 ... ...   aopsend
-rwxr-xr-x  --s-  2 OMVSKERN OMVSGRP     4710 ... ...   aopsetup
-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        1531904 ... ...   aopippd
-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
-rwxr-x---  a-s-  2 0        4001     2625536 ... ...   aopsend
-rwxr-xr-x  --s-  2 0        1           4710 ... ...   aopsetup
-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:

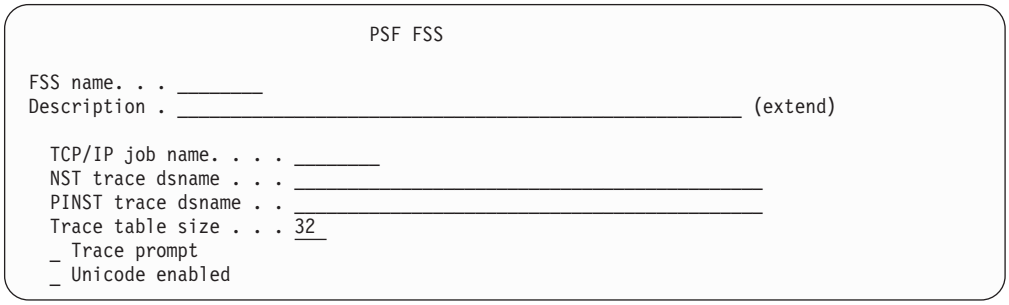
- "Running aopsetup" on page 14

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 that you use to create a PSF FSS definition.



PSF FSA definition for a channel-attached printer

This is the ISPF panel that you use to create a PSF FSA definition for a channel-attached printer.

```
                              PSF FSA, Channel

FSA Name. . . ________
Description . ____________________________________________________ (extend)
Location. . . ____________________________________________________ (extend)
                                                                  More:     +
Operator security profile
   . . . ____________________________________________________________
Processing Information:
   _ Blank compression
   _ Consolidate IM1 images
   _ Inhibit recovery
   _ Close libraries when idle
   _ Release data set when repositioning
   _ Suppress copy marks
   _ CSE sheet eject
   _ CSE preserve page position
   _ Use Line-Mode Migration LINECT
   Check CSE fit. . . . . _  1. No  2. First  3. All
   CSE orientation. . . . . _  1. Portrait  2. Landscape
   Eject to front facing. . . . . _  1. None  2. Job  3. Document  4. Both
   Offset stacking. . . . . _  1. None  2. Data set  3. Job
   Auxiliary files MO:DCA level . 1  1. None  2. IS/3
   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 that you use to create a PSF FSA definition for a TCP/IP-attached printer.

```
                          PSF FSA, TCP/IP

FSA Name. . . ________
Description . _____________________________________________________ (extend)
Location. . . _____________________________________________________ (extend)
                                                                    More:     +
Operator security profile
   . . . _____________________________________________________________
Processing Information:
   _ Blank compression
   _ Consolidate IM1 images
   _ Inhibit recovery
   _ Close libraries when idle
   _ Capture inline resources
   _ Release data set when repositioning
   _ Suppress copy marks
   _ Issue intervention messages
   _ 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
   Auxiliary files MO:DCA level . 1  1. None  2. IS/3
   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 that you use to create a PSF FSA definition for an SNA-attached printer.

```
                          PSF FSA, SNA

FSA Name. . . ________
Description . _____________________________________________________ (extend)
Location. . . _____________________________________________________ (extend)
                                                                  More:     +
Operator security profile
   . . . ____________________________________________________________
Processing Information:
   _ Blank compression
   _ Consolidate IM1 images
   _ Inhibit recovery
   _ Close libraries when idle
   _ Capture inline resources
   _ Release data set when repositioning
   _ Suppress copy marks
   _ Issue intervention messages
   _ CSE sheet eject
   _ CSE preserve page position
   _ Use Line-Mode Migration LINECT
   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
   Auxiliary files MO:DCA level . 1  1. None  2. IS/3
   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 that 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)
                                                                    More:     +
 Operator security profile
    . . . ____________________________________________________________
 Processing Information:
    _ Blank compression
    _ Consolidate IM1 images
    _ Release data set when repositioning
    _ Page accounting supported
    _ Report Line-Mode Conversion paper-length errors
    _ Use Line-Mode Migration LINECT
    _ Save auxiliary files
    Default process mode. . ________
    Paper width . . . . . . ___________
    Paper length. . . . . . ________
    Resolution. . . . . . . ___   (240, 300)
    Image output format. . . . . . . . . . 1  1. IOCA  2. Unchanged
    Auxiliary files MO:DCA level . . . . . 1  1. None  2. IS/3
    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 IBM Knowledge Center (http://www.ibm.com/support/knowledgecenter/SSLTBW/welcome).

If you experience difficulty with the accessibility of any z/OS information, send a detailed message to the "Contact us" web page for z/OS (http://www.ibm.com/systems/z/os/zos/webqs.html) or use the following mailing address.

IBM Corporation
Attention: MHVRCFS Reader Comments
Department H6MA, Building 707
2455 South Road
Poughkeepsie, NY 12601-5400
United States

Accessibility features

Accessibility features help users who have physical disabilities such as restricted mobility or limited vision use software products successfully. The accessibility features in z/OS can help users do the following tasks:

- Run assistive technology such as screen readers and screen magnifier software.
- Operate specific or equivalent features by using the keyboard.
- Customize display attributes such as color, contrast, and font size.

Consult assistive technologies

Assistive technology products such as screen readers function with the user interfaces found in z/OS. Consult the product information for the specific assistive technology product that is used to access z/OS interfaces.

Keyboard navigation of the user interface

You can access z/OS user interfaces with TSO/E or ISPF. The following information describes how to use TSO/E and ISPF, including the use of keyboard shortcuts and function keys (PF keys). Each guide includes the default settings for the PF keys.

- *z/OS TSO/E Primer*
- *z/OS TSO/E User's Guide*
- *z/OS V2R2 ISPF User's Guide Vol I*

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users who access IBM Knowledge Center with a screen reader. In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always present together (or always absent together), they can appear on the same line because they are considered a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or 3.1 or 3.1.1. To hear these numbers correctly, make sure that the screen reader is set to read out

punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1) are mutually exclusive alternatives. If you hear the lines 3.1 USERID and 3.1 SYSTEMID, your syntax can include either USERID or SYSTEMID, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The * symbol is placed next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element *FILE with dotted decimal number 3 is given the format 3 * FILE. Format 3* FILE indicates that syntax element FILE repeats. Format 3* * FILE indicates that syntax element * FILE repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol to provide information about the syntax elements. For example, the lines 5.1*, 5.1 LASTRUN, and 5.1 DELETE mean that if you use more than one of the LASTRUN and DELETE syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, it indicates a reference that is defined elsewhere. The string that follows the % symbol is the name of a syntax fragment rather than a literal. For example, the line 2.1 %OP1 means that you must refer to separate syntax fragment OP1.

The following symbols are used next to the dotted decimal numbers.

? indicates an optional syntax element
The question mark (?) symbol indicates an optional syntax element. A dotted decimal number followed by the question mark symbol (?) indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example 5? NOTIFY). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines 5 ?, 5 NOTIFY, and 5 UPDATE, you know that the syntax elements NOTIFY and UPDATE are optional. That is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.

! indicates a default syntax element
The exclamation mark (!) symbol indicates a default syntax element. A dotted decimal number followed by the ! symbol and a syntax element indicate that the syntax element is the default option for all syntax elements that share the same dotted decimal number. Only one of the syntax elements that share the dotted decimal number can specify the ! symbol. For example, if you hear the lines 2? FILE, 2.1! (KEEP), and 2.1 (DELETE), you know that (KEEP) is the

default option for the FILE keyword. In the example, if you include the FILE keyword, but do not specify an option, the default option KEEP is applied. A default option also applies to the next higher dotted decimal number. In this example, if the FILE keyword is omitted, the default FILE(KEEP) is used. However, if you hear the lines 2? FILE, 2.1, 2.1.1! (KEEP), and 2.1.1 (DELETE), the default option KEEP applies only to the next higher dotted decimal number, 2.1 (which does not have an associated keyword), and does not apply to 2? FILE. Nothing is used if the keyword FILE is omitted.

*** indicates an optional syntax element that is repeatable**

The asterisk or glyph (*) symbol indicates a syntax element that can be repeated zero or more times. A dotted decimal number followed by the * symbol indicates that this syntax element can be used zero or more times; that is, it is optional and can be repeated. For example, if you hear the line 5.1* data area, you know that you can include one data area, more than one data area, or no data area. If you hear the lines 3* , 3 HOST, 3 STATE, you know that you can include HOST, STATE, both together, or nothing.

Notes:

1. If a dotted decimal number has an asterisk (*) next to it and there is only one item with that dotted decimal number, you can repeat that same item more than once.
2. If a dotted decimal number has an asterisk next to it and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the previous example, you can write HOST STATE, but you cannot write HOST HOST.
3. The * symbol is equivalent to a loopback line in a railroad syntax diagram.

+ indicates a syntax element that must be included

The plus (+) symbol indicates a syntax element that must be included at least once. A dotted decimal number followed by the + symbol indicates that the syntax element must be included one or more times. That is, it must be included at least once and can be repeated. For example, if you hear the line 6.1+ data area, you must include at least one data area. If you hear the lines 2+, 2 HOST, and 2 STATE, you know that you must include HOST, STATE, or both. Similar to the * symbol, the + symbol can repeat a particular item if it is the only item with that dotted decimal number. The + symbol, like the * symbol, is equivalent to a loopback line in a railroad syntax diagram.

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