Infoprint Server Printer Inventory for PSF
Infoprint Server Printer Inventory for PSF
About this book .......................... xiii
Who should read this book .......... xiii
How this book is organized .......... xiii
How to read syntax diagrams ......... xiii
Where to find more information .. xiv
  Web sites ................................. xiv
  Preventive Service Planning information .... xv
  Infoprint Server Books ............... xv
  Infoprint Server online help .......... xv
Summary of changes .................... xvii

Chapter 1. Introducing the Printer Inventory for PSF .......................... 1
  Printer Inventory overview .......... 1
    PSF FSS definitions ............... 2
    PSF FSA definitions ............... 2
  How the Printer Inventory for PSF works ............. 3

Chapter 2. Customizing the Printer Inventory for PSF ................. 5
  Verifying software requirements .... 5
  Making Language Environment and C++ runtime libraries available .... 5
  Allocating the Infoprint Server base directory ........ 7
    Infoprint Server base directory (/var/Printsrv) .......... 7
    Allocating the base directory (/var/Printsrv) .......... 7
  Setting up security ................. 8
    RACF profiles and groups for Infoprint Server ...... 8
    Steps for setting up security .... 9
  Creating the Infoprint Server configuration file ........ 12
    Configuration file aopd.conf ....... 12
    Creating the aopd.conf configuration file ........ 12
    Editing the aopd.conf configuration file .... 14
  Setting permissions for directories and files ......... 14
    aopsetup shell script ............. 14
    Running aopsetup ................. 15
  Setting environment variables .... 16
    Environment variables .......... 17
    Editing the /etc/profile file .... 20
    Creating an aopstart EXEC ........ 21
    Editing an aopstart EXEC ....... 22
    Creating an STDENV data set .... 23
  Creating Infoprint Server startup and shutdown procedures .... 24
    AOPSTART JCL procedure ........ 24
    AOPSTOP JCL procedure .......... 24
    Editing the AOPSTART JCL procedure .... 25
    Editing the AOPSTOP JCL procedure .... 26
    Starting Infoprint Server automatically ........ 26
  Enabling ISPF panels .............. 26
    Defining libraries in the TSO logon procedure .... 27
    Displaying the Infoprint Server panel option ...... 27
modify—change attributes of an object in the Printer Inventory . . . . . .58
rename—rename an object in the Printer Inventory . . . . . . . . . .59

Attribute characteristics ........................................... 60
Abbreviations .................................................. 60
Default values .................................................. 60
Single-valued and multi-valued attributes .......................... 60
Types of values ............................................... 61

PSF FSA attributes ............................................... 61
acknowledgement-level ........................................... 62
afdp-dataset-grouping ........................................... 62
afdp-working-directory ......................................... 62
applid .......................................................... 63
blank-compression .............................................. 63
capture-inline-resources ........................................ 63
channel-buffer-count ............................................ 63
chars ............................................................ 64
close-libraries-when-idle ....................................... 64
color-map ...................................................... 64
com-setup-member .............................................. 65
compression .................................................... 65
consolidate-im1-images ......................................... 65
cse-check-fit .................................................. 65
cse-orientation ................................................ 66
cse-preserve-page-position .................................... 66
cse-sheet-eject ................................................ 66
default-process-mode ........................................... 66
description ..................................................... 67
disconnect-action ............................................... 67
dump-code ...................................................... 68
dump-message-id ............................................... 68
eject-to-front-facing .......................................... 68
end-sna-conversation .......................................... 69
error-disposition-supported .................................... 69
failure-action .................................................. 69
form-definition ................................................ 69
fsa-trace-dsname .............................................. 70
fsa-type ....................................................... 70
global-overlay ................................................ 70
go-ca-box-supported ........................................ 70
go-ca-fractional-line-supported .............................. 71
go-ca-process-color-supported .............................. 71
highlight-communications-failure-message .................... 71
image-output-format ................................ .......... 72
inhibit-recovery .............................................. 72
inline-bcoca-objects .......................................... 72
inline-color-management-resources ............................ 72
inline-foca-objects .......................................... 73
inline-form-definitions ................................ ....... 73
inline-goca-objects .......................................... 73
inline-ioca-objects .......................................... 74
inline-object-containers ....................................... 74
inline-overlays ............................................... 74
inline-page-segments ......................................... 74
inline-truetype-fonts .......................................... 75
input-tray-substitutions ....................................... 75
interrupt-message-page ........................................ 76
<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>interrupt-message-page-copies</td>
<td>76</td>
</tr>
<tr>
<td>ioca-replicate-trim-supported</td>
<td>76</td>
</tr>
<tr>
<td>issue-intervention-messages</td>
<td>76</td>
</tr>
<tr>
<td>issue-setup-messages</td>
<td>77</td>
</tr>
<tr>
<td>label-data-pages</td>
<td>77</td>
</tr>
<tr>
<td>label-separator-pages</td>
<td>77</td>
</tr>
<tr>
<td>location</td>
<td>78</td>
</tr>
<tr>
<td>logmode</td>
<td>78</td>
</tr>
<tr>
<td>luname</td>
<td>78</td>
</tr>
<tr>
<td>map-to-outline-fonts</td>
<td>78</td>
</tr>
<tr>
<td>mark-interrupt-message-page</td>
<td>79</td>
</tr>
<tr>
<td>mcf-name</td>
<td>79</td>
</tr>
<tr>
<td>message-count-before-dump</td>
<td>79</td>
</tr>
<tr>
<td>name</td>
<td>80</td>
</tr>
<tr>
<td>no-response-action</td>
<td>80</td>
</tr>
<tr>
<td>no-response-notify</td>
<td>80</td>
</tr>
<tr>
<td>offset-interrupt-message-page</td>
<td>81</td>
</tr>
<tr>
<td>offset-stacking</td>
<td>81</td>
</tr>
<tr>
<td>oid-format-supported</td>
<td>81</td>
</tr>
<tr>
<td>override-3800-default-font</td>
<td>82</td>
</tr>
<tr>
<td>page-accounting-supported</td>
<td>82</td>
</tr>
<tr>
<td>page-definition</td>
<td>82</td>
</tr>
<tr>
<td>port-number</td>
<td>83</td>
</tr>
<tr>
<td>print-error-messages</td>
<td>83</td>
</tr>
<tr>
<td>print-error-messages-maximum</td>
<td>83</td>
</tr>
<tr>
<td>print-error-reporting</td>
<td>84</td>
</tr>
<tr>
<td>printer-acquire-interval</td>
<td>84</td>
</tr>
<tr>
<td>printer-connect-interval</td>
<td>84</td>
</tr>
<tr>
<td>printer-disconnect-interval</td>
<td>84</td>
</tr>
<tr>
<td>printer-ip-address</td>
<td>85</td>
</tr>
<tr>
<td>printer-management-mode</td>
<td>85</td>
</tr>
<tr>
<td>printer-release-interval</td>
<td>85</td>
</tr>
<tr>
<td>printer-release-mode</td>
<td>85</td>
</tr>
<tr>
<td>prune-double-byte-fonts</td>
<td>86</td>
</tr>
<tr>
<td>prune-single-byte-fonts</td>
<td>86</td>
</tr>
<tr>
<td>psf-send-default-character</td>
<td>86</td>
</tr>
<tr>
<td>recover-from-font-not-found</td>
<td>86</td>
</tr>
<tr>
<td>release-ds-when-repositioning</td>
<td>87</td>
</tr>
<tr>
<td>resolution</td>
<td>87</td>
</tr>
<tr>
<td>response-timeout</td>
<td>87</td>
</tr>
<tr>
<td>restrict-printable-area</td>
<td>87</td>
</tr>
<tr>
<td>retained-fonts</td>
<td>88</td>
</tr>
<tr>
<td>retained-fonts</td>
<td>88</td>
</tr>
<tr>
<td>retained-form-definitions</td>
<td>88</td>
</tr>
<tr>
<td>retained-object-containers</td>
<td>88</td>
</tr>
<tr>
<td>retained-page-definitions</td>
<td>89</td>
</tr>
<tr>
<td>retained-page-segments</td>
<td>89</td>
</tr>
<tr>
<td>save-printer-information</td>
<td>89</td>
</tr>
<tr>
<td>secure-transmission</td>
<td>89</td>
</tr>
<tr>
<td>send-messages-to-sysout</td>
<td>90</td>
</tr>
<tr>
<td>set-3800-dataset-header-origin</td>
<td>91</td>
</tr>
<tr>
<td>set-3800-dataset-origin</td>
<td>91</td>
</tr>
<tr>
<td>set-3800-job-header-origin</td>
<td>91</td>
</tr>
<tr>
<td>set-3800-job-trailer-origin</td>
<td>91</td>
</tr>
<tr>
<td>set-3800-messages-origin</td>
<td>92</td>
</tr>
<tr>
<td>snmp-reporting</td>
<td>92</td>
</tr>
<tr>
<td>suppress-copy-marks</td>
<td>92</td>
</tr>
</tbody>
</table>
Figures

1. How the Printer Inventory for PSF works ............................................. 3
2. AOPSTART startup procedure — SYS1.PROCLIB(AOPSTART) .................... 24
3. AOPSTOP shutdown procedure — SYS1.PROCLIB(AOPSTOP) ..................... 25
4. Sample JCL for running PIDU as a batch job — SYS1.SAMPLIB(AOPPIDU) .... 51
5. Sample output from command ls -E /usr/lpp/Printsrv/bin ....................... 105
6. Sample output from command ls -nE /usr/lpp/Printsrv/bin ..................... 106
7. Sample output from command ls -E /usr/lpp/Printsrv/lib ........................ 106
8. Sample output from command ls -nE /usr/lpp/Printsrv/lib ....................... 107
Tables

1. Infoprint Server ........................................... xv
2. RACF access ................................................. 9
3. Environment variables ..................................... 17
4. AOPINIT EXEC values ...................................... 27
5. Summary of PIDU commands ............................... 52
6. Object classes ............................................... 52
7. Operators for attributes ................................... 53
8. General location of abend information and system dumps ........................................... 103
9. General location of messages ............................. 104
About this book

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

Who should read this book

This book is for PSF customers who have not purchased an Infoprint Server license. It is intended for:

• System programmers responsible for customizing Infoprint Server
• Operators responsible for starting and stopping Infoprint Server
• Administrators responsible for administering the Printer Inventory
• Diagnosticians responsible for diagnosing errors

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

How this book is organized

This book is organized so that you can read it sequentially or refer directly to individual tasks:

Chapter 1 introduces the Printer Inventory for PSF.
Chapter 2 describes how to customize Infoprint Server.
Chapter 3 describes how to start and stop Infoprint Server.
Chapters 4 describes how to use Infoprint Server ISPF panels to administer the Printer Inventory.
Chapters 5 describes how to use the Printer Inventory Definition Utility to administer the Printer Inventory.
Chapters 6 describes the migration program for PSF.
Chapters 7 describes how to diagnose problems.
Appendix A shows the Infoprint Server ISPF panels.
Appendix B describes the accessibility features.

This book also contains a bibliography and an index.

How to read syntax diagrams

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

<table>
<thead>
<tr>
<th>This notation:</th>
<th>Means:</th>
<th>You enter:</th>
<th>For example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apostrophes</td>
<td>String</td>
<td>As shown</td>
<td>SEND '123'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SEND '123'</td>
</tr>
</tbody>
</table>

© Copyright IBM Corp. 1995, 2008
This notation: | Means: | You enter: | For example: This book shows: | You enter:  
---|---|---|---|---  
**Bold** | **Keyword** | As shown | **CLASS** | **CLASS**  
**Braces** | List of items | The braces and one or more items from the list | {GT10 GT12} | {GT10 GT12}  
**Brackets** | Optional item | One item or no items | aopstop [now] | aopstop  
**Comma** | Separator | As shown | **DISPLAY C,K** | **DISPLAY C,K**  
**Ellipsis** | Repeatable item | One or more items | filename ... | file1 file2  
**Lowercase** | Item the system defines | As shown, in lowercase | lp | lp  
**Lowercase italics** | Variable item | A value for the item | MOUNT devnum | MOUNT A30  
**Parentheses** | List of items | The parentheses and one or more items from the list | (GT10,GT12) | (GT10,GT12)  
**Special characters** | Various symbols | As shown | {%filter-options} | %{filter-options}  
**Underline** | Default | The item, or you can omit it | K T REF | K T  
**Uppercase** | Item the system defines | As shown, in uppercase | PRMODE | PRMODE  
**Vertical bar** | UNIX® pipe (the output of the first is input to the second) | As shown | ls | lp | ls | lp  
**Vertical bar in braces** | Required choice | One item | {NOW|FOREVER} | FOREVER  
**Vertical bar in brackets** | Optional choice | One item or no items | [PORTNO|PRTQUEUE] | PORTNO  

**Where to find more information**

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

**Web sites**

These Web sites contain related information:

<table>
<thead>
<tr>
<th>This site:</th>
<th>Contains:</th>
</tr>
</thead>
</table>
| [http://www.ibm.com/systems/z/os/zos/bkserv](http://www.ibm.com/systems/z/os/zos/bkserv) | z/OS documentation, including:  
  - All z/OS books  
  - Updates from APARs and PTFs  
| [publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/Shelves](http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/Shelves) | z/OS bookshelves, including bookshelves for Infoprint Server |
Preventive Service Planning information

Before installing Infoprint Server, you should review the current Preventive Service Planning (PSP) information, also called the PSP bucket. You should also periodically review the current PSP information. The PSP upgrade ID is the ID for the z/OS operating system, for example ZOSV1R8. The subset for Infoprint Server is: INFOPRINT.

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

Infoprint Server Books

Table 1 lists books that can help you use Infoprint Server. These books are intended for customers who have purchased Infoprint Server.

For a list of the books referred to in this book, and for books that contain additional information about related products, see “Bibliography” on page 125. For books for all z/OS products, see z/OS Information Roadmap.

<table>
<thead>
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<th>Books</th>
<th>Form number</th>
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</thead>
<tbody>
<tr>
<td>z/OS Infoprint Server Introduction</td>
<td>S544-5742</td>
</tr>
<tr>
<td>Introduces Infoprint Server. This book contains printing scenarios that show how you can use Infoprint Server in your installation.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server Customization</td>
<td>S544-5744</td>
</tr>
<tr>
<td>Describes customization tasks for Infoprint Server.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server Operation and Administration</td>
<td>S544-5745</td>
</tr>
<tr>
<td>Describes operator procedures and administrative tasks for Infoprint Server. It describes how administrators can create entries in the Printer Inventory using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server User’s Guide</td>
<td>S544-5746</td>
</tr>
<tr>
<td>Describes user tasks for Infoprint Server. This book describes how to submit print jobs from remote systems (including Windows® systems), the local z/OS system, and Virtual Telecommunications Access Method (VTAM®) applications.</td>
<td></td>
</tr>
<tr>
<td>z/OS Infoprint Server Messages and Diagnosis</td>
<td>G544-5747</td>
</tr>
<tr>
<td>Describes messages from Infoprint Server. This book also describes how to use Infoprint Server tracing facilities to diagnose and report errors.</td>
<td></td>
</tr>
</tbody>
</table>

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).
Summary of changes

Summary of changes
for S510-7703-01
z/OS Version 1 Release 8 and higher

This book contains information previously presented in S510-7703-00, which supports z/OS Version 1 Release 8 (V1R8). It contains information about Infoprint Server PTF UA39898.

New information

- The `highlight-communications-failure-message` attribute has been added. See "highlight-communications-failure-message" on page 71.
- The `inline-color-management-resources` attribute has been added. See "inline-color-management-resources" on page 72.
- The `Highlight communications failure message` field has been added to the ISPF panels. See "PSF FSA definition for a TCP/IP-attached printer" on page 112.
- The `Color management resources` field has been added to the ISPF panels. See "PSF FSA definition for AFP Download Plus" on page 116.

You may notice changes in the style and structure of some content in this document—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents. This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.
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 Version 1 Release 8 and higher. PSF for z/OS customers can use the Printer Inventory for PSF if they have not purchased an Infoprint Server license.

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

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

Printer Inventory overview

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

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

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

- **ISPF panels**: The Infoprint Server ISPF panels let you add, list, browse, copy, edit, and delete PSF FSS and FSA definitions in the Printer Inventory.

- **Printer Inventory Definition Utility (PIDU)**: PIDU lets you create, list, display, edit, delete, export, and dump PSF FSS and FSA definitions in the Printer Inventory. PIDU is useful for creating a large number of definitions at one time and for making the same change to many definitions. It is also useful for backing up and restoring the Printer Inventory. You can run the z/OS UNIX `pidu` command from the z/OS UNIX command line or as a batch program.

- **Migration program**: The Infoprint Server migration program for PSF creates PSF FSS and FSA definitions by copying configuration parameters in existing PSF startup procedures.

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

- It is easier for the administrator to use the Infoprint Server ISPF panels to specify PSF configuration information than to specify the same information in a PSF startup procedure or write a PSF Exit 7.

- After the administrator creates an FSA definition or changes information in an FSA definition, you only need to start (or restart) the affected PSF FSA for PSF to use the new configuration information. You do not need to restart all FSAs in the FSS.

- You can use RACF®, or a similar product, to control who can view and update the Printer Inventory.

Related information:

- Chapter 4, “Using Infoprint Server ISPF panels,” on page 37
- Chapter 5, “Using the Printer Inventory Definition Utility (PIDU),” on page 47
PSF FSS definitions

A PSF FSS definition contains configuration information, such as the TCP/IP 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 109

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.

- **Channel:** The printer is channel-attached to the z/OS system.
- **SNA:** The printer is SNA-attached to the z/OS system.
- **TCP/IP:** The printer is TCP/IP-attached to the z/OS system.
- **AFP Download Plus:** The AFP Download Plus sender on the z/OS system sends documents to a receiver running on a TCP/IP-attached system. The receiver can print, fax, or e-mail 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.
How the Printer Inventory for PSF works

Figure 1 shows how the Printer Inventory for PSF works.

![Diagram showing how the Printer Inventory for PSF works]

**Figure 1. How the Printer Inventory for PSF works**

**Related information:**
- Appendix A, “Infoprint Server ISPF panels,” on page 109

**How the Printer Inventory for PSF works**

Figure 1 shows how the Printer Inventory for PSF works.

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

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

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

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

   **Tip:** PSF must be configured to use the Printer Inventory. When PSF uses the Printer Inventory, it ignores the configuration information specified in the PSF startup procedure and in the PSF Exit 7 initialization (INIT) call if the same information can be specified in the Printer Inventory.

**Related information:**
- Chapter 4, “Using Infoprint Server ISPF panels,” on page 37
Chapter 5, “Using the Printer Inventory Definition Utility (PIDU),” on page 47
For information about how to configure 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 topics describe how to customize Infoprint Server:

- “Verifying software requirements”
- ”Making Language Environment and C++ runtime libraries available”
- “Allocating the Infoprint Server base directory” on page 7
- “Setting up security” on page 8
- “Creating the Infoprint Server configuration file” on page 12
- “Setting permissions for directories and files” on page 14
- “Setting environment variables” on page 16
- “Creating Infoprint Server startup and shutdown procedures” on page 24
- “Enabling ISPF panels” on page 26
- “Backing up the Printer Inventory” on page 28
- “Restoring the Printer Inventory” on page 31

Related information: For information about how to configure a PSF startup procedure 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:

- z/OS V1R8 or higher
- PTF UA37619
- PSF V3R4 for z/OS (5655-B17) or PSF V4R1 for z/OS or higher (5655-M32)
- If AFP Download Plus uses the Printer Inventory:
  - PTF UA37616
  - PTF UA37617
  - PTF UA39898
- If you want to use the migration program for PSF, PTF UA38345
- z/OS Security Server Resource Access Control Facility (RACF) or another access control manager with equivalent function

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

Making Language Environment and C++ runtime libraries available

These Language Environment® and C++ runtime libraries must reside in an APF-authorized library and be available to Infoprint Server:

- CEE.SCEERUN
- CEE.SCEERUN2
- CBC.SCLBDLL
To make Language Environment and C++ runtime libraries available:

1. Add the SCEERUN, SCEERUN2, and SCLBDLL libraries to the system LNKLST.

   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 in SYS1.PROCLIB.
f. Add the SCEERUN and SCLBDLL libraries to the TSO logon procedures for Infoprint Server administrators who use Infoprint Server ISPF panels.

Related information:
- "Creating the aopd.conf configuration file" on page 12
- "Editing the AOPSTART JCL procedure" on page 25
- "Defining libraries in the TSO logon procedure" on page 27

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.db, jestoken.db, and pwjestoken.db.
- Language Environment dumps (CEEDUMPs).
- Trace files in the /var/Printsrv/trace subdirectory. However, you can specify an alternate trace directory in the AOPTRACEDIR environment variable.

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

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

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

Related information:
- "Allocating the base directory (/var/Printsrv)"
- "Running aopsetup" on page 15
- For information about zFS file systems, see z/OS UNIX System Services Planning.

Allocating the base directory (/var/Printsrv)

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

To allocate the base directory:

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

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

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

   **Example:** This example shows a sample BPXPRMxx member in SYS1.PARMLIB:
   
   ```plaintext
   MOUNT FILESYSTEM('my.var.printsrv.filesystem')
   TYPE(ZFS)
   MODE(RDWR)
   NOAUTOMOVE
   MOUNTPOINT('/&SYSNAME./var/Printsrv')
   ```

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

---

**Related information:**

-  "Infoprint Server base directory (/var/Printsrv)" on page 7
-  "Running aopsetup" on page 15
-  For information about zFS file systems, see *z/OS UNIX System Services Planning*

---

**Setting up security**

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

**RACF profiles and groups for Infoprint Server**

The AOP.ADMINISTRATOR RACF profile in the RACF PRINTSRV class controls access to the Printer Inventory:

-  READ access to this profile lets users view the Printer Inventory.
-  UPDATE access lets users update the Printer Inventory.

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

These RACF groups control access to the Printer Inventory and to Infoprint Server operator commands:

-  AOPADMIN: A group for Infoprint Server administrators who can view and update the Printer Inventory.
-  AOPOPER: A group for Infoprint Server operators who can start and stop Infoprint Server.

You can choose any names for these groups.

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

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

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

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

**To set up security:**

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

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

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

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

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

   **Example:** This RACF SETROPTS command activates the PRINTSRV class and copies profiles into virtual storage.
3. Define a resource profile to RACF named AOP.ADMINISTRATOR in the PRINTSRV class.

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

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

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

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

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

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

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

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

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

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

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

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

6. Make sure that all user IDs for Infoprint Server administrators and operators are defined as z/OS UNIX users. The user ID must have an OMVS segment, a home directory, and the user’s default group must have an OMVS segment with a group identifier (GID).

**Summary of the required steps:**

a. If a user ID is not a z/OS UNIX user, modify the user ID to add an OMVS segment, a home directory, 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('/u/userid')
    PROGRAM('/bin/sh') DFLTGRP(group)
```
b. On the z/OS UNIX command line, create the user’s home directory (/u_userid), and set the directory permissions to give the user read, write, and execute access to the directory.

   **Example:** This example uses the `mkdir` command to create a home directory with the correct permissions, and the `chown` command to make the user the owner of the home directory.

   ```bash
   su
   cd /u
   mkdir -m 0700 AOPSTC
   mkdir -m 0700 userid
   chown -R AOPSTC /u/AOPSTC
   chown -R userid /u/_userid
   exit
   ```

   To use the z/OS UNIX su command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF. The `exit` command switches back to your own UID.

   **Tip:** Instead of using the z/OS UNIX mkdir command, you can use the z/OS automounter facility to create the home directory and set permissions.

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:

   ```bash
   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.

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

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

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

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

   ```bash
   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 24](#)
- [“AOPSTOP JCL procedure” on page 24](#)
Creating the Infoprint Server configuration file

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

Configuration file aopd.conf

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

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

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

**Related information:**
- "Creating the aopd.conf configuration file"

Creating the aopd.conf configuration file

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

**To create the aopd.conf file:**

1. On the z/OS UNIX command line, switch to an effective UID of 0:
   ```
   su
   ```
   - To use the su command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.
2. Copy the sample configuration file, `/usr/lpp/Printsrv/samples/aopd.conf`, to `/etc/Printsrv/aopd.conf`:

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

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

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

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

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

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

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

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

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

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

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

   - base-directory
   - inventory

   Edit this file using the IBM-1047 code page.

7. Switch back to your own UID:

   ```
   exit
   ```

Syntax rules:

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

Related information:

- “Configuration file aopd.conf” on page 12
- “Setting environment variables” on page 16
Editing the aopd.conf configuration file

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

To edit the aopd.conf file:

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

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

2. Edit the configuration file using your preferred editor and save your changes.
   For example:
   
   oedit /etc/Printsrv/aopd.conf

   Edit this file using the IBM-1047 code page.

3. Switch back to your own UID:
   
   exit

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

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

Syntax rules:

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

Related information:

- “Configuration file aopd.conf” on page 12
- “Creating the aopd.conf configuration file” on page 12

Setting permissions for directories and files

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

aopsetup shell script

The aopsetup shell script creates the /var/Printsrv directory if it does not already exist. If you specified a different directory in the base-directory attribute in the Infoprint Server configuration file (aopd.conf), aopsetup creates that directory instead of the /var/Printsrv directory.
**aopsetup** also sets the appropriate z/OS UNIX permissions for these Infoprint Server directories and files:

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

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

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

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

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

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

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

**Related information:**

- “Steps for setting up security” on page 9
- “Running aopsetup”

**Running aopsetup**

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

**Before you begin:**

- Define the RACF groups for Infoprint Server operators and administrators.
- Create the Infoprint Server configuration file (**aopd.conf**) and specify the **base-directory** attribute in it.
- Make sure that the file systems that contain the /usr/lpp/Printsrv/bin and /var or /var/Printsrv directories are mounted read/write.
- You should run **aopsetup** before you start Infoprint Server. However, if you attempted to start Infoprint Server before running **aopsetup**, stop Infoprint Server before doing this step.
To run aopsetup:
1. On the z/OS UNIX command line, switch to an effective UID of 0:
   su

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

2. Run aopsetup. You can run aopsetup from an rlogin shell or from an OMVS
   session.
   Examples:
   • If you defined group AOPOPER for operators and group AOPADMIN for
     administrators, enter:
     /usr/lpp/Printsrv/bin/aopsetup AOPOPER AOPADMIN
   • If you want to run aopsetup while the /usr/lpp/Printsrv directory is mounted
     at a /service mount point, specify the service directory in the INSTALL_DIR
     environment variable. For example, enter:
     INSTALL_DIR=/service/usr/lpp/Printsrv aopsetup AOPOPER AOPADMIN

3. Switch back to your own UID:
   exit

Results: If you specified the AOPOPER and AOPADMIN groups as arguments to
aopsetup, output from the z/OS UNIX ls command should look similar to the
sample output below. Also, the owner ID of the /var/Printsrv directory and the
executable files, shown as ROOT in the sample output, should have a UID of 0.
   • ls -d -E /var/Printsrv
     drwxrwx--x 11 ROOT AOPADMIN ... ... /var/Printsrv
   • ls -E /usr/lpp/Printsrv/bin
     ...
     -rwxrwxr-- a--- 2 ROOT AOPADMIN ... ... aopd
     -rwxr-xr-- ---s- 2 ROOT AOPADMIN ... ... aoplogu
     -rwxr-xr-- ---s- 2 ROOT AOPADMIN ... ... aopstart
     -rwxr-xr-- ---s- 2 ROOT AOPADMIN ... ... aopstop
     -rwxr-xr-- ---s- 2 ROOT AOPADMIN ... ... hinvu
     -rwxr-xr-- ---s- 2 ROOT AOPADMIN ... ... pidu
     -rwxr-xr-- ---s- 2 ROOT AOPADMIN ... ... sdbu

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

Related information:
   • “Creating the aopd.conf configuration file” on page 12
   • “aopsetup shell script” on page 14
   • “Setting up security” on page 8
   • “Checking permissions settings” on page 104

Setting environment variables

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

Environment variables

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

<table>
<thead>
<tr>
<th>Environment variable</th>
<th>Location where set</th>
<th>STDENV data set (AOPSTART JCL procedure)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/etc/profile file</td>
<td>aopstart EXEC</td>
</tr>
<tr>
<td>_BPX_SHAREAS</td>
<td>No</td>
<td>Required ¹</td>
</tr>
<tr>
<td>AOPCONF</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>AOPTRACEON</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>AOPTRACEDIR</td>
<td>No</td>
<td>Optional</td>
</tr>
<tr>
<td>AOPVALIDATEDB</td>
<td>No</td>
<td>Optional</td>
</tr>
<tr>
<td>LANG</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>LC_ALL</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>LC_CTYPE</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>LC_TIME</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>LIBPATH</td>
<td>Required</td>
<td>Required ¹</td>
</tr>
<tr>
<td>NLSPATH</td>
<td>Required</td>
<td>Required ¹</td>
</tr>
<tr>
<td>PATH</td>
<td>Required</td>
<td>Required ¹</td>
</tr>
</tbody>
</table>

1. The default aopstart EXEC sets these required environment variables to the default values. You do not need to set them in the aopstart EXEC if the default values are suitable.

The environment variables are:

**_BPX_SHAREAS**

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

**AOPCONF**

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

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

**Default:** /etc/Printsrv/aopd.conf
AOPTRACEDIR
The name of the trace directory. This environment variable is optional. Specify it only if you set the AOPTRACEON environment variable and the default trace directory is not suitable. The AOPADMIN group must have permission to write to the specified trace directory.

Set this environment variable in the aopstart EXEC.

Default: base-directory/trace

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

Example: AOPTRACEDIR=/mydirectory/trace

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

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

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

Default: The environment variable is not set.

Examples:
AOPTRACEON=1
AOPTRACEON=ON

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

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

Default: The environment variable is not set.

Example: AOPVALIDATEDB=yes

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

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

Default: C (equivalent to En_US)

LC_ALL
The locale used to format time and date information in messages. This locale overrides the locale in the LC_TIME variable. This environment variable is optional. Specify it only if the default value is not suitable.
Set this environment variable in the /etc/profile file. Also, set this environment variable in either the aopstart EXEC or the STDENV data set.

**Example:** LC_ALL=Fr_FR.IBM-297

**Default:** C (also called POSIX)

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

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

**Example:** LC_CTYPE=Fr_FR.IBM-297

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

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

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

**Default:** C (also called POSIX)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Related information:**
- "Editing the `/etc/profile` file"
- "Creating an aopstart EXEC" on page 21
- For information about environment variables, see `z/OS UNIX System Services User's Guide`
- For information about the `LANG`, `LC_ALL`, `LC_CTYPE`, and `LC_TIME` environment variables, see `z/OS UNIX System Services Command Reference`

### Editing the `/etc/profile` file

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

**To edit the `/etc/profile` file:**

1. On the z/OS UNIX command line, switch to an effective UID of 0:
   ```
su
   
   To use the `su` command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.
   
   2. Edit the `/etc/profile` file using your preferred editor and save your changes. For example:
      ```
oedit /etc/profile
      
      If you installed Infoprint Server libraries in the default locations, add these statements to set the required environment variables:
      ```
      export LIBPATH=/usr/lpp/Printsrv/lib:$LIBPATH
      export NLSPATH=/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv/En_US/%N:$NLSPATH
      export PATH=/usr/lpp/Printsrv/bin:$PATH
      ```
      
      3. Switch back to your own UID:
         ```
         exit
         ```

**Related information:**
- "Environment variables" on page 17
Creating an aopstart EXEC

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

In the aopstart EXEC, you can:

- Change the value of any environment variable that is set in the EXEC.
- Set a new environment variable in this format:
  
  \[n=n+1;env.n='environment_variable=value']

  Specify all environment variables before this statement that is in the EXEC:
  
  env.0=n

  Example:

  \[n=n+1;env.n='AOPTRACEDIR=/mydirectory/trace'\]
  
  env.0=n

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

  \[install_path='/usr/lpp/Printsrv']

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

To create an aopstart EXEC:

1. Switch to an effective UID of 0:

   ```sh
su
   
   To use the z/OS UNIX su command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.
   
   2. Copy the default aopstart EXEC to another directory, such as /usr/sbin:

   ```sh
cp /usr/lpp/Printsrv/bin/aopstart /usr/sbin/
   
   You must copy the file because you should not modify the directory that contains Infoprint Server executable files.
   
   3. Change to the directory where the aopstart EXEC exists:

   ```sh
cd /usr/sbin
   
   4. Change the owner of the aopstart file to UID 0:

   ```sh
chown 0 aopstart
   
   5. Change the group owner of the aopstart file to AOPOPER. AOPOPER is the suggested RACF group name for Infoprint Server operators. However, you might have used a different name for this group.

   ```sh
chgrp AOPOPER aopstart
   ```
6. Edit the new `aopstart` file using your preferred editor and save your changes.
   For example:
   ```
eedit aopstart
   ```
   Edit this file using the IBM-1047 code page. For additional instructions, see the comments in the `aopstart` EXEC.

7. Change the permissions for the file. Make the file writeable by only UID 0, readable by everyone, and executable only by UID 0 and members of the AOPOP 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/sbin/aopstart',
   // TIME=NOLIMIT
   ```

**Related information:**
- "Environment variables" on page 17
- "Editing the AOPSTART JCL procedure" on page 25

**Editing an aopstart EXEC**

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

**To edit the aopstart EXEC:**

1. Switch to an effective UID of 0:
   ```
   su
   ```
   To use the z/OS UNIX `su` command, you must be permitted to the BPX.SUPERUSER profile in the FACILITY class in RACF.

2. Change to the directory where you have copied the `aopstart` EXEC. For example:
   ```
   cd /usr/sbin
   ```

3. Edit the `aopstart` file using your preferred editor and save your changes. For example:
   ```
   oedit aopstart
   ```
   Edit this file using the IBM-1047 code page. For additional instructions, see the comments in the `aopstart` EXEC.
4. Set the \texttt{set-uid-flag} on. For example:

    chmod 4754 aopstart

    \textbf{Tip:} Do this step after you edit the file because the \texttt{set-uid-flag} is turned off when you edit a file.

5. Switch back to your own UID:

    \texttt{exit}

\textbf{Related information:}

- “Environment variables” on page 17
- “Creating an aopstart EXEC” on page 21

\textbf{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 \texttt{aopstart} EXEC, which only authorized users can edit.

    \textbf{Tip:} If you specify an environment variable in the \texttt{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

\textit{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:

- \textbf{MVS data set:} Give the AOPOPER group RACF authorization to read the data set.
- \textbf{UNIX file:} Make group AOPOPER the owner of the file. Set the z/OS UNIX permission bits to let the group read the file.

\textbf{Related information:}

- “Environment variables” on page 17
- “Editing the AOPSTART JCL procedure” on page 21
Creating Infoprint Server startup and shutdown procedures

To start and stop Infoprint Server, you use the AOPSTART and AOPSTOP JCL procedures that Infoprint Server provides in SYS1.PROCLIB. In addition, 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 provided in SYS1.PROCLIB invokes the aopstart command to start Infoprint Server. Figure 2 shows the AOPSTART procedure that Infoprint Server provides in SYS1.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',
/*   TIME=NOLIMIT
/*STDOUT DD SYSDTOUT=
/*STDERR DD SYSDTOUT=
/*-----------------------------------
/*  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.PROCLIB(AOPSTART)

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

AOPSTOP JCL procedure

The AOPSTOP procedure provided in SYS1.PROCLIB invokes the aopstop command to stop Infoprint Server.

Figure 3 on page 25 shows the AOPSTOP procedure provided in SYS1.PROCLIB.
Editing the AOPSTART JCL procedure

You must edit the AOPSTART JCL procedure in these situations:

- You need to specify a higher region size in the EXEC statement because the default region size set by your installation is not sufficient.
- You need to specify the directory path for the `aopstart` EXEC you created for your installation in the PARM parameter of the EXEC statement.
- You need to set environment variables in the STDENV data set.

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

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

To authorize the user ID:

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

Related information:
• “Creating an STDENV data set” on page 23
• “AOPSTART JCL procedure” on page 24
• “Starting Infoprint Server with the AOPSTART JCL procedure” on page 35

Editing the AOPSTOP JCL procedure

You must edit the AOPSTOP JCL procedure if any of these conditions apply to your installation:
• If the aopstop command is not in the default directory /usr/lpp/Printsrv/bin, specify the directory in the PARM parameter on the EXEC statement.
• If the Infoprint Server configuration file is not in the default location /etc/Printsrv/aopd.conf, specify the location of the file in the AOPCONF environment variable in a data set referred to by the STDENV DD statement.

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

If you specify an MVS data set or z/OS UNIX file in a DD statement in the AOPSTOP procedure, the user ID associated with the AOPSTOP procedure must be authorized to:
• Read the data set or file specified in the STDENV DD statement.
• Read and write to the data set or file specified in the STDOUT and STDERR DD statements.

To authorize the user ID:
• MVS data set: Give the AOPOPER group RACF authorization to read or write to the data set.
• z/OS UNIX file: Make group AOPOPER the owner of the file and set the UNIX permission bits to let the group read the file.

Related information:
• “Creating an STDENV data set” on page 23
• “AOPSTOP JCL procedure” on page 24
• “Stopping Infoprint Server with the AOPSTOP JCL procedure” on page 35

Starting Infoprint Server automatically

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

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

Enabling ISPF panels

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

Note: Not all Infoprint Server ISPF panels have been translated into Japanese.
Defining libraries in the TSO logon procedure

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

To define libraries in the TSO logon procedure:

1. Concatenate one of these panel libraries to DD statement ISPPLIB, depending on the language in which you want to view the panels:
   - **English**: AOP.SAOPPENU
   - **Japanese**: AOP.SAOPPJPN

2. Concatenate one of these message libraries to DD statement ISPMLIB, depending on the language in which you want to receive messages:
   - **English**: AOP.SAOPMENU
   - **Japanese**: AOP.SAOPMJPN

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

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

Displaying the Infoprint Server panel option

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

AOPINIT EXEC

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

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base directory</td>
<td>The directory where Infoprint Server programs are installed. The default directory is /usr/lpp/Printsrv.</td>
</tr>
<tr>
<td>Configuration file</td>
<td>The full path name of the Infoprint Server configuration file. The default name is /etc/Printsrv/aopd.conf.</td>
</tr>
<tr>
<td>Language</td>
<td>The value of the LANG and LC_ALL environment variables. The default is En_US (equivalent to C).</td>
</tr>
</tbody>
</table>
Table 4. AOPINIT EXEC values (continued)

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLS path</td>
<td>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.</td>
</tr>
<tr>
<td>Trace file</td>
<td>The path name of the file where Infoprint Server writes a trace of the ISPF panels. The default file name is /var/Printsrv/trace.</td>
</tr>
</tbody>
</table>

Related information:
- "Editing the AOPINIT file"

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

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

To edit the AOPINIT file:
1. Copy AOPINIT from AOP.SAOPEXEC(AOPINIT) to a local library.
2. Follow the instructions in the comments in AOPINIT to make your changes.
3. Add the local library that contains AOPINIT to the SYSPROC or SYSEXEC DD statement of each user's TSO logon procedure at the beginning of the search order.

Related information:
- "AOPINIT EXEC" on page 27

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

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

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

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

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

To back up the Printer Inventory to a UNIX file:
1. Create a file to contain a short shell script, such as /u/userid/do.backup. Your login user ID is userid.
   If you set the PATH, NLSPATH, and optional AOPCONF environment variables with the values required by Infoprint Server in /etc/profile or /u/userid/.profile, put these lines in the file:
   
   ```
   . /etc/profile
   . /u/userid/.profile
   export extension=$(date "+%y%m%d")
   pidu -c "export /var/Printsrv.backups/inventory.backup.$extension;"
   ```
   Otherwise, put the following lines in the file to export the environment variables. You can omit the AOPCONF variable if the Infoprint Server configuration file is /etc/Printsrv/aopd.conf.
   
   ```
   export PATH=/usr/lpp/Printsrv/bin:/bin:$PATH
   export NLSPATH=/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv/En_US/%N:$NLSPATH
   export AOPCONF=/etc/Printsrv/aopd.conf
   export extension=$(date "+%y%m%d")
   pidu -c "export /var/Printsrv.backups/inventory.backup.$extension;"
   ```
   To automatically delete all files in the /var/Printsrv.backups directory that were created more than five days ago, add this command to the shell script:
   
   ```
   rm $(find /var/Printsrv.backups -ctime +5)
   ```
   Tip: When the cron daemon runs the commands in your crontab entry, it does not first run your .profile to establish environment variables.

2. Set the execute permission bit for the /u/userid/do.backup shell script. For example:
   ```
   chmod +x /u/userid/do.backup
   ```

3. Use the crontab command with the -e option to insert this line into the crontab entry:
   ```
   00 03 * * * /u/userid/do.backup
   ```

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

You can back up the Printer Inventory to a generation data group (GDG). This topic 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 UPDATE 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(hiq.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 `hiq.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=hiq.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
   pidu -c "export //hiq.INV.BACKUPS\(+\+1\)" */
```

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

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

   **A.** Create a file to contain a short shell script, such as `~/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 `~/userid/.profile`, put these lines in the file:

   ```
   . /etc/profile
   . ~/userid/.profile
   pidu -c "export //\'hiq.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 //\'hiq.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.

```
0 0 * * * /u/userid/do.backup
```

---

Related information:

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

---

**Restoring the Printer Inventory**

You might need to restore the Printer Inventory if the Printer Inventory has an error. You can use the Infoprint Server Printer Inventory Definition Utility (PIDU) to restore the Printer Inventory from one of these types of files:

- A UNIX file
- A data set in a generation data group (GDG)

---

**Restoring the Printer Inventory from a UNIX file**

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

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

**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. If you are not a member of the AOPADMIN RACF group and do not have UPDATE access to the AOP.ADMINISTRATOR resource profile in the PRINTSRV class, switch to an effective UID of 0:

```
su
```

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

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

4. 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.

5. Run the \texttt{pdu} command to restore the Printer Inventory. This example shows how to restore the Printer Inventory from file:

   \texttt{/var/Printsrv.backups/inventory.backup.$yymmdd}

   This command uses the UNIX redirection symbols (> for \texttt{stdout} and 2> for \texttt{stderr}) to redirect command output to file \texttt{pdu.output}, and command errors to file \texttt{pdu.errors}:

   \texttt{pdu /var/Printsrv.backups/inventory.backup.$yymmdd >pdu.output 2>pdu.errors}

6. Switch back to your own UID:

   \texttt{exit}

Related information:

- “Setting up security” on page 8
- Chapter 5, “Using the Printer Inventory Definition Utility (PDU),” on page 47

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.

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

\textbf{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. If you are not a member of the AOPADMIN RACF group and do not have UPDATE access to the AOP.ADMINISTRATOR resource profile in the PRINTSRV class, switch to an effective UID of 0:

   \texttt{su}

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

3. Move the \texttt{/var/Printsrv/master.db}, \texttt{/var/Printsrv/jestoken.db}, and \texttt{pwjestoken.db} files to another directory. Save these files until you have
restored the Printer Inventory, restarted Infoprint Server, and run with the
restored Printer Inventory for a few days.

4. 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.

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

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

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

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

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

  a. Create a file to contain a short shell script, such as `/u/userid/do.restore`.  
     Your login user ID is `userid`. This example shows how to restore the
     Printer Inventory from the most recent generation data set of a GDG
     named `hlq.INV.BACKUPS`. This example uses the UNIX redirection
     symbols ( > for `stdout` and 2> for `stderr`) to redirect command output to
     file `pidu.output` and command errors to file `pidu.errors`:

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

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

     `sh /u/userid/do.restore`

     **Tip:** Use the `sh` command to run the `pidu` command in the
     `/u/userid/do.restore` shell script instead of running the `pidu` command
directly. GDG relative generations are maintained for the duration of the
UNIX shell created when you log in to z/OS UNIX System Services.

     Using the `sh` command to create a new shell ensures that the current
generation is always 0. For example, these commands create a new
 generation data set and then display the generation data set prior to the
newly created data set:

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

     `cat //\'hlq.INV.BACKUPS\(0\)\'`

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

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

     `cat //\'hlq.INV.BACKUPS\(+1\)\'`
6. Switch back to your own UID:
   exit

Related information:
- Chapter 5, “Using the Printer Inventory Definition Utility (PIDU),” on page 47
Chapter 3. Starting and stopping Infoprint Server

You must start Infoprint Server before you can create PSF FSS and PSF FSA definitions in the Printer Inventory. These topics describes 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 in SYS1.PROCLIB. The AOPSTART JCL procedure runs the aopstart REXX™ EXEC.

When you start Infoprint Server, these daemons start:
- aopd
- aophinvd
- aoplogd
- aopsdbd

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

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

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.

   Related information:
   - “Setting up security” on page 8
   - “Creating Infoprint Server startup and shutdown procedures” on page 24

Stopping Infoprint Server with the AOPSTOP JCL procedure

To stop Infoprint Server, you use the AOPSTOP JCL procedure in SYS1.PROCLIB. The AOPSTOP JCL procedure runs the z/OS UNIX aopstop command, which stops all Infoprint Server daemons after current activity ends.
Tip: The AOPSTOP JCL procedure can end with abend EC6 (reason code FFFF) or abend 33E. These abends do not indicate an error. Your installation can suppress these abends in the IEASLP00 member of SYS1.PARMLIB.

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

To stop Infoprint Server:

1. Enter this MVS START command:
   
   ```
   START AOPSTOP[,OPTIONS='{now|force}']
   ```

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

   - **now** Stops Infoprint Server immediately.
   - **force** Stops Infoprint Server immediately using a “destructive” shutdown. Infoprint Server database might be corrupted.

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

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

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

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 24
- "Backing up the Printer Inventory" on page 28
Chapter 4. Using Infoprint Server ISPF panels

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

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

Starting an Infoprint Server ISPF session

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

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

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

   Note: Some Infoprint Server ISPF panels might not be available in Japanese as yet.

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

3. On the z/OS System Programmer Primary Option panel, select the 8 Infoprint Server option. The first panel is called the Infoprint Server: Printer Inventory Manager panel.
   If the z/OS System Programmer Primary Option panel does not contain the Infoprint Server option, ask your system programmer to customize the ISPF panels.

Related information:
- “Setting up security” on page 8

Using the ISPF help system

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

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

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

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

---

**Configuring the ISPF panels**

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

To configure the ISPF panels:

1. Start an Infoprint Server ISPF session.

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

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

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

**Related information:**

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

---

**Using ISPF panels to work with FSS definitions**

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

**Adding PSF FSS definitions**

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

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

**To add a PSF FSS definition:**

1. Start an Infoprint Server ISPF session.
2. On the Infoprint Server: Printer Inventory Manager panel, select 4 Add and press Enter.

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

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

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

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

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

To list all PSF FSS definitions:
1. Start an Infoprint Server ISPF session.

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

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

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

To list selected PSF FSS definitions:
1. Start an Infoprint Server ISPF session.

2. On the Infoprint Server: Printer Inventory Manager panel, select 6 Select and press Enter.
3. On the FSS Select panel, type values in one or more fields to specify selection criteria and press Enter. The online help for each field tells you how to use an * or ? to represent one or more variable characters.

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

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

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

Browsing PSF FSS definitions
You can browse a PSF FSS definition.

To browse a PSF FSS definition:
1. Start an Infoprint Server ISPF session.

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

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

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

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

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

To copy a PSF FSS definition:
1. Start an Infoprint Server ISPF session.

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

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

4. On the PSF FSS panel, change the name of the FSS in the FSS name field. Change the values in any other fields. For information about each field, use the ISPF online help system.
5. Do one of these:
   - To create the new definition but keep the panel on the screen, type SAVE on the command line and press Enter. Type SAVE on the command line to easily add more than one FSS definition of the same type.
   - To create the new definition and exit the panel, press the END function key.

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

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

To edit a PSF FSS definition:
1. Start an Infoprint Server ISPF session.
2. List the FSS definition that you want to edit.
3. On the FSS List panel, type E in the A column in front of the FSS definition you want to edit and press Enter.
4. On the PSF FSS panel, change any fields. For information about each field, use the ISPF online help system.
5. To save the changes to the FSS definition, press the END function key.

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

Deleting PSF FSS definitions
You can delete a PSF FSS definition.

To delete a PSF FSS definition:
1. Start an Infoprint Server ISPF session.
2. List the FSS definition that you want to delete.
3. On the FSS List panel, type D in the A column in front of the FSS definition you want to delete and press Enter.
4. On the Confirm Delete panel, press Enter.

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

Using ISPF panels to work with FSA definitions

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

Adding PSF FSA definitions

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

To add a PSF FSA definition:

1. Start an Infoprint Server ISPF session.

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

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

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

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

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

Listing PSF FSA definitions

You must list FSA definitions before you can browse, copy, edit, or delete a definition.
You can list all PSF FSA definitions, or you can select PSF FSA definitions to list based on one or more criteria. FSA definitions are listed if they meet all of the criteria you specify. The criteria you can specify are:
- FSA name
- Description of the FSA definition
- Type of FSA definition: PSF channel, PSF SNA, PSF TCP/IP, or PSF AFP

To list all PSF FSA definitions:
1. Start an Infoprint Server ISPF session.

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

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

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

To list selected PSF FSA definitions:
1. Start an Infoprint Server ISPF session.

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

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

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

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

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

Browsing PSF FSA definitions
You can browse a PSF FSA definition.

To browse a PSF FSA definition:
1. Start an Infoprint Server ISPF session.
2. List the PSF FSA definition that you want to browse.

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

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

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

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

To copy a PSF FSA definition:
1. Start an Infoprint Server ISPF session.

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

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

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

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

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

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

To edit a PSF FSA definition:
1. Start an Infoprint Server ISPF session.

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

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

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

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

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

Deleting PSF FSA definitions
You can delete a PSF FSA definition.

To delete a PSF FSA definition:
1. Start an Infoprint Server ISPF session.

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

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

4. On the Confirm Delete panel, press Enter.

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

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

To change the type of a PSF FSA definition:
1. Start an Infoprint Server ISPF session.

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

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

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

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

Related information:
- "Starting an Infoprint Server ISPF session" on page 37
- "Listing PSF FSA definitions" on page 42
- "Using the ISPF help system" on page 37
Chapter 5. Using the Printer Inventory Definition Utility (PIDU)

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

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

These topics describe how to administer the Printer Inventory for PSF:

- “pidu command” on page 50
- “Running the pidu command as a batch job” on page 50
- “PIDU commands” on page 52
- “Attribute characteristics” on page 60
- “PSF FSA attributes” on page 61
- “PSF FSS attributes” on page 93

pidu command

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

Format

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

Description

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

Options

```
-c "command; ...
```

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

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

You can specify these PIDU commands:

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

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

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

Operands

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

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

//"USERID.MYFILE"

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

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

Usage notes

• You can specify PIDU commands interactively from your keyboard.
• When you specify PIDU commands in a UNIX file (such as a z/FS file) or an MVS data set, you can:
  – Start comments with a pound sign (#).
  – Include blank lines if desired.
  – Specify the PIDU command names, attribute names, and attribute values on separate lines:
    - In a UNIX file, an attribute value can span lines provided that all lines other than the last line end with a backslash. Be sure that no blank characters are present after the backslash. For example:
      attribute1 = 'A very, very, very long \n value'
    - In an MVS data set, the entire attribute value must be on one line. To specify a very long attribute value, allocate a data set that has a logical record length of 255 (LRECL=255) and a variable blocked record format (RECFM=VB). Then specify the entire value on one line. For example:
      attribute1 = 'A very, very, very long value'
Examples -- pidu

Enter \textbf{PIDU commands interactively}

To enter one or more \textbf{PIDU} commands interactively from your keyboard:

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

2. Type a \textbf{PIDU} command and press Enter. For example, to create an FSA definition, type:
   \begin{verbatim}
   create fsa PRT001 fsa-type = psf-tcip form-definition = A10110
   page-definition = A08682 printer-ip-address = 9.99.12.33;
   \end{verbatim}

3. After the command is processed, type another command and press Enter. For example, to display the attributes of the FSA definition just created, enter:
   \begin{verbatim}
   display fsa PRT001;
   \end{verbatim}

4. After the command is processed, use \texttt{Ctrl-D} or type \texttt{exit} to end the \texttt{pidu} command.

\section*{Specifying PIDU commands on the command line}

To specify two \textbf{PIDU list} commands with the \texttt{-c} option, enter:

\begin{verbatim}
pidu -c "list fsa; list psf-fss;"
\end{verbatim}

\section*{Specifying PIDU commands in a file}

To specify a UNIX file named \texttt{pidu.commands} that contains \textbf{PIDU} commands, enter:

\begin{verbatim}
pidu pidu.commands
\end{verbatim}

To use the < symbol to redirect \texttt{stdin} to file \texttt{pidu.commands}, enter:

\begin{verbatim}
pidu <pidu.commands
\end{verbatim}

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

\begin{verbatim}
pidu //\'MARY.PIDU.CMDS\'
\end{verbatim}

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

\begin{verbatim}
pidu //PIDU.CMDS
\end{verbatim}

File \texttt{pidu.commands} (or data set \texttt{PIDU.CMDS}) contains the \textbf{PIDU} commands. For example:

\begin{verbatim}
create fsa PRT001 fsa-type = psf-tcip form-definition = A10110
   page-definition = A08682 printer-ip-address = 9.99.12.33;
   display fsa;  # list all FSAs
\end{verbatim}

Environment variables

\begin{description}
\item AOPCONF\hspace{2em}Names the Infoprint Server configuration file. The file named in this variable takes precedence over the user-specific configuration file (\texttt{${HOME}/aopconf}) and the system default configuration file (\texttt{/etc/Printsrv/aopd.conf}).
\item LIBPATH\hspace{2em}The path used to locate dynamic link libraries (DLL).
\end{description}
NLSPATH
Lists the directory where the Infoprint Server message catalogs are located.

PATH
Lists the directory where the Infoprint Server executables are located.

Files

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

/etc/Printsrv/aopd.conf
The default Infoprint Server configuration file.

Exit values

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

Running the pidu command as a batch job

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

Using AOPBATCH

You can invoke AOPBATCH in JCL with this EXEC statement:

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

- **-q**  Suppresses informational messages that the pidu command writes to the output data set named in the STDOUT DD statement.
- **-v**  Writes the name of the Printer Inventory to the output data set named in the STDERR DD statement. Also provides additional informational messages.

You can specify these DD statements:

- **STDENV**  Specifies environment variables that PIDU uses. You can specify the environment variables either in-stream or in a UNIX file or MVS data set. When you use AOPBATCH, you need to specify the PATH, LIBPATH, and NLSPATH environment variables only if your installation did not install Infoprint Server files in the default directories. Specify the AOPCONF environment variable if the Infoprint Server configuration file is not in /etc/Printsrv/aopd.conf or in $HOME/.aopconf. Specify the environment variables in the format `variable = value`.

- **STDERR**  Specifies a SYSOUT data set, a UNIX file, or an MVS data set. PIDU writes error messages to this file or data set.

- **STDIN**  Specifies PIDU commands in-stream or names a UNIX file or MVS data set that contains the commands.

  **Tip:** If any attribute value is greater than 80 characters, you cannot specify the PIDU commands in-stream because an attribute value cannot span lines and the SYSIN DD * statement lets you specify a
maximum of 80 characters on one line. Instead, specify the PIDU commands in an MVS data set that has a logical record length (LRECL) of 255 and a variable blocked (VB) blocksize (BLKSIZE).

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

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

```jcl
//AOPPIDU JOB ,'pidu'
//*
//PIDU EXEC PGM=AOPBATCH,PARM='pidu'
//*
//STDIN DD DSN=hlq.INVDEFS,DISP=SHR
//*
//STDOUT DD SYSOUT=*  
//STDERR DD SYSOUT=* 
//*
//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:

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

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

Using BPXBATCH

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

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

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

Table 5. Summary of PIDU commands

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

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

**PIDU object classes**

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

Table 6. Object classes

<table>
<thead>
<tr>
<th>Object class</th>
<th>Description of object</th>
</tr>
</thead>
<tbody>
<tr>
<td>fsa</td>
<td>A definition for a PSF functional subsystem application</td>
</tr>
<tr>
<td>psf-fss</td>
<td>A definition for a PSF functional subsystem</td>
</tr>
</tbody>
</table>

**Where predicate**

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

The where predicate has this format:

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

A condition has this format:

```
[not] attribute operator value
```

- **not** Indicates that the evaluation of the condition is to be reversed.
- **attribute** Specifies the name of a single-valued attribute that is valid for the object class. Note that multi-valued attributes are not supported.
You can specify any attribute that is valid for the object class. You can also specify the attribute name to limit definitions by name.

**operator** Specifies one of the operators shown in Table 7.

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

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

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

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

**Table 7. Operators for attributes**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Operation</th>
<th>String values</th>
<th>Fixed values</th>
<th>Integer values</th>
</tr>
</thead>
<tbody>
<tr>
<td>=</td>
<td>Equal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>!=</td>
<td>Not equal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>&gt;</td>
<td>Match a value greater than the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>&lt;</td>
<td>Match a value less than the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Match a value less than or equal to the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>&gt;=</td>
<td>Match a value greater than or equal to the specified value</td>
<td>Yes¹</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>match</td>
<td>Match the specified regular expression</td>
<td>Yes¹</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

¹. A string value is evaluated using binary collation.

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

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

**or** The expression is true if either condition is true.

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

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

```
pidu -c 'list fsa where fsa-type=psf-tcip;'```
create and force-create—create an object in the Printer Inventory

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

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

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

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

Operands

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

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

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

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

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

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

Examples -- create and force-create

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

pidu -c 'create psf-fss PSFFSS
tcplp-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-tcplp
      form-definition = A10110
      location = "Bldg 3"
      page-definition = A08682
      printer-ip-address = 9.99.12.33;'

54 z/OS V1R8.0 Infoprint Server Printer Inventory for PSF
The attributes set in this definition are:

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

**Example -- delete**
This example deletes the FSA definition named PRT001:
```
pidu -c 'delete fsa PRT001;'
```

**display**—show attributes of an object in the Printer Inventory

**Format**
```
display objectclass name;
```

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

**Operands**
- **objectclass**: The class of the object that you want to display. Valid values are fsa and psf-fss.
- **name**: The name of the object. Names are case-sensitive, so be sure to use the correct uppercase and lowercase letters. Enclose the name in single or double quotation marks if the name contains special characters.

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

**Example -- display**
This example displays all attributes for an FSA definition:
```
pidu -c 'display fsa PRT001;'
```
dump—dump the Printer Inventory to a file

Format

dump  filename ;

Description

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

Operands

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

If the data set is an MVS data set, specify // before the file name. If you specify a fully-qualified data set name, also enclose the data set name in single quotation marks and specify a backslash before each single quotation mark. For example, if the output file is named USER1.MYFILE, enter:

//"USER1.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 recommends that you use RECFM=VB and LRECL=8192. However, other values might be suitable as well.
- To write the contents of the Printer Inventory to a file in a more readable format, or to back up the Printer Inventory, use the export command.

Examples -- dump

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

pidu -c 'dump inventory.dump;'

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

pidu -c "dump //"USER1.INVENT.DUMP";"

export—export objects in the Printer Inventory to a file

Format

export  filename [objectclass [where condition [and/ or condition]... ] ];

Description

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

The export command writes a create statement for each exported object to an output file. The output file does not need to exist. However, if the file already exists, the file is replaced.
Tip: Use the `export` command to back up the Printer Inventory. Do not use ordinary copy commands to create a backup copy of the Printer Inventory because the copy might contain inconsistent data.

Operands

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

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

`//"USERID.MYFILE"`

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

`//MYFILE`

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

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

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

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

Usage notes

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

Related information:

- “Back up the Printer Inventory” on page 28

Examples -- export

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

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

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

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

list—list names of objects in the Printer Inventory

Format

```
list objectclass [where condition [and|or condition]... ]
```
Description
The list command lists the names of all objects in a specified object class or only objects that meet certain criteria.

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

where condition [and|or condition...]
Conditions that can limit the objects that are listed. Only objects that meet the conditions are listed. If you omit the where predicate, all objects in the specified object class are listed.

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

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

Example -- list
Listing FSA definitions:
• This example lists all FSA definitions in the Printer Inventory:
  pidu -c 'list fsa;'
• This example lists FSA definitions for PSF printers that are TCP/IP-attached:
  pidu -c 'list fsa where fsa-type=psf-tcpip;'

modify—change attributes of an object in the Printer Inventory

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

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

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

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

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

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

Usage notes
• To remove an attribute, type null as the value for the attribute.
If you repeat the same attribute in a modify statement, PIDU uses the last specification.
You can use the list command with the modify command to modify all or selected objects in an object class.

Example -- modify
This example, entered as one command on the z/OS UNIX command line, lists selected FSA definitions and changes an attribute in those FSA definitions. This example uses these PIDU commands and the awk command:
1. The PIDU list command lists the names of all FSA definitions with form-definition=F1OLD.
2. These names are input to the awk program, which writes PIDU modify commands to modify the form-definition attribute.
3. The output from the awk program is input to the pidu command:

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

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

rename—rename an object in the Printer Inventory

Format
rename objectclass name newname ;

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

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

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

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

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

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

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

```bash
pidu -c 'rename fsa PRT001 PRT002;'
```
Attribute characteristics

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

Abbreviations

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

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

Default values

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

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

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

Single-valued and multi-valued attributes

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

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

Single-valued attributes: Single-valued attributes accept only one value. The syntax is:
attribute = value
attribute = "value with spaces"

Multi-valued attributes: Multi-valued attributes accept one or more values separated with spaces and enclosed in braces. Multi-valued attributes can contain a list of values or a value-map:
- A list assigns one or more values to the attribute. The syntax is:
  attribute = {value1 value2 value3}
Example:
resource-directories={/u/myuserid/truetype /u/myuserid/opentype}
- A value-map assigns one value to another. The syntax is:
attribute = {value1 -> value2 value3 -> value4}

Example:
input-tray-map = {top -> 1 bottom -> 2}

Types of values

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

Integer values

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

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

String values

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

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

Fixed values (enumerated values)

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

PSF FSA attributes

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

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

- [PSF for z/OS: Customization](#)
- [PSF for z/OS: AFP Download Plus](#)

PSF requires these attributes:
- applid (when fsa-type=psf-sna)
- form-definition
• fsa-type
• luname (when fsa-type=psf-sna)
• page-definition
• printer-ip-address (when fsa-type=psf-tcip or fsa-type=afp-download-plus)

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

ISPF field name
Acknowledgement level

Allowed values
You can enter one of these fixed values:

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

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

ISPF field name
Data set grouping

Allowed values
You can enter one of these fixed values:

yes    PSF groups output data sets into jobs. The AFP Download Plus receiver prints the data sets in the same job in sequence with one set of separator pages for the job.
no     PSF does not group output data sets into jobs (default). The AFP Download Plus receiver treats each data set as a separate job.

afdpdp-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 field is case-sensitive.

Default value
PSF uses directory /var/psf/.

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

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

**ISPF field name**  
Applid

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

blank-compression

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

**ISPF field name**  
Blank compression

**Allowed values**  
You can enter one of these fixed values:

- **yes**  
  PSF compresses blanks.
- **no**  
  PSF does not compress blanks (default).

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

capture-inline-resources

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

**ISPF field name**  
Capture inline resources

**Allowed values**  
You can enter one of these fixed values:

- **yes**  
  DPF captures inline resources.
- **no**  
  DPF does not capture inline resources (default).

cchannel-buffer-count

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

**ISPF field name**  
Channel buffer count
Allowed values
You can enter an integer from 1 to 10000. This value is multiplied by 32 KB (32768 bytes) to determine the total amount of reserved storage.

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

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

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

chars={GT12 GB12 GI12}

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

ISPF field name
Close libraries when idle
Allowed values
You can enter one of these fixed values:

yes PSF closes resource libraries.
no PSF does not close resource libraries (default).

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

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

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

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

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

**ISPF field name**
Com setup member

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

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

**ISPF field name**
Compression

**Allowed values**
You can enter one of these fixed values:

- **lzw** PSF uses the LZW compression algorithm to compress data.
- **none** PSF does not compress data (default).

**consolidate-im1-images**
This **single-valued** attribute specifies whether PSF consolidates a multiple-celled IM1 image into a single Image Object Content Architecture (IOCA) image.

**ISPF field name**
Consolidate IM1 images

**Allowed values**
You can enter one of these fixed values:

- **yes** PSF consolidates a multiple-celled IM1 image into a single IOCA image.
- **no** PSF converts a multiple-celled IM1 image to multiple IOCA images (default).

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

**ISPF field name**
Check CSE fit
**Allowed values**
You can enter one of these fixed values:

- no  PSF does not check to see whether the page fits 2 up on the sheet (default).
- first  PSF only checks the first page printed for a new copy group to see if it fits 2 up on the sheet.
- all  PSF checks front side of all pages to see if they fit 2 up on the sheet.

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

**ISPF field name**
CSE orientation

**Allowed values**
You can enter one of these fixed values:

- portrait  PSF generates portrait pages (default).
- landscape  PSF generates landscape pages.

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

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

**ISPF field name**
CSE preserve page position

**Allowed values**
You can enter one of these fixed values:

- yes  Page placement is preserved.
- no  Page placement is not preserved (default).

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

**ISPF field name**
CSE sheet eject

**Allowed values**
You can enter one of these fixed values:

- yes  PSF starts printing on a new sheet. PSF also starts printing on a new sheet whenever it does offset stacking. For example, when the form definition requests separation for a new copy group.
no  PSF starts printing on the next sheet or, in N_UP printing, on the next front-side partition. The next front-side partition might occur on the same sheet. This is the default.

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

ISPF field name
Default process mode

Allowed values
PSF ignores all values but these fixed values:

- **SOSI1** Each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control (default).
- **SOSI2** Each shift-out, shift-in code is converted to a Set Coded Font Local text control.
- **SOSI3** The shift-out code is converted to a Set Coded Font Local text control. The shift-in code is converted to a Set Coded Font Local text control and two blanks.
- **SOSI4** Each shift-out, shift-in code is skipped and not counted when calculating offsets for the print data set. SOSI4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC.

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

ISPF field name
Description

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

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).
dump-code

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

**ISPF field name**

*Dump: Code*

**Allowed values**

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

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

dump-message-id

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

**ISPF field name**

*Dump: Message ID*

**Allowed values**

You can enter a value in the format APSnnnt:

- **nnnn** Three to four digit message number
- **t** One of these type codes:
  - A Message requiring operator action
  - I Information message

eject-to-front-facing

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

**ISPF field name**

*Eject to front facing*

**Allowed values**

You can enter one of these fixed values:

- **none** Eject to front facing is not done (default).
- **job** Eject to front facing is done before the job-header page.
- **document** Eject to front facing is done between documents in a data set.
- **both** Eject to front facing is done before the job-header page and between documents.
end-sna-conversation

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

**ISPF field name**
End SNA conversation

**Allowed values**
You can enter one of these fixed values:

- yes  PSF ends the SNA LU1 conversation with the printer.
- no  PSF maintains the SNA LU1 conversation between print jobs (default).

error-disposition-supported

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

**ISPF field name**
Error disposition supported

**Allowed values**
You can enter one of these fixed values:

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

failure-action

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

**ISPF field name**
Failure action

**Allowed values**
You can enter one of these fixed values:

- stop  PSF must be restarted by an operator command.
- connect  PSF establishes a connection or waits for the printer (default).

form-definition

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

**ISPF field name**
Form definition

**Allowed values**
You can enter a valid combination of 1–8 letters (a-z, A-Z), numbers (0–9), and special characters (# $ @). Blanks and other special characters are not allowed. If a value contains special characters, enclose the value in quotation marks. Lowercase letters are converted to uppercase.
You can specify the form definition name with or without the F1 prefix. However, if the name of the form definition, without the F1 prefix, starts with F1, specify the full name. For example, F1F1USER.

**fsa-trace-dsname**

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

**ISPF field name**

FSA trace dsname

**Allowed values**

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

**fsa-type**

This single-valued attribute specifies the type of FSA.

**Allowed values**

You can enter one of these fixed values:

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

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

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

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

**global-overlay**

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

**ISPF field name**

Overlay

**Allowed values**

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

**goca-box-supported**

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

**ISPF field name**

GOCA Box Orders

**Allowed values**

You can enter one of these fixed values:

- **yes** The printer supports the orders.
- **no** The printer does not support the orders (default).
Usage guidelines
This attribute affects how line data is transformed to MO:DCA-P before it is sent to the AFP Download Plus receiver.

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

**ISPF field name**
GOCA Set Fractional Line Width orders

**Allowed values**
You can enter one of these fixed values:

- **yes** The printer supports the orders.
- **no** The printer does not support the orders (default).

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

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

**ISPF field name**
GOCA Set Process Color Orders

**Allowed values**
You can enter one of these fixed values:

- **yes** The printer supports the orders.
- **no** The printer does not support the orders (default).

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

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

**ISPF field name**
Highlight communications failure message

**Allowed values**
You can enter one of these fixed values:

- **yes** PSF highlights the communications failure message.
- **no** PSF does not highlight the communications failure message (default).
image-output-format

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

**ISPF field name**
Image output format

**Allowed values**
You can enter one of these fixed values:
- **ioca** Image data is in uncompressed Image Object Content Architecture (IOCA) format (default).
- **unchanged** Image data is in the same format as in the input document.

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

inhibit-recovery

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

**ISPF field name**
Inhibit recovery

**Allowed values**
You can enter one of these fixed values:
- **yes** Error recovery is inhibited and data is only resent if it has not printed.
- **no** Recovery is not inhibited and data is resent from the point of the error (default).

inline-bcoca-objects

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

**ISPF field name**
Bar code objects (BCOCA)

**Allowed values**
You can enter one of these fixed values:
- **yes** PSF includes BCOCA objects inline (default).
- **no** PSF does not include BCOCA objects inline.

inline-color-management-resources

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

**ISPF field name**
Color management resources
Allowed values
You can enter one of these fixed values:

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

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

- **none**: PSF does not include any CMRs inline. Specify this value if the CMRs reside on the receiving system.

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

**ISPF field name**
Font objects (FOCA)

**Allowed values**
You can enter one of these fixed values:

- **yes**: PSF includes FOCA objects inline (default).
- **no**: PSF does not include FOCA objects inline.

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

**ISPF field name**
Form definitions

**Allowed values**
You can enter one of these fixed values:

- **yes**: PSF includes form definitions inline (default).
- **no**: PSF does not include form definitions inline.

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

**ISPF field name**
Graphics objects (GOCA)

**Allowed values**
You can enter one of these fixed values:

- **yes**: PSF includes GOCA objects inline (default).
- **no**: PSF does not include GOCA objects inline.
**inline-ioca-objects**

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

**ISPF field name**

Image objects (IOCA)

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF includes IOCA objects inline (default).
- **no**: PSF does not include IOCA objects inline.

**inline-object-containers**

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

**ISPF field name**

Object containers

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF includes object containers inline (default).
- **no**: PSF does not include object containers inline.

**inline-overlays**

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

**ISPF field name**

Overlays

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF includes overlays inline (default).
- **no**: PSF does not include overlays inline.

**inline-page-segments**

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

**ISPF field name**

Page segments

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF includes page segments inline (default).
- **no**: PSF does not include page segments inline.
**inline-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**

Tray substitutions

**Allowed values**

One to four sets of values in the format: `input_tray -&gt; {simplex_tray duplex_tray}`:

- **input_tray**: An integer from 1–255 that identifies the tray specified for the job in the INTRAY JCL parameter, the **input-tray-number** job attribute, or the form definition PSF uses to print the job.
- **simplex_tray**: An integer from 1–255 that identifies the tray PSF is to use for jobs printed on a single side of the paper.
- **duplex_tray**: An integer from 1–255 that identifies the tray PSF is to use for jobs printed on both sides of the paper.

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

Enclose the entire values in braces. For example:

```
input-tray-substitutions = { 1 -&gt;{1 3} 2 -&gt; {2 4} }
```

In this example:

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

**Default value**

PSF does not use substitute tray numbers.

**Usage guidelines**

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

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

**ISPF field name**

Interrupt message page

**Allowed values**

You can enter one of these fixed values:

- **print**  An interrupt message page is printed (default).
- **suppress**  An interrupt message page is not printed.

**interrupt-message-page-copies**

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

**ISPF field name**

Interrupt message page: Copies

**Allowed values**

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

**ioca-replicate-trim-supported**

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

**ISPF field name**

IOCA replicate and trim function

**Allowed values**

You can enter one of these fixed values:

- **yes**  The printer supports the function.
- **no**  The printer does not support the function (default).

**Usage guidelines**

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

**issue-intervention-messages**

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

**ISPF field name**

Issue intervention messages

**Allowed values**

You can enter one of these fixed values:

- **yes**  Intervention messages are displayed.
no Intervention messages are not displayed.

**Default value**
Intervention messages are not displayed.

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

**ISPF field name**
Issue setup messages

**Allowed values**
You can enter one of these fixed values:

- **none**  Do not display setup messages (default).
- **burst**  Display setup messages for the BURST setup parameter.
- **forms**  Display setup messages for the FORMS setup parameter.
- **all**  Display setup messages for both BURST and FORMS setup parameters.

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

**ISPF field name**
Label data pages

**Allowed values**
You can enter one of these fixed values:

- **yes**  The security label determined by SECLABEL is printed.
- **no**  The security label is not printed.

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

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

**ISPF field name**
Label separator pages

**Allowed values**
You can enter one of these fixed values:

- **yes**  The security label determined by SECLABEL is printed.
- **no**  The security label is not printed.
Default value
If this attribute is not specified, PSF sets the value to yes if PSFMPL is active (default) or to no if PSFMPL is not active. For more information, see PSF for z/OS: Security Guide.

location
This single-valued attribute lets you specify the location of the printer or the AFP Download Plus receiver. The location can help users find printers or AFP Download Plus receivers.

ISPF field name
Location

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

Default value
None.

Usage guidelines
If you use the same format to specify the location in all FSA definitions (for example: Bldg 3/Col 2), users can find all printers or AFP Download Plus receivers with similar locations, such as all printers in building 3.

logmode
This single-valued attribute specifies the name of the VTAM logon-mode table entry, which defines the session parameters for an SNA-attached printer.

ISPF field name
Logmode

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

luname
This single-valued attribute specifies the unique, logical-unit name of an SNA-attached printer.

ISPF field name
LU name

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

map-to-outline-fonts
This single-valued attribute specifies whether PSF maps fonts to outline fonts.
**ISPF field name**  
**Map to outline fonts**

**Allowed values**  
You can enter one of these fixed values:

- **yes**  
  PSF uses system and user mapping tables to map fonts to corresponding outline fonts.

- **no**  
  PSF does not map fonts to outline fonts (default).

**Usage guidelines**  
Specify `map-to-outline-fonts=yes` if your printer supports outline fonts, you have existing applications that use raster fonts, and you want to use outline fonts without changing the applications.

**mark-interrupt-message-page**  
This **single-valued** attribute specifies whether PSF marks the interrupt message page with form marks.

**ISPF field name**  
**Interrupt message page: Mark page**

**Allowed values**  
You can enter one of these fixed values:

- **yes**  
  PSF marks the interrupt message page with form marks.

- **no**  
  PSF does not mark the interrupt message page (default).

**mcf-name**

This **single-valued** attribute specifies how PSF builds the Map Coded Font (MCF) Format 2 structured field in the data it sends to the AFP Download Plus receiver.

**ISPF field name**  
**Map Coded Font (MCF) Format 2 Name**

**Allowed values**  
You can enter one of these fixed values:

- **coded-font**  
  PSF uses the name of the coded font to build the MCF structured field. Specify this value for documents that contain double-byte character set (DBCS) fonts.

- **codepage-character-set**  
  PSF uses the names of the code page and character set to build the MCF structured field (default).

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

**message-count-before-dump**  
This **single-valued** attribute specifies the number of times the message specified by the `dump-message-id` attribute is sent before PSF produces a conditional dump.
**ISPF field name**

**Dump: Count**

**Allowed values**
You can enter an integer from 1 (default) to 99.

**name**

This single-valued attribute specifies the name of the FSA. This name must be a unique name in the Printer Inventory and it must match the name on the JES initialization statement.

**Note:** This is a non-settable attribute. Do not specify the `name` attribute on the PIDU `create`, `force-create`, or `modify` command. Instead, specify the name as an operand on the command. However, you can specify the `name` attribute when you construct a condition for the `where` predicate on the `list` and `export` commands.

**ISPF field name**

**FSA name**

**Allowed values**
None.

**no-response-action**

This single-valued attribute specifies what action PSF takes when the time specified by the `response-timeout` attribute expires and a response has not been received from the SNA-attached or TCP/IP-attached printer.

**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 from the printer.
- **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 from the printer.
- **notify-operator** PSF sends a message to the system operator and to JES indicating that an expected response was not received from the printer.
- **terminate** PSF stops the printer FSA.

**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 before time expires.

This attribute is used when `no-response-action=notify-user`.

**ISPF field name**

**No response action: Notify**

**Allowed values**
Specify the value in the format `node.userid:`
node  The node associated with the user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. Lowercase letters are converted to uppercase.

The node is required.

userid  The user ID. Specify from 1–8 alphanumeric or national ($, #, @) characters. The first character must be alphabetic or national. Lowercase letters are converted to uppercase.

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.

**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 field must match the TCP/IP port number in the printer or the AFP Download Plus receiver.

ISPF field name
Port number

**Allowed values**
You can enter an integer from 1 to 65535. The default is 5001.

**print-error-messages**

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

ISPF field name
Print error messages

**Allowed values**
You can enter one of these fixed values:

- **yes** PSF prints or saves error messages until an error occurs that ends processing (default).
- **no** PSF does not print or save error messages unless an error occurs that ends processing. If that happens, only the message group describing the last error is printed or saved.

**print-error-messages-maximum**

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

ISPF field name
Print error messages: Maximum messages

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

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

**ISPF field name**

Print error reporting

**Allowed values**

You can enter one of these fixed values:

- **none**: Do not report any character or position errors (default).
- **all**: Report all character and position errors.
- **character**: Report only character errors.
- **position**: Report only position errors.

printer-acquire-interval

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

**ISPF field name**

Acquire interval

**Allowed values**

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

printer-connect-interval

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

**ISPF field name**

Connect interval

**Allowed values**

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

**Default value**

For channel-attached and SNA-attached printers, if this field is 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**

You can specify the IP address in dotted-decimal format (nnnn.nnnn.nnnn.nnnn) or you can specify the host name. Specify a valid combination of 1–40 letters (a-z, A-Z), numbers (0–9), and special characters (such as # $ @ — = /). Blanks are not allowed. If the value contains special characters, enclose the value in quotation marks.

printer-management-mode

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

**ISPF field name**

**Management mode**

**Allowed values**

You can enter one of these fixed values:

- **immediate**: PSF starts a communication session with the printer immediately and then looks for output available on the JES spool.
- **dialin**: PSF starts a session with the printer when the switched line is connected.
- **outavail**: PSF starts a communication session with the printer only when output is available on the JES spool (default).

printer-release-interval

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

**ISPF field name**

**Release interval**

**Allowed values**

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

printer-release-mode

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

**ISPF field name**

**Release mode**

**Allowed values**

You can enter one of these fixed values:

- **idle**: PSF releases the printer when a request to release has been received and the time specified by the printer-release-interval attribute has expired with no output on the spool for the printer.
time  PSF starts the timer for the release interval when a release request is received, even when there is more output on the spool.
none  PSF does not release the printer (default).

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

ISPF field name
Prune double-byte fonts

Allowed values
You can enter one of these fixed values:
yes  PSF prunes double-byte raster fonts (default).
no   PSF does not prune double-byte fonts.

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

ISPF field name
Prune single-byte fonts

Allowed values
You can enter one of these fixed values:
yes  PSF prunes single-byte raster fonts (default).
no   PSF does not prune single-byte fonts.

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

ISPF field name
Send default character

Allowed values
You can enter one of these fixed values:
yes  PSF passes the default character information to the printer.
no   PSF does not pass the default character information to the printer (default).

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

ISPF field name
Recover from font not found

Allowed values
You can enter one of these fixed values:
yes  PSF should do library queries to make sure the mapped font exists before loading it.
no  PSF does not need to make sure that the mapped font exists (default).

**Usage guidelines**

- Specify `recover-from-font-not-found=yes` if your printer supports outline fonts, you have requested that PSF map to outline fonts, and you do not want pages in your job ended because the outline font identified through the mapped font did not exist on the host.
- When you specify `recover-from-font-not-found=yes`, the performance of PSF is degraded because of additional library queries for every mapped font resource.

**release-ds-when-repositioning**

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

**ISPF field name**

Release data set when repositioning

**Allowed values**

You can enter one of these fixed values:

- **yes**  PSF releases the data sets when repositioning. The data sets might be reselected in a different order.
- **no**   PSF retains data sets during repositioning (default).

**resolution**

This single-valued attribute specifies the resolution at which the output was formatted. PSF uses this value to choose the associated resolution system library that has previously been defined by the system programmer.

**ISPF field name**

Resolution

**Allowed values**

You can enter one of these fixed values:

- **240**   The data was formatted with resources at 240 pels per inch.
- **300**   The data was formatted with resources at 300 pels per inch.

**Default value**

PSF uses the default system library.

**Usage guidelines**

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

**response-timeout**

This single-valued attribute specifies maximum number of seconds PSF should wait for a response from an SNA-attached or TCP/IP-attached printer.

**ISPF field name**

Response timeout

**Allowed values**

You can enter an integer from 0 (default) to 86400.
restrict-printable-area

This single-valued attribute specifies whether an area on each page of printed output is reserved for the security label.

**ISPF field name**
Restrict printable area

**Allowed values**
You can enter one of these fixed values:

- **yes**: An area on each page is reserved for the security label.
- **no**: An area is not reserved for the security label.

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

retained-fonts

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

**ISPF field name**
Retained fonts

**Allowed values**
You can enter a value from 0 to 32767. The default value depends on the type of printer and the amount of storage available in the printer.

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

retained-form-definitions

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

**ISPF field name**
Retained form definitions

**Allowed values**
You can enter a value from 0 to 32767. The default value is 6.

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

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

**ISPF field name**
Retained object containers

**Allowed values**
You can enter a value from 0 to 32767.

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

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

**retained-page-definitions**

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

**ISPF field name**
Retained page definitions

**Allowed values**
You can enter a value from 0 to 32767. The default value is 6.

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

**retained-page-segments**

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

**ISPF field name**
Retained page segments

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

**Usage guidelines**
- When PSF retains page segments, PSF does not need to reload the same page segments for subsequent jobs. However, retaining page segments requires additional printer storage.
save-printer-information

This **single-valued** attribute requests that PSF save information about the printer, including the printer's model and supported features. PSF saves the information in a data set specified in the PSF startup procedure each time the printer is started and each time the printer's configuration changes. This information can help IBM diagnose problems.

**ISPF field name**
Save printer information

**Allowed values**
You can enter one of these fixed values:
- **yes**: PSF saves printer information.
- **no**: PSF does not save printer information.

**Default value**
PSF V3R4 uses a default value of **no**. PSF V4R1 and higher uses a default value of **yes**.

**Usage guidelines**
This attribute is equivalent to the PRTINFO keyword of the PRINTDEV statement.

secure-transmission

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

**ISPF field name**
Secure transmission

**Allowed values**
You can enter one of these fixed values:
- **yes**: PSF encodes data (default).
- **no**: PSF does not encode data.

send-messages-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.
**set-3800-dataset-header-origin**

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

**ISPF field name**

Set media origin to 3800 origin for: Data set header

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF sets the data set header media origin to the top left corner.
- **no**: PSF does not set the data set header media origin to the top left corner (default).

**set-3800-dataset-origin**

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

**ISPF field name**

Set media origin to 3800 origin for: Data set

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF sets the data set media origin to the top left corner.
- **no**: PSF does not set the data set media origin to the top left corner (default).

**set-3800-job-header-origin**

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

**ISPF field name**

Set media origin to 3800 origin for: Job header

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF sets the job header media origin to the top left corner.
- **no**: PSF does not set the job header media origin to the top left corner (default).

**set-3800-job-trailer-origin**

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

**ISPF field name**

Set media origin to 3800 origin for: Job trailer

**Allowed values**

You can enter one of these fixed values:

- **yes**: PSF sets the job trailer media origin to the top left corner.
- **no**: PSF does not set the job trailer media origin to the top left corner (default).
set-3800-messages-origin

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

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

**Allowed values**
You can enter one of these fixed values:

- **yes**: PSF sets the message data set media origin to the top left corner.
- **no**: PSF does not set the message data set media origin to the top left corner (default).

snmp-reporting

This single-valued attribute specifies whether PSF supplies printer status information to the z/OS Simple Network Management Protocol (SNMP) agent.

**ISPF field name**
SNMP reporting

**Allowed values**
You can enter one of these fixed values:

- **yes**: SNMP reporting is done.
- **no**: SNMP reporting is not done (default).

suppress-copy-marks

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

**ISPF field name**
Suppress copy marks

**Allowed values**
You can enter one of these fixed values:

- **yes**: Copy marks are not printed and offset stacking is not done.
- **no**: Copy marks are printed and offset stacking is done if requested in the COPYMARK parameter (default).

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

trace-mode

This single-valued attribute specifies the type of tracing that is started during FSA initialization. If the FSA has already started, a new trace mode takes effect the next time the FSA starts.

**ISPF field name**
Trace mode
Allowed values
You can enter one of these fixed values:

- none  No tracing is started during PSF initialization.
- internal An internal trace is started (default).
- ipds An external trace containing only IPDS™ data is started. An internal trace is also started.
- limit An external trace like the full trace is started. However, information in some data buffers is truncated. An internal trace is also started.
- sync An FSA SYNC external trace is started. An internal trace is also started.
- no-printing PSF ignores this value and starts only an internal trace.
- full An FSA full external trace is started. An internal trace is also started.

trace-table-size
This single-valued attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table.

**ISPF field name**
**Trace table size**

**Allowed values**
You can enter an integer from 1 to 999. The default is 32.

PSF FSS attributes
This topic lists the attributes that are valid when you create PSF FSS definitions, which are in object class psf-fss.

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

**ISPF field name**
**Description**

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

**Default value**
None.

name
This single-valued attribute specifies the name of the FSS definition.

**Note:** This is a non-settable attribute. Do not specify the name attribute on the PIDU create, force-create, or modify command. Instead, specify the name
as an operand on the command. However, you can specify the name attribute when you construct a condition for the where predicate on the list and export commands.

**ISPF field name**
- FSS name

**Allowed values**
- None.

**Default value**
- None.

**nst-trace-dsname**
- This single-valued attribute specifies the name of the data set that PSF directs a notify subtask (NST) trace to. This name must be different than the data set name PSF directs an FSA external trace to. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

**ISPF field name**
- NST trace dsname

**Allowed values**
- You can enter a valid data set name.

**Default value**
- None.

**Usage guidelines**
- An NST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.

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

**ISPF field name**
- TCP/IP job name

**Allowed values**
- You can enter a valid job name. The letters you type are converted to uppercase.

**Default value**
- TCPIP

**trace-prompt**
- This single-valued attribute specifies whether the operator is prompted with message APS620A each time the FSS starts. Prompting lets the operator start tracing all FSAs before the FSA starts processing any data sets. For complete details about this attribute, see *PSF for z/OS: Diagnosis*.

**ISPF field name**
- Trace prompt
Allowed values
You can enter one of these fixed values:

- **yes** The operator is prompted when the FSS starts.
- **no** The operator is not prompted.

**Default value**
no

**trace-table-size**
This **single-valued** attribute specifies a number that indicates how many 4 KB pages of storage are allocated for the PSF FSA trace table. This allocation occurs only if the **trace-mode** attribute is **internal**, **ipds**, **limit**, **full**, or **sync**. For complete details about this attribute, see [PSF for z/OS: Diagnosis](#).

**ISPF field name**
Trace table size

**Allowed values**
You can enter an integer from 1 to 999.

**Default value**
32

**unicode-enabled**
This **single-valued** attribute specifies whether PSF is Unicode-enabled for TrueType and OpenType fonts. When PSF is Unicode-enabled, you can use TrueType and OpenType fonts, and these interfaces are enabled: Unicode encoding transform, UNIX System Services C, and file system.

**ISPF field name**
Unicode enabled

**Allowed values**
You can enter one of these fixed values:

- **yes** PSF is Unicode-enabled.
- **no** PSF is not Unicode-enabled.

**Default value**
no
Chapter 6. Using the Infoprint Server migration program

The Infoprint Server migration program for PSF (aopmig) copies configuration information in PSF startup procedures to PSF FSS and FSA definitions in the Printer Inventory. You can use the migration program to create initial PSF FSS and FSA definitions in the Printer Inventory. After you use the migration program, you can use the Infoprint Server ISPF panels or PIDU to create new FSS and FSA definitions or to edit the FSS and FSA definitions that the migration program created.

Limitation: The migration program does not examine the PSF Exit 7 initialization (INIT) call. Therefore, if your installation has written a PSF Exit 7 INIT call, you might need to edit the PSF FSA definitions that the migration program creates in the Printer Inventory to specify these fields:

- Default process mode
- Issue intervention messages
- Map to outline fonts
- Recover from font not found

Note: PTF UA38345 adds support to the migration program to migrate parameters specified in the AFPARMS control statement. (The AFPARMS control statement can be specified in an AFP Download Plus startup procedure.) It also adds support to migrate additional configuration information specified in the PRINTDEV statement of the PSF startup procedure. The PTF adds support for the following ISPF 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)
- 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)
- Recover from font not found (recover-from-font-not-found)
- Resources Included Inline:
  - Bar code objects (inline-bcoca-objects)
  - 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)
- TrueType fonts (inline-truetype-fonts)
- Color management resources (inline-color-management-resources)

- Save printer information (save-printer-information)
- Secure transmission (secure-transmission)
- Unicode enabled (unicode-enabled)
- 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 topics describe how to diagnose problems with the Printer Inventory for PSF:

- "Submitting APARs"
- "Tracing Infoprint Server"
- "Using database diagnostic tools" on page 103
- "Finding abend information, system dumps, and messages" on page 103
- "Checking permissions settings" on page 104

Submitting APARs

Report any difficulties using Infoprint Server to your IBM Support Center. If an APAR is required, the Support Center can tell you where to send the required diagnostic information. When submitting an APAR, use this component ID: 5647A01OP.

Tracing Infoprint Server

The service representative in the IBM Support Center might ask you to run a trace to aid in diagnosing a problem. If so, the representative will tell you how and where to send the trace information. You do not have to interpret the trace. Send it to your service representative.

Environment variables for tracing

These environment variables control tracing:

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

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

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

**Default:** The environment variable is not set.

**Examples:**

- AOPTRACEON=1
- AOPTRACEON=YES

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

Set this environment variable in the *aopstart* EXEC.

**Default:** base-directory/trace

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

**Example:** AOPTRACEDIR=/mydirectory/trace
Turning tracing on

You turn tracing on by setting the AOPTRACEON environment variable. This topic shows how to set the AOPTRACEON environment variable in an STDENV data set that the AOPSTART JCL procedure points to.

Tracing slows performance considerably. You should turn tracing on for only as long as necessary to capture the error.

Tip: To find out if the AOPTRACEON environment variable is set in the z/OS UNIX shell, use the z/OS UNIX export and grep commands to look at the value of the AOPTRACEON variable:

```
export | grep AOPTRACEON
```

Result:
- If AOPTRACEON is not set, the export and grep commands do not return any output.
- If AOPTRACEON is set, the export and grep commands return the AOPTRACEON value or AOPTRACEON="".

To turn tracing on:

1. Specify the AOPTRACEON environment variable in the STDENV data set of the AOPSTART JCL procedure:
   a. Create an MVS data set, such as TRACE.ENV, with these DCB attributes:
      - RECFM=VB
      - LRECL=255

   b. In the data set, specify the AOPTRACEON variable. Start in the first column, and do not code any blank characters in the string or at the end of the line:
      `AOPTRACEON=1`

   c. Specify the TRACE.ENV data set in the AOPSTART JCL procedure:
      `///STDENV DD DSN=TRACE.ENV,DISP=SHR`

2. (Optional) Change the name of the trace directory in the AOPTRACEDIR environment variable in the aopstart EXEC. The AOPADMIN group must have permission to write to the specified trace directory.

3. Enter the MVS START command to run the AOPSTOP JCL procedure to stop Infoprint Server:
   `START AOPSTOP`

4. Enter the MVS START command to run the AOPSTART JCL procedure to restart Infoprint Server:
Turning tracing off
You turn tracing off by unsetting the AOPTRACEON environment variable. This topic 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
   ```

Finding the trace file
The trace facility creates a separate trace file for each Infoprint Server process traced:
- Infoprint Server daemon trace files are named:
  ```
  userid.daemon_name.process_id.uniqueidentifier.tracefile#
  ```
  For example:
  ```
  MACBETH.aopd.pid66297.BA71F05F29707301.1
  ```
- Infoprint Server command trace files (for example, the trace file for the `pidu` command) are named:
  ```
  userid.process_id.uniqueidentifier.tracefile#
  ```
  For example:
  ```
  MACBETH.pid50397251.BA71F08C5514A644.1
  ```

The variables in the trace file names are:
- `userid`:
  - The TSO user ID of the person who initiated the trace.
- `daemon_name`:
  - The name of the daemon being traced, if applicable.
The ID of the process created in z/OS UNIX to create the trace.

unique identifier
The time the trace was created. This value is the result of the Store Clock (STCK) processing instruction. The value is displayed as a character string in hexadecimal format.

tracefile#
The number of the trace file.

Tracing ISPF panels
You can trace the processing in the Infoprint Server ISPF panels during an interactive ISPF session. Tracing is usually used only for short periods of time to diagnose problems and collect information to forward to your service representative at the IBM Support Center.

Infoprint Server writes the ISPF trace to a separate UNIX file for each ISPF session. If you turn tracing on and off during the same ISPF session, the Infoprint Server appends trace records to the UNIX file. Infoprint Server creates the trace file in directory /var/Printsrv/trace unless you specify a different directory name when you start the trace. The name of the trace file that Infoprint Server creates is userid.process_ID:

userid
Specifies the TSO user ID of the person who initiated the ISPF session.

process_ID
Specifies the ID of the UNIX process that is started for the ISPF panel session.

To trace ISPF panels:
1. On the Infoprint Server: Printer Inventory Manager panel, select 7 Configure.

2. On the Configuration panel:
   a. Select the Trace Printer Inventory ISPF internals field.
   b. Specify the fully qualified name of an existing directory. To return to the default directory, clear the ISPF trace directory field.
   c. To save the trace option and name of the directory, and exit the panel, press the END function key or enter END on the command line.

3. When you are done tracing, turn tracing off by deselecting the Trace Printer Inventory ISPF internals field. Tracing remains on during your next Infoprint Server ISPF session unless you turn tracing off.
Using database diagnostic tools

You can use the `pidu` command to write the definitions in the Printer Inventory to a file. The `pidu` dump command writes to a UNIX file or to an MVS data set. It does not write to `stdout`.

To dump all the PSF FSS and PSF FSA definitions in the Printer Inventory to the file you specify, enter this command on the z/OS UNIX command line:

`pidu -c 'dump filename;'

Example:

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

Note: The service representative in the IBM Support Center might ask you to set the AOPDUMPON environment variable to capture more detailed dump information for an internal error. If so, the representative will tell you how and where to set the variable, and where to send the dump information.

Related information:

- [Chapter 5, “Using the Printer Inventory Definition Utility (PIDU),” on page 47](#)

Finding abend information, system dumps, and messages

This topic shows, in general, where to find abend information, system dumps, and messages that the IBM service representative might ask you to locate. The exact locations depend on your particular installation.

Table 8 shows where to find the abend information and system dumps that the IBM service representative might ask you to locate. However, dumps might not be available if Dump Analysis and Elimination (DAE) suppressed them.

Table 9 on page 104 shows where to find the messages that the IBM service representative might ask you to locate.

<table>
<thead>
<tr>
<th>General location of abend information and system dumps</th>
<th>Areas and conditions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Console log</td>
<td>All Infoprint Server components.</td>
<td></td>
</tr>
<tr>
<td><code>/var/Printsrv</code> directory</td>
<td>This is the default base directory for Infoprint Server.</td>
<td>Your installation might have specified a different base directory in the <code>base-directory</code> attribute in the Infoprint Server configuration file, <code>aopd.conf</code>.</td>
</tr>
<tr>
<td>The current working directory</td>
<td>You entered a z/OS UNIX command.</td>
<td>For example, you entered the <code>pidu</code> command.</td>
</tr>
<tr>
<td>The home directory</td>
<td>You ran the AOPBATCH program.</td>
<td></td>
</tr>
</tbody>
</table>

Chapter 7. Diagnosing errors in the Printer Inventory for PSF 103
Table 8. General location of abend information and system dumps (continued)

<table>
<thead>
<tr>
<th>General location of abend information and system dumps</th>
<th>Areas and conditions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Language Environment CEEDUMP directory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language Environment writes CEEDUMPs to one of these directories, in the specified order:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The directory found in the _CEE_DMPTARG environment variable, if found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The current working directory, if the directory is not the root directory (/) and if the Language Environment can write to the directory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The directory found in the TMPDIR environment variable, which indicates the location of a temporary directory if it is not /tmp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The /tmp directory</td>
<td>You can specify the _CEE_DMPTARG and TMPDIR environment variables in these locations:</td>
<td></td>
</tr>
<tr>
<td>For more information about CEEDUMPs, see z/OS Language Environment Debugging Guide</td>
<td>• The apostart EXEC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Your .profile or the /etc/profile file, if you entered a z/OS UNIX command</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The data set indicated in the STDENV DD statement for the AOPBATCH program</td>
<td></td>
</tr>
</tbody>
</table>

Table 9. General location of messages

<table>
<thead>
<tr>
<th>Component</th>
<th>General location of messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>All components</td>
<td>Console log</td>
</tr>
<tr>
<td>ISPF panels</td>
<td>Messages displayed on ISPF panel</td>
</tr>
</tbody>
</table>

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:
- Is -E /usr/lpp/Printsrv/bin
Figure 5 and Figure 6 on page 106 show sample output from the commands. The sample output shows the normal permissions settings of Infoprint Server directories and the files that user ID 0 should own. If you specified the AOPOPER and AOPADMIN groups in aopsetup, your output from the commands should look similar to the sample output.

In the sample output:

- OMVSKERN is the owner ID. This name might be different in your installation.
- OMVSGRP is the group ID. This name might be different in your installation.
- AOPOPER is the RACF group for operators.
- AOPADMIN is the RACF group for administrators.

**Rule:** The owner ID must have a UID of 0 (root). The `-n` option on the `ls` command shows the UID of the owner ID.

```
drwxr-xr-x  2 OMVSKERN OMVSGRP 1376  ...  IBM
-rwx------- --s- 2 OMVSKERN OMVSGRP 20480  ...  aopcstart
-rwx------ a---- 2 OMVSKERN AOPADMIN 483328  ...  aopd
-rwx------- a-s- 2 OMVSKERN OMVSGRP 1531904  ...  aopipdxc
-rwx------- --s- 2 OMVSKERN OMVSGRP 802816  ...  aoplogd
-drwxr-xr-x  2 OMVSKERN AOPADMIN 1372160  ...  aoplogu
-rwx------- a-s- 2 OMVSKERN OMVSGRP 311296  ...  aopmig
-rwx------- a-s- 2 OMVSKERN OMVSGRP 13941  ...  aopstart
-rwx------- a-s- 2 OMVSKERN OMVSGRP 704512  ...  aopsubd
-rwx------- a-s- 2 OMVSKERN OMVSGRP 4710  ...  aopsetup
-rwx------- a-s- 2 OMVSKERN OMVSGRP 1257472  ...  aopsmmd
-rwx------- a-s- 2 OMVSKERN OMVSGRP 950272  ...  aopssid
-rwx------- a-s- 2 OMVSKERN AOPPER 13941  ...  aopstart
-rwx------- a-s- 2 OMVSKERN OMVSGRP 512000  ...  aopxfd
-rwx------- a-s- 2 OMVSKERN OMVSGRP 3194880  ...  cancel
-rwxr-xr-x  2 OMVSKERN OMVSGRP 2224128  ...  filter
-rwxr-xr-x  2 OMVSKERN AOPADMIN 1523712  ...  hinvu
-rwxr-xr-x  2 OMVSKERN OMVSGRP 3203072  ...  lp
-rwxr-xr-x  2 OMVSKERN OMVSGRP 3272704  ...  lpsstat
-rwxr-xr-x  2 OMVSKERN AOPADMIN 3391488  ...  pidu
-rwxr-xr-x  2 OMVSKERN OMVSGRP 2223  ...  remotexf
-rwxr-xr-x  2 OMVSKERN AOPADMIN 1576960  ...  sdbu
```

*Figure 5. Sample output from command ls -E /usr/lpp/Printsrv/bin*
Figure 6. Sample output from command ls -nE /usr/lpp/Printsrv/bin

drwxr-xr-x 2 0 1 1376 IBM
-rwx------ --s- 2 0 1 20480 aopcsstart
-rwx------- a-- 2 0 4000 483328 aoppd
-rwx------- a-- 2 0 1 626688 aophinvd
-rwx------- a-- 2 0 1 1531904 aopipdpdxp
-rwx------- --s- 2 0 1 802816 aoplogd
-rwxr-x--- --s- 2 0 4000 1372160 aoplogu
-rwx------- a-- 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-- 2 0 1 212992 aopnetd
-rwxr-xr-x a-- 2 0 1 3362816 aopoms
-rwx------- a-- 2 0 1 2195456 aopoutd
-rwsr-xr-x --s- 2 0 1 2453504 aopsapd
-rwx------- --s- 2 0 1 3620864 aopsdbd
-rwxr-xr-x --s- 2 0 1 4710 aopsetup
-rwx------- --s- 2 0 1 1257472 aopsmnpd
-rwx------- a-- 2 0 1 950272 aopssid
-rwsr-xr-x --s- 2 0 4001 13941 aopstart
-rwxr-xr-x --s- 2 0 4001 1490944 aopstop
-rwx------- a-- 2 0 1 704512 aopsubd
-rwx------- a-- 2 0 1 376832 aopwsmd
-rwx------- --s- 2 0 1 512000 aopxfd
-rwxr-xr-x a-- 2 0 1 3194880 cancel
-rwxr-xr-x a-- 2 0 1 2224128 filter
-rwxr-x--- ---s- 2 0 4000 1523712 hinvu
-rwxr-xr-x a-- 2 0 1 3203072 lp
-rwxr-xr-x a-- 2 0 1 3272704 lpsstat
-rwxr-xr-x ---s- 2 0 4000 3391488 pidu
-rwxr-xr-x a-- 2 0 1 2223 remotexf
-rwxr-xr-x ---s- 2 0 4000 1576960 sdbu

Figure 7. Sample output from command ls -E /usr/lpp/Printsrv/lib

drwxr-xr-x 2 OMVS KERN OMVSGRP 928 IBM
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 4022272 aop.so
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 3526656 aoppapi.dll
-rwxr-xr-x -ps- 2 OMVS KERN OMVSGRP 3987912 aopcentral.so
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 352256 aopcop.dll
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 987136 aopdb.so
-rwxr-xr-x -ps- 2 OMVS KERN OMVSGRP 2023424 aoppeapi.dll
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 16384 aopfiltr.so
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 229376 aopform.dll
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 1097728 aoprxf.so
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 290816 itm_client.so
-rwxr-xr-x -ps- 2 OMVS KERN OMVSGRP 19962 libaopapi.a
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 3158016 libaopjnixp.so
-rwxr-xr-x -ps- 2 OMVS KERN OMVSGRP 4132864 libipa.so
-rwxr-xr-x aps- 2 OMVS KERN OMVSGRP 24576 lpd_compat.so
<table>
<thead>
<tr>
<th>Mode</th>
<th>User</th>
<th>Group</th>
<th>Size</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>drwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>928</td>
<td>IBM</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>402272</td>
<td>aop.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>3526656</td>
<td>aopapi.dll</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>3878912</td>
<td>aopcentral.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>352256</td>
<td>aopcop.dll</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>987136</td>
<td>aopdb.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>2023424</td>
<td>aopeapi.dll</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>16384</td>
<td>aopfiltr.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>229376</td>
<td>aoprform.dll</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>1097728</td>
<td>aoprxf.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>290816</td>
<td>itm_client.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>19962</td>
<td>libaopapi.a</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>3158016</td>
<td>libaopjni.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>4132864</td>
<td>libipa.so</td>
</tr>
<tr>
<td>-rwxr-xr-x</td>
<td>2</td>
<td>0</td>
<td>24576</td>
<td>lpd_compat.so</td>
</tr>
</tbody>
</table>

Figure 8. Sample output from command `ls -nE /usr/lpp/Printsrv/lib`

**Related information:**
- ["Running aopsetup" on page 15](#)
Appendix A. Infoprint Server ISPF panels

This topic shows the Infoprint Server ISPF panels for the Printer Inventory for PSF. You use these ISPF panels to define PSF functional subsystems (FSSs) and functional subsystem applications (FSAs) in the Printer Inventory.

PSF FSS definition

This is the ISPF panel you use to create a PSF FSS definition.

```
PSF FSS
FSS name . . . _____
Description : _________________________________ (extend)
TCP/IP job name . . _____
NST trace dsname . . _____
Trace table size . . 32
  Trace prompt
  Unicode enabled
```
PSF FSA definition for a channel-attached printer

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

**PSF FSA, Channel**

**FSA Name**

**Description**

**Location**

**Processing Information:**

- Blank compression
- Consolidate IM1 images
- Inhibit recovery
- SNMP reporting
- Close libraries when idle
- Release data set when repositioning
- Suppress copy marks
- CSE sheet eject
- CSE preserve page position

**Check CSE fit**

- 1. None
- 2. First
- 3. All

**CSE orientation**

- 1. Portrait
- 2. Landscape

**Eject to front facing**

- 1. None
- 2. Job
- 3. Document
- 4. Both

**Offset stacking**

- 1. None
- 2. Data set
- 3. Job

**Default process mode**

**Resolution**

(extend)

(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

1. None
2. Job
3. Data set
4. Document
5. Both

Maximum messages

16 (0-999)

Print error reporting

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. 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 . . ___ (1-99)
  Trace:
    Trace mode . . . . . 2. None 3. Internal 4. Sync
    Trace table size . . ___ (1-999)
    FSA trace dsname . ____________________________________________
    _ Save printer information

3800 Compatibility:
  _ Override default font
Set media origin to 3800 origin for:
  _ Data set
  _ Data set header
  _ Job header
  _ Job trailer
  _ Message data set
PSF FSA definition for a TCP/IP-attached printer

This is the ISPF panel you use to create a PSF FSA definition for a TCP/IP-attached printer.

```
PSF FSA, TCP/IP
FSA Name. . .
Description : ____________________________ (extend)
Location . . . ____________________________ (extend)

Processing Information:
  _ Blank compression
  _ Consolidate IM1 images
  _ Inhibit recovery
  _ SNMP reporting
  _ Close libraries when idle
  _ Capture inline resources
  _ Release data set when repositioning
  _ Suppress copy marks
  _ Issue intervention messages
  _ Highlight communications failure message
  _ CSE sheet eject
  _ CSE preserve page position
Check CSE fit . . . . . . = 1. No 2. First 3. All
CSE orientation . . . . = 1. Portrait 2. Landscape
Issue setup messages. . . = 1. None 2. Burst 3. Forms 4. All
Offset stacking . . . . = 1. None 2. Data set 3. Job
Default process mode . . .________
Resolution . . . . . . . = (240, 300)

Resources:
  Form definition. . ______
  Page definition. . ______
  Character sets . . ______
  Color map. . . . . . . ______
  Com setup member . ______
  Overlay. . . . . . . ______
  / Prune double-byte fonts
  / Prune single-byte fonts
  / Map to outline fonts
  / Recover from font not found
  / Send default character

Retained Resource Counts:
  Form definitions . ______
  Page definitions . ______
  Page segments. . . . ______
  Fonts. . . . . . . ______
  Object containers. ______

Input Tray Substitution:
  Source tray: Substitute trays:
    Simplex  Duplex
    . . . .
    . . . .
    . . . .
    . . . .

Error Reporting Values:
  _ Error disposition supported
  _ Send msgs to SYSOUT
Print error messages . . = 2. 1. No 2. Yes
  Maximum messages. . = T6 (0-999)
Print error reporting . . = 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 . 1 (0-86400)
  Management mode . 3 1. Immediate 2. Dial in 3. Output available
  No response action . 3 1. Notify JES 2. Notify user
                      3. Notify operator 4. Terminate
  Notify . . . . . . . . . . . (0-20864)
  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. IPOS
  Trace table size . 32 (1-999)
  FSA trace dsname . ________________________________
  _ Save printer information

3800 Compatibility:
  Override default font
  Set media origin to 3800 origin for:
  _ Data set
  _ Data set header
  _ Job header
  _ Job trailer
  _ Message data set
PSF FSA definition for an SNA-attached printer

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

<table>
<thead>
<tr>
<th>PSF FSA, SNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSA Name:...</td>
</tr>
<tr>
<td>Description:</td>
</tr>
<tr>
<td>Location:...</td>
</tr>
</tbody>
</table>

Processing Information:
- Blank compression
- Consolidate IM1 images
- Inhibit recovery
- SNMP reporting
- Close libraries when idle
- Capture inline resources
- Release data set when repositioning
- Suppress copy marks
- Issue intervention messages
- CSE sheet eject
- CSE preserve page position
- Check CSE fit... 1. No 2. First 3. All
- CSE orientation... 1. Portrait 2. Landscape
- Issue setup messages... 1. None 2. Burst 3. Forms 4. All
- Offset stacking... 1. None 2. Data set 3. Job
- Default process mode...
- Resolution... (240, 300)

Resources:
- Form definition.
- Page definition.
- Character sets...
- Color map.
- Com setup member.
- Overlay.
- / Prune double-byte fonts
- / Prune single-byte fonts
- Map to outline fonts
- Recover from font not found
- Send default character

Retained Resource Counts:
- Form definitions.
- Page definitions.
- Page segments.
- Fonts.
- Object containers.

Input Tray Substitution:
- Source tray: Substitute trays:
  - Simplex  Duplex

Error Reporting Values:
- Error disposition supported
- Send msgs to SYSPUT
- Print error messages... 2. 1. No 2. Yes
- Maximum messages... 16 (0-999)
- Print error reporting... 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 dname .
  Save printer information

3800 Compatibility:
  Override default font
Set media origin to 3800 origin for:
  Data set
    Data set
  Data set header
  Job header
  Job trailer
  Message data set
PSF FSA definition for AFP Download Plus

This is the ISPF panel you use to create a PSF FSA definition for an AFP Download Plus sender.

<table>
<thead>
<tr>
<th>PSF FSA, AFP Download Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSA Name: . .</td>
</tr>
<tr>
<td>Description: . .</td>
</tr>
<tr>
<td>Location: . .</td>
</tr>
</tbody>
</table>

Processing Information:
- Blank compression
- Consolidate IM1 images
- Close libraries when idle
- Release data set when repositioning
- Page accounting supported
- Default process mode: . . .

Resolution: . . . . . (240, 300)
Image output format: . . . . . 1. 10CA 2. Unchanged
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
/ TrueType fonts
Color management resources: . 1. None 2. All 3. Generic

Error Reporting Values:
- Error disposition supported
- Send msgs to SYSOUT
- Print error messages: . 1. No 2. Yes
- Maximum messages: . 16 (0-999)
- Print error reporting: . 1. None 2. All 3. Character 4. Position

Connection:
- Connect Interval: . 600 (0-86400 seconds)
- IP address: . . . .
- Port number: . 5001
Transmission:
  _ Data set grouping
  / Secure transmission
Compression... 1. None 2. LZW

Debugging:
  Dump: Code . . ______ Message ID . . ______ Count . . 1 (1-99)
  Trace:
    Trace mode . . . 2. None 3. Internal 4. Sync
    Trace table size . 32 (1-999)

3800 Compatibility:
  _ Override default font
  _ Set media origin to 3800 origin for:
    _ Data set
Appendix B. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to z/OS TSO/E Primer, z/OS TSO/E User’s Guide, and z/OS ISPF User’s Guide Vol. I for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

z/OS information

z/OS information is accessible using screen readers with the BookServer/Library Server versions of z/OS books in the Internet library at:

http://www.ibm.com/systems/z/os/zos/bkserv/
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# Bibliography

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<table>
<thead>
<tr>
<th>Title</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS Infoprint Server Customization</td>
<td>S544-5744</td>
</tr>
<tr>
<td>z/OS Infoprint Server Introduction</td>
<td>S544-5742</td>
</tr>
<tr>
<td>z/OS Infoprint Server Messages and Diagnosis</td>
<td>G544-5747</td>
</tr>
<tr>
<td>z/OS Infoprint Server Operation and Administration</td>
<td>S544-5745</td>
</tr>
<tr>
<td>z/OS Infoprint Server Printer Inventory for PSF</td>
<td>S510-7703</td>
</tr>
<tr>
<td>z/OS Infoprint Server User's Guide</td>
<td>S544-5746</td>
</tr>
<tr>
<td>ABCs of z/OS System Programming Volume 7</td>
<td>SG24-6987</td>
</tr>
</tbody>
</table>

## Print Services Facility (PSF)

<table>
<thead>
<tr>
<th>Title</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFP Conversion and Indexing Facility User's Guide</td>
<td>S550-0436</td>
</tr>
<tr>
<td>PSF for z/OS: AFP Download Plus</td>
<td>S550-0433</td>
</tr>
<tr>
<td>PSF for z/OS: Customization</td>
<td>S550-0427</td>
</tr>
<tr>
<td>PSF for z/OS: Diagnosis</td>
<td>G550-0428</td>
</tr>
<tr>
<td>PSF for z/OS: Download for z/OS</td>
<td>S550-0429</td>
</tr>
<tr>
<td>PSF for z/OS: Introduction</td>
<td>G550-0430</td>
</tr>
<tr>
<td>PSF for z/OS: Messages and Codes</td>
<td>G550-0432</td>
</tr>
<tr>
<td>PSF for z/OS: User's Guide</td>
<td>S550-0435</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Title</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Printing Systems: Printer Information</td>
<td>G544-3290</td>
</tr>
<tr>
<td>IBM Printing Systems: Printer Summary</td>
<td>G544-3135</td>
</tr>
<tr>
<td>IBM AFP: Programming Guide and Line Data Reference</td>
<td>S544-3884</td>
</tr>
<tr>
<td>IBM AFP Fonts: Font Summary for APF Font Collection</td>
<td>S544-5633</td>
</tr>
<tr>
<td>IBM Data Stream and Object Architectures: Bar Code Object Content Architecture Reference</td>
<td>S544-3766</td>
</tr>
<tr>
<td>IBM Data Stream and Object Architectures: IOCA Reference</td>
<td>SC31-6805</td>
</tr>
<tr>
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<td>S544-5284</td>
</tr>
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<td>Order number</td>
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<tr>
<td>--------------------------------------------------</td>
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<tr>
<td>z/OS Information Roadmap</td>
<td>SA22-7500</td>
</tr>
<tr>
<td>z/OS MVS JCL Reference</td>
<td>SA22-7597</td>
</tr>
<tr>
<td>z/OS Planning for Installation</td>
<td>GA22-7504</td>
</tr>
<tr>
<td>z/OS Program Directory</td>
<td>GI10-0670</td>
</tr>
<tr>
<td>z/OS Security Server RACF Security Administrator's Guide</td>
<td>SA22-7683</td>
</tr>
<tr>
<td>z/OS Summary of Message and Interface Changes</td>
<td>SA22-7505</td>
</tr>
<tr>
<td>z/OS UNIX System Services Command Reference</td>
<td>SA22-7802</td>
</tr>
<tr>
<td>z/OS UNIX System Services Messages and Codes</td>
<td>SA22-7807</td>
</tr>
<tr>
<td>z/OS UNIX System Services Planning</td>
<td>GA22-7800</td>
</tr>
<tr>
<td>z/OS UNIX System Services User's Guide</td>
<td>SA22-7801</td>
</tr>
</tbody>
</table>
Index

Special characters

_BPX_SHAREAS environment variable 17
/etc/profile file
  editing 20
  environment variables 17
/var/Printsrv directory 7

A
abbreviations for attributes 60
abend information, finding 103
accessibility 119
acknowledgement-level attribute 62
AFP Download Plus
  FSA attributes 61
  ISPF panel 116
  support 1
afdp-dataset-grouping attribute 62
afdp-working-directory attribute 62
AFPPARMS control statement 97
AOPADMINISTRATOR profile 8, 9
AOPADMIN group 8, 9
AOPBATCH, using to run PIDU 50
AOPCONF environment variable 17
aopd.conf file
  attributes 12
  creating 12
  editing 14
AOPDUMPON environment variable 103
AOPINIT EXEC
  editing 28
  overview 27
aopmig 97
  AFPPARMS control statement 97
  limitation 97
AOPOPER group 8, 9
aopsetup shell script
  overview 14
  running 15
aopstart EXEC
  creating 21
  editing 22
  environment variables 17
  overview 21
AOPSTART JCL procedure
  defining to RACF 11
  editing 25
  overview 24
  running 35
AOPSTOP JCL procedure
  defining to RACF 11
  editing 26
  overview 24
  running 35
AOPTRACEDIR environment variable 17, 99
AOPTRACEON environment variable 18, 99
AOPVALIDATEDB environment variable 18
applid attribute 63
attributes
  fsa object class 61
  integer values, how to enter 61
  multi-valued 60
  psf-fss object class 93
  resetting to default value 60
  single-valued 60
  string values, how to enter 61
  value-map 60

B
backing up the Printer Inventory 28
base-directory attribute 12
blank-compression attribute 63
books 125
BPXBATCH, using to run PIDU 51

C
capture-inline-resources attribute 63
case sensitivity of values in Printer Inventory 61
channel-buffer-count attribute 63
chars attribute 64
close-libraries-when-idle attribute 64
color-management-resources 72
color-map attribute 64
com-setup-member attribute 65
compression attribute 65
configuration file, aopd.conf
  attributes 12
  creating 12
  editing 14
consolidate-im1-images attribute 65
create command, PIDU 54
cse-check-fit attribute 65
cse-orientation attribute 66
cse-preserve-page-position attribute 66
cse-sheet-eject attribute 66

default values for attributes 60
default-process-mode attribute 67
delete command, PIDU 55
description attribute 67, 93
directory for Printer Inventory files 7
disability 119
disconnect-action attribute 67
display command, PIDU 55
dump command, PIDU 56
dump-code attribute 68
dump-message-id attribute 68
dumping Printer Inventory 103
eject-to-front-facing attribute 68
enablement 5
end-sna-conversation attribute 69
environment variables
   _BPX_SHAREAS 17
   AOPCONF 17
   AOPTRACEDIR 17, 99
   AOPTRACEON 18, 99
   AOPVALIDATEDB 18
for PIDU 50
in /etc/profile 17, 20
in aopstart EXEC 17, 21
LANG 18
LC_ALL 18
LC_CTYPE 19
LC_TIME 19
LIBPATH 19
NLSPATH 19
PATH 20
STEPPLIB 6
tracing 99
error-disposition-supported attribute 69
exporting the Printer Inventory 28

failure-action attribute 69
force-create command, PIDU 54
form-definition attribute 69
FSA attributes
   acknowledgement-level 62
   afpd-p-dataset-grouping 62
   afpd-working-directory 62
   applid 63
   blank-compression 63
   capture-inline-resources 63
   channel-buffer-count 63
   chars 64
   close-libraries-when-idle 64
   color-management-resources 72
   color-map 64
   com-setup-member 65
   compression 65
   consolidate-im1-images 65
   cse-check-fit 65
   cse-orientation 66
   cse-preserve-page-position 66
   cse-sheet-eject 66
   default-process-mode 67
   description 67
   disconnect-action 67
   dump-code 68
   dump-message-id 68
   eject-to-front-facing 68
   end-sna-conversation 69
   error-disposition-supported 69
   failure-action 69
   form-definition 69
   fsa-trace-dnsname 70

FSA attributes (continued)
   fsa-type 70
   global-overlay 70
   goca-box-supported 70
   goca-fractional-line-supported 71
   goca-process-color-supported 71
   highlight-communications-failure-message 71
   image-output-format 72
   inhibit-recovery 72
   inline-bcoca-objects 72
   inline-foca-objects 73
   inline-form-definitions 73
   inline-goca-objects 73
   inline-ioca-objects 74
   inline-object-containers 74
   inline-overlays 74
   inline-page-segments 74
   inline-truetype-fonts 75
   input-tray-substitutions 75
   interrupt-message-page 76
   interrupt-message-page-copies 76
   ioca-replicate-trim-supported 76
   issue-intervention-messages 76
   issue-setup-messages 77
   label-data-pages 77
   label-separator-pages 77
   location 78
   logmode 78
   luname 78
   map-to-outline-fonts 78
   mark-interrupt-message-page 79
   mcf-name 79
   message-count-before-dump 79
   name 80
   no-response-action 80
   no-response-notify 80
   offset-interrupt-message-page 81
   offset-stacking 81
   oid-format-supported 81
   override-3800-default-font 82
   page-accounting-supported 82
   page-definition 82
   port-number 83
   print-error-messages 83
   print-error-messages-maximum 83
   print-error-reporting 84
   printer-acquire-interval 84
   printer-connect-interval 84
   printer-disconnect-interval 84
   printer-ip-address 85
   printer-management-mode 85
   printer-release-interval 85
   printer-release-mode 85
   prune-double-byte-fonts 86
   prune-single-byte-fonts 86
   psf-send-default-character 86
   recover-from-font-not-found 86
   release-ds-when-repositioning 87
   resolution 87
   response-timeout 87
   restrict-printable-area 88
FSA attributes (continued)
   retained-fonts 88
   retained-form-definitions 88
   retained-object-containers 89
   retained-page-definitions 89
   retained-page-segments 89
   save-printer-information 90
   secure-transmission 90
   send-messages-to-sysout 90
   set-3800-dataset-header-origin 91
   set-3800-dataset-origin 91
   set-3800-job-header-origin 91
   set-3800-job-trailer-origin 91
   set-3800-messages-origin 92
   snmp-reporting 92
   suppress-copy-marks 92
   trace-mode 92
   trace-table-size 93

FSA definitions
   adding 42
   browsing 43
   changing type 45
   copying 44
   deleting 45
   editing 44
   ISPF panel, AFP Download Plus 116
   ISPF panel, channel-attached 110
   ISPF panel, SNA-attached 114
   ISPF panel, TCP/IP-attached 112
   listing 42
   overview 2
   fsa-trace-dsname attribute 70
   fsa-type attribute 70

FSS attributes
   description 93
   name 93
   nst-trace-dsname 94
   tcpip-job-name 94
   trace-prompt 94
   trace-table-size 95
   unicode-enabled 95

FSS definitions
   adding 38
   browsing 40
   copying 40
   deleting 41
   editing 41
   ISPF panel 109
   listing 39
   overview 2

G
   global-overlay attribute 70
   goca-box-supported attribute 70
   goca-fractional-line-supported attribute 71
   goca-process-color-supported attribute 71

H
   highlight-communications-failure-message 71

I
   image-output-format attribute 72
   inhibit-recovery attribute 72
   inline-bcoca-objects attribute 72
   inline-foca-objects attribute 73
   inline-form-definitions attribute 73
   inline-goca-objects attribute 73
   inline-ioca-objects attribute 74
   inline-object-containers attribute 74
   inline-overlays attribute 74
   inline-page-segments attribute 74
   inline-truetype-fonts attribute 75
   input-tray-substitutions attribute 75
   interrupt-message-page attribute 76
   interrupt-message-page-copies attribute 76
   inventory attribute 12
   ioca-replicate-trim-supported attribute 76
   ISPF panels
      configuring 38
      enabling 26
      Japanese 37
      screens 109
      starting a session 37
   issue-intervention-messages attribute 76
   issue-setup-messages attribute 77

J
   Japanese
      defining ISPF libraries 27
      LANG environment variable 18
      logging in to ISPF panels 37
      NLSPATH environment variable 19

K
   keyboard 119

L
   label-data-pages attribute 77
   label-separator-pages attribute 77
   LANG environment variable 18
   Language Environment runtime libraries 5
   LC_ALL environment variable 18
   LC_CTYPE environment variable 19
   LC_TIME environment variable 19
   LIBPATH environment variable 19
   list command, PIDU 57
   location attribute 78
   logmode attribute 78
   luname attribute 78

M
   map-to-outline-fonts attribute 78
   mark-interrupt-message-page attribute 79
   mcf-name attribute 79
   message-count-before-dump attribute 79
   migration program 97
migration program (continued)
   AFPARMS control statement 97
   limitation 97
modify command, PIDU 58
multi-valued attribute, defined 60

N
name attribute 80, 93
NLSPATH environment variable 19
no-response-action attribute 80
no-response-notify attribute 80
NOAUTOMOVE mount option 7
nst-trace-dsname attribute 94
null value, used to restore attribute to default value 60

O
offset-interrupt-message-page attribute 81
offset-stacking 81
oid-format-supported attribute 81
override-3800-default-font attribute 82
overview 3

P
page-definition attribute 82
pate-accounting-supported attribute 82
PATH environment variable 20
permissions
   checking 104
   setting 14
PIDU 47
   command 47
   commands 52
   create command 54
   delete command 55
   display command 55
   dump command 56
   force-create command 54
   list command 57
   modify command 58
   object classes 52
   rename command 59
   running as a batch job 50
   sample JCL 51
port-number attribute 83
print-error-messages attribute 83
print-error-messages-maximum attribute 83
print-error-reporting attribute 84
Printer Inventory
   backing up 28
   creating definitions 37, 47
   dumping 103
   name 12
   overview 1
   restoring 31
Printer Inventory Definition Utility (continued)
   delete command 55
   display command 55
   dump command 56
   force-create command 54
   list command 57
   modify command 58
   object classes 52
   rename command 59
   running as a batch job 50
   sample JCL 51
Printer Inventory Definition Utility (PIDU) 47
   printer-acquire-interval attribute 84
   printer-connect-interval attribute 84
   printer-disconnect-interval attribute 84
   printer-ip-address attribute 85
   printer-management-mode attribute 85
   printer-release-interval attribute 85
   printer-release-mode attribute 85
   PRINTER class 8
   prune-double-byte-fonts attribute 86
   prune-single-byte-fonts attribute 86
   psf-send-default-character attribute 86
   PSP bucket xv
   publications 125

R
RACF
   AOP.ADMINISTRATOR profile 8, 9
   AOPADMIN group 8, 9
   AOPOP group 8, 9
   aopsetup shell script 14
   PRINTER class 8
   recover-from-font-not-found attribute 86
   release-ds-when-repositioning attribute 87
   rename command, PIDU 59
   requirements, software 5
   resolution attribute 87
   response-timeout attribute 87
   restoring the Printer Inventory 31
   restrict-printable-area attribute 88
   retained-fonts 88
   retained-form-definitions 88
   retained-object-containers 89
   retained-page-definitions 89
   retained-page-segments 89

S
Sample JCL for Running PIDU —
   SYS1.SAMPLIB(AOPPIDU) 51
   save-printer-information 90
   SCEERUN libraries 5
   SCLBDLL library 5
   secure-transmission attribute 90
   security
      AOPADMINISTRATOR profile 8, 9
      AOPADMIN group 8, 9
      AOPOP group 8, 9
      aopsetup shell script 14
security (continued)

PRINTSRV class 8
send-messages-to-sysout attribute 90
set-3800-dataset-header-origin attribute 91
set-3800-dataset-origin attribute 91
set-3800-job-header-origin attribute 91
set-3800-job-trailer-origin attribute 91
set-3800-messages-origin attribute 92
shortcut keys 119
single-valued attribute, defined 60
snmp-reporting attribute 92
software requirements 5
STDENV data set, creating 23
STDENV DD statement 25
STEPLIB environment variable 6
STEPLIBLIST facility 6
suppress-copy-marks attribute 92
sysplex considerations 7

c TCP

tcpip-job-name attribute 94
trace-mode attribute 92
trace-prompt attribute 94
trace-table-size attribute 93, 95
tracing 99
evironment variables 99
finding trace file 101
ISPF panels 102
turning off 101
turning on 100
trademarks 123
TSO logon procedure, defining libraries in 27

 U

unicode-enabled attribute 95

V

value-map, defined 60

W

where predicate 52