IBM

Infoprint Transforms to AFP for z/OS

Version 2 Release 3

> **Note:**
> Before using this information and the product it supports, read the information in "Notices" on page 135.

This edition applies to Version 2 Release 3 of IBM Infoprint Transforms to AFP for z/OS (program number 5655–N60) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces G550–0443–04.

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About this publication

With this product, you can transform documents to Advanced Function Presentation (AFP) format from:
- HP Printer Control Language (PCL)
- Adobe Portable Document Format (PDF)
- Adobe PostScript
- SAP R/3 System Generic Output Format (SAPGOF)

The transforms require Infoprint Server, which is a separately priced feature of z/OS. The transforms run on all supported releases of z/OS.

Who should read this publication

This publication is for anyone who needs to transform documents to AFP, system programmers who customize the transform products, administrators responsible for maintaining the Infoprint Server Printer Inventory, and diagnosticians who must diagnose transform errors.

Readers should be familiar with Infoprint Server, AFP, z/OS UNIX System Services, and z/OS job control language (JCL).

How to read syntax diagrams

Syntax diagrams in this publication illustrate how enter commands. The general notations that this publication uses in syntax diagrams are described below. For ease of reading, this publication breaks some examples into several lines. However, when you enter a command, enter it all on one line. Do not press Enter until you type the entire command.

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

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

Where to find more information

This section describes where to find related information.

Preventive Service Planning information

Before installing Infoprint transforms, 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 IDs and subsets are:

Table 1. PSP upgrade IDs and subsets

Transform	Upgrade ID	Subset
IBM Infoprint Transforms to AFP	5655N60	HXFR2B0

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.

Related documentation

This section lists documentation for Infoprint Server and other related documentation.

Table 2. Documentation for Infoprint Server

Publication	Form number
z/OS Infoprint Server Introduction Introduces Infoprint Server. This publication contains printing scenarios that show how you can use Infoprint Server in your installation.	SA38-0692
z/OS Infoprint Server Customization Describes customization tasks for Infoprint Server. This publication describes Infoprint Server environment variables, configuration files, startup procedures, how to write exit routines and filter programs, and how to use the Infoprint Server API.	SA38-0691
z/OS Infoprint Server Operation and Administration Describes operator procedures and administrative tasks for Infoprint Server. This publication describes how to start and stop Infoprint Server and how operators can use Infoprint Central. It describes how administrators can create entries in the Printer Inventory using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program and define NetSpool printer LUs to VTAM®.	SA38-0693
z/OS Infoprint Server User's Guide Describes user tasks for Infoprint Server. This publication describes how to submit print jobs from remote systems (including Windows systems), the local z/OS system, and Virtual Telecommunications Access Method (VTAM) applications. It describes z/OS UNIX commands; the AOPPRINT JCL procedure; the AOPBATCH program; DD and OUTPUT JCL parameters that Infoprint Server supports; and how to download and install the Infoprint Port Monitor for Windows.	SA38-0695
z/OS Infoprint Server Messages and Diagnosis Describes messages from Infoprint Server. This publication also describes how to use Infoprint Server tracing facilities to diagnose and report errors.	GA32-0927

Table 3. Licensed program specification

Licensed program specification	Form number
IBM Infoprint Transforms to AFP for z/OS	G550-0445

Table 4. Program directory

Program directory	Form number
IBM Infoprint Transforms to AFP for z/OS	GI11-9497

How to send your comments to IBM

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2. Send an email from http://www.ibm.com/systems/z/os/zos/webqs.html
3. Mail the comments to the following address:
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   Attention: MHVRCFS Reader Comments
   Department H6MA, Building 707
   2455 South Road
   Poughkeepsie, NY 12601-5400
   US
4. Fax the comments to us, as follows:
   From the United States and Canada: 1+845+432-9405
   From all other countries: Your international access code +1+845+432-9405

Include the following information:
- Your name and address
- Your email address
- Your telephone or fax number
- The publication title and order number:
  IBM Infoprint Transforms to AFP V2.3 for z/OS
  G550-0443-05
- The topic and page number related to your comment.
- The text of your comment.

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If you have a technical problem

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

Summary of changes

This document describes IBM Infoprint Transforms to AFP, Version 2 Release 3. It contains information that was previously presented in these documents:

- *IBM Infoprint Transforms to AFP*, G550-0443-04, which is the latest document that supports IBM Infoprint Transforms to AFP Version 2 Release 2.
- *IBM Infoprint Transforms to AFP*, G550-0443-02, which is the latest document that supports IBM Infoprint Transforms to AFP Version 2 Release 1.

chapter

Technical changes or additions to the text and illustrations are indicated by a vertical line in the left margin.

New information:

- Information about the new functions has been added. See "What is new in Version 2 Release 3" on page 1.
- Information about the new **-C** and **-I** options on the **pcl2afp** command has been added. See "pcl2afp—Transform PCL data to AFP data" on page 13.
- Information about the new **-I** option on the **pdf2afp** command has been added. See "pdf2afp—Transform PDF data to AFP data" on page 23.
- Information about the new **-I** option on the **ps2afp** command has been added. See "ps2afp—Transform PostScript data to AFP data" on page 31.
- Information about these new options on the **sap2afp** command has been added: **-a**, **-b**, **-f**, **-h**, **-k**, **-u**, **-I**. See "sap2afp—Transform SAP OTF or ABAP data to AFP data" on page 40.
- Information about the new SAP to AFP transform AOP_WORLDTYPE_PATH environment variable and how to specify it in the **aopxfd.conf** file has been added:
  - "Environment variables for the SAP to AFP transform" on page 77
  - "Examples -- Transform configuration file entries for the SAP to AFP transform" on page 81
- Information about support for Mixed Object Document Content Architecture Presentation Interchange Set 3 (MO:DCA IS/3) AFP output has been added, and includes:
  - Information about the new **fonts.tab.unicode.truetype** configuration file added to the SAP to AFP transform. See "fonts.tab.unicode.truetype configuration file" on page 90.
  - Information about the new **fonts.tab.unicode.embed.truetype** configuration file added to the SAP to AFP transform. See "fonts.tab.unicode.embed.truetype configuration file" on page 91.
  - Information about the new **pagedef.tab.unicode.truetype** configuration file added to the SAP to AFP transform. See "pagedef.tab.unicode.truetype configuration file" on page 95.
  - Information about the TrueType fonts (required for SAP to AFP MO:DCA IS/3-compliant output) that now ship with the Transforms product. For a list of the TrueType fonts included with the Transforms product, see"SAP to AFP transform TrueType fonts" on page 130.

Changed information:

- Information about changes to the **-r** option on the **pcl2afp** command has been added. See "pcl2afp—Transform PCL data to AFP data" on page 13.
- Information about changes to the PCL to AFP transform resolution environment variable, AOP_RESOLUTION, has been added. See "Environment variables" on page 22.
- Information about changes to the **-r** option on the **sap2afp** command has been added. See "sap2afp—Transform SAP OTF or ABAP data to AFP data" on page 40.
- Information about a change to the text of message AOP2061E has been added. For more information, see "Messages" on page 119.

Chapter 1. Introduction

This chapter introduces Version 2 Release 3 (V2.3) of IBM Infoprint Transforms to AFP for z/OS (program number 5655-N60).

This product provides data-stream transforms that let you transform documents to Advanced Function Presentation (AFP) format from other data stream formats. These transforms let you print non-AFP data on AFP printers, also known as Intelligent Printer Data Stream (IPDS) printers. You can transform documents to AFP format from:

- Hewlett-Packard (HP) Printer Control Language (PCL)
- Adobe Portable Document Format (PDF)
- Adobe PostScript
- SAP R/3 System Generic Output Format (SAPGOF)

What is new in Version 2 Release 3

- The transforms can create MO:DCA Presentation Interchange Set (IS) data, which now includes the newest interchange set, MO:DCA IS/3. MO:DCA IS/3 is a subset of MO:DCA that defines an interchange format for presentation documents and includes structured fields that are not found in MO:DCA IS/1. While providing interoperability among AFP products that are MO:DCA IS/3 compliant, MO:DCA IS/3 also provides enhanced functions, including support for color and the latest fonts, images, and graphics.
- **New in the PCL to AFP Transform**
  - The **-r** *resolution* option for the **pcl2afp** command now accepts two additional values (720 and 1200).
  - The **pcl2afp** command supports the new **-C** option. The -C option specifies that the transform processes the color PCL files that the PCL 5c driver created to grayscale output. If this option is not specified for transforming PCL 5c files, the resulting AFP file might not print correctly.. If this option is not specified for transforming PCL 5c files, the resulting AFP file might print incorrectly.
  - The **pcl2afp** command supports the new **-I** option, which specifies that the transform produces MO:DCA IS/3-compliant output.
  - The PCL to AFP transform AOP_RESOLUTION environment variable accepts two additional values (720 and 1200).
- **New in the PDF to AFP Transform**
  - The new **pdf2afp** command option **-I** specifies that the transform produces MO:DCA IS/3-compliant output.
  - The PDF to AFP transform now supports PDF 1.7 (ISO 32000) and earlier levels (except for the various interactive features of any PDF version).
- **New in the PS to AFP Transform**
  - The new **ps2afp** command option **-I** specifies that the transform produces MO:DCA IS/3-compliant output.
- **New in the SAP to AFP Transform**

- The SAP to AFP transform supports the use of TrueType fonts (required for MO:DCA IS/3-compliant output created by using the SPF transform). Several TrueType fonts from the WorldType 8.1 library are now included in the product.
- A new environment variable, AOP_WORLDTYPE_PATH, allows you to specify that TrueType fonts have been installed in a non-standard path.
- Three new configuration files support TrueType fonts for the SAP to AFP transform: **fonts.tab.unicode.truetype**, **fonts.tab.unicode.embed.truetype**, and **pagedef.tab.unicode.truetype**.
- The **-r** *resolution* option for the **sap2afp** command now accepts two additional values (720 and 1200).
- The **sap2afp** command supports five new options:
  - The **-a** *imagetype* option specifies the IOCA function set that the transform uses when transforming Output Text Format (OTF) color image data, allowing the transform to generate Image Object Content Architecture (IOCA) FS45 output for SAP OTF data streams.
  - The **-b** and **-k** options place bar codes (**-b**) and boxes (**-k**) in AFP output by using the SAP specification instead of the AFP specification.
  - The **-f** option specifies the use of TrueType fonts for Unicode SAP files.
  - The **-h** option specifies that the OTF input file was generated using SAPGOF_ST_CHARS:X entry from the SAP Unicode system.
  - The **-u** option provides compatibility for customers who are using older printers that have only ASCII (and no Unicode) support, but are submitting data that contains Unicode code pages through the transform. For example, a customer might have a file generated using a SAPGOF device that uses Unicode code pages, and is printing the output on an ASCII printer.
  - The **-I** option specifies that the transform produces MO:DCA IS/3-compliant output.

Transform names and levels

The names of the transforms to AFP and the levels of data streams that they transform are:

This transform:	Transforms to AFP from these levels:
PCL to AFP	PCL 6 (XL, 5, 5e, 5c).
	Note: PCL 5c support results in grayscale output only.
PDF to AFP	PDF 1.7 and earlier levels
PostScript to AFP	PostScript Language Level 3
SAP to AFP	SAP R/3 SAPGOF Release 4.6C and most functions in SAP R/3 Release 6.10.

Using transforms with Infoprint Server

This section describes how you can use the transforms together with Infoprint Server to meet your printing needs. It describes these scenarios:

- Printing web documents on AFP printers
- Printing PDF documents on AFP printers
- Printing SAP R/3 documents on AFP printers

Printing web documents on AFP printers

A company wants to print web-based documents on an AFP printer. Here is how the company can use the PCL to AFP transform, Infoprint Server, and Print Services Facility™ (PSF) to meet its requirement:

1. The user installs the Infoprint Port Monitor on her Windows system and configures it to print on the AFP printer. The user associates a PCL driver with the Infoprint port.

2. The user views the web-based document using a browser, such as Microsoft Internet Explorer. The user prints the document using the standard print-submission method that the browser provides, selecting the printer configured at the Infoprint port.

   As an option, the user specifies Infoprint Server job attributes in the Infoprint Port Monitor window. For example, the user might specify distribution information for PSF to print on the printer's separator page and the name of a form definition for PSF to use when it prints the document.

3. The PCL driver associated with the Windows printer creates a document in PCL format.

4. The Infoprint Port Monitor sends the PCL document and job attributes over the TCP/IP network to Infoprint Server.

5. Infoprint Server determines that it needs to call the PCL to AFP transform. The transform converts the PCL document to AFP format.

6. Infoprint Server writes the AFP document to an output data set on the JES spool.

   Infoprint Server also specifies JES output parameters that route the output data set to the PSF-controlled AFP printer and tell PSF how to process the document. For example, Infoprint Server specifies distribution information and the name of the form definition in JES output parameters.

7. PSF selects the output data set from the JES spool. It uses the form definition to process the AFP document and sends it to the AFP printer.

Figure 1 shows how to print a web document on an AFP printer.
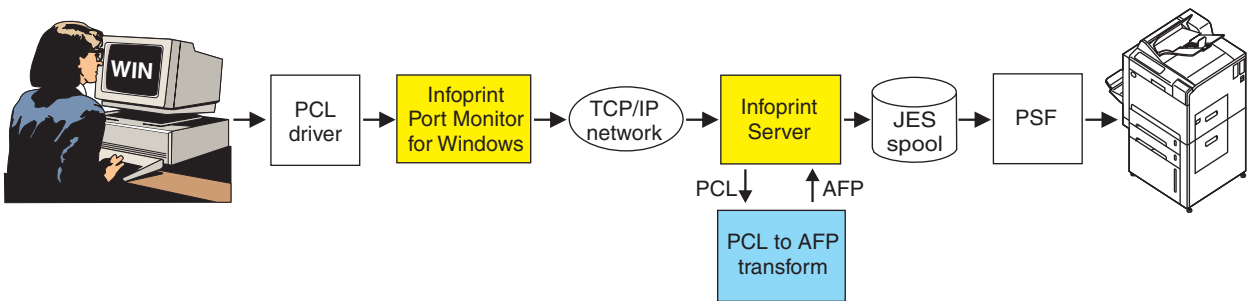
Figure 1. Printing web documents on AFP printers

Printing PDF documents on AFP printers

A company wants to print PDF documents on a high-speed AFP printer. Here is how the company can use the PDF to AFP transform, Infoprint Server, and PSF to meet its requirement:

1. The user installs the **lprafp** command on his Windows system. Using the command, the user submits the PDF document to Infoprint Server and specifies the name of the AFP printer on the command.

As an option, the user specifies Infoprint Server job attributes on the **lprafp** command. For example, the user might specify the number of copies and the name of a form definition for PSF to use when it prints the document.

2. The **lprafp** command sends the PDF document and job attributes over the TCP/IP network to Infoprint Server.

3. Infoprint Server determines that it needs to call the PDF to AFP transform. The transform converts the PDF document to AFP format.

4. Infoprint Server writes the AFP document to an output data set on the JES spool.

   Infoprint Server also specifies JES output parameters that route the output data set to the PSF-controlled AFP printer and tell PSF how to process the document. For example, Infoprint Server specifies the number of copies and the name of the form definition in JES output parameters.

5. PSF selects the output data set from the JES spool. It uses the form definition to process the AFP document and sends it to the AFP printer.

Figure 2 shows how to print a PDF document on an AFP printer.
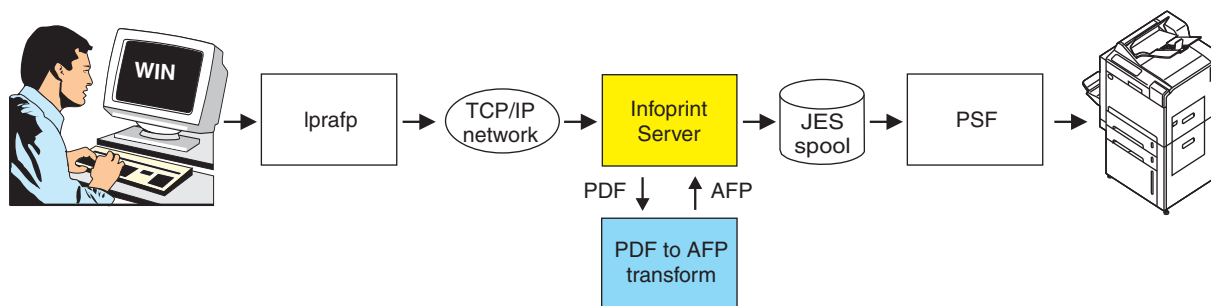
Figure 2. Printing PDF documents on AFP printers

Printing SAP R/3 documents on AFP printers

A company wants to print purchase orders created by SAP R/3 applications on a high-speed AFP printer. Here is how the company can use the SAP to AFP transform, Infoprint Server, the SAP R/3 Application Server for z/OS, and PSF to meet its requirement:

1. Using the SAP R/3 GUI, a user submits an SAP SAPGOF (ABAP or SAP OTF format) document for printing on an SAP R/3 output device that the SAP R/3 administrator has associated with a printer defined to Infoprint Server.

   The SAP R/3 application server sends the document over the TCP/IP network to the spool work process of the SAP R/3 Application Server for z/OS. (The spool work process must run on the same system as Infoprint Server.)

2. The SAP R/3 Application Server's spool work process submits the print request to the Infoprint Server SAP Output Management System (OMS).

3. Infoprint Server determines that it needs to call the SAP to AFP transform.

4. The SAP to AFP transform converts the SAP R/3 OTF data to AFP format and ABAP data to line data format. The transform selects appropriate AFP resources, such as a form definition, for PSF to use when it prints the document.

5. Infoprint Server writes the AFP document to an output data set on the JES spool.

Infoprint Server also specifies JES output parameters that route the output data set to the AFP printer and tell PSF how to process the document. For example, the transform specifies the name of the form definition in a JES output parameter.

6. PSF selects the output data set from the JES spool. It uses the form definition to process the AFP document and sends it to the AFP printer.

7. When the data set finishes printing or is deleted from the JES spool, Infoprint Server sends notification back to the SAP application server that submitted the print request. The notification indicates whether the data set printed successfully.

Figure 3 shows how to print an SAP R/3 document on an AFP printer.
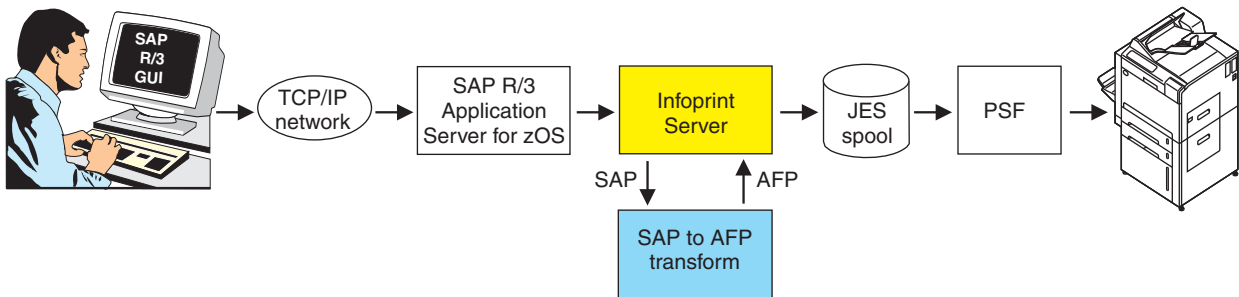
Figure 3. Printing SAP R/3 documents on AFP printers

Methods for transforming documents

You can use either of these methods to transform documents to AFP:

z/OS UNIX transform commands

z/OS UNIX System Services users can use transform commands to convert documents to AFP format from another format without printing the documents. You can run the transform commands from the z/OS UNIX command line, or you can use the Infoprint Server AOPBATCH program to run them.

If you intend to print a document many times, you might want to transform the document once and the print the output in a separate step. This is more efficient than transforming the document every time you print it.

You can use these transform commands:

pcl2afp   For PCL to AFP

pdf2afp   For PDF to AFP

ps2afp   For PostScript to AFP

sap2afp   For SAP to AFP

The input document and the output AFP document can be in an MVS™ data set or in a z/OS UNIX file.

For example, to transform the PostScript document `myfile.ps` to an AFP document named `myfile.afp`, enter:

```
ps2afp -o myfile.afp myfile.ps
```

Printer definitions

The administrator can specify transform filters in printer definitions in the

Infoprint Server Printer Inventory. When you do this, Infoprint Server automatically calls the appropriate transform filter before it prints the document or sends it to an email destination. You use this method when you want to transform and print AFP documents but not save the transformed output.

For example, suppose that the administrator has configured a printer definition named "myprinter" to use the PDF to AFP transform filter:

- You can use the z/OS UNIX **lp** command to transform and print a PDF document using this printer definition. For example, to transform and print a PDF document in file myfile.pdf, enter this z/OS UNIX command:

```
lp -d myprinter myfile.pdf
```

- You can transform and print the PDF output of a batch job using the Print Interface subsystem and this printer definition. For example, to transform and print a PDF document created by a batch program using the subsystem named AOP1, submit this JCL:

```
//MYJOB   JOB ...
//STEP1   EXEC PGM=USERA
//DD1     DD SUBSYS=(AOP1,'myprinter')
```

Specifying transform options

You can use transform options to tell the transforms how you want the data to be transformed to AFP. You can use these methods to specify transform options:

Transform configuration file
The administrator can specify some transform options in the transform configuration file **aopxfd.conf**. For example, you can tell the PCL to AFP transform the resolution of the printer in the AOP_RESOLUTION environment variable in the transform configuration file.

The administrator can create separate classes of a transform with different transform options in each class. For example, the administrator could create a transform class for AFP printers with a resolution of 300 pels, and a class for printers with a resolution of 600 pels. The administrator names and defines the transform classes in the transform configuration file. To use a transform class that the administrator has defined:

- The administrator can specify the name of the transform class in the **-c** transform option in the printer definition.
- The job submitter can specify the name of the transform class in the **-c** transform command option.

Transform command options
You can specify some transform options on the transform commands. For example, when you enter the **pdf2afp** command, you can specify option **-c** *transformclass* to tell the transform the name of a transform class to use.

When you transform and print documents, you can specify transform command options in the **filter-options** job attribute. For example, when you enter the **lp** command, you can specify the **-c** option in the **filter-options** job attribute.

Software requirements

The transforms to AFP run on z/OS V1.12 (Program Number 5694-A01) or later or z/OS V2.1 (5650-ZOS).

This additional IBM software is required:
- Infoprint Server feature of z/OS with all current service applied
- SMP/E for z/OS, Version 3.4 (5655-G44) or later to install IBM Infoprint Transforms to AFP for z/OS
- PSF Version 4.3 or later for z/OS (5655–M32) to print the transform output on AFP printers

Performance considerations

Transforming documents from the document format in which they were created to another document format uses more system resources than printing the documents on printers that support the original document format.

The impact on system and network resources varies depending on items such as:
- Print volume
- Content of documents being transformed
- Current utilization of the system and network resources

The throughput of the transform varies depending on items such as:
- Document format created
- Size, density, and complexity of the documents to be transformed
- Resolution of the output documents

In addition, transformed documents are usually larger than the original documents.

PCL to AFP transform

The PCL to AFP transform converts documents in Printer Control Language (PCL) 6 (XL, 5, 5e, 5c) format to AFP format. The transform can accept PCL documents in color. However, it always creates a monochrome AFP image.

The PCL to AFP transform can create MO:DCA IS/3 AFP output. PSF V4.4 or later accepts MO:DCA IS/3 output for printing. For information about MO:DCA IS/3, see *Mixed Object Document Content Architecture Reference*.

The transform creates an AFP Image Object Content Architecture (IOCA) image for each page in the PCL document. The image can be a compressed IOCA image (recommended for faster printing) or an uncompressed image. The transform can produce a complete printable AFP document, or it can create an AFP overlay or page segment of a single page that you can print as part of other documents.

You can specify the type of IOCA image and type of document the transform creates in options on the transform command and in options in the printer definition. The administrator can specify the height and width of the output page and the resolution of the IOCA image in environment variables in the transform configuration file.

Supported fonts

The PCL to AFP transform contains a set of single-byte built-in fonts, which it uses to create a rasterized image of the data. For a list of the fonts that are built in, see Table 16 on page 129. Double-byte character set (DBCS) fonts are not built in to the transform, but the transform can process DBCS fonts that are embedded in the PCL document.

If a PCL document specifies a font that is not built in and is not embedded in the PCL document, the transform substitutes another font that is the best match for the specified font. You cannot customize the way the transform performs font substitution, and the transform does not write any message when it substitutes fonts.

The administrator cannot add fonts to the transform. However, you can embed fonts in the PCL document.

PCL to AFP transform limitations

These limitations apply to the PCL to AFP transform:

- The transform does not produce color output. It produces monochrome output only.
- DBCS fonts are not built in to the transform, but the transform can process DBCS fonts that are embedded in the PCL document.
- PCL data can contain device commands (for example, to begin or end duplexing or to change the input bin). Because the AFP architecture defines those device functions in an AFP form definition, the transform ignores the device commands in the PCL data stream. To obtain these device functions, you must specify them in the form definition or Infoprint Server job attributes.
- Resolution conversion algorithms might produce a degraded appearance when used to reduce the resolution of a data stream. For this reason, the transform might degrade the appearance of higher-resolution data streams when used with 240-pel printers. You should verify that print fidelity is satisfactory.
- Subtle differences exist between PCL4 and PCL5e related to handling fonts. While many PCL4 files work with the transform, some might not produce the expected output.

PDF to AFP transform

The PDF to AFP transform converts documents in PDF 1.7 or earlier levels of PDF format to AFP format. The transform can accept PDF documents in color. However, it always creates a monochrome AFP image.

The PDF to AFP transform can create MO:DCA IS/3-compliant AFP output. PSF for z/OS V4.4 and later lets you print MO:DCA IS/3-compliant AFP output. For information about MO:DCA IS/3-compliant AFP, see *Mixed Object Document Content Architecture Reference*.

The transform creates an AFP Image Object Content Architecture (IOCA) image for each page in the PDF document. The image can be a compressed IOCA image (recommended for faster printing) or an uncompressed image. The transform can produce a printable AFP document, or an AFP overlay or page segment that you can print as part of other documents.

You can specify the type and resolution of the IOCA image, the height and width of the output page, and the type of document the transform creates in options on the transform command and in options in the printer definition.

Supported fonts

The PDF to AFP transform provides a set of fonts, which it uses to create a rasterized image of the data. For a list of the fonts that are provided with the transform, see Table 17 on page 129.

If a PDF document specifies a font that is not embedded in the PDF document and is not provided with the transform, the transform substitutes another font that is the best match for the specified font. You cannot customize the way the transform performs font substitution.

The administrator can add single-byte ASCII fonts to the transform. For information, see "Adding fonts" on page 74.

When the transform substitutes fonts in a document, it writes a message to the transform's **stderr** file and to the transform invoker's **stderr** file so that the administrator can see which fonts the transform has substituted.

PDF to AFP transform limitations

These limitations apply to the PDF to AFP transform:

- The transform does not produce color output. It produces monochrome output only.
- The transform cannot process DBCS fonts.
- The PDF to AFP transform might not be able to transform very large PDF documents that contain non-balanced page trees. For information about page trees, see the Adobe PDF Reference, which is available on the Adobe web site (www.adobe.com).

  Tip: Applications that create PDF documents by combining a large number of separate PDF documents sometimes create PDF documents with non-balanced tree structures.

- Resolution conversion algorithms might produce a degraded appearance when used to reduce the resolution of images imbedded in a data stream. For this reason, the transform might degrade the appearance of higher-resolution images when used with 240-pel printers. You should verify that print fidelity is satisfactory.
- This transform cannot create AFP FS45 image objects, which some color printers require. However, the PDF to AFP transform that InfoPrint Manager for AIX® and Windows provides can create FS45 images. If your installation has installed InfoPrint Manager for AIX or Windows, the administrator can set up the printer definitions for the color printers to run the transform remotely using InfoPrint Manager. For information, see "Transforming data remotely with InfoPrint Manager for AIX or Windows" in *z/OS Infoprint Server Operation and Administration*.
- The transform cannot transform PDF files that are concatenated. If you use the AOPBATCH program to run the transform, you must transform each PDF file in a separate step.

PostScript to AFP transform

The PostScript to AFP transform converts documents in PostScript Language Level 3 format to AFP format. The transform can accept PostScript documents in color. However, it always creates a monochrome AFP image.

The transform creates an AFP Image Object Content Architecture (IOCA) image for each page in the PostScript document. The image can be a compressed IOCA image (recommended for faster printing) or an uncompressed image. The transform can produce a printable AFP document, or an AFP overlay or page segment that you can print as part of other documents.

The PostScript to AFP transform can create MO:DCA IS/3-compliant AFP output. PSF V4.4 or later lets you print MO:DCA IS/3-compliant output. For information about MO:DCA IS/3-compliant, see *Mixed Object Document Content Architecture Reference*.

You can specify the type, height, width, and resolution of the IOCA image, and the type of document the transform creates in options on the transform command and in options in the printer definition.

Supported fonts

The PostScript to AFP transform provides a set of fonts, which it uses to create a rasterized image of the data. For a list of the fonts that are provided with the transform, see Table 17 on page 129.

If a PostScript document specifies a font that is not embedded in the PostScript document and is not provided with the transform, the transform substitutes another font that is the best match for the specified font. You cannot customize the way the transform performs font substitution.

The administrator can add single-byte ASCII fonts to the transform. For information, see "Adding fonts" on page 74.

The transform writes a message when it substitutes fonts in a document. The transform writes the font-substitution message to the transform's **stderr file** so that the administrator can see which fonts the transform has substituted.

PostScript to AFP transform limitations

These limitations apply to the PostScript to AFP transform:

- The transform does not produce color output. It produces monochrome output only.
- The transform cannot process DBCS fonts.
- PostScript data can contain device commands (for example, to begin or end duplexing or to change the input bin). Because the AFP architecture defines those device functions in a form definition resource, the transform command ignores the device commands in the print data. To access those device functions, you must specify them in the form definition or attributes file, or on a print command, when you print the job.
- Resolution conversion algorithms might produce a degraded appearance when used to reduce the resolution of images imbedded in a data stream. For this reason, the transform might degrade the appearance of higher-resolution images when used with 240-pel printers. You should verify that print fidelity is satisfactory.

- This transform cannot create AFP FS45 image objects, which some color printers require. However, the PostScript to AFP transform that InfoPrint Manager for AIX and Windows provides can create FS45 images. If your installation has installed InfoPrint Manager for AIX or Windows, the administrator can set up the printer definitions for the color printers to run the transform remotely using InfoPrint Manager. For information about how to set up printer definitions to run transform remotely, see *z/OS Infoprint Server Operation and Administration*.
- The transform cannot transform PostScript files that are concatenated. If you use the AOPBATCH program to run the transform, you must transform each PostScript file in a separate step.

SAP to AFP transform

The SAP to AFP transform converts SAP R/3 Release 4.6C Output Text Format (OTF) and Advanced Business Application Programming (ABAP) documents to AFP format:

- SAP R/3 OTF data streams are converted to MO:DCA data streams.
- SAP R/3 ABAP data streams are converted to line data.

The SAP R/3 OTF and ABAP data streams must be in ASCII or Unicode representation.

The transform selects the appropriate AFP resources (form definition, page definition, and font) to use when PSF prints the document. The transform selects the resources based on the value of the PJFORM keyword in the header of the SAP data stream.

The SAP to AFP transform can create MO:DCA IS/3-compliant AFP output. PSF V4.4 or later lets you print MO:DCA IS/3-compliant output. For information about MO:DCA IS/3-compliant, see *Mixed Object Document Content Architecture Reference*.

For information about how to customize SAP to AFP configuration files, see "Customizing SAP to AFP configuration files" on page 81.

Supported fonts

The SAP to AFP transform now supports TrueType fonts. For a list of the fonts that are provided with the transform, see Table 18 on page 130.

Supported input code pages

The SAP to AFP transform supports these input code pages:

- 0000 ASCII ISO-1 (Latin 1)
- 1100 ASCII ISO 8859/1 (Latin 1)
- 1500 Cyrillic ISO 8859/5
- 4001 OCR-A (ASCII)
- 4004 OCR-B (ASCII)
- 4102 ISO ISO/IEC DIS 10646-1.2 Unicode UTF-16BE
- 4103 ISO ISO/IEC DIS 10646-1.2 Unicode UTF-16LE
- 8000 Japanese ISO Shift-JIS
- 8300 Chinese (traditional) ISO Big5
- 8400 Chinese (simplified) ISO GB2312
- 8500 Korean ISO KSC 5601

- 8600 Thai ISO TIS620-2529

For information about the 4-byte codes (such as 1100), see the SAP R/3 4.6C specifications.

OTF BX command support

The SAP to AFP transform supports the OTF BX command. The BX command lets you print boxes that are either clear, solid, or contain four different levels of shading. The levels of shading are a percentage between 0 and 100, with 0 indicating a clear box and 100 a solid box. If the SAP to AFP transform recognizes a BX command, it creates Graphics Object Content Architecture (GOCA) output. GOCA is an AFP data architecture used to represent pictures generated by computer.

If your applications do not require GOCA support features such as box shading, you might want to improve performance by suppressing GOCA support. To suppress GOCA support, specify the **-s** option on the command or on the transform filter in the printer definition.

SAP to AFP transform limitations

These limitations apply to the SAP to AFP transform:
- The transform cannot transform SAP R/3 EBCDIC data. It can only transform ASCII or Unicode data.
- If you use the **sap2afp** command to transform ABAP data to line data and you write to an output file, the output file must be an MVS data set, not a UNIX file.

Chapter 2. Using transforms

This chapter describes the z/OS UNIX transform commands that you can use. It also describes how to use the Infoprint Server subsystem and the **lprafp** command to transform and print documents.

The transform commands let you convert files to an AFP data stream without printing. The transform commands can write the output AFP data stream to a UNIX file or to an MVS data set.

For the levels of the data stream files that the transform commands transform, see "Transform names and levels" on page 2.

The sections in this chapter are:

pcl2afp—Transform PCL data to AFP data

Format

pcl2afp [**-a** *imagetype*] [**-c** *transformclass*] [**-l** *length*] [**-o** *outputfile*]

[**-p** *pagerange*] [**-r** *resolution*] [**-t** *outputtype*] [**-w** *width*]

[**-x** *xmargin*] [**-y** *ymargin*] [**-C**] [**-I**] [**-T**] [*inputfile ...*]

Description

The **pcl2afp** command converts a Printer Control Language (PCL) data file to an AFP data stream file.

If you specify the same option multiple times, the command uses only the last option.

You can specify one or more input files to be transformed. If you do not specify an input file name, or if you specify a dash (**-**) as the file name, **pcl2afp** uses standard input. The output file name is also optional. If you do not specify one, the **pcl2afp** command writes the results to standard output.

Options

Note: All options and values are case-sensitive, except as noted.

-a *imagetype*

Determines the type of AFP data stream image to generate for each page in the PCL file.

Values are:

io1-g4 Compressed Image Object Content Architecture (IOCA) image in Modified Telecommunication Standardization Sector (TSS) T.6 G4 Facsimile Coding Scheme (G4 MMR) format. This is the recommended output type because the AFP output data stream is smaller and it prints faster.

> **Tips:**
> 1. Some older AFP printers do not support printing with an image type of **io1-g4**. For these printers, specify an image type of **io1-mmr** because it is the compressed image type that they support. This image type results in faster printing than uncompressed image types.
> 2. TSS was formerly the International Telegraph and Telephone Consultative Committee (CCITT).

im1 IM1 image. This type of image is not compressed. Specify it only if you know that your printer does not support compressed images.

> **Note:** Do not create IM1 images at a resolution that the printer does not support because Print Services Facility (PSF) converts the IM1 images to uncompressed IOCA images at the resolution the printer requires. This conversion can cause PSF to use very large amounts of CPU time.

io1 IOCA image. This type of image is not compressed. Specify it only if you know that your printer does not support compressed images.

io1-mmr

Compressed IOCA image in Modified Modified Read (MMR) format.

Default: io1-g4

-c *transformclass*

Specifies the name of a transform class that your administrator has defined. The transform class determines these options:

- The length and width of the generated image
- The page margins
- The resolution of the output image
- The amount of memory that the transform allocates

Ask your administrator for the name of a transform class suitable for the printer and the type of job.

> **Tip:** If the transform class specifies a resolution that the printer does not support, PSF prints the image under most conditions, but with degraded results.

-l *length*

> **Note:**
> Specifies the length of the generated image. In general, specify the length

of the physical page. For more information about this option, see "Usage notes" on page 21. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

<u>**pel**</u>   Pels, the default unit

Values are:

0.1334in to **53in**	Inch values for 240-pel printers
0.1067in to **53in**	Inch values for 300-pel printers
0.0667in to **53in**	Inch values for 480-pel printers
0.0534in to **53in**	Inch values for 600-pel printers
0.0445in to **53in**	Inch values for 720-pel printers
0.0267in to **53in**	Inch values for 1200-pel printers
3.3867mm to **1346.2mm**	Millimeter values for 240-pel printers
2.7094mm to **1346.2mm**	Millimeter values for 300-pel printers
1.6934mm to **1346.2mm**	Millimeter values for 480-pel printers
1.3547mm to **1346.2mm**	Millimeter values for 600-pel printers
1.1289mm to **1346.2mm**	Millimeter values for 720-pel printers
0.6774mm to **1346.2mm**	Millimeter values for 1200-pel printers
32pel to **12720pel**	Pel values for 240-pel printers
32pel to **15900pel**	Pel values for 300-pel printers
32pel to **25440pel**	Pel values for 480-pel printers
32pel to **31800pel**	Pel values for 600-pel printers
32pel to **31860pel**	Pel values for 720-pel printers
32pel to **63600pel**	Pel values for 1200-pel printers

Examples:

```
-l 40mm
-l 200.5mm
-l 13in
-l 5280
-l 5280pel
```

Default: The value specified in the AOP_PAGE_HEIGHT environment variable. If the environment variable is not specified, 11in is the default value.

Tips:

1. If a text margin is already set in the file, try `-l 11in` to set the length to 11 inches.
2. Inch values and millimeter values can contain a decimal point; pel values cannot.
3. You can specify the unit using lowercase or uppercase letters (for example, `in` or `IN`).

-o *outputfile*

Specifies the output path and file to which the transform output (that is,

AFP data) is written. The transform overwrites any existing data in the output file. If you specify more than one output file, the last path and file name are used. If you do not specify an output file, the result is written to standard output (STDOUT).

To specify an MVS data set, such as a sequential or partitioned data set, precede the data set name with **//**. When you specify a fully qualified name, two sets of quotation marks are required. For example, `"//'`*hlq*`.PDS(MYDOC)'"` or `"//'`*hlq*`.SEQDS'"`. When you specify a partially qualified name, you only need one set of quotation marks. For example, `"//PDS(MYDOC)"` or `"//SEQDS"`.

If you specify an MVS data set, you must allocate and catalog the data set before you run this command. Allocate the output data set with these characteristics:
- Record format: VBM
- Record length: 8K (8192) bytes or larger

Allocate an MVS data set that is large enough to hold the AFP data stream. The size of the AFP data stream depends on the size and complexity of the document, the type of image compression you select in the **-a** option, and the resolution specified in the **-r** option or in the AOP_RESOLUTION environment variable. Typically, an output AFP data stream is several times as large as the input data stream. For information about the size of the AFP data stream, see "Calculating the size of the AFP data stream" on page 51.

Note: If the specified MVS output data set does not exist, the transform creates the data set; however, the data set does not have the correct record format and record length. If you attempt to print the data set, PSF for z/OS writes message APS114I.

-p *pagerange*
Specifies that the output should contain only selected pages.

The **-p** option counts pages by their actual sequence in the document, not by page number. For example, to write only the last page of a document whose pages are numbered i, ii, 1, 2, 3, 4, specify `-p 6`.

Examples of values include:

`-p 1-10`   Write the first through tenth pages.

`-p 10-`   Write pages from the tenth page until the end of the file.

-r *resolution*
Specifies the resolution used to print image data in the job. Select the correct resolution for the printer on which you intend to print the job.

Values are:

240   240 pels per inch (for example, IBM 3812, 3825, 3827, 3835, and 3900 printers)

300   300 pels per inch (for example, IBM 3112, 3116, 4019, 4028, 4029, and 4039 printers and some Hewlett-Packard printers)

480   480 pels per inch

600   600 pels per inch (for example, the InfoPrint 60 and InfoPrint 4000 printers)

720   720 pels per inch (for example, the InfoPrint 5000 printer)

| | **1200** 1200 pels per inch (for example, the InfoPrint Pro C900 printer)

Default: 600

Tips:

1. If you specify a resolution that the printer does not support, PSF prints the image under most conditions, but sometimes with degraded results.

2. A resolution of 300 pels typically produces good quality output on 300-, 600-, or 720-pel printers. 300-pel output requires one-fourth the space and transmission time compared to 600-pel output.

3. A resolution of 600 pels typically produces good quality output on 1200-pel printers.

-t *outputtype*

Determines the type of output to create.

Values are:

document
Printable document.

overlay
Graphic image that can be printed on each page of a printable document.

pagesegment
Graphic image that can be embedded in a printable document.

| | **Default:** document

Tip:

When you create overlays or page segments from multiple-page documents, use the **-p** option to select a single page. If you do not select a page, the output contains an overlay or page segment only for the first page because the AFP architecture does not allow multiple, concatenated overlays or page segments.

-w *width*

Specifies the maximum width of the generated image. In general, specify the width of the physical page. For more information about this option, see "Usage notes" on page 21. Specify a number followed by one of these units:

in Inches

mm Millimeters

pel Pels, the default unit

Values are:

0.1334in to **25.5in**	Inch values for 240-pel printers
0.1067in to **25.5in**	Inch values for 300-pel printers
0.0667in to **25.5in**	Inch values for 480-pel printers
0.0534in to **25.5in**	Inch values for 600-pel printers
0.0445in to **25.5in**	Inch values for 720-pel printers
0.0267in to **25.5in**	Inch values for 1200-pel printers

3.3867mm to **647.7mm**	Millimeter values for 240-pel printers
2.7094mm to **647.7mm**	Millimeter values for 300-pel printers
1.6934mm to **647.7mm**	Millimeter values for 480-pel printers
1.3547mm to **647.7mm**	Millimeter values for 600-pel printers
1.1289mm to **647.7mm**	Millimeter values for 720-pel printers
0.6774mm to **647.7mm**	Millimeter values for 1200-pel printers
32pel to **6120pel**	Pel values for 240-pel printers
32pel to **7650pel**	Pel values for 300-pel printers
32pel to **12240pel**	Pel values for 480-pel printers
32pel to **15300pel**	Pel values for 600-pel printers
32pel to **18360pel**	Pel values for 720-pel printers
32pel to **30600pel**	Pel values for 1200-pel printers

Examples:

```
-w 40mm
-w 200.5mm
-w 13in
-w 4000
-w 4000pel
```

Default: The value specified in the AOP_PAGE_WIDTH environment variable. If the environment variable is not specified, 8.5in is the default value.

Tips:

1. If a text margin is already set in the file, try **-w 8.5in** to set the width to 8.5 inches

2. Inch values and millimeter values can contain a decimal point; pel values cannot.

3. You can specify the unit using lowercase or uppercase letters (for example, `in` or `IN`).

-x *xmargin*

Specifies a horizontal margin or border around the generated image to avoid the non-printable areas of some printers. For more information about this option, see "Usage notes" on page 21. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

pel   Pels, the default unit

Values are:

0in to **12.75in**   Inch values for all printers

0mm to **323.85mm**
         Millimeter values for all printers

0pel to **3060pel**
         Pel values for 240-pel printers

0pel to **3825pel**

> Pel values for 300-pel printers

0pel to **6120pel**

> Pel values for 480-pel printers

0pel to **7650pel**

> Pel values for 600-pel printers

0pel to **9180pel**

> Pel values for 720-pel printers

0pel to **15300pel**

> Pel values for 1200-pel printers

Default: 0.167in

Tips:

1. If the value is less than 1, include a leading zero. For example, specify:

   ```
   0.5in
   0.8mm
   ```

2. Because the X value specifies margins on *both* the left and right sides of the page, the X value can be no more than half of the width (**-w**) of the generated image. For example, if you specify a width of 8 inches, the X value can be no larger than 4 inches. If you specify an X value of 5 inches, a blank page is printed because the sum of the left and right margins exceeds the width of the paper.

3. The X value does not shift the image on the page. The image is cropped if it is defined to print in the left or right margin.

4. Inch values and millimeter values can contain a decimal point; pel values cannot.

5. You can specify the unit using lowercase or uppercase letters (for example, in or IN).

-y *ymargin*

> Specifies a vertical margin or border around the generated image to avoid the non-printable areas of some printers. For more information about this option, see "Usage notes" on page 21. Specify a number followed by one of these units:
>
> **in**   Inches
>
> **mm**   Millimeters
>
> **pel**   Pels, the default unit
>
> Values are:
>
> **0in** to **26.5in**   Inch values for all printers
>
> **0mm** to **673.1mm**
>
> > Millimeter values for all printers
>
> **0pel** to **6360pel**
>
> > Pel values for 240-pel printers
>
> **0pel** to **7950pel**
>
> > Pel values for 300-pel printers
>
> **0pel** to **12720pel**
>
> > Pel values for 480-pel printers

> **0pel** to **15900pel**
>> Pel values for 600-pel printers
>
> **0pel** to **19080pel**
>> Pel values for 720-pel printers
>
> **0pel** to **31800pel**
>> Pel values for 1200-pel printers
>
> **Default:** 0.167in
>
> **Tips:**
>
> 1. If the value is less than 1, include a leading zero. For example, specify:
>    ```
>    0.5in
>    0.8mm
>    ```
> 2. Because the Y value specifies margins on *both* the top and bottom of the page, the Y value can be no more than half of the length (**-l**) of the generated image. For example, if you specify a length of 12 inches, the Y value can be no larger than 6 inches. If you specify a Y value of 7 inches, a blank page is printed because the sum of the top and bottom margins exceeds the length of the paper.
> 3. The Y value does not shift the image on the page. The image is cropped if it is defined to print in the top or bottom margin.
> 4. Inch values and millimeter values can contain a decimal point; pel values cannot.
> 5. You can specify the unit using lowercase or uppercase letters (for example, in or IN).

-C
Specifies that the transform processes the color PCL files that the PCL 5c driver created to grayscale output. If this option is not specified for transforming PCL 5c files, the resulting AFP file might not print correctly.

-I
Specifies that the transform produces MO:DCA IS/3-compliant output.

> **Default:** If the **-I** option is not set, the default is MO:DCA IS/1 output.
>
> This functionality is only available when a single file is sent to the transform, not several at a time.
>
> **Note:** Select this option only if the level of PSF for z/OS you are using can process MO:DCA IS/3-compliant output.

-T
Requests a trace. Specify this option only if instructed by IBM service personnel. For more information, see Chapter 5, "Diagnosing errors," on page 115.

Tip: You can use the **filter-options** job attribute with, for example, the **lp** command to pass any of these options except **-o** *outputfile* to the transform. For information about the **filter-options** job attribute, see *z/OS Infoprint Server User's Guide*.

Operand

inputfile
Specifies an input file to be transformed. If you specify more than one input file name, the **pcl2afp** command transforms each file to AFP format and writes the results to a single output file (if one is specified) or to standard output.

If you do not specify an input file, or if you specify a dash (**-**) as the file name, **pcl2afp** uses standard input.

Usage notes

In general, to position data on the page:

- Use **-l** and **-w** to set the physical page dimensions.
- Use **-x** and **-y** to set the amount of white space between the physical page dimensions and the image.

  These options do not shift or scale the image on the page. If the image is defined to print in the unprintable areas, it is cropped.

  For example, to create a 6.5 x 9 inch image that is centered on an 8.5 x 11 inch page, enter:

  ```
  -l 11in -w 8.5in -x 1in -y 1in
  ```

- Use a form definition that specifies zero vertical offset and zero horizontal offset, or specify X and Y offsets of 0 when you submit the print job.

Examples -- pcl2afp

Transform a file, specifying transform class

To transform the PCL file `myfile.pcl` to an AFP data stream, using the `a4_300` transform class, and write the result to a file called `myfile.afp`, enter:

```
pcl2afp -c a4_300 -o myfile.afp myfile.pcl
```

Transform and print a file, specifying image type

To transform the PCL file `myfile.pcl` to an AFP data stream as an IO1-MMR image, and send the result to the default printer with the **lp** command, enter:

```
pcl2afp -a io1-mmr myfile.pcl | lp
```

Transform a file using redirection

To transform the PCL file `input.pcl` to the AFP output file called `output.afp`, enter:

```
pcl2afp < input.pcl > output.afp
```

Note: You can use redirection operators only with UNIX files.

Transform multiple files

To transform the PCL files `input.01.pcl`, `input.02.pcl`, ... `input.xx.pcl` and write the results to one AFP output file called `output.afp`, enter:

```
pcl2afp -o output.afp input.01.pcl input.02.pcl ... input.xx.pcl
```

Transform a UNIX file to an MVS data set

To transform file `input.pcl` to an existing, cataloged MVS output data set called `hlq.OUTPUT.AFP(member)`, where *hlq* is your user ID, enter:

```
pcl2afp -o "//'hlq.OUTPUT.AFP(member)'" input.pcl
```

Transform an MVS data set, writing the output to a UNIX file

To transform the MVS data set `hlq.INPUT.PCL(member)`, where *hlq* is your user ID, to an output file called `output.afp`, enter:

```
pcl2afp -o output.afp "//'hlq.INPUT.PCL(member)'"
```

Transform a file and receive MVS return codes

To transform the PCL file `myfile.pcl` to an AFP data stream and write the result to a file called `myfile.afp` and receive MVS return codes (0, 4, 8), enter:

```
AOP_MVS_RETURN_CODES=YES pcl2afp -o myfile.afp myfile.pcl
```

MVS return codes indicate whether the transform was successful (0), a transform warning occurred (4), or a transform error occurred (8).

Environment variables

The **pcl2afp** command uses these environment variables:

AOPCONF   Names the Infoprint Server configuration file. This variable takes precedence over the user-specific configuration file (**$HOME/.aopconf**) and the system default configuration file (**/etc/Printsrv/aopd.conf**). For more information about the configuration file, see *z/OS Infoprint Server Customization*.

AOP_MVS_RETURN_CODES
> Specifies whether the command returns MVS return codes (0, 4, 8) or UNIX exit values (0, 1). The default is UNIX exit values.

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

NLSPATH
> Names the directory paths that the **pcl2afp** command searches for message catalogs.

For information about setting and using environment variables, see *z/OS UNIX System Services User's Guide*.

The PCL to AFP transform uses environment variables specified in the Infoprint Server transform configuration file. For information, see "Environment variables for the PCL to AFP transform" on page 57.

Files

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

/etc/Printsrv/aopd.conf
> Contains the system default Infoprint Server configuration file.

For the format of the configuration files, see *z/OS Infoprint Server Customization*.

Exit values

MVS return codes:
0   Successful.
4   A warning occurred during the transform.
8   The command was not accepted, a data stream error occurred during the transform, or the transform failed.

UNIX exit values (default):
0   Successful. However, a warning or data stream error might have occurred during the transform.
1   The command was not accepted, or the transform failed.

Notes:

1. The AOP_MVS_RETURN_CODES environment variable determines the type of exit values.

2. The AOP_FAIL_ON_ERROR environment variable controls whether the transform fails when it detects a data stream warning or error.

pdf2afp—Transform PDF data to AFP data

Format

pdf2afp [**-a** *imagetype*] [**-c** *transformclass*] [**-l** *length*] [**-o** *outputfile*]

[**-p** *pagerange*] [**-r** *resolution*] [**-t** *outputtype*] [**-w** *width*]

[**-x** *xmargin*] [**-y** *ymargin*][**-I**] [**-T**] [*inputfile...*]

Description

The **pdf2afp** command converts a Portable Document Format (PDF) data file to an AFP data stream file.

If you specify the same option multiple times, the command uses only the last option.

You can specify one or more input files to be transformed. If you do not specify an input file name, or if you specify a dash (**-**) as the file name, **pdf2afp** uses standard input. The output file name is also optional. If you do not specify one, the **pdf2afp** command writes the results to standard output.

Options

Note: All options and values are case-sensitive, except as noted.

-a *imagetype*
> Determines the type of AFP data stream image to generate for each page in the PDF file.
>
> Values are:
>
> **io1-g4** Compressed Image Object Content Architecture (IOCA) image in Modified Telecommunication Standardization Sector (TSS) T.6 G4 Facsimile Coding Scheme (G4 MMR) format. The recommended output type is iol-g4 because the AFP output data stream is smaller and it prints faster.
>
> > **Tips:**
> > 1. Some older AFP printers do not support printing with an image type of **io1-g4**. For these printers, specify an image type of **io1-mmr** because it is the compressed image type that they support. This image type results in faster printing than uncompressed image types.
> > 2. TSS was formerly the International Telegraph and Telephone Consultative Committee (CCITT).
>
> **im1** IM1 image. This type of image is not compressed. Specify it only if you know that your printer does not support compressed images.
>
> > **Note:** Do not create IM1 images at a resolution that the printer does not support because Print Services Facility (PSF) converts the IM1 images to uncompressed IOCA images at

the resolution the printer requires. This conversion can cause PSF to use very large amounts of CPU time.

io1 IOCA image. This type of image is not compressed. Specify it only if you know that your printer does not support compressed images.

io1-mmr
Compressed IOCA image in Modified Modified Read (MMR) format.

Default: io1-g4

-c *transformclass*
Specifies the name of a transform class defined in the transform configuration file. The transform class determines these options:

- The initial transform configuration
- The fonts used in the transformed files

Ask the administrator for the name of a transform class suitable for the type of job.

-l *length*
Specifies the length of the generated image. In general, specify the length of the physical page. For more information about this option, see "Usage notes" on page 29. Specify a number followed by one of these units:

in Inches

mm Millimeters

pel Pels, the default unit

Values are:

0.1334in to **53in**	Inch values for 240-pel printers
0.1067in to **53in**	Inch values for 300-pel printers
0.0667in to **53in**	Inch values for 480-pel printers
0.0534in to **53in**	Inch values for 600-pel printers
3.3867mm to **1346.2mm**	Millimeter values for 240-pel printers
2.7094mm to **1346.2mm**	Millimeter values for 300-pel printers
1.6934mm to **1346.2mm**	Millimeter values for 480-pel printers
1.3547mm to **1346.2mm**	Millimeter values for 600-pel printers
32pel to **12720pel**	Pel values for 240-pel printers
32pel to **15900pel**	Pel values for 300-pel printers
32pel to **25440pel**	Pel values for 480-pel printers
32pel to **31800pel**	Pel values for 600-pel printers

Examples:
```
-l 40mm
-l 200.5mm
-l 13in
-l 5280
-l 5280pel
```

Default: The length value set in the file is used. If none is set, 11in is the default.

Tips:

1. If a text margin is already built into the file, try **-l 11in** to set the length to 11 inches.

2. Inch values and millimeter values can contain a decimal point; pel values cannot.

3. You can specify the unit using lowercase or uppercase letters (for example, `in` or `IN`).

-o *outputfile*

Specifies the output path and file into which the transform output (that is, AFP data) is written. The transform overwrites any existing data in the output file. If you specify more than one output file, the last path and file name are used. If you do not specify an output file, the result is written to standard output (STDOUT).

To specify an MVS data set, such as a sequential or partitioned data set, precede the data set name with **//**. When you specify a fully qualified name, two sets of quotation marks are required. For example, `"//'hlq.PDS(MYDOC)'"` or `"//'hlq.SEQDS'"`. When you specify a partially qualified name, you only need one set of quotation marks. For example, `"//PDS(MYDOC)"` or `"//SEQDS"`.

If you specify an MVS data set, you must allocate and catalog the data set before you run this command. Allocate the output data set with these characteristics:

- Record format: VBM
- Record length: 8K (8192) bytes or larger

Allocate an MVS data set that is large enough to hold the AFP data stream. The size of the AFP data stream depends on the size and complexity of the document, the type of image compression (**-a** option), and the resolution of the image (**-r** option). Typically, an output AFP data stream is several times as large as the input data stream. For information about the size of the AFP data stream, see "Calculating the size of the AFP data stream" on page 51.

Note: If the specified MVS output data set does not exist, the transform creates the data set; however, the data set does not have the correct record format and record length. If you attempt to print the data set, PSF for z/OS writes message APS114I.

-p *pagerange*

Specifies that the output should contain only selected pages.

Examples of values include:

-p 1-10   Write the first through tenth pages.

-p 10-   Write pages from the tenth page until the end of the job.

-r *resolution*

Specifies the resolution of the output image. Select the correct resolution for the printer on which you intend to print the image.

Values are:

240   240 pels per inch (for example, IBM 3812, 3825, 3827, 3835, and 3900 printers)

300 300 pels per inch (for example, IBM 4019, 4028, 4029, and 4039 printers and some Hewlett-Packard printers)

480 480 pels per inch

<u>600</u> 600 pels per inch (for example, InfoPrint 60 and InfoPrint 4000 printers)

Default: 600

Tips:

1. If you specify a resolution that the printer does not support, PSF prints the image under most conditions, but sometimes with degraded results.

2. A resolution of 300 pels typically produces good quality output on 300-, 600-, or 720-pel printers.

   300-pel output requires one-fourth the space and transmission time compared to 600-pel output.

3. A resolution of 600 pels typically produces good quality output on 1200-pel printers.

-t *outputtype*
Determines the type of output to create.

Values are:

<u>document</u>
Printable document.

overlay
Graphic image that can be printed on each page of a printable document.

pagesegment
Graphic image that can be embedded in a printable document.

Default: document

Tip:

When you create overlays or page segments from multiple-page documents, use the **-p** option to select a single page. If you do not select a page, the output contains an overlay or page segment only for the first page because the AFP architecture does not allow multiple, concatenated overlays or page segments.

-w *width*
Specifies the maximum width of the generated image. In general, specify the width of the physical page. For more information about this option, see "Usage notes" on page 29. Specify a number followed by one of these units:

in Inches

mm Millimeters

<u>pel</u> Pels, the default unit

Values are:

0.1334in to **25.5in** Inch values for 240-pel printers

0.1067in to **25.5in** Inch values for 300-pel printers

0.0667in to **25.5in**	Inch values for 480-pel printers
0.0534in to **25.5in**	Inch values for 600-pel printers
3.3867mm to **647.7mm**	Millimeter values for 240-pel printers
2.7094mm to **647.7mm**	Millimeter values for 300-pel printers
1.6934mm to **647.7mm**	Millimeter values for 480-pel printers
1.3547mm to **647.7mm**	Millimeter values for 600-pel printers
32pel to **6120pel**	Pel values for 240-pel printers
32pel to **7650pel**	Pel values for 300-pel printers
32pel to **12240pel**	Pel values for 480-pel printers
32pel to **15300pel**	Pel values for 600-pel printers

Examples:

```
-w 40mm
-w 200.5mm
-w 13in
-w 4000
-w 4000pel
```

Default: The width set in the file is used. If none is set, the default is 8.5in.

Tips:

1. If a text margin is already built into the file, try **-w 8.5in** to set the width to 8.5 inches.
2. Inch values and millimeter values can contain a decimal point; pel values cannot.
3. You can specify the unit using lowercase or uppercase letters (for example, in or IN).

-x *xmargin*

Specifies a horizontal margin or border around the generated image to avoid the non-printable areas of some printers. For more information about this option, see "Usage notes" on page 29. Specify a number followed by one of these units:

in Inches

mm Millimeters

pel Pels, the default unit

Values are:

0 Zero

0in to **12.75in** Inch values for all printers

0mm to **323.85mm**
Millimeter values for all printers

0pel to **3060pel**
Pel values for 240-pel printers

0pel to **3825pel**
Pel values for 300-pel printers

0pel to **6120pel**
Pel values for 480-pel printers

0pel to **7650pel**
> Pel values for 600-pel printers

Default: 0

Tips:

1. If the value is less than 1, include a leading zero. For example, specify:

   ```
   0.5in
   0.8mm
   ```

2. Because the X value specifies margins on *both* the left and right sides of the page, the X value can be no more than half of the width (**-w**) of the generated image. For example, if you specify a width of 8 inches, the X value can be no larger than 4 inches. If you specify an X value of 5 inches, a blank page is printed because the sum of the left and right margins exceeds the width of the paper.

3. The X value does not shift the image on the page. The image is cropped if it is defined to print in the left or right margin.

4. Inch values and millimeter values can contain a decimal point; p values cannot.

5. You can specify the unit using lowercase or uppercase letters (for example, in or IN).

-y *ymargin*

Specifies a vertical margin or border around the generated image to avoid the non-printable areas of some printers. For more information about this option, see "Usage notes" on page 29. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

pel   Pels, the default unit

Values are:

0   Zero

0in to **26.5in**   Inch values for all printers

0mm to **673.1mm**
> Millimeter values for all printers

0pel to **6360pel**
> Pel values for 240-pel printers

0pel to **7950pel**
> Pel values for 300-pel printers

0pel to **12720pel**
> Pel values for 480-pel printers

0pel to **15900pel**
> Pel values for 600-pel printers

Default: 0

Tips:

1. If the value is less than 1, include a leading zero. For example, specify:

   ```
   0.5in
   0.8mm
   ```

2. Because the Y value specifies margins on *both* the top and bottom of the page, the Y value can be no more than half of the length (**-l**) of the generated image. For example, if you specify a length of 12 inches, the Y value can be no larger than 6 inches. If you specify a Y value of 7 inches, a blank page is printed because the sum of the top and bottom margins exceeds the length of the paper.

3. The Y value does not shift the image on the page. The image is cropped if it is defined to print in the top or bottom margin.

4. Inch values and millimeter values can contain a decimal point; pel values cannot.

5. You can specify the unit using lowercase or uppercase letters (for example, `in` or `IN`).

-I   Specifies that the transform produces MO:DCA IS/3-compliant data streams.

This functionality is only available when a single file is sent to the transform, not several at a time.

Note:
Select this option only if the level of PSF for z/OS you are using can process MO:DCA IS/3-compliant output.

Default: If the -I option is not specified, the default is MO:DCA IS/1 output.

-T   Requests a trace. Specify this option only if instructed by IBM service personnel. For more information, see Chapter 5, "Diagnosing errors," on page 115.

Tip: You can use the **filter-options** job attribute with, for example, the **lp** command to pass any of these options except **-o** *outputfile* to the transform. For information about the **filter-options** job attribute, see *z/OS Infoprint Server User's Guide*.

Operand

inputfile
Specifies an input file to be transformed. If you specify more than one input file name, the **pdf2afp** command transforms each file to AFP format and writes the results to a single output file (if one is specified) or to standard output.

If you do not specify an input file, or if you specify a dash (**-**) as the file name, **pdf2afp** uses standard input.

Usage notes

In general, to position data on the page:
- Use **-l** and **-w** to set the physical page dimensions.
- Use **-x** and **-y** to set the amount of white space between the physical page dimensions and the image.

These options do not shift or scale the image on the page. If the image is defined to print in the unprintable areas, it is cropped.

For example, to create a 6.5 x 9 inch image that is centered on an 8.5 x 11 inch page, enter:

```
-l 11in -w 8.5in -x 1in -y 1in
```

- Use a form definition that specifies zero vertical offset and zero horizontal offset, or specify X and Y offsets of 0 when you submit the print job.

Examples -- pdf2afp

Transform and print a file, specifying image type
To transform the PDF myfile1.pdf file to an AFP data stream as an IO1-MMR image, and send the result to the default printer with the **lp** command, enter:

```
pdf2afp -a io1-mmr myfile1.pdf | lp
```

Transform and print a file, specifying resolution
To transform the PDF file myfile1.pdf to an AFP data stream, and then submit it to the 4019 printer called robin, enter:

```
pdf2afp -r 300 myfile1.pdf | lp -d robin
```

Tip: You need to specify a resolution of 300 pels (-r 300) because the 4019 is a 300-pel resolution printer. The default resolution for the **pdf2afp** command is 600 pels.

Transform and print a file, specifying image type and resolution
To transform the PDF myfile1.pdf file to an AFP data stream in 300-pel resolution, as an IO1-MMR image, and send the result to the default printer with the **lp** command, enter:

```
pdf2afp -a io1-mmr -r 300 myfile1.pdf | lp
```

Transform a UNIX file to an MVS data set
To transform file input.pdf to an existing, cataloged MVS output data set called *hlq*.OUTPUT.AFP(*member*), where *hlq* is your user ID, enter:

```
pdf2afp -o "//'hlq.OUTPUT.AFP(member)'" input.pdf
```

Transform a file and receive MVS return codes: To transform the PDF file myfile.pdf to an AFP data stream and write the result to a file called myfile.afp and receive MVS return codes (0, 4, 8), enter:

```
AOP_MVS_RETURN_CODES=YES pdf2afp -o myfile.afp myfile.pdf
```

MVS return codes indicate whether the transform was successful (0), a transform warning occurred (4), or a transform error occurred (8).

Environment variables

The **pdf2afp** command uses these environment variables:

AOPCONF   Names the Infoprint Server configuration file. This variable takes precedence over the user-specific configuration file (**$HOME/.aopconf**) and the system default configuration file (**/etc/Printsrv/aopd.conf**). For more information about the configuration file, see *z/OS Infoprint Server Customization*.

AOP_MVS_RETURN_CODES
             Specifies whether the command returns MVS return codes (0, 4, 8) or UNIX (0, 1) exit values. The default is UNIX exit values.

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

NLSPATH   Names the directory paths that the **pdf2afp** command searches for message catalogs.

For information about setting and using environment variables, see *z/OS UNIX System Services User's Guide*.

The PDF to AFP transform uses environment variables specified in the Infoprint Server transform configuration file. For information, see "Environment variables for the PDF to AFP and PostScript to AFP transforms" on page 66.

Files

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

/etc/Printsrv/aopd.conf
> Contains the system default Infoprint Server configuration file.

For the format of the configuration files, see *z/OS Infoprint Server Customization*.

Exit values

Exit values
MVS return codes:
0	Successful.
4	A warning occurred during the transform.
8	The command was not accepted, a data stream error occurred during the transform, or the transform failed.

UNIX exit values (default):
0	Successful. However, a warning or data stream error might have occurred during the transform.
1	The command was not accepted, or the transform failed.

Notes:

1. The AOP_MVS_RETURN_CODES environment variable determines the type of exit values.

2. The AOP_FAIL_ON_ERROR transform environment variable controls whether the transform fails when it detects a data stream warning or error.

ps2afp—Transform PostScript data to AFP data

Format

ps2afp [**-a** *imagetype*] [**-c** *transformclass*] [**-l** *length*]

[**-o** *outputfile*] [**-r** *resolution*] [**-t** *outputtype*] [**-w** *width*]

[**-x** *xmargin*] [**-y** *ymargin*][**-I**] [**-T**] [*inputfile ...*]

Description

The **ps2afp** command converts a PostScript data file into an AFPdata stream file.

If you specify the same option multiple times, the command uses only the last option. You can specify one or more input files to be transformed. If you do not specify an input file name, or if you specify a dash (**-**) as the file name, **ps2afp** uses standard input. The output file name is also optional. If you do not specify one, the **ps2afp** command writes the results to standard output.

Options

Note: All options and values are case-sensitive, except as noted.

-a *imagetype*

Determines the type of AFP data stream image to generate for each page in the PostScript file.

Values are:

io1-g4 Compressed Image Object Content Architecture (IOCA) image in Modified Telecommunication Standardization Sector (TSS) T.6 G4 Facsimile Coding Scheme (G4 MMR) format. This is the recommended output type because the AFP output data stream is smaller and it prints faster.

Tips:

1. Some older AFP printers do not support printing with an image type of **io1-g4**. For these printers, specify an image type of **io1-mmr** because it is the compressed image type that they support. This image type results in faster printing than uncompressed image types.

2. TSS was formerly the International Telegraph and Telephone Consultative Committee (CCITT).

im1 IM1 image. This type of image is not compressed. Specify it only if you know that your printer does not support compressed images.

Note: Do not create IM1 images at a resolution that the printer does not support because Print Services Facility (PSF) converts the IM1 images to uncompressed IOCA images at the resolution the printer requires. This conversion can cause PSF to use very large amounts of CPU time.

io1 IOCA image. This type of image is not compressed. Specify it only if you know that your printer does not support compressed images.

io1-mmr

Compressed IOCA image in Modified Modified Read (MMR) format.

Default: io1–g4

-c *transformclass*

Specifies the name of a transform class that your administrator has defined. The transform class determines these options:

- The initial transform configuration
- The fonts used in the transformed files

Ask your administrator for the name of a transform class suitable for the type of job.

-l *length*

Specifies the length of the generated image. In general, specify the length of the physical page. For more information about this option, see "Usage notes" on page 38. Specify a number followed by one of these units:

in Inches

mm Millimeters

pel   Pels, the default unit

Values are:

0.1334in to **53in**	Inch values for 240-pel printers
0.1067in to **53in**	Inch values for 300-pel printers
0.0667in to **53in**	Inch values for 480-pel printers
0.0534in to **53in**	Inch values for 600-pel printers
3.3867mm to **1346.2mm**	Millimeter values for 240-pel printers
2.7094mm to **1346.2mm**	Millimeter values for 300-pel printers
1.6934mm to **1346.2mm**	Millimeter values for 480-pel printers
1.3547mm to **1346.2mm**	Millimeter values for 600-pel printers
32pel to **12720pel**	Pel values for 240-pel printers
32pel to **15900pel**	Pel values for 300-pel printers
32pel to **25440pel**	Pel values for 480-pel printers
32pel to **31800pel**	Pel values for 600-pel printers

Examples:

```
-l 40mm
-l 200.5mm
-l 13in
-l 5280
-l 5280pel
```

Default: The length value set in the file is used. If none is set, 11in is the
default.

Tips:

1. If a text margin is already built into the file, try **-l 11in** to set the length
   to 11 inches.
2. Inch values and millimeter values can contain a decimal point; pel
   values cannot.
3. You can specify the unit using lowercase or uppercase letters (for
   example, `in` or `IN`).

-o *outputfile*

Specifies the output path and file into which the transform output (that is,
AFP data) is written. The transform overwrites any existing data in the
output file. If you specify more than one output file, the last path and file
name are used. If you do not specify an output file, the result is written to
standard output (STDOUT).

To specify an MVS data set, such as a sequential or partitioned data set,
precede the data set name with **//**. When you specify a fully qualified
name, two sets of quotation marks are required. For example,
`"//'hlq.PDS(MYDOC)'"` or `"//'hlq.SEQDS'"`. When you specify a partially
qualified name, you only need one set of quotation marks. For example,
`"//PDS(MYDOC)"` or `"//SEQDS"`.

If you specify an MVS data set, you must allocate and catalog the data set
before you run this command. Allocate the output data set with these
characteristics:
- Record format: VBM

- Record length: 8K (8192) bytes or larger

Allocate an MVS data set that is large enough to hold the AFP data stream. The size of the AFP data stream depends on the size and complexity of the document, the type of image compression (**-a** option), and the resolution of the image (**-r** option). Typically, an output AFP data stream is several times as large as the input data stream. For information about the size of the AFP data stream, see "Calculating the size of the AFP data stream" on page 51.

Note: If the specified MVS output data set does not exist, the transform creates the data set; however, the data set does not have the correct record format and record length. If you attempt to print the data set, PSF for z/OS writes message APS114I.

-r *resolution*

Specifies the resolution of the output image. Select the correct resolution for the printer on which you intend to print the image.

Values are:

240   240 pels per inch (for example, IBM 3812, 3825, 3827, 3835, and 3900 printers)

300   300 pels per inch (for example, IBM 4019, 4028, 4029, and 4039 printers and some Hewlett-Packard printers)

480   480 pels per inch

600   600 pels per inch (for example, InfoPrint 60 and InfoPrint 4000 printers)

Default: 600

Tips:

1. If you specify a resolution that the printer does not support, PSF prints the image under most conditions, but sometimes with degraded results.
2. A resolution of 300 pels typically produces good quality output on 300-, 600-, or 720-pel printers.

   300-pel output requires one-fourth the space and transmission time compared to 600-pel output.
3. A resolution of 600 pels typically produces good quality output on 1200-pel printers.

-t *outputtype*

Determines the type of output to create.

Values are:

document
       Printable document.

overlay
       Graphic image that can be printed on each page of a printable document.

pagesegment
       Graphic image that can be embedded in a printable document.

Default: document

Tip: When you create an overlay or page segment from a multiple-page input file, use the **-p** option to select a single page. If you do not select a page, the output will contain multiple, concatenated overlays or page segments. The AFP architecture does not allow multiple, concatenated overlays or page segments.

-w *width*

Specifies the maximum width of the generated image. In general, specify the width of the physical page. For more information about this option, see "Usage notes" on page 38. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

pel   Pels, the default unit

Values are:

0.1334in to **25.5in**	Inch values for 240-pel printers
0.1067in to **25.5in**	Inch values for 300-pel printers
0.0667in to **25.5in**	Inch values for 480-pel printers
0.0534in to **25.5in**	Inch values for 600-pel printers
3.3867mm to **647.7mm**	Millimeter values for 240-pel printers
2.7094mm to **647.7mm**	Millimeter values for 300-pel printers
1.6934mm to **647.7mm**	Millimeter values for 480-pel printers
1.3547mm to **647.7mm**	Millimeter values for 600-pel printers
32pel to **6120pel**	Pel values for 240-pel printers
32pel to **7650pel**	Pel values for 300-pel printers
32pel to **12240pel**	Pel values for 480-pel printers
32pel to **15300pel**	Pel values for 600-pel printers

Examples:

```
-w 40mm
-w 200.5mm
-w 13in
-w 4000
-w 4000pel
```

Default: The width set in the file is used. If none is set, the default is 8.5in.

Tips:

1. If a text margin is already built into the file, try **-w 8.5in** to set the width to 8.5 inches.
2. Inch values and millimeter values can contain a decimal point; pel values cannot.
3. You can specify the unit using lowercase or uppercase letters (for example, in or IN).

-x *xmargin*

Specifies a horizontal margin or border around the generated image to

avoid the non-printable areas of some printers. For more information about this option, see "Usage notes" on page 38. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

pel   Pels, the default unit

Values are:

0in to **12.75in**   Inch values for all printers

0mm to **323.85mm**

> Millimeter values for all printers

0pel to **3060pel**

> Pel values for 240-pel printers

0pel to **3825pel**

> Pel values for 300-pel printers

0pel to **6120pel**

> Pel values for 480-pel printers

0pel to **7650pel**

> Pel values for 600-pel printers

Default: 0

Tips:

1. If the value is less than 1, include a leading zero. For example, specify:
   ```
   0.5in
   0.8mm
   ```

2. Because the X value specifies margins on *both* the left and right sides of the page, the X value can be no more than half of the width (**-w**) of the generated image. For example, if you specify a width of 8 inches, the X value can be no larger than 4 inches. If you specify an X value of 5 inches, a blank page is printed because the sum of the left and right margins exceeds the width of the paper.

3. The X value does not shift the image on the page. The image is cropped if it is defined to print in the left or right margin.

4. Inch values and millimeter values can contain a decimal point; pel values cannot.

5. You can specify the unit using lowercase or uppercase letters (for example, in or IN).

-y *ymargin*

Specifies a vertical margin or border around the generated image to avoid the non-printable areas of some printers. For more information about this option, see "Usage notes" on page 38. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

pel   Pels, the default unit

Values are:

0in to **26.5in**   Inch values for all printers

0mm to **673.1mm**

        Millimeter values for all printers

0pel to **6360pel**

        Pel values for 240-pel printers

0pel to **7950pel**

        Pel values for 300-pel printers

0pel to **12720pel**

        Pel values for 480-pel printers

0pel to **15900pel**

        Pel values for 600-pel printers

Default: 0

Tips:

1. If the value is less than 1, include a leading zero. For example, specify:

   ```
   0.5in
   0.8mm
   ```

2. Because the Y value specifies margins on *both* the top and bottom of the page, the Y value can be no more than half of the length (**-l**) of the generated image. For example, if you specify a length of 12 inches, the Y value can be no larger than 6 inches. If you specify a Y value of 7 inches, a blank page is printed because the sum of the top and bottom margins exceeds the length of the paper.

3. The Y value does not shift the image on the page. The image is cropped if it is defined to print in the top or bottom margin.

4. Inch values and millimeter values can contain a decimal point; pel values cannot.

5. You can specify the unit using lowercase or uppercase letters (for example, `in` or `IN`).

-I   Specifies that the transform produces MO:DCA IS/3-compliant data streams.

This functionality is only available when a single file is sent to the transform, not several at a time.

Default: If the -I option is not set, the default is MO:DCA IS/1 output.

-T   Requests a trace. Specify this option only if instructed by IBM service personnel. For more information, see Chapter 5, "Diagnosing errors," on page 115.

Tip: You can use the **filter-options** job attribute with, for example, the **lp** command to pass any of these options except **-o** *outputfile* to the transform. For information about the **filter-options** job attribute, see *z/OS Infoprint Server User's Guide*.

Operand

inputfile

Specifies an input file to be transformed. If you specify more than one input file name, the **ps2afp** command transforms each file to AFP format and writes the results to a single output file (if one is specified) or to standard output.

If you do not specify an input file, or if you specify a dash (**-**) as the file name, **ps2afp** uses standard input.

Usage notes

In general, to position data on the page:

- Use **-l** and **-w** to set the physical page dimensions.
- Use **-x** and **-y** to set the amount of white space between the physical page dimensions and the image.

  These options do not shift or scale the image on the page. If the image is defined to print in the unprintable areas, it is cropped.

  For example, to create a 6.5 x 9 inch image that is centered on an 8.5 x 11 inch page, enter:

  ```
  -l 11in -w 8.5in -x 1in -y 1in
  ```

- Use a form definition that specifies zero vertical offset and zero horizontal offset, or specify X and Y offsets of 0 when you submit the print job.

Examples -- ps2afp

Transform a file, specifying transform class

To transform the PostScript file `myfile.ps` into an AFP data stream, using the `bigjob` transform class, and write the result to a file called `myfile.afp`, enter:

```
ps2afp -c bigjob -o myfile.afp myfile.ps
```

Transform a file, specifying image size

To transform the PostScript file `myfile2.ps` into an AFP data stream, with an image that is 8 inches high and 5 inches wide, and write the result to a file called `myfile2.afp`, enter:

```
ps2afp -l 8in -w 5in -o myfile2.afp myfile2.ps
```

Transform a file, using redirection

To transform the PostScript file `input.ps` into the AFP output file called `output.afp`, enter:

```
ps2afp < input.ps > output.afp
```

Note: You can only use redirection operators with z/OS UNIX files.

Transform multiple files

To transform the PostScript files `input.01.ps`, `input.02.ps`, ... `input.xx.ps` and write the results to one AFP output file called `output.afp`, enter:

```
ps2afp -o output.afp input.01.ps input.02.ps ... input.xx.ps
```

Transform a UNIX file to an MVS data set

To transform file `input.ps` into an existing, cataloged MVS output data set called `hlq`.OUTPUT.AFP(`member`), where `hlq` is your user ID, enter:

```
ps2afp -o "//'hlq.OUTPUT.AFP(member)'" input.ps
```

Transform a file and receive MVS return codes

To transform the PostScript file `myfile.ps` into an AFP data stream and write the result to a file called `myfile.afp` and receive MVS return codes (0, 4, 8), enter:

```
AOP_MVS_RETURN_CODES=YES ps2afp -o myfile.afp myfile.ps
```

MVS return codes indicate whether the transform was successful (0), a transform warning occurred (4), or a transform error occurred (8).

Environment variables

The **ps2afp** command uses these environment variables:

AOPCONF Names the Infoprint Server configuration file. This variable takes precedence over the user-specific configuration file (**$HOME/.aopconf**) and the system default configuration file (**/etc/Printsrv/aopd.conf**). For more information about the configuration file, see *z/OS Infoprint Server Customization*.

AOP_MVS_RETURN_CODES
  Specifies whether the command returns MVS return codes (0, 4, 8) or UNIX exit values (0, 1). The default is UNIX exit values.

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

NLSPATH Names the directory paths that the **ps2afp** command searches for message catalogs.

For information about setting and using environment variables, see *z/OS UNIX System Services User's Guide*.

The PostScript to AFP transform uses environment variables specified in the Infoprint Server transform configuration file. For information, see "Environment variables for the PDF to AFP and PostScript to AFP transforms" on page 66.

Files

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

/etc/Printsrv/aopd.conf
  Contains the system default Infoprint Server configuration file.

For the format of the configuration files, see *z/OS Infoprint Server Customization*.

Exit values

MVS return codes:
0   Successful.
4   A warning occurred during the transform.
8   The command was not accepted, a data stream error occurred during the transform, or the transform failed.

UNIX exit values (default):
0   Successful. However, a warning or data stream error might have occurred during the transform.
1   The command was not accepted, or the transform failed.

Notes:

1. The AOP_MVS_RETURN_CODES environment variable determines the type of exit values.
2. The AOP_FAIL_ON_ERROR transform environment variable controls whether the transform fails when it detects a data stream warning or error.

sap2afp—Transform SAP OTF or ABAP data to AFP data

Format

sap2afp [-a *imagetype*] [-c *transformclass*] [-o *outputfile*] [-r *resolution*] [-b] [-f] [-h] [-k]
[-s] [-u] [-I] [-T] [*inputfile ...*]

Description

The **sap2afp** command converts SAP Generic Output Format (SAPGOF) Output
Text Format (OTF) and Advanced Business Application Programming (ABAP) data
files:

- SAP OTF data files are converted into MOD:CA data streams.
- SAP ABAP data files are converted into line data streams.

The SAP OTF and ABAP data streams must be in ASCII or Unicode representation.

If you specify the same option multiple times, the command uses only the last
option.

You can specify one or more input files to be transformed. If you specify more
than one input file, the command concatenates the files, and the job attributes are
determined by the first file transformed. If you do not specify an input file name,
or if you specify a dash (**-**) as the file name, **sap2afp** uses standard input.

The output file name is also optional. If you do not specify one, the **sap2afp**
command writes the results to standard output.

Options

Note: All options and values are case-sensitive.

-a *imagetype*
    Specifies the IOCA function set that the transform uses when transforming
OTF color image data.

    Values are:

    FS10   Creates black-and-white (also called bi-level) output.

    FS45   Generates color IOCA FS45 output.

    Default: FS10

-b   Specifies the SAP bar code orientation point as the lower left corner. This
option tells the transform to override the transform's default behavior, and
instead, place bar codes according to the SAP specification.

    Consider using the **-b** option when differences between the SAP and AFP
coordinates cause the bar codes to appear slightly out of place in the AFP
output.

    Default: The transform places bar codes according to the MO:DCA
coordinate system.

-f   Specifies the use of TrueType fonts in the Unicode environment. The
transform uses the configuration files **fonts.tab.unicode.truetype** (for OTF
input) and **pagedef.tab.unicode.truetype** (for ABAP output) to map the

TrueType fonts. For SAP OTF input files with TrueType inline fonts, the transform creates AFP data containing the referenced TrueType fonts as inline resources.

> **Default:** The SAP to AFP transform does not use TrueType fonts to produce AFP output.

-h   Specifies that the OTF input file was generated using the SAPGOF_ST_CHARS:X entry from the SAP Unicode system.

When **-h** is specified, the SAP to AFP transform doubles the LENGTH parameters of ST and BC commands for Unicode pages, so that the OTF stream can be correctly processed in accordance with the SAP standard. You should only use the **-h** option if the SAPGOF_ST_CHARS:X entry has been set on the SAP Unicode system that generates the SAP input. This option is ignored for ABAP files.

Note: The **-h** option does not influence the ASCII or Unicode processing environment for the file.

> **Default:** If the **-h** option is not applied, the SAP to AFP transform does not change the ST and BC commands for the OTF input.

-k   Specifies the use of the SAP specification for centering BX boxes; tells the transform to override AFP placement for SAP boxes defined by the BX command, and instead place boxes according to the SAP specification.

The **-k** option is useful if boxes in AFP output appear to be positioned slightly out of place, due to differences between the SAP and AFP coordinate systems.

> **Default:** The transform prints boxes centered according to the MO:DCA coordinate system, not the SAP coordinate system.

-o *outputfile*
Specifies the output path and file into which the transform output (that is, AFP or line data) is written. The transform overwrites any existing data in the output file. If you specify more than one output file, the last specified path and file name are used. If you do not specify an output file, the result is written to standard output (STDOUT).

For SAP R/3 OTF data, you can specify either an MVS data set (such as a sequential or partitioned data set) or a UNIX file. However, for SAP ABAP data, you must specify an MVS data set.

If you specify an MVS data set, precede the data set name with **//**. When you specify a fully qualified name, two sets of quotation marks are required. For example, `"//'hlq.PDS(MYDOC)'"` or `"//'hlq.SEQDS'"`. When you specify a partially qualified name, you only need one set of quotation marks. For example, `"//PDS(MYDOC)"` or `"//SEQDS"`.

If you specify an MVS data set, you must allocate and catalog the data set before you run this command. Allocate the output data set with these characteristics:
- Record format: VBM
- Record length: 8K (8192) bytes or larger

Allocate an MVS data set that is large enough to hold the AFP data stream. Typically, the output AFP data stream is the same size as the input data stream.

Note: If the specified MVS output data set does not exist, the transform creates the data set; however, the data set does not have the correct record format and record length. If you attempt to print the data set, PSF for z/OS writes message APS114I.

-r *resolution*

Specifies the resolution used to print image data in the job. Select the correct resolution for the printer on which you intend to print the job.

Values are:

240   240 pels per inch (for example, IBM 3812, 3825, 3827, 3835, and 3900 printers)

300   300 pels per inch (for example, IBM 3112, 3116, 4019, 4028, 4029, and 4039 printers and Hewlett-Packard printers)

480   480 pels per inch

600   600 pels per inch (for example, the InfoPrint 60 and InfoPrint 4000 printers)

720   720 pels per inch (for example, the InfoPrint 60 and InfoPrint 4000 printers)

1200   1200 pels per inch (for example, the InfoPrint 60 and InfoPrint 4000 printers)

Default: The resolution specified in the **image.tab** configuration file.

Tips:

1. If you specify a resolution that the printer does not support, PSF prints the image under most conditions, but sometimes with degraded results.

2. A resolution of 300 pels typically produces good quality output on 300-, 600-, or 720-pel printers.

   300-pel output requires one-fourth the space and transmission time compared to 600-pel output.

3. A resolution of 600 pels typically produces good quality output on 1200-pel printers.

-s   Suppresses Graphic Object Content Architecture (GOCA) boxes. Some older printers do not print these boxes.

-u   Causes the transform to treat data as ASCII in SAPGOF OTF with ST commands that use Unicode code pages.

The -u option lets you transform SAP input files that were created in a Unicode environment and print them on older printers that do not support Unicode. This option produces AFP that does not use Unicode pages, so the data can print on ASCII-only printers. This option is ignored for ABAP files and for SAPGOFU data.

Note: If Unicode characters in the input file are not covered by code page ISO-8859-1, the input characters are replaced by spaces.

-I   Specifies that the transform produces MO:DCA IS/3 data streams. When this option is specified, TrueType fonts are used for creating the AFP output.

This functionality is only available when a single file is sent to the transform, not several at a time.

| The **-I** option overrides other conflicting options:

- Because it enables Unicode, the **-u** option is ignored, if set.
- Because TrueType fonts are used when this option is set, the **-I** option disables the use of FOCA fonts and implicitly sets the **-f** option to use TrueType fonts.

Default: If the **-I** option is not specified, the default is MO:DCA IS/1 output.

-T Requests a trace. Specify this option only if instructed by IBM service personnel. For more information, see Chapter 5, "Diagnosing errors," on page 115.

Tip: You can use the **filter-options** job attribute with, for example, the **lp** command to pass any of these options except **-o** *outputfile* to the transform. For information about the **filter-options** job attribute, see *z/OS Infoprint Server User's Guide*.

Operand

inputfile

Specifies an input file to be transformed. If you specify more than one input file name, the **sap2afp** command concatenates the files. The results are written to a single output file (if one is specified) or to standard output.

The data in the file must be in stream mode. That is, it must not contain any record data.

If you do not specify an input file, or if you specify a dash (**-**) as the file name, **sap2afp** uses standard input.

Examples -- sap2afp

Transform a file, specifying resolution

To transform the SAP OTF file `myfile.otf` for printing on a 600-pel AFP printer, and write the result to a UNIX file called `myfile.afp`, enter:

```
sap2afp -r 600 -o myfile.afp myfile.otf
```

Transform and print a file

To transform the SAP OTF file `myfile.otf` into an AFP data stream, and send the result to the default printer with the **lp** command, enter:

```
sap2afp myfile.otf | lp
```

Transform a file using redirection

To transform the SAP OTF file `input.otf` into a UNIX output file called `output.afp`, enter:

```
sap2afp < input.otf > output.afp
```

Note: You can use redirection operators only with UNIX files.

Transform multiple files and concatenate the output

To transform the SAP OTF files `input.01.otf`, `input.02.otf`, ... `input.xx.otf` into one UNIX output file called `output.afp`, enter:

```
sap2afp -o output.afp input.01.otf input.02.otf ... input.xx.otf
```

Transform a UNIX file to an MVS data set

To transform file `input.sap` into an existing, cataloged MVS output data set called `hlq.OUTPUT.AFP(member)`, where *hlq* is your user ID, enter:

```
sap2afp -o "//'hlq.OUTPUT.AFP(member)'" input.sap
```

Transform an MVS data set, writing the output to a UNIX file

To transform the MVS data set `hlq.INPUT.OTF(member)`, where *hlq* is your user ID, into an output file called `output.afp`, enter:

```
sap2afp -o output.afp "//'hlq.INPUT.OTF(member)'"
```

Transform a file and receive MVS return codes

To transform the SAP file `myfile.sap` into an AFP data stream and write the result to an existing, cataloged MVS output data set called `hlq.OUTPUT.AFP(member)` and receive MVS return codes (0, 4, 8), enter on the same command line:

```
AOP_MVS_RETURN_CODES=YES sap2afp -o "//'hlq.OUTPUT.AFP(member)'" myfile.sap
```

MVS return codes indicate whether the transform was successful (0), a transform warning occurred (4), or a transform error occurred (8).

Environment variables

The **sap2afp** command uses these environment variables:

AOPCONF   Names the Infoprint Server configuration file. This variable takes precedence over the user-specific configuration file (**$HOME/.aopconf**) and the system default configuration file (**/etc/Printsrv/aopd.conf**). For more information about the configuration file, see *z/OS Infoprint Server Customization*.

AOP_MVS_RETURN_CODES
              Specifies whether the command returns MVS return codes (0, 4, 8) or UNIX exit values (0, 1). The default is UNIX exit values.

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

NLSPATH   Names the directory paths that the **sap2afp** command searches for message catalogs.

For information about setting and using environment variables, see *z/OS UNIX System Services User's Guide*.

The SAP to AFP transform uses environment variables specified in the Infoprint Server transform configuration file. For information, see "Environment variables for the SAP to AFP transform" on page 77.

Files

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

/etc/Printsrv/aopd.conf
              Contains the system default Infoprint Server configuration file.

Exit values

MVS return codes:
0   Successful.
4   A warning occurred during the transform.

| 8 | The command was not accepted, a data stream error occurred during the transform, or the transform failed. |

UNIX exit values (default):

| 0 | Successful. However, a warning or data stream error might have occurred during the transform. |
| 1 | The command was not accepted, or the transform failed. |

Notes:

1. The AOP_MVS_RETURN_CODES environment variable determines the type of exit values.

2. The AOP_FAIL_ON_ERROR transform environment variable controls whether the transform fails when it detects a data stream warning or error.

Transforming data with the AOPBATCH program

This section describes how to use the Infoprint Server AOPBATCH program to run the transform commands. The AOPBATCH program lets you submit a batch job to transform data to AFP. Infoprint Server provides the AOPBATCH program in SYS1.LINKLIB.

AOPBATCH parameters

The AOPBATCH parameters are the name of the transform command, followed by transform options and arguments, in this format:

```
EXEC PGM=AOPBATCH,PARM='/transform_name transform_options'
```

/   The optional slash indicates that the PARM data that follows is input to AOPBATCH. If you omit the initial slash, your PARM data might be interpreted as C++ run-time options. You *must* include the initial slash if any of the PARM data itself includes a slash. For example, if the transform name is /mylib/ps2afp, specify: PARM='//mylib/ps2afp ...'.

transform_name
The name of an executable transform program that resides in a z/OS UNIX file. The name of the transform program is case-sensitive. You can specify one of these command names: **pcl2afp, pdf2afp, ps2afp, sap2afp**.

If the transform program does not reside in one of the directories that are specified in the PATH environment variable, also specify the pathname. You can use the STDENV DD statement to set the PATH environment variable if the default value set by AOPBATCH is not suitable. For information about the defaults set for environment variables, see "AOPBATCH DD statements" on page 46.

transform_options
Options and arguments accepted by the transform. For a description of each, see "pcl2afp—Transform PCL data to AFP data" on page 13, "pdf2afp—Transform PDF data to AFP data" on page 23, "ps2afp—Transform PostScript data to AFP data" on page 31, or "sap2afp—Transform SAP OTF or ABAP data to AFP data" on page 40.

You must specify the transform input data set or file as a transform argument, and you must specify the **-o** transform option to identify where you want the transform to write its output. (This is because the transform cannot write its output to standard output and cannot read input from standard input.) To identify the transform input and output data set or file, you can specify either

a DD statement name or a data set or file name. You must specify a DD statement name if you want to write the transform output to an MVS data set that does not already exist.

Specify the names of DD statements to the transform in this format:

`//DD:DDname`

The name of the DD statement is *DDname*.

When you specify an MVS data set name in the **-o** option, code two slashes before the data set name and enclose the data set name in two sets of single quotation marks if you specify a fully qualified data set name. If you do *not* enclose the data set name in quotation marks, a high-level qualifier is added to the name you specify:

- If you are running under TSO (batch or interactive), the TSO user prefix is appended.
- If you are running under MVS batch or IMS™ (batch or online), the RACF® user ID is appended.
- If your system does not use RACF, a high-level qualifier is not added.

For examples of different ways to specify transform input and output data sets and files, see "AOPBATCH examples" on page 47.

Note: A maximum region size of 6 MB should be sufficient.

AOPBATCH DD statements

The AOPBATCH JCL procedure accepts these standard DD statements:

STDENV

Specifies environment variables that the transform command uses. You can specify the environment variables in-stream in the JCL, in an MVS data set, or in a UNIX file. Specify the environment variables in the format *variable=value*, with one environment variable per line or record. Sequence numbers in columns 73 - 80 in data that is specified with the STDENV DD statement are ignored and *not* treated as part of the data.

If you omit the STDENV DD statement or do not specify one of these environment variables, AOPBATCH sets these default values, which are suitable for running Infoprint Server programs if your installation installed Infoprint Server files in the default directories:

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

Notes:

1. To obtain MVS return codes (0, 4, 8) instead of the default UNIX exit values (0, 1), set the AOP_MVS_RETURN_CODES=yes environment variable. For information, see "AOP_MVS_RETURN_CODES environment variable" on page 52.
2. AOPBATCH sets the HOME environment variable to the user's home directory and sets the LOGIN variable to the user ID.
3. Do not specify the _BPX_SHAREAS environment variable. AOPBATCH sets it appropriately.

STDERR

Specifies the system output data set where error messages are to be written. The data set can be an MVS data set or a UNIX file. The

transforms do not write messages related to errors in the input data stream in this data set. Instead, the transforms write these messages at the end of the output document.

STDOUT

Specifies the system output data set where informational messages are to be written. The data set can be an MVS data set or a UNIX file.

You can also include DD statements to specify MVS data sets that contain input data to be transformed, the transformed output, or job attributes that are input to the transform.

Rules:

1. Do *not* use DD names STDIN, STDOUT, or STDERR to specify the transform input and output data sets. Instead, use other DD names, such as INPUT and OUTPUT, which are used in the examples.

2. If you have not added the Language Environment® run-time library (CEE.SCEERUN) or the C++ run-time library (CBC.SCLBDLL) to the system LNKLST, specify these data sets in a STEPLIB DD statement.

3. The PDF to AFP and the PostScript to AFP transforms cannot transform concatenated input files. If you want to transform more than one PDF or PostScript file in the same job, create a separate step to transform each file. (The PCL to AFP transform can transform concatenated input files.) See "AOPBATCH examples" for an example of how to transform and print multiple PDF files in the same job.

4. If you want to write the AFP data stream to an MVS data set, you must allocate and catalog the MVS data set before you run AOPBATCH or include a DD statement in the AOPBATCH job to allocate the data set. Allocate a data set with these characteristics:
   - Record format: VBM.
   - Record length: 8192 (8K) or larger.
   - Disposition: SHR or OLD overwrites any existing data in the data set; MOD appends the output to any existing data. MOD is the default.

   Allocate an MVS data set that is large enough to hold the AFP data stream. The size of the AFP data stream depends on the size and complexity of the document, the type of image compression, and the resolution of the image. Typically, the PCL to AFP, PDF to AFP, and PostScript to AFP transforms create an output AFP data stream that is several times as large as the input data stream. For more information about the size of the AFP data stream, see "Calculating the size of the AFP data stream" on page 51.

   Note: If you specify an MVS output data set that does not exist, the transform creates the data set; however, the data set does not have the correct record format and record length. If you attempt to print the data set, PSF for z/OS writes message APS114I.

AOPBATCH examples

These examples show how to use the AOPBATCH procedure to transform data. For additional AOPBATCH examples, see *z/OS Infoprint Server User's Guide*.

Specify transform input and output in MVS data sets, and specify environment variables

This example shows how to transform data when the transform input is in an MVS data set and transform output is written to an MVS data set. The PostScript to AFP transform reads PostScript input from data set HLQ.INPUT.PS and writes AFP output to data set HLQ.OUTPUT.AFP. HLQ represents the high-level qualifier.

This example also shows how to specify environment variables in-stream in the
STDENV DD statement. If you installed Infoprint Server and created Infoprint
Server configuration files in default directories, you do not need to specify the
PATH, LIBPATH, NLSPATH, and AOPCONF environment variables.

```
//AOPBATCH JOB  ...
//TRANSFRM EXEC PGM=AOPBATCH,PARM='/ps2afp -c letter -r 300 -o //DD:OUT
//           PUT DD:INPUT'
//INPUT    DD   DSN=HLQ.INPUT.PS,DISP=SHR
//OUTPUT   DD   DSN=HLQ.OUTPUT.AFP,DISP=(NEW,CATLG,DELETE),
// DCB=(RECFM=VBM,LRECL=32756,BLKSIZE=32760),SPACE=(CYL,(1,1))
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
//STDENV   DD   *
AOP_MVS_RETURN_CODES=YES
PATH=/usr/lpp/Printsrv/bin:/bin:/usr/bin
LIBPATH=/usr/lpp/Printsrv/lib:/lib:/usr/lib
NLSPATH=/usr/lpp/Printsrv/En_US/%N:/usr/lib/nls/msg/En_US/%N
AOPCONF=/etc/Printsrv/aopd.conf
/*
```

Specify transform input in a UNIX file and output in an MVS data set

This example shows how to transform data when the transform input is in a UNIX
file and transform output is written to an MVS data set. The PDF to AFP transform
reads the PDF input from file **/tmp/input.pdf** and writes AFP output to
HLQ.OUTPUT.AFP.

```
//AOPBATCH JOB  ...
//TRANSFRM EXEC PGM=AOPBATCH,PARM='/pdf2afp -c letter_300 -o //DD:OUTPU
//          T /tmp/input.pdf'
//OUTPUT   DD   DSN=HLQ.OUTPUT.AFP,DISP=(NEW,CATLG,DELETE),
// DCB=(RECFM=VBM,LRECL=32756,BLKSIZE=32760),SPACE=(CYL,(1,1))
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
```

Transform and print data sets

This example shows how to transform data and print the output from the
transform in a subsequent step.

In the first step, the PostScript to AFP transform reads PostScript input from data
set HLQ.INPUT.PS and writes AFP output to data set HLQ.OUTPUT.AFP, where
HLQ represents the high-level qualifier.

In the second step, the AOPPRINT JCL procedure prints the AFP output to the
printer named mypsfprinter, which is defined in the Printer Inventory.

For information about AOPPRINT, see *z/OS Infoprint Server User's Guide*.

```
//AOPBATCH JOB  ...
//TRANSFRM EXEC PGM=AOPBATCH,PARM='/ps2afp -o //DD:OUTPUT //DD:INPUT'
//INPUT    DD   DSN=HLQ.INPUT.PS,DISP=SHR
//OUTPUT   DD   DSN=HLQ.OUTPUT.AFP,DISP=(NEW,CATLG,DELETE),
// DCB=(RECFM=VBM,LRECL=32756,BLKSIZE=32760),SPACE=(CYL,(1,1))
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
//PRINT    EXEC AOPPRINT,PRINTER='mypsfprinter'
//SYSIN    DD   DSN=HLQ.OUTPUT.AFP,DISP=SHR
```

Transform and print data sets only if the transform is successful

This example shows how to transform data and print the output from the
transform in a subsequent step only if no warnings or errors occur during the
transform.

In the first step, the PostScript to AFP transform reads PostScript input from data set HLQ.INPUT.PS and writes AFP output to data set HLQ.OUTPUT.AFP, where HLQ represents the high-level qualifier.

The STDENV data set specifies the AOP_MVS_RETURN_CODES environment variable. Because this variable is set to YES, the transform returns MVS return codes: 0 (successful), 4 (warning), 8 (failure).

In the second step, the AOPPRINT JCL procedure prints the AFP output to the printer named `mypsfprinter`, which is defined in the Printer Inventory. This step runs only if the return code from the transform step is less than 4.

For information about AOPPRINT, see *z/OS Infoprint Server User's Guide*.

```
//AOPBATCH JOB  ...
//TRANSFRM EXEC PGM=AOPBATCH,PARM='/ps2afp -o //DD:OUTPUT //DD:INPUT'
//INPUT    DD   DSN=HLQ.INPUT.PS,DISP=SHR
//OUTPUT   DD   DSN=HLQ.OUTPUT.AFP,DISP=(NEW,CATLG,DELETE),
// DCB=(RECFM=VBM,LRECL=32756,BLKSIZE=32760),SPACE=(CYL,(1,1))
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
//STDENV   DD   *
AOP_MVS_RETURN_CODES=YES
/*
//PRINT    EXEC AOPPRINT,PRINTER='mypsfprinter',
// COND=(4,LT,TRANSFRM)
//SYSIN    DD   DSN=HLQ.OUTPUT.AFP,DISP=SHR
```

Continuing parameter fields in JCL

To continue a parameter field:

1. Interrupt the field after a complete parameter or subparameter, including the comma that follows it, at or before column 71.

   _____

2. Code // in columns 1 and 2 of the following statement.

   _____

3. Code a blank character in column 3 of the following statement.

   _____

4. Continue the interrupted parameter or field beginning in any column from 4 through 16.

   _____

To continue a parameter that is enclosed in apostrophes:

1. Extend the parameter to column 71. Do not code an apostrophe in column 71.

   _____

2. Code // in columns 1 and 2 of the following statement.

   _____

3. Continue the parameter in column 16 of the following statement even if doing this splits the parameter.

   _____

AOPBATCH exit values

AOPBATCH returns one of these values:

Value	Meaning
1	An error occurred while AOPBATCH was trying to write to the STDOUT DD.
2	An error occurred while AOPBATCH was trying to write to the STDERR DD.
4	AOPBATCH could not spawn the process.
nn	The exit value from the transform command.

The transforms return either MVS return codes (0, 4, 8) or UNIX exit values (0, 1) depending on the value of the AOP_MVS_RETURN_CODES environment variable. If the environment variable is not set, the transforms return UNIX exit values.

Using the Print Interface subsystem

You can use the Print Interface subsystem (provided with Infoprint Server) to transform data created by a batch application to AFP format so that it can be printed on an AFP printer. The Print Interface subsystem writes the AFP output from the transform to an output data set on the JES spool. PSF can then print the output data set on an AFP printer.

For information about the Print Interface subsystem, see "Transforming data using the Print Interface subsystem" in *z/OS Infoprint Server User's Guide*.

Example: This example shows how to print a PDF document created by a batch application on an AFP printer using form definition F1MYDEF, which is in library USERA.MYLIB, to format the AFP data. It assumes that:

- The Print Interface subsystem named AOP1 has been started.
- Printer definition myafpprinter exists in the Infoprint Server Printer Inventory with these characteristics:
  - The PDF to AFP transform is specified.
  - The class and destination name for the PSF-controlled AFP printer are specified. (CLASS and DEST are JES work-selection parameters that can direct output from the JES spool to a PSF-controlled printer.)

```
//SUBSYS JOB ...
//STEP1  EXEC PGM=USERA
//OUTDS1 OUTPUT FORMDEF=MYDEF,USERLIB=USERA.MYLIB
//DD1    DD SUBSYS=(AOP1,'myafpprinter'),OUTPUT=*.OUTDS1
```

Using the lprafp command

The **lprafp** command lets you print documents from Windows systems and UNIX systems (such as HP-UX and SunOS) and specify Infoprint Server job attributes. For example, when you use the **lprafp** command, you can specify the name of a form definition in the **form-definition** attribute and the number of copies in the **copies** attribute.

You might want to use the **lprafp** command to print PDF or PostScript documents that are on your Windows or UNIX systems.

Example: This example shows how to print two copies of a PDF document named
`myfile.pdf` on an AFP printer named `myafpprinter` using form
definition `F1FORM` to format the AFP data. It assumes that:

- The host name of the z/OS system where Infoprint Server is running
  is `systema`.
- Printer definition `myafpprinter` exists in the Infoprint Server Printer
  Inventory with these characteristics:
  - The PDF to AFP transform is specified.
  - The class and destination name for the PSF-controlled AFP printer
    are specified. (CLASS and DEST are JES work-selection parameters
    that can direct output from the JES spool to a PSF-controlled
    printer.)

```
lprafp -o"XAOP form-definition=f1form copies = 2" -p myafpprinter -s systema myfile.pdf
```

Calculating the size of the AFP data stream

If a transform command writes the AFP data stream to an MVS data set, you must
allocate an MVS data set that is large enough to hold the AFP data stream.
Typically, the AFP data stream is several times as large as the input data stream.

The size of the AFP data stream depends on the size and complexity of the
document, whether the AFP images are compressed, and the resolution of the
images. You specify the type of image compression in the **-a** option of the
transform command. You can specify the resolution in the **-r** option of the
transform command, in the AOP_RESOLUTION environment variable (PCL to AFP
transform), and in the **image.tab** configuration file (SAP to AFP transform).

Steps for calculating the size of the AFP data stream:

1. Use these formulas to calculate the number of bytes per page:

   page width * resolution * page height * resolution = bits per page
   bits per page / 8 = bytes per page

   The page width, page height, and resolution must be in the same units.
   For example, for an 8.5 x 11 inch page at 600 pels (bits) per inch resolution:
   ```
   (8.5 * 600 * 11.0 * 600) / 8  = 4,207,500 bytes per page
   ```

   Note: If the pages contain blank areas, which is typical of most text pages, the
   number of bytes per page can be substantially smaller.

   _____

2. If the transform creates a compressed IOCA image (G4 MMR or MMR format),
   multiply the bytes per page by 50%. For example:
   ```
   4,207,500 * 0.5 = 2,103,750 bytes per page
   ```

   _____

3. Multiply the number of bytes per page by the number of pages in the document. For example, for 100 pages:

```
2,103,750 * 100 = 210,375,000 bytes in AFP data stream
```

_____

Note: The SAP to AFP transform does not produce full-page AFP images. This transform creates an AFP data stream that is approximately the same size as the input data stream.

Tip: To reduce the size of the AFP data stream:

- Specify the lowest resolution that produces good quality output. A resolution of 300 pels typically produces good quality output on 300- or 600-pel printers. A resolution of 300 pels typically produces good quality output on 300-, 600-, or 720-pel printers. 300-pel output requires one-fourth the space and transmission time compared to 600 pel output. (The default resolution for the PDF to AFP, PostScript to AFP, and SAP to AFP transforms is 600 pels. The default resolution for the PCL to AFP transform is 240 pels.)
- Specify compressed IOCA images (**-a io1-g4** or **-a io1-mmr**). Specify uncompressed IOCA or IM1 images only if you know that your printer does not support compressed images. Most newer printers support compressed IOCA images.
- Do not specify IM1 images at a resolution that the printer does not support because Print Services Facility (PSF) converts the IM1 images to uncompressed IOCA images at the resolution the printer requires. This conversion can cause PSF to use very large amounts of CPU time.

Note: You should only embed TrueType fonts if the product you are using does not use a RAT. If you embed TrueType fonts, the output file will be much larger, which might decrease performance or cause the transform to run out of space when writing the output

AOP_MVS_RETURN_CODES environment variable

The AOP_MVS_RETURN_CODES environment variable determines whether the transform command returns MVS return codes (0, 4, 8) instead of UNIX exit values (0, 1). MVS return codes let you determine whether a warning or error occurred during the transform.

MVS return codes are useful when you use the AOPBATCH JCL procedure to run a transform and want a subsequent step in the job to run only if the transform step was successful. For an example of using MVS return codes with AOPBATCH, see "AOPBATCH examples" on page 47.

AOP_MVS_RETURN_CODES

Specifies whether the **lp**, **pcl2afp**, **pdf2afp**, **ps2afp**, and **sap2afp** commands return MVS return codes or UNIX exit values:

Value	Meaning
YES	MVS return codes:
	0 Successful.
	4 A warning occurred during the transform.
	8 The command was not accepted, a data stream error occurred during the transform, or the transform failed.

NO UNIX exit values:

    0   Successful. However, a warning or data stream error might have occurred during the transform.

    1   The command was not accepted, or the transform failed.

Notes:

- Specify this environment variable before the command on the z/OS UNIX command line. You can also specify this variable in the **$HOME/.profile** file (if you use the /bin/sh shell) or the **$HOME/.tcshrc** file (if you use the /bin/tcsh shell).
- If you use the AOPPRINT JCL procedure, specify this environment variable in the STDENV data set of the procedure. AOPPRINT runs the **lp** command and returns the code from the **lp** command.
- If you use the AOPBATCH JCL procedure to run a transform command or the **lp** command, specify this environment variable in the STDENV data set of the procedure. AOPBATCH returns the code from the transform command or the **lp** command.
- Do not specify this environment variable in the transform entry in the Infoprint Server transform configuration file, **aopxfd.conf**.
- You can specify the value using lowercase or uppercase letters (for example, no or NO).

Default: NO

Example: AOP_MVS_RETURN_CODES=YES

Table 5 shows the transform exit values when the AOP_FAIL_ON_ERROR and AOP_MVS_RETURN_CODES environment variables are set and the transform is successful, a warning occurs, or a data stream error occurs. (The **Fail on error** field in the printer definition and the **fail-on-transform-error** job attribute provide equivalent function to the AOP_FAIL_ON_ERROR environment variable.)

Table 5. Transform exit values with AOP_FAIL_ON_ERROR and AOP_MVS_RETURN_CODES environment variables

AOP_FAIL_ON_ERROR	AOP_MVS_RETURN_CODES=YES		AOP_MVS_RETURN_CODES=NO	
NO	**Successful:**	0	**Successful:**	0
	Warning:	4	**Warning:**	0
	Error:	8	**Error:**	0
ERROR	**Successful:**	0	**Successful:**	0
	Warning:	4	**Warning:**	0
	Error:	8	**Error:**	1
WARNING	**Successful:**	0	**Successful:**	0
	Warning:	8	**Warning:**	1
	Error:	8	**Error:**	1

Chapter 3. Customizing transforms

This chapter describes how to customize the transforms:

Task	See page
Customizing the PCL to AFP transform	55
Customizing the PDF to AFP and PostScript to AFP transforms	63
Customizing the SAP to AFP transform	75

Customizing the PCL to AFP transform

To customize the PCL to AFP transform, do the tasks listed in this table. Required tasks are required by all installations. Optional tasks are required only if the listed condition applies to your installation.

Task	Condition	See page
Creating an entry in the Infoprint Server transform configuration file	Required	55

Creating an entry in the Infoprint Server transform configuration file

You must create at least one transform entry in the Infoprint Server transform configuration file (**aopxfd.conf**) for the PCL to AFP transform. In the transform entry, you specify:

- Environment variables that control the transform
- Attributes that control how the Infoprint Server Transform Manager manages the transform

For information about how to create and edit the Infoprint Server transform configuration file, see "Creating the transform configuration file (aopxfd.conf)" in *z/OS Infoprint Server Customization*. After you update the transform configuration file, you must restart the Infoprint Server Transform Manager.

Tip: After you restart the Infoprint Server Transform Manager, check for error messages in the transform's **standard error**. If you find any error messages, fix the errors and restart the Infoprint Server Transform Manager. For more information about how to find the transform message logs, see "Finding the transform stderr file" on page 115.

Transform classes

If you want to specify different transform options for different printers, you can create different classes of the transform. For example, you might create classes for printers that print on different paper sizes.

For each transform class, you must create a separate transform entry. You select a name for the transform class in the transform entry (see the **transform** attribute).

To use a transform class, job submitters must specify the class name in the **-c** option on the **pcl2afp** command or in the **filter-options** job attribute, and

administrators must specify the class name in the **-c** filter option in the printer definition. For example, these z/OS UNIX commands use the "letter_300" transform class:

```
pcl2afp -c letter_300 -o myfile.afp myfile.pcl
lp -d myprinter -o "filter-options='-c letter_300'" myfile.pcl
```

Tip: The sample transform configuration file, **/usr/lpp/Printsrv/samples/aopxfd.conf**, shows examples of transform entries with different transform classes. Also, see "Examples -- Transform configuration file entries for the PCL to AFP transform" on page 62.

Format of a PCL to AFP transform entry

The format of a PCL to AFP transform entry in the transform configuration file (**aopxfd.conf**) is:

```
transform pcl2afp[_transformclass]
    start-command = pcl2afpd
    [ environment  = {name –> value [ name –> value]... } ]
    [ maximum-active = number ]
    [ maximum-idle-time = seconds ]
    [ minimum-active = number ]
    ;
```

transform pcl2afp[_*transformclass*]

This statement indicates the beginning of a transform entry.

pcl2afp

The name of the transform.

transformclass

The name of an optional transform class. Specify from 1 to 63 characters, including letters, numbers, or special characters. The name of the transform class is case-sensitive.

Default: No transform class.

Example: transform pcl2afp_letter_300

start-command = pcl2afpd

This attribute names the transform daemon and option. Enclose the value in single or double quotation marks if you specify the option.

pcl2afpd

The name of the transform daemon. If the transform daemon is not in a directory that is identified in the PATH environment variable in the **aopstart** EXEC, specify the full directory path name of the daemon. (The **pcl2afpd** daemon is installed in **/usr/lpp/Printsrv/bin**.) This attribute is required.

environment = {*name* –> *value* [*name* –> *value***]... }**

Environment variables that specify transform options. Enclose the entire set of environment variables in braces. The values in these environment variables override environment variables with the same name that are set in the **aopstart** EXEC. If a value contains special characters or spaces, enclose the value in single or double quotation marks.

For information about the environment variables you can specify, see "Environment variables for the PCL to AFP transform" on page 57.

Rule: Environment variable names must be uppercase. Environment variable values are case-insensitive.

Default: None.

Example:
```
environment = {AOP_RESOLUTION -> 240}
```

maximum-active = *number*

The maximum number of transform daemons that the Infoprint Server Transform Manager activates concurrently. Specify a number greater than 0 and greater than or equal to the number specified in the **minimum-active** attribute. For more information, see "Format of a transform entry" in *z/OS Infoprint Server Customization*.

Default: No maximum number. Transform daemons are started when needed.

maximum-idle-time = *seconds*

The number of seconds before the Infoprint Server Transform Manager shuts down an idle transform daemon and system resources are freed. Specify a number greater than 0. For more information, see "Format of a transform entry" in *z/OS Infoprint Server Customization*.

Default: Idle transform daemons are not shut down.

minimum-active = *number*

The minimum number of transform daemons that the Infoprint Server Transform Manager activates concurrently. Specify a number less than or equal to the number specified in the **maximum-active** attribute. For more information, see "Format of a transform entry" in *z/OS Infoprint Server Customization*.

Default: minimum-active = 0

Environment variables for the PCL to AFP transform

Use environment variables to specify:

- Height and width of the page
- Margins of the page
- Resolution of the printer
- Record length of AFP images
- Tracing options
- Whether the transform fails when warnings or data stream errors occur
- Whether the transform writes messages to a trailer error page

You can specify these environment variables. All environment variables are optional.

_BPX_JOBNAME

The job name for this transform. When you assign a different job name to each class of transform, the operator can manage the transform daemons more effectively. Specify a job name of 1 to 8 alphanumeric characters. Incorrect job names are ignored. For more information about the _BPX_JOBNAME variable, see *z/OS UNIX System Services Planning*.

Default: The job name is AOPXFD.

Example: `environment = {_BPX_JOBNAME -> PCL2AFPD}`

AOP_FAIL_ON_ERROR

Specifies whether the transform stops processing when a warning or data stream error occurs during the transform. Warnings can indicate degraded output.

Valid values are:

error   The transform fails when a data stream error occurs and does not create an output document. However, the transform continues if warnings occur.

<u>**no**</u>   The transform continues processing when a warning or data stream error occurs and creates an output document. This value is the default.

warning

The transform fails when a warning or data stream error occurs and does not create an output document.

Tips:

- For backward compatibility, value **yes** is allowed and is equivalent to **error**.
- The **fail-on-transform-error** job attribute and the **Fail on error** field in the printer definition override this value.
- You can specify the value by using lowercase or uppercase letters (for example, `no` or `NO`).

Default: AOP_FAIL_ON_ERROR –> no

Example: `environment = {AOP_FAIL_ON_ERROR –> error}`

AOP_HORIZONTAL_MARGINS

The left and right margins of the page. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

<u>**pel**</u>   Pels, the default unit

Tips:

- Inch values and millimeter values can contain a decimal point; pel values cannot.
- You can specify the unit by using lowercase or uppercase letters (for example, `in` or `IN`).
- The **-x** option of the **pcl2afp** command and transform filter overrides this value.

Default: `AOP_HORIZONTAL_MARGINS –> 0.167in`

AOP_PAGE_HEIGHT

The height of the page. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

<u>**pel**</u>   Pels, the default unit

Tips:

- Inch values and millimeter values can contain a decimal point; pel values cannot.

- You can specify the unit by using lowercase or uppercase letters (for example, `in` or `IN`).
- The **-l** option of the **pcl2afp** command and transform filter overrides this value.

Default: AOP_PAGE_HEIGHT –> 11in

AOP_PAGE_WIDTH
The width of the page. Specify a number followed by one of these units:

in   Inches

mm   Millimeters

<u>**pel**</u>   Pels, the default unit

Tips:
- Inch values and millimeter values can contain a decimal point; pel values cannot.
- You can specify the unit by using lowercase or uppercase letters (for example, `in` or `IN`).
- The **-w** option of the **pcl2afp** command and transform filter overrides this value.

Default: `AOP_PAGE_WIDTH –> 8.5in`

AOP_RECLEN
The length of the AFP images the transform creates. Each output record contains an AFP image and an additional 17 bytes of information (for example, header information). For example, if you specify a value of 8 (8,000 bytes) for the AFP image in this environment variable, the length of each output record is 8,017 bytes.

Valid values are from 8 to 32, in units of 1,000 bytes. For example, 8 = 8,000.

Tip: The default value is suitable for most installations. However, a larger record length might improve performance.

Default: AOP_RECLEN -> 8

Example: `environment = {AOP_RECLEN -> 16}`

AOP_RESOLUTION
The resolution of the printer in pels per inch. The transform creates the AFP images with this resolution. Valid values: 240, 300, 480, 600, 720, and 1200.

Default: AOP_RESOLUTION –> 240

Example: `environment = {AOP_RESOLUTION –> 300}`

Tips:
- If you specify a resolution that the printer does not support, PSF prints the image under most conditions, but sometimes with degraded results.
- A resolution of 300 pels typically produces good quality output on 300-, 600-, or 720-pel printers.

  300-pel output requires one-fourth the space and transmission time compared to 600-pel output.

- A resolution of 600 pels typically produces good quality output on 1200-pel printers.
- The **-r** option of the **pcl2afp** command and transform filter overrides this value.

AOP_RESOURCE_PATH

The directory that contains the fonts that are provided with the transform. If you installed the fonts in **/usr/lpp/Printsrv/pcl2afpv2.3/fonts**, the default directory, you do not need to specify this environment variable. The transform always looks for fonts in the default font directory last.

Default: AOP_RESOURCE_PATH –> /usr/lpp/Printsrv/pcl2afpv2.3/fonts

Example:

```
environment = {AOP_RESOURCE_PATH –> /etc/Printsrv/pcl2afpv2.3/fonts}
```

AOP_TRAILER_ERROR_PAGE

Specifies whether the transform writes messages for transform warnings and data stream errors to a trailer error page. The trailer error page is the last page in the output document. Warnings can indicate degraded output.

Valid values are:

error　The transform writes error messages, but not warning messages, to a trailer error page. This option does not apply when `AOP_FAIL_ON_ERROR–> error` or `AOP_FAIL_ON_ERROR–>warning` because no output document is created when an error occurs.

no　The transform does not write messages to a trailer error page.

warning

The transform writes warning and error messages to a trailer error page. This option does not apply when `AOP_FAIL_ON_ERROR–>warning` because no output document is created when an error or warning occurs. This value is the default.

Tips:
- The **trailer-transform-error-page** job attribute and the **Trailer error page** field in the printer definition override this value.
- You can specify the value by using lowercase or uppercase letters (for example, `no` or `NO`).

Default: `AOP_TRAILER_ERROR_PAGE –> warning`

Example: `environment = {AOP_TRAILER_ERROR_PAGE –> error}`

AOP_VERTICAL_MARGINS

The top and bottom margins of the page. Specify a number followed by one of these units:

in　Inches

mm　Millimeters

pel　Pels, the default unit

Tips:
- Inch values and millimeter values can contain a decimal point; pel values cannot.
- You can specify the unit by using lowercase or uppercase letters (for example, `in` or `IN`).

- The **-y** option of the **pcl2afp** command and transform filter overrides this value.

  Default: `AOP_VERTICAL_MARGINS —> 0.167in`

AOPTRACEDIR
>
> The full path name of the directory where the transform writes trace information. You can specify the same directory for different transform classes. The name of the trace file identifies the transform and transform class, and contains a timestamp.
>
> This directory must already exist. If the directory does not exist, the transform writes trace information to the transform's **standard error**. For information about how to find the **standard error**, see "Finding the transform stderr file" on page 115.
>
> **Default:** AOPTRACEDIR -> /var/Printsrv/trace
>
> **Examples:**
>
> ```
> environment = {AOPTRACEDIR -> /var/Printsrv/xfd}
> environment = {AOPTRACEDIR -> .}
> ```

AOPTRACEON
>
> Turns on tracing. The transform traces all transform requests that use this transform class. Any value turns on tracing. To turn tracing off, do not specify this environment variable. Specify this environment variable only if IBM directs you to do so. Tracing can adversely affect performance.
>
> **Default:** Tracing is turned off.
>
> **Example:** `environment = {AOPTRACEON -> 1}`

AOP_TRIM
>
> Indicates whether the transform creates trimmed AFP images or full-page AFP images. Trimmed AFP images are smaller than full-page AFP images. Therefore, AFP output files that contain trimmed AFP images are smaller and can be transmitted more quickly over a network.
>
> In contrast to full-page AFP images, trimmed AFP images do not include any white space that surrounds the data on the page. The transform positions trimmed AFP images on the page so that the data prints in the correct position on the page. For example, if a page is 8 1/2 by 11 inches and has a 1-inch margin on all sides:
> - A trimmed AFP image is 6 1/2 x 9 inches. It is positioned at offset 1 inch (x), 1 inch (y) on the page.
> - A full-page AFP image is 8 1/2 by 11 inches. It is positioned at offset 0 (x), 0 (y) on the page.
>
> AFP documents print the same whether you specify AOP_TRIM = yes or AOP_TRIM = no. However, AFP overlays and AFP page segments typically print differently because trimmed AFP images are smaller than full-page AFP images. A page segment that contains a trimmed AFP image typically prints higher and to the left on a page. (The **-t** transform option determines the type of output. For example, `-t pagesegment` creates a page segment.)
>
> Values are:
>
> **yes**   The transform creates trimmed AFP images (default).
>
> **no**   The transform creates full-page AFP images.

The V1 transforms always create full-page AFP images. To create full-page AFP images in V2, you must specify the AOP_TRIM=no environment variable.

Tip: In addition to the environment variables listed in this section, you can specify other environment variables. For example, you can specify the _CEE_RUNOPTS environment variable. For information, see "Changing Language Environment run-time options."

Examples -- Transform configuration file entries for the PCL to AFP transform

This section shows sample transform entries in the Infoprint Server transform configuration file (**aopxfd.conf**) for the PCL to AFP transform.

Print on letter size paper on 300-pel printers: This transform entry can be used for printers that print on letter size paper (8.5 inches wide, 11 inches high) and that have a resolution of 300 pels per inch. This transform entry creates transform class "letter_300". To use this transform class, specify the class in the **-c** transform option as shown in these two examples:

```
pcl2afp -c letter_300 -o myfile.afp myfile.pcl
lp -o "filter-options='-c letter_300'" -d myprinter myfile.pcl

 transform pcl2afp_letter_300
      start-command = pcl2afpd
      maximum-active = 2
      maximum-idle-time = 300   # 5 minutes
      minimum-active = 1
      environment = {
          _BPX_JOBNAME -> PCL2AFPD
          AOP_PAGE_HEIGHT -> 11in
          AOP_PAGE_WIDTH -> 8.5in
          AOP_HORIZONTAL_MARGINS -> 0.167in
          AOP_VERTICAL_MARGINS -> 0.167in
          AOP_RESOLUTION -> 300
      }
;
```

Print on A4 paper on 300-pel printers: This transform entry can be used for printers that print on A4 paper (210 millimeters wide, 297 millimeters high). This transform entry creates transform class "a4_300". To use this transform class, specify the class in the **-c** transform option as shown in these two examples:

```
pcl2afp -c a4_300 -o myfile.afp myfile.pcl
lp -o "filter-options='-c a4_300'" -d myprinter myfile.pcl

transform pcl2afp_a4_300
      start-command = pcl2afpd
      maximum-active = 2
      maximum-idle-time = 300  # 5 minutes
      minimum-active = 1
      environment = {
          _BPX_JOBNAME -> PCL2AFPD
          AOP_PAGE_HEIGHT -> 297mm
          AOP_PAGE_WIDTH -> 210mm
          AOP_HORIZONTAL_MARGINS -> 4.242mm
          AOP_VERTICAL_MARGINS -> 4.242mm
          AOP_RESOLUTION -> 300
      }
;
```

Changing Language Environment run-time options
The transform sets these run-time options for the Language Environment(LE):

- ALL31(ON)
- ANYHEAP(16K,8K,ANYWHERE,FREE)

- BELOWHEAP(8K,4K,FREE)
- DEPTHCONDLMT(10)
- ERRCOUNT(0)
- HEAP(512K,512K,ANYWHERE,FREE)
- HEAPPOOLS=(ON)
- LIBSTACK(8K,4K,FREE)
- STACK(128K,128K,ANYWHERE,KEEP,512K,128K)
- STORAGE(NONE,NONE,NONE,8K)
- TERMTHDACT(DUMP)
- THREADHEAP(8K,8K,ANYWHERE,KEEP)
- THREADSTACK(OFF)
- TRAP(ON,SPIE)

If you need to change any of these options, you can specify a new value by setting the _CEE_RUNOPTS environment variable in the transform configuration file, **aopxfd.conf**.

For example, to change the ERRCOUNT value, specify this environment variable:
`_CEE_RUNOPTS -> 'ERRCOUNT(4)'`

Guideline: Do not specify smaller initial allocation sizes in the ANYHEAP, HEAP, STACK, and THREADSTACK options. Setting smaller values can cause severe performance degradation.

For more information, see *z/OS XL C/C++ Programming Guide*

Customizing the PDF to AFP and PostScript to AFP transforms

To customize the PDF to AFP and PostScript to AFP transform, do the tasks listed in this table. Required tasks are required by all installations. The customization tasks are the same for both transforms. Optional tasks are required only if the listed condition applies to your installation.

Tip: The same transform daemon (**ps2afpd**) transforms both PDF and PostScript data streams. Therefore, the customization tasks for the PDF to AFP transform and the PostScript to AFP transform are the same.

Task	Condition	See page
Creating an entry in the transform configuration file	Required	63
Starting Infoprint Server with sufficient memory	Required	71
Setting up security	Required	72
Adding fonts	Optional: To add custom fonts	74

Creating an entry in the transform configuration file

You must create at least one transform entry in the Infoprint Server transform configuration file (**aopxfd.conf**) for the PDF to AFP and PostScript to AFP transform. In the transform entry, you specify:
- Environment variables that control the transform

- Attributes that control how the Infoprint Server Transform Manager manages the transform

For information about how to create and edit the Infoprint Server transform configuration file, see "Creating the transform configuration file (aopxfd.conf)" in *z/OS Infoprint Server Customization*. After you update the transform configuration file, you must restart the Infoprint Server Transform Manager.

Tip: After you restart the Infoprint Server Transform Manager, check for error messages in the transform's **standard error**. If you find any error messages, fix the errors and restart the Infoprint Server Transform Manager. For more information about how to find the transform message logs, see "Finding the transform stderr file" on page 115.

Transform classes

If you want to specify different transform options for different transform situations, you can create different classes of the transform. For example, you could create a separate class that turns tracing on. You could use this transform class if IBM directs you to trace the transform.

For each transform class, you must create a separate transform entry. You select a name for the transform class in the transform entry (see the **transform** attribute).

To use a transform class, job submitters must specify the class name in the **-c** option on the **pdf2afp** or **ps2afp** transform command or in the **filter-options** job attribute, and administrators must specify the class name in the **-c** filter option in the printer definition. For example, these z/OS UNIX commands use the "trace" transform class:

```
pdf2afp -c trace -o myfile.afp myfile.pdf
lp -d myprinter -o "filter-options='-c trace'" myfile.pdf
```

Tip: The sample transform configuration file, **/usr/lpp/Printsrv/samples/aopxfd.conf**, shows examples of transform entries with different transform classes. Also, see "Examples -- Transform configuration file entries for the PDF to AFP and PostScript to AFP transforms" on page 71.

Format of a PDF to AFP and PostScript to AFP transform entry

The format of a PDF to AFP and PostScript to AFP transform entry in the transform configuration file (**aopxfd.conf**) is:

```
transform ps2afp[_transformclass]
    start-command = "ps2afpd [-m nnnnnn[K|M]]"
    [ environment = {name –> value [ name –> value]... } ]
    [ maximum-active = number ]
    [ maximum-idle-time = seconds ]
    [ minimum-active = number ]
  ;
```

transform ps2afp[_transformclass]
>   This statement indicates the beginning of a transform entry.

>   **ps2afp**
>>   The name of the PDF and PostScript to AFP transform.

>   *transformclass*
>>   The name of an optional transform class. Specify from 1 to 63 characters, including letters, numbers, or special characters. The name of the transform class is case-sensitive.

>>   **Default:** No transform class.

Example: `transform ps2afp_trace`

start-command = "ps2afpd [-m *nnnnnn***[K|M]]"**

This attribute names the transform daemon and option. Enclose the value in single or double quotation marks if you specify the option.

ps2afpd

The name of the transform daemon. If the transform daemon is not in a directory identified in the PATH environment variable in the **aopstart** EXEC, specify the full directory path name of the daemon. (The **ps2afpd** daemon is installed in **/usr/lpp/Printsrv/bin**.) This attribute is required.

-m *nnnnnn***[K|M]**

The maximum number of bytes of memory the transform daemon uses to do transforms. Specify the number of bytes in either kilobytes (K) or megabytes (M).

Suggested values are:

> 15M to 2047M
> 15360K to 1048576K

The amount of memory the transform requires depends on the complexity of the documents to be transformed. If you specify too low a value, the transform of complex PDF or PostScript documents might fail with undefined PostScript errors. If this occurs, try increasing the value in this option.

You must specify a maximum region size that is at least 10 MB greater than the value you specify in this option. For example, if you use the default value (246M), set the region size to at least 256 MB (246 MB + 10 MB). For information about how to specify the region size, see "Starting Infoprint Server with sufficient memory" on page 71.

Note: Specify a region size of at least 256 MB unless you routinely transform large or complex files. In that case, consider specifying a larger region size, such as 512 MB or 1024 MB, to improve performance and avoid errors. Otherwise, if the region size is too small to transform a file, the transform fails.

Default: 246M

Example: `start-command = "ps2afpd -m 512M"`

environment = { *name* **–>** *value* **[** *name* **–>** *value***]... }**

Environment variables that specify transform options. Enclose the entire set of environment variables in braces. The values in these environment variables override environment variables with the same name that are set in the **aopstart** EXEC. If a value contains special characters or spaces, enclose the value in single or double quotation marks.

For information about the environment variables you can specify, see "Environment variables for the PDF to AFP and PostScript to AFP transforms" on page 66.

Default: None

Example:

```
environment = {AOP_RESOURCE_PATH –> /etc/Printsrv/ps2afpv2.3/fonts}
```

maximum-active = *number*

The maximum number of transform daemons that the Infoprint Server Transform Manager activates concurrently. Specify a number greater than 0 and greater than or equal to the number specified in the **minimum-active** attribute. For more information, see "Format of a transform entry" in *z/OS Infoprint Server Customization*.

Default: No maximum number. Transform daemons are started when needed.

maximum-idle-time = *seconds*

The number of seconds before the Infoprint Server Transform Manager shuts down an idle transform daemon and system resources are freed. Specify a number greater than 0. For more information, see "Format of a transform entry" in *z/OS Infoprint Server Customization*.

Default: Idle transform daemons are not shut down.

minimum-active = *number*

The minimum number of transform daemons that the Infoprint Server Transform Manager activates concurrently. Specify a number less than or equal to the number specified in the **maximum-active** attribute. For more information, see "Format of a transform entry" in *z/OS Infoprint Server Customization*.

Default: minimum-active = 0

Environment variables for the PDF to AFP and PostScript to AFP transforms

Environment variables let you specify:

- Directory that contains transform resources
- Record length of AFP images
- Tracing options
- Whether the transform fails when warnings or data stream errors occur
- Whether the transform writes messages to a trailer error page

You can specify these environment variables. All environment variables are optional.

_BPX_JOBNAME

The job name for this transform. When you assign a different job name to each class of transform, the operator can manage the transform daemons more effectively. Specify a job name of 1 to 8 alphanumeric characters. Incorrect job names are ignored. For more information about the _BPX_JOBNAME variable, see *z/OS UNIX System Services Planning*.

Default: The job name is AOPXFD.

Example: environment = {_BPX_JOBNAME –> PS2AFPD}

_CEE_DMPTARG

The directory where Language Environment (LE) writes a CEEDUMP. You can

specify a period (.) to write the CEEDUMP to the transform's current working directory. IBM customer service expects to find CEEDUMPs in the transform's current working directory.

The transform's current working directory is: *base-directory*/xfd/ps2afp.#.d. *base-directory* is the base directory specified in the Infoprint Server configuration file, **aopd.conf**. An example of the transform's current working directory is:

```
/var/Printsrv/xfd/ps2afp.0.d
```

If you specify a directory other than the transform's current working directory, make sure that the user ID that owns the **ps2afpd** file has write access to the directory. For example, if user PS2AFPD owns transform file **ps2afpd**, user PS2AFPD must have write access to the directory.

Default: LE writes the dump to the directory specified in the TMPDIR environment variable. If the TMPDIR environment variable is not specified, LE writes the dump to the **/tmp** directory.

Example: `environment = {_CEE_DMPTARG -> .}`

Note: For other transforms, such as the PCL to AFP transform, LE writes the CEEDUMP to the transform's current working directory by default. This is because the owners of the other transforms have write access to the Infoprint Server base directory. Therefore, you do not need to specify the _CEE_DMPTARG environment variable for other transforms. For more information about how LE determines where to write the CEEDUMP, see *z/OS Language Environment Debugging Guide*.

AOP_FAIL_ON_ERROR
Specifies whether the transform stops processing when a warning or data stream error occurs during the transform. Warnings can indicate degraded output.

Valid values are:

error The transform fails when a data stream error occurs and does not create an output document. However, the transform continues if warnings occur.

no The transform continues processing when a warning or data stream error occurs and creates an output document. This is the default.

warning
The transform fails when a warning or data stream error occurs and does not create an output document.

Tips:
- For backward compatibility, value **yes** is allowed and is equivalent to **error**.
- The **fail-on-transform-error** job attribute and the **Fail on error** field in the printer definition override this value.
- You can specify the value using lowercase or uppercase letters (for example, no or NO).

Default: AOP_FAIL_ON_ERROR -> no

Example: `environment = {AOP_FAIL_ON_ERROR -> error}`
errorhandling

AOP_FONT_SUBSTITUTION_MESSAGES
Indicates whether the transform writes a message (AOP2500W) when it substitutes fonts in a document. However, if another warning or an error occurs during the transform, the transform writes the font-substitution message regardless of the setting of this environment variable because the font-substitution message might help you diagnose problems.

Font-substitution messages let you determine if the transform has used substitute fonts. If a substitute font is not acceptable, you might be able to add the original font to the transform. For information, see "Adding fonts" on page 74.

Valid values are:

yes   The transform writes messages about font substitution.

no   The transform does not write messages about font substitution.

Tip: If the `AOP_TRAILER_ERROR_PAGE ->` error or `AOP_TRAILER_ERROR_PAGE ->` no environment variable is set, the transform does not write the font-substitution message to a trailer error page regardless of the setting of the AOP_FONT_SUBSTITUTION_MESSAGES environment variable.

Default: AOP_FONT_SUBSTITUTION_MESSAGES -> yes

Example: environment = {AOP_FONT_SUBSTITUTION_MESSAGES -> no}

AOP_RECLEN
The length of the AFP images the transform creates. Each output record contains an AFP image and an additional 17 bytes of information (for example, header information). For example, if you specify a value of 8 (8,000 bytes) for the AFP image in this environment variable, the length of each output record is 8,017 bytes.

Valid values are from 8 to 32, in units of 1,000 bytes. For example, 8 = 8,000.

Tip: The default value is suitable for most installations. However, a larger record length might improve performance.

Default: `AOP_RECLEN -> 8`

Example: `environment = {AOP_RECLEN -> 16}`

AOP_RESOURCE_PATH
The directories that contains fonts and other transform resources. If the fonts and other resources are in more than one directory, list all directories separated by a colon. The directories are searched in the order that they are listed. Do not list the default resource directories because the transform always searches these directories last. For more information, see "Adding fonts" on page 74.

Default:

AOP_RESOURCE_PATH –> /usr/lpp/Printsrv/ps2afpv2.3/lib:/usr/lpp/Printsrv/ps2afpv2.3/Resource/Init:/usr/lpp/Printsrv/ps2afpv2.3/Resource

Example:

`environment = {AOP_RESOURCE_PATH –> /etc/Printsrv/ps2afpv2.3/fonts}`

AOP_TRAILER_ERROR_PAGE

Specifies whether the transform writes messages for transform warnings and data stream errors to a trailer error page. The trailer error page is the last page in the output document. Warnings can indicate degraded output.

Valid values are:

error   The transform writes error messages, but not warning messages, to a trailer error page. This option does not apply when `AOP_FAIL_ON_ERROR–>` error or `AOP_FAIL_ON_ERROR–>warning` because no output document is created when an error occurs.

no   The transform does not write messages to a trailer error page.

warning
The transform writes warning and error messages to a trailer error page. This option does not apply when `AOP_FAIL_ON_ERROR–>warning` because no output document is created when an error or warning occurs. This is the default.

Tips:

- The **trailer-transform-error-page** job attribute and the **Trailer error page** field in the printer definition override this value.
- You can specify the value using lowercase or uppercase letters (for example, `no` or `NO`).

Default: `AOP_TRAILER_ERROR_PAGE –> warning`

Example: `environment = {AOP_TRAILER_ERROR_PAGE –> error}`

AOPTRACEDIR

The full path name of the directory where the transform writes trace information. You can specify the same directory for different transform classes. The name of the trace file identifies the transform and transform class, and contains a timestamp.

Default: AOPTRACEDIR -> /var/Printsrv/trace

Examples:

```
environment = {AOPTRACEDIR -> /var/Printsrv/xfd}
environment = {AOPTRACEDIR -> .}
```

AOPTRACEON

Turns tracing on. The transform traces all transform requests that use this transform class. Any value turns tracing on. To turn tracing off, do not specify this environment variable. Specify this environment variable only if IBM directs you to do so. Tracing can adversely affect performance.

Default: Tracing is turned off.

Example: `environment = {AOPTRACEON -> 1}`

AOP_TRIM

Indicates whether the transform creates trimmed AFP images or full-page AFP images. Trimmed AFP images are smaller than full-page AFP images. Therefore, AFP output files that contain trimmed AFP images are smaller and can be transmitted more quickly over a network.

In contrast to full-page AFP images, trimmed AFP images do not include any white space that surrounds the data on the page. The transform positions

trimmed AFP images on the page so that the data prints in the correct position on the page. For example, if a page is 8 1/2 by 11 inches and has a 1 inch margin on all sides:

- A trimmed AFP image is 6 1/2 x 9 inches. It is positioned at offset 1 inch (x), 1 inch (y) on the page.
- A full-page AFP image is 8 1/2 by 11 inches. It is positioned at offset 0 (x), 0 (y) on the page.

AFP documents print the same whether you specify AOP_TRIM = yes or AOP_TRIM = no. However, AFP overlays and AFP page segments typically print differently because trimmed AFP images are smaller than full-page AFP images. A page segment that contains a trimmed AFP image typically prints higher and to the left on a page. (The **-t** transform option determines the type of output. For example, **-t pagesegment** creates a page segment.)

Values are:

yes   The transform creates trimmed AFP images (default).

no   The transform creates full-page AFP images.

The V1 transforms always create full-page AFP images. To create full-page AFP images in V2, you must specify the AOP_TRIM=no environment variable.

Tip: In addition to the environment variables listed in this section, you can specify other environment variables. For example, you can specify the _CEE_RUNOPTS environment variable. For information, see "Changing Language Environment run-time options."

Changing Language Environment run-time options

The transform sets these run-time options for the Language Environment (LE):

- ALL31(ON)
- ANYHEAP(16K,8K,ANYWHERE,FREE)
- BELOWHEAP(8K,4K,FREE)
- DEPTHCONDLMT(10)
- ERRCOUNT(0)
- HEAP(512K,512K,ANYWHERE,FREE)
- LIBSTACK(8K,4K,FREE)
- STACK(128K,128K,ANYWHERE,KEEP,512K,128K)
- STORAGE(NONE,NONE,NONE,8K)
- TERMTHDACT(DUMP)
- THREADHEAP(8K,8K,ANYWHERE,KEEP)
- THREADSTACK(OFF)
- TRAP(ON,SPIE)

If you need to change any of these options, you can specify a new value by setting the _CEE_RUNOPTS environment variable in the transform configuration file, **aopxfd.conf**.

For example, to change the ERRCOUNT value, specify this environment variable:
```
_CEE_RUNOPTS -> 'ERRCOUNT(4)'
```

Guideline: Do not specify smaller initial allocation sizes in the ANYHEAP, HEAP, STACK, and THREADSTACK options. Setting smaller values can cause severe performance degradation.

For more information, see *z/OS XL C/C++ Programming Guide*

Examples -- Transform configuration file entries for the PDF to AFP and PostScript to AFP transforms

This section shows sample transform entries in the Infoprint Server transform configuration file (**aopxfd.conf**) for the PDF to AFP and PostScript to AFP transforms.

Specify a transform resource path: This transform specifies a resource directory that your installation created to contain custom fonts. This transform does not create a transform class. Therefore, to use this transform, do not specify a transform class in the **-c** transform option.

```
transform ps2afp
     start-command = ps2afpd
     maximum-active = 2
     maximum-idle-time = 300    # 5 minutes
     minimum-active = 1
     environment = {
       _BPX_JOBNAME -> PS2AFPD
       _CEE_DMPTARG -> . # CEEDUMPs in current working directory
       AOP_RESOURCE_PATH -> /etc/Printsrv/ps2afpv2.3/fonts
     }
;
```

Trace the transform: This transform entry traces transform jobs and writes the trace to the **/var/Printsrv/xfd/ps2afp.#.d** directory. This transform entry creates transform class "trace". To use this transform class, specify the class in the **-c** transform option as shown in these two examples:

```
pdf2afp -c trace -o myfile.afp myfile.pdf
lp -o "filter-options='-c trace'" -d myprinter myfile.pdf
```

```
transform ps2afp_trace
     start-command = ps2afpd
     maximum-active = 2
     maximum-idle-time = 300    # 5 minutes
     minimum-active = 1
     environment = {
       _BPX_JOBNAME -> PS2AFPD
       _CEE_DMPTARG -> . # CEEDUMPs in current working directory
       AOPTRACEON ->1
       AOPTRACEDIR -> .
     }
;
```

Starting Infoprint Server with sufficient memory

The region size available for Infoprint Server must be at least 10 MB larger than the number of bytes specified in the **-m** option in the transform configuration file. For information about the **-m** option, see "Creating an entry in the transform configuration file" on page 63. (The default minimum region size in the **-m** option is 246M.) Use a region size of 256 MB or more so that you can transform large or complex data streams.

To make sure that sufficient memory is available when you start the transform:
* In the AOPSTART procedure, specify a region size of at least 256 MB in the REGION parameter on the EXEC statement. If the REGION parameter is not specified, the default region size defined for your installation is used.
* Make sure the maximum address space size for Infoprint Server is at least 256 MB.

You can set the system-wide maximum address space size in the BPXPRMxx member or with the SETOMVS command.

Examples:

– This statement in the BPXPRMxx member sets the maximum region size to 256 MB:

```
MAXASSIZE(268435456)  /* 256*1024*1024 = 256MB    */
```

– This command sets the maximum region size to 256 MB:

```
SETOMVS MAXASSIZE=268435456
```

– This command checks the MAXASSIZE value from the operator console:

```
d omvs,o
```

You can set the maximum address space for Infoprint Server higher than the system-wide maximum address in the ASSIZEMAX parameter of the RACF ADDUSER and ALTUSER command for the user that starts Infoprint Server. The ASSIZEMAX value overrides the MAXASSIZE value.

If you enter the **aopstart** command from the z/OS UNIX command line during a TSO session, the SIZE parameter on the TSO/E LOGON panel determines the maximum region size for an address space. Specify a SIZE parameter of at least 256 MB.

- The z/OS IEFUSI user exit can modify the region size of an address space. IBM strongly discourages you from altering the region size of address spaces in the OMVS subsystem category. For more information about the IEFUSI exit, see *z/OS MVS Installation Exits*.

Setting up security

Security checking done in the transform requires that the user identifier (UID) of the executable file for the transform, **ps2afpd**, *not* be 0 (zero). When it is installed, file **ps2afpd** has a UID of 0. Therefore, you must change the owner of the file. The new owner must have a UID that is *not* 0 and *not* the default UID. Also, the set-user-ID flag for the file must be turned on.

First use the Resource Access Control Facility (RACF), or another program that follows system authorization facility (SAF) protocol, to create a user and group profile for the owner of **ps2afpd**. Then, change the owner of **ps2afpd** and turn on the set-user-ID flag.

The **ps2afpd** ships with the extrattr +p program-control bit set on, due to a UNIX System Services LE-related security fix.

Steps for establishing security:

1. Define a group to RACF.

   The group profile must have an OMVS segment and a group identifier (GID). You can use any group name. You should not give this group any authority to the z/OS file system.

   This group must not have any additional authority, such as authority to BPX.SUPERUSER or BPX.DAEMON.

   For example, this RACF command defines group PS2AFPDG. For *ps2afpdg-gid*, specify an integer that is different from other GIDs in your installation:

   ```
   ADDGROUP (PS2AFPDG) OMVS(GID(ps2afpdg-gid))
   ```

2. Define a user to RACF as a z/OS UNIX user.

   This user will be the owner of **ps2afpd**. The transform, as well as PostScript jobs being transformed, run with the UID of this user. For complete information about how to define z/OS UNIX users to RACF, see *z/OS UNIX System Services Planning*.

   The user profile must have an OMVS segment. Its UID must (1) *not* be 0 and (2) *not* be the default UID, which is defined in the BPX.DEFAULT.USER profile in the RACF FACILITY class. You can use any user name. For example, you can use PS2AFPD.

   You should not give this user authority to the z/OS file system. However, if any PostScript jobs to be transformed require access to certain files, you can give this user access to the required files or connect this user to another group (or groups) that has access to the required files.

   This user must not have any additional authority, such as authority to BPX.SUPERUSER or BPX.DAEMON.

   For example, this RACF command defines user PS2AFPD. For *ps2afpd-uid*, specify an integer that is different from other UIDs in your installation:

   ```
   ADDUSER (PS2AFPD) OMVS(UID(ps2afpd-uid))
   ```

   _____

3. Connect the user to the group.

   Connect the user defined in step 2 to the group defined in step 1. For example, this RACF command connects user PS2AFPD to the PS2AFPDG group:

   ```
   CONNECT (PS2AFPD) GROUP(PS2AFPDG)
   ```

   _____

4. Switch to an effective UID of 0:

   ```
   su
   ```

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

   _____

5. Assign the user as the owner of file **ps2afpd**.

   Use the **chown** command to assign the user defined in step 2 as the owner of **ps2afpd**. For example, type this command on the z/OS UNIX command line to assign user PS2AFPD as the owner:

   ```
   chown PS2AFPD /usr/lpp/Printsrv/bin/ps2afpd
   ```

   _____

6. Turn the set-user-ID flag on for file **ps2afpd**.

   The **chown** command turns off the set-user-ID flag. Therefore, use the **chmod** command to turn this flag on again. For example, type this command on the z/OS UNIX command line:

   ```
   chmod u+s /usr/lpp/Printsrv/bin/ps2afpd
   ```

   _____

7. If you switched to an effective UID of 0 in step 4, switch back to your own UID:

   ```
   exit
   ```

   _____

After doing these steps, you can use the **ls** command to list the owner of **ps2afpd** and to verify that the set-user-ID flag is on. For example, type on the z/OS UNIX command line:

```
ls -l /usr/lpp/Printsrv/bin/ps2afpd
```

Assuming that you assigned user PS2AFPD as the owner of **ps2afpd**, output from the **ls** command should look like this:

```
-rws------ 1 PS2AFPD PS2AFPDG ... /usr/lpp/Printsrv/bin/ps2afpd
```

The lowercase letter *s* in the owner permissions section indicates that the set-user-ID flag is on and that the owner has permission to execute the file.

For more information about RACF, see *z/OS Security Server RACF Security Administrator's Guide*. For more information about the **chown**, **chmod**, and **ls** commands, see *z/OS UNIX System Services Command Reference*.

Adding fonts

The PDF to AFP and PostScript to AFP transforms provide fonts in the **/usr/lpp/Printsrv/ps2afpv2.3/Resource/Font** directory. If the PDF and PostScript files you transform use other fonts, you can add the fonts to the transforms. You can add these types of fonts:

- Type 0, 1, 3, 4, and 42 fonts
- MultiMaster fonts

Rules:

1. Fonts must be in ASCII representation. Postscript font files in both PFA and PFB format are supported.
2. The font file name can have a suffix. However, a suffix is not required.
3. If the font file name is not exactly the same as the font name, you must specify the font file name in the **Fontmap.GS** file. (If the font file name is the same as the font name, the transform finds the font even if the font name is not in the **Fontmap** file.)
4. The data in the **Fontmap** file must be in ASCII representation.

Steps for adding fonts:

1. Create a directory for the fonts. Set the z/OS UNIX permissions so that the owner can read, write, and access the directories, and everyone can read and access them. For example:

```
mkdir /etc/Printsrv/ps2afpv2.3
chmod 755 /etc/Printsrv/ps2afpv2.3
mkdir /etc/Printsrv/ps2afpv2.3/fonts
chmod 755 /etc/Printsrv/ps2afpv2.3/fonts
```

_____

2. Add fonts to the fonts directory created in step 1. Set the z/OS UNIX permissions so that the owner can read and write the font files, and everyone can read them. For example:

```
chmod 644 /etc/Printsrv/ps2afpv2.3/fonts/*
```

_____

3. (Optional) If the names of the font files are not the same as the font names, edit the **Fontmap** file. First, copy the file from directory **/usr/lpp/Printsrv/ps2afpv2.3/Resource/Init** to the fonts directory created in step 1. For example:

```
cp /usr/lpp/Printsrv/ps2afpv2.3/Resource/Init/Fontmap /etc/Printsrv/ps2afpv2.3/fonts/Fontmap
```

Then follow the instructions in the file to specify the names and file names of the fonts you added.

Tip: The data in the **Fontmap** file must be in ASCII representation. To edit this file in EBCDIC on the z/OS system, you can use the **iconv** command to convert between ASCII and EBCDIC. These steps show how to use the **alias** command to create **a2e** and **e2a** commands that convert data between EBCDIC and ASCII code pages, and then use these commands to convert data in the **Fontmap** file:

a. Convert data in **Fontmap** from ASCII to EBCDIC and create file **Fontmap.e**:

```
alias a2e="iconv -f iso8859-1 -t ibm-1047"
a2e Fontmap > Fontmap.e
```

b. Edit file **Fontmap.e**.

c. Convert data in **Fontmap.e** from EBCDIC to ASCII and replace data in file **Fontmap**:

```
alias e2a="iconv -f ibm-1047 -t iso8859-1"
e2a Fontmap.e > Fontmap
```

_____

4. Specify the directory that contains the fonts you added and the modified **Fontmap** file in the AOP_RESOURCE_PATH environment variable in the transform configuration file, **aopxfd.conf**. For example:

```
environment = {AOP_RESOURCE_PATH -> /etc/Printsrv/ps2afpv2.3/fonts}
```

_____

5. Restart the Infoprint Server Transform Manager to pick up the changes to the **Fontmap** and **aopxfd.conf** files. For example, use the AOPSTOP and AOPSTART JCL procedures:

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

_____

Customizing the SAP to AFP transform

To customize the SAP to AFP transform, do the tasks listed in this table. Required tasks are required by all installations. Optional tasks are required only if the listed condition applies to your installation.

Task	Condition	See page
Creating an entry in the transform configuration file	Required	75
Customizing SAP to AFP configuration files	Optional: To customize the SAP to AFP transform	81
Customizing multibyte conversion tables	Optional: To customize multibyte conversion tables	98

Creating an entry in the transform configuration file

You must create at least one transform entry in the Infoprint Server transform configuration file (**aopxfd.conf**) for the SAP to AFP transform. In the transform entry, you specify:

- Environment variables that control the transform

- Attributes that control how the Infoprint Server Transform Manager manages the transform

For information about how to create or edit the Infoprint Server transform configuration file, see "Creating the transform configuration file (aopxfd.conf)" in *z/OS Infoprint Server Customization*. After you update the transform configuration file, you must restart the Infoprint Server Transform Manager.

Tip: After you restart the Infoprint Server Transform Manager, check for error messages in the transform's **standard error**. If you find any error messages, fix the errors and restart the Infoprint Server Transform Manager. For more information about how to find the transform message logs, see "Finding the transform stderr file" on page 115.

Transform classes

If you want to specify different transform options or environment variable for different print applications, you can create different classes of the transform. For each transform class, you must create a separate transform entry. You select a name for the transform class in the transform entry (see the **transform** attribute).

To use a transform class, job submitters must specify the class name in the **-c** option on the **sap2afp** command or in the **filter-options** job attribute, and administrators must specify the class name in the **-c** filter option in the printer definition. For example, these z/OS UNIX commands use the "myfonts" transform class:

```
sap2afp -c myfonts -o myfile.afp myfile.sap
lp -d myprinter -o "filter-options='-c myfonts'" myfile.sap
```

Tip: The sample transform configuration file, **/usr/lpp/Printsrv/samples/ aopxfd.conf**, shows examples of transform entries with different transform classes. Also, see "Examples -- Transform configuration file entries for the SAP to AFP transform" on page 81.

Format of an SAP to AFP transform entry

The format of an SAP to AFP transform entry in the transform configuration file (**aopxfd.conf**) is:

```
transform sap2afp[_transformclass]
    start-command = "sap2afpd "
    [ environment  = {name –> value [ name –> value]... } ]
    [ maximum-active = number ]
    [ maximum-idle-time = seconds ]
    [ minimum-active = number ]
    ;
```

transform sap2afp[_transformclass_**]**

> This statement indicates the beginning of a transform entry.

> **sap2afp**
>> The name of the transform.

> _transformclass_
>> The name of an optional transform class. Specify from 1 to 63 characters, including letters, numbers, or special characters. The name of the transform class is case-sensitive.

>> **Default:** No transform class.

>> **Examples:**

>>> transform sap2afp

```
                          transform sap2afp_myfonts
```

start-command = sap2afpd
> This attribute names the transform daemon.

> **sap2afpd**
>> The name of the transform daemon. If the transform daemon is not
>> in a directory identified in the PATH environment variable in the
>> **aopstart** EXEC, specify the full directory path name of the daemon.
>> (The **sap2afpd** daemon is installed in **/usr/lpp/Printsrv/bin**.) This
>> attribute is required.

environment = {_name_ **–>** _value_ **[**_name_ **–>** _value_**]... }**
> Environment variables that specify transform options. Enclose the entire set
> of environment variables in braces. The values in these environment
> variables override environment variables with the same name that are set
> in the **aopstart** EXEC. If a value contains special characters or spaces,
> enclose the value in single or double quotation marks.

> For information about the environment variables you can specify, see
> "Environment variables for the SAP to AFP transform."

> **Default:** None.

> **Example:**

>> ```
>> environment = {AOP_SAP2AFP_RESOURCES -> /etc/Printsrv/sap2afpv2.3/res}
>> ```

maximum-active = _number_
> The maximum number of transform daemons that the Infoprint Server
> Transform Manager activates concurrently. Specify a number greater than 0
> and greater than or equal to the number specified in the **minimum-active**
> attribute. For more information, see "Format of a transform entry" in _z/OS_
> _Infoprint Server Customization_.

> **Default:** No maximum number. Transform daemons are started when
>> needed.

maximum-idle-time = _seconds_
> The number of seconds before the Infoprint Server Transform Manager
> shuts down an idle transform daemon and system resources are freed.
> Specify a number greater than 0. For more information, see "Format of a
> transform entry" in _z/OS Infoprint Server Customization_.

> **Default:** Idle transform daemons are not shut down.

minimum-active = _number_
> The minimum number of transform daemons that the Infoprint Server
> Transform Manager activates concurrently. Specify a number less than or
> equal to the number specified in the **maximum-active** attribute. For more
> information, see "Format of a transform entry" in _z/OS Infoprint Server_
> _Customization_.

> **Default:** minimum-active = 0

Environment variables for the SAP to AFP transform

Environment variables let you specify:
* Transform job name
* Error handling option
* Resource path

- Tracing options
- Whether the transform fails when warnings or data stream errors occur
- Whether the transform writes messages to a trailer error page

You can specify these environment variables. All environment variables are optional.

_BPX_JOBNAME

The job name for this transform. When you assign a different job name to each class of transform, the operator can manage the transform daemons more effectively. Specify a job name of 1 to 8 alphanumeric characters. Incorrect job names are ignored. For more information about the _BPX_JOBNAME variable, see *z/OS UNIX System Services Planning*.

Default: The job name is AOPXFD.

Example: environment = {_BPX_JOBNAME –> SAP2AFPD}

AOP_FAIL_ON_ERROR

Specifies whether the transform stops processing when a warning or data stream error occurs during the transform. Warnings can indicate degraded output.

Valid values are:

error The transform fails when a data stream error occurs and does not create an output document. However, the transform continues if warnings occur.

<u>**no**</u> The transform continues processing when a warning or data stream error occurs and creates an output document. This is the default.

warning

The transform fails when a warning or data stream error occurs and does not create an output document.

Tips:
- For backward compatibility, value **yes** is allowed and is equivalent to **error**.
- The **fail-on-transform-error** job attribute and the **Fail on error** field in the printer definition override this value.
- You can specify the value using lowercase or uppercase letters (for example, no or NO).

Default: AOP_FAIL_ON_ERROR –> no

Example: environment = {AOP_FAIL_ON_ERROR –> error}

AOP_RECLEN

The length of the output records that the transform creates.

Valid values are from 8 to 32, in units of 1,000 bytes. For example, 8 = 8,000.

Tip: The default value is suitable for most installations. However, a larger record length might improve performance.

Default: AOP_RECLEN -> 8

Example: environment = {AOP_RECLEN -> 16}

AOP_SAP2AFP_ICU
The directory that contains all of the SAP to AFP transform double-byte conversion tables. You can specify only one directory name. If the conversion tables are in the default directory, **/usr/lpp/Printsrv/sap2afpv2.3/icu**, you do not need to set this environment variable.

Default: AOP_SAP2AFP_ICU -> /usr/lpp/Printsrv/sap2afpv2.3/icu

Example:

    environment = {AOP_SAP2AFP_ICU -> /etc/Printsrv/sap2afpv2.3/icu}

AOP_SAP2AFP_RESOURCES
The directory that contains all of the SAP to AFP transform resources, such as configuration files. You can specify only one directory name. If the Infoprint Server Transforms resources are in the default directory, **/usr/lpp/Printsrv/sap2afpv2.3/res**, you do not need to set this environment variable.

Default: AOP_SAP2AFP_RESOURCES -> /usr/lpp/Printsrv/sap2afpv2.3/res

Example:

    environment = {AOP_SAP2AFP_RESOURCES -> /etc/Printsrv/sap2afpv2.3/res}

AOP_TRAILER_ERROR_PAGE
Specifies whether the transform writes messages for transform warnings and data stream errors to a trailer error page. The trailer error page is the last page in the output document. Warnings can indicate degraded output.

Valid values are:

error   The transform writes error messages, but not warning messages, to a trailer error page. This option does not apply when AOP_FAIL_ON_ERROR-> error or AOP_FAIL_ON_ERROR->warning because no output document is created when an error occurs.

no   The transform does not write messages to a trailer error page.

warning
The transform writes warning and error messages to a trailer error page. This option does not apply when AOP_FAIL_ON_ERROR->warning because no output document is created when an error or warning occurs. This is the default.

Tips:

- The **trailer-transform-error-page** job attribute and the **Trailer error page** field in the printer definition override this value.
- You can specify the value using lowercase or uppercase letters (for example, no or NO).

Default: AOP_TRAILER_ERROR_PAGE -> warning

Example: environment = {AOP_TRAILER_ERROR_PAGE -> error}

AOPTRACEDIR
The full path name of the directory where the transform writes trace information. You can specify the same directory for different transform classes. The name of the trace file identifies the transform and transform class, and contains a timestamp.

This directory must already exist. If the directory does not exist, the transform writes trace information to the transform's **stderr** file. For information about how to find the **stderr** file, see "Finding the transform stderr file" on page 115.

Default: `AOPTRACEDIR -> /var/Printsrv/trace`

Examples:

```
environment = {AOPTRACEDIR -> /var/Printsrv/xfd}
environment = {AOPTRACEDIR -> .}
```

AOPTRACEON
Turns tracing on. The transform traces all transform requests that use this transform class. Any value turns tracing on. To turn tracing off, do not specify this environment variable. Specify this environment variable only if IBM directs you to do so. Tracing can adversely affect performance.

Default: Tracing is turned off.

Example: `environment = {AOPTRACEON -> 1}`

AOP_WORLDTYPE_PATH
The directory that contains WorldType TrueType fonts. You can specify only one directory name. If the WorldType fonts are installed in the default directory, **/usr/lpp/fonts/worldtype**, you do not need to set this environment variable.

Default: `/usr/lpp/fonts/worldtype`

Example: `AOP_WORLDTYPE_PATH -> /u/Printsrv/worldtypefonts`

Tip: In addition to the environment variables listed in this section, you can specify other environment variables. For example, you can specify the _CEE_RUNOPTS environment variable. For information, see "Changing Language Environment run-time options."

Changing Language Environment run-time options
The transform sets these run-time options for the Language Environment (LE):
- ALL31(ON)
- ANYHEAP(16K,8K,ANYWHERE,FREE)
- BELOWHEAP(8K,4K,FREE)
- DEPTHCONDLMT(10)
- ERRCOUNT(0)
- HEAP(512K,512K,ANYWHERE,FREE)
- LIBSTACK(8K,4K,FREE)
- STACK(128K,128K,ANYWHERE,KEEP,512K,128K)
- STORAGE(NONE,NONE,NONE,8K)
- TERMTHDACT(DUMP)
- THREADHEAP(8K,8K,ANYWHERE,KEEP)
- THREADSTACK(OFF)
- TRAP(ON,SPIE)

If you need to change any of these options, you can specify a new value by setting the _CEE_RUNOPTS environment variable in the transform configuration file, **aopxfd.conf**.

For example, to change the ERRCOUNT value, specify this environment variable:
_CEE_RUNOPTS -> 'ERRCOUNT(4)'

Guideline: Do not specify smaller initial allocation sizes in the ANYHEAP, HEAP, STACK, and THREADSTACK options. Setting smaller values can cause severe performance degradation.

For more information, see *z/OS XL C/C++ Programming Guide*

Examples -- Transform configuration file entries for the SAP to AFP transform

This example shows a transform entry in the Infoprint Server transform configuration file (**aopxfd.conf**) for the SAP to AFP transform. This entry does not create a transform class.

```
transform sap2afp
    start-command = sap2afpd
    maximum-active = 2
    maximum-idle-time = 300    # 5 minutes
    minimum-active = 1
    environment = {
        _BPX_JOBNAME -> SAP2AFPD
    }
;
```

This example shows how to specify the AOP_SAP2AFP_RESOURCES environment variable in the transform entry. This example assumes that the transform configuration files are in directory **/etc/Printsrv/sap2afpv2.3/res**. This entry does not create a transform class.

```
transform sap2afp
    start-command = sap2afpd
    maximum-active = 2
    maximum-idle-time = 300    # 5 minutes
    minimum-active = 1
    environment = {
        _BPX_JOBNAME -> SAP2AFPD
        AOP_SAP2AFP_RESOURCES -> /etc/Printsrv/sap2afpv2.3/res
    }
;
```

Customizing SAP to AFP configuration files

Table 6 lists the SAP to AFP transform configuration files that you can customize.

Table 6. SAP to AFP transform configuration files

Configuration file	Purpose	SAP data stream
barcode.tab	Maps SAP OTF bar code names to Bar Code Object Content Architecture (BCOCA) bar codes.	OTF data only
defcp.tab	Maps single-byte ASCII code points to EBCDIC code points.	ABAP data only
defcp.tab.cyr	Maps single-byte ASCII code points to EBCDIC code points, and also contains some Cyrllic conversion directives.	ABAP data only
defcp.tab.japan	Maps single-byte ASCII code points to EBCDIC code points, and also contains some Japanese conversion directives.	ABAP data only

Table 6. SAP to AFP transform configuration files (continued)

Configuration file	Purpose	SAP data stream
defcp.tab.korea	Maps single-byte ASCII code points to EBCDIC code points, and also contains some Korean conversion directives.	ABAP data only
defcp.tab.spchinese	Maps single-byte ASCII code points to EBCDIC code points, and also contains some Simplified Chinese conversion directives.	ABAP data only
dcfcp.tab.tdchinese	Maps single-byte ASCII code points to EBCDIC code points, and also contains some Traditional Chinese conversion directives.	ABAP data only
defcp.tab.unicode	Maps single-byte ASCII code points to EBCDIC code points, and also contains some Unicode conversion directives.	ABAP data only
fonts.tab	Maps the fonts used in the OTF data stream to AFP fonts.	OTF data only
fonts.tab.unicode	Maps the AFP outline fonts to be used for OTF files in a Unicode environment.	OTF data only
fonts.tab.unicode.truetype	Maps the TrueType fonts to be used for OTF files in a Unicode environment.	OTF data only
fonts.tab.unicode.embed.truetype	Maps the TrueType fonts to be used for OTF files in a Unicode environment, embedding the fonts in the document. This sample file must be copied and customized to be used by the transform, as described in Chapter 3, "Customizing transforms," on page 55.	OTF Only
image.tab	Defines values used to print image data.	OTF data only
pagedef.tab	For SAP R/3 format names, specifies the page definition, form definition, and ABAP coded fonts.	ABAP and OTF data
pagedef.tab.cyr	Used by ASCII-encoded ABAP files containing Cyrillic characters in a non-Unicode environment. The structure of the file is the same as the **pagedef.tab** file.	ABAP and OTF data
pagedef.tab.japan	Used by ASCII-encoded files containing Japanese characters. The structure of the file is the same as the **pagedef.tab** file.	ABAP and OTF data
pagedef.tab.korea	Used by ASCII-encoded files containing Korean characters. The structure of the file is the same as the **pagedef.tab** file.	ABAP and OTF data
pagedef.tab.spchinese	Used by ASCII-encoded files containing Simplified Chinese characters. The structure of the file is the same as the **pagedef.tab** file.	ABAP and OTF data
pagedef.tab.tdchinese	Used by ASCII-encoded files containing Tradional Chinese characters. The structure of the file is the same as the **pagedef.tab** file.	ABAP and OTF data
pagedef.tab.unicode	Specifies the form definitions to be used for ABAP and OTF input files, and page definitions to be used for ABAP files, in a Unicode environment.	ABAP and OTF files

Table 6. SAP to AFP transform configuration files (continued)

Configuration file	Purpose	SAP data stream
pagedef.tab.unicode.truetype	Specifies the form definitions to be used with TrueType for ABAP and OTF input files, and page definitions to be used with TrueType for ABAP files, in a Unicode environment.	ABAP and OTF data
*xxxx*0000.tab	Maps SAP code pages to AFP code pages.	OTF data only
6400fonts.tab	Lists raster fonts that apply exclusively to the InfoPrint 6400 printer with the appropriate character set and code page.	OTF data only
userenv	Specifies the input character set.	ABAP and OTF

Rules:

1. All configuration files must reside in the same directory.

2. If the configuration files are not in the default directory, **/usr/lpp/Printsrv/ sap2afpv2.3/res**, environment variable AOP_SAP2AFP_RESOURCES must specify the directory name.

3. TrueType fonts ship with a RAT for processing the fonts, but RAT processing of TrueType fonts occurs in the product that processes the AFP, for example, PSF. If you have your own RAT, you can configure PSF or another processor to use your RAT to process TrueType fonts. For more information, see the product documentation for the processor.

Steps for customizing SAP to AFP transform configuration files

1. Create a new directory.

   Do *not* change files that reside in the **/usr/lpp/Printsrv/sap2afpv2.3/res** directory; you should create a new resource directory and point to it by using the AOP_SAP2AFP_RESOURCES environment variable in the **aopxfd.conf** configuration file. For example, you can create directory **/etc/Printsrv/ sap2afpv2.3/res**.

   _____

2. Copy all configuration files to the new directory or use symbolic links.

   All configuration files must reside in the same directory. However, if you do not want to customize some files, you can use symbolic links to the **/usr/lpp/Printsrv/sap2afpv2.3/res** directory for those files.

   _____

3. Change to the new directory.

   _____

4. Convert the files that you want to customize from ASCII to EBCDIC.

   _____

5. Edit the files and save them.

   _____

6. Convert the edited files from EBCDIC to ASCII.

   _____

7. Specify the directory that contains all the configuration files in the AOP_SAP2AFP_RESOURCES environment variable in the Infoprint Server transform configuration file, **aopxfd.conf**.

> **Tip:** You can also specify the AOP_SAP2AFP_RESOURCES environment variable in the AOPSTART EXEC. The **aopxfd.conf** file takes precedence over the AOPSTART EXEC.

_____

8. Restart the Infoprint Server Transform Manager.

   For example, use the AOPSTOP and AOPSTART JCL procedures:

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

   > **Tip:** After you restart the Infoprint Server Transform Manager, check for error messages in the transform's **stderr** file. If you find any error messages, fix the errors and restart the Infoprint Server Transform Manager. For information about how to find the transform message logs, see "Finding the transform stderr file" on page 115.

   _____

barcode.tab configuration file

The **barcode.tab** configuration file maps SAP R/3 Output Text Format (OTF) bar code names to AFP Bar Code Object Content Architecture (BCOCA) bar codes.

You need to edit this file in these situations:

- If you define a new OTF user bar code, you must add the bar code name to this file and map it to a BCOCA bar code.
- If you want to print an OTF bar code with a different width or wide-to-narrow ratio, you can specify the **ModWidth** and **Ratio** keywords for the SAP bar code.

You can specify these keywords and values in file **barcode.tab** file:

BarCode = *name*
> This required keyword specifies the OTF bar code name (SAPBARCODE parameter of the BC OTF command). The maximum length of this field is 8 bytes. It can contain any value.

Type = *nnn*
> This required keyword specifies the AFP bar code type as defined in *Data Stream and Object Architectures: Bar Code Object Content Architecture Reference* for the **Barcode Type** parameter of the **Barcode Data Descriptor** structured field. This value can be any decimal value between 0 and 999. The transform does not verify that this value maps to a valid hexadecimal barcode type.

Mode= *nnn*
> This required keyword specifies the modifier byte in the **Barcode Modifier** parameter of the **Barcode Data Descriptor** structured field. Any numeric value between 0 and 999 is accepted.

Flag = [0 | 128]
> This required keyword controls the printing of the Human Readable Interface (HRI) character. Specify one of these values:
>
> **0**   Prints the HRI characters
>
> **128**   Does not print the HRI characters

FlagPdf= *nnn*
> This optional keyword is used only for PDF417 bar codes (Type = 030). The value is byte 5 of the Bar Code Symbol Data (BSA) from PDF417 Special-Function parameters. For information, see *Bar Code Object Content Architecture Reference*.

ModWidth = *nnn*

This optional keyword specifies the width of the narrowest defined bar code element (bar or space) in mils (that is, thousandths of an inch – 1/1000). Allowed values are 1– 254.

For bar code types that explicitly specify the module width, such as POSTNET and RM4SCC, this field is ignored.

Default: The printer default ModWidth

Ratio = *nnn* This optional keyword specifies the ratio of the width of wide bar code elements to narrow bar code elements, when only two different size elements exist, that is, for a two-level bar code type. Express the ratio as a percentage. Allowed values are 100 – 500. However, the value should usually be between 200 and 300. For example: 200 represents a ratio of 2 to 1, and 250 represents a ratio of 2.5 to 1.

Specify a value that is appropriate for the bar code type and for your printer. Many bar codes do not support ratio values, and other bar codes require that the ratio value fall within a specific range. If you specify a ratio value that is not appropriate for the printer, error messages are sent at printing time.

For bar code types that explicitly specify the module width, such as POSTNET and RM4SCC, this field is ignored.

Default: The default ratio for the bar code type.

Note: Verify any values you enter in this table. The transform does not verify values, and values that are not valid might result in errors.

Figure 4 on page 86 shows the SAP bar codes defined in the default **barcode.tab** configuration file.

```
BarCode = ARTNR    Type = 017 Mode = 002 Flag = 000
BarCode = AUFNR    Type = 017 Mode = 002 Flag = 000
BarCode = BARCLVS  Type = 001 Mode = 001 Flag = 000

BarCode = BC_C128B Type = 017 Mode = 002 Flag = 128
BarCode = BC_CD39  Type = 001 Mode = 001 Flag = 128
BarCode = BC_CD39C Type = 001 Mode = 002 Flag = 128
BarCode = BC_EAN13 Type = 009 Mode = 000 Flag = 128
BarCode = BC_EAN8  Type = 008 Mode = 000 Flag = 128
BarCode = BC_EANH  Type = 017 Mode = 002 Flag = 128
BarCode = BC_I25   Type = 012 Mode = 001 Flag = 128
BarCode = BC_I25C  Type = 012 Mode = 002 Flag = 128
BarCode = BC_MSI   Type = 002 Mode = 001 Flag = 128
BarCode = BC_MSIC  Type = 002 Mode = 002 Flag = 128
BarCode = BC_MSIC1 Type = 002 Mode = 003 Flag = 128
BarCode = BC_MSIC2 Type = 002 Mode = 005 Flag = 128
BarCode = BC_PSN5  Type = 024 Mode = 000 Flag = 128
BarCode = BC_PSN9  Type = 024 Mode = 001 Flag = 128
BarCode = BC_PSN11 Type = 024 Mode = 002 Flag = 128

BarCode = C128A_00 Type = 017 Mode = 002 Flag = 000
BarCode = C128A_01 Type = 017 Mode = 002 Flag = 000
BarCode = C128B_00 Type = 017 Mode = 002 Flag = 000
BarCode = C128B_01 Type = 017 Mode = 002 Flag = 000
BarCode = CD39C_00 Type = 001 Mode = 002 Flag = 000
BarCode = CD39C_01 Type = 001 Mode = 002 Flag = 000
BarCode = CD39_00  Type = 001 Mode = 001 Flag = 000
BarCode = CD39_01  Type = 001 Mode = 001 Flag = 000

BarCode = KUNAUNR  Type = 017 Mode = 002 Flag = 000
BarCode = KUNAUPS  Type = 017 Mode = 002 Flag = 000
BarCode = MBBARC   Type = 017 Mode = 002 Flag = 000
BarCode = MBBARC1  Type = 008 Mode = 000 Flag = 000
BarCode = RSNUM    Type = 017 Mode = 002 Flag = 000
BarCode = RSPOS    Type = 017 Mode = 002 Flag = 000
BarCode = RUECKNR  Type = 017 Mode = 002 Flag = 000

BarCode = ZCODE39  Type = 001 Mode = 001 Flag = 000
BarCode = BC_93    Type = 033 Mode = 000 Flag = 000


BarCode = ZBC39    Type = 001 Mode = 001 Flag = 000
BarCode = ZBC39N   Type = 001 Mode = 001 Flag = 000
BarCode = ZINT25NC Type = 012 Mode = 001 Flag = 000
BarCode = ZINT25   Type = 012 Mode = 001 Flag = 000
BarCode = ZBC128N  Type = 017 Mode = 002 Flag = 000
BarCode = ZBC128   Type = 017 Mode = 002 Flag = 000
BarCode = ZBC128U  Type = 017 Mode = 002 Flag = 000
BarCode = ZPDF2    Type = 030 Mode = 000 Flag = 000 FlagPdf = 128
BarCode = ZPDF3    Type = 030 Mode = 000 Flag = 000 FlagPdf = 128
BarCode = ZPDF4    Type = 030 Mode = 000 Flag = 000 FlagPdf = 128
BarCode = ZPDF1    Type = 030 Mode = 000 Flag = 000 FlagPdf = 128
BarCode = ZPDF1    Type = 030 Mode = 000 Flag = 000 FlagPdf = 000
BarCode = ZBC93    Type = 033 Mode = 000 Flag = 000
BarCode = ZBC93N   Type = 033 Mode = 000 Flag = 000
```

Figure 4. Default **barcode.tab** *configuration file*

Examples:

- To shorten an existing bar code named BC_CD29, specify this line in the **barcode.tab** file:

  `BarCode=BC_CD39 Type=001 Mode=001 Flag=128 Ratio=200 ModWidth=10`

- To map a new user OTF bar code named ZDOBAR to a BCOCA bar code, add this line in the **barcode.tab** file:

```
                BarCode=ZDOBAR Type=017 Mode=002 Flag=128
```

For instructions about customizing SAP configuration files, see "Steps for
customizing SAP to AFP transform configuration files" on page 83.

defcp.tab configuration file

The **defcp.tab** configuration file maps single-byte ASCII code points to EBCDIC
code points. The SAP to AFP transform uses this file for ABAP data conversion.

The format of the file is: ASCII code = EBCDIC code. The transform checks the
values for a decimal numeric value between 0 and 255.

Figure 5 shows the default **defcp.tab** file.

```
// Linedata CodePage
//--------------------------------------------------------------------
// This file is used internally by sap2afp, as well as to convert ABAP
// data to linedata.

// Format : Ascii=Ebcdic

// T1000819 + box characters -> T1DABASE

000 = 064
001 = 064
002 = 064
003 = 064
004 = 055
      ⋮
250 = 222
251 = 219
252 = 208
253 = 064
254 = 062
255 = 223
```

Figure 5. Default **defcp.tab** *configuration file*

For instructions about customizing SAP configuration files, see "Steps for
customizing SAP to AFP transform configuration files" on page 83.

fonts.tab configuration file

The **fonts.tab** configuration file maps the fonts used in the SAP OTF data stream to
AFP fonts. If you add an OTF user font, you must add a new entry in the **fonts.tab**
configuration file for the new OTF font.

These font families are predefined with SAP R/3:

Font Family	Font
CNHEI	Simplified Chinese double-byte font (People's Republic of China)
CNKAI	Simplified Chinese double-byte font (People's Republic of China)
CNSONG	Chinese double-bye standard font (People's Republic of China)
COURCYR	COURCYR Cyrillic font, non-proportional (Russia), ISO 8859/5
COURIER	Courier
DBGOTHIC	Heisei Gothic

DBMINCHO	Heisei Mincho
HELVCYR	Cyrillic font, proportional (Russia), ISO 8859/5
HELVE	Helvetica
JPMINCHO	Heisei Mincho
KPSAMMUL	Double-byte standard font (South Korea)
LETGOTH	Letter Gothic
LNPRINT	Line Print
OCRA	Optical Character Recognition A
OCRB	Optical Character Recognition B
TIMECYR	Cyrillic font, proportional (Russia), ISO 8859/5
TIMES	Times New Roman
TWSONG	Traditional Chinese double-byte standard font (Taiwan)

Tip: JPMINCHO and DBMINCHO are different names for the same font.

A font named **BARCODE** must be defined for the **HRI** character of a bar code.

These attributes in the **fonts.tab** configuration file set the format of the fonts you use to print with SAP R/3:

DefCodePage   Specifies the default SBCS code page used if no **FC** OTF command is given or if the requested font is not found in the **fonts.tab** table.

DefCharSet   Specifies the default SBCS character set used if no **FC** OTF command is given or if the requested font is not found in the **fonts.tab** table.

DBDefCodePage

Specifies the default DBCS code page used if no **FC** OTF command is given or if the requested font is not found in the **fonts.tab** table.

DBDefCharSet

Specifies the default DBCS character set used if no **FC** OTF command is given or if the requested font is not found in the **fonts.tab** table.

SBDefCodePage

Specifies the default SBCS code page used for half-width characters in DBCS fonts if no **FC** OTF command is given or if the requested font is not found in the **fonts.tab** table.

SBDefCharSet

Specifies the default SBCS character set used for half-width characters in DBCS fonts if no **FC** OTF command is given or if the requested font is not found in the **fonts.tab** table.

Font   Describes the font family (**FONTFAMILY** parameter of the **FC** OTF command). The maximum size is 8 bytes and content is not verified.

Size   Specifies the font size in 1/10 of a point (**FONT SIZE** parameter of the **FC** OTF command). The value must be numeric and is not verified.

Type   Defines the font type (**BOLD** and **ITALIC** parameter of the **FC** OTF command). **Type=0** is normal, **Type=1** is italic, **Type=2** is bold, and **Type=3** is italic bold. Any other value is not valid.

CodePage Specifies the code page and requires a valid AFP code page name (8 bytes). The value is not verified. A name that is not valid can result in an error message.

CharSet Specifies the AFP font character set. The content is not verified.

CodedFont Specifies the AFP coded font. The content is not verified.

DB Specifies whether the font is an SBCS font (**DB=0**) or a DBCS font (**DB=1**).

SBCodePage Specifies the single-byte code page used for half-width characters in DBCS fonts. The value is not verified. A name that is not valid can result in an error message.

SBCharSet Specifies the AFP single-byte font character set used for half-width characters in DBCS fonts. The content is not verified.

SBCodedFont Specifies the AFP single-byte coded font used for half-width characters in DBCS fonts. The content is not verified.

If an SBCS font that matches the **Font**, **Size**, and **Type** values is not found, the code page and font character set from the **DefCodePage** and **DefCharSet** attributes are used. A warning message is sent.

If a DBCS font that matches the **Font**, **Size**, and **Type** values is not found, the code pages and font character sets from the **DBDefCodePage**, **SBDefCodePage**, **DBDefCharSet**, and **SBDefCharSet** attributes are used. A warning message is sent.

The SAP device types **IBMAFP** and **IBMAFP3** support the predefined font families. These font families are also supported as IBM Expanded Core Fonts or IBM Japanese Fonts.

For ABAP listings, use the Letter Gothic Latin1 font provided with the AFP Font Collection V2 (program number 5648-B33). If you choose not to install the AFP Font Collection and plan to use the Gothic Text fonts provided with the IBM Compatibility Fonts, adjust the font names in the **pagedef.tab** configuration file.

Figure 6 on page 90 and Figure 7 on page 90 show sections of the **fonts.tab** configuration file.

For z/OS V2R1 and higher, the Letter Gothic Latin1 font is included in the z/OS Font Collection.

```
DefCodePage = T1V10273
DefCharSet  = C0420000
DBDefCodePage = T10300
DBDefCharSet  = CZJHMN
SBDefCodePage = T1H01027
SBDefCharSet  = CZJHMN

// Courier
Font=COURIER  Size=070 Type=0 CodePage=T1V10273 CharSet=C0420070 DB=0
Font=COURIER  Size=070 Type=1 CodePage=T1V10273 CharSet=C0430070 DB=0
Font=COURIER  Size=070 Type=2 CodePage=T1V10273 CharSet=C0440070 DB=0
Font=COURIER  Size=070 Type=3 CodePage=T1V10273 CharSet=C0450070 DB=0
Font=COURIER  Size=080 Type=0 CodePage=T1V10273 CharSet=C0420080 DB=0
Font=COURIER  Size=080 Type=1 CodePage=T1V10273 CharSet=C0430080 DB=0
Font=COURIER  Size=080 Type=2 CodePage=T1V10273 CharSet=C0440080 DB=0
Font=COURIER  Size=080 Type=3 CodePage=T1V10273 CharSet=C0450080 DB=0
Font=COURIER  Size=100 Type=0 CodePage=T1V10273 CharSet=C0420000 DB=0
Font=COURIER  Size=100 Type=1 CodePage=T1V10273 CharSet=C0430000 DB=0
Font=COURIER  Size=100 Type=2 CodePage=T1V10273 CharSet=C0440000 DB=0
Font=COURIER  Size=100 Type=3 CodePage=T1V10273 CharSet=C0450000 DB=0
Font=COURIER  Size=120 Type=0 CodePage=T1V10273 CharSet=C04200B0 DB=0
Font=COURIER  Size=120 Type=1 CodePage=T1V10273 CharSet=C04300B0 DB=0
Font=COURIER  Size=120 Type=2 CodePage=T1V10273 CharSet=C04400B0 DB=0
Font=COURIER  Size=120 Type=3 CodePage=T1V10273 CharSet=C04500B0 DB=0
Font=COURIER  Size=140 Type=0 CodePage=T1V10273 CharSet=C04200D0 DB=0
Font=COURIER  Size=140 Type=1 CodePage=T1V10273 CharSet=C04300D0 DB=0
Font=COURIER  Size=140 Type=2 CodePage=T1V10273 CharSet=C04400D0 DB=0
Font=COURIER  Size=140 Type=3 CodePage=T1V10273 CharSet=C04500D0 DB=0
Font=COURIER  Size=200 Type=0 CodePage=T1V10273 CharSet=C04200J0 DB=0
Font=COURIER  Size=200 Type=1 CodePage=T1V10273 CharSet=C04300J0 DB=0
Font=COURIER  Size=200 Type=2 CodePage=T1V10273 CharSet=C04400J0 DB=0
Font=COURIER  Size=200 Type=3 CodePage=T1V10273 CharSet=C04500J0 DB=0
```

Figure 6. Courier portion of default **fonts.tab** *configuration file*

```
// Japanese Gothic
Font=DBGOTHIC Size=060 Type=0 CodePage=T10300 CharSet=CZJHKG DB=1 SBCodePage=T1H01027 SBCharSet=CZJHKG
Font=DBGOTHIC Size=080 Type=0 CodePage=T10300 CharSet=CZJHKG DB=1 SBCodePage=T1H01027 SBCharSet=CZJHKG
Font=DBGOTHIC Size=100 Type=0 CodePage=T10300 CharSet=CZJHKG DB=1 SBCodePage=T1H01027 SBCharSet=CZJHKG
Font=DBGOTHIC Size=120 Type=0 CodePage=T10300 CharSet=CZJHKG DB=1 SBCodePage=T1H01027 SBCharSet=CZJHKG
Font=DBGOTHIC Size=140 Type=0 CodePage=T10300 CharSet=CZJHKG DB=1 SBCodePage=T1H01027 SBCharSet=CZJHKG
Font=DBGOTHIC Size=160 Type=0 CodePage=T10300 CharSet=CZJHKG DB=1 SBCodePage=T1H01027 SBCharSet=CZJHKG
Font=DBGOTHIC Size=180 Type=0 CodePage=T10300 CharSet=CZJHKG DB=1 SBCodePage=T1H01027 SBCharSet=CZJHKG
```

Figure 7. Heisei Gothic portion of default **fonts.tab** *configuration file*

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

fonts.tab.unicode.truetype configuration file

The **fonts.tab.unicode.truetype** file specifies TrueType fonts to use when transforming OTF files in a Unicode environment. The additional parameters set the names and paths of the fonts you use to print.

You can map the TrueType fonts in **fonts.tab.unicode.truetype** in one of these ways.

- Use FullFontName:

      Font=COURIER Size=080 Type=0 FullFontName="WT SerifDuo"

  A RAT must be present if you use this mapping method.

- Use TTFileName:

  ```
  Font=COURIER  Size=080 Type=0 TTFileName="wt_dw___.ttf"
  ```

  No RAT is required, and the transform embeds the specified TrueType file in the AFP output.
- Use TTFileName with linked fonts:

  ```
  Font=COURIER  Size=080 Type=0 TTFileName="wt_dw___.ttf" TTLinkFileNames="wts_w___.ttf:wt_w___.ttf"
  ```

  No RAT is required. The transform embeds the specified TrueType file and the specified TrueType linked font files in the AFP output.

The **fonts.tab.unicode.truetype** file maps the TrueType fonts using FullFontName. The **fonts.tab.unicode.embed.truetype** file embeds the TrueType fonts using TTFileName; it doesn't use TTLinkFileNames, but you can use TTLinkFileNames when you use TTFileName with linked fonts.

These are the attributes in the **fonts.tab.unicode.truetype** configuration file:

DefTTFileName

> Specifies the name of the default TrueType font file used when no matching entry for an OTF font is found.
>
> The TrueType font file is searched in the AOP_WORLDTYPE_PATH directory.

TTFFileName Specifies the name of the TrueType font file used for the corresponding OTF font entry.

> The TrueType font file is searched in the AOP_WORLDTYPE_PATH directory.

TTLinkFileNames

> Specifies the linked fonts for the corresponding base font that was specified using TTFileName.
>
> If the base font does not contain a certain character, the transform searches for that character in the fonts specified as linked fonts. You can enter multiple names separated by a colon. The linking order is the order you entered the linked font names.
>
> This parameter is optional and can be entered only after the TTFileName attribute.

DefFullFontName

> Specifies the default font full name used when no matching entry for an OTF font is found.

FullFontName Specifies the default font full name used for the corresponding OTF font entry.

> FullFontName indicates that a RAT is present for printing the AFP file, and the TrueType fonts are not embedded in the AFP file. When the name of the TrueType font file is specified, the transform embeds the TrueType fonts in the AFP file.

fonts.tab.unicode.embed.truetype configuration file

The **fonts.tab.unicode.embed.truetype** configuration file is provided as a sample of a **fonts.tab.unicode.truetype** configuration file that tells the transform to embed the TrueType fonts into the file. The transform does not automatically read this file. For Unicode files, when **-f** or **-I** is specified, the transform automatically reads **fonts.tab.unicode.truetype**, which uses full font names for TrueType fonts. To use

the contents of **fonts.tab.unicode.embed.truetype** to embed fonts, replace the contents of the **fonts.tab.unicode.truetype** file with the contents of **fonts.tab.unicode.embed.truetype**.

You should only use this file to embed TrueType fonts if the product you are using does not use a RAT. When you embed TrueType fonts, the output file is much larger, which might lower performance or cause the transform to run out of space while writing the output.

To use the fonts.tab.unicode.embed.truetype file:

1. Create a copy of the original **fonts.tab.unicode.truetype** file.

   ```
   cp fonts.tab.unicode.trueype fonts.tab.unicode.truetype.save
   ```

   _____

2. Copy the **fonts.tab.unicode.embed.truetype** configuration file to the **fonts.tab.unicode.truetype** configuration file.

   ```
   cp fonts.tab.unicode.embed.truetype fonts.tab.unicode.truetype
   ```

   _____

3. Specify the **-f** or **-I** option with the **sap2afp** command. The TrueType fonts are embedded in your AFP output

   _____

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

image.tab configuration file

The **image.tab** configuration file defines values used to print image data. It contains these parameters:

DEFRES
: Specifies the default resolution used for printing image data if you do not specify a resolution in the printer definition and the job submitter does not specify a resolution in the **-r** option on the **lp** or **sap2afp** command. Valid values are **240**, **300**, **480**, **600**, **720**, and **1200**.

Width
: Specifies the width of the dither matrix.

Height
: Specifies the height of the dither matrix.

Cell
: Specifies the values for the dither matrix.

Transform
: Specifies 256 grayscale correction values.

These are the **image.tab** files. To use one of these files, rename it to **image.tab**:
- **image.tab** - same as **image.tab.85lr**
- **image.tab.141ap** - 141 lines/inch AppleWriter grayscale emulation
- **image.tab.141dt** - 141 lines/inch Xerox DocuTech grayscale emulation
- **image.tab.141lr** - 141 lines/inch linear gamma correction
- **image.tab.85ap** - 85 lines/inch AppleWriter grayscale emulation
- **image.tab.85dt** - 85 lines/inch Xerox DocuTech grayscale emulation
- **image.tab.85lr** - 85 lines/inch linear gamma correction

Figure 8 on page 93 shows the default **image.tab** configuration file.

```
// image.tab
//
// This file is used to determine the dither matrix and the
// grayscale correction values.
// Define the default output resolution
DEFRES = 600
// Define the dither matrix
Width = 78
Height = 78
Cell =
 15   63 184 219 249 240 158 109  98  54  82 118 133 113  75  64
 87  104 166 215 234 229 179  62  38   4  15  59 186 220 246 240
166  123  87  61  65 108 133 118  78  64 100 105 167 219 234 230
    .
    .
 28   73 193 223 253 247 199  76  31   8  20  93 148 156 203 178
136  126 144 186 201 155 151  90  43  24  28  75 199 222 254 251
196   79  31   7
//
// Grayscale correction values
//
Transform =
0
1
2
.
.
248
252
255
```

*Figure 8. Default **image.tab** configuration file*

For instructions about customizing SAP configuration files, see "Steps for
customizing SAP to AFP transform configuration files" on page 83.

pagedef.tab configuration file

The **pagedef.tab** configuration file maps SAP R/3 format names to the names of
AFP form definitions, AFP page definitions, and fonts. The SAP to AFP transform
uses the form definition name when it transforms either SAP OTF or ABAP data.
However, the transform uses the page definition and font names only for SAP
ABAP data.

Every SAP R/3 document to be printed is associated with an SAP R/3 format; for
example, the X_65_80 format for ABAP data or the LETTER format for OTF data. If
you define a user format to SAP R/3, you must add the format to the **pagedef.tab**
file.

A form definition lets you specify electronic overlays, portrait or landscape
presentation mode, the paper source, and simplex or duplex printing. By default,
the transform uses the F1A10111 form definition, which specifies no electronic
overlays, portrait presentation, the primary paper source, and duplex printing. You
can change the form definition in the **pagedef.tab** file to another form definition
that PSF provides. For information about form definitions that PSF provides, see
PSF for z/OS: User's Guide

For example, to print in landscape orientation, you can define new user formats to
SAP R/3 (for example ZLAND for ABAP data and Z_65_255 for OTF data), and
then map the new user formats to form definition F1C10110 in the **pagedef.tab** file.
F1C10110 is a form definition provided by PSF, with landscape presentation mode
specified.

File **pagedef.tab** contains these parameters:

Paper   Specifies the name of the SAP R/3 format. This is the value of the OTF print option parameter **PJFORM** or **PJPAPER**.

FormDef   Specifies the name of the form definition that is used for printing both OTF and ABAP reports. An error results if PSF cannot find the form definition during printing.

PageDef   Specifies the name of the page definition that is used for printing ABAP reports. An error results if PSF cannot find the page definition during printing.

FontNorm   Specifies the normal coded font that is used for printing ABAP data.

FontBold   Specifies the bold coded font that is used for printing ABAP data.

Figure 9 shows the default **pagedef.tab** configuration file.

```
// ABAP Formats
Paper=X_65_132 FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=X_44_120 FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=X_58_170 FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT8A FontBold=GT8A
Paper=X_65_255 FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GT2A
Paper=X_65_80  FormDef=F1A10111 PageDef=P1C09182 FontNorm=GT2A FontBold=GB2A
Paper=X_90_120 FormDef=F1A10111 PageDef=P1C09182 FontNorm=GT5A FontBold=GT5A
Paper=X_PAPER  FormDef=F1A10111 PageDef=P1C09182 FontNorm=GT2A FontBold=GB2A

// OTF Formats
Paper=DINA3    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=DINA4    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=DINA5    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=EXECUTIV FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH4    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH6    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH7    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH8    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH11   FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH12   FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LEGAL    FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LETTER   FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LINE_21  FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LINE_22  FormDef=F1A10111 PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A

//Sample of a added user-defined pagedef entry:
//Paper=Z_INCH12 FormDef=F1A10111    PageDef=P1SAPPD  FontNorm=GT2A FontBold=GB2A
```

Figure 9. Default **pagedef.tab** *configuration file*

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

pagedef.tab.unicode configuration file
The **pagedef.tab.unicode** configuration file maps SAP R/3 format names to the names of AFP form definitions, AFP page definitions, and fonts in a Unicode environment. The SAP to AFP transform uses the form definition name when it transforms either SAP OTF or ABAP data. The structure is the same as the **pagedef.tab** file.

For ABAP format entries, the page definitions that map the Courier Unicode fonts are used by default. To process ABAP files containing CJK characters, specify the

names of the corresponding Unicode page definitions for Japanese, Simplified Chinese, Traditional Chinese, or Korean in the **pagedef.tab.unicode** configuration file.

If you have your own custom page definitions to use for Unicode processing, modify your sources to include mappings and associations for the required Unicode fonts and recompile them. Specify the name of the custom page definition in the **pagedef.tab.unicode** configuration file.

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

pagedef.tab.unicode.truetype configuration file

The **pagedef.tab.unicode.truetype** configuration file specifies the form definitions to use with TrueType for ABAP and OTF input files and page definitions to use with TrueType for ABAP files in a Unicode environment. The structure is identical to the **pagedef.tab** file.

Figure 10 shows a sample **pagedef.tab.unicode.truetype** configuration file.

```
// ABAP Formats; FontNorm and FontBold are ignored in this table,
// because they are set in the corresponding unicode pagedef.
Paper=X_65_132 FormDef=F1SAP PageDef=P1UTT683 FontNorm=xxxx FontBold=yyyy
Paper=X_44_120 FormDef=F1SAP PageDef=P1UTT683 FontNorm=xxxx FontBold=yyyy
Paper=X_58_170 FormDef=F1SAP PageDef=P1UTT683 FontNorm=xxxx FontBold=yyyy
Paper=X_65_255 FormDef=F1SAP PageDef=P1UTT683 FontNorm=xxxx FontBold=yyyy
Paper=X_65_80  FormDef=F1SAP PageDef=P1UTT182 FontNorm=xxxx FontBold=yyyy
Paper=X_90_120 FormDef=F1SAP PageDef=P1UTT182 FontNorm=xxxx FontBold=yyyy
Paper=X_PAPER  FormDef=F1SAP PageDef=P1UTT182 FontNorm=xxxx FontBold=yyyy

// OTF Formats
Paper=DINA3    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=DINA4    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=DINA5    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=EXECUTIV FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH4    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH6    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH7    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH8    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH11   FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=INCH12   FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LEGAL    FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LETTER   FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LINE_21  FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A
Paper=LINE_22  FormDef=F1SAP PageDef=P1V06683 FontNorm=GT2A FontBold=GB2A

//Sample of a added user-defined pagedef entry:
//Paper=Z_INCH12 FormDef=F1SAP    PageDef=P1SAPPD  FontNorm=GT2A FontBold=GB2A
```

*Figure 10. Sample **pagedef.tab.unicode.truetype** configuration file*

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

*xxxx*0000.tab configuration file

These configuration files contain tables that map characters of an individual SAP code page to an AFP code page:

Table 7. SAP code page configuration files

File name	SAP R/3 input code page	Description of input code page	AFP output code page	Description of output code page
00000000.tab	T1000819	Latin-1 ISO ANSI 8-bit (ASCII)	T1V10273	Germany F.R./Austria-CECP
11000000.tab	T1000819	Latin-1 ISO ANSI 8-bit (ASCII)	T1V10273	Germany F.R./Austria-CECP
15000000.tab	T1000915	Cyrillic ISO 8859/5	T1001172	Cyrillic Multilingual with Box Draw
40010000.tab	T1000876[1]	OCR-A (ASCII)	T1000892	OCR-A
40040000.tab	T1000877[1]	OCR-B (ASCII), MICR_C, MICR_E	T1000893	OCR-B
41020000.tab	4102	Unicode UTF-16 Big Endian	T11200	Unicode
41030000.tab	4103	Unicode UTF-16 Little Endian	T11200	Unicode
80000000.tab	IBM-943C	Japanese ISO Shift-JIS	IBM-1399-SAP2AFP	Japanese
83000000.tab	8300	Traditional Chinese ISO Big5	IBM-937-SAP2AFP	Traditional Chinese
84000000.tab	8400	Simplified Chinese ISO GB2312	IBM-1388-SAP2AFP	Simplified Chinese
85000000.tab	8500	Korean ISO KSC 5601	IBM-933-SAP2AFP	Korean
86000000.tab	8600	Thai ISO TIS620–2529	T1000874	Thai

1. The input OCR-A and the OCR-B code pages are equivalent to ISO-8859-1 with the special characters **hook**, **fork**, and **chair**.

Asian versions of SAP R/3 use special coding to represent double-byte special characters. Therefore, the **80000000.tab** file must indicate the SAP R/3 system code page and the output code page. These parameters in the table specify the input and output code pages:

- CONVERT FOR=*xxxx*

  xxxx is the SAP R/3 system code page.

- CONVERT TO=*yyyyyyyyy*

  yyyyyyy is the output code page conversion table.

Figure 11 shows the default **80000000.tab** configuration file used for the SAP R/3 system code page 8000 (Japanese).

```
CONVERT FOR=8000
CONVERT TO=ibm-1399-sap2afp
```

*Figure 11. Default **80000000.tab** configuration file*

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

6400fonts.tab configuration file

The **6400fonts.tab** configuration file maps Output Text Format (OTF) fonts to fonts in an InfoPrint 6400 printer. The printer must support the graphics object content architecture (GOCA) feature.

You can edit the **6400fonts.tab** file to resize an OTF font. To do this, you specify the SIZE and CPI parameters.

Parameters in the configuration file are:

CharSet
Specifies the AFP font character set.

CodedFont
Specifies the AFP coded font. The content is not verified.

CodePage
Specifies the AFP code page name (8 bytes).

CPI
Specifies the horizontal width (in characters per inch) to which the 6400 printer-resident fonts should be scaled. The smaller the number you specify, the wider the font you receive.

DB Specifies whether the font is an SBCS font (**DB=0**) or a DBCS font (**DB=1**).

Font
Describes the font family (**FONTFAMILY** parameter of the **FC** OTF command). The maximum size is 8 bytes.

SBCharSet
Specifies the AFP single-byte font character set used for half-width characters in DBCS fonts.

SBCodedFont
Specifies the AFP single-byte coded font used for half-width characters in DBCS fonts.

SBCodePage
Specifies the single-byte code page used for half-width characters in DBCS fonts.

Size
Specifies the height (in points) to which the 6400 printer-resident font should be scaled. Because there are 72 points in an inch, 720 indicates a height of an inch.

Type
Defines the font type. Valid values are: **Type=0** is normal, **Type=1** is italic, **Type=2** is bold, and **Type=3** is italic bold.

Examples:

1. For fonts that print one inch high, specify this line in the **6400fonts.tab** configuration file:
   ```
   Font=TIMES Size=720 Type=3 CocePage=T1V10273 CharSet=C0S0ESTR DB=0
   ```
2. For fonts that print one inch wide, specify this line in the **6400fonts.tab** configuration file:
   ```
   Font=TIMES Size=360 Type=3 CodePage=T1V10273 CharSet=C0S0ESTR DB=0 CPI=1
   ```
3. For fonts that print one-half inch wide, specify this line in the **6400fonts.tab**configuration file:
   ```
   Font=TIMES Size=360 Type=3 CodePage=T1V10273 CharSet=C0S0ESTR DB=0 CPI=2
   ```

Note: After you edit the **6400fonts.tab** file, access the Print Screen List window on the SAP R/3 graphical user interface and specify 6400 in the **Title** field of the Spool request pane.

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

userenv configuration file

The **userenv** configuration file, provided in **/usr/lpp/Printsrv/sap2afpv2.3/res**, specifies the processing environment, such as the character-set encoding used for data in ASCII SAP files. To enable the SAP to AFP transform for non-Latin character sets, you must edit the **userenv** configuration file to specify the character set. Valid values in **userenv** are:

Value	Character set
`CYRILLIC`	Cyrillic
`KOREAN`	Korean
`JAPANESE`	Japanese (Shift-JIS encoding)
`NORMAL`	Latin
`SPCHINESE`	Simplified Chinese
`TDCHINESE`	Traditional Chinese
`UNICODE`	Unicode, or a mixture of ASCII and Unicode

The SAP to AFP transform can automatically detect Unicode encoding of SAP OTF and ABAP files. Therefore, to transform SAPGOFU files, the **userenv** file does not need to specify UNICODE. However, to transform SAP ASCII files that contain Unicode data, the **userenv** file must specify UNICODE. If the **userenv** file specifies UNICODE, all SAP files must contain Unicode data or ASCII with Unicode.

For Unicode, if the **-f** or **-I** option is specified, **pagedef.tab.unicode.truetype** is selected as the page definition table file.

Older versions of the transform (2.2 and earlier) required AFP Unicode Migration fonts to process Unicode data. Now you can use the WorldType fonts by specifying **-f** or **-I**.

For instructions about customizing SAP configuration files, see "Steps for customizing SAP to AFP transform configuration files" on page 83.

Customizing multibyte conversion tables

To transform and print SAP R/3 data streams that contain multibyte special characters, you might need to customize the conversion tables for the code pages that the SAP to AFP transform uses.

You can edit the source files that the transform provides in the **/usr/lpp/Printsrv/sap2afpv2.3/icu** directory, and then use the z/OS UNIX **makeconv** command to compile them. These source files define the mapping between UCS-2 and multibyte code sets:

- Japanese: ibm-939-sap2afp.ucm
- Japanese: ibm-1399-sap2afp.ucm
- Korean: ibm-933-sap2afp.ucm
- Simplified Chinese: ibm-1388-sap2afp.ucm
- Traditional Chinese: ibm-937-sap2afp.ucm

Steps for customizing conversion tables:

1. Create a new directory for the conversion tables. For example, you can create directory **/etc/Printsrv/sap2afpv2.3/icu**.

You should *not* change files that reside in the **/usr/lpp/Printsrv/sap2afpv2.3/icu** directory.

_____

2. Copy all files from directory **/usr/lpp/Printsrv/sap2afpv2.3/icu** to the new directory or use symbolic links.

   All **.cnv** conversion tables must in the same directory. However, if you do not want to customize some files, you can use symbolic links to the **/usr/lpp/Printsrv/sap2afpv2.3/icu** directory for those files.

_____

3. Change to the new directory. For example:

   ```
   cd /etc/Printsrv/sap2afpv2.3/icu
   ```

_____

4. Edit the .ucm file and save it.

_____

5. Use the z/OS UNIX **makeconv** command to compile the .ucm file and create a .cnv file. For example:

   ```
   makeconv -p ICUDATA ibm-1388-sap2afp.ucm
   ```

_____

6. Change the access permissions of the .cnv file to give everyone permission to read the file. For example:

   ```
   chmod 644 ibm-1388-sap2afp.cnv
   ```

_____

7. Specify the new directory that contains the conversion tables in the AOP_SAP2AFP_ICU environment variable in the SAP to AFP transform entry of the Infoprint Server transform configuration file.

   Tip: You can also specify the AOP_SAP2AFP_RESOURCES environment variable in the AOPSTART EXEC. The **aopxfd.conf** file takes precedence over the AOPSTART EXEC.

_____

8. Restart the Infoprint Server Transform Manager.

   For example, use the AOPSTOP and AOPSTART JCL procedures:

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

   Tip: After you restart the Infoprint Server Transform Manager, check for error messages in the transform's **stderr** file. If you find any error messages, fix the errors and restart the Infoprint Server Transform Manager. For more information about how to find the transform message logs, see "Finding the transform stderr file" on page 115.

_____

Chapter 4. Administering transforms

This chapter describes how Infoprint Server administrators can set up printer definitions in the Infoprint Server Printer Inventory so that Infoprint Server automatically transforms documents to AFP format before it writes them to the JES spool or sends them to other print servers or email destinations.

Task	See page
Requesting the PCL to AFP transform	101
Requesting the PDF to AFP transform	104
Requesting the PostScript to AFP transform	107
Requesting the SAP to AFP transform	110

Requesting the PCL to AFP transform

This section describes how you can set up your printer definitions so that Infoprint Server automatically calls the PCL to AFP transform when it processes PCL documents.

PCL to AFP transform filter

In the printer definitions for AFP printers, you can specify the PCL to AFP transform filter and associate it with the PCL data format. A filter is a program that modifies the input data before it is sent to the printer. When you associate the transform filter with the PCL data format, Infoprint Server automatically calls the PCL to AFP transform to process a document with the PCL data format.

Table 8 shows the filter name and filter options that you can specify in the **Filter** field of a printer definition.

Table 8. PCL to AFP filter name and filter options

Field name (attribute name)	Filter name	Filter options
Filter (filters)	pcl2afp.dll	[%filter-options] [-a *imagetype*] [-c *transformclass*] [-p *pagerange*] [-r *resolution*] [-t *outputtype*] [-w *width*] [-x *xmargin*] [-y *ymargin*] [-C] [-I] [-T]

The filter options are:

%filter-options
> Passes options that are specified in the **filter-options** job attribute to the transform.
>
> You can type the **%filter-options** option in any position relative to the other filter options. If you specify filter options to the right of **%filter-options**, those options override the same options that are specified in the **filter-options** job attribute.

-c *transformclass*
> Specifies the name of a transform class that is defined in the transform configuration file, **aopxfd.conf**. The name is case-sensitive. The job submitter can also specify this option in the **filter-options** job attribute.

Steps for editing printer definitions for the PCL to AFP transform

To edit printer definitions, use either Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) program. This section describes how to use the ISPF panels. For information about the PIDU program, see "Using the PIDU program to manage the Printer Inventory" in *z/OS Infoprint Server Operation and Administration*.

Before you begin: You must be authorized to edit the Printer Inventory. You must have UPDATE access to the AOP.ADMINISTRATOR profile in the RACF PRINTSRV class.

Steps for editing printer definitions:

1. (Optional) Create a Processing component. If you need to specify the PCL to AFP transform in a large number of printer definitions, you can create a component to simplify administration. Then, to change your transform filter in the future, you can make the change in your Processing component.

   _____

2. On the Processing panel of either the printer definition or the component, select the **PCL** data format.

   Tip: In PSF printer definitions, also select the **Line data**, **MO:DCA-P**, and **Text** data formats. PSF can print line data and MO:DCA-P data on AFP printers, and Infoprint Server automatically converts text data to line data.

   _____

3. Next to the **PCL** data format, specify the **pcl2afp.dll** filter and filter options in the **Filter** field. Type the absolute path name if the filter is not in a directory that is named in the LIBPATH environment variable. For filter options, see "PCL to AFP transform filter" on page 101.

   _____

4. In PSF printer definitions, do not select the **Resubmit for filtering** field.

   _____

5. (Optional) In the **Fail on error** field, select whether you want the transform to fail when a transform warning or data stream error occurs during the transform. When a transform fails, the transform does not produce an output document.

   The Infoprint Server **fail-on-transform-error** job attribute overrides this field.

   If you do not select an option in this field and **fail-on-transform-error** is not specified, the AOP_FAIL_ON_ERROR environment variable determines when the transform fails.

   _____

6. (Optional) In the **Trailer error page** field, select the type of messages you want the transform to write on a page at the end of the AFP output (called the **trailer error page**).

   The Infoprint Server **trailer-transform-error-page** job attribute overrides this value.

If you do not select an option in this field, the AOP_TRAILER_ERROR_PAGE environment variable determines the type of messages the transform writes.

_____

7. (Optional) If you created a Processing component, specify the name of the Processing component in the **Component name** field on the PSF printer definition panel. Do this step in all printer definitions to which the transform applies.

   After you include a Processing component, check the Processing panel in the printer definition to ensure that the transform is specified correctly. You might need to remove (space over) any filters that are specified on the Processing panel of the printer definition itself. If any filters are specified in the printer definition, the filters that are specified in the component are not used.

_____

8. (Optional) On the Allocation panel, you can specify the name of the form definition that PSF uses when it prints the AFP image data that the transform creates.

_____

Example -- ISPF Processing panel for the PCL to AFP transform

This ISPF panel shows how to specify the PCL to AFP transform in a printer definition for a PSF printer. Only a portion of the Processing panel is shown.

```
                         Processing

Printer definition name . afp-printer_____
:
Supported data formats and associated filters:
Data format:  Filter:

/ Line data     _____  (extend)
7 MO:DCA-P      _____  (extend)
_ PostScript    _____  (extend)
/ Text          _____  (extend)
7 PCL           pcl2afp.dll -c letter_300 %filter-options_  (extend)
_ PDF           _____  (extend)
_ SAP           _____  (extend)
_ XML           _____  (extend)
_ Other         _____  (extend)

_ Resubmit for filtering

Transforms to AFP:
   Fail on error . . . .  2   1. No  2. Error  3. Warning
   Trailer error page. .  1   1. No  2. Error  3. Warning
:
```

Explanation of fields:

- The **PCL** data format is selected because the **pcl2afp2.dll** filter can transform PCL documents to AFP format. The transform options are:
  - The **-c** filter option causes the transform to use the **letter_300** transform class, which is defined in the transform configuration file.

    Because the **-c** option is specified to the *left* of **%filter-options**, any **-c** option specified in the **filter-options** job attribute overrides the **-c** option that is specified in the printer definition.

- The %**filter-options** filter option causes the transform to use transform options that are specified in the **filter-options** job attribute.
- The **Line data** and **MO:DCA-P** data formats are selected because PSF can print these data formats on AFP printers.
- The **Text** data format is selected because Infoprint Server automatically converts text data to line data when it is processing data for PSF printers.
- In the **Fail on error** field, option **Error** is selected. If a data stream error occurs during the transform, the transform fails and does not create an output document.
- In the **Trailer error page** field, option **No** is selected. The transform does not write any warning or error messages to a trailer error page.

Requesting the PDF to AFP transform

This section describes how you can set up your printer definitions so that Infoprint Server automatically calls the PDF to AFP transform when it processes PDF documents.

PDF to AFP transform filter

In the printer definitions for AFP printers, you can specify the PDF to AFP transform filter and associate it with the PDF data format. (A filter is a program that modifies the input data before it is sent to the printer.) When you associate the transform filter with the PDF data format, Infoprint Server automatically calls the PDF to AFP transform to process a document with the PDF data format.

Table 9 shows the filter name and filter options that you can specify in the **Filter** field of a printer definition.

Tip: The same **ps2afp.dll** filter transforms both PostScript and PDF documents to AFP format, but the filter options are different for each data format.

Table 9. PDF to AFP filter name and filter options

Field name (attribute name)	Filter name	Filter options
Filter (filters)	ps2afp.dll	[%filter-options] [-a *imagetype*] [-c *transformclass*] [-l *length*] [-p *pagerange*] [-r *resolution*] [-t *outputtype*] [-w *width*] [-x *xmargin*] [-y *ymargin*] [-I] [-T]

The filter options mean:

%filter-options

> Causes options that are specified in the **filter-options** job attribute to be passed to the transform.
>
> You can type the %**filter-options** option in any position relative to the other filter options. If you specify filter options to the right of %**filter-options**, those options override the same options that are specified in the **filter-options** job attribute.

-c *transformclass*

> Specifies the name of a transform class that is defined in the transform configuration file, **aopxfd.conf**. The name is case-sensitive. The job submitter can also specify this option in the **filter-options** job attribute.

For a description of the other PDF to AFP filter options, see "pdf2afp—Transform PDF data to AFP data" on page 23.

Steps for editing printer definitions for the PDF to AFP transform

To edit printer definitions, use either Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) program. This section describes how to use the ISPF panels. For information about the PIDU program, see "Using the PIDU program to manage the Printer Inventory" in *z/OS Infoprint Server Operation and Administration*.

Before you begin: You must be authorized to edit the Printer Inventory. You must have UPDATE access to the AOP.ADMINISTRATOR profile in the RACF PRINTSRV class.

Steps for editing printer definitions:

1. (Optional) Create a Processing component. If you need to specify the PDF to AFP transform in a large number of printer definitions, a component can simplify administration. If you need to change your transform filter in the future, you can make the change in your Processing component.

   _____

2. On the Processing panel of either the printer definition or the component, select the **PDF** data format.

   Tip: In PSF printer definitions, also select the **Line data**, **MO:DCA-P**, and **Text** data formats. PSF can print line data and MO:DCA-P data on AFP printers, and Infoprint Server automatically converts text data to line data.

   _____

3. Next to the **PDF** data format, specify the **ps2afp.dll** filter and filter options in the **Filter** field. Type the absolute path name if the filter is not in a directory that is named in the LIBPATH environment variable. For filter options, see "PDF to AFP transform filter" on page 104.

   _____

4. In PSF printer definitions, do not select the **Resubmit for filtering** field.

   _____

5. (Optional) In the **Fail on error** field, select whether you want the transform to fail when a transform warning or data stream error occurs during the transform. When a transform fails, the transform does not produce an output document.

   The Infoprint Server **fail-on-transform-error** job attribute overrides this field.

   If you do not select an option in this field and **fail-on-transform-error** is not specified, the AOP_FAIL_ON_ERROR environment variable determines when the transform fails.

   _____

6. (Optional) In the **Trailer error page** field, select the type of messages you want the transform to write on a page at the end of the AFP output (called the **trailer error page**).

   The Infoprint Server **trailer-transform-error-page** job attribute overrides this value.

If you do not select an option in this field, the AOP_TRAILER_ERROR_PAGE environment variable determines the type of messages the transform writes.

_____

7. (Optional) If you created a Processing component, specify the name of the Processing component in the **Component name** field on the PSF printer definition panel. Do this step in all printer definitions to which the transform applies.

    After you include a Processing component, check the Processing panel in the printer definition to ensure that the transform is specified correctly. You might need to remove (space over) any filters that are specified on the Processing panel of the printer definition itself. If any filters are specified in the printer definition, the filters that are specified in the component are not used.

_____

8. (Optional) On the Allocation panel, you can specify the name of the form definition that PSF uses when it prints the AFP image data that the transform creates.

_____

Example -- ISPF Processing panel for the PDF to AFP transform

This ISPF panel shows how to specify the PDF to AFP transform in a printer definition for a PSF printer. Only a portion of the Processing panel is shown.

```
                          Processing

Printer definition name . afp-printer_____
:
Supported data formats and associated filters:
Data format:  Filter:

/ Line data     _____ (extend)
/ MO:DCA-P      _____ (extend)
_ PostScript    _____ (extend)
/ Text          _____ (extend)
_ PCL           _____ (extend)
/ PDF           ps2afp.dll  %filter-options -r 300_____ (extend)
_ SAP           _____ (extend)
_ XML           _____ (extend)
_ Other         _____ (extend)

_ Resubmit for filtering

Transforms to AFP:
   Fail on error . . . .  2  1. No  2. Error  3. Warning
   Trailer error page. .  1  1. No  2. Error  3. Warning
:
```

Explanation of fields:

- The **PDF** data format is selected because the **ps2afp2.dll** filter can transform PDF documents to AFP format. The transform options are:
  - The **%filter-options** filter option causes the transform to use transform options that are specified in the **filter-options** job attribute.
  - The **-r** option causes the transform to format the output for a 300-pel resolution printer.

    Because the **-r** option is specified to the *right* of **%filter-options**, the transforms ignore the **-r** option specified in the **filter-options** job attribute.

- The **Line data** and **MO:DCA-P** data formats are selected because PSF can print these data formats on AFP printers.
- The **Text** data format is selected because Infoprint Server automatically converts text data to line data when it processes data for PSF printers.
- In the **Fail on error** field, option **Error** is selected. If a data stream error occurs during the transform, the transform fails and does not create an output document.
- In the **Trailer error page** field, option **No** is selected. The transform does not write any warning or error messages to a trailer error page.

Requesting the PostScript to AFP transform

This section describes how you can set up your printer definitions so that Infoprint Server automatically calls the PostScript to AFP transform when it processes PostScript documents.

PostScript to AFP transform filter

In the printer definitions for AFP printers, you can specify the PostScript to AFP transform filter and associate it with the PostScript data format. (A filter is a program that modifies the input data before it is sent to the printer.) When you associate the transform filter with the PostScript data format, Infoprint Server automatically calls the PostScript to AFP transform when it processes a document with the PostScript data format.

Table 10 shows the filter name and filter options that you can specify in the **Filter** field of a printer definition.

Tip: The same **ps2afp.dll** filter transforms both PostScript and PDF documents to AFP format but the filter options are different for each data format.

Table 10. PostScript to AFP filter name and filter options

Field name (attribute name)	Filter name	Filter options
Filter (filters)	ps2afp.dll	[%filter-options] [-a *imagetype*] [-c *transformclass*] [-l *length*] [-o *outputfile*] [-r *resolution*] [-t *outputtype*] [-w *width*] [-x *xmargin*] [-y *ymargin*] [-I] [-T] [*inputfile...*]

The filter options mean:

%filter-options

Causes options that are specified in the **filter-options** job attribute to be passed to the transform.

You can type the **%filter-options** option in any position relative to the other filter options. If you specify filter options to the right of **%filter-options**, those options override the same options that are specified in the **filter-options** job attribute.

-c *transformclass*

Specifies the name of a transform class that is defined in the transform configuration file, **aopxfd.conf**. The name is case-sensitive. The job submitter can also specify this option in the **filter-options** job attribute.

For a description of the other PostScript to AFP filter options, see "ps2afp—Transform PostScript data to AFP data" on page 31.

Steps for editing printer definitions for the PostScript to AFP transform

To edit printer definitions, use either Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) program. This section describes how to use the ISPF panels. For information about the PIDU program, see "Using the PIDU program to manage the Printer Inventory" in *z/OS Infoprint Server Operation and Administration*.

Before you begin: You must be authorized to edit the Printer Inventory. You must have UPDATE access to the AOP.ADMINISTRATOR profile in the RACF PRINTSRV class.

Steps for editing printer definitions:

1. (Optional) Create a Processing component. If you need to specify the PostScript to AFP transform in a large number of printer definitions, a component can simplify administration. If you need to change your transform filter in the future, you can make the change in your Processing component.

   _____

2. On the Processing panel of either the printer definition or the component, select the **PostScript** data format.

   Tip: In PSF printer definitions, also select the **Line data**, **MO:DCA-P**, and **Text** data formats. PSF can print line data and MO:DCA-P data on AFP printers, and Infoprint Server automatically converts text data to line data.

   _____

3. Next to the **PostScript** data formats, specify the **ps2afp.dll** filter and filter options in the **Filter** field. Type the absolute path name if the filter is not in a directory that is named in the LIBPATH environment variable. For filter options, see "PostScript to AFP transform filter" on page 107.

   _____

4. In PSF printer definitions, do not select the **Resubmit for filtering** field.

   _____

5. (Optional) In the **Fail on error** field, select whether you want the transform to fail when a transform warning or data stream error occurs during the transform. When a transform fails, the transform does not produce an output document.

   The Infoprint Server **fail-on-transform-error** job attribute overrides this field.

   If you do not select an option in this field and **fail-on-transform-error** is not specified, the AOP_FAIL_ON_ERROR environment variable determines when the transform fails.

   _____

6. (Optional) In the **Trailer error page** field, select the type of messages you want the transform to write on a page at the end of the AFP output (called the **trailer error page**).

   The Infoprint Server **trailer-transform-error-page** job attribute overrides this value.

   If you do not select an option in this field, the AOP_TRAILER_ERROR_PAGE environment variable determines the type of messages the transform writes.

7. (Optional) If you created a Processing component, specify the name of the Processing component in the **Component name** field on the PSF printer definition panel. Do this step in all printer definitions to which the transform applies.

After you include a Processing component, check the Processing panel in the printer definition to ensure that the transform is specified correctly. You might need to remove (space over) any filters that are specified on the Processing panel of the printer definition itself. If any filters are specified in the printer definition, the filters that are specified in the component are not used.

8. (Optional) On the Allocation panel, you can specify the name of the form definition that PSF uses when it prints the AFP image data that the transform creates.

Example -- ISPF Processing panel for the PostScript to AFP transform

This ISPF panel shows how to specify the PostScript to AFP transform in a printer definition for a PSF printer. Only a portion of the Processing panel is shown.

```
                            Processing

Printer definition name . afp-printer
 :
 :
Supported data formats and associated filters:
Data format:  Filter:

/ Line data      _____  (extend)
7 MO:DCA-P       _____  (extend)
7 PostScript  ps2afp.dll   %filter-options -r 300            (extend)
7 Text           _____  (extend)
_ PCL            _____  (extend)
_ PDF            _____  (extend)
_ SAP            _____  (extend)
_ XML            _____  (extend)
_ Other          _____  (extend)

_ Resubmit for filtering

Transforms to AFP:
   Fail on error . . . .  2   1. No  2. Error  3. Warning
   Trailer error page. .  1   1. No  2. Error  3. Warning
 :
 :
```

Explanation of fields:

- The **PostScript** data format is selected because the **ps2afp2.dll** filter can transform PostScript documents to AFP format. The transform options are:
  - The **%filter-options** filter option causes the transform to use transform options that are specified in the **filter-options** job attribute.
  - The **-r** option causes the transform to format the output for a 300-pel resolution printer.

    Because the **-r** option is specified to the *right* of **%filter-options**, the transforms ignore the **-r** option that is specified in the **filter-options** job attribute.

- The **Line data** and **MO:DCA-P** data formats are selected because PSF can print these data formats on AFP printers.
- The **Text** data format is selected because Infoprint Server automatically converts text data to line data when it is processing data for PSF printers.
- In the **Fail on error** field, option **Error** is selected. If a data stream error occurs during the transform, the transform fails and does not create an output document.
- In the **Trailer error page** field, option **No** is selected. The transform does not write any warning or error messages to a trailer error page.

Requesting the SAP to AFP transform

This section describes how you can set up your printer definitions so that Infoprint Server automatically calls the SAP to AFP transform when it processes SAP documents.

SAP to AFP transform filter

In the printer definitions for AFP printers, you can specify the SAP to AFP transform filter and associate it with the PCL data format. (A filter is a program that modifies the input data before it is sent to the printer.) When you associate the transform filter with the SAP data format, Infoprint Server automatically calls the SAP to AFP transform when it processes a document with the SAP data format.

Table 11 shows the filter name and filter options that you can specify in the **Filter** field of a printer definition.

Table 11. SAP to AFP filter name and filter options

Field name (attribute name)	Filter name	Filter options
Filter (filters)	sap2afp.dll	[%filter-options] [-a *imagetype*] [-b] [-c *transformclass*] [-r *resolution*] [-f][-h] [-k] [-s] [-u] [-I] [-T]

The filter options mean:

%filter-options
>
> Causes options that are specified in the **filter-options** job attribute to be passed to the transform.
>
> You can type the **%filter-options** option in any position relative to the other filter options. If you specify filter options to the right of **%filter-options**, those options override the same options that are specified in the **filter-options** job attribute.

-c *transformclass*
>
> Specifies the name of a transform class that is defined in the transform configuration file, **aopxfd.conf**. The name is case-sensitive. The job submitter can also specify this option in the **filter-options** job attribute.

For a description of the other SAP to AFP filter options, see "sap2afp—Transform SAP OTF or ABAP data to AFP data" on page 40.

Steps for editing printer definitions for the SAP to AFP transform

To edit printer definitions, use either Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) program. This section describes how to use the ISPF panels. For information about the PIDU program, see "Using the PIDU program to manage the Printer Inventory" in *z/OS Infoprint Server Operation and Administration*.

Before you begin: You must be authorized to edit the Printer Inventory. You must have UPDATE access to the AOP.ADMINISTRATOR profile in the RACF PRINTSRV class.

Steps for editing printer definitions:

1. (Optional) Create a Processing component. If you need to specify the SAP to AFP transform in a large number of printer definitions, a component can simplify administration. If you need to change your transform filter in the future, you can make the change in your Processing component.

   _____

2. On the Processing panel of either the printer definition or the component, select the **SAP** data format.

   Tip: In PSF printer definitions, also select the **Line data**, **MO:DCA-P**, and **Text** data formats. PSF can print line data and MO:DCA-P data on AFP printers, and Infoprint Server automatically converts text data to line data.

   _____

3. Next to the **SAP** data format, specify the **sap2afp.dll** filter and filter options in the **Filter** field. Type the absolute path name if the filter is not in a directory that is named in the LIBPATH environment variable. For filter options, see "SAP to AFP transform filter" on page 110.

   _____

4. In PSF printer definitions, do not select the **Resubmit for filtering** field.

   _____

5. (Optional) In the **Fail on error** field, select whether you want the transform to fail when a transform warning or data stream error occurs during the transform. When a transform fails, the transform does not produce an output document.

   The Infoprint Server **fail-on-transform-error** job attribute overrides this field.

   If you do not select an option in this field and **fail-on-transform-error** is not specified, the AOP_FAIL_ON_ERROR environment variable determines when the transform fails.

   _____

6. (Optional) In the **Trailer error page** field, select the type of messages you want the transform to write on a page at the end of the AFP output (called the **trailer error page**).

   The Infoprint Server **trailer-transform-error-page** job attribute overrides this value.

   If you do not select an option in this field, the AOP_TRAILER_ERROR_PAGE environment variable determines the type of messages the transform writes.

7. (Optional) If you created a Processing component, specify the name of the Processing component in the **Component name** field on the PSF printer definition panel. Do this step in all printer definitions to which the transform applies.

After you include a Processing component, check the Processing panel in the printer definition to make sure that the transform is specified correctly. You might need to remove (space over) any filters that are specified on the Processing panel of the printer definition itself. If any filters are specified in the printer definition, the filters that are specified in the component are not used.

Tip: The SAP to AFP transform determines the appropriate form definition, page definition, and fonts to use from its own configuration files and overrides any form definition, page definition, and fonts that are specified on the Allocation panel or in job attributes.

Example -- ISPF Processing panel for the SAP to AFP transform

This ISPF panel shows how to specify the SAP to AFP transform in printer definition for a PSF printer. Only a portion of the Processing panel is shown.

```
                          Processing

Printer definition name . afp-printer_____
:
:
Supported data formats and associated filters:
Data format:  Filter:

/ Line data    _____  (extend)
/ MO:DCA-P     _____  (extend)
_ PostScript   _____  (extend)
/ Text         _____  (extend)
_ PCL          _____  (extend)
_ PDF          _____  (extend)
/ SAP          sap2afp.dll %filter-options -r 300_____  (extend)
_ XML          _____  (extend)
_ Other        _____  (extend)

_ Resubmit for filtering
Transforms to AFP:
  Fail on error . . . .  2   1. No  2. Error  3. Warning
  Trailer error page. .  1   1. No  2. Error  3. Warning
:
:
```

Explanation of fields:

- The **SAP** data format is selected because the **sap2afp2.dll** filter can transform SAP documents to AFP format. The transform options are:
  – The **%filter-options** filter option causes the transform to use transform options that are specified in the **filter-options** job attribute.
  – The **-r** option causes the transform to format the output for a 300-pel resolution printer.
    Because the **-r** option is specified to the *right* of **%filter-options**, the transforms ignore the **-r** option specified in the **filter-options** job attribute.

- The **Line data** and **MO:DCA-P** data formats are selected because PSF can print these data formats on AFP printers.
- The **Text** data format is selected because Infoprint Server automatically converts text data to line data when it processes data for PSF printers.
- In the **Fail on error** field, option **Error** is selected. If a data stream error occurs during the transform, the transform fails and does not create an output document.
- In the **Trailer error page** field, option **No** is selected. The transform does not write any warning or error messages to a trailer error page.

Chapter 5. Diagnosing errors

This chapter describes the diagnostic facilities that the transforms provide.

Submitting APARs

Report any difficulties using the transforms to your IBM Support Center. If an APAR is required, the Support Center can tell you where to send the required diagnostic information.

When you submit an APAR, use the component ID **5655N6001**.

Using error messages

The transforms write error messages to these locations:

- **Trailer error page:** The transforms add to the end of the AFP output when a warning or data stream error occurs during the transform. The trailer error page contains warning and error messages from the transform to help you diagnose problems.

  To print AFP output without transform messages, you can suppress all messages on the trailer error page, or you can choose to suppress only transform warning messages. The transform always writes warning and error messages to the Infoprint Server common message log and the transform's **stderr** file so that you can find messages even if the transform does not write a trailer error page.

  You can use these methods to suppress messages on a trailer error page:

  – Specify the Infoprint Server **trailer-transform-error-page** job attribute with the print request.
  – Set the **Trailer error page** field in the printer definition that is used to print the document.
  – Set the **AOP_TRAILER_ERROR_PAGE** environment variable in the Infoprint Server transform configuration file, **aopxfd.conf**.

- **Infoprint Server common message log:** The transforms write all warning and error messages to the Infoprint Server common message log if the common message log is enabled in Infoprint Server.

- **Transform stderr file:** The transform's **stderr** file is a file that Infoprint Server administrators can access. In general, the transforms write messages in both the **stderr** file and the Infoprint Server common message log.

  For some error conditions, the PCL to AFP transform writes more detailed error messages to the transform's **stderr** file when tracing is turned on. If you have trouble diagnosing a problem, you can turn tracing on and look for more messages in the **stderr** file.

Finding the transform stderr file

You can find a transform's **stderr** file in the directory named *base-directory*/**xfd**, where *base-directory* is determined by the value of the **base-directory** attribute in the Infoprint Server configuration file, **aopd.conf**. The default base directory is named **/var/Printsrv**.

The **stderr** file-naming convention is:

```
transform[_class].#.stderr
```

transform   Specifies the transform name, which is defined in the Infoprint
           Server Transform Manager configuration file, **aopxfd.conf**. For
           example, **pcl2afp**.

class   Specifies the transform class, which is specified in the **-c** option
           when the transform is called. Transform classes are defined in the
           Infoprint Server Transform Manager configuration file,
           aopxfd.conf.

A unique number that the transform assigns. This number is
           incremented each time a new transform is started.

Tip: To read the transform's **stderr** file, you must be a member of the AOPADMIN
       group. For information about how to establish security for Infoprint Server
       administrators, see *z/OS Infoprint Server Customization*.

Running traces

This section describes how to run a trace of a transform. 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.

Tracing the transforms

This section describes how to run a trace of a transform. Tracing can slow
performance considerably. Turn tracing on for only as long as necessary to capture
the error.

Tip: For some error conditions, the PCL to AFP transform writes more detailed
       error messages to the transform's **stderr** file when tracing is turned on. If you
       have trouble diagnosing a problem, you can turn tracing on and look for
       more messages in the **stderr** file.

To trace transforms, you can either specify the **-T** transform option or set the
AOPTRACEON environment variable:

- Specify the **-T** option to trace a specific transform request, or to trace all
  transform requests for a specific printer.
- Set the AOPTRACEON environment variable to trace all transform requests, or
  to trace all transforms that use a transform class that you configure for tracing.

You can specify the **-T** option in these ways:

- On the **pcl2afp**, **pdf2afp**, **ps2afp, or sap2afp** command.
- In the **filter-options** job attribute on a print command. By using the **lp**
  command, the Infoprint Port Monitor for Windows, and some other print
  commands you can specify Infoprint Server job attributes.
- In the **Filter options** field in a printer definition in the Printer Inventory.

When you request a trace by using either the **-T** option or the AOPTRACEON
environment variable, the transform writes the trace in a file in the directory that is
specified in the AOPTRACEDIR environment variable or to the default directory
(/var/Printsrv/trace). One trace file can contain trace information for multiple
print jobs because each instance of a transform appends trace information to the
same trace file. The transform's **stderr** file contains the name of the trace file.

These environment variables in the Infoprint Server transform configuration file, **aopxfd.conf**, turn tracing on and specify where the trace is written:

AOPTRACEON

> Set this variable to any value to turn on tracing. The transform traces all transform requests that use this transform class. Any value turns on tracing. To turn tracing off, do not specify this environment variable.
>
> **Default:** Tracing is turned off.
>
> **Example:** `environment = {AOPTRACEON -> 1}`

AOPTRACEDIR

> Specify the full path name of the directory where the transform writes trace information. You can specify the same directory for different transform classes. The name of the trace file identifies the transform and transform class, and contains a timestamp.
>
> This directory must exist. If the directory does not exist, the transform writes trace information to the transform's **stderr** file. For information about how to find the **stderr** file, see "Finding the transform stderr file" on page 115.
>
> **Default:** `AOPTRACEDIR -> /var/Printsrv/trace`
>
> **Examples:**
>
> ```
>           environment = {AOPTRACEDIR -> /var/Printsrv/xfd}
>           environment = {AOPTRACEDIR -> .}
> ```

For an example of a transform entry in the transform configuration file that specifies these variables, see "Trace the transform" on page 71.

Tip:

> Using **AOPTRACEDIR -> .** has these benefits and limitations:
> - The trace is recorded in the transform's working directory. This location keeps the trace closely associated with any other items that might be produced when the job runs (for example, a memory dump). The transform's working directory is a secure location, which protects any sensitive information trace might contain.
> - The trace is automatically cleaned up when you restart the Infoprint Server Transform Manager.
> - However, when you restart the Infoprint Server Transform Manager, the transform's working directory and its contents are deleted. Be sure to look in all the active transform directories to find the trace that you are interested in.

Examples:

1. To request a trace by specifying the **-T** option on a transform command:

   ```
   pdf2afp -o outputfile -T myfile.pdf
   ```

   _____

2. To request a trace by specifying the **-T** option on a transform command when you use the AOPBATCH program:

   ```
   //AOPBATCH JOB  ...
   //TRANSFRM EXEC PGM=AOPBATCH,PARM='/ps2afp -T -o //DD:OUTPUT DD:INPUT'
   //INPUT    DD   DSN=HLQ.INPUT.PS,DISP=SHR
   ```

```
//OUTPUT   DD   DSN=HLQ.OUTPUT.AFP,DISP=(NEW,CATLG,DELETE),
// DCB=(RECFM=VBM,LRECL=32756,BLKSIZE=32760),SPACE=(CYL,(1,1))
//STDOUT   DD   SYSOUT=*
//STDERR   DD   SYSOUT=*
```

Note: To continue the PARM parameter:

- Extend the parameter to column 71. Do not code an apostrophe in column 71.
- Code // in columns 1 and 2 of the following statement.
- Continue the parameter in column 16 of the following statement even if doing this splits the parameter.

3. To request a trace by specifying the **-T** option on an **lp** command:

```
lp -d myprinter -o "filter-options='-T'" myfile.pdf
```

4. To request a trace by specifying the **-T** option in a printer definition:

```
                         Processing

Supported data formats and associated filters:
Data format:  Filter:
/ PostScript  ps2afp.dll %filter-options  -T_____  (extend)
/ PCL         pcl2afp.dll %filter-options -T_____  (extend)
/ PDF         pdf2afpdll %filter-options  -T_____  (extend)
/ SAP         sap2afpdll %filter-options  -T_____  (extend)
```

5. To submit a transform request to a transform class that specifies the AOPTRACEON environment variable. If the administrator defined a transform class that is called "trace" in the Infoprint Server transform configuration file (aopxfd.conf), use these commands to submit a trace request to it.

```
pdf2afp -c trace -o myfile.afp myfile.pdf
lp -o "filter-options='-c trace'" -d myprinter myfile.pdf
```

Chapter 6. Messages

This chapter describes the messages that the transforms produce.

For information about all the messages from Infoprint Server, including messages that are related to transforms, see *z/OS Infoprint Server Messages and Diagnosis*.

Message format

The messages have this format:

AOP*nnnnt*

AOP   Identifies messages from Infoprint Server

nnn   The message number

t   One-character type code:

Type code	Meaning
E	An error occurred.
I	Information message.
W	A warning situation occurred.

message_text
    The text of the message.

Messages

AOP2061E   **The document contains EBCDIC data. The SAP to AFP transform can only transform ASCII or Unicode SAP data.**

Explanation: The SAP to AFP transform detected EBCDIC data. The transform accepts only ASCII or Unicode data.

System action: The request is not completed.

User response: In the SAP R/3 output device, select either SAPGOF (Generic Output Format) or SAPGOFU (Unicode encoded data).

System programmer response: Not applicable.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2201E   **The effective UID of this program must not be 0.**

Explanation: The Infoprint Server Transform Manager

attempted to start a transform daemon. However, for security reasons, the Infoprint Server Transform Manager requires that (1) the owner of the executable file for the transform *not* have a UID of 0 and (2) the set-user-ID flag for the file is turned on. The message contains the name of the executable file.

System action: The Infoprint Server Transform Manager does not start the transform daemon. The Infoprint Server Transform Manager attempts to start other transform daemons configured in the transform configuration file, **aopxfd.conf**.

User response: Contact your system programmer.

System programmer response: Use the **ls** command to list the owner of the file and to verify that the set-user-ID flag is on:

```
ls -l /usr/lpp/Printsrv/bin/ps2afpd
```

Output from the **ls** command should look like this, assuming that the owning user name is NOBODY and that the owning group name is NOGROUP:

```
-rws------   1  NOBODY NOGROUP ...
```

The lowercase letter *s* in the owner permissions section indicates that the set-user-ID flag is on and that the owner has permission to execute the file. Use the **id** command to determine the UID of the user.

If the user has a UID of 0, enter the z/OS UNIX **chown** command to change the owner of the file. For example, to change the owner of file **ps2afpd** to NOBODY, type:

```
chown NOBODY /usr/lpp/Printsrv/bin/ps2afpd
```

If the set-user-ID flag is off, or if you entered the **chown** command, use the **chmod** command to turn on the set-user-ID flag. For example, to turn the flag on for file **ps2afpd**, type:

```
chmod u+s /usr/lpp/Printsrv/bin/ps2afpd
```

For more information, see "Customizing the PDF to AFP and PostScript to AFP transforms" on page 63.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2500W   Font substitution information: *date-time*

Explanation: The PDF to AFP or PostScript to AFP transform did not find one or more fonts that a document requested, so it substituted similar fonts. To determine the substitute fonts, the transform used a font-substitution algorithm that you cannot modify.

In the message text, *date-time* is the date and time the message was written.

The text that follows this message identifies the fonts that the document requested and the fonts that the transform substituted.

The AOP_FONT_SUBSTITUTION_MESSAGES environment variable determines whether the transform writes this message when it substitutes fonts in a document if no other errors occurred.

System action: The document is transformed without error.

User response: None.

System programmer response: In most cases, the substitute font results in acceptable output and no response is necessary. However, if the output is not acceptable, you might be able to add the original font to the transform. For information, see "Adding fonts" on page 74.

If you added a font to the transform and the transform still substitutes another font, make sure that you specified the correct name of the font directory in the AOP_RESOURCE_PATH environment variable in the transform configuration file, **aopxfd.conf**. For information, see Appendix A, "Environment variables," on page 127.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2501E   The transform detected an error in the input data stream, or an error occurred while transforming the document. No output was produced.

Explanation: A transform error occurred.

System action: The transform request was not completed. No output was produced.

Operator response: None.

User response: If there is an error in the input data stream to be transformed, correct the error. If the input data stream is correct, notify the system programmer that this error occurred. After the error is corrected, resubmit the transform request.

System programmer response: For information about the transform problem, see the accompanying messages from the transform. After you correct the problem, you might need to restart the Infoprint Server Transform Manager daemon.

If you do not want transform requests to fail when this type of error occurs, set the AOP_FAIL_ON_ERROR -> no environment variable for the transform instance in the transform configuration file, **aopxfd.conf**. If AOP_FAIL_ON_ERROR->no, the return code from the transform is 0. For information about how to edit the transform configuration file, see Chapter 3, "Customizing transforms," on page 55.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2502I   The transform attempted to convert the document to AFP format. The input data stream might not be valid. Diagnostic information from transform *transform* **follows.**

Explanation: The information that follows this message is from the transform. You can use this information to diagnose the problem. In the message text, *transform* is the name of the transform in the format: *transform_class.#*.

System action: Processing continues if possible.

User response: Use the diagnostic information to correct any data stream errors.

System programmer response: If no data stream error is found, contact an IBM service representative.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2503I   The transform attempted to convert the document to AFP format. Trace information from transform *transform* follows.

Explanation: The diagnostic information that follows this message is from the transform. IBM can use this information to diagnose the transform problem. In the message text, *transform* is the name of the transform in the format: *transform_class.#*.

System action: Processing continues if possible.

User response: Notify your system programmer.

System programmer response: If you cannot correct the error, contact an IBM service representative. Provide the diagnostic information to IBM.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2504E   The transform initialization failed. Diagnostic information from transform *transform* follows.

Explanation: The transform could not be initialized. In the message text, *transform* is the name of the transform in the format: *transform_class.#*.

System action: The transform request was not completed.

User response: Notify your system programmer.

System programmer response: Contact an IBM service representative. Report the diagnostic information to IBM.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2505E   Not enough memory is available to transform the data stream. Increase the memory available to this transform in the Infoprint Server transform configuration file. Also, make sure the region size is large enough.

Explanation: The transform could not obtain enough memory to convert the data stream. The data stream might be large or complex.

System action: The transform request is not completed. No output is produced.

User response: Notify your system programmer. After the problem is corrected, resubmit the transform or print request.

System programmer response: Increase the amount of storage available to the transform:

- Increase the amount of storage in the Infoprint Server transform configuration file, **aopxfd.conf**. Specify up to 1024M in the **-m** option of the entry for this transform. For example: `start-command="ps2afpd -m 1024M"`
- Specify a region size that is at least 10M greater than the value in the **-m** option:
  - If you use the AOPSTART JCL procedure to start Infoprint Server, specify the region size in the REGION parameter of the EXEC statement.
  - If you issue the **aopstart** command from the z/OS UNIX command line during a TSO session, specify the region size in the SIZE option on the logon panel or logon procedure for the TSO user ID.
- Make sure the maximum address space size for Infoprint Server is at least 10M greater than the value in the **-m** option:
  - Check the MAXASSIZE value in the BPXPRMxx member of SYS1.PARMLIB. MAXASSIZE sets the system-wide maximum address space size. You can set MAXASSIZE dynamically with the SETOMVS command. You can check MAXASSIZE from the operator console with this Display command: `d omvs,o`
  - Check the RACF ASSIZEMAX value for the user ID that starts Infoprint Server. ASSIZEMAX overrides the MAXASSIZE value. You can increase the ASSIZEMAX value on the RACF ALTUSER command.
- If you have IEFUSI exits that limit region sizes, make sure the limits in the IEFUSI exits do not apply to OMVS. Enter one of these commands:
  - If you do not want any exits to apply to OMVS:
    `SETSMF SUBSYS(OMVS,NOEXITS)`

– If you need some exits to apply to OMVS:

```
SETSMF SUBSYS(OMVS,EXITS(exits))
```

In the EXITS parameter, specify the exits to apply to OMVS, but do not specify IEFUSI.

For more information about the IEFUSI exit, see *z/OS MVS Installation Exits*.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

AOP2506W **The transform converted the first page of the input file to a page segment or overlay because no page number was specified in the -p option.**

Explanation: The transform request specified the **-t**

pagesegment or **-t** overlay option to convert the input file to an AFP page segment or overlay. The transform can create an AFP page segment or overlay for only one page in the input file. Because the transform request did not identify which page in the input file to use for the page segment or overlay, the transform used the first page.

System action: The transform completed successfully.

User response: If the transform did not create a page segment of overlay of the correct page, resubmit the request and specify the page in the transform **-p** option.

System programmer response: None.

Problem determination: Not applicable.

Source: Infoprint Transforms to AFP for z/OS

Module: Not applicable.

Routing code: Not applicable.

Descriptor code: Not applicable.

Automation: Not applicable.

Chapter 7. Migrating to the latest release

This chapter describes how to migrate to Infoprint Transforms to AFP 2.3 for z/OS from Version 2.2 of the product. It describes these actions:

- Migrating from V2.2 to V2.3
- Using the new functions introduced in V2.3

Migrating from V2.2 to V2.3

Table 12 lists the tasks you might need to do when you migrate from Infoprint Transforms to AFP V2.2 to V2.3. Required tasks apply to all installations. Optional tasks are required only if the listed condition applies to your installation. The table also indicates when to do each task.

Table 12. Tasks for migrating from Infoprint Transforms V2.2 to V2.3

Task	Condition	When to do the task	See page
Removing the PCL to AFP, PDF to AFP, PostScript to AFP, and SAP to AFP V2.2 resource directories	Required.	After installing V2.3	123
Customizing the aopxfd.conf file	Required if the aopxfd file has been altered so that environment variables point to non-standard V2.2 resources.	After installing V2.3	124

Removing the PCL to AFP, PDF to AFP, PostScript to AFP, and SAP to AFP V2.2 resource directories

In V2.3, all transform resources are installed in different directories. Table 13 lists the resource directories. If you have made changes to customize files or directories, make those changes in the new resource directories before you delete the previous version's directories.

Table 13. PCL, PDF, PostScript, and SAP transform resource directories in V2.2 and V2.3

Transform	V2.2 resource directories	V2.3 resource directories
PCL to AFP	/usr/lpp/Printsrv/pcl2afpv2.2/fonts	/usr/lpp/Printsrv/pcl2afpv2.3/fonts
PDF to AFP	/usr/lpp/Printsrv/ps2afpv2.2/lib /usr/lpp/Printsrv/ps2afpv2.2/Resource/Init /usr/lpp/Printsrv/ps2afpv2.2/Resource	/usr/lpp/Printsrv/ps2afpv2.3/lib /usr/lpp/Printsrv/ps2afpv2.3/Resource/Init /usr/lpp/Printsrv/ps2afpv2.3/Resource
PostScript to AFP	/usr/lpp/Printsrv/ps2afpv2.2/lib /usr/lpp/Printsrv/ps2afpv2.2/Resource/Init /usr/lpp/Printsrv/ps2afpv2.2/Resource	/usr/lpp/Printsrv/ps2afpv2.3/lib /usr/lpp/Printsrv/ps2afpv2.3/Resource/Init /usr/lpp/Printsrv/ps2afpv2.3/Resource
SAP to AFP	/usr/lpp/Printsrv/sap2afpv2.2/res /usr/lpp/Printsrv/sap2afpv2.2/icu	/usr/lpp/Printsrv/sap2afpv2.3/res /usr/lpp/Printsrv/sap2afpv2.3/icu

To remove the PCL to AFP, PDF to AFP, PostScript to AFP, and SAP to AFP V2.2 resource directories:

1. If the AOP_RESOURCE_PATH, AOP_SAP2AFP_RESOURCES, and AOP_SAP2AFP_ICU environment variables in the **aopxfd.conf** transform configuration file specify the name of a V2.2 resource directory, delete the directory name. You do not need to specify any of these unless the files are not in the standard path.

   _____

2. Restart the Infoprint Server Transform Manager to pick up the changes to the transform configuration file.

   For example, use the AOPSTOP and AOPSTART JCL procedures:
   ```
   START AOPSTOP,OPTIONS='-d xfd'
   START AOPSTART
   ```

   _____

3. Delete the V2.2 resource directories because the install process does not delete them (the install usually deletes the files in the directories):
   ```
   su
   rm -r /usr/lpp/Printsrv/pcl2afpv2.2
   rm -r /usr/lpp/Printsrv/ps2afpv2.2
   rm -r /usr/lpp/Printsrv/sap2afpv2.2
   ```

   _____

Customizing the aopxfd.conf file

If you customized the **aopxfd.conf** file so that environment variables point to non-standard V2.2 resources, you must change the corresponding environment variables to point to V2.3 resources. This potentially affects:

- The PostScript to AFP and PDF to AFP AOP_RESOURCE_PATH environment variables
- The SAP to AFP variables AOP_SAP2AFP_RESOURCES and AOP_SAP2AFP_ICU

For information about how to create and edit the Infoprint Server transform configuration file, see "Creating the transform configuration file (aopxfd.conf)" in *z/OS Infoprint Server Customization*. After you update the transform configuration file, you must restart the Infoprint Server Transform Manager.

Note: In V2.3, you can specify the AOP_SAP2AFP_RESOURCES environment variable in the SAP to AFP entry in the **aopxfd.conf** transform configuration file or in the AOPSTART EXEC. The **aopxfd.conf** file takes precedence over the AOPSTART EXEC.

Using new functions introduced in V2.3

Table 14 lists the customization tasks that you must do to use new functions introduced in Infoprint Transforms to AFP V2.3, and whether you can do each task before or after you install V2.3. You are not required to use the new functions; these tasks are optional.

Table 14. Optional Tasks for using new functions in V2.3

Task	When to do the task	See page
Creating MO:DCA IS/3-compliant output	After installing V2.3	125

Table 14. Optional Tasks for using new functions in V2.3 (continued)

Task	When to do the task	See page
Creating AFP output for 720-pel and 1200-pel printers	After installing V2.3	125
Using TrueType fonts in AFP output	After installing V2.3	126
Improving alignment of boxes and bar codes in SAP to AFP output	After installing V2.3	126
Generating color IOCA FS45 output with the SAP to AFP transform	After installing V2.3	126
Printing SAPGOF data on printers that do not support Unicode	After installing V2.3	126
Transforming files created with SAPGOF_ST_CHARS: X	After installing V2.3	126
Processing color PCL files into grayscale output	After installing V2.3	126

Creating MO:DCA IS/3-compliant output

In V2.3, you can create MOD:CA IS/3-compliant output in all transforms, by using the **-I** option.

PCL To transform the PCL file **myfile.pcl** into an MO:DCA IS/3 AFP data stream and write the result to a file called myfile.afp enter:

```
pcl2afp -I  -o myfile.afp myfile.pcl
```

PDF To transform the PDF **myfile1.pdf** file into an MO:DCA IS/3 AFP data stream and print it, enter:

```
pdf2afp -I myfile1.pdf | lp
```

PostScript
To transform the PDF **myfile1.pdf** file into an MO:DCA IS/3 AFP data stream and print it, enter:

```
pdf2afp -I myfile1.pdf | lp
```

SAP To transform the SAP file file.sap into an MO:DCA IS/3-compliant AFP data stream, and write the result to a UNIX file called file.afp, enter:

```
sap2afp -I -o file.afp file.sap
```

Creating AFP output for 720-pel and 1200-pel printers

In V2.3, you can specify 720 or 1200 resolution output for both the PCL to AFP and SAP to AFP transforms.

For the PCL to AFP transform, you can specify the resolution using the AOP_RESOLUTION environment variable, or you can specify it using the **-r** option in a command. To enter a command that transforms the PCL file **myfile.pcl** into a 1200 pels per inch file called **myfile.afp**, enter:

```
pcl2afp -r 1200 -o myfile.afp myfile.pcl
```

For the SAP to AFP transform, specify the resolution using the **-r** option. To enter a command that transforms the SAP file **myfile.sap** into a 720 pels per inch file called **myfile.afp**, enter:

```
sap2afp -r 720 -o myfile.afp myfile.sap
```

Using TrueType fonts in AFP output

V2.3 ships with several TrueType fonts. The **-f** option in the **sap2afp** command specifies the use of TrueType fonts in your SAP to AFP output.

If PSF uses a RAT to print the AFP output, you do not need to customize the configuration files to use the **-f** option.

To embed the TrueType fonts in the output file, rather than use a RAT file to locate the fonts, you first need to customize the **fonts.tab.unicode.truetype** configuration file, as described in "Steps for customizing SAP to AFP transform configuration files" on page 83.

Improving alignment of boxes and bar codes in SAP to AFP output

Due to an incompatibility between the AFP and SAP coordinate systems, boxes and bar codes in AFP output are sometimes slightly out of place. The **-b** option places bar codes and **-k** places boxes according to the SAP specification, rather than using the AFP placements.

To transform the SAP file called **file.sap** into an AFP data stream with bar codes and boxes placed according to the SAP specification, and write the result to a UNIX file called **file.afp**, enter:

```
sap2afp -b -k -o file.afp file.sap
```

Generating color IOCA FS45 output with the SAP to AFP transform

To transform the color SAP file called **file.sap** into a color IOCA FS45 AFP data stream and write the result to a UNIX file called **file.afp**, enter:

```
sap2afp -a fs45 -o file.afp file.sap
```

Printing SAPGOF data on printers that do not support Unicode

To transform the SAP file called **file.sap** that was generated as SAPGOF and contains Unicode characters, write the result to a UNIX file called **file.afp**, that can then be printed on a printer that does not support Unicode, enter:

```
sap2afp -u -o file.afp file.sap
```

Transforming files created with SAPGOF_ST_CHARS: X

To transform SAP data called **file.sap** that was generated on a SAP Unicode system with the SAPGOF_ST_CHARS:X entry set, and write the result to a UNIX file called **file.afp**, enter:

```
sap2afp -h -o file.afp file.sap
```

Processing color PCL files into grayscale output

To transform the PCL 5c file **myfile.pcl** into a grayscale AFP data stream, and write the result to a file called **myfile.afp**, enter:

```
pcl2afp -C -o myfile.afp myfile.pcl
```

Appendix A. Environment variables

Table 15 lists all the environment variables the transforms use and indicates which transforms support the variable. For information about these environment variables, see:

- "Environment variables for the PCL to AFP transform" on page 57
- "Environment variables for the PDF to AFP and PostScript to AFP transforms" on page 66
- "Environment variables for the SAP to AFP transform" on page 77

Table 15. Environment variables the transforms support

Environment variable	PCL to AFP transform	PDF to AFP transform	PostScript to AFP transform	SAP to AFP transform
_BPX_JOBNAME	Yes	Yes	Yes	Yes
_CEE_DMPTARG	Yes	Yes	Yes	Yes
AOP_FAIL_ON_ERROR	Yes	Yes	Yes	Yes
AOP_FONT_SUBSTITUTION_ MESSAGES	No	Yes	Yes	No
AOP_HORIZONTAL_MARGINS	Yes	No	No	No
AOP_MVS_RETURN_CODES (see **Note**)	Yes	Yes	Yes	Yes
AOP_PAGE_HEIGHT	Yes	No	No	No
AOP_PAGE_WIDTH	Yes	No	No	No
AOP_RECLEN	Yes	Yes	Yes	Yes
AOP_RESOLUTION	Yes	No	No	No
AOP_RESOURCE_PATH	Yes	Yes	Yes	No
AOP_TRAILER_ERROR_PAGE	Yes	Yes	Yes	Yes
AOP_TRIM	Yes	Yes	Yes	No
AOP_SAP2AFP_ICU	No	No	No	Yes
AOP_SAP2AFP_RESOURCES	No	No	No	Yes
AOP_VERTICAL_MARGINS	Yes	No	No	No
AOPTRACEDIR	Yes	Yes	Yes	Yes
AOPTRACEON	Yes	Yes	Yes	Yes
AOP_WORLDTYPE_PATH	No	No	No	Yes

Note: Do not specify AOP_MVS_RETURN_CODES in the Infoprint Server transform configuration file as you do the other environment variables. For information about where to specify this environment variable, see "AOP_MVS_RETURN_CODES environment variable" on page 52.

Appendix B. Fonts

This appendix lists the fonts that the PCL to AFP, PDF to AFP, and PostScript to AFP transforms support. It also lists the WorldType fonts the SAP transform supports.

PCL to AFP transform fonts

Table 16 lists the Monotype MicroType fonts that are built in to the PCL to AFP transform.

Table 16. PCL to AFP transform built-in fonts

Fonts	Fonts (continued)	Fonts (continued)
Albertus Extra Bold	Clarendon Condensed Bold	Symbol
Albertus Medium	Coronet	Times New Roman
Antique Olive	Courier	Times New Roman Bold
Antique Olive Bold	Courier Bold	Times New Roman Bold Italic
Antique Olive Italic	Courier Bold Italic	Times New Roman Italic
Arial	Courier Italic	Univers Bold
Arial Bold	Garamond Antiqua	Univers Bold Italic
Arial Bold Italic	Garamond Halbfett	Univers Condensed Bold
Arial Italic	Garamond Kursiv	Univers Condensed Bold Italic
CG Omega	Garamond Kursiv Halbfett	Univers Condensed Medium
CG Omega Bold	Letter Gothic	Univers Condensed Medium Italic
CG Omega Bold Italic	Letter Gothic Bold	Univers Medium
CG Omega Italic	Letter Gothic Italic	Univers Medium Italic
CG Times	Marigold	WingDings
CG Times Bold		
CG Times Bold Italic		
CG Times Italic		

PDF to AFP and PostScript to AFP transform fonts

Table 17 lists the Ghostscript fonts that the PDF to AFP and PostScript to AFP transforms use. The Ghostscript fonts are functional equivalents of the corresponding PostScript fonts in that the typeface styles are similar and the font metrics are identical to provide the same pagination and line endings.

Table 17. PDF to AFP and PostScript to AFP transform fonts

For this PostScript font:	The transform uses this Ghostscript font:
NewCenturySchlbk-BoldItalic	CenturySchL-BoldItal
NewCenturySchlbk-Bold	CenturySchL-Bold
NewCenturySchlbk-Italic	CenturySchL-Ital
NewCenturySchlbk-Roman	CenturySchL-Roma
ZapfDingbats	Dingbats
Courier-BoldOblique	NimbusMonL-BoldObli
Courier-Bold	NimbusMonL-Bold
Courier-Oblique	NimbusMonL-ReguObli
Courier	NimbusMonL-Regu

Table 17. PDF to AFP and PostScript to AFP transform fonts (continued)

For this PostScript font:	The transform uses this Ghostscript font:
Times-BoldItalic	NimbusRomNo9L-MediItal
Times-Bold	NimbusRomNo9L-Medi
Times-Italic	NimbusRomNo9L-ReguItal
Times-Roman	NimbusRomNo9L-Regu
Helvetica-Narrow-BoldOblique	NimbusSanL-BoldCondItal
Helvetica-Narrow-Bold	NimbusSanL-BoldCond
Helvetica-BoldOblique	NimbusSanL-BoldItal
Helvetica-Bold	NimbusSanL-Bold
Helvetica-Narrow-Oblique	NimbusSanL-ReguCondItal
Helvetica-Narrow	NimbusSanL-ReguCond
Helvetica-Oblique	NimbusSanL-ReguItal
Helvetica	NimbusSanL-Regu
Symbol	StandardSymL
Bookman-DemiItalic	URWBookmanL-DemiBoldItal
Bookman-Demi	URWBookmanL-DemiBold
Bookman-LightItalic	URWBookmanL-LighItal
Bookman-Light	URWBookmanL-Ligh
ZapfChancery-MediumItalic	URWChanceryL-MediItal
AvantGarde-BookOblique	URWGothicL-BookObli
AvantGarde-Book	URWGothicL-Book
AvantGarde-DemiOblique	URWGothicL-DemiObli
AvantGarde-Demi	URWGothicL-Demi
Palatino-BoldItalic	URWPalladioL-BoldItal
Palatino-Bold	URWPalladioL-Bold
Palatino-Italic	URWPalladioL-Ital
Palatino-Roman	URWPalladioL-Roma

SAP to AFP transform TrueType fonts

V2.3 includes some WorldType TrueType fonts. WorldType fonts are IBM's
TrueType and OpenType fonts that support Unicode encoded glyphs for almost
every language in the world. Table Table 18 lists the TrueType fonts included with
the transform product.

Table 18. SAP to AFP TrueType fonts

Font file name	Full font name	Localization
wt__j__b.ttf	WT Serif J	Japanese
wt__k__b.ttf	WT Serif K	Korean
wt__s__b.ttf	WT Serif SC	Simplified Chinese
wt__tt_b.ttf	WT Serif TW	Traditional Chinese Taiwan
wt__w___.ttf	WT Serif	N/A
wt_dj__b.ttf	WT SerifDuo J	Japanese

Table 18. SAP to AFP TrueType fonts (continued)

Font file name	Full font name	Localization
wt_dk__b.ttf	WT SerifDuo K	Korean
wt_ds__b.ttf	WT SerifDuo SC	Simplified Chinese
wt_dtt_b.ttf	WT SerifDuo TW	Traditional Chinese Taiwan
wt_dw___.ttf	WT SerifDuo	N/A
wts_w___.ttf	WT Sans	N/A
wtsdj__b.ttf	WT SansDuo J	Japanese
wtsdk__b.ttf	WT SansDuo K	Korean
wtsds__b.ttf	WT SansDuo SC	Simplified Chinese
wtsdsxb_.ttf	WT SansDuo SC xB	Simplified Chinese
wtsdtt_b.ttf	WT SansDuo TW	Traditional Chinese Taiwan
wtsdw___.ttf	WT SansDuo	N/A

Appendix C. Accessibility

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Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

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

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Vol I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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