IBM

IBM Systems - iSeries

Printing
Advanced Function Presentation

Version 5 Release 4

IBM

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> **Note**
>
> Before using this information and the product it supports, read the information in "Notices," on page 61.

Contents

Advanced Function Presentation

IBM® iSeries servers have powerful printing and display functions. With Advanced Function Presentation™ (AFP™) you can present information using overlays, bar codes, graphics, images, and more. iSeries servers support a variety of powerful printing and presentation solutions.

This information illustrates some of the core iSeries printing functions, and helps you plan for and configure these functions.

"What's new for V5R4" on page 2
This topic contains information about the changes and improvements made to Advanced Function Presentation since the last release.

"Printable PDF" on page 2
This is a PDF version of this information topic.

"AFP concepts" on page 2
Use this information to understand how AFP works on the iSeries server.

"Plan for AFP" on page 16
Use this information to help plan how to use Print Services Facility™ (PSF) in your environment.

"Get started with AFP" on page 18
Use this information to help you get started using PSF by using AFP resources and creating AFP data.

"Configure PSF" on page 39
See this procedure for instructions on setting up different aspects of AFP configuration.

"Manage PSF" on page 40
Find resources for administering and working with your AFP environment after successful configuration.

"Send data from zSeries to iSeries servers" on page 47
Use this information for instructions to receive and print data and resources from a zSeries® server to your iSeries™ server.

"Line and mixed data stream support" on page 43
Use this information to understand how PSF supports line and mixed data.

"AFP reference information" on page 49
Look up information about PSF here, such as form definitions and page definitions included on your system.

"Troubleshoot AFP" on page 59
Find help for resolving AFP printing problems.

"Related information for AFP" on page 59
Get detailed information about iSeries AFP from the manuals, IBM Redbooks™, and Web sites listed here.

What's new for V5R4

Enhancements to AFP information

An extensive amount of information is added to the Advanced Function Presentation (AFP) topic (formerly known as the Other printing topic) this release. Most of this information is not new, but is moved from the Printer Device Programming manual.

To find other information about what is new or changed this release, see the Memo to Users topic.

Related information

Infoprint® Server for iSeries User's Guide PDF

Printable PDF

To view or download the PDF version of this document, select Advanced Function Presentation (about 1000 KB).

You can also view or download the related topic Basic printing (about 7050 KB).

Saving PDF files

To save a PDF file on your workstation for viewing or printing:
1. Right-click the PDF file in your browser (right-click the link above).
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF file.
4. Click **Save**.

Downloading Adobe Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free copy from the Adobe Web site (www.adobe.com/products/acrobat/readstep.html) .

AFP concepts

Read these topics for an overview of the Advanced Function Presentation (AFP) and related concepts.

Overview topics

> **"Overview of AFP printing" on page 4**
> This topic provides a high-level overview of the printing process.
>
> AFP resource topics:
>
> **"AFP resources" on page 5**
> This topic provides a high-level overview of AFP resources. It describes what an AFP resource is and how it is used.
>
> **"AFP fonts" on page 5**
> This topic provides a high-level overview of AFP fonts. It describes what an AFP font is, including the font components: font character set, code page, and coded font. It also describes the differences between double-byte and single-byte fonts.

"Form definitions" on page 6
This topic provides a high-level overview of form definitions. It describes when a form definition is required, lists the options you can control with a form definition, and where you can get form definitions.

"Line data" on page 7
This topic provides a high-level overview of line data. It describes what line data is and gives a brief overview of how to specify it.

"Mixed data" on page 7
This topic provides a high-level overview of mixed data.

"Object containers" on page 7
This topic provides a high-level overview of object containers. It describes what an object container is and why you would use them.

"Overlays" on page 8
This topic provides a high-level overview of overlays, also known as electronic forms. It describes what an overlay is and how you can obtain them.

"Page definitions" on page 9
This topic provides a high-level overview of page definitions. It describes what a page definition is used to specify and when it is required.

"Page segments" on page 9
This topic provides a high-level overview of page segments. It describes what page segments are and lists several ways to obtain them.

"Resources in the integrated file system" on page 10
This topic describes how Print Services Facility (PSF) can use resources in the integrated file system and why you would store resources there.

Libraries and library lists:

"Resource library lists" on page 11
This topic provides a high-level overview of library lists. It describes what resource library lists are, the different types of resource library lists, and why you would use them.

"AFP font libraries" on page 11
This topic provides a high-level overview of font libraries. It lists which libraries are the font libraries and describes how they relate to library lists.

TrueType and OpenType font topics

"TrueType and OpenType fonts" on page 12
This topic provides a high-level overview of TrueType and OpenType fonts. It describes what a TrueType or OpenType font is and the requirements for using them with PSF. It also introduces resource access tables.

"How TrueType and OpenType fonts differ from AFP fonts" on page 12
This topic describes how TrueType and OpenType fonts are different from AFP fonts in their use, installation, and more.

PSF configuration topics

Overview of AFP printing

Advanced Function Presentation (AFP) is an architecture-based system of hardware and software for creating, formatting, viewing, retrieving, printing, and distributing information on a wide variety of printer and display devices. It is the original, integrated data stream on the iSeries for generating fully composed pages of data. Traditional line-mode print applications compose a line at a time down the page (typically continuous form pages), whereas AFP composes the entire page before printing. In AFP, page elements such as text, images, bar codes, page segments, and overlays, can be specified in any order at any position in the page. This is called all points addressability.

Advanced Function Presentation data stream (AFPDS) is a printer-independent data stream that composes full pages within a document. Many of the page elements you can use with AFP are special objects called resources.

AFPDS

AFPDS files can be generated on the iSeries server as well as many other platforms. These operating systems can send AFPDS files to each other for printing on AFP-configured printers.

PSF

Print Services Facility (PSF) combines print data with resources to manage and control data transmitted to AFP printers. PSF accepts various data streams, transforms these data streams into the data stream required by each printer, and then transmits the data to the printer. PSF uses processing and printing options specified by the user and the installation during these processes. In addition, PSF does the following:

- Manages resources.
- Verifies part of the input data stream's syntax (the printer verifies the remainder of the syntax).
- Provides diagnostic aids, which provide information that can be used for problem analysis.
- Reports the status of a printer to the system operator.
- Provides accounting information.
- Provides error-recovery procedures for AFP printers. If a spooled file does not print due to a printer problem such as a paper jam, PSF retransmits the affected pages when the problem at the printer is corrected.

To use AFP support on the iSeries server, typically PSF must be installed. However, if the ASCII data stream is converted through Host Print Transform, you can use the AFP support without installing PSF.

Related concepts

"AFP resources" on page 5

Related tasks

AFP resources

Advanced Function Presentation (AFP) resource objects contain data and control information. This information can be shared by different pages within a spooled file as well as different spooled files. Examples of resources are fonts, which define the characters used to print text, and page segments, which can include images and text.

Resources can be stored and accessed from within the operating system being used. By referring to the name of the stored resource, many data streams can share the same resources. For more information about resources, see the descriptions of the different resource types:
* "AFP fonts"
* "Form definitions" on page 6
* "Object containers" on page 7
* "Overlays" on page 8
* "Page definitions" on page 9
* "Page segments" on page 9
* "TrueType and OpenType fonts" on page 12

AFP fonts

A font is a collection of characters of a certain size, typeface, and type style. Each character in a font is identified by a 1-byte (single-byte) or a 2-byte (double-byte) code. The internal structure of fonts depends on whether the font is for a phonetic or a non-phonetic writing system. An example of a phonetic writing system is English. An example of a non-phonetic writing system is Kanji. Advanced Function Presentation (AFP) fonts (or Font Object Content Architecture (FOCA) fonts) are the standard fonts used for Intelligent Printer Data Stream™ (IPDS) output. AFP fonts are made up of a code page and a character set, which are described in greater detail later. All AFP fonts are encoded as either single-byte or double-byte fonts, depending on the language for which they are being used.

At least two resources are needed to make up a font: a font character set and a code page. The relationship between code pages and font character sets is illustrated in Figure 1 on page 6. A third resource, a coded font, can define a font by naming a font character set and a code page.

Font character set
> This resource contains the patterns for each character in the font and associates an 8-byte character identifier with each pattern. This resource also contains descriptive information for the entire character set.

Code page
> This resource associates code points with character identifiers within a font character set, each representing a character pattern. A code point is an 8-bit binary number representing one of 256 potential characters.

Coded font
> This resource associates one or more code pages with the appropriate font character sets.
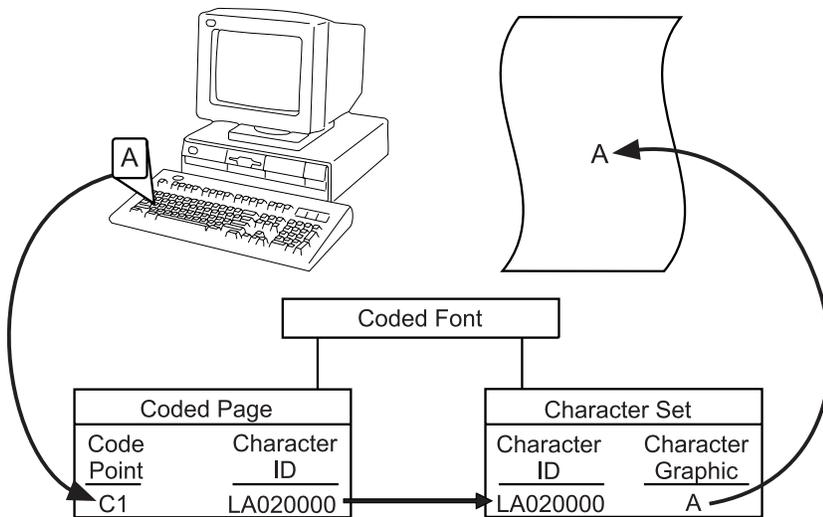
Figure 1. Translation of a keyboard character into a printed character

Related tasks

"Obtain AFP resources" on page 18

"Specify an AFP font" on page 26

Form definitions

A form definition is an Advanced Function Presentation (AFP) resource object that defines the characteristics of the physical form to be printed on, including these:
* Overlays to be used
* Position of page data on the form
* Rotation
* Duplexing
* Input drawer
* Formfeed type
* Print quality
* Number of copies of each page and the modifications that apply to each set of copies

Whenever you are printing to a printer configured as AFP(*YES), a form definition is required. If you do not specify a form definition on the printer file, an inline form definition is built from the printer file parameters. If you specify a form definition, no inline form definition is built from the printer file parameters. In this case, if you send the data to an AFP printer, Print Services Facility (PSF) ignores some printer file parameters.

This list details the origin of AFP-related form definitions:
* Provided with the iSeries server
* Created with the IBM Infoprint Designer for iSeries licensed program
* Downloaded from zSeries
* Inline from zSeries
* Created automatically from printer file parameters

Related concepts

Related tasks

Related reference

Line data

Advanced Function Presentation (AFP) applications can generate Advanced Function Printer data stream (AFPDS), line, or mixed (AFPDS and line) spooled files. Line data is record-oriented readable text. The generating application can partially format line data by doing one of these:

* adding carriage control characters to the first column of each record
* adding blank lines to adjust vertical positioning
* using skipping and spacing controls (such as on an RPG output specification)

Line data is supported as a device type in the printer file commands through the DEVTYPE(*LINE) specification. The printer file commands follow:

* Create Printer File (CRTPRTF)
* Change Printer File (CHGPRTF)
* Override with Printer File (OVRPRTF)

Related concepts

Mixed data

Advanced Function Presentation (AFP) applications can generate Advanced Function Printer data stream (AFPDS), line, or mixed (AFPDS and line) spooled files. Mixed data is line data intermixed with AFPDS data. It can also be called *AFPDSLINE data. Only certain AFPDS structured fields are allowed to be intermixed with line data. See *Advanced Function Printing™: Programming Guide and Line Data Reference* for information about mixing line data and AFPDS structured fields.

Related information

Advanced Function Printing: Programming Guide and Line Data Reference PDF

Object containers

Object containers are used to carry non-Object Content Architecture (OCA) objects in an Advanced Function Presentation (AFP) data stream. Some such objects are Graphics Interchange Format (GIF) and Tagged Image File Format (TIFF) images. These non-OCA objects can be *wrapped* or *unwrapped*. Wrapped objects are carried in a Mixed Object Data Content Architecture (MO:DCA™) envelope called an object container. Unwrapped objects are unaltered from their original form. If the object is to be carried in MO:DCA resource groups and interchanged, it must be wrapped.

Note: Print Services Facility (PSF) does not check an object container's contents. Therefore, it is up to the user to verify that the printer can handle the type of data in the object container. The Infoprint Server PDF subsystem works like a printer. For information about the types of images it can accept, see the *Infoprint Server for iSeries: User's Guide*.

Object containers, even though they contain non-OCA objects, are similar to other AFP resources in these ways:

- They can be mapped. A mapped resource is downloaded once per spooled file, irrespective of the number of times the resource is referenced within the spooled file.
- They can be included on a page.
- They can be captured in the printer.

Using object containers has several benefits:

- You can reference several types of MO:DCA objects in a spooled file without having to include them in an overlay or page segment. These image types are image data, bar code data and graphics data.
- You can scale and rotate these objects. With page segments and overlays, you need to create one copy of the object in each orientation needed.
- You can include images larger than 16 MB in your output. If an image exceeds 16 MB, the image cannot be stored as a page segment object.
- Print applications can specify the use of non-OCA objects which refer to other non-OCA objects, such as color mapping tables (which are printer-resident). These are called *secondary resources*.
- Applications can use color objects with Intelligent Printer Data Stream (IPDS) printers.
- The IBM Infoprint Server for iSeries licensed program's PDF subsystem accepts object containers with certain types of images as input.

Related tasks

"Obtain AFP resources" on page 18

"Specify an object container" on page 29

Related information

Infoprint Server for iSeries User's Guide PDF

Overlays

Overlays are a collection of predefined data such as lines, shading, text, boxes, or logos. They can be merged with variable data on a sheet while a spooled file is being processed.

You can use the licensed program IBM Infoprint Designer for iSeries, the licensed program Advanced Function Printing Utilities for iSeries, the licensed program IBM Infoprint Server for iSeries, or the Advanced Function Presentation (AFP) printer drivers provided for Microsoft® Windows® 2000/XP to create overlays on the iSeries server. Overlays can also be downloaded from other operating systems, such as the zSeries.

When overlay data is received from the zSeries, you place it in a data file. To convert the page overlay data to a format that can be used by i5/OS, use the Create Overlay (CRTOVL) CL command.

Related tasks

"Obtain AFP resources" on page 18

"Specify an overlay" on page 25

Related reference

Create Overlay (CRTOVL) CL command

Page definitions

Page definitions are resources that format and compose line data into logical pages. A page definition contains printing controls that specify:

- Where data from each input record is to be printed
- Page size (height and width)
- Data fields that can be suppressed
- Print positions for line-data records containing carriage control characters
- Inline printing direction
- Number of lines per inch
- List of page segments that might be used
- List of overlays that might be used
- Record definitions
- Constant data to be printed
- List of fonts that might be used

Whenever you are printing to a printer configured as AFP(*YES) and you are printing line or mixed data, a page definition is required. If a page definition is not specified on the printer file, an inline page definition is built from the printer file parameters.

If you specify a page definition and also specify line data or mixed data, no inline page definition is built from the printer file parameters. In this case, if you send the data to an Advanced Function Presentation (AFP) printer, Print Services Facility (PSF) ignores some print parameters.

Related concepts

"How page definitions, form definitions, and printer files interact" on page 15

Related tasks

"Obtain AFP resources" on page 18

"Specify a page definition" on page 24

Related reference

"Page definitions included with the server" on page 51

Page segments

Page segments are objects containing composed text and images that are prepared before formatting and included during printing.

For example, you might want to repeat constant data at different positions on a page or overlay. You might also want to repeat that data on different pages or overlays. You can do this by using a page segment. A company logo is an example of this type of data.

You can use the IBM Infoprint Designer for iSeries licensed program, the Advanced Function Printing Utilities for iSeries licensed program, the IBM Infoprint Server for iSeries licensed program, or the Advanced Function Presentation (AFP) printer drivers provided with Microsoft Windows 2000/XP, to create page segments on the iSeries server. Page segments can also be downloaded from zSeries. The page segments must be stored in an accessible library.

When page segment data is received from the zSeries, you place it in a data file. To convert the page data to a format that can be used by i5/OS, use the Create Page Segment (CRTPAGSEG) command.

Related concepts

"How page definitions, form definitions, and printer files interact" on page 15

Related tasks

"Obtain AFP resources" on page 18

"Specify a form definition" on page 23

Related reference

Create Page Segment (CRTPAGSEG) CL command

"Form definitions included with the server" on page 50

Resources in the integrated file system

Print Services Facility (PSF) can process several types of Advanced Function Presentation (AFP) and non-AFP resources that are stored in the integrated file system. These are objects that are not stored within a page segment or overlay. Following are the AFP resource types that can be stored in the integrated file system:

- Image Object Content Architecture (IOCA)
- Graphics Object Content Architecture (GOCA)
- Bar Code Object Content Architecture™ (BCOCA™)

All non-AFP resources are placed in the integrated file system. PSF will process any non-AFP resource that is specified. However, the actual support of non-AFP resources depends on the printer to which the data is being sent.

The Data description specifications (DDS) keyword AFPRSC is used to identify any resources stored in the integrated file system. For information about DDS keywords used with printer files, see DDS for printer files in the Programming topic. There are several benefits of using the AFPRSC keyword:

- You do not need to create objects as a page segment.
- You can use non-AFP resources.
- You can obtain objects from other operating systems and reference them without further modification. You do not need to create them into a page segment.
- Some applications generate AFP resources and write them to the integrated file system. PSF can access those resources without requiring you to create a page segment or overlay.

When referencing resources in the integrated file system, you must understand how the operating system searches for those resources. See the Search order of library list topic for information.

Related concepts

DDS for printer files

"Search order of library list" on page 30

Resource library lists

A resource library list specifies the libraries that are searched for the Advanced Function Presentation (AFP) resources needed to process a spooled file. There are two types of resource library lists: user and device.

user resource library list
> Specifies what user libraries are searched when processing your spooled files. It might vary from user to user.

device resource library list
> Specifies what libraries are searched when using a specific device, regardless of who is using the device. This list does not change from user to user but can vary from device to device.

There are several reasons to use library lists:

- You can ensure that the necessary libraries are actually in the library list that Print Services Facility (PSF) uses.
- They can improve performance when you specify only the libraries that need to be searched. For example, you can specify one set of libraries for a 240 pel printer and another set for a 300 pel printer.

When searching for resources, the user library list is searched first and then the device library list. The libraries are searched in the order listed. You can specify a user resource library list and a device resource library list in the PSF configuration object.

Related concepts

"Search order of library list" on page 30

"PSF configuration objects" on page 13

AFP font libraries

When a printer writer is started for an Advanced Function Presentation (AFP)-configured printer and a font is specified, the operating system searches in these locations:

1. User library list
2. IBM-supplied font libraries

The IBM-supplied font libraries are:

- QFNTCPL

  This library contains the AFP Compatibility Fonts. These are the fonts included with the iSeries server.
- Single-byte character set font libraries numbered QFNT01 through QFNT19 and double-byte character set font libraries numbered QFNT61 through QFNT69.

  These are the font libraries that support various IBM licensed programs on the iSeries server.

Any of the libraries in the previous list that are found are put in the library list of the job printing the spooled file. These libraries are then available to the device even if they were not in the library list of the user that created the spooled file. Also, if you have acquired additional font resources, you can store them in these IBM-supplied font libraries. Storing them in the IBM-supplied libraries provides widespread access to the font.

You can use a font that is not in one of the QFNT*xx* libraries. To do so, add the library containing the font to your library list when you create the spooled file.

For information about specifying a different font library list on a printer, see Resource library lists.

Related concepts

TrueType and OpenType fonts

There is extensive operating system support for TrueType fonts, and they are popular with PC applications. Consequentially, TrueType is probably the most prevalent font technology in the industry today. The OpenType font format is an extension of the TrueType font format that allows better support for international character sets and provides broader multi-platform support. The OpenType format allows both TrueType or Adobe Type 1 outline fonts to be packaged as a TrueType font. OpenType fully supports Unicode. Advanced Function Presentation data stream (AFPDS) accepts Unicode UTF-8 or UTF-16.

You can only print TrueType and OpenType fonts if both your printer driver, such as Print Services Facility (PSF), and your printer support the fonts. You can use a code page with TrueType and OpenType fonts, but it is not required.

Note: Any TrueType font that is to be used with Advanced Function Presentation (AFP) must be Unicode-enabled. This means that the font must have these characteristics:

- It must contain a Microsoft Unicode subtable identified by platform ID = 3 (Microsoft) and platform-specific encoding ID = 1 (Unicode, UTF-16).
- It must specify a full font name (Name ID 4) using the same encoding in the naming table.

When you install a TrueType font with the Font Installer for AFP Systems, it creates a resource access table. This table has a hard-coded name and is used to find fonts on your system. The Font Installer for AFP Systems is a feature of the IBM Infoprint Fonts for Multiplatforms licensed program

Related concepts

Related tasks

Related reference

How TrueType and OpenType fonts differ from AFP fonts

When usingTrueType fonts, you will see differences in how the fonts are specified, managed, and installed when compared to Advanced Function Presentation (AFP) fonts.

Note: In this topic, the term TrueType refers to both TrueType and OpenType fonts.

Table 1. Differences between AFP and TrueType or OpenType fonts

AFP fonts	TrueType fonts
AFP fonts are i5/OS™ objects.	TrueType fonts are stream files in the integrated file system.
DDS keyword FNTCHRSET is used to select AFP fonts.	DDS keyword FONTNAME is used to select TrueType fonts.

AFP fonts	TrueType fonts
Print Services Facility (PSF) uses a defined search algorithm to search for AFP fonts. It searches the library list associated with the job for a matching font.	TrueType fonts reside in one of two locations. • /QIBM/ProdData/OS400/Fonts/TTFonts contains IBM-supplied fonts • /QIBM/UserData/OS400/Fonts/TTFonts contains user fonts.
AFP fonts are created and managed using the font resource commands: CHGCDEFNT, CHGFNTRSC, CRTFNTRSC, DLTFNTRSC, DSPCDEFNT, DSPFNTRSCA, and WRKFNTRSC.	TrueType fonts have no i5/OS management commands. Instead, the fonts are installed using the Font Installer for AFP Systems feature of the Infoprint Fonts licensed program. The generated resource access table resides in the /QIBM file system.
An AFP font is specified by using the *FNTRSC object name such as C0D0GT10.	TrueType fonts are specified using a font name such as Times New Roman.
AFP fonts can be substituted when the requested font is not available.	There is no font substitution with TrueType fonts.
An AFP font is marked as eligible for capture with the Change Font Resource (CHGFNTRSC) command.	TrueType fonts are marked as eligible for capture by the Font Installer for AFP Systems feature of the Infoprint Fonts licensed program.
PSF will only try to capture AFP fonts if the PSF configuration object specifies FNTCAPTURE(*YES).	PSF will always try to capture TrueType fonts.

Related tasks

"Specify an AFP font" on page 26

"Specify a TrueType or OpenType font" on page 26

PSF configuration objects

A Print Services Facility (PSF) configuration object lets you specify Intelligent Printer Data Stream (IPDS) printer customization options that you cannot specify elsewhere. These are some of the print functions that you can enable with a PSF configuration object:

• IPDS pass-through
• IPDS-to-PDF transform
• Session and IPDS dialog sharing
• User resource library list

Related tasks

"Configure PSF" on page 39

"Specify a PSF configuration object" on page 25

IPDS pass-through

Before printing, SNA character string (SCS) files are converted to Intelligent Printer Data Stream (IPDS) files. These are then converted to Advanced Function Presentation data stream (AFPDS), and then to printer-specific IPDS. Also, IPDS files are converted to AFPDS, then are converted to printer-specific IPDS. The final IPDS files have specific commands for your printer. You can choose to skip the conversion to AFPDS and to printer-specific IPDS. This is called IPDS pass-through. IPDS pass-through is specified on a PSF configuration object.

Specifying IPDS pass-through in the PSF configuration object allows only those spooled files eligible for IPDS pass-through to bypass the extra transforms. Those spooled files not eligible for IPDS pass-through are still transformed to AFPDS and then to printer-specific IPDS.

This figure shows the data stream origination, flow, and conversion for a spooled file when IPDS pass-through support is enabled.
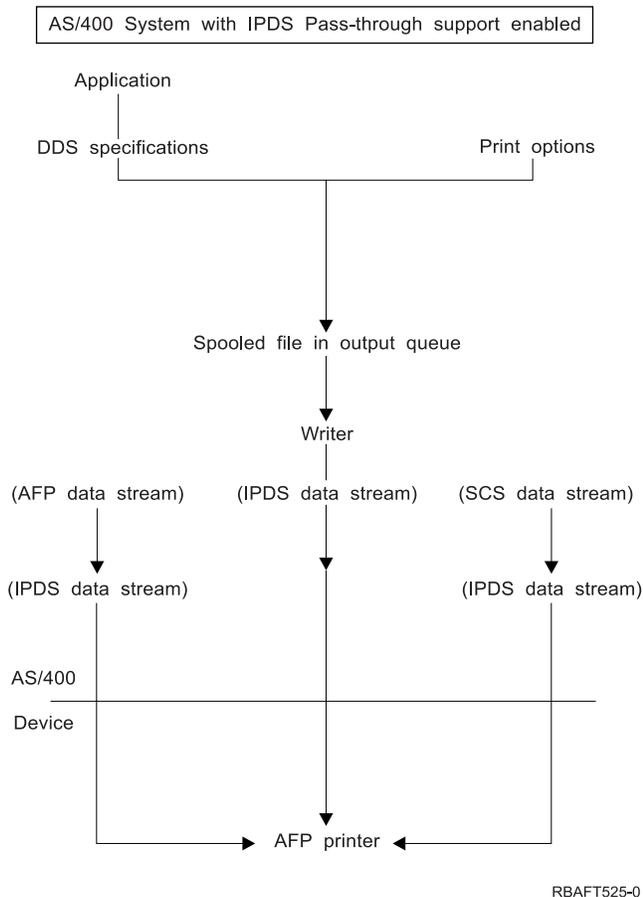
Consider using IPDS pass-through if one of these apply:
* You have applications that generate SCS or IPDS data streams when printing to an Advanced Function Presentation (AFP) printer.
* You are using applications such as the IBM Business Graphics Utility for AS/400® licensed program, GDDM®, or Virtual Print that do not support AFPDS.
* Your SCS or IPDS application does not contain any reference to overlays or to host font character sets.

Limitations of IPDS pass-through

These IPDS pass-through limitations determine whether a spooled file or printer is eligible for IPDS pass-through:
* Some SCS or IPDS spooled files are not eligible for IPDS pass-through. One such situation is when they contain special functions that require being transformed to AFPDS for the spooled file to print correctly.

  Spooled files that contain the following data or printer file attributes are not eligible for IPDS pass-through:
  – For SCS or IPDS data streams, the data stream contains Image Object Content Architecture (IOCA) or IM1.

- For SCS or IPDS data stream, a front or back overlay was specified in the printer file.
- For SCS data stream, IGCDTA(*YES) was specified in the printer file.
- For SCS or IPDS data streams, MULTIUP with REDUCE(*NONE) was specified in the printer file.
- For SCS or IPDS data stream, a form definition was specified in the printer file.
- The EDGESTITCH or CORNERSTPL finishing operation is specified in the printer file.

If IPDS pass-through is specified but the spooled file is ineligible, a diagnostic message is sent and the spooled file is processed as usual. It is transformed to AFPDS and then to printer-specific IPDS.

- IPDS pass-through support is available for any IPDS printer that provides resident fonts. This is because the resident fonts referenced in the data stream must be mapped to the host fonts, which are downloaded to the printer. Therefore, IPDS pass-through support is not available for these IBM IPDS printers: 3820, 3825, 3827, 3828, 3829, 3831, 3835, and 3900-001.

  When a printer writer is started to an AFP(*YES) printer that does not support IPDS pass-through and IPDSPASTHR(*YES) is specified, a diagnostic message is sent. The spooled file is transformed to AFPDS and then to printer-specific IPDS.

How page definitions, form definitions, and printer files interact

Page definition and the printer file

When you specify a page definition on the printer file, some printer file parameters might be ignored when the spooled file is printed through Print Services Facility (PSF). For example, if you specify a page definition and also specify line data or mixed data, an inline page definition is not built. In this case, the following happens:

- If you send line data with a printer file to an Advanced Function Presentation (AFP) printer, PSF ignores these printer file parameters:
  - CDEFNT
  - CHRID
  - CPI
  - FNTCHRSET
  - FOLD
  - FONT
  - LPI
  - MULTIUP
  - PAGESIZE
  - PAGRTT
  - REDUCE
- If you send the line data with a page definition to a non-AFP printer with a device type of *LINE, the page definition parameter is ignored and the printer file parameters are used. The line data is converted to SNA character string (SCS) or Intelligent Printer Data Stream (IPDS).

Form definition and the printer file

When using a form definition, depending on the specifications given, some printer file parameters might be ignored when output is printed through PSF. For example, if you specify a form definition, an inline form definition is not built. In this case, if you send the line data with a form definition to an AFP device, PSF ignores these printer file parameters:

- BACKMGN
- CORNERSTPL
- EDGESTITCH
- FORMFEED

- FRONTMGN
- MULTIUP (N_UP)
- PAGRTT
- PRTQLTY
- REDUCE (N_UP)
- SADLSTITCH

However, if you send the line data with a form definition to a non-AFP printer with a device type of *IPDS or *SCS in this example, the form definition parameter is ignored and the printer file parameters are used.

When specifying a form definition, the values you specify on the printer file's DRAWER and DUPLEX parameters override those values specified in the form definition. To use the drawer and duplex values specified in the form definition, specify DRAWER(*FORMDF) and DUPLEX(*FORMDF) on the printer file.

zSeries and S/390 AFP and line data

In these topics, the term zSeries means zSeries and S/390® unless otherwise stated. From an Advanced Function Presentation (AFP) perspective, data sent to i5/OS from the zSeries can be any of these:
- Print data (letters, documents, and so on)
  - Advanced Function Presentation data stream (AFPDS)
  - AFPDSLINE (or mixed data). AFPDSLINE is data that has a mixture of line data and AFPDS data.
  - LINE (line data). Line data is data that has been prepared for printing on a line printer. Line data does not contain all placement or presentation information that is needed for printing on page printers.
- Resources

Plan for AFP

Before using Advanced Function Presentation (AFP), use these topics to help you get ready.

"When PSF is required"
This topic describes when Print Services Facility (PSF) must be installed.

"Install PSF" on page 17
This topic contains instructions about installing PSF.

"Ensure you have the necessary AFP resources" on page 17
This topic describes how to determine whether you have the resources needed to print your document.

When PSF is required

The Print Services Facility (PSF) feature is required in any of these situations:

Your printer falls into one of these categories:
- Any TCP/IP attached IPDS printer.
- Any Twinax attached IPDS printer that uses PSF functions. See the lists of printer file parameters and Data description specifications (DDS) keywords that require PSF.

PSF is also required in these situations:
- i5/OS is used to print any line or mixed-mode data.
- You use any of the parameters listed below.

Printer file parameters that require PSF:
- AFP characters (AFPCHARS)
- Back overlay (BACKOVL) (requires PSF when printing to a device with type *SCS)
- Corner staple (CORNERSTPL)
- Device type (DEVTYPE= *LINE, or *AFPDSLINE)
- Edge stitch (EDGESTITCH)
- Font resolution for formatting (FNTRSL)
- Front overlay (FRONTOVL) (requires PSF when printing to a device with type *SCS)
- IPDS pass through (IPDSPASTHR)
- Multi-up (MULTIUP REDUCE(*NONE))
- Page definition (PAGEDEF)
- Saddle stitch (SADLSTITCH)
- Table reference characters (TBLREFCHR)
- User-defined data (USRDFNDTA (AFPRESPOOL(*PRINT|*NOPRINT)))
- User-defined data (USRDFNDTA (IPDSPASTHR(*YES|*NO)))
- User-defined data (USRDFNOBJ (*PSFCFG))
- User resource library list (USRRSCLIBL(*DEVD))

DDS keywords that require PSF
- AFP resource (AFPRSC)
- Document Index Tag (DOCIDXTAG)
- End page group (ENDPAGGRP)
- Graphic data file (GDF)
- Invoke data map (INVDTAMAP)
- Start page group (STRPAGGRP)
- Staple (STAPLE)
- Z-fold (ZFOLD)

Install PSF

To install Print Services Facility (PSF), follow the instructions in the Install, upgrade, or delete i5/OS and related software topic.

PSF options

There are three options associated with PSF. Depending on what you purchase, you will be issued a key for one of these options:
- 36 - PSF 1-45 pages per minute license
- 37 - PSF 1-100 pages per minute license
- 38 - PSF 1- Any speed license

Related Tasks

Install, upgrade, or delete i5/OS and related software

Ensure you have the necessary AFP resources

Resource objects contain data and control information that can be used by a printing job. Resources can be shared by different pages and different print data sets. Examples of resources are fonts, which define the characters used to print text, and page segments, which can include images and text. Resources can

be stored and accessed from within the operating system being used. By referring to the name of the stored resource, many data streams can share the same resources.

You need to determine what resources you need for your Advanced Function Presentation (AFP) application and ensure that they are stored in appropriate locations. Most resources should be placed in a library that is defined to your library list when you initially sign on the system. However, some resources, such as TrueType fonts and object containers, are stored in the integrated file system. True Type Fonts must be stored in specific directories but you can store object containers in any directory.

Related concepts

AFP font libraries

AFP resources

Resources in the integrated file system

Resource library lists

Related tasks

Obtain AFP resources

Get started with AFP

Use the information in these topics to get started using Advanced Function Presentation (AFP).

"Obtain AFP resources"
This topic describes different ways to obtain AFP resources.

"Use AFP resources" on page 22
This topic describes how to reference AFP resources in your data and how Print Services Facility (PSF) finds those resources.

"Create AFP data" on page 31
This topic contains instructions for several different ways of creating AFP data.

"Print AFP data with PSF" on page 32
This topic describes how to print a document using PSF.

"Transform data to PDF" on page 34
This topic describes how to convert a spooled file to PDF using the IBM Infoprint Server for iSeries licensed program.

Obtain AFP resources

There are many sources of Advanced Function Presentation (AFP) resources. Some of the resources are included with the system. You can download resources from another system, or they can come inline with the data that is to be printed. Form definitions, fonts, page segments, overlays, and page definitions are examples of resources that can come from another system. Additionally, you can create overlays and page segments yourself using the IBM Infoprint Designer for iSeries licensed program (5733-ID1). You can generate page segments and overlays from existing images using the IBM Infoprint Server for iSeries licensed program (5722–IP1).

"Fonts provided by i5/OS" on page 19
This topic describes the fonts that are included with the i5/OS operating system.

"Create AFP resources" on page 20
This topic describes different methods of creating AFP resources.

"Receive AFP resources from another system" on page 20
This topic provides information about receiving AFP resources from another system.

Fonts provided by i5/OS

i5/OS - AFP Compatibility Fonts is included free of charge in the iSeries base operating system. It can be installed as an option on any iSeries system. The fonts are downloadable 240-pel raster fonts and are installed in font library QFNTCPL.

The 240- and 300-pel versions of the AFP Compatibility Fonts are provided in the IBM AFP Font Collection for Workstations and OS/400® licensed product.

When your operating system was loaded, you chose to install or not install IBM-supplied fonts. If you did not install the fonts and now want to install them, see the *Install, upgrade, or delete i5/OS and related software* PDF for instructions.

The compatibility set is provided to allow i5/OS applications that use resident fonts to print on the 3820, 3825, 3827, 3828, 3829, 3831, 3835, and 3900 model 1 printers. The numeric font identifiers specified in the application are translated into one of the fonts in the compatibility set.

The AFP Compatibility Fonts feature includes both uniformly spaced and mixed-pitch type families at 240-pel resolution. These font families are included:
* APL
* Boldface
* Courier
* Document
* Essay
* Format
* Gothic
* Orator
* Prestige
* Proprinter Emulation
* Roman
* Script
* Serif
* Symbol Set
* Text

In addition to these 240-pel raster fonts, the compatibility set includes a number of code pages that are downloadable to printers. For use on printers that support outline fonts, the compatibility set also includes a Letter Gothic outline font that contains the euro symbol.

Related reference

"Purchase fonts" on page 53

Related information

Install, upgrade, or delete i5/OS and related software PDF

Create AFP resources

There are several different ways to create the Advanced Function Presentation (AFP) resources that you need.

Create page segments and overlays

There are several tools available for you to use to create page segments and overlays:

- The IBM Infoprint Designer for iSeries licensed program lets you design and create page segments and overlays and upload them to the iSeries.
- The IBM Infoprint Server for iSeries licensed program lets you create page segments and overlays from Joint Photographic Experts Group (JPEG), Graphics Interchange Format (GIF), and Tagged Image File Format (TIFF) images.
- The AFP Manager component of iSeries Navigator lets you build a file on your system as an iSeries page segment or overlay. This file must already be in AFP resource format. This tool is useful for migrating AFP resources from other systems to the iSeries.
- The AFP printer driver creates AFP documents, overlays, and page segments from your Windows 2000/XP applications.

Create page definitions and form definitions

Page definitions and form definitions are created automatically with Infoprint Designer when you create an overlay.

Receive AFP resources from another system

When you receive Advanced Function Presentation (AFP) resource data from an operating system other than an iSeries server, you typically cannot change the resource. If you want to change the resource, it must be changed on the originating operating system and then resent to the iSeries. Follow these steps to receive an AFP resource from another system:

1. Place the received resource in a data file.
2. Start an iSeries Navigator session.
3. Expand **My Connections** (or your active environment).
4. If you do not have an AFP Manager icon, install AFP Manager as follows: Right-click **My Connections** (or your active environment) and select **Install Options** then **Selective Setup**.
5. Expand **Resources**.
6. Right-click the appropriate resource type and select **Import**.
7. Specify the name of the source file and the name and location for the new resource to be created on the server.

"Fonts from zSeries" on page 21
This topic provides information about receiving fonts from a zSeries system.

"Receive AFP resources inline in the data stream" on page 21
This topic provides information about receiving resources inline in a data stream from another system.

"Receive resources and AFPDS data sent to network files" on page 21
This topic provides information about receiving resources and other data from another system.

Related concepts

"Resource library lists" on page 11

Related tasks

Send data from zSeries to iSeries servers

Fonts from zSeries: Fonts might be sent to the iSeries server from the zSeries. Check your licensing agreements to see if they preclude the transfer of printer resources between operating systems.

Font resources can be downloaded from the zSeries. These font resources cannot be altered by the iSeries operator. If changes need to be made to any font resources, the zSeries site must be notified.

When these font resources are received from the zSeries, you place them in a data file. To convert these font resources to a format that can be used by i5/OS, use the Create Font Resource (CRTFNTRSC) command.

3800 Printer font restrictions on the iSeries server

You can receive data from a zSeries server that was generated to print on a 3800 printer using 3800 printer font character sets. However, the iSeries server does not support the 3800 printer and its font character sets. Therefore, you should not receive 3800 printer font character sets on the iSeries server.

If you have Advanced Function Presentation (AFP) data that calls for a 3800 font and you have the 3800 printer font character sets on the system, i5/OS tries to use them. You will get an error when the data prints.

Instead, download the 3820 printer font character sets from the zSeries. When the data generated for the 3800 printer starts to print, i5/OS will substitute the 3820 printer font character sets.

The naming convention for 3800 printer font character sets is C1xxxxxx. The naming convention for 3820 printer font character sets is C0xxxxxx.

Related reference

Create Font Resource (CRTFNTRSC) CL command

Receive AFP resources inline in the data stream: Advanced Function Presentation (AFP) resources can be part of the data received from another system, such as a zSeries system. These resources can only be used in that data stream. They cannot be saved to your iSeries in a data file and converted to an AFP resource.

Receive resources and AFPDS data sent to network files: To make receiving resources and Advanced Function Presentation data stream (AFPDS) data as easy as possible, you should be aware of the following:

- Make sure you do not send line data or mixed data (AFPDSLINE data) to network files.
- The AFPDS files, as they exist on S/390, are in variable-length record format. Make sure the S/390 site converts the AFPDS files to a fixed-length record format. If this is not done before sending the AFPDS files, large amounts of iSeries server disk space will be required. You need to reach an agreement with the S/390 site as to what fixed-length record format you will use; for example, 4000 bytes. AFPDS records longer than the fixed-length record size must be converted into multiple fixed-length records. Pad the last record with blank characters if necessary.
- Before receiving AFPDS files from the S/390, you should consider creating a fixed-length physical data file to hold the files from the S/390. The CL command to do this is Create Physical File (CRTPF).

  The length of the records in the physical data file should be the number that you and the S/390 site agreed to; for example, 4000 bytes.

When resource data is received from S/390, convert the resources to a format that can be used by i5/OS. These commands are in the Create AFP resources topic.

Create a physical file

Many types of resources are sent to the iSeries server. Administratively, it is more convenient to store the different types of resources in separate physical files. That is, put all the font data in a physical file that contains only fonts, the overlay data in a physical file that contains only overlays, and so on.

This command creates a physical file that can receive resources and AFPDS data:

```
CRTPF FILE(MYLIB/MYFILE) RCDLEN(4000) MBR(*NONE) MAXMBRS(*NOMAX) LVLCHK(*NO)
```

Examples of using the Work with Network Files (WRKNETF) and Receive Network File (RCVNETF) commands

Use the Work with Network Files (WRKNETF) and Receive Network File (RCVNETF) commands to receive, delete, browse, or submit (print) files.

This command lets you work with the network files for USR1 and prints the output with the job's spooled output. This command can only be issued by USR1, a member of the USR1 group, or a user with security officer authority.

```
WRKNETF USER(USR1) OUTPUT(*PRINT)
```

This command lets you work with the network files for all users and is written to the first member of the specified database file. If the file exists in a library on the library list, the existing file is used; otherwise, the file is created in library QGPL. If the file did not exist, or did not contain any members, a member with the same name as the file is added to the file. Otherwise, the first member of the file is cleared and used. Only a user with security officer authority can issue this command.

```
WRKNETF USER(*ALL) OUTPUT(*OUTFILE) OUTFILE(NETFILES)
```

This command receives the network file SCRIPT, member $REPORT, into a physical file named MYFILE in library MYLIB. The new member in MYFILE is $REPORT.

```
RCVNETF FROMFILE(SCRIPT) TOFILE(MYLIB/MYFILE) FROMMBR($REPORT)
```

Related tasks

Create AFP resources

Print data sent to iSeries from S/390

Receive AFP resources from another system

Send data from zSeries to iSeries servers

Related reference

Create Physical File (CRTPF) CL command

Receive Network File (RCVNETF) CL command

Work with Network Files (WRKNETF) CL command

Use AFP resources

When specifying an Advanced Function Presentation (AFP) resource, you need to include the library that contains the resource in your library list. If you have more than one resource with the same name, make sure the one you want to use is in the first library searched. Otherwise, you might specify the correct name, but get an incorrect resource in your output.

This topic describes how to specify AFP resources in your data.

This topic describes how Print Services Facility (PSF) searches for AFP resources.

Specify AFP resources

When specifying an overlay, page definition, or page segment, you need to include the library that contains the resource in your library list. If you have more than one overlay, page definition, or page segment with the same name, make sure the one you want to use is in the first library searched. Otherwise, you might specify the correct name, but get the wrong resource in your output. When PSF searches for resources, it searches the user library list first and then the device library list.

If you have a resource that many users need to access (fonts, for example), you might put that resource in a library that everyone can access. Some such libraries are those identified in the system values QSYSLIBL or QUSRLIBL.

Alternatively, if you have a resource to which you want to restrict access (signatures, for example), you might put it in a library that only certain users can access. If you own the library that the resources are stored in, you can grant access to that library with the Grant Object Authority (GRTOBJAUT) command.

"Specify a form definition"
This topic describes how to specify a form definition to use with your spooled file.

This topic describes how to specify a page definition to use with your spooled file.

This topic describes how to specify a PSF configuration object.

This topic describes how to specify an overlay to use with your spooled file.

This topic describes how to specify an Advanced Function Presentation (AFP) font in your spooled file.

This topic describes how to specify a TrueType or OpenType font in your spooled file.

This example shows how to use Data description specifications (DDS) to specify different types of fonts.

This topic describes how to specify a page segment in your spooled file.

This topic describes how to specify an object container in your spooled file.

Specify a form definition: To use or identify a fully qualified form definition, specify a value in the FORMDF parameter with one of these CL commands:
- Create Printer File (CRTPRTF)
- Change Printer File (CHGPRTF)
- Override with Printer File (OVRPRTF)

You can specify a form definition with these device types:
- *AFPDS
- *AFPDSLINE
- *IPDS

- *LINE
- *SCS
- *USERASCII (If the data is ASCII XML, a page definition and form definition are required.)

When you specify output to an Advanced Function Presentation (AFP) printer but do not specify a form definition, an inline form definition is built from the printer file parameters. The inline form definition is then passed to Print Services Facility (PSF).

Depending on the specifications given, some printer file parameters might be ignored when output is printed through PSF.

To indicate an output bin for a form definition, specify the OUTBIN parameter on the printer file.

Use Change Spooled File Attributes (CHGSPLFA) to change the spooled file attributes for the form definition.

Related concepts

"How page definitions, form definitions, and printer files interact" on page 15

Related reference

Change Printer File (CHGPRTF) CL command

Create Printer File (CRTPRTF) CL command

Change Spooled File Attributes (CHGSPLFA) CL command

Grant Object Authority (GRTOBJAUT) CL command

Override with Printer File (OVRPRTF) CL command

Specify a page definition: To use or identify a fully qualified page definition, specify the PAGDFN parameter on one of these CL commands:
- Create Printer File (CRTPRTF)
- Change Printer File (CHGPRTF)
- Override with Printer File (OVRPRTF)

You can specify a page definition with *LINE, *AFPDSLINE, or *USERASCII data.

Note: If the data is ASCII XML (*USERASCII), a page definition and form definition are required. After Print Services Facility (PSF) completes formatting, it converts the line data and page definition to Intelligent Printer Data Stream (IPDS).

When you specify a page definition on the printer file, some printer file parameters might be ignored when the spooled file is printed through PSF.

To change the PAGDFN spooled file attribute, use the Change Spooled File Attributes (CHGSPLFA) command.

Related concepts

"How page definitions, form definitions, and printer files interact" on page 15

Related reference

Change Printer File (CHGPRTF) CL command

Change Spooled File Attributes (CHGSPLFA) CL command

Create Printer File (CRTPRTF) CL command

Override with Printer File (OVRPRTF) CL command

Specify a PSF configuration object: To use a Print Services Facility (PSF) configuration object, do these on either the Create Device Description (Printer) (CRTDEVPRT) or Change Device Description (Printer) (CHGDEVPRT) commands:
- Name the PSF configuration object on the User Defined Object (USRDFNOBJ) parameter.
- Specify AFP(*YES).

Example: In this example, the device named MYPRINTER is configured to reference the PSF configuration object MYPSFCFG. MYPSFCFG is in the library MYLIB.
```
CHGDEVPRT DEVD(MYPRINTER) AFP(*YES) USRDFNOBJ(MYLIB/MYPSFCFG *PSFCFG)
```

Any device description for an Intelligent Printer data stream (IPDS) printer specified as AFP(*YES) can use any PSF configuration object. PSF checks for a PSF configuration object when a writer is started.

Related concepts

"PSF configuration objects" on page 13

"How page definitions, form definitions, and printer files interact" on page 15

Related tasks

"Configure PSF" on page 39

Related reference

Create Device Description (Printer) (CRTDEVPRT) CL command

Change Device Description (Printer) (CHGDEVPRT) CL command

Specify an overlay: To use overlays, specify them in the front and back overlay parameters of the printer file being used with your application using one of these:
- **Override with Printer File (OVRPRTF)** command: Temporarily changes the printer file.
- **Change Printer File (CHGPRTF)** command: Permanently changes the printer file.
- **Change Spooled File Attributes (CHGSPLFA)** command: Changes the spooled file before printing.
- Data description specifications (DDS) **OVERLAY** keyword: for information about this keyword, see Printer files in the DDS topic of the Programming category.

Related concepts

DDS for printer files

Related reference

Change Printer File (CHGPRTF) CL command

Change Spooled File Attributes (CHGSPLFA) CL command

Override with Printer File (OVRPRTF) CL command

Specify an AFP font: There are many different tools you can use to specify Advanced Function Presentation (AFP) fonts in your document. Each tool has different capabilities. Use the tool that best fits your needs. These tools are discussed in greater detail in other topics and related publications.

DDS You can use keywords in your Data description specifications (DDS) application to specify fonts, including how they look and how they are placed. The example in the Example: Specify a font topic uses DDS.

IBM Infoprint Designer for iSeries
> This graphical tool lets you use menus to specify fonts and font properties, such as size and weight. You can also specify placement properties, such as alignment and orientation.

AFP printer driver
> This device driver can be used to produce AFP documents, overlays, and page segments from any Windows 2000/XP application that supports printing to AFP printers.

IBM Advanced Function Printing Utilities for iSeries
> You can specify fonts in the components of AFP Utilities.

Third-party applications
> Several third-party applications exist that you can use to work with fonts in a document. Some such products are Papyris, Elixir, Opus, StreamServe, and DOC1.

Related concepts

DDS keyword finder

"AFP fonts" on page 5

Related tasks

"Example: Specify a font" on page 27

Related information

Infoprint Server for iSeries User's Guide PDF

iSeries Guide to Output PDF

Specify a TrueType or OpenType font: You can specify a TrueType font anywhere that you can specify an Advanced Function Presentation (AFP) font. You can also mix references to TrueType and AFP fonts. However, TrueType fonts are referenced differently than AFP fonts.

Note: In this topic, the term TrueType refers to both TrueType and OpenType fonts.

To specify a TrueType font in your document, use the Data description specifications (DDS) FONTNAME keyword to specify the TrueType font name. You can also use this keyword to specify other options, such as a code page.

Usage notes:
1. If you do not specify a code page with the TrueType font, i5/OS assumes the print data that uses this font is UTF–16.
2. The font name must match exactly, including the case, trailing blanks, embedded blanks, and so on.
3. You must ensure that your printer supports the specified font. If the printer does not support a requested font, processing stops. No substitution is done.

Note: Any TrueType font that is to be used with AFP must be Unicode-enabled. This means that the font must have these characteristics:

- It must contain a Microsoft Unicode subtable identified by platform ID = 3 (Microsoft) and platform-specific encoding ID = 1 (Unicode, UTF-16).
- It must specify a full font name (Name ID 4) using the same encoding in the naming table.

Related concepts

DDS keyword finder

"How TrueType and OpenType fonts differ from AFP fonts" on page 12

"TrueType fonts on OS/400 V5R2" on page 54

Example: Specify a font: This example uses Data description specifications (DDS) keywords and RPG to specify TrueType and Advanced Function Presentation (AFP) fonts. The document is followed by the DDS keywords used.

Using Fonts With DDS

1

2

The brown fox jumped ABC123! ¤ #
Courier New, 20p
Code page 37
TrueType,   Outline

3

The brown fox jumped ABC123! ¤ #
Boldface
Character set C0S0BRTR, Code page T1V10037
Proportional, Host-Resident,   Raster

4

The brown fox jumped ABC123! ¤ #
Times New Roman, Italic, Bold, 18p
FGID 2311   Code Page 37 (default)
Typographic, Printer-Resident,   Outline

5

The brown fox jumped ABC123] ¤ #
Times New Roman, Italic, Bold, 18p
Character set C0N500H0, Code page T1V10500
Typographic, Host-Resident,   Raster

6

The brown fox jumped ABC123] ¤ Ñ
Times New Roman, Italic, Bold, 18p
Character set CZN500,   Code page T1V10284
Typographic, Host-Resident,   Outline

7

The brown fox jumped ABC123] € #
Times New Roman, Italic, Bold, 18p
Coded font X0N51EHC
     Character set C0N500H0, Code page T1001148
Typographic, Host-Resident,   Outline

8

The brown fox jumped ABC123! ¤ #
Helvetica, Roman, Medium,24ph 10pw
FGID 2304   Code Page 37 (default)
Typographic, Host-Resident,   Outline

9

The brown fox jumped ABC123] ¤ #
Helvetica, Roman, Medium,48ph 10pw
Character set CZH200,   Code page T1V10274
Typographic, Host-Resident,   Outline

10

THE BROWN FOX JUMPED ABC123]   # ¤ ♪ ♀
OCR-A
FGID 19   Code Page 37 (default)
Fixed Pitch, Host-Resident,   Raster

11

12

Figure 2. Document with several fonts

The fonts in the example have been specified using these DDS keywords. The line numbers below correspond to the numbering in the sample document.

```
Line 1:    FONT(2305 (*POINTSIZE 18)) COLOR(RED)
Line 2:    FONTNAME('Courier New' (*POINTSIZE 20)(*CODEPAGE T1V10037)) COLOR(GRN)
Line 3:    FNTCHRSET(C0S0BRTR T1V10037) COLOR(BLU)
Line 4:    FONT(2311 (*POINTSIZE 18)) COLOR(PNK)
Line 5:    FNTCHRSET(C0N500H0 T1V10500) COLOR(*RGB 50 50 75)
Line 6:    FNTCHRSET(CZN500 T1V10284 (*POINTSIZE 18)) COLOR(*RGB 75 20 40)
Line 7:    CDEFNT(X0N51EHC) COLOR(*CMYK 0 50 50 0)
Line 8:    FONT(2304 (*POINTSIZE 24 10)) COLOR(*CMYK 50 0 0 50)
Line 9:    FNTCHRSET(CZH200 T1V10274 (*POINTSIZE 48 10)) COLOR(TRQ)
Line 10:   FONT(19) COLOR(BRN)
Line 11:   FONT(420 (*POINTSIZE 18 50)) COLOR(RED) TXTRTT(270)
Line 12:   FONT(420 (*POINTSIZE 18 50)) COLOR(RED) TXTRTT(90)
```

Figure 3. DDS keywords used to create the sample document

Notes:

1. The TXTRTT keyword only works with fields, not constants.
2. The print data for lines 1 through 10 is constant text and was specified in the DDS source.
3. The print data for lines 11 and 12 is a data field that contains the printed text.

Related concepts

DDS keyword finder

Specify a page segment: A page segment object can be built into your application output in a number of ways, such as these:
- Calling it in the printer file Data description specifications (DDS)
- Referencing it in any overlay
- Placing it in a print application with the Print Format Utility of the AFP Utilities licensed program
- Specifying it within a page definition or form definition
- Using it directly in Advanced Function Presentation (AFP) data streams

Related concepts

DDS for printer files

Page segments

Related tasks

Specify an overlay

Create AFP data

Specify an object container: Object containers are used to carry non-Object Content Architecture (OCA) objects in an AFP data stream. Some such objects are Graphics Interchange Format (GIF), and Tagged Image File Format (TIFF) images. There are different ways to include them in your data, depending on your installation and how you want to use them.

With the AFPRSC keyword, you can reference a print resource stored in the integrated file system, including an object container.

You can specify at most 10 object containers per page of data. When using object containers, you must ensure that the device to which you send the data supports the type of object included. Also, the system searches for object containers differently than how it searches for other objects. The search method is described in the documentation of the Data description specifications (DDS) AFPRSC keyword.

Related concepts

DDS keyword finder

Object containers

Related information

iSeries Guide to Output PDF

Search order of library list

It is essential that you understand how your i5/OS system searches for Advanced Function Presentation (AFP) resources. When you create a spooled file, the operating system saves the libraries in your library list. Within that list are the libraries that contain the resources used to create the spooled file.

Why you should use a library list

When specifying an overlay, page definition, or page segment, you need to include the library that contains the resource in your library list. If you have more than one overlay, page definition, or page segment with the same name, make sure the one you want to use is in the first library searched. Otherwise, you might specify the correct name, but get the wrong resource in your output.

If you have a resource that you want many users access (fonts, for example), you might put that resource in a library that everyone can access. For example, you could put it in a library identified in the system value QSYSLIBL.

Search order for resources that are not specified by the AFPRSC keyword

When the operating system searches libraries for the resources needed to print a spooled file, the user library list is searched first and then the device library list. By default, the operating system searches libraries in the following order:
1. System libraries

   These libraries are identified in system value QSYSLIBL. System libraries are available to all users; they are identified in your library list with a Type of SYS.
2. Current library

   The current library is identified in your user profile as the value for the current library (CURLIB) parameter. In your library list, the current library has a Type of CUR.
3. User libraries

   User libraries are identified in system value QUSRLIBL or in a job description. In your library list, these libraries are identified with a Type of USR.

You can override the system library search list and specify a library search list for a particular device or user. To do this, use a PSF configuration object. If you create a PSF configuration object, the default for the user and device library lists will be the same as the library search described previously.

Search order for resources that are specified by the AFPRSC keyword

When you specify a resource by using the AFPRSC Data description specifications (DDS) keyword, the operating system uses a different method to search for that resource. Instead, it uses a search order that involves the environment variable QIBM_AFP_RESOURCES_PATH. The system searches the integrated file system for those resources as described in the AFPRSC topic.

The QIBM_AFP_RESOURCES_PATH environment variable

The QIBM_AFP_RESOURCES_PATH environment variable is used when The DDS keyword AFPRSC is used to specify objects in the integrated file system. This environment variable specifies the paths to search for the specified object.

To specify multiple paths in QIBM_AFP_RESOURCES_PATH, use a colon to separate them. For example, /home/officers/signatures:/home/checkimages/2003 identifies two directories to be searched:

- /home/officers/signatures (This directory is searched first.)
- /home/checkimages/2003 (This directory is searched second.)

The directories are searched in the order in which they are listed.

The /QIBM/UserData/OS400/AFPresources directory is created when i5/OS is installed. It is always available for use.

You can use these CL commands to work with environment variables:

- Work with Environment Variables (WRKENVVAR)
- Add Environment Variable (ADDENVVAR)
- Change Environment Variable (CHGENVVAR)
- Remove Environment Variable (RMVENVVAR)

Related concepts

"PSF configuration objects" on page 13

DDS AFPRSC keyword

Related reference

Add Environment Variable (ADDENVVAR) CL command

Change Environment Variable (CHGENVVAR) CL command

Remove Environment Variable (RMVENVVAR) CL command

Work with Environment Variables (WRKENVVAR) CL command

Create AFP data

This topic contains information about several different ways to generate Advanced Function Presentation (AFP) data.

Create AFP data by using a printer file

You can create AFP data on the iSeries server from applications using a printer file with the device type (DEVTYPE) parameter value set to *AFPDS.

Create AFP data by using DDS keywords

You can create AFP data with Data description specifications (DDS) printing functions that are tailored for use with AFP.

Create AFP data by using IBM Infoprint Server for iSeries

Infoprint Server has a Create AFP Data (CRTAFPDTA) command that lets you transform line (*LINE) or mixed (*AFPDSLINE) data into AFP (*AFPDS) data. It can also take an AFP file as input and generate an AFP stream file. It can index a document for viewing, archiving, or document retrieval. Optionally, it retrieves and packages the AFP resources that are needed for printing or viewing. Refer to the Infoprint Server for iSeries: User's Guide for instructions to use the CRTAFPDTA command.

Create AFP data by using the AFP printer driver for Windows 2000 and XP

The AFP printer driver creates AFP documents, overlays, and page segments from your Windows 2000/XP applications. For more information about the AFP printer driver or to download the printer driver, see the AFP Driver for Windows 2000 and XP Web page at http://www-1.ibm.com/support/docview.wss?uid=psd1P4000187.

Create AFP data by using IBM Advanced Function Printing Utilities for iSeries

By using the IBM Advanced Function Printing Utilities for iSeries (AFP Utilities) licensed program, you can create and print AFP data from an existing database file, merged with an overlay. For more information about this licensed program, see AFP Utilities for AS/400. This publication is available on the IBM Publications Center Web page at http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

Related concepts

DDS for printer files

Related information

Infoprint Server for iSeries User's Guide PDF

Print AFP data with PSF

This topic discusses these ways of printing Advanced Function Presentation (AFP) data with Print Services Facility (PSF):

"Print AFP data generated on the iSeries server"
This topic describes how to print AFP data that was generated on the iSeries server by using an application program or the PRTAFPDTA command.

"Print data sent to iSeries from zSeries" on page 33
This topic describes how to print data that was generated on a zSeries server. This data might be AFP, AFPDSLINE (AFP data mixed with line data), or line data. The data might be sent to network files or directly to an output queue.

Print AFP data generated on the iSeries server

Follow these steps to generate and print i5/OS Advanced Function Presentation data stream (AFPDS) data with Print Services Facility (PSF):

1. Create the AFPDS data.
2. Optional: Specify overlays.
3. Generate an AFPDS spooled file.

   Method 1: Use an application program. The application program that creates the data to be used with the overlays might need to be tailored so the printed output fits with the overlays you designed.

   Tailoring the program to fit the overlay is similar to tailoring the program to work with a preprinted form.

   Method 2: Use the Print AFP Data (PRTAFPDTA) command. If you have a database file that contains AFP data, use the PRTAFPDTA command to spool the file.

   If you want to use a prompt display with this command, type PRTAFPDTA and press F4 (Prompt).

   Notes:

   a. The PRTAFPDTA command prints AFPDS data. Any padding between the AFPDS structured fields must be X'40' or X'00'.

b. When using the PRTAFPDTA command, do not override the DEVTYPE parameter on the system printer file, QSYSPRT.

c. When using the PRTAFPDTA command, the form definition typically identifies the drawer to print from. An exception is when an Override with Printer File (OVRPRTF) command has been issued with a different drawer value. In this case, the drawer value is taken from the override command.

Examples

This command prints the first member in file MYFILE starting with page 2 and ending on page 6.

```
PRTAFPDTA  FILE(MYLIB/MYFILE) STRPAGE(2)  ENDPAGE(6)
```

This command prints the member $REPORT in file MYFILE using a form definition of F10101 and all available exception handling.

```
PRTAFPDTA  FILE(MYLIB/MYFILE) MBR($REPORT)  FORMDF(F10101)  FIDELITY(*CONTENT)
```

4. Release the spooled file to a device with device type *AFPDS.

Related reference

Print AFP Data (PRTAFPDTA) CL command

Print data sent to iSeries from zSeries

There are different steps to print data sent to an iSeries, depending on where it is sent to.

Print data sent from a zSeries server to an i5/OS network file

To print data that has been placed on an i5/OS network file, follow these steps:

1. Receive the file to a library.
2. Use the Print AFP Data (PRTAFPDTA) command.

All resources must be processed this way.

Print data sent from a zSeries server to an i5/OS output queue

You can print data that has been placed on an i5/OS output queue the same way you print any other spooled file. However, there are some considerations when having data placed directly on an output queue. If a printer is active for that output queue, spooled files placed directly into the output queue could be printed without the owner of the queue realizing it. To avoid this, try one of these possible solutions:

- Create a special user ID and a special output queue for that user ID. You could then sign on using that user ID and assign a printer to your output queue to print the spooled files.
- Make sure the output queue of the receiving user ID is held before the zSeries server sends the files.
- Use the End Writer (ENDWTR) command to end the printer assigned to that output queue before the zSeries server sends the file.

When data is sent from a zSeries server to an i5/OS output queue and then printed, it follows this path:

1. zSeries
2. Target iSeries server identified by a node ID
3. Target output queue for the target user ID

   The target user ID must have access to the libraries containing the resources that the spooled file needs when it prints on the iSeries server.

4. Target printer

   Make sure that the printer you want to print the files on is assigned to the correct output queue. If any special handling of the printer is necessary (form choice, drawer selection, envelopes, and so on), it should be done before the files are sent.

Note: If you cannot find the spooled file on the output queue of the specified user ID, look in the QNFTP job log for messages. The QNFTP job runs under the QSNADS user profile.

Related concepts

AFP resources

Resource library lists

Related tasks

Receive resources and AFP data sent to network files

Release a spooled file

Send data from a zSeries server to i5/OS network files

Related reference

Print AFP Data (PRTAFPDTA) CL command

Transform data to PDF

This topic provides information about IPDS-to-PDF transform support, also called the **PDF subsystem**. The PDF subsystem is an IBM Infoprint Server for iSeries function that lets you generate Portable Document Format (PDF) files or Advanced Function Presentation (AFP) files (for spooling only) from AFP, SNA character string (SCS), or Intelligent Printer Data Stream (IPDS) spooled files. Intelligent routing is then used to route the output file. Intelligent routing is the ability to take the entire spooled file or any segment of the input spooled file and do any combination of these:

* Generate a PDF file and send it as an e-mail attachment.
* Generate a PDF file and store it as a stream file in the integrated file system.
* Generate a PDF file and spool it.
* Generate an AFP file and spool it.

Intelligent routing is controlled by values in a PSF configuration object and a mapping program.

Note: The Print Services Facility (PSF) transform interface supports an IPDS-to-PDF transform program that emulates a TCP/IP-connected IPDS 4028, 3812, or Infoprint 40 printer device.

An IPDS-to-PDF transform that can be used with PSF is provided in the IBM Infoprint Server for iSeries product. The transform converts IPDS controls and data into PDF files. The output PDF files include text, graphics, and image data, as appropriate. The transform also stores the mail tag in a comment statement in the PDF output. The mail tag is specified in the printer file's USRDFNDTA parameter or the STRPAGGRP Data description specifications (DDS) keyword. For detailed information about the IPDS-to-PDF transform (including the user exit program), see the Infoprint Server for iSeries User's Guide. To use the transform provided in Infoprint Server, PSF is not required.

A mapping program is a user exit program specified on the PSF configuration object's PDFMAPPGM parameter. You can do these and more with a mapping program:

* Interpret routing tags
* Specify the subject of an e-mail
* Add text to the beginning of an e-mail
* Specify the path to store the PDF stream file

If you are using a Simple Mail Transfer Protocol (SMTP) server to send the e-mail, it has additional capabilities, such as specifying carbon-copy (cc), blind-carbon-copy (bcc), and return-to e-mail addresses; specifying a file to use as the body of an e-mail; and specifying attachments.

These topics describe the main ways to access the PDF subsystem and how to specify that a PDF file is sent as e-mail:

- Transform spooled files to PDF without manual setup: For operating systems later than V5R3, this method requires no setup. It is best for simple applications, such as a trial run of a billing application. The input spooled files can only be output in one way, not a combination.
- Transform spooled files to PDF with manual setup: This method requires varying levels of setup, depending on the complexity of the required output. This method gives you the most flexibility.
- "Send the PDF file as e-mail" on page 38: This topic describes how to send an output PDF file as e-mail. It also describes how to use a mapping program to customize the e-mail.

Related information

Infoprint Server for iSeries User's Guide PDF

Transform spooled files to PDF without manual setup

Follow these steps to transform an Intelligent Printer Data Stream (IPDS), Advanced Function Presentation (AFP), or SNA character string (SCS) spooled file to Portable Document Format (PDF) automatically. This method is not available on operating systems earlier than V5R4. An Infoprint Server for iSeries license is required.

Prerequisites:

1. If the PDF file will be sent as e-mail, make sure your i5/OS is set up to send e-mail. For instructions on setting up your iSeries server to send e-mail, see the Configure e-mail topic.
2. Optional: Write your mapping program. Refer to the Infoprint Server for iSeries User's Guide for the format.

To transform a spooled file to PDF, do these steps:

1. Start an iSeries Navigator session.
2. Expand **My Connections** (or your active environment).
3. If you do not have an AFP Manager icon, install AFP Manager as follows: Right-click **My Connections** (or your active environment) and select **Install Options** then **Selective Setup**.
4. Expand **Basic Operations** and select **Printer Output**.
5. Right-click the output files you want to convert and select **Convert to PDF**. The Convert to PDF wizard opens.
6. Follow the instructions in the wizard.

Related tasks

Configure e-mail

Related information

Infoprint Server for iSeries User's Guide PDF

Transform spooled files to PDF with manual setup

This method for transforming spooled files to Portable Document Format (PDF) requires more setup, but is also more flexible.

Prerequisites:

1. Set up your PSF configuration object: The Print Services Facility (PSF) configuration object you use specifies what is done with the PDF file and other transform options.
2. Optional: Change the input file to create multiple output files or an indexed file.
3. Configure a device for PDF conversion.

To transform the spooled file, submit the spooled file to a printer that is set up correctly.

Set up your PSF configuration object: Before you set up your Print Services Facility (PSF) configuration object, you need to decide what you want done with the output file after it is created. It can be stored in a directory as PDF, placed on an output queue as Advanced Function Presentation (AFP) or PDF, or e-mailed as a PDF attachment.

Note: You must have system configuration authority (*IOSYSCFG) to create a PSF configuration object.

To create or change a PSF configuration object, follow these steps:
1. In iSeries Navigator, expand **My Connections** (or your active environment).
2. Expand **AFP Manager**.

   If you do not have an AFP Manager icon, install AFP Manager as follows: Right-click **My Connections** (or your active environment) and select **Install Options** then **Selective Setup**.
3. Create a new PSF configuration object or change one that already exists.
   - To create a PSF configuration object, right-click the **PSF configuration objects** folder and select **New**.
   - To change a PSF configuration object, expand the **PSF configuration objects** folder, right-click the PSF configuration object you want to change, and select **Configure**.
4. If you are creating a PSF configuration object, on the **General** page, specify a name.
5. On the **PDF Destinations** page, specify what you want done with the generated PDF files:
   - Select **Generate PDF**.
   - If you want the PDF files spooled to an output queue, select **Store as printer output**. You must also specify the library-qualified output queue. Click **Browse** to search for an output queue.
   - If you want the PDF files stored as a stream file in the integrated file system, select **Store as stream file**. You must also specify the stream file directory where you want the PDF file stored.
   - If you want the PDF files sent as e-mail, select **Send as electronic mail**.
   - For **Administrator address**, specify the e-mail address of the PDF administrator. Any PDF files that are not distributed correctly are attached (if possible) to an e-mail that is sent to this address. Your iSeries must be set up to send e-mail to use this option. If the specified address is on an iSeries, that iSeries must be set up to receive e-mail. For instructions about setting up your iSeries to send and receive e-mail, see the Configure e-mail topic.
6. If you selected **Send as electronic mail** or specified an **Administrator address**, specify the mail sender and, optionally, the mail server to use:
   - Specify the e-mail sender or click the arrow to select from a list. The e-mail sender must be enrolled in the system distribution directory.

     Use the Display Directory Entries (DSPDIRE) command to view the entry in the system distribution directory. If you have security administrator authority, you can change the Simple Mail Transfer Protocol (SMTP) information with the Work with Directory Entries (WRKDIRE) command.
   - If you want to specify the mail server to use, select **Advanced**. If you do not specify a mail server, the Send Distribution (SNDDST) command is used. Many of the options available through the mapping program require you to use an SMTP server.
7. On the **PDF Processing** page, specify any of these options to customize the PDF that is generated:
   - If you want the fonts to be included in the output file, select **Include PDF fonts inline**. This ensures fidelity when you print or view the file, but increases file size. This function only works with IP40240 or IP40300 device emulation.

- If you want PSF to use the named groups defined in the input file, select **Generate multiple PDF files**.
  - If you want the file split at named group boundaries, select **Create separate PDF files**.
  - If you want one output file created with index tags at named group boundaries, select **Create single PDF file with index tags**.
- In the **Device emulation type** field, specify the device that AFP should emulate.
- Specify the paper size in printer drawers one and two of the device specified for **Device emulation type**.
- Specify the library-qualified data queue where the PDF transform status messages should be posted. Click **Browse** to search for a library.
- If applicable, specify the library-qualified **Mapping program**. Click **Browse** to search for a library. If you want to use a mapping object, select *IBMPGM.
- If applicable, specify the library-qualified **Mapping object**. Click **Browse** to search for the mapping object.
8. Click **OK**.

For help with any field, select the field and press **F1**.

Related tasks

Configure e-mail

Related reference

Display Directory Entries (DSPDIRE) CL command

Send Distribution (SNDDST) CL command

Work with Directory Entries (WRKDIRE) CL command

Change the input file to create multiple output files or an indexed file: You can insert group tags into your data before it is transformed. This lets the transform generate one Portable Document Format (PDF) file for each group or insert an index tag at the beginning of each group. The action taken depends on the value specified for the Multiple PDF Files (PDFMULT) parameter on the Print Services Facility (PSF) configuration object. You can also use group tags to send each group as e-mail to a different recipient. The group name is used as the index tag or mail tag when appropriate. For information about putting mail tags on the group tags, see the Infoprint Server for iSeries User's Guide.

You can use a utility such as Data description specifications (DDS) or the IBM Infoprint Server for iSeries Create AFP Data (CRTAFPDTA) command to insert group tags in your data. If you choose to specify groups, all of the data must be inside a group.

To use DDS to generate groups, use the STRPAGGRP and ENDPAGGRP DDS keywords.

To use CRTAFPDTA to generate groups, follow the instructions in the Infoprint Server for iSeries User's Guide to index your file. The value specified with **Select index for group names** (IDXGRP) is the group name.

Related information

Infoprint Server for iSeries User's Guide PDF

Configure a device for PDF conversion: Set up your device for Portable Document Format (PDF) conversion the same way you set up a TCP/IP Intelligent Printer Data Stream (IPDS) printer. You can

have multiple IPDS-to-PDF printers active, but each must be configured as a different printer with a different port. Use the Create Device Description (Printer) (CRTDEVPRT) command to specify the following parameters:

Device description	*printer-name*
Device class	*LAN
Device type	*IPDS
Device model	0
LAN attachment	*IP
Advanced function printing	*YES
Port number	*xxxxx*, the number must be unique for each printer.
Font	*printer font*
Remote location	127.0.0.1
User defined object	

	Object	*PSF-configuration-object-name*
	Library	*PSF-configuration-object-library*
	Object type	*PSFCFG

Send the PDF file as e-mail

To specify that an output Portable Document Format (PDF) file is sent as e-mail, you can set up a mapping program for e-mail. For instructions to set up a mapping program for e-mail, see the Infoprint Server for iSeries User's Guide.

There are two ways to send the output file as e-mail without using a mapping program:
- Specify PDFGEN(*MAIL) in the Print Services Facility (PSF) configuration object.
- use a mapping object.

After the PDF file creation, PSF retrieves the mail tag. The mail tag is on the printer file's User defined data (USRDFNDTA) parameter or the Start page group (STRPAGGRP) Data description specifications (DDS) keyword. If you do not specify an exit program, you must provide a valid e-mail address in the USRDFNDTA parameter or in the STRPAGGRP DDS keyword. PSF then electronically mails the output. It uses a Simple Mail Transfer Protocol (SMTP) server if one is specified in the PSF configuration object. If none is specified, it uses the Send Distribution (SNDDST) command . For instructions to create a mapping program, see the Infoprint Server for iSeries User's Guide.

Format of the printer file's USRDFNDTA mail information

The format of the mail information when it is specified in the printer file's USRDFNDTA parameter is:

```
USRDFNDTA('MAILTAG(80 bytes of text) MAILSENDER(10 byte name)')
```

The 80 bytes of text can contain a mail address or a tag. The mail exit routine converts tags into a mail address and an optional message. The MAILSENDER parameter is 10 bytes long and specifies the name of the user profile that is sending the file. This parameter overrides the PSF configuration object's PDFSENDER value.

Format of the STRPAGGRP mail tag

When you specify PDFMULT(*YES *SPLIT), the Name parameter of the STRPAGGRP DDS keyword can contain a mail tag. The mail tag can contain either a mail address or a tag. The mail exit routine converts tags into a mail address and an optional message. The STRPAGGRP name overrides a mail tag in the printer file's USRDFNDTA parameter.

Related information

Infoprint Server for iSeries User's Guide PDF

Configure PSF

You can configure Print Services Facility (PSF) by using the printer device description or by using a PSF configuration object.

Configure PSF by using a device description

To use PSF, you must specify AFP(*YES) in the printer device description.

Other parameters in the device description affect how PSF works with Advanced Function Presentation (AFP). For example, you can specify these options:
* The maximum number of print requests that can be queued for printers.
* Whether a file using AFP must be completely converted to IPDS before printing begins.
* How long to wait after a print request has been received before forcing the last pages of the output into the paper stacker. This is for continuous forms printers only.
* A default form definition to use.
* A PSF configuration object to use.

Configure PSF by using a PSF configuration object

A PSF configuration object is an extension of the printer device description. You can use a PSF configuration object to specify device configuration options that you cannot specify with the device description. For example, with a PSF configuration object you can specify these:
* A library list for PSF to use to search for resources
* When PSF should release a session with a printer
* Whether to automatically take advantage of outline fonts
* Whether to generate Portable Document Format (PDF) output from the spooled file

To use a PSF configuration object, follow these steps:
1. Create a PSF configuration object by using the Create PSF Configuration Object (CRTPSFCFG) command or by using AFP Manager:
   a. Start an iSeries Navigator session.
   b. Expand **My Connections** (or your active environment).
   c. Expand **AFP Manager**.

      If you do not have an AFP Manager icon, install AFP Manager as follows: Right-click **My Connections** (or your active environment) and select **Install Options** then **Selective Setup**.
   d. Right-click **PSF configurations** and select **New**.
   e. Specify the options you want. For help on any page, press F1. Select **OK**.
2. Specify the PSF configuration object by following the steps in the "Specify a PSF configuration object" on page 25 topic.

Related concepts

Related tasks

Related reference

Create Device Description (Printer) (CRTDEVPRT) CL command

Create PSF Configuration Object (CRTPSFCFG) CL command

Change Device Description (Printer) (CHGDEVPRT) CL command

Manage PSF

This topic describes several ways you might want to manage your Print Services Facility (PSF) sessions.

"Enable IPDS pass-through support"
This topic describes how to enable Intelligent Printer Data Stream (IPDS) pass-through support.

"Share print sessions" on page 41
This topic describes how to enable session sharing.

"Automatic session recovery" on page 42
This topic describes how to enable session recovery.

Enable IPDS pass-through support

There are several ways to enable Intelligent Printer Data Stream (IPDS) pass-through support:
* Specify IPDSPASTHR(*YES) in the printer file.
* Specify IPDSPASTHR in the PSF configuration object and specify IPDSPASTHR(*DEVD) in the printer file.

  When IPDSPASTHR(*DEVD) is specified, PSF will first check whether IPDSPASTHR is specified in the printer file's USRDFNDTA parameter. It then checks for a value for IPDSPASTHR in the PSF configuration object that is specified in the printer device description, if one is specified. If there is no object that is specified in the printer device description, IPDS pass-through is ignored.

Enabling IPDS pass-through support means that IPDS pass-through is done for the device for all eligible spooled files.

Related concepts

"IPDS pass-through" on page 13

"PSF configuration objects" on page 13

Related tasks

"Specify a PSF configuration object" on page 25

Share print sessions

You can specify printer sharing properties on the PSF configuration object. This lets you limit the amount of time that you have a connection to the printer, control when the session is released, control when a new session is started, and specify how many times Print Services Facility (PSF) tries to connect to the printer.

Several parameters from the PSF configuration object and device description let you configure PSF to share sessions with other PSF sessions or ASCII print drivers.

Notes:

1. PSF supports session sharing with TCP/IP-attached printers.
2. PSF supports session sharing with any printer attached to the PSF Direct licensed program.
3. PSF does not support session sharing with APPC-attached printers. If you want to use session sharing with these printers, either use their TCP/IP support, if available, or attach them to PSF Direct, if supported.
4. PSF does not support session sharing with twinaxial printers attached to local or remote workstation controllers. If you want to use session sharing with these printers, check if TCP/IP support is available.

Following are the parameters you need to consider for printer session and dialog sharing.

ACTTMR

Printer device description parameter that specifies how long (in seconds) that PSF waits for a printer to respond to an activation request. This applies to TCP/IP-attached printers only. PSF uses this timer only after a session has been opened with the printer.

No timers can influence the length of time that TCP/IP takes to wait for a response to a session start request. You can specify that PSF retries session start requests after a failure of the session start request failure is detected. To do this, use the PSF configuration object RETRY parameter to specify how many session start request retries PSF should perform.

ACTRLSTMR

PSF configuration object parameter that specifies the point at which the Release Timer (RLSTMR) is activated.

If you are using a non-impact continuous forms printer, do not set the PRTRQSTMR parameter in the printer device description to *NOMAX. If you set the PRTRQSTMR to *NOMAX, an operator must perform a manual nonprocess runout (NPRO) at the printer. PSF will not release a session or Intelligent Printer Data Stream (IPDS) dialog until the last file sent to the printer is printed.

RESTRTMR

PSF configuration object parameter that specifies the amount of time to wait before the printer writer attempts to re-establish either a session or dialog. For example, if this value is set to 10, PSF activates the timer as soon as a session or dialog is released. After 10 minutes have elapsed, PSF checks for a spooled file with a status of RDY. If there is one, PSF tries to start a session or dialog with the printer in order to print the file. If a spooled file is not ready after the timer expires, PSF waits for a RDY spooled file to be placed on its output queue before attempting to start a session or dialog.

This timer is ignored if PSF has not been configured to release either a session or dialog. Use the ACTRLSTMR and RLSTMR parameters to configure PSF to release either a session or dialog.

RETRY

PSF configuration object parameter that specifies the number of additional attempts PSF will make to establish an APPC or TCP/IP session. When PSF is sharing a PSF directly-attached printer with other PSF sessions, you might want to set the value to *NOMAX. This specifies that PSF will continue trying to obtain a session. The default value for the RETRY parameter is 15.

The RETRY parameter is helpful for TCP/IP-attached printers in this situation: You want to share an AFCCU™ printer with more than three PSFs. A printer is temporarily unavailable when PSF tries to

open a session with it. You might have seen this when PSF failed to start a printer session. One example of this is when PSF issues message PQT3603 with error code 22 or 15. The RETRY parameter specifies that instead of ending PSF should retry to open a session with the printer. PSF will try to open a session up to the number of times specified.

RETRYDLY

PSF configuration object parameter that specifies the number of seconds to wait between each retry attempt to establish a session. This parameter is used only when PSF is using an SNA attachment. The default value for the RETRYDLY parameter is 90.

RLSTMR

Timer set in the PSF configuration object. Its value is referenced by the ACTRLSTMR parameter. The default setting is *NOMAX, which means that PSF does not release the session or dialog with the printer until the writer is ended.

The value specified for parameter RESTRTMR determines when PSF re-establishes a session or a dialog.

Related concepts

"PSF configuration objects" on page 13

Related tasks

"Specify a PSF configuration object" on page 25

Related reference

"CL commands for PSF configuration objects" on page 52

"CL commands for device descriptions" on page 53

Automatic session recovery

Print Services Facility (PSF) can try to resume printing when a session has been unexpectedly ended by a device. A message is sent to the message queue when PSF is performing automatic session recovery.

These PSF configuration object parameters support automatic session recovery.

AUTOSSNRCY

Automatic session recovery specifies whether PSF tries to resume printing when a session has been unexpectedly ended by a printer or other network device, such as a router. AUTOSSNRCY(*YES) also lets you power your printer off and on without ending PSF. If you plan to specify *YES, you should consider these values for other parameters in the PSF configuration object:

- For a TCP/IP connection, use RETRY or ACKFRQ.
- For an APPC connection, use RETRY, RETRYDLY, or ACKFRQ.

Note: When automatic session recovery takes place, pages might be printed when printing resumes.

ACKFRQ

Acknowledgment frequency specifies the frequency, in pages, with which PSF sends Intelligent Printer Data Stream (IPDS) acknowledgment requests to a printer. The acknowledgment request responses from the printer that contains information as to the status of pages that is sent to the printer. You might want to adjust this value if you are concerned about one of these issues:

- Losing a connection to a printer while spooled files are being printed
- Duplicate pages being printed

More frequent acknowledgment request responses provide more information about pages that have been printed. However, if you increase the frequency of acknowledgment requests (by specifying a lower value), you can slow the print process. You might need to experiment with different values in order to find one that is suitable for your environment.

Related concepts

"PSF configuration objects" on page 13

Related tasks

"Specify a PSF configuration object" on page 25

Related reference

"CL commands for PSF configuration objects" on page 52

Line and mixed data stream support

This topic describes line and mixed data stream support on the iSeries server.

"Printer file parameters used with line and mixed data"
This topic describes the keywords and parameters you can use when working with line and mixed data.

"Special characters used with line data" on page 44
This topic describes carriage control characters and table reference characters for line data.

"Considerations and restrictions when using line data" on page 45
This topic describes considerations and restrictions when using line data.

Printer file parameters used with line and mixed data

There are several printer file parameters that can be used when working with line and mixed data. These parameters can all be specified on the Create Printer File (CRTPRTF), Change Printer File (CHGPRTF), and Override with Printer File (OVRPRTF) CL commands.

AFP characters (AFPCHARS)
This parameter identifies up to four 4-byte coded font names. The 4-byte names are concatenated to X'0'. The names identify the coded fonts that are needed when table reference characters are used in line or mixed data.

Control character (CTLCHAR)
This parameter specifies the type of control characters (American National Standards Institute (ANSI) or machine code) that are in the line or mixed data.

Convert line data (CVTLINDTA)
This parameter specifies whether line data is converted to Advanced Function Presentation data stream (AFPDS) before the data is spooled. A page definition specifies how the data is formatted.

DBCS character rotation (IGCCHRRTT)
For non-AFP printers, this parameter is used to rotate the double-byte character set (DBCS) data when line data is transformed to SNA Character Stream (SCS). For AFP printers, this parameter is ignored. Character rotation can be specified in the page definition.

DBCS characters per inch (IGCCPI)
For non-Advanced Function Presentation (AFP) printers, this parameter specifies the pitch of the DBCS data during transformation from line data to SCS. DBCS shift-out, shift-in (SOSI) characters cannot be transformed when going to an Intelligent Printer data stream (IPDS) printer. Mixed

data cannot be transformed when going to an SCS or IPDS printer. For AFP printers, this parameter is ignored, as the pitch of the DBCS data is determined by the selected font.

DBCS SO/SI spacing (IGCSOSI)

This parameter indicates what action should be taken when SOSI characters are found in the data. If the data is mixed, the SOSI should be taken out and appropriate spaces inserted based on the value of this keyword.

Printer device type (DEVTYPE)

Use this parameter to place line data or mixed data onto the printer spool.

Table reference characters (TBLREFCHR)

This parameter indicates whether table reference characters (TRC) exist in the line or mixed data. If forms control characters are used with the data, the TRC follows the forms control character, but precedes the data bytes. If forms control characters are not used, the TRC is the first byte of the data record. If table reference characters are used, every data record must contain a TRC byte.

User-specified DBCS data (IGCDTA)

This parameter specifies whether the file processes DBCS data. If so, the user of a line or mixed data file must specify *YES to indicate that there are SOSI characters in the data.

Related reference

Change Printer File (CHGPRTF) CL command

Create Printer File (CRTPRTF) CL command

Override with Printer File (OVRPRTF) CL command

Special characters used with line data

There are two types of special characters that can be used with line data; carriage control characters (CC) and table reference characters (TRC).

Carriage control characters affect the data's line positioning. A carriage control character can be represented as either American National Standards Institute (ANSI) or machine code. You cannot use both ANSI and machine codes within a single data set. ANSI carriage control is a standard representation that is used with printers from many different manufacturers. See the ANSI carriage control characters topic for the ANSI codes and their functions. Machine code control characters were defined by IBM; they correspond to channel command words issued by the operating system. See the Machine carriage control characters topic for the IBM machine code values and functions.

There are differences in the conventions used by the i5/OS operating system for ANSI and machine code line spacing. The i5/OS convention for ANSI handles line spacing and then causes the line to be printed. The i5/OS convention for machine codes causes the line to be printed and then performs the spacing action.

Table reference characters allow an additional byte at the beginning of a line. The byte indicates which coded font (specified on the AFPCHARS parameter) is used to print the line. Up to four coded fonts are specified on the AFPCHARS parameter. The table reference character contains a value of X'F0', X'F1', X'F2', or X'F3'. The value corresponds to the relative position of the required coded font in the list on the AFPCHARS parameter. If table reference characters are used, every data record must contain a table reference character. The printer file parameter Table Reference Characters (TBLREFCHR) specifies whether table reference characters are in the data.

If carriage control and table reference characters are used with the data, the table reference character follows the carriage control character. Both special characters precede the data. If carriage control bytes are not used, the table reference character is the first byte of the data record.

These graphics illustrate the valid forms of line data.

Data

Figure 4. Simple line data

TRC	Data

Figure 5. Line data with table reference characters

CC	Data

Figure 6. Line data with carriage control characters

CC	TRC	Data

Figure 7. Line data with carriage control characters and table reference characters

Related reference

Considerations and restrictions when using line data

Application considerations

To use line data, first determine whether your application generates an American National Standards Institute (ANSI) control character in column 1 of your spooled output. If your application does generate an ANSI control character as described, specify CTLCHAR(*FCFC) and DEVTYPE(*LINE) on the printer file.

If your application does not generate an ANSI control character in column 1 of your spooled output, change your application to do so. To change your application, use a language or application construct (such as a SKIP or SPACE option on a COBOL WRITE statement), or make an RPG output specification. If your application cannot generate ANSI control characters, specify CTLCHAR(*NONE) and DEVTYPE(*LINE) on your printer file. The operating system will use control information to generate machine code control characters in your data.

Specifying a page definition and form definition

When using line data, you can specify various combinations of DEVTYPE(*LINE), PAGDFN, and FORMDF parameters on the printer file:

If you specify DEVTYPE(*LINE), PAGDFN and FORMDF
> When you print to an Advanced Function Presentation (AFP) printer, Print Services Facility (PSF) uses the PAGDFN and FORMDF parameters to transform the data to Intelligent Printer Data Stream (IPDS).

> When you print to a non-AFP printer, the PAGDFN and FORMDF parameters are ignored. The other parameters on the printer file are used and the line data is transformed to IPDS or SNA Character Stream (SCS).

If you specify DEVTYPE(*LINE) and FORMDF (no page definition)

When you print to an AFP printer, an inline page definition is built from the printer file parameters. PSF uses the form definition and the inline page definition to transform the data to IPDS.

When you print to a non-AFP printer, the FORMDF parameter is ignored. The other printer file parameters are used and the line data is transformed to IPDS or SCS.

If you specify DEVTYPE(*LINE) and PAGDFN (no form definition)

When you print to an AFP printer, an inline form definition is built from the printer file parameters. PSF uses the page definition and the inline form definition to transform the data to IPDS.

When you print to a non-AFP printer, the PAGDFN parameter is ignored. The other printer file parameters are used and the line data is transformed to IPDS or SCS.

If you specify DEVTYPE(*LINE) only (no page definition or form definition)

When you print to an AFP printer, an inline page definition and an inline form definition are built from the printer file parameters. PSF uses the inline form definition and the inline page definition to transform the data to IPDS.

When you print to a non-AFP printer, the printer file parameters are used and the line data is transformed to IPDS or SCS.

When specifying DEVTYPE(*AFPDSLINE)

The support for combinations of DEVTYPE(*AFPDSLINE), PAGDFN, and FORMDF are similar to DEVTYPE(*LINE) line data. However, you should be aware of these exceptions:

- The spooled file must be printed on an AFP printer. When you send data to a non-AFP printer, the data cannot be transformed to IPDS or to SCS.

- You are not required to specify a page definition or form definition with *AFPDSLINE data because they can be built inline. However, certain Advanced Function Presentation data stream (AFPDS) commands in the data stream (for example, Invoke Medium Map) might reference named structured fields in the page definition or form definition that do not match those in the inline page definition and form definition.

Supported DDS keywords

Below is a list of Data description specifications (DDS) keywords that are supported for line data. If you use DDS keywords that are not included on this list while processing line data, they will be ignored.

- ALIAS
- BLKFOLD
- CCSID
- DATE
- DATFMT
- DATSEP
- DFT
- DLTEDT
- EDTCDE
- EDTWRD
- FLTFIXDEC
- FLTPCN
- IGCALTTYP
- IGCANKCNV
- INDARA

- INDTXT
- INVDTAMAP
- MSGCON
- PAGNBR
- REF
- REFFLD
- SKIPA
- SKIPB
- SPACEA
- SPACEB
- TEXT
- TIME
- TIMFMT
- TIMSEP

Restrictions when using line data or mixed data

- Externally described printer files (DDS SUPPORT) support both line and mixed data device types.
- In the printer file, if you specify *LINE or *AFPDSLINE for device type, you cannot specify SPOOL(*NO). If you specify one of these combinations, Message CPD7341, indicating the value SPOOL(*NO) is not valid with device type, is issued.

Send data from zSeries to iSeries servers

In this topic, the term zSeries refers to zSeries and S/390 servers. Communication with the zSeries is important to determine how the zSeries will send data to your iSeries server. When data is sent from a zSeries to an iSeries server, it can go directly to the output queue of a designated user ID. Alternatively, it can go into your network files.

Notes:

1. You can only send print data to the output queue of a user ID when your host S/390 RSCS/JES subsystem is connected to the iSeries server VM/MVS bridge.
2. To send data to another system (iSeries or a zSeries server), you can use the Send Network Spooled File (SNDNETSPLF) command.
3. The SNA Distribution Service guide contains information about how to create communications networks that let you send data from the iSeries server to other systems.

If you are sending print data, it can be sent directly to an output queue of a specified user ID on the iSeries. Advanced Function Presentation data stream (AFPDS) data can go to your network files. However, you must then use the Print Advanced Function Printer Data (PRTAFPDTA) command to put the file on an output queue. If you are sending resources, the data must go into your network files.

"Send print data from a VM S/390 to the output queue of a user ID" on page 48
This topic provides instructions on how to send print data from a VM S/390 to an iSeries output queue.

"Send print data from MVS S/390 to an i5/OS output queue" on page 48
This topic provides instructions on how to send print data from an MVS™ S/390 to an iSeries.

"Send data from a zSeries server to i5/OS network files" on page 49
This topic provides instructions on how to send print data from a zSeries server to an iSeries network file.

Related tasks

Receive AFP resources from another system

Related reference

SNA Distribution Services PDF

Send print data from a VM S/390 to the output queue of a user ID

A z/VM® can issue a PRINT or a PSF command to place a file directly into an i5/OS user's output queue.

Example using the PRINT command

These commands place the file REPORTS LETTER A into the output queue of USERONE on i5/OS with the node ID AS4002.

```
CP TAG DEV PRT AS4002 USERONE
CP SPOOL PRT TO RSCS COPY 1
PRINT REPORTS LETTER A (NOCC
```

These commands place the file REPORTS LISTING A into the output queue of USERONE on i5/OS with the node ID AS4002.

```
CP TAG DEV PRT AS4002 USERONE
CP SPOOL PRT RSCS COPY 1
PRINT REPORTS LISTING A
```

Using the PSF command

These commands place the line data spooled file into an i5/OS. They use these variables:

Spooled file name:
     reports letter a

User ID that owns the output queue:
     userone

iSeries server node ID:
     is002

A page definition will be used when the data is printed. When using the PSF command, you must place the characters P1 in front of the page definition name. When using a form definition, you must place the characters F1 in front of the form definition name. This example uses a page definition named P1MYFORM.

```
TAG DEV PRT is002 userone
SPOOL PRT TO RSCS COPY 1
PSF reports letter a (PAGEDEF (P1MYFORM RESOURCE A))
```

Send print data from MVS S/390 to an i5/OS output queue

These commands, when issued by an MVS S/390, place the Advanced Function Presentation data stream (AFPDS) spooled file into the output queue of the specified user on an iSeries. These commands are job control language (JCL) commands. Do not place a P1 (for PAGEDEF) or an F1 (for FORMDEF) in the instructions.

In the following example, a form definition named MYFORM is used. The user is userone and the node name is is002.

```
//INSTR    PROC   NODE='is002',USER='userone'
       INFILE='dept265.userx.files(report)'
//SPOOL    EXEC   PGM=IEBGENER
//MYOUT    OUTPUT  DEST=NODE..USER,
```

```
        COPIES=1,
        FORMDEF=MYFORM
//SYSPRINT DD    SYSOUT=*
//SYSIN   DD    DUMMY
//SYSUT1  DD    DSN=&,DISP=SHR,DCB=(RECFM=FBA);
//SYSUT2  DD    SYSOUT=A,OUTPUT=*.MYOUT
// PEND
//STEP01  EXEC   PROC=INSTR
```

Send data from a zSeries server to i5/OS network files

Advanced Function Presentation (AFP) resources sent from an a zSeries server to an iSeries server must be sent to network files.

Note: AFP data can also be sent to network files. However, this is not the recommended way to send this data to an iSeries server. If you choose this method, you must use the Print Advanced Function Presentation Data (PRTAFPDTA) command to put the file on an output queue.

Sending resources and AFPDS data from VM S/390 to network files

When issued by a VM S/390, this command places the specified file into the network files of `userone` on an iSeries server named `is002`.

```
SENDFILE fonts resource a TO userone AT is002
```

Sending resources and AFPDS data from MVS S/390 to network files

When issued by an MVS S/390, this command places the specified file into a user's network files. The user is `userone` and the iSeries server is named `is002`.

```
TRANSMIT is002.userone DSNAME('system.afp.resources(font)')
```

Related concepts

Fonts from zSeries

Related tasks

Print data sent to iSeries from a zSeries server

Receive AFP resources from another system

Related reference

z/OS® parameters and matching i5/OS printer file

AFP reference information

This topic contains additional reference materials related to Advanced Function Presentation (AFP) printing.

"Form definitions included with the server" on page 50
This topic lists the form definitions that are included with the iSeries server.

"Page definitions included with the server" on page 51
This topic lists the page definitions that are included with the iSeries server.

"CL commands for PSF configuration objects" on page 52
This topic describes the commands to use to create, change, display, and delete a PSF configuration object.

"CL commands for device descriptions" on page 53
This topic describes how to create and change a printer device description.

"Purchase fonts" on page 53
This topic describes the IBM font products.

TrueType fonts on OS/400 V5R2
This topic describes how to use TrueType fonts on V5R2 operating systems.

"S/390 parameters and corresponding i5/OS printer file parameters" on page 55
This topic provides a table relating zSeries printer parameters and VM commands to i5/OS printer file parameters, along with a description of the parameter.

"ANSI carriage control characters" on page 57
This topic provides a table that lists the American National Standards Institute (ANSI) carriage control characters for line or mixed data. It also describes what each is used for.

"Machine code carriage control characters" on page 58
This topic provides a table that lists the carriage control characters for line or mixed data in IBM machine code. It also describes what each character is used for.

Printer file parameter considerations
This topic provides more detailed information about certain printer file parameters.

Printing related CL commands
This topic provides a list of CL commands that are related to printing.

DDS for printer files
This topic provides information you need to know for coding the data description specifications (DDS) for printer files.

Form definitions included with the server

These form definitions are provided with the iSeries server in library QSYS.

Name	Across (inches)	Down (inches)	Presentation	Direction	Bin	Duplex
F1A10110	1/6	1/6	Portrait	Across	1	No
F1A10111	1/6	1/6	Portrait	Across	1	Yes
F1A10112	1/6	1/6	Portrait	Across	1	Tumble
F1A10120	1/6	1/6	Portrait	Across	2	No
F1A10121	1/6	1/6	Portrait	Across	2	Yes
F1A10122	1/6	1/6	Portrait	Across	2	Tumble
F1C10110	1/6	1/6	Landscape	Down	1	No
F10101LA	0	1/2	Landscape	Across	1	No
F10101LD	0	1/2	Landscape	Down	1	No
F10101PA	0	1/2	Portrait	Across	1	No
F10101PD	0	1/2	Portrait	Down	1	No

Name	Across (inches)	Down (inches)	Presentation	Direction	Bin	Duplex
F1OGL	0	0	Portrait	Across	1	No
Note: The IBM-supplied form definitions do not set the print quality for the 4224, 4230, 4234, and 4247 printers. You must set the print quality on the printer operator panel when using an IBM-supplied form definition.						

Page definitions included with the server

The page definitions shown in the following table are provided with the iSeries server in library QSYS.

Table 2. IBM-supplied page definitions

Name	Size of form	Orientation on page	Description
P1A06462	8.5 x 11.0 inches	Portrait	Letter size. 6 lines per inch (LPI). 64 lines per page.
P1A08584 [1]	9.5 x 11.0 inches	Portrait	Continuous forms. 8 lines per inch (LPI). 85 lines per page.
P1A08682	8.5 x 11.0 inches	Portrait	Letter size. 8 lines per inch (LPI). 86 lines per page.
P1B04963	8.5 x 14.0 inches	Portrait	Legal size. 6 lines per inch (LPI). 82 lines per page.
P1B08262	8.5 x 14.0 inches	Portrait	Legal size. 6 lines per inch (LPI). 82 lines per page.
P1B11082	8.5 x 14.0 inches	Portrait	Legal size. 8 lines per inch (LPI). 110 lines per page.
P1B06683	14.0 x 8.5 inches	Landscape	Legal size. 8 lines per inch (LPI). 66 lines per page.
P1C09182	8.27 x 11.69 inches	Portrait	Legal size. 8 lines per inch (LPI). 91 lines per page.
P1D08083	14.33 x 10.12 inches	Landscape	B4 Size forms. 8 lines per inch (LPI). 80 lines per page.
P1D08462	14.33 x 10.12 inches	Landscape	B4 size forms. 6 lines per inch (LPI). 84 lines per page.
P1D11382	10.12 x 14.33 inches	Portrait	B4 Size forms. 8 lines per inch (LPI). 113 lines per page.
P1J04964 [1]	12.0 x 8.5 inches	Landscape	Continuous forms. 6 lines per inch (LPI). 49 lines per page.
P1J06484 [1]	12.0 x 8.5 inches	Landscape	Continuous forms. 8 lines per inch (LPI). 64 lines per page.
P1L06464 [1]	14.88 x 11.0 inches	Landscape	Continuous forms. 6 lines per inch (LPI). 64 lines per page.
P1L08584 [1]	14.88 x 11.0 inches	Landscape	Continuous forms. 8 lines per inch (LPI). 85 lines per page.

Table 2. IBM-supplied page definitions (continued)

Name	Size of form	Orientation on page	Description
P1V04863	8.27 x 11.00 inches	Portrait	Combined letter and A4 size forms. 6 lines per inch (LPI). 48 lines per page.
P1V06483	8.27 x 11.00 inches	Portrait	Combined letter and A4 size forms. 8 lines per inch (LPI). 64 lines per page.
P1V06683	8.27 x 11.00 inches	Portrait	Combined letter and A4 size forms. 8 lines per inch (LPI). 66 lines per page.
P1W120C2	8.27 x 11.00 inches	Portrait	Combined letter and A4 size forms using MULTIUP. 12 lines per inch. 120 lines printed per page. 2 logical pages printed on one physical page.
P1W12883	8.27 x 11.00 inches	Portrait	Combined letter and A4 size forms using MULTIUP. 8 lines per inch. 128 lines printed per page. 2 logical pages printed on one physical page.
P1W240F3	8.27 x 11.00 inches	Portrait	Combined letter and A4 size forms using MULTIUP. 15 lines per inch. 240 lines printed per page. 4 logical pages printed on one physical page.
[1] Can only be used with the 4224, 4230, 4234, and 4247 printers.			

CL commands for PSF configuration objects

There are several CL commands you can use with PSF configuration objects. The following table provides a brief description of each command. For information about specific parameters of the configuration object, see the online help. You can also use the AFP Manager component of iSeries Navigator to create, change, and delete a PSF configuration object.

Table 3. CL commands for PSF configuration objects

Command	Description
Change PSF Configuration (CHGPSFCFG)	This command changes the PSF configuration object in the library specified on the command.
Create PSF Configuration (CRTPSFCFG)	This command lets you specify additional parameters for an Advanced Function Presentation (AFP) printer that are not supported in the Create Device Description (Printer) (CRTDEVPRT) command.
Delete PSF Configuration (DLTPSFCFG)	This command deletes a PSF configuration object from a specified library. If the PSF configuration object is found, it is deleted. If it is not found, a message is sent to the user indicating that the PSF configuration object could not be found.
Display PSF Configuration (DSPPSFCFG)	This command lets you display or print the contents of a PSF configuration object.
Work with PSF Configuration (WRKPSFCFG)	This command lets the user work with all of the PSF configuration objects from the system libraries or the user libraries.

Related reference

Change PSF Configuration (CHGPSFCFG) CL command

Create PSF Configuration (CRTPSFCFG) CL command

Delete PSF Configuration (DLTPSFCFG) CL command

Display PSF Configuration (DSPPSFCFG) CL command

Work with PSF Configuration (WRKPSFCFG) CL command

CL commands for device descriptions

There are several CL commands you can use with device descriptions. The following table provides a brief description about each command. For information about specific parameters of the configuration object, see the online help.

Table 4. CL commands for device descriptions

Command	Description
Change Device Description (Printer) (CHGDEVPRT)	This command lets you change a device description for a printer device. Before you change a printer device description, it is recommended that you do these: • End the printer writer with the End Writer (ENDWTR) command. • Vary off the printer device with the Work with Configuration Status (WRKCFGSTS) command.
Create Device Description (Printer) (CRTDEVPRT)	This command lets you create a device description for a printer device. If you have a locally-attached Twinax device and the automatic configuration (QAUTOCFG) system value is *YES, the system will create printer device descriptions automatically.
Delete Device Description (DLTDEVD)	This command deletes a device description.
Display Device Description (DSPDEVD)	This command lets you display or print the contents of a device description.
Work with Device Descriptions (WRKDEVD)	This command lets a user display and work with device descriptions.

Related reference

Change Device Description (Printer) (CHGDEVPRT) CL command

Create Device Description (Printer) (CRTDEVPRT) CL command

Delete Device Description (DLTDEVD) CL command

Display Device Description (DSPDEVD) CL command

Work with Device Descriptions (WRKDEVD) CL command

Purchase fonts

There are several different font products that you can purchase, depending on your needs.

IBM Infoprint Fonts for Multiplatforms (Program 5648-E77)

> IBM Infoprint Fonts for Multiplatforms licensed program is the current and recommended font product. It is best for customers who are in one of these categories:
>
> - Those who do not already have AFP Font Collection
> - Those who want to use the Font Installer for AFP Systems to install and manage TrueType fonts.

IBM Advanced Function Printing Fonts for AS/400 (Program 5769-FNT)

> This licensed program is only required for compatibility with older font technology.

IBM AFP Font Collection for Workstations and OS/400 (Program 5648-B45)

> This licensed program is only required for compatibility with older font technology.

IBM Advanced Function Printing DBCS Fonts for AS/400 (Program 5769-FN1)

> This licensed program is only required for compatibility with older font technology.

There are many sources of TrueType fonts. However, not all TrueType fonts are suitable for use in Advanced Function Presentation (AFP). In general, a TrueType font that is to be installed and referenced in an AFP system must be Unicode-enabled. A Unicode-enabled font has these characteristics:

- It must contain a Microsoft Unicode subtable identified by platform ID = 3 (Microsoft) and platform-specific encoding ID = 1 (Unicode, UTF-16).
- It must specify a full font name (Name ID 4) using the same encoding in the naming table.

The TrueType fonts included with i5/OS and the TrueType fonts available with the IBM Infoprint Fonts for Multiplatforms licensed program are suitable for use in AFP. The TrueType fonts included with i5/OS are installed with option 43 Additional fonts.

Related information

IBM Infoprint Fonts: Font Summary PDF

TrueType fonts on OS/400 V5R2

You can use TrueType fonts on V5R2 operating systems. However, there are some differences between using these fonts on a V5R2 operating system as compared to using the fonts on a later-level system.

One difference is that Print Services Facility (PSF) does not support TrueType fonts on V5R2 operating systems, only Host Print Transform does. Also, there is no resource access table available on V5R2 operating systems. Instead, the operating system maintains index tables that map the full font names to the actual font files stored in the integrated file system. The index table is built for all TrueType fonts contained in these directories:

- QIBM/ProdData/OS400/Fonts/TTFonts
- QIBM/UserData/OS400/Fonts/TTFonts

Because there is no resource access table on V5R2 operating systems, linked fonts and font capturing are not supported on V5R2.

Migration notes

For fonts in the /QIBM/UserData/OS400/Fonts/TTFonts directory, the base implementation on V5R3 and later-level systems functions exactly the same as V5R2. Customers who use TrueType fonts on V5R2 and do not want to use resource access tables do not need to change anything when they migrate to a later-level system. However, customers can access all of the TrueType functions by using the Font Installer for AFP Systems to install the fonts. Font Installer for AFP Systems is a feature of the IBM Infoprint Fonts for Multiplatforms licensed program. This program generates a resource access table when TrueType fonts are installed, and this enables the extended functions.

On V5R3 and later-level operating systems, the search order for full font names follows:

1. Search the resource access table (if it exists) in /QIBM/UserData/OS400/Fonts/TTFonts.
2. Search the resource access table (if it exists) in /QIBM/ProdData/OS400/Fonts/TTFonts.
3. Search all the TrueType font files in /QIBM/UserData/OS400/Fonts/TTFonts.
4. Search all the TrueType font files in /QIBM/ProdData/OS400/Fonts/TTFonts.

This lets the resource access table take precedence over the V5R2 search method. If there is no resource access table, the old method still works.

S/390 parameters and corresponding i5/OS printer file parameters

Be aware of these special considerations when working with these S/390 (VM and MVS) parameters:

FCB   If you specify the FCB parameter on VM or MVS, the iSeries server uses the printer file of that name. i5/OS uses the library list of the user receiving the spooled file to find the printer file. If the FCB parameter is not specified, the i5/OS printer file QSYSPRT is used.

BIN and DUPLEX

The values for the DRAWER and DUPLEX parameters are taken from the printer file specified in the FCB parameter if both of these are true:

- The BIN and DUPLEX parameter values are not specified from VM and MVS
- The form definition is not specified from VM or MVS

If the FCB parameter is not specified, the DRAWER and DUPLEX values are set to *FORMDEF. This means that the values are taken from the form definition.

FORMDEF

If the form definition (FORMDEF) parameter is not specified from VM or MVS, the i5/OS form definition parameter is set to *DEVD, and *LIBL is used for the library. *DEVD means that the form definition used is the one specified in the device description for the printer you want to use.

These S/390 parameters are supported when an S/390 user sends data directly to the output queue of a user on the iSeries server.

The S/390 parameter is ignored when the data is printed on the iSeries server when both of these are true:

- The S/390 printer parameter is not one that is specified in this table.
- No matching or equivalent i5/OS printer file parameter exists.

Table 5. VM S/390 parameters

S/390 printer parameter	VM commands	Function	i5/OS printer file parameter
BIN	PSF	Specifies which drawer to take the paper from.	DRAWER
CC	PRINT, PSF	Specifies control characters.	CTLCHAR[1]
CHARS	SPOOL	Specifies a table of coded fonts.	AFPCHARS
COPY	SPOOL	Specifies the number of copies.	COPIES

Table 5. VM S/390 parameters (continued)

S/390 printer parameter	VM commands	Function	i5/OS printer file parameter
DATACK	PSF	Specifies whether the printer blocks print positioning and incorrect character errors. Printers will always block these unless the printer file that is used to create the spooled file specifies *ABSOLUTE for fidelity.	None
DEST	TAG	Specifies node and user ID.	None
DUPLEX	PSF	Specifies whether duplex printing is used.	DUPLEX
FCB	SPOOL, TAG	Specifies the printer file used.	FILE
FORM	SPOOL	Specifies the form type used.	FORMTYPE
FORMDEF	PSF	Specifies the form definition used.	FORMDF
PAGEDEF	PSF	Specifies the page definition used.	PAGDFN
PRMODE[2]	PSF	Specifies the device type, ideographic character data, processing shift-out, shift-in characters.	DEVTYPE, IGCDTA, IGCSOSI
TRC	PRINT, PSF	Specifies whether the data stream contains table reference codes.	TBLREFCHR

[1] To correctly print S/390 line data with first-character forms control, each channel value specified in the CTLCHAR parameter must have a unique line number associated with that channel value.

[2] Only PRMODE values of PAGE, LINE, SOSI1, SOSI2, and SOSI3 are supported. The supported PRMODE values translate to device types of *AFPDS, *LINE, or *AFPDSLINE. See Network Job Entry Formats and Protocols for more specific information.

Table 6. MVS S/390 parameters

S/390 printer parameter	MVS JCL statements	Function	i5/OS printer file parameter
CHARS	DD, OUTPUT	Specifies a table of coded fonts.	AFPCHARS
CONTROL	OUTPUT	Specifies line spacing	None
COPIES	DD, OUTPUT	Specifies the number of copies.	COPIES

Table 6. MVS S/390 parameters (continued)

S/390 printer parameter	MVS JCL statements	Function	i5/OS printer file parameter
DATACK	OUTPUT	Specifies whether the printer blocks print positioning and incorrect character errors. Printers will always block these unless the printer file that is used to create the spooled file specifies *ABSOLUTE for fidelity.	None
DCB=RECFM	DD	Specifies control characters.	CTLCHAR[1]
DEST	DD, OUTPUT	Specifies node and user ID.	None
FCB	DD, OUTPUT	Specifies the printer file used.	FILE
FORMDEF	OUTPUT	Specifies the form definition used.	FORMDF
FORMS	OUTPUT	Specifies the form type used.	FORMTYPE
PAGEDEF	OUTPUT	Specifies the page definition used.	PAGDFN
PRMODE[2]	OUTPUT	Specifies the device type, ideographic character data, processing shift-out, shift-in characters.	DEVTYPE, IGCDTA, IGCSOSI
TRC	OUTPUT	Specifies whether the data stream contains table reference codes.	TBLREFCHR

[1] To correctly print S/390 line data with first-character forms control, each channel value specified in the CTLCHAR parameter must have a unique line number associated with that channel value.

[2] Only PRMODE values of PAGE, LINE, SOSI1, SOSI2, and SOSI3 are supported. The supported PRMODE values translate to device types of *AFPDS, *LINE, or *AFPDSLINE. See Network Job Entry Formats and Protocols for more specific information.

Related information

Network Job Entry Formats and Protocols PDF, SC23-0070

ANSI carriage control characters

This table lists the American National Standards Institute (ANSI) carriage control characters and their functions.

Table 7. ANSI carriage control characters and their functions

Control character value (in hexadecimal)	Function
X'40' (blank)	Space one line, and then print (single spacing).
X'F0' (zero)	Space two lines, and then print (double spacing).
X'60' (dash)	Space three lines, and then print (triple spacing).
X'4E' (plus sign)	Suppress spacing, and then print (type over previous line).

Table 7. ANSI carriage control characters and their functions (continued)

Control character value (in hexadecimal)	Function
X'F1'	Print the data at the line position defined as Channel 1 (by convention, the first line on a new page).
X'F2'	Print the data at the line position defined as Channel 2.
X'F3'	Print the data at the line position defined as Channel 3.
X'F4'	Print the data at the line position defined as Channel 4.
X'F5'	Print the data at the line position defined as Channel 5.
X'F6'	Print the data at the line position defined as Channel 6.
X'F7'	Print the data at the line position defined as Channel 7.
X'F8'	Print the data at the line position defined as Channel 8.
X'F9'	Print the data at the line position defined as Channel 9.
X'C1'	Print the data at the line position defined as Channel 10.
X'C2'	Print the data at the line position defined as Channel 11.
X'C3'	Print the data at the line position defined as Channel 12.
Note: When ANSI carriage controls are used, only the values that appear in this table are considered valid by Print Services Facility (PSF). PSF treats any other ANSI carriage control value as not valid and uses single spacing to print any data on the line.	

Machine code carriage control characters

This table lists the carriage control characters in IBM machine code and their functions.

Table 8. Carriage control characters in IBM machine code and their functions

Control character value (in hexadecimal)	Function
X'03'	No operation.
X'09'	Print, and then space one line (single spacing).
X'11'	Print, and then space two lines (double spacing).
X'19'	Print, and then space three lines (triple spacing).
X'01'	Print without spacing (type over next line).
X'89'	Print the data, then skip to the line position defined as Channel 1 (by convention, the first line on a new page).
X'91'	Print the data, then skip to the line position defined as Channel 2.
X'99'	Print the data, then skip to the line position defined as Channel 3.
X'A1'	Print the data, then skip to the line position defined as Channel 4.
X'A9'	Print the data, then skip to the line position defined as Channel 5.
X'B1'	Print the data, then skip to the line position defined as Channel 6.
X'B9'	Print the data, then skip to the line position defined as Channel 7.
X'C1'	Print the data, then skip to the line position defined as Channel 8.
X'C9'	Print the data, then skip to the line position defined as Channel 9.
X'D1'	Print the data, then skip to the line position defined as Channel 10.
X'D9'	Print the data, then skip to the line position defined as Channel 11.
X'E1'	Print the data, then skip to the line position defined as Channel 12.

Table 8. Carriage control characters in IBM machine code and their functions (continued)

Control character value (in hexadecimal)	Function
X'0B'	Space one line without printing.
X'13'	Space two lines without printing.
X'1B'	Space three lines without printing.
X'8B'	Skip to Channel 1 immediately (by convention, the first line on a new page).
X'93'	Skip to the Channel 2 position immediately.
X'9B'	Skip to the Channel 3 position immediately.
X'A3'	Skip to the Channel 4 position immediately.
X'AB'	Skip to the Channel 5 position immediately.
X'B3'	Skip to the Channel 6 position immediately.
X'BB'	Skip to the Channel 7 position immediately.
X'C3'	Skip to the Channel 8 position immediately.
X'CB'	Skip to the Channel 9 position immediately.
X'D3'	Skip to the Channel 10 position immediately.
X'DB'	Skip to the Channel 11 position immediately.
X'E3'	Skip to the Channel 12 position immediately.
Note: Print Services Facility (PSF) ignores these hexadecimal machine code carriage control characters and does not print lines containing them: X'02' through X'07', X'0A', X'12', X'23', X'43', X'63', X'6B', X'73', X'7B', X'EB', X'F3', and X'FB'. PSF treats any other carriage control value as not valid and prints any data on the line using single spacing.	

Troubleshoot AFP

For help troubleshooting problems with Advanced Function Presentation (AFP), see IBM Printing Systems Support (http://www.printers.ibm.com/internet/wwsites.nsf/vwwebpublished/ supportoverview_ww) and the IBM Knowledge Base (http://www.ibm.com/eserver/iseries/ support/s_dir/slkbase.nsf/slkbase).

Related information for AFP

Following are the product manuals and IBM Redbooks (in PDF format), Web sites, and information center topics that relate to the AFP topic. You can view or print any of the PDFs.

Manuals

Download these manuals from the Printing Systems Manuals and Publications page (http://www.printers.ibm.com/internet/wwsites.nsf/vwwebpublished/supportmanuals_ww) Select **AFP Architecture** to find these manuals:
* Bar Code Object Content Architecture (BCOCA) Reference, S544-3766
* Graphics Object Content Architecture (GOCA) Reference, S544-5498
* Image Object Content Architecture (IOCA) Reference, SC31-6805
* Presentation Text Object Content Architecture (PTOCA) Reference, SC31-6803
* Font Object Content Architecture (FOCA) Reference, S544-3285
* Data Stream & Object Architectures: MO:DCA Reference, SC31-6802
* Using OpenType Fonts in an AFP System, G544-5876

These manuals are available in the iSeries information center:

- Infoprint Designer for iSeries: Getting Started, G544-5773 (1188 KB)

- Infoprint Fonts: Font Summary, G544-5846 (2518 KB)

- Infoprint Server for iSeries: Introduction, G544-5774 (484 KB)

- Infoprint Server for iSeries: User's Guide, G544-5775 (3439 KB)

- iSeries Guide to Output, S544-5349 (9872 KB)

IBM Redbooks and Redpapers

- IBM AS/400 Printing V, SG24-2160 (500 KB)

- IBM eServer™ iSeries Printing VI: Delivering the Output of e-business, SG24-6250 (760 KB)

- IBM eServer iSeries Printing VII: Infoprint Server Implementation, REDP-3752 (350 KB)

Web sites

- Software Solutions for iSeries
  (www.printers.ibm.com/R5PSC.NSF/Web/as400overview)
  This Web site describes all of the iSeries Advanced Function Presentation (AFP) products.

- IBM Printing Systems Support
  (www.printers.ibm.com/R5PSC.NSF/Web/support+overview)
  This Web site has online support options for your printer or software (including fonts), such as downloads, device drivers, frequently asked questions, and manuals.

- IBM eServer iSeries Software Knowledge Base
  (www.ibm.com/eserver/iseries/support/s_dir/slkbase.NSF)
  This Web site has hints and tips for using your server.

Other information

- DDS for printer files
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