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## **Chapter 1. iSeries printing software for creating and managing your output**

IBM offers a wide variety of iSeries printing software solutions for the creation, formatting and management of your electronic documents. They range from products designed for an application developer or programmer, to ones that provide an easy to use graphical user interface (GUI). Several products have overlapping functions, while others complement each other. Some are priced program products, some are included as part of other products and some are even available at no charge.

This chapter will help you understand the role of the different offerings, and assist you in the selection of the correct product or products for your environment. We have categorized them in terms of the stages of the development and the types of objects involved.

For the sake of this discussion, we will look at the offerings in terms of:

- Formatting your application data
- Creating the external resources
- Driving the printer, including data stream transformations
- Managing the printed output
- Complementary offerings from IBM
- Complementary non-IBM offerings

Additional details on most of these offerings can be found in other sources, such as product manuals and users' guides, other IBM redbooks, or on the IBM web sites, in particular at:

<http://www.ibm.com/printers/iseriess>

The goal of this chapter is to introduce each of the products to the reader and provide enough information to compare them and choose which might be appropriate. After that decision is made, the reader could go to the other sources for more in depth descriptions. For additional information see the reference materials listed in the Bibliography.)

There will naturally be some overlap between the categories in the list above. For example, as you will see in Section 1.1.2, "Infoprint Designer" on page 6, the Infoprint Designer package has components for application formatting as well as resource creation within the one offering.

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### **1.1 Formatting your application data**

Most output consists of variable data that is generated by some sort of application or program. This section will deal with the software tools that work directly on the data. This can be as simple as deciding what setting to use for characters per inch (cpi) or lines per inch (lpi) to use for the entire document.

The next level of complexity may be to add some fixed resources, such as an electronic form (overlay) or a logo (page segment) to the document. (The decisions on how to use these resources is part of the overall design. The offerings for purchasing or creating these static resources will be described in Section 1.2, "Building or obtaining external resources" on page 13.)

You might then want to move data fields around, change fonts, suppress data, print multiple copies or even convert some of the data to a bar code. Some of the offerings support the insertion of logic to choose what is to be done based on the content of the page or line.

In this section we will describe the software offerings that are used to format application data and lay it out on the page. Many of them are built on the Advanced Function Presentation (AFP) architecture. They include:

- Printer files, including those built using Data Description Specifications (DDS)
- Infoprint Designer for iSeries
- AFP PrintSuite - Page Printer Formatting Aid (PPFA/400)
- AFP PrintSuite - Advanced Print Utility (APU)
- AFP PrintSuite - AFP Toolbox
- SAP R/3 AFP PrintSuite feature
- AFP Utilities/400 - Print Format Utility

### 1.1.1 Printer files and DDS

Printer files and DDS have been enhanced for Version 5 Release 1 of OS/400.

The concept of printer files and DDS has been around since the introduction of the IBM System/38 in 1979. Naturally the supported functions have evolved over time as print technology has changed.

All print applications use printer files, whether explicitly or implicitly. The process of copying data to a printer file causes a spooled file to be generated and placed in an output queue.

Printer files can contain two different types of information:

- printer file parameters that control how spooled file data is processed
- printer Data Description Specifications (DDS), which actually define how application data is positioned on the output page.

The first set of output information, the printer file parameters, are part of any printer file on the system. The second set, the printer DDS, is optional and exists if the application program has externally-described output. A compiled printer DDS source file also results in a printer file, but one with more detailed formatting instructions.

#### 1.1.1.1 Printer files

There are over 75 parameters in the Create Printer File (CRTPRTF) command. Any value used here will pertain to the entire printer file, unless it is overridden by entries in DDS. Some of the things you can do using a printer file alone are:

- select the data stream of the spooled file to be generated
- select the page size, default characters per inch, and default lines per inch
- add an offset to move the data down and to the right of the top left corner
- set print quality
- select an input drawer and output bin
- select a default font and code page
- set page rotation, duplex, or multi-up printing
- add an electronic overlay to front and/or back
- control stapling and finishing
- set the output queue, form type, page range and copies

- determine if line data is to be converted to AFP data stream

If you consider the above, you will notice that the most detailed level of formatting possible is to document or file-level. For example, we can change the lines per inch, the font, add an electronic overlay, and so on - but these changes affect every page of the spooled file.

Some parameters can only be used on spooled files that are in specific formats. For example, you can only use the Front margin (FRONTMGN) parameter if the printer file used generates AFPDS (AFP data stream). For a complete description of values that can be set in a printer file please see the reference material as described in Section 3.2, "References" on page 31.

Printer files may be modified separately from the application program that is using them. Use the Change Printer File (CHGPRTF) command to make permanent changes. The Override with Printer File (OVRPRTF) command can be used to make a temporary change. A subset of the parameters may be changed after the spooled file has been generated using Change Spooled File Attributes (CHGSPLFA).

#### 1.1.1.2 DDS keywords

There are over 60 DDS keywords available for use with printer files. They can be used to change the format of the data being printed down to the record or field level. For example, a customer address in a different font, with the zip code printed as a barcode. Some DDS keywords can be used for all spooled file types. Other keywords such as OVERLAY, LINE, or FNTCHRSET are specific to spooled files that are generated using DEVTYPE(\*AFPDS).

For an online source of the latest DDS keywords, see the iSeries Information page at:

<http://publib.boulder.ibm.com/pubs/html/as400/>

then navigate via the Online Library to the V5R1 section and select **Database and file systems - DB2 UDB for iSeries**. The DDS manual has been extracted into several sections, including one entitled *DDS Reference: Printer files*.

#### 1.1.1.3 Using a printer file with an application program

In Figure 1, "Using a printer file" on page 5 you can see how a simple printer file with DDS can affect the format of the resulting output. The application program issues an instruction to write a record of data. Using the information in the printer file, the appropriate data stream commands are built into the resulting spooled file and the output will have the desired characteristics. In this example, the printer file was created specifying a default font 11 (Courier medium at 10 cpi). In the DDS the keyword FONT(46) acts upon just the name field to cause it to print in Courier bold. A further keyword, UNDERLINE, acts only upon the city field.

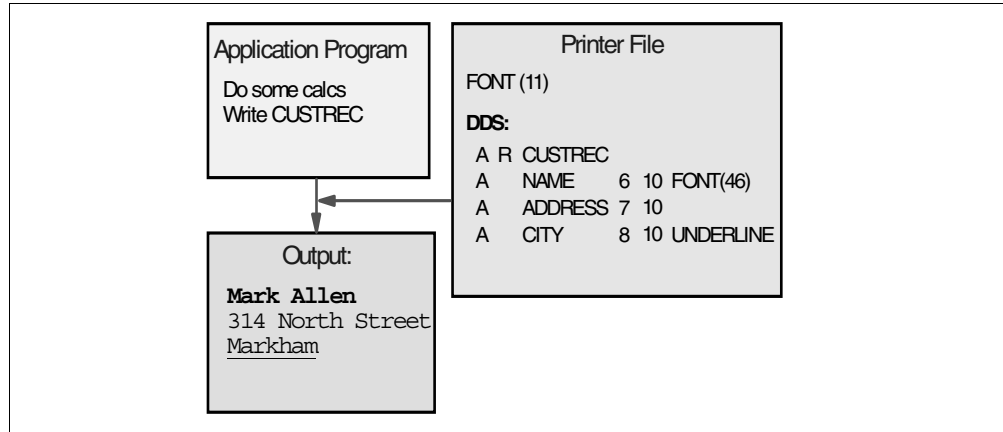


Figure 1. Using a printer file

The layout of the data is not specified explicitly in the program, it is picked up from the DDS when the program is compiled. It is possible to make minor changes to the DDS, such as changing a field's font or position, without recompiling the program. More drastic changes, such as changing the size or number of fields will likely require you to recompile the program, and possibly make corresponding program changes.

**1.1.1.4 P-values**

Some DDS keywords support the use of variable information through the use of program-to-system fields. These can be used to change the name of an external resource being used, or the position of some print elements. Using this technique, the programmer can decide which electronic form (overlay) or image (page segment) to use based on some logic in the program.

Because DDS can be tightly linked to the application program, it is possible to create quite complex pages, often limited only by the skill and imagination of the programmer.

**1.1.1.5 When to use printer files and DDS**

You can use printer files if you need only to make minor changes that affect the entire file. A common example is to add an overlay, or change the bin number. No programming skills are required.

If you have access to the application source and have the need to use high level language logic to control the layout of the data and resources, DDS may provide the flexibility that you need.

DDS may be needed if you wish to insert the break sequences that will allow you to take advantage of the new e-mail capability to send different pages of your data to different recipients.

Table 1. Advantages and disadvantages of DDS

| Advantages                           | Disadvantages                          |
|--------------------------------------|--|
| No charge - part of OS/400           | Not a graphical user interface (GUI)   |
| Integrated with iSeries applications | Programming skills / resource required |

Table 1. Advantages and disadvantages of DDS

| Advantages                                | Disadvantages   |
|---|---|
| Powerful document formatting capabilities | May need to consider application requirements while designing output with DDS |

### 1.1.2 Infoprint Designer for iSeries

Infoprint Designer for iSeries is a new program product (5733-ID1), available with OS/400 V4R5 or higher.

Infoprint Designer provides a new way for you to format your data and create AFP overlays and page segments. It has a true WYSIWYG (what you see is what you get) interface, allowing the user to see exactly how the application will look while it is being worked on. The package includes overlay creation and data layout functions which are closely integrated, plus a separate Image Editor program for producing and editing page segments.

**1.1.2.1** In this section we will provide an overview of the data layout component. For an overview of the Infoprint Designer product see page 13 in the description of the Infoprint Designer product can be found in **Designing the layout**

The first step in working with a print application using Infoprint Designer is to import a sample spooled file. This could be an iSeries spooled file, or a file in "line data" format that has been stored on the PC. You then drag the required field or fields from the data window to the layout window. You can easily change the format of these fields, such as fonts, interline spacing or rotation, at the click of a button.

If you have already created an overlay it will be displayed on the layout panel in gray. If you need to change part of the overlay you can easily switch modes and the data in your layout will now be in gray and you can work with the overlay.

For a basic design you can start with just mapping the data to the new layout. This would replicate your existing stationery, with the overlay replacing the pre-printed elements. A more advanced user can add additional copies, constant back, multi-up or conditional processing. For example, you can choose different page layouts based on the contents of pre-defined fields.

Under the covers of Infoprint Designer, AFP objects called form definitions and page definitions are being created. However, an end-user need not be concerned with that until some of the more advanced functions are being used.

At the current release, Infoprint Designer will only produce traditional record formats, based on line data. That is, the data must be in a predictable format, so you can define fields as "total", "customer number" and so on. Future enhancements to the product *may* incorporate advances in data formatting such as Record Format Architecture. IBM understands that supporting the Record Formatting Architecture is a requirement, but has not yet committed a date for delivery of this function.

#### 1.1.2.2 Using the objects created by Infoprint Designer.

After the design is complete, the resources are uploaded to the iSeries server. The user is responsible for integrating them into the applications. You do not need to make any changes to the programs that generate the data, but the printer files being used need to be changed or overridden to generate line data and to

reference the form definition and page definition created. This is described in These resources can be used on any AS/400 or iSeries system from V3R2 and V3R7 onwards.

Note that Infoprint Designer is not required at run-time. Therefore you could run Infoprint Designer on your development system and use it to produce AFP resources for use on this and any production systems.

If you are printing to an IPDS printer that is configured with AFP(\*YES), you can have the application just generate LINE data. The page and form definitions, fonts, overlays and so on, will be processed by Print Services Facility/400 (PSF/400) at print time. If you wish to use the AFP Viewer, or to send the output to an ASCII printer using Host Print Transform, use the CVTLINDTA (Convert Line Data) parameter in the printer file. This will cause the output to be generated as fully-composed AFP data stream (AFPDS). The CVTLINDTA command is described in

**1.1.2.3 When to use Infoprint Designer**

Infoprint Designer is a very easy to use data layout tool, especially for the basic layout functions. The WYSIWYG view provides instant feedback and can improve the designers productivity versus the iterative approaches needed by the other “programming” tools, and even the “green screen” GUI used by Advanced Print Utility (APU). See Figure 3 on page 9 for a representation of the product running under Windows:

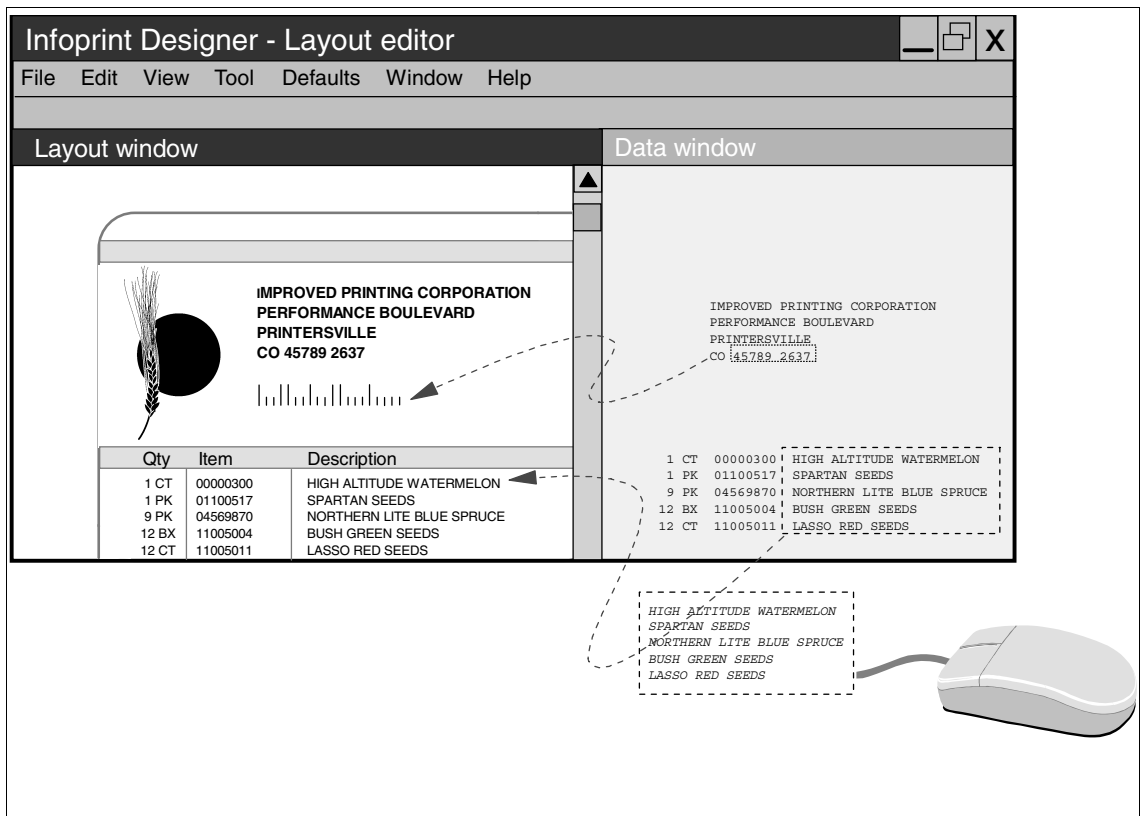


Figure 2. Drag and drop data mapping with Infoprint Designer for iSeries

Infoprint Designer can be used whenever the source data is generated in a predictable manner. This is often the case when the application is being migrated from pre-printed forms. However be aware that you may need access to change or override the printer files in order to produce line data, rather than the SCS data that the iSeries normally generates. This is discussed in greater detail in

Table 2. Advantages and disadvantages of Infoprint Designer

| Advantages  | Disadvantages   |
|---|---|
| WYSIWYG overlay, image and document design                                  | Data must be in a fixed or predictable position in order to re-format                                     |
| Powerful conditional processing   | Some knowledge of the principles of page and form definitions may be required                             |
| Efficient - works with native AFP resources such as fonts and page segments | Printer file must be changed or overridden to produce line data in order to use page and form definitions |
| Entirely automatic when in production use                                   |   |
| Not required at run-time  |   |

### 1.1.3 AFP Printsuite - Page Printer Formatting Aid/400

Page Printer Formatting Aid/400 (PPFA) is a separately charged feature of AFP PrintSuite, 5798-AF3. PPFA is a page formatting language that allows you to create objects called page definitions and form definitions. These two object types can then be used externally to the application program to format the data.

In the past, PPFA was more common as the formatting tool for OS/390 or AIX customers, or ones that had iSeries systems in a mixed environment. With the enhancements being made for V5R1, it is expected that more customers may choose this route for formatting their output. These enhancements include:

- Ability to resolve LINE data to AFPDS with the Convert Line Data (CVTLINDTA) printer file parameter or CRTAFPDTA command
- Support on iSeries for Record Format Line data

These enhancements are described in more detail in the OS/400, Infoprint Server and PPFA chapters of this book.

The Infoprint Designer product provides a WYSIWYG alternative to PPFA coding. It is described in Section 1.1.2, "Infoprint Designer" on page 6.

#### 1.1.3.1 PPFA resources

As mentioned above, PPFA creates two type of AFP resource, a form definition and a page definition.

The *form definition* controls how the logical page is placed on the physical medium - the sheet of paper. Source statements within the form definition specify what drawer the paper is selected from, what overlay(s) is to be used, whether duplexing is used, whether multiple logical pages should be placed on a single physical page, what copies are to be automatically created, and what fields should be suppressed from which copy.

The *page definition* defines how data is placed on a logical page layout. Input print lines are read in, optionally parsed into individual fields, and placed on the

page. Similar in structure to DDS, the page definition language of PPFA enables you to place print lines or print fields anywhere on the page while controlling font, orientation, and color characteristics. Data can also be printed as a bar code.

Page definitions can contain conditional logic. This means that the formatting rules can change based on the contents of an input field. A trigger field (for example, company number) may be used to select a whole series of formatting commands.

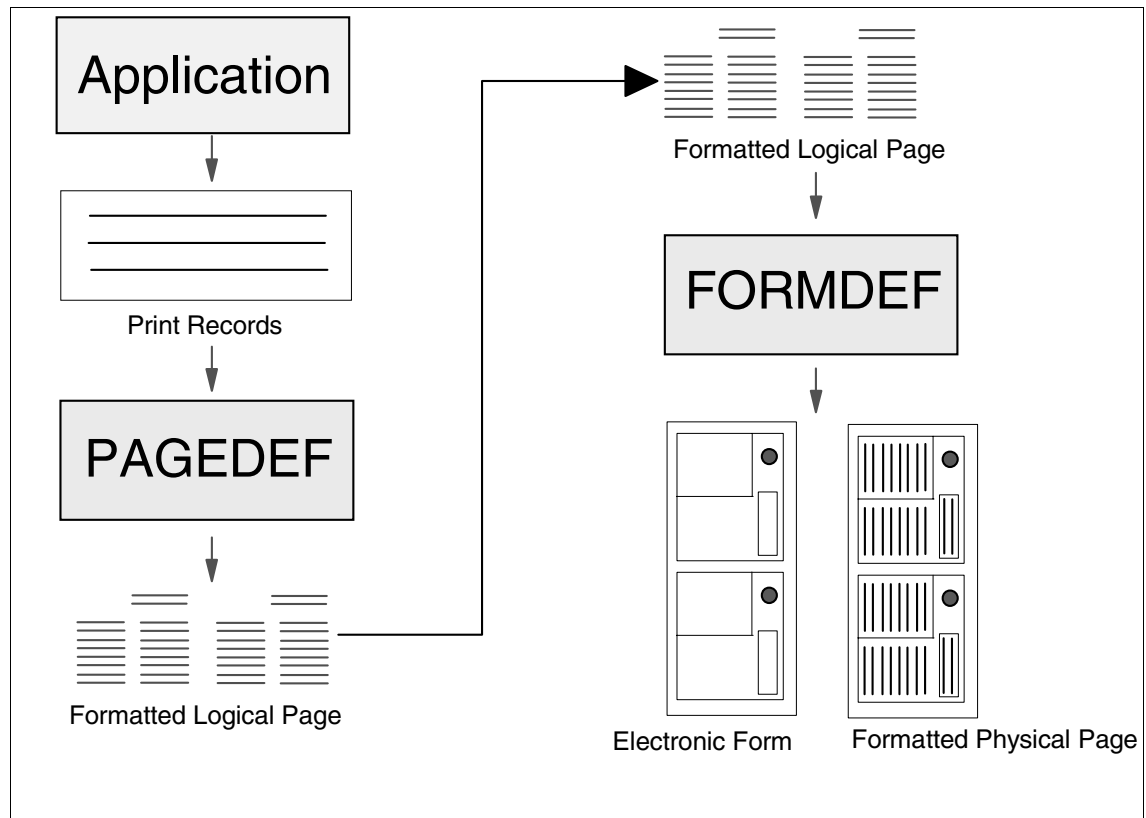


Figure 3. Concept of page and form definitions

### 1.1.3.2 Using PPFA

To create form definition and page definition using PPFA you first enter the source statements into a source physical file on the iSeries. You then use the PPFA command Convert PPFA Source (CVTPPFASRC) to generate physical files that contain the AFP instructions. The form and page definition objects are then built (compiled) using the OS/400 commands Create Form Definition (CRTFORMDF) and Create Page Definition (CRTPAGDFN).

The printer file refers to these two object types with the FORMDF and PAGDFN parameters. A form definition can be used with spooled files that are SCS, AFPDS, AFPDSLIN, or LINE. Page definitions can only be used with spooled files that are generated as LINE data.

The application that generates the data does not need to be changed to use these PPFA objects, with the exception of a one-time change to the printer file to generate \*LINE data and reference the new resources. The formatting rules that



are defined in the form and page definition are processed by PSF/400 at print time. Note that this means that the formatted job (with overlays, fonts & other resources) is created only at print time. Therefore, if you require a fully-composed AFP file to be created (for example, for viewing, archiving or for use with Host Print Transform), you must use the CVTLINDTA command as mentioned previously (Section 1.1.2.2, "Using the objects created by Infoprint Designer." on page 7).

### 1.1.3.3 When to use PPFA

If you do not have access to the application programs you may want to consider using PPFA to create form definitions and page definitions to format your data. (Please be aware that you may need access to change or override the printer files in order to produce line data, rather than the SCS data that the iSeries normally generates. The considerations are the same as for the layout tool in Infoprint Designer. This is discussed in greater detail in )

You may wish to use PPFA if you are also doing AFP processing on zSeries, pSeries, and xSeries servers. As of Version 5 Release 1 of OS/400, PPFA/400 on the iSeries will support all the same functions as these other platforms.

If you are developing new applications, the Record Format Line data support, which is available in PPFA provides a new way to deal with different types and amounts of data on the same page. Each record includes a format identifier which determines how the data is to be mapped. It supports different types of lines such as page headers, body, page trailers, and groups. Graphical elements such as lines, boxes, circles and ellipses can be placed directly on the page. These new functions are ideal for printing complex statements that have multiple types of data such as might be found on a financial statement or telephone bill. .

Table 3. Advantages and disadvantages of PPFA/400

| Advantages  | Disadvantages   |
|---|---|
| Powerful page formatting tool - finishing and record-level formatting supported | No GUI design   |
| No changes to the original application  | Requires knowledge of the principles of page and form definitions   |
| Resources may be used on other IBM platforms                                    | Requires a programmer's approach to source coding, if not an actual programmer                            |
| No run-time compiler needed - resources "plug into" OS/400 printer file         | Printer file must be changed or overridden to produce line data in order to use page and form definitions |
| Entirely automatic when in production use                                       |   |

### 1.1.4 AFP Printsuite - Advanced Print Utility (APU)

Advanced Print Utility (APU) is a separately charged package of AFP PrintSuite, 5798-AF3. It enables you to use SCS files as input and then to transform that input to "full-page" electronic output, with pages that include electronic forms, image, bar codes, lines, boxes, and text in a variety of fonts.

APU is designed to make it very easy to migrate applications that print on multipart impact printers to a laser print environment. You do not need to modify any existing application programs or spooled files.

**1.1.4.1 How APU works**

During the design stage you display an existing spooled file on any 5250 style terminal, and set up the formatting rules in what is known as a print definition. You can change the fonts, move, remap, or suppress fields, or you could have them print as bar codes. Constant text, overlays, page segments and boxes can be added to the page. You can produce multiple copies of the spooled file using different formatting rules. For example, you could have a "Terms and Conditions" page printed on the back of the customer copy of an invoice but not on the file copy. You may choose to suppress the amount fields on the packing copy, and print bar codes of the part number instead.

You can also choose to apply different layouts to different pages in your document based on the content of the page. For example, you may want to use a special layout and/or overlay for documents that have "PAGE 1" printing at the top, and a different layout for all other pages.

When you are ready to go into production, you set up the APU output queue monitor to watch for spooled files that match certain criteria, such as file name, user data, or form type. When there is a match, APU takes the input SCS spooled file, applies the rules that you set in the print definition, and builds a new spooled file using the AFP data stream.

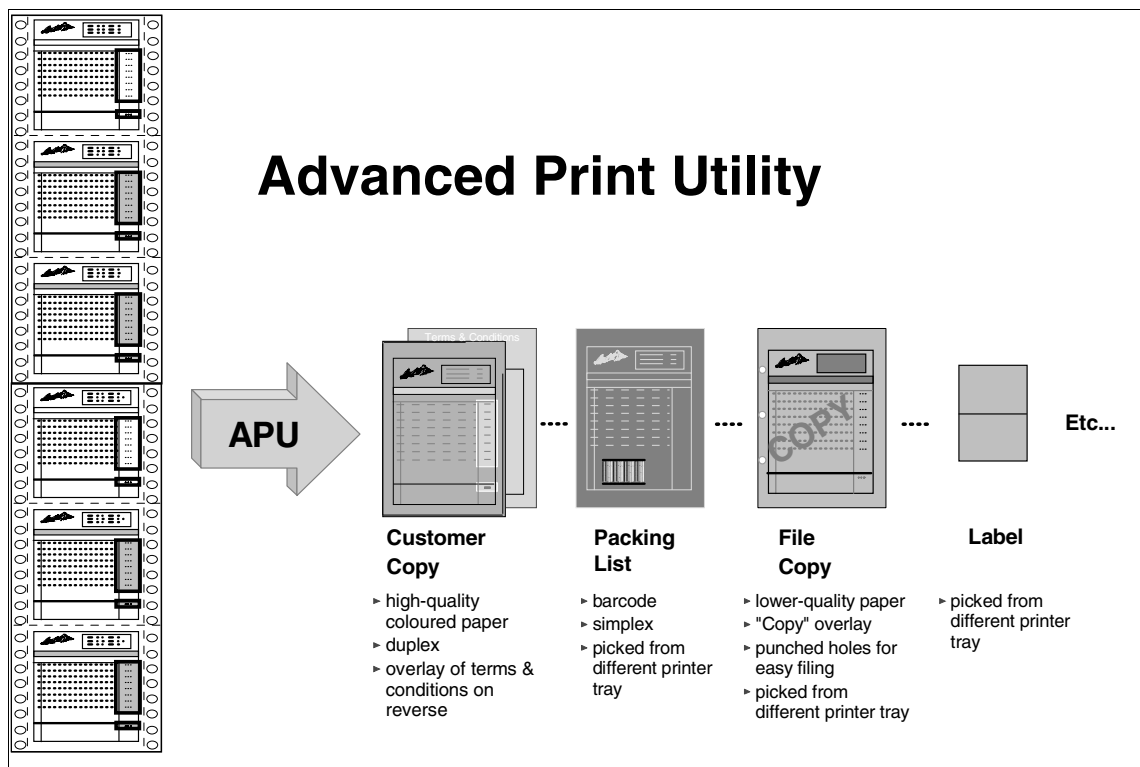


Figure 4. Results possible when using Advanced Print Utility

**1.1.4.2 When to use APU**

APU is a good choice when your application programs generate SCS and you have absolutely no access to any of the source, not even to the point where you would be able to change the printer file type to DEVTYPE(\*LINE), as needed by Infoprint Designer and/or PPFA.

APU provides a “green screen” approach that is familiar to many iSeries customers and may be considered to be a mid point between true WYSIWYG programs such as Infoprint Designer and the programming needed for DDS or PPFA.

APU has more flexibility than PPFA and Infoprint Designer when it comes to how multiple copies of the same page can be formatted. With PPFA and Infoprint Designer copies of the same page can have a different overlay or paper source, but the data mapping will essentially be the same. The only data mapping differences would be the ability to turn on or off suppression for selected fields for different copies. With APU, each copy of a given page can have completely different field mapping. If this is a requirement, APU would be the product of choice.

The APU monitor also provides additional functions not available with any of the other formatting applications. It is possible to use the monitor to route files to different destinations, even if they are not to be reformatted. The monitor also provides the ability to process one spooled file multiple times, either to the same printer or different printers. For example, you may have a program that generates one copy of a spooled file, and you use APU to send one copy to the office printer for mailing to the customer, and the second copy, with suppression of the prices, to the warehouse printer.

Table 4. Advantages and disadvantages of Advanced Print Utility

| Advantages   | Disadvantages   |
|--|---|
| Easy to use  | Design interface is 5250 “green-screen”                               |
| No changes to the original application                                       | Data must be in a fixed or predictable position in order to re-format |
| Entirely automatic when in production use                                    | No support for graphics or finishing                                  |
| Add overlays, images, barcodes and different fonts to your output            |   |
| Dynamically select different page layouts and/or overlays based on your data |   |
| Send completed documents to different printers and/or at different locations |   |
| Replicate multipart stationery   |   |

### 1.1.5 AFP PrintSuite - AFP Toolbox

AFP Toolbox is a separately charged package of the AFP PrintSuite, 5798-AF3. AFP Toolbox provides a high-level, application-programming interface that enables programs written in the ILE C, ILE COBOL, and ILE RPG programming languages to produce an AFP data stream directly. The MO:DCA-P, or AFPDS documents created with AFP Toolbox are platform-independent and can be printed or viewed by all the major IBM platforms, that is, iSeries, zSeries, pSeries, xSeries, and the predecessor AS/400, S/390, RISC/6000, and Intel platforms. AFP Toolbox output can be written to a file or returned to the application for further processing.

The iSeries version of AFP Toolbox consists of RPG, COBOL, and C libraries containing the procedure function calls to be included in the application program.

The document is built up using these function calls in a hierarchical fashion; a document contains pages, and pages are made up of various objects.

The text processing components are much more advanced than the other products available from IBM for the iSeries. AFP Toolbox supports use of justified typographic fonts, variable sized, dynamically-built boxes, and indexing tags for use in archive/retrieval applications, or for viewing. One of the key features is the way AFP Toolbox can handle text in the form of paragraphs. Paragraphs of text can be defined and dynamically formatted. The text will be flowed and aligned based on the area of the page allotted for it. Figure 6 on page 14 shows some of the advanced formatting options including left and right-justification of typographic fonts, columnar alignment of typographic fonts, a dynamically-sized box and variable page segments, and a "page x of y" page count.

A skilled application programmer who understands the document structure would be needed to create applications with the AFP Toolbox

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|---|---|
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| <p><i>Page 3 of 3</i></p>   |   |

Figure 5. Some of the formatting options with AFP Toolbox

**1.1.5.1 When to use AFP Toolbox**

AFP Toolbox is the solution when the customer has a requirement for very complex, highly formatted output. Examples might be complex statements such as one might find in the financial industry where the document content is highly variable. The ability of AFP Toolbox to deal with paragraphs of data makes it ideal for complex letter creation.

AFP Toolbox has also been used by customers who wish to convert applications that had printer-specific sequences imbedded in the output. The AFP Toolbox

allowed them to move to a printer independent and platform independent output format, while still maintaining much of the original program logic.

Table 5. Advantages and disadvantages of AFP Toolbox

| Advantages  | Disadvantages                            |
|---|--|
| Very powerful document formatting tool              | High level of programming skill required |
| Only solution for justified typographic fonts       | Access to application source required    |
| May be incorporated into existing application logic |  |
| Low-cost software licence                           |  |

### 1.1.6 AFP Utilities for iSeries - Print Format Utility

Print Format Utility is a component of AFP Utilities for iSeries, 5722-AF1 for V5R1. It is included with the AFP Utilities for iSeries (AFPU) product. It enables you to build AFP reports or documents directly from iSeries database files without the need for any application programs, or indeed any programming.

Print Format Utility (PFU) is like an AFP version of Query/400, producing high-quality output that features overlays, image, bar coding, and more. Just as you would use Query/400 to select database records and produce a report, you can use Print Format Utility to select database records and create advanced, full-page AFP output. With comprehensive bar code support built in, PFU is especially adept at quick bar-coded applications.

The design editor of PFU is very similar to the visual Overlay Utility editor. (This is described in Section 1.2.2, "AFP Utilities for iSeries" on page 18). You can include the same kinds of electronic form elements in your report design. Essentially, you design the layout for one label and then tell PFU how many times to print it across and down the page. Some elements, such as page segments may be selected based on information in the database.

Print Format Utility also allows you to select fields for page breaks, and you can print summary information such as totals or counts on each page, or at the end of each group.

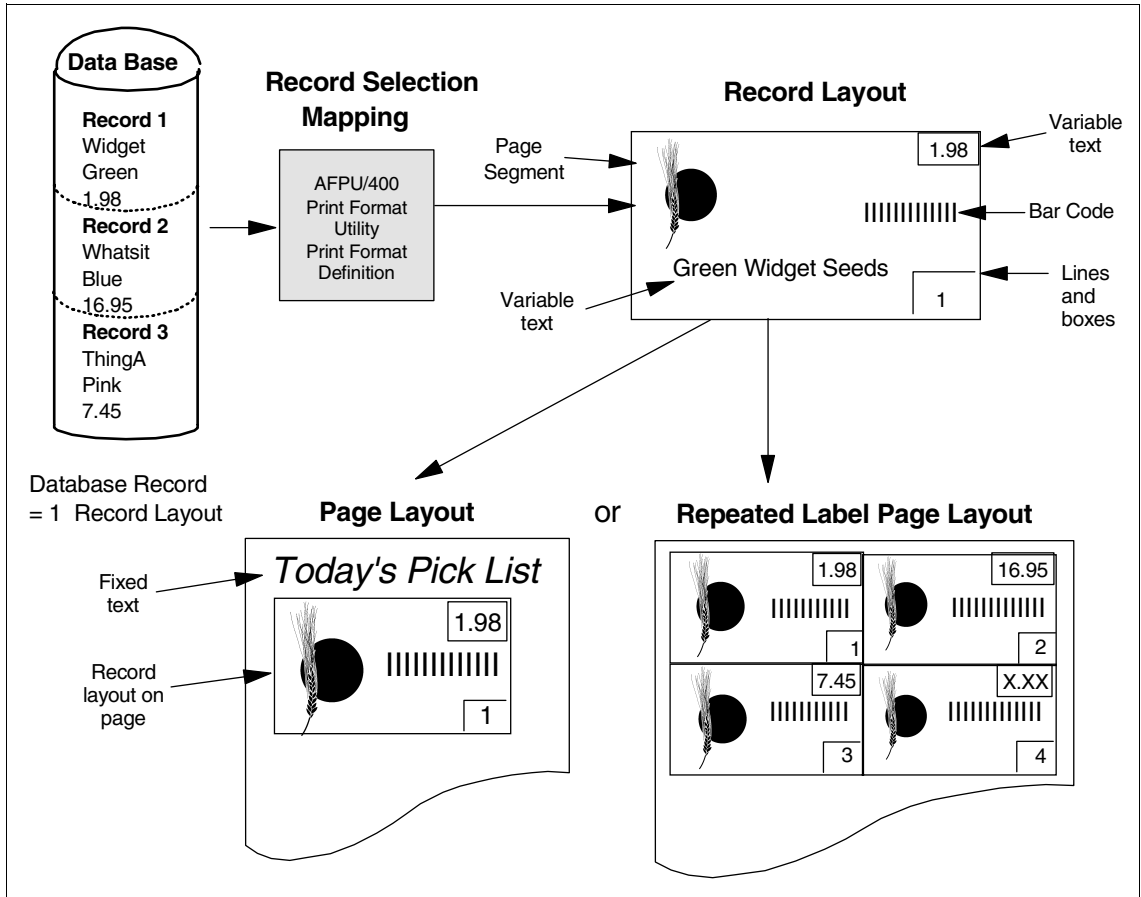


Figure 6. Use of Print Format Utility to extract and format records from a database file

**1.1.6.1 When to use Print Format Utility**

PFU is an easy tool to use for simple reports. It provides more formatting than Query and allows you to add AFP resources. Customers needing to print labels will find a quick way to produce them without needing any programming.

Table 6. Advantages and disadvantages of Print Format Utility

| Advantages   | Disadvantages  |
|--|--|
| Easy to use - simple Query-like use                        | Only acts on a single database file (programming resource would be needed to create a single logical file) |
| No programming required                                    | AFP Utilities/400 required at run-time   |
| PFU print definitions may be incorporated into CL programs |  |

**1.2 Building or obtaining external resources**

Most output consists of variable data that changes for every page such as individual customer invoices or statements. This data is merged with fixed elements that are constant. These fixed elements or resources do not change on

a day to day basis. This section describes the IBM AFP software offerings for the creation of these fixed resources, namely:

- overlays or electronic forms
- page segments, such as logos or signatures
- fonts

Strictly speaking, form and page definitions are also considered to be external resources. However it is more logical to consider them in the section on formatting your variable data (Section 1.1, “Formatting your application data” on page 3).

## 1.2.1 Infoprint Designer for iSeries

Infoprint Designer (5733-ID1 for V4R5 or V5R1) has three components, of which two are considered to be primarily resource-creation tools. The third component, Infoprint Designer Layout Editor, creates formatting resources, i.e. form and page definitions was described in Section 1.1.2, “Infoprint Designer for iSeries” on page 7.

### 1.2.1.1 Infoprint Designer Overlay Editor

This part of the Infoprint Designer product creates overlays, in full WYSIWYG (“what you see is what you get”) mode, on a Windows PC. It actually uses native AFP objects such as fonts and page segments, as well as common PC elements such as TIFF, BMP and JPEG files. The AFP resources are uploaded and created on the iSeries server with a “one-click” operation. Advanced graphics features such as rounded boxes, dashed or dotted lines, shading, diagonal objects and circles may be created quickly and easily.

### 1.2.1.2 Infoprint Image Editor

The Infoprint Image Editor can be used both to “clean-up” scanned-in image files at the individual pel (picture element) level, and to create AFP page segments from such files.

### 1.2.1.3 When to use Infoprint Designer

Infoprint Designer is a one-product solution to the problem of matching electronic forms (overlays) with variable data. The same interface is used both for designing the overlay and for integrating the variable data with that overlay.

Use Infoprint Designer when you want development staff (especially non-programmers) to be able to quickly generate print applications using a Windows GUI interface.

*Table 7. Advantages and disadvantages of Infoprint Designer*

| <b>Advantages</b>                                  | <b>Disadvantages</b>  |
|--|---|
| Windows GUI overlay and image design, full WYSIWYG | Only one active user per iSeries  |
| Easy download of sample iSeries spooled file data  | Printer file must be changed or overridden to produce line data in order to use page and form definitions |
| One-step upload and creation of AFP resources      |   |

Table 7. Advantages and disadvantages of Infoprint Designer

| Advantages   | Disadvantages |
|--|---------------|
| Overlay and image elements are native AFP objects - will match iSeries AFP objects   |               |
| Existing overlays and/or pre-printed forms may be used as templates for new overlays |               |

### 1.2.2 AFP Utilities for iSeries

AFP Utilities for iSeries (5722-AF1) has already been mentioned in Section 1.1.6, “AFP Utilities for iSeries - Print Format Utility” on page 15 in relation to the Print Format Utility application. Now we will consider AFPU as a resource-generation tool.

#### 1.2.2.1 Overlay Creation

AFPU includes an Overlay Utility. This permits the near-WYSIWYG creation of electronic forms, or overlays, directly on the iSeries server.

At first glance the on-screen display looks nothing like the final printed form. However since V4R2 you can use an extremely useful feature. Assuming you have Client Access/400 or Client Access Express, you can type \*VIEW in the Control field of the Design Overlay screen. This invokes the AFP Viewer function within Client Access/400 and the overlay is displayed with full fidelity, except for graphics and bar codes.

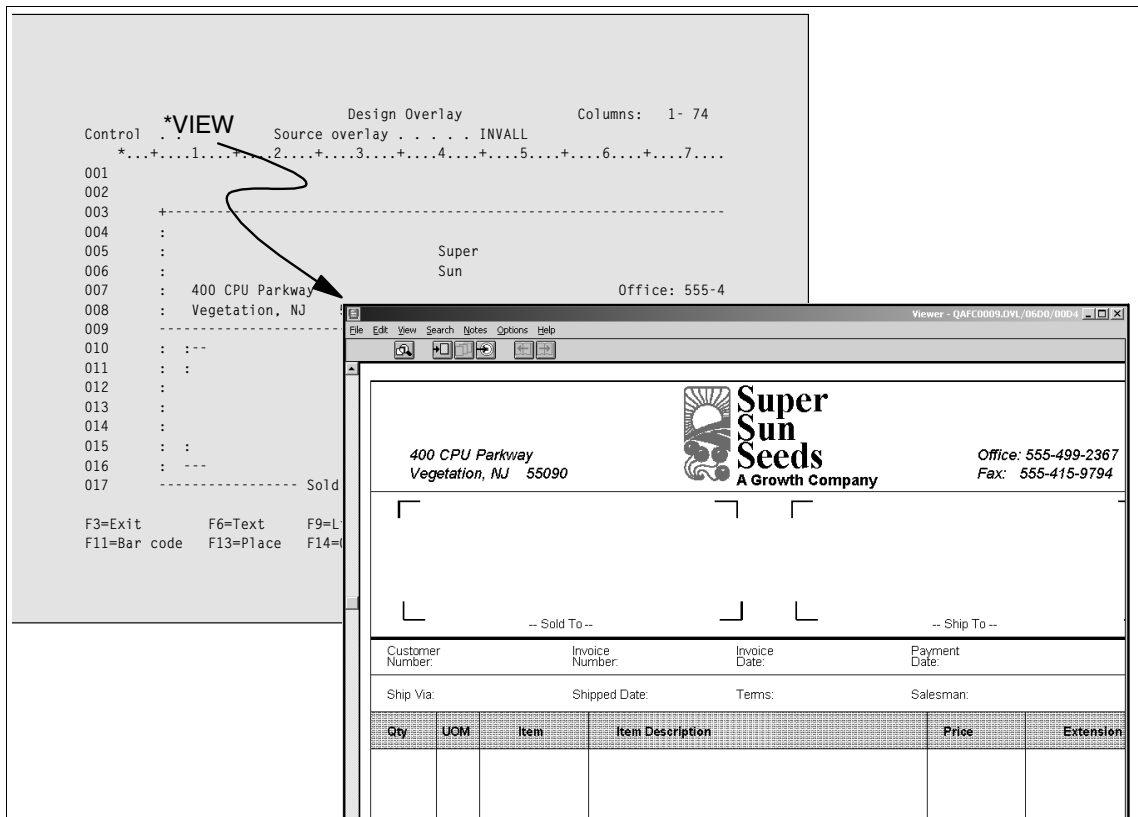


Figure 7. Using the WYSIWYG AFP Viewer with AFP Utilities for iSeries



You can use the on-screen iSeries GUI to design the overlay, then refine the position of overlay elements down to 1/100" (or centimeter). This is particularly useful when later mapping data using a product such as Advanced Print Utility (APU) - you can correlate the position of overlay elements with those of variable data.

Perhaps the major advantage of the Overlay Utility is its ease of use. With simple step-by-step instructions for drawing boxes, lines and text, you can be reasonably proficient within an hour.

### 1.2.2.2 Page Segment Creation

AFP/400 also includes a utility to create images such as company logos and signatures. These are known as page segments in the AFP architecture. Creation of page segments is found within the Resource Management Utility within AFP/400.

The principle is that you obtain your image (e.g. from a scanned source), create an IBM IOCA (Image Object Content Architecture) version of the source file, AFP/400 "wraps" it and produces an AFP page segment. The source file may be in an iSeries physical file, or more likely, exist as a PC file in the iSeries integrated file system, placed there using iSeries NetServer or similar method.

How do you create an IOCA image in the first place? Windows graphics packages such as HiJaak Pro, RasterMaster and others can convert standard image file formats such as BMP, GIF or JPEG into IOCA (with a file suffix of \*.ICA).

Once the IOCA file exists, AFP/400 can resize and/or rotate the page segment it produces. There are also various mapping options, for example a scale to fit option which is useful for keeping a logo or signature in proportion while fitting it into a particular size area.

### 1.2.2.3 When to use AFP Utilities for iSeries

If you are creating multiple similar overlays which may be updated fairly frequently (say twice a year), AFP/400 is very convenient. The source is stored safely on the iSeries server and can be accessed from any 5250 session. Extremely precise overlays may be created, which are very efficient in terms of file size and therefore printing performance.

*Table 8. Advantages and disadvantages of AFP Utilities for iSeries as a resource creation tool*

| Advantages  | Disadvantages   |
|---|---|
| Easy to use: quick learning curve                   | Only a near-WYSIWYG view in design mode on iSeries "green-screen"                               |
| Call to AFP Viewer provides WYSIWYG view of overlay | Expensive if AFP/400 used just for overlays - unless the licence is on a smaller iSeries system |
| Produces efficient overlays                         |   |

## 1.2.3 AFP Font Collection for Workstations and OS/400

The AFP Font Collection for Workstations and OS/400, 5648-B45, Version 2.1.1, is an inexpensive collection of AFP and compatible Type 1 and CID keyed outline fonts, compatible across several platforms and covering approximately forty-six languages. As of OS/400 V4R5, the SBCS (single-byte character set) fonts are included free of charge with any new PSF/400 order.

There is a free tool available on the IBM Printing Systems web site to help you use your AFP fonts. See:

<http://www.printers.ibm.com/R5PSC.NSF/Web/rdfont01>

The RDFONT01 package includes two tools:

- LOADFNTC - select the languages and the object types you need and this program will build them into libraries on your iSeries
- PRTFNTC - selectively print fonts from the AFP Font Collection and/or printer resident fonts

#### **1.2.3.1 AFP Type Transformer and Utilities for Windows**

This is an optional priced feature of the AFP Font Collection. It allows you to take PC outline fonts (such as Windows TrueType and Adobe Type 1) and convert them to AFP fonts, either in raster or outline format, or both. A Windows NT 4.0 platform is required to run the Type Transformer.

The Type Transformer feature is also required if you wish to create raster versions of the DBCS (double-byte character set) fonts, as the latter are supplied in outline format only.

#### **1.2.3.2 When to use the AFP Font Collection**

This product is especially useful for customers who:

- need to have consistent font appearance on different printers
- have different printers with different resolutions
- have operations in more than one country
- wish to maintain the fidelity of printed output to media such as fax and viewing
- need support for the Euro character
- need to convert PC fonts to AFP format (using Type Transformer)

### **1.2.4 AFP Fonts/400**

This section refers to the products 5769-FN1 (DBCS) and 5769-FNT (SBCS). The available fonts are listed in *AS/400 Printing V* redbook, SG21-2160, in the Fonts chapter.

#### **1.2.4.1 When to use AFP Fonts/400**

You should note that these font products supply only 240-pel raster fonts, and for selected font families such as Sonoran Serif. Therefore order them only if you have a very specific need for the particular font families.

### **1.2.5 AFP Driver for Windows**

The AFP Print Driver for Windows is supplied with products such as Client Access, Content Manager OnDemand and AFP Workbench. It is also available on an "as-is" basis from the World-Wide Web, at:

<http://www.printers.ibm.com/R5PSC.NSF/Web/afpdr>

The driver can be used to create:

- AFP versions of your PC documents for printing on IPDS printers
- AFP overlays
- AFP page segments

The resources may be created as full-page image, giving true fidelity at the expense of a large file size, or as text objects. The latter method maps AFP fonts to PC fonts and requires that the AFP Font Collection be installed on the iSeries server. Using this method the file size is much smaller however and the print quality may be better. On some IPDS printers there may be a performance delay while downloading complex AFP resources produced using this tool. This is usually negligible or not the case with AFCCU (Advanced Function Common Control Unit) printers such as the Infoprint 4000 or Infoprint 62.

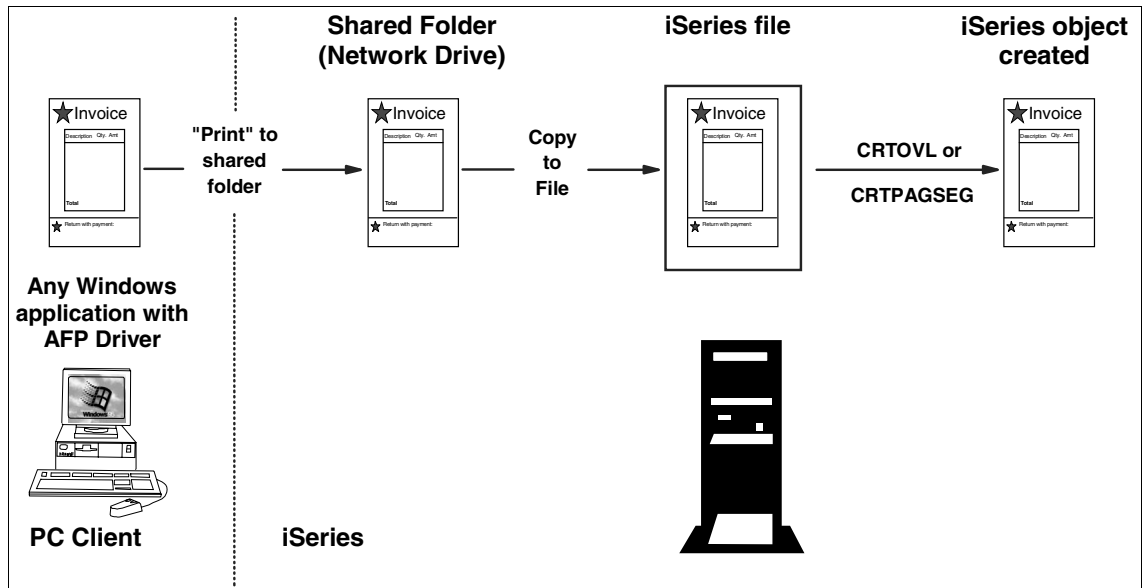


Figure 8. Creating AFP resources using the IBM AFP Driver for Windows

### 1.2.5.1 When to use the AFP Driver

For page segments, the AFP Driver is useful for taking good-quality copies of your company logo or a signature and creating an AFP page segment. There is no ability to "clean-up" the image, however.

For overlays, the AFP Driver allows you to use your favorite graphics design tool to create an overlay, then upload the results to the iSeries server. You need to perform testing to ensure that the overlays printing performance is satisfactory. You must also carefully manage the storage and back-up of potentially-valuable source overlay material as only the final overlay objects are normally stored on the iSeries.

Where the AFP Driver process is most useful is in use of PC functions such as spell-checking and automatic text alignment. A Terms and Conditions overlay would be a typical example of using the AFP Driver.

Remember that you can use the AFP Driver to create small, specific AFP resources, for example a page segment of a signature, or an overlay that gives a "watermark" effect, in conjunction with a more efficient overlay tool such as Infoprint Designer or AFP Utilities/400. Use the appropriate tool for the appropriate task

Figure 9. Advantages and disadvantages of the AFP Driver for Windows

| Advantages   | Disadvantages  |
|--|--|
| May be used with any Windows application   | Requires setup and management of the various steps in the process e.g. file transfer                 |
| Permits use of advanced design elements such as curved lines and boxes               | Back-up and storage of the source Windows documents is a separate process to be managed              |
| Allows use of PC word-processing functions such as spell-checking and text alignment | May be difficult to correlate overlay element positions with that of the corresponding variable data |
| No-charge product  | Produces relatively inefficient AFP overlays; complex overlays may print slowly on smaller printers  |

### 1.2.5.2 Uploading resources created by the AFP Driver

Figure 8, "Creating AFP resources using the IBM AFP Driver for Windows" on page 21 shows the use of a mapped network drive with iSeries NetServer, as a means of transferring the AFP resources.

Another method is to use File Transfer Protocol (FTP). This is described in the *AS/400 Printing V*, SG24-2160 redbook, in the chapter on the AFP Driver.

A new method is to use the AFP Manager feature within Client Access Operations Navigator. This is described in .

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## 1.3 Driving the printer

In today's world, a customer may have a wide variety of printer types, each supporting a different data stream or language. They may have small laser printers for desktop publishing, workgroup printers for convenience printing, and high speed production printers for company output. At the same time, different applications or software packages generate the output in different ways. To add to the confusion, there may be restrictions on the type of data supported on a given printer depending on the attachment method.

In the past, users were restricted to printing their output only on the specific printer type for which the application was designed. IBM now offers a number of different solutions that will allow almost any type of document to be printed on almost any printer.

In this section we will describe the different offerings and tools available from IBM to transform the data from one data stream to another and/or send it to the printer. Essentially we are describing printer drivers for the iSeries.

### 1.3.1 OS/400 for SCS and IPDS twinaxial printers

The default data stream type generated by iSeries is SCS, or SNA Character Stream. This EBCDIC-based data stream has a minimum number of formatting controls in its basic implementation.

iSeries can also produce the IPDS, or Intelligent Printer Data Stream. This is a *bi-directional* data stream, providing a two way conversation between the printer and the iSeries. In the twinaxial environment, without PSF/400, the IPDS support includes graphics, printer resident fonts, images and bar codes. External resources such as overlays, page segments or host fonts are not supported in this environment.

The spooling subsystem included in OS/400 supports sending SCS and a subset of IPDS to the appropriate twinaxial attached printer. SCS spooled files may also be sent to an IPDS printer. Some IPDS spooled files may be sent to SCS printers, but there will likely be some loss of function in the process. This is described in, *iSeries Printer Device Programming*, SC41-5713, under "Redirecting Output".

#### 1.3.1.1 When to use OS/400 print support

You will use OS/400 print support whenever you connect twinaxial printers to the iSeries, whether they are SCS printer or IPDS printers configured as AFP(\*NO). If the latter are configured AFP(\*YES), you will be using PSF/400 as described in the following section.

### 1.3.2 Print Services Facility/400

Print Services Facility/400 is an optional, chargeable feature of OS/400, 5722-SS1. It is the driving force behind the AFP (Advanced Function Presentation) architecture on the iSeries. The application data stream of AFP is the AFP Data Stream, or AFPDS. This data stream is independent of the target printer or the system it is being generated on. PSF/400 takes the AFPDS and converts it to the printer specific, or printer-dependent, data stream called IPDS (Intelligent Printer Data Stream). AFPDS is sometimes referred to as MODCA, Mixed Object Document Content Architecture. There are some very slight differences architecturally between the two, but they are functionally the same when it comes to printing on the iSeries.

In this environment the full range of printer capability is supported, including external resources. PSF/400 carries on a two way conversation with the device, making sure every page is printed accurately (i.e. with fidelity), and with the correct external resources. If there are problems, PSF/400 will ensure recovery at the page level.

PSF/400 will also accept spooled files that have been generated in SCS, IPDS, LINE, or AFPDSLIN data stream formats; each time it automatically converts the data stream to IPDS.

#### What is PSF/400?

You can think of PSF/400 as being the software equivalent of the IPDS hardware function on the printer. In the bi-directional communication, the PSF/400 software talks to the IPDS hardware in the printer.

#### 1.3.2.1 When you *must* use PSF/400

PSF/400 is a licensing requirement if you are using IPDS printers configured as AFP(\*YES) on your iSeries. Since all LAN-attached IPDS printers only function as AFP(\*YES), it follows that you will need PSF/400 for any LAN-attached IPDS printers.

### 1.3.2.2 When you *should* use PSF/400

Print Services Facility/400 provides the highest degree of integration, function and management for printing on an iSeries. It is recommended for any business-critical application where output fidelity and error handling down to the page level is essential.

### 1.3.2.3 What does PSF/400 do?

Because PSF/400 is so well integrated into OS/400, it may be difficult to appreciate what it is capable of doing. The following functions are all performed by PSF/400, if required:

- Interrogation of printers to determine their characteristics
- Automatic download and management of resources at the printer
- Enables printing of AFP resources:
  - Barcodes
  - Outline and raster fonts
  - Overlays
  - Page segments
- Tracks jobs to completion; issues detailed error messages if problems occur
- Provides support for page range printing
- Allows printer sharing between other hosts including Windows
- Automatically transforms data streams as required
- Enables advanced finishing options where supported by the printer
- Automatic session recovery if a print session is interrupted
- Enable a resource library list for the printer
- Rotation of printed image to cater for edge-sensitive paper (e.g. punched)
- Permanent capture of host fonts at the printer
- Use of custom font-substitution tables

### 1.3.2.4 Licensing PSF/400

PSF/400 is an optional component of the Operating System/400, 5722-SS1. The price is based on the speed of the single fastest printer attached to the iSeries. For V5R1, the price breaks are for 1-45 impression per minute (ipm), 1-100 ipm, or AnySpeed. There is no licensing limit to the number of printers that may be used with PSF/400.

PSF/400 is also included in the ValuPak for AS/400 for V5R1, (5722-VP1). ValuPak consists of the following products:

- Option 36 of OS/400 - PSF/400 1-45 IPM Printer Support
- 5722-PT1 Performance Tools for iSeries - Option 1 Manager feature
- 5722-QU1 Query for iSeries
- 5722-ST1 DB2 Query Manager and SQL Development Kit for iSeries
- 5722-XW1 Client Access Family

Do not confuse ValuPak for AS/400 with the ValuPak for AS/400 Printing. This latter product (5769-PPK) was actually an offering, bundling the APU and PPFA/400 components of AFP PrintSuite for OS/400, AFP Utilities/400 and the AFP Font Collection. ValuPak for AS/400 Printing was withdrawn from marketing at OS/400 V5R1 but is still available for ordering with OS/400 V4R5.

## 1.3.3 Host Print Transform

Host Print Transform is included with OS/400. It provides a simple and easy way of converting spooled files that are generated in SCS or AFPDS to ASCII. SCS

files may be converted to one of several ASCII printer data streams. AFPDS works best with the PPDS or HP-PCL ASCII data streams. AFP resources (such as fonts, overlays, page segments) referenced in AFPDS spooled files are converted into an ASCII printer data stream and passed to the ASCII printer.

A wide variety of preset definitions are available to support many printers, from IBM and many other vendors. Beyond that, you may modify the translation through the use of workstation customization objects, although this is not a trivial task.

There is extensive documentation on Host Print Transform in earlier AS/400 printing Redbooks, for example:

- *IBM AS/400 Printing III*, GG24-4028, Chapter 7. Host Print Transform
- *IBM AS/400 Printing IV*, GG24-4389, Chapter 6, Advanced Host Print Transform Customization
- *IBM AS/400 Printing V*, SG24-2160, Chapter 6. Host Print Transform

Host Print Transform can be invoked when you send spooled file to a printer using a variety of methods, such as an ASCII device description, a remote output queue, and a 5250 printer session. In any of these methods, the default for HPT is TRANSFORM(\*YES). You need to select the appropriate Manufacturer Type and Model for the customization, because the iSeries has no way of communicating directly with the printer to establish its characteristics in the way that PSF/400 does.

#### **1.3.3.1 HPT limitations**

Host Print Transform has the following limitations or restrictions:

- AFP graphics (GOCA objects) are not supported
- Graphics (GDF) files are not supported
- GDDM fonts are not supported
- CHRISZ DDS keyword is not supported
- Edge-to-edge printing is supported only by removing all no-print border values
- The FIDELITY printer file keyword is ignored
- AFP to ASCII transform may need to be run in raster mode for better print fidelity, at the risk of poorer performance
- Impact printers are not supported
- COR (computer output reduction) and multiple-up printing is not supported
- Color bar codes are not supported
- Only 240 and 300-pel images may be transformed

#### **1.3.3.2 Image print transform**

It has been possible to transform image or PostScript data streams since OS/400 V4R2. The resulting data streams are either AFPDS or ASCII. Specifically the supported input data streams are TIFF, GIF, BMP and PostScript Level 1; the supported output data streams are AFPDS, PCL and again PostScript Level 1.

The source of the image or PostScript data stream would typically be a Windows PC, but could also be a Network Station, or a file placed in the iSeries integrated file system (IFS) by some other process.

Examples of where this might be used include the ability to print a customer Postscript application on a high-speed iSeries IPDS printer. This will be transformed by the iSeries into AFPDS, then passed to PSF/400 for conversion

into IPDS and printing as normal. The difference now is that you have page-level status and error recovery for your PostScript job.

Another example might be TIFF images from an archiving system: these could be printed on a variety of iSeries printers, the OS/400 operating system determining the appropriate transform in each case.

Image print transform is described in detail in *AS/400 Printing V* redbook, SG24-2160, Chapter 7. As the section entitled "Troubleshooting" implies, it is an early invocation of image print transforms within the operating system. For example only PostScript Level 1 is supported and there is very limited control over both the positioning of converted images and the speed of conversion. For production use of image or data streams, that is, involving business-critical printing, one must purchase the Infoprint Server for iSeries program product.

### 1.3.4 Infoprint Server for iSeries

Infoprint Server, 5722-IP1, contains many additional data stream transforms, several of which can be used to drive printers. The product is described in detail in but the following sections provide an overview.

#### 1.3.4.1 PDF transform

Your print applications that create AFP spooled files for printing on mission-critical IPDS system printers can also generate industry-standard Adobe Portable Document Format (PDF) files. These can be stored in the iSeries integrated file system (IFS) for later processing, printed directly on a PDF-capable printer (such as the Infoprint 21 or 70), or even automatically sent as an e-mail.

The PDF produced by the transform is actual text (not image, so the resulting PDF file is efficient, in terms of file size, and enables use of standard Adobe Acrobat Reader functions such as text search, replace and copy/paste.

Since the transform to PDF takes place on the IPDS spooled file that PSF/400 (Print Services Facility/400) creates, the initial spooled file can be anything that can normally be printed on an IPDS printer, such as SCS, IPDS, AFPDS, Line data (externally formatted with page definitions and form definition), Mixed data (line data mixed with AFP), or output from OfficeVision ® (OV/400).

Further to this, an AFP spooled file may be segmented into multiple PDF files; this is likely to be of use with e-mails, for example one customer statement per e-mail from a statement run of many hundreds or thousands of customers.

If you want to break the spooled file into multiple PDFs or multiple e-mails, you need to have special AFPDS structured fields inserted into your data stream. This can be done in one of two ways:

1. Use the DDS keywords STRPAGGRP and ENDPAGGRP in your application and generate an AFPDS spooled file directly.
2. Use the indexing feature of the CRTAFPDTA (Create AFP Data) command. This requires Line data as input. For more information

#### 1.3.4.2 Create AFP Data (from line data)

The CRTAFPDTA command included with Infoprint Server allows you to convert a line data spooled file (or one containing mixed line and AFP data) to an AFP file.



This is a fully-resolved AFP file, i.e. all the externally-referenced AFP resources are built into the AFP file. Optionally, the file may be indexed.

The significance of this is that the fully-resolved AFP spooled file may now be:

- viewed using the AFP Viewer within Client Access or the AFP Workbench
- sent to another system for printing, storing or viewing
- processed by Host Print Transform, converted to ASCII and sent to a non-IPDS printer
- stored in a document archival system, such as iSeries Content Manager OnDemand

all without needing to send or manage the separate AFP resources.

The indices may be used to break up the file into multiple PDF files, which may be e-mailed to different destinations.

#### **1.3.4.3 Convert PCL, PostScript or PDF to AFPDS**

Infoprint Server can convert several ASCII data streams to AFPDS, for example PCL, PDF and PostScript (levels 1 to 3). Using OS/400 NetServer (described in Figure 1.4.1.1, "NetServer" on page 29), for example, we can print directly to an iSeries-attached IPDS system printer using an ASCII printer driver. Previously we would have needed the AFP Driver for Windows to generate AFP from the Windows application. More likely, we might have an application generating PostScript, or PDF. We can place this output on the OS/400 spool and have PSF/400 takeover the printing. This is the same scenario as portrayed in Figure 1.3.3.2, "Image print transform" on page 25, but with enhanced versions of the transforms (i.e. PDF and PostScript levels 2 and 3).

#### **1.3.4.4 Convert PC image formats to AFPDS or PostScript**

These transforms run on a Windows PC and transform the images into AFP overlays or page segments, or into PostScript Level 2. The supported images are TIFF, GIF and JPEG.

### **1.3.5 Convert Line Data (CVTLINDTA)**

This is a new parameter available in the Create, Change or Override Printer File Commands (CRTPRTF, CHGPRTF or OVRPRTF) as of Version 5 Release 1. It takes printer files that accept Line data as input, applies a Page Definition to it, and generates a spooled file that is in fully-resolved AFPDS format.

By "fully-resolved" we mean that the instructions for placing the data on the page have been imbedded with the text. The page definition is no longer needed. External AFP resources - such as fonts, overlays, page segments - remain external to the file and must be managed separately if moving the files from one system to another. (If you wish to include the external resources with the spooled file you will need to use the CRTAFPDTA command that part of the Infoprint Server product. See Appendix 1.3.4.2, "Create AFP Data (from line data)" on page 26 for general information, or for details.

This parameter is part of OS/400. It was provided to compensate for some of the limitations of spooled files generated as DEVTYPE(\*LINE) data:

- Cannot use the IBM AFP Viewer with these spooled files.
- Cannot send these spooled files to a printer configured to use Host Print Transform.

The resolved AFPDS output generated when using CVTLINDTA overcomes these limitations.

### 1.3.6 SAP R/3 AFP PrintSuite feature

SAP R/3 has become a popular choice for medium to large companies that require an integrated software product to provide basic business automation. The R/3 client/server application provides businesses with a series of integrated modules that span the major functions of manufacturing, finance, sales, distribution, and human resources.

SAP R/3 normally generates output in two formats:

*ABAP* is a classical computer listing that contains fixed characters, line positions, and fixed fonts, such as Courier. R/3 uses this format whenever you request a report. Some R/3 applications use report printing for outputting forms.

*SAPscript* is the formatting program for word processing. SAPscript processing creates a data stream in Output Text Format (OTF). SAPscript is a tag oriented language that contains records with the print options, fixed text, and variable data placed on the page by a particular printer. SAPscript is used in most of the commercial applications that comprise R/3, such as invoices, bills, reminders, and paychecks. Usually, SAPscript uses typographic fonts such as Times Roman or Helvetica.

The SAP R/3 product includes device drivers for the iSeries to convert the output to SCS, PCL or Postscript. The SAP R/3 feature of AFP PrintSuite (5798-AF3) extends this print support to enable users to access the full range of IPDS printers. This provides them with the intelligent error recovery not found on ASCII printers and hence the ability to perform business-critical printing.

This added support is provided through a command, Convert Print Data, (CVTPRTDTA). CVTPRTDTA provides a direct transform of SAP R/3 print data into AFPDS or LINE data. It may be run from the command line or automatically called from within an R/3 spool process.

The CVTPRTDTA function allows you to add form definitions (with overlays) images, fonts, and bar codes to the output. You may choose to add a page definition to further format the ABAP report output. A number of page definitions are provided with the package, or you may choose to make your own using PPFA/400 or Infoprint Designer.

PSF/400 and the AFP Font Collection are required to print the output produced by the SAP R/3 AFP PrintSuite feature on an IPDS printer.

For more information see:

<http://www.printers.ibm.com/r5psc.nsf/web/fssuite3>

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## 1.4 Managing the printed output

In this section we will examine some of the software available for managing and controlling your printed (and non-printed) output.

### 1.4.1 OS/400 spool support

The spooling support in OS/400 is taken rather for granted. This is especially true when you compare the options available for manipulating a spooled file in Windows. OS/400 users can change, hold, save, redirect and delete their spooled files, subject to security status. In most cases, users may select a range of pages to be printed. They can view the spooled files - in text mode on a "green screen" or with full fidelity using the AFP Viewer within Client Access. Much of the above applies also to PC-sourced files, printed via the iSeries. Again compare this with the support offered by a Windows print server.

#### 1.4.1.1 NetServer

This function was introduced as part of OS/400 V4R2. It provides Windows Network Neighborhood support for print and file serving on the iSeries server. What this means is that you can access iSeries printers and files in the integrated file system from the Windows desktop. A product such as Client Access, described below, is not required, although it does offer enhancements to the file/print operations.

For more information see:

<http://www.as400.ibm.com/netserver/index.htm>

### 1.4.2 PSF/400 spool support

OS/400 twinax devices provide some feedback when a problem occurs, such as a ribbon check, open cover or paper out. IPDS printers, whether attached over twinax or the LAN, SNA or TCP/IP, provide an even higher degree of feedback and error recovery. However they require (in most cases) the complementary software on the iSeries server called PSF/400, Print Services Facility/400, which is an optional charged feature of OS/400.

Do not go looking too hard for a PSF/400 front-end menu - the real secret of PSF/400 is that it is *system-managed* printing. Most of the parameters to change printer and printing behavior are found in the user-created PSF configuration objects. These are optionally referenced (i.e. invoked) in a printer device description.

PSF/400 typically delivers detailed status or error messages to the print writer joblogs (of which there are two for an AFP=\*YES printer) and/or the system operator message queue.

For a reminder of many of the functions PSF/400 performs, refer to Section 1.3.2.3, "What does PSF/400 do?" on page 24. See also the web site entry at:

<http://www.printers.ibm.com/r5psc.nsf/web/4psf400>

### 1.4.3 Client Access/400

Client Access/400 is a Windows product for connecting your PC to one or more iSeries servers. It provides functions such as 5250 terminal emulation, file transfer and database access. The full-function version of the product is known as iSeries Client Access for Windows 95/NT, 5763-XD1, but the strategic new version of the product is iSeries Client Access Express for Windows, 5769-XE1.

Both clients are available with the iSeries Client Access Family for Windows product, 5769-XW1.

#### **1.4.3.1 Operations Navigator**

Operations Navigator is part of Client Access, whether the original full version or the later Express client. Amongst the many possibilities, it offers a GUI view of your printing operations. The most notable feature is the integration of the AFP Viewer product. Simply double-click on a spooled file from a list, and the AFP Viewer is invoked. AFP resources will be fetched automatically from the iSeries and cached locally on the PC for easy viewing.

##### ***Using Operations Navigator to implement online viewing***

This is actually a “free” way to implement online viewing, rather than printing in an enterprise. Let’s consider an example. Daily management reports are printed overnight and delivered to a user’s desk in the morning, perhaps several hundred pages of information, printed on an impact printer, using “music-rule” stationery. Sometimes the printed output will sit on the desk all day, until discarded - unused - at night.

Alternatively the same job *could* be delivered to the user’s output queue, rather than directly to the printer. The user would double-click on the spooled file, using Operations Navigator, obtain the information he/she needs, and perhaps copy/paste it into a spreadsheet or word processing document. The user could also select one or more pages to be printed locally, on the nearby Windows inkjet or laser printer, even if the original spooled file was in AFP format (the Viewer will convert the data into PCL or Postscript for local printing). Finally, the user could, if desired, drag and drop the spooled file onto the traditional impact printer queue and print it “on demand” (as required). The difference here is that you are giving users the choice to be more productive, use less paper and hence keep costs down.

#### **1.4.3.2 AFP Manager**

AFP Manager is an install option with Operations Navigator under Client Access Express that is new with Version 5 Release 1. The component provides three main functions:

- easy import of AFP resources created on the PC to the iSeries
- creation and management of PSF configuration objects
- creation and management of font substitution tables

AFP Manager is described in detail in .

For more information about Client Access see:

<http://www-1.ibm.com/servers/eserver/series/clientaccess>

#### **1.4.4 AFP Viewer**

This very useful utility has been described several times already in this chapter. The following list shows which products ship the AFP Viewer:

- AFP Workbench for Windows
- iSeries Client Access for Windows 95/NT
- iSeries Client Access Express for Windows
- Content Manager for iSeries

The list is actually more extensive when you consider that products such as AFP Utilities/400 and Facsimile Support/400 are able to invoke the AFP Viewer if it is already installed on the client PC.

For most iSeries customers, the AFP Viewer provided with one of the Client Access products will provide all the functionality they need. The AFP Workbench product is intended for cross-platform access to AFP documents, but may also be useful if Client Access is not in use at a customer site. The AFP Viewer shipped with various components of Content Manager is usually invoked while using those particular products.

The AFP Viewer can view:

- AFP documents
- AFP overlays
- AFP page segments

as well as PC file formats such as TIFF and PCX.

Indexed AFP documents are particularly effective when used with the AFP Viewer, in terms of speed and ease of navigation. Documents may be viewed in “n-up” and/or rotated views and printed locally with full fidelity on a local Windows printer. The option of displaying image data in a different color to text is useful when creating efficient AFP resources such as overlays and page segments.

#### **1.4.4.1 AFP Viewer plug-in**

Another means of using the AFP Viewer is to obtain the AFP Viewer web browser “plug-in”. This can be downloaded from:

[http://www.printers.ibm.com/R5PSC.NSF/Web/afp\\_viewer\\_plug-in](http://www.printers.ibm.com/R5PSC.NSF/Web/afp_viewer_plug-in)

This is free of charge but supplied “as is”. It auto-detects AFP documents and adds the appropriate navigation icons to the browser toolbar. Full details are supplied in the IBM AFP Viewer Technical Reference, which is available at the web site above and downloaded along with the plug-in. The plug-in works with Internet Explorer and Netscape Navigator, from Version 3.01 and upwards (but not with Internet Explorer 6.0).

### **1.4.5 Infoprint Manager for AIX, and Infoprint Manager for Windows NT and 2000**

The IBM Infoprint Manager product family can potentially deliver a great deal of additional function to the iSeries server, for example:

- enterprise-wide printer management
- intelligent document routing and scheduling
- multi-host printer usage
- job notification and accounting for all printers in the enterprise

The main concern for an iSeries system administrator will be how to dispatch print output to one of these external print servers. This topic was covered in detail in AS/400 Printing V redbook, SG24-2160-01, Appendix H “AS/400 to AIX printing”. Much of what is described can also be applied to the Windows NT or 2000 environment.

For more information see:

<http://www.printers.ibm.com/R5PSC.NSF/Web/ipmgrfamilyhome>

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## 1.5 Complementary IBM offerings

By complementary offerings we mean applications that complement, use or at the very least are compatible with IBM printing products, in particular those that use AFP printing. Read this section if you are wondering how to further develop your AFP print applications into other forms of output presentation, such as fax, viewing, archiving, e-mail and web-enabling.

### 1.5.1 Facsimile Support/400

Facsimile Support/400 V4R4, 5798-TBY, and Facsimile Support for iSeries V5R1, 5798-FAX, are an iSeries-based inbound and outbound fax product. Links with the AFP print model include:

- use of iSeries IPDS and other printers
- use of AFP overlays and page segments with header sheets
- spooled files may be faxed instead of / as well as printed
- the Client Access AFP Viewer can be used to view inbound faxes

For more information see:

<http://www.ibm.com/servers/eserver/series/fax400>

### 1.5.2 Content Manager OnDemand for iSeries

This product has been known by a variety of names. It began life as R/DARS (Report/Data Archive and Retrieval System). It then became EDMSuite OnDemand. The current full name is Content Manager OnDemand for iSeries, 5722-RD1. For now, we will refer to it simply as "OnDemand".

OnDemand is a high-volume archive and retrieval product. Such products are often known by other names, such as COLD (Computer Output to Laser Disk) but in fact the storage media used by OnDemand could be iSeries disk, CD-ROM, tape or any other accessible iSeries media. Similarly, another industry term is ERM (Enterprise Report Management) but with OnDemand, many objects may be stored, such as spooled files (including AFP spooled files), e-mails, images and OS/400 objects. These may be indexed (if not already AFP-indexed) and stored in the OnDemand repository. They may then later be searched for, retrieved, possibly viewed (using the AFP Viewer) and thus re-enter the output presentation cycle of print, fax, e-mail and so on.

#### 1.5.2.1 Content Manager Common Server

Although OnDemand for iSeries is specifically architected for the iSeries server, some customers may also be interested in using a more common, or generic archive tool. The Common Server product from the AIX and Windows NT platform has been ported to the iSeries platform. The resulting product is iSeries Content Manager Common Server, included with the native OnDemand for iSeries product, 5769-RD1. The Common Server provides the tools for complete and secure capture, storage, retrieval, and viewing of all your documents. It incorporates the Spool File Archive (SFA) and AnyStore capabilities available in the parent OnDemand for iSeries product.

Some of the new, unique features supported by Common Server are:

- A larger number (up to 32) of more flexible, longer index keys
- Improved searching tools
- Optional support for indexing PDF documents, in addition to existing support for line data, SCS, and AFPDS documents
- Unique views by user; viewing can be done across folders
- Full text search, if desired
- Higher compression ratios for archived data

For more information see:

[http://www.ibm.com/software/data/cm/cmgr/about\\_cm400.html](http://www.ibm.com/software/data/cm/cmgr/about_cm400.html)

### 1.5.3 Content Manager for iSeries

This product has also been known by several different product names. Separate products such as ImagePlus, VisualInfo and Workfolder Application Facility/400 were brought together under the EDMSuite banner. Today they are functions within the Content Manager for iSeries 5.1 product, 5722-VI1. This is a *content and object management* product, used for storing all the miscellaneous pieces of information a company holds, from images to word-processed documents to multimedia.

While OnDemand/400 concentrates more on storing company-generated documentation, Content Manager is more likely to be used for document imaging and workflow, implying inbound documents. This is an over-simplification of the roles of the two products but will suffice in this instance. An important point to note is that if the two products are in use in an organization, they can share a common repository of data, accessed by a common front-end (probably one of the products' clients).

For more information see:

<http://www.ibm.com/software/data/ondemand>

### 1.5.4 Backup Recovery and Media Services

Backup Recovery and Media Services (BRMS) for iSeries, 5722-BR1, provides automated data backup and retrieval for the iSeries server. From a printing point of view, of interest is the ability to save spooled files, output queues and any external AFP resources associated with AFP spooled files.

For more information see:

<http://www-1.ibm.com/servers/eserver/series/service/brms.htm>

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## 1.6 Complementary non-IBM offerings

Some customer's print formatting requirements may lie outside the scope of the various products described above. In this section we will describe a few of those types of products.

### 1.6.1 Office Vision/400 replacements

With the proliferation of easy to use word processing packages available on the workstation, fewer customer use the 5250-based Office Vision/400 (OV/400)

product as an editor for straight document creation. However, many customers used the powerful ability of OV/400 to easily merge their iSeries data base records to create customized documents. In some cases mission-critical applications have been built up over the years around these functions. As of Version 5 Release 1, you will not be able to run OV/400 on your iSeries. A redbook has been written to address this topic -- *How to Replace OfficeVision/400 in Your Applications: Looking at Domino for AS/400 and AS/400 Alternatives*, SG24-5406.

Lotus Domino provides a possible replacement for the simple document creation, mail, and calendaring functions of OV/400. Other products from Lotus and other vendors can be used to create new word processing documents. However, most other word processing packages do not provide an integrated way of merging iSeries data base information into text documents.

Three vendors are described in the OV/400 Replacement redbook:

- Inventive Designers' DTM for AS/400
- Aia's Intelligent Text Processing/Client Server (ITP/CS)
- Triangle's Data/Text Merge for Notes/Domino

This list is not exhaustive. Other IBM Business Partners and independent software vendors provide solutions to replace OfficeVision/400 services or API's in an iSeries environment.

For additional information see the summary in Section 3.3 of *How to Replace OfficeVision/400 in Your Applications: Looking at Domino for AS/400 and AS/400 Alternatives*, SG24-5406, or Appendices J, K, and L for details on each product.

A useful web site for considering OV/400 migration is:

<http://www.as400.ibm.com/developer/ov400/index.html>