

Feature Article...

iSeries Printing

The Output of e-Business

By Mira Shnier



Going through basic training at IBM many moons ago, I learned one basic concept of data processing that has stuck with me throughout my career: Input - Process - Output. Things haven't really changed since then. Companies spend countless resources gathering data, and processing it every which way. The piece of the puzzle that tends to get overlooked, or added on at the last minute is the design, creation and management of output. In the past, output almost always meant the printed page. With Version 5, Release 1, V5R1 on the iSeries, IBM is delivering solutions to help you deliver your output to the intended recipient in the way you want.

In this article I will take a few moments to review how AFP can help you deliver mission critical print.



Mira Shnier

I will describe to you new ways to work with your iSeries output. Infoprint Server for iSeries provides new transformations to help you integrate your standard iSeries business output with the world of e-business. Infoprint Designer takes developing AFP applications beyond the creation and use of simple electronic forms to the development of customized, full function electronic documents. Finally, I will summarize other new enhancements for print and presentation that have been included in the V5R1 announcements.

AFP for Mission Critical Print and Presentation

This section may be a review for some, but it is important that you understand the underlying concepts of AFP. AFP stands for Advanced Function Presentation. Note that I said "presentation", not "printing". We refer to presentation as opposed to printing because, as you will see with products like Infoprint Server for iSeries, the output is not always delivered as ink or toner on a piece of paper. AFP is an architecture designed for business and integrated fully on the iSeries.

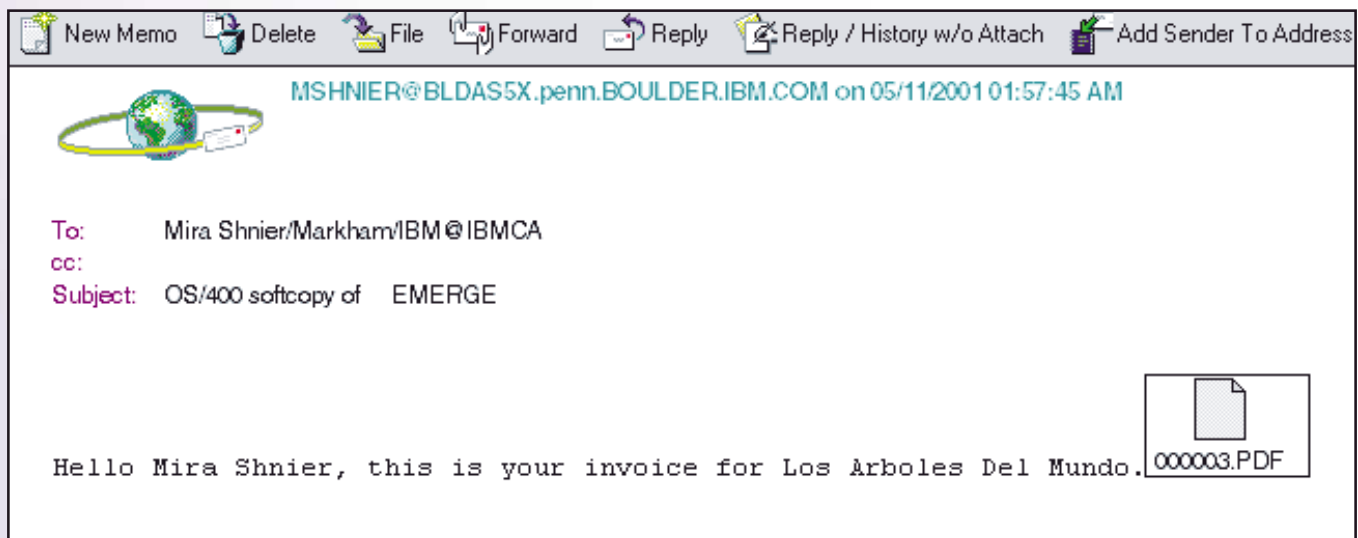


Figure 1

It is designed based on structured definitions for documents and pages. It is independent of the device that the output is delivered to. For the most part, resources that are used repeatedly are stored external to the document and are brought into play at the time the finished document is being generated for presentation.

Resources and Data Streams

External resources which are used to format the document are kept separate from the spooled file, reducing the size of the file. They are sent to the printer when needed, and stored there for repeated use, within the same job, or even across job boundaries. The two-way IPDS conversation helps keep the iSeries informed as to what resources reside on the printer.

The external resources we are talking about here include overlays, oage segments, and fonts. Overlays are used as an electronic version of a preprinted form. Page Segments are smaller images, such as a company logo or signature. Font objects define how the codes in the document are rendered as characters.

Keywords to reference these objects can be found in the printer file definitions, and DDS (Data Description Specifications). Spooled files generated as the iSeries default data stream, SCS, as well as IPDS or AFPDS can take advantage of these resources in increasing degrees, with AFPDS spooled files providing the greatest amount of function.

There is another spooled file type used in the world of AFP, called LINE data. Line data is similar to SCS – it contains simple lines, but it doesn't support any of the imbedded formatting instructions. Usually the first character is reserved for use as a forms control character to control spacing but that's about it.

The formatting of a spooled file containing line data comes from two other types of objects that are not as well known in the iSeries world, although they have been supported on the AS/400 for the last decade. These are form definitions and page definitions. They provide similar functions to the printer file with DDS, but are independent of the application program.

The form definition is used with spooled files containing SCS, IPDS, AFPDS and LINE data. It provides information about the media to be used, such as paper size, simplex versus duplex, special copy instructions and what overlays to be used. Page definitions are designed to work specifically with LINE data. It maps out the line data on the page, providing information about spacing, fonts, bar codes, or the inclusion of additional overlays or page segments. There is some logic available in a page definition to process different pages differently.

It is expected that the use of LINE data with form definitions and page definitions will escalate as customers use the new composition system, Infoprint Designer for iSeries, to format their applications. More on Infoprint Designer for iSeries later.

Putting It All to Paper

AFP applications work best when sent to an IPDS printer. There are a number of reasons for this. First of all, IPDS, which stands for "Intelligent Printer Data

Stream" provides for a two way conversation between the system and the printer. If there is a problem such as a jam, or out of supplies condition, the printer knows exactly what page the problem occurred on and will report back to the operating system. Once the condition is fixed, printing will resume exactly where it left off, avoiding missing or duplication of pages. This is important for mission critical applications such as statement or cheque printing.

Print Services Facility for iSeries, PSF, is the optional, fee-based component of OS/400 that carries on the conversation with the IPDS printer, manages the external resources, and does some data stream conversion. This is recommended for any printing that you do in your business, where you care about complete and accurate delivery.

Infoprint Server for iSeries

In the past, many iSeries customers found that they could take advantage of the AFP architecture to save money and

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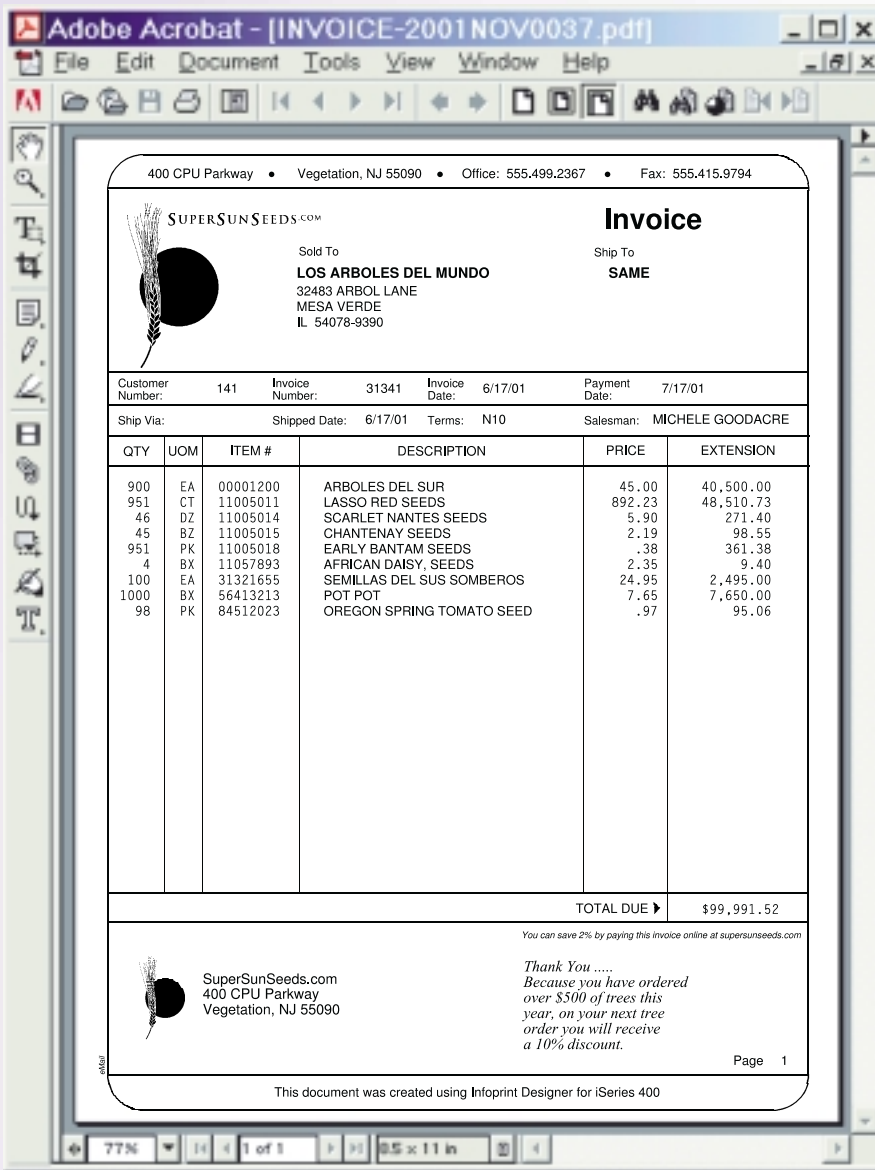


Figure 2

improve their image as they migrated from impact to non-impact printing. For the most part, the benefits were limited to applications where the data is generated on the iSeries and printed on iSeries managed printers. This has all changed with the announcement of Infoprint Server for iSeries, which is available now for V5R1.

Infoprint Server brings a variety of data stream transformations that open the iSeries to be able to generate AFP applications based on data from other sources, and deliver it in new and exciting ways.

It is composed of four separate components.

- PDF generation, including e-mail delivery
- AFPDS creation (CRTAFPDTA command)
- Conversion of PCL, PostScript and PDF to AFPDS
- Conversion of TIFF, JPEG, and GIF to AFP

These functions help you get the data that you have to the destination you want in a manner that best suits the recipient.

PDF Generation and Email Delivery

This probably the most important component of the Infoprint Server product. It allows you to take your business documents that you normally print and mail, and turn them into e-business documents for delivery over the web.

Consider the Following Scenarios:

- A company generates monthly financial reports that are printed, and then physically distributed to various department managers. With Infoprint Server, these reports can be converted to a PDF file and placed in the Integrated File System, IFS, for inclusion in a web application. The managers can retrieve the information using a standard browser.
- A company generates hard copy purchase orders, statements, invoices, or other similar documents, which are then mailed. The program generates these documents as one large spooled file. With Infoprint Server, these documents can be separated out based on some predictable information in the data, and sent via e-mail as a PDF attachment.

The PDF transform can accept almost all types of spooled files that you can generate on the iSeries. This includes the default spooled file type of SCS (SNA Character Set), IPDS, AFPDS, line data or mixed mode (AFPDSLIN). The only type of spooled file it cannot handle is USERASCII.

The output generated by the PDF transform is text-based, as opposed to bit-mapped. That means that it is fully navigable and more compact.

A key factor is the flexibility you have in determining how the PDF will be generated:

- destination type: e-mail, a stream file in the IFS, or a new spooled file.
- keep the file as one large PDF or automatically split it into multiple smaller files.



If you choose the e-mail option, the PDF file that is generated is delivered as an attachment in an e-mail document. If you choose to store the file in the IFS, it is available for use by a web based application allowing Intranet or Internet users to view documents and reports. The spooled file can be sent directly to a device that supports PDF, such as the IBM Infoprint 70.

Another important choice you can make is whether the entire file is to be converted as one PDF output file, or whether it is to be split into multiple smaller files. This splitting is based on "group" records that are inserted into the spooled file. You can insert the group records using DDS keywords (Start Page Group and End Page Group) or use another component of Infoprint Server, the Create AFP Data command (CRTAFPDTA). More on CRTAFPDTA later. These group records do two things. They tell Infoprint Server how to break up the spooled file, and provide either the e-mail address explicitly, or enough information for an exit program to do a file lookup.

The PDF e-mail function also allows you to customize a message that will appear with the attachment. **Figure 1** is an example of an e-mail, including a custom message and a PDF attachment. **Figure 2** is an example of what a recipient sees when they open that attachment.

If you do not break up a spooled file to groups, you specify the address in one of two ways. There is a new parameter available for printer files called USRD-FNDTA. Within that you may specify a MAILTAG. An alternative approach is to specify a unique identifier in the USRDFTA field in the printer file or the spooled file, and then use the mail exit program to map that to an e-mail address. (Sample exit programs are included in the Infoprint Server User's Guide and in Printing Redbook IV.)

Configuring for PDF Conversion

The PDF conversion function was designed to work automatically as part of your production system.

It is based on the creation of a printer device description and a corresponding PSF Configuration object. The key feature of the device description is that it looks just like any other IPDS printer you define to print on your TCP/IP LAN, with the notable exception that it uses a loop back address (127.0.0.1) instead of the standard device address. This device description must also reference a PSF Configuration object. The PSF Configuration object is used to define more specific parameters of the PDF creation, such as the destination type, and whether to break the file into multiple smaller ones. Once the printer and PSF configuration object are created, and the writer started, you only need to move your output to the associated output queue. Infoprint Server for iSeries does the rest.

CRTAFPDTA

The Create AFP Data command is another component of Infoprint Server for iSeries. It is a multipurpose command that transforms line data to AFPDS for printing and viewing.

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It optionally indexes the document for use in the PDF creation program or for viewing. In addition, you can retrieve and package AFP resources to allow for easier portability to other systems.

The following scenarios show examples of using CRTAFPDTA:

- Use the indexing function of the CRTAFPDTA command to generate the group records that are needed for the PDF e-mail function. This is important if you use Infoprint Designer for iSeries to develop your applications. (This entire process from “end-to-end” is described in Printing Redbook VI, SG24-6250.)
- If you distribute AFP spooled files from one system to another, you will need copies of the external resources on the target system in order to print or display the document. Use CRTAFPDTA, to concatenate the resource documents with the document to ensure fidelity on the target system.
- If you use the AFP Viewer, either via Client Access Express Operations Navigator, or as a plug-in to a web browser, CRTAFPDTA can help you in two ways. The indexing function can aid in navigating the document, allowing you to access

pages quickly based on predefined index tags, such as customer number, date, phone number etc. If the documents are distributed over the web, CRTAFPDTA is used to package the necessary resources with the document correctly. (When using the viewer through Client Access, the resources are downloaded to the workstation automatically for you.)

Conversion of PCL, PostScript and PDF to AFPDS

We already described above some of the advantages of printing AFP applications, especially on an IPDS printer. This component of Infoprint Server for iSeries brings these advantages to applications that generate the common ASCII data streams, PCL, PostScript and PDF. These applications could be on other systems or platforms such as Windows or AIX. Many ERP applications that run on the iSeries generate ASCII data stream.

By using these conversions, the user can take advantage of the recoverability and management offered by IPDS printers. Also, by centralizing the print on a few large iSeries based printers, you can save money as these “production” printers typically have a lower cost per page than workstation printers. By reducing the number of printers, you can reduce the management time and costs as well.

Conversion of TIFF, JPEG, and GIF to AFP

Web and client applications typically use GIF, TIFF and JPEG image file formats where the iSeries uses AFP image file format. In many applications, there is a need to bridge these format differences and enable use of Web and client image in iSeries output applications. Infoprint Server provides GIF, TIFF, and JPEG to AFP transforms.

Infoprint Designer for iSeries

Whether you choose to deliver your documents electronically as PDF files, or print them on a laser printer, you want to ensure that the recipient is presented with a document that clearly conveys the intended message. Infoprint Designer for iSeries is a new interactive tool for designing your print application.

Unlike earlier solutions for the iSeries, it integrates both the creation of static elements such as the electronic forms, with dynamic mapping of the application data, allowing you to enjoy a new level of productivity in the design process.

Infoprint Designer for iSeries has the following features:

- A truly interactive WYSIWYG (what-you-see-is-what-you-get) tool, running on a Windows workstation.
- Includes three components which are tightly integrated with each other, and with the iSeries: an Image tool, and Overlay tool, and a Layout tool.
- Scan in existing hard copy to use as a template
- Works with live iSeries spooled files. This helps in the design stage, and gives you the opportunity to preview the output without printing.
- Conditional processing in the design allows you map the data differently, or use different resources on different pages depending on specific conditions in the data
- Completed resources are automatically uploaded and generated as iSeries objects.

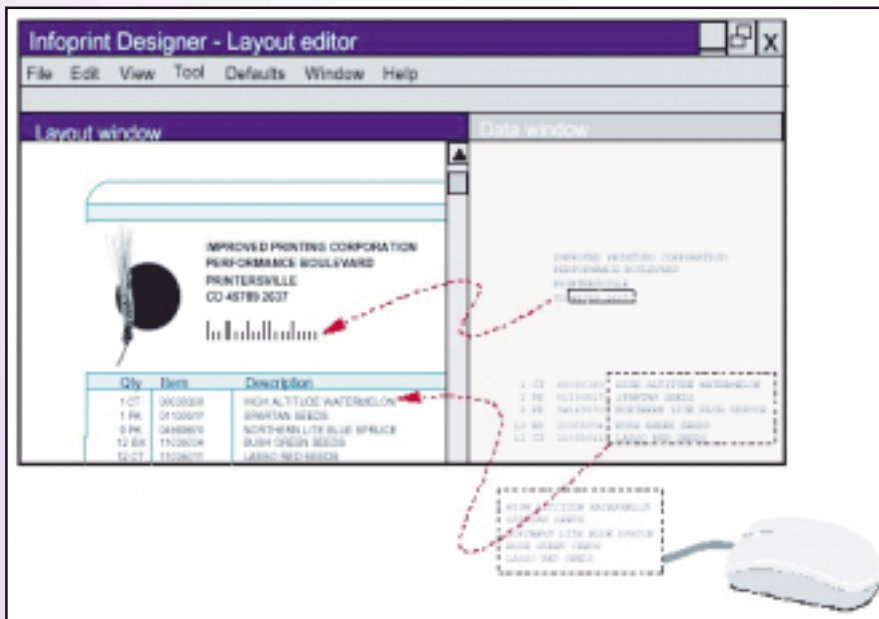


Figure 3



Infoprint Designer for iSeries will create overlay objects and page segments. The Layout editor creates two objects, a form definition and a page definition. The form definitions describes the physical media, such as what size paper and drawer number. It also specifies which overlay(s) to use. The page definitions provides all the information to map the lines of data onto the page, such as position, fonts, or even bar codes. The page definitions also contains the logic to change the media or data layout based on predictable information on the page.

A typical Infoprint Designer Session

You start the Infoprint Designer session with either the overlay design, or the layout. Assume you decide to start with the overlay design. Use the tools available to add constant text in a variety of fonts, bring images onto the page, draw lines, boxes, circles or ad-hoc shapes. Snap-to grids, object grouping, repeat functions and auto align help create a professional looking document very quickly.

Once your overlay design is complete, you select the Layout tool. You will be prompted for the source of data to use, either a PC file, or you can bring down an iSeries spooled file from your output queue. The overlay is displayed in light gray on one half of the screen, known as the View/Edit window, and the data is displayed on the other. You simply drag the application data to the View/Edit window, on top of the overlay you had just created. You can group lines of information together, such as an address block, or group of detail lines in an invoice. (See **Figure 3.**)

While you are working on the data mapping, suppose you realize that you wish to change or move an element that was on the overlay. Not a problem, just click on the overlay button, and make the necessary changes. The data will be displayed in grey while you work on the overlay. You can add some enhancement and logic to the application to customize how each page is presented. For example:

- Print a constant "terms and condition" page on the back

- Print multiple copies of the same data, with different overlays on each
- Use a French or English overlay, based on a code in the customer number.
- Use a completely different layout for different pages such as headers, details or summary.

When you finish your design, you select the option to upload the project to the iSeries. The various resources you just created, overlays, page segments, form definition and page definition, are uploaded to your iSeries and the appropriate object types are created in your library.

In order to put these new resources into production you need to make some small changes to the printer file used by the application so it knows to generate line data and to use the page definition and form definition. All the other resources will be brought into play by these two objects. Infoprint Designer for iSeries will run on V4R5 or higher. It requires

an active Client Access Express session between the workstation and the iSeries.

Other V5R1 Enhancements Relating to Print

There are a number other new features and functions included with V5R1 that relate to print and presentation.

- AFP font collection is now included (as of V4R5) with PSF/400
- Print directly to iSeries-connected printers using Internet Print Protocol (IPP)
- Produce up to 999,999 spooled files from a single program
- A new parameter in the printer file, CVTLINDTA, allows Line data to be printed on an ASCII printer or viewed with the AFP Viewer that is shipped with Client Access Express. This is important for users of Infoprint Designer for iSeries, or other tools that create page definitions which are used with a printer files defined for line data.

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- Enhancements to DDS include new Bar code options, extended colour support, font scaling horizontally as well as vertically (i.e., create a tall/skinny or short/fat character based on the same outline font).
- New JAVA classes to enable AFP printing, to access AFP resources, and to generate XML based reports.
- Support in DDS, Java, and a programming tool called PPFA (Page Printer Formatting Aid) for a new type of line data called Record Format Line Data.
- ISeries now supports Unicode-encoded data
- A new archive product, Content Manager Common Server is available.

Summary

Version 5 Release 1 is the most significant release for the iSeries to date, when it comes to print and presentation. Infoprint Server for iSeries embraces other platforms and data streams and allows for the delivery of the output of your e-business applications.

Infoprint Designer for iSeries gives you tools to generate effective and flexible output.

Behind all of this is the AFP architecture, which is designed to deliver printed or electronic output reliably, accurately and efficiently.

For further Information

Each of the products described in this article has its own set of manuals and user guides. A new Redbook, iSeries Printing VI: delivering the output of e-business, SG24-6250, includes more detailed implementation information, including tips on how the different products can be integrated. [TUG](#)

Mira Shnier is a Senior IT Specialist, who currently works in the IBM Canada Printing Systems Division. She recently was coauthor of the new IBM Printing Redbook VI: "Delivering the output of e-business". Mira will be speaking at the next TUG MoM, Nov. 21, 2001. Contact her at mshnier@ca.ibm.com.

The 5th Wave

By Rich Tennant



"Okay, Darryl, I think it's time to admit we didn't load the onboard mapping software correctly."