FUJITSU

WHITE PAPER

APA Printing Concept with BS2000/OSD

Modern High Performance Printing

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APA (All Points Addressable) is a printing concept in BS2000/OSD for printing on the Océ high-performance printers (in I-Mode). In conjunction with these so-called APA printers (also called AFP printers, IPDS printers or I-Mode printers) it provides almost limitless possibilities for designing the layout of a print page. APA is the next logical step in the further development of print applications, which, on conventional high-performance printers (in E-Mode), have reached their very limits with regards to print quality and volume. This applies not only to the printing of normal system prints and printed forms (with or without user data), but also to the printing of complex technical and business documents.

AFP (Advanced Function Printing) is the *de facto* industry standard for electronic printing solutions, transforming data into meaningful and impactful information with high quality rendering. The PRISMAproduction server is at the core of the AFP solution. It manages and controls data transmitted to IPDS (Intelligent Printer Data Stream) printers.

The PRISMAproduction/Host Router/BS2000 is an Océ licensed software that creates the link between the BS2000 Spool and the PRISMAproduction server. This PRISMAproduction server can be a Primergy with Linux.

The following basic principles are valid for APA printing:

Clear division between formatting data and user data
In APA, formatting data includes all elements that influence the presentation of the text on the page. Formatting data are managed in a resource library.

Hierarchical structure of the print files
A print file consists of one or more documents, which, in turn, comprise one or more pages. A logical page consists of APA objects (text and images as building blocks of a page).

Distinction between logical and physical print page
One or more logical pages of one or more documents can be assigned freely to a (physical) print page. This applies to both the size and position of the logical page on the physical page.

Free positioning and rotation
Predefined text and image objects can be positioned anywhere on a page and can be rotated and repeated.

Mosaic-like structure of the print page
If you are working with FOBs, the print page is composed of layers. With APA, however, the print page is structured in much the same way as a mosaic.

Free addressability of the pixels on a print page
APA printers implement a new printing technique based on the principle of freely addressing each pixel on a print page.

Page-oriented data stream
The data stream to the printer is no longer line-oriented but page-oriented. The print resources are assigned to the page and can be downloaded for each individual page (resulting in modest memory requirements on the part of the printer).

This paper will provide a basic information about AFP printing with BS2000/OSD.

Contents

Understanding AFP and Router/BS2000

AFP (Advanced Function Printing) is an architected system of hardware and software for creating, formatting, viewing, retrieving, printing, and distributing information on a wide variety of printers and imaging devices. First introduced in 1984 by IBM, AFP now supports new printing technology and new functions. From tabletop printers to high-speed production printers, AFP currently supports a full family of printers. These printers include those with both continuous form and cut-sheet capability and those with a choice of channel and communication attachments.

The AFP architecture governs the creation and control of data types (such as text, font, image, graphics, bar code, fax, and colour) so that computer output is more readable and attractive. AFP's specific interchange architecture, called Mixed Object Document Content Architecture for Presentation (MO:DCA-P), makes information interchange possible among different platforms using different protocols.

The Spool BS2000 does not directly control the AFP printers; it transfers the corresponding print jobs to a PRISMAproduction™ server that can be described as an output management system that processes multiple-input PDLs in a very high volume environment and provides maximum production security for single or multiple printing devices operating at the highest speeds.

For more information, see: **http://www.oce.de/products/prisma-production-server**.

The component that covers this function is the Router (Océ Printing Systems). The Router validates the PRINT-DOC orders given by BS2000 users, checks the availability of resources and transfers all necessary data to the Print. The print server combines the data streams with the resources, generates the IPDS data stream (Intelligent Printer Data Stream) and sends the result to the printer.

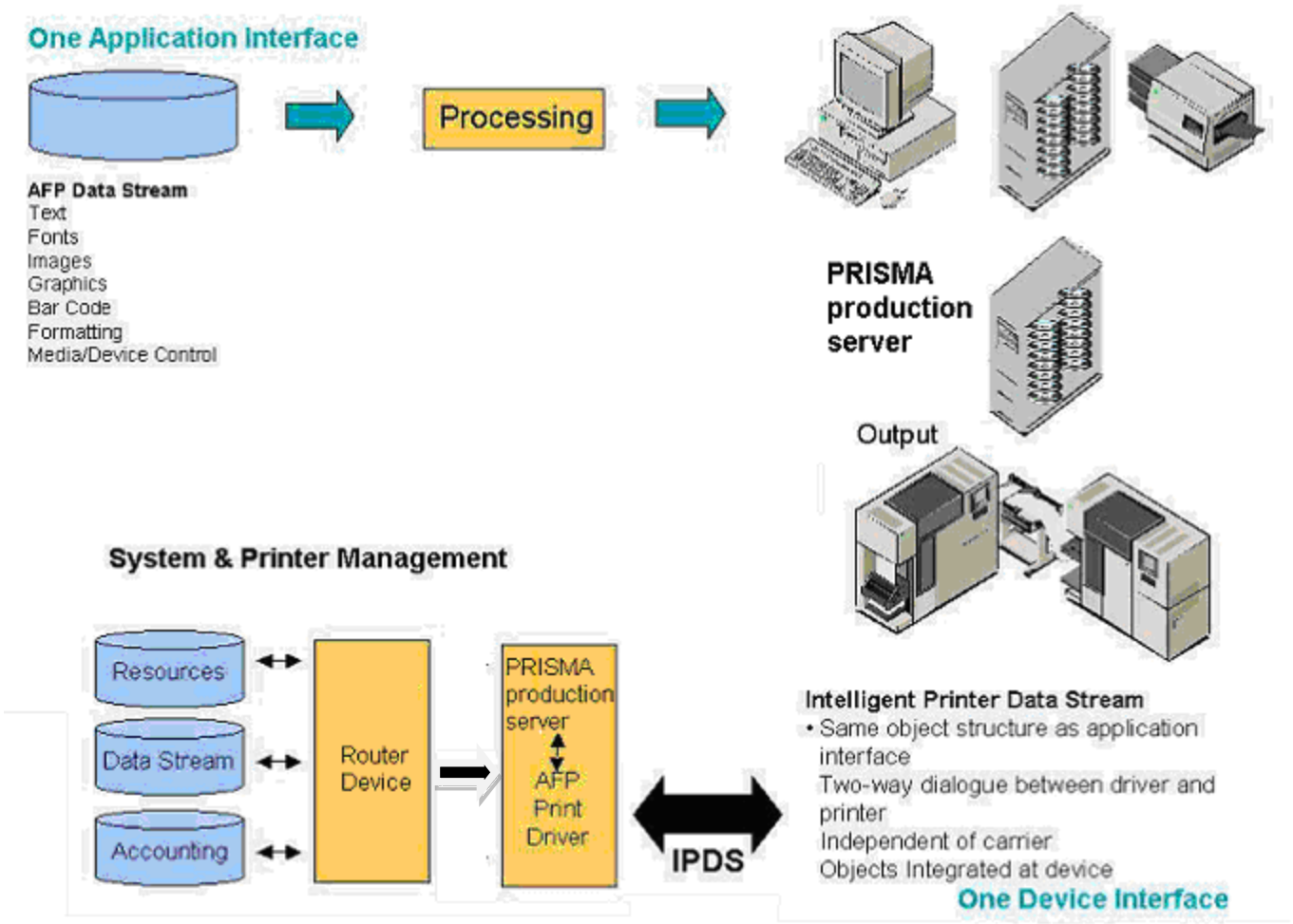

Figure 1: AFP architecture

The Print server communicates back and forth with the printer through IPDS to successfully manage and control the data transmitted to the printers.

Components of AFP Printing

Two strategic AFP presentation data streams are key components of the architected AFP printing solution: application data stream and printer device data stream.

Application data stream

Mixed **O**bject **D**ocument **C**ontent **A**rchitecture for **P**resentation (MO:DCA-P) data stream is the application data stream through which applications can describe pages composed of text, images, and graphics data. MO:DCA-P is device independent; therefore, applications that produce this data stream can be directed to any of the printers supported by the AFP system or to graphical personal computer displays for viewing.

Note: In BS200/OSD, it does not exist applications that capitalize on MO:DCA-P like IBM offers with:

- AFP Toolbox that produces documents with extended formatting capabilities.
- Document Composition Facility (DCF) that is a host-based publishing product that produces high-quality, complex documents.

Printer device data stream

Intelligent **P**rinter **D**ata **S**tream (IPDS) is the printer device data stream that contains the information necessary to identify, monitor, and control the functions of the printer. IPDS enables a two-way dialog between the printer and the printer driver to create a cooperative print management system. IPDS is device dependent and is unique for each printer.

The Router is the glue between theBS2000 application and the AFP server and printer. It accepts MO:DCA-P and line data and sends them to the server that converts them into IPDS for each AFP (IPDS) printer it manages. Because MO:DCA-P and IPDS are part of the same architecture, this is a very efficient process for applications that produce MO:DCA-P.

Figure 2 shows the basic components required printing data on AFP printers in a BS2000/OSD environment. The PRISMAproduction server processes print jobs streams from the SPOOL subsystem through the Router, combines the data streams with resources needed to print the data, converts the data into IPDS, and sends the result to the printer.

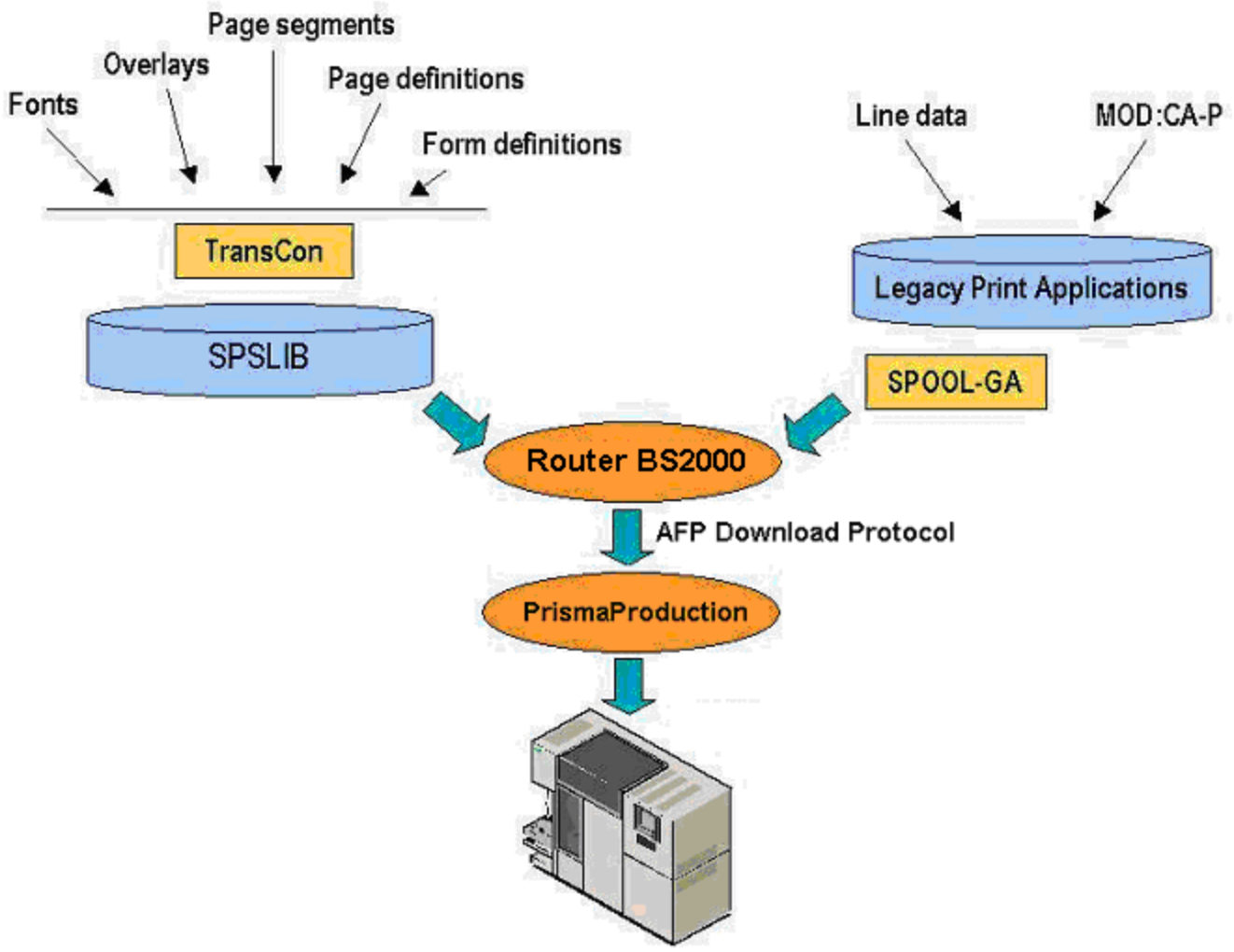

Figure 2: Components required to print data on AFP printers

Input data streams

The data streams submitted to the SPOOL subsystem are: line data, MO:DCA data, line data with AFP control records and mixed data.

Line data

To compose pages for the page printer from line data, the server separates the incoming print records into pages according to specifications in a resource called a page definition. A page definition is always required for printing line data in AFP. You can create your own page definition or use a page definition provided with the Router.

The line data input can consist of records that are fully formatted for printing on line printers; or it can consist of records that contain only the fields of data to be printed; or it can consist of records of both types. You can use the page definition resource to format fields of line data outside of the application program.

Figure 3 shows the difference between formatted and unformatted line text.

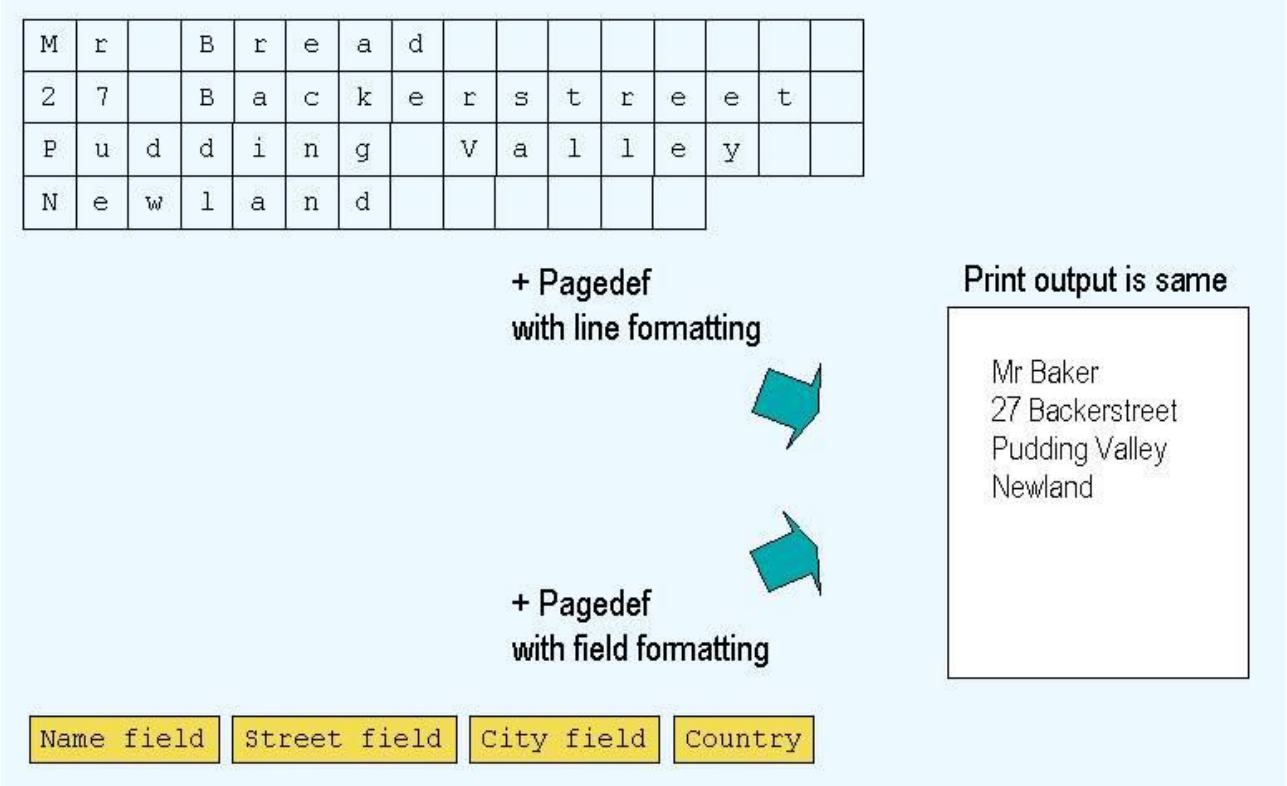

Figure 3: Difference between formatted and unformatted line text

MO:DCA-P

The processing for MO:DCA data is different from the processing that it does to line data. The reason is that whereas line data must be composed into pages, MO:DCA data is already composed into pages; it consists of structured fields containing commands, plus the data comprising the print job.

Line data with AFP control records

For more flexibility in formatting your line-data applications, you can include certain AFP control records in line data to change the formatting of selected pages within a data set or to include images or blocks of composed text on a page.

Mixed data

In addition to MO:DCA data, line data, or line data containing AFP control records, the server can process data sets containing both line data and data that has been composed into pages. If MO:DCA data is already formatted into pages, it cannot be printed on the same logical page as line data. When it finds the beginning or the ending of a MO:DCA data page, it starts a new page.

Resources

The resources needed to print the data are: form definitions, page definitions, fonts, page segments and overlays.

Form definitions

A form definition is the resource that specifies the physical attributes of the printed output. The word form refers to a sheet of paper or any other print medium. You must specify a form definition for each document you want to print. You can specify a form definition by name, or you can use the default form definition set up by your installed SPOOL form.

A form definition contains printing controls that specify the following, within the limitations of each printer:

- Page origin, which is the top-left boundary for printing. When the printer is duplexing, page origin may be different for the front and back of the page.
- Sheets on which medium overlays are to be printed.
- Sheets on which a forms flash is to be printed.
- Printing with only overlays or forms flash and no variable data. This is the constant-forms function.
- Number of copies of each page to be printed.
- Paper source (input bin of the printer), for printers with more than 1 paper source.
- Output bin, for printers with more than one output stacker.
- Simplex (printing on 1 side of a sheet) or duplex (printing on both sides of a sheet), for printers that support duplex printing.
- Data fields that are to be suppressed, that is, not printed.
- Printed copy groups to be stacked offset from each another.
- Page presentation in either portrait or landscape position.
- Print-quality level (on printers that support different levels of print quality).
- Horizontal adjustment, in pels.
- N_UP Printing: printing multiple logical pages on a sheet. These pages can be either MO:DCA pages (fully composed pages containing data and the structured fields controlling presentation of the data) or line data.
- Type of font fidelity. You can ensure the font used to format the data and the font used to print the data have the same resolution.
- Type of finishing, for example, corner stapling.

A form definition is required for every print job that you send to an IPDS printer. The form definition is needed to position the logical page on the physical form. The form definition specifies the origin of the logical page as an offset from the origin of the physical form, or medium. The logical page is an area defined by the page definition for line data or by structured fields for MO:DCA data.

Page definitions

A page definition is the resource that specifies how to format line data into pages. No page definition is used for MO:DCA data, because that data is already composed into pages. The page definition replaces the forms control buffer (VFB or loop) used by line printers.

You can specify a page definition by name, or you can use the default set up by your installed SPOOL form.

A page definition contains formatting information specifying the following:

- Page size (height and width)
- Print direction for the page of data
- Number of lines per inch
- Fonts to be used for printing the data
- Where data from each input record is to be printed
- Constant data to be printed
- Data fields that can be suppressed
- Data fields to be printed as a bar code
- Print position for carriage control characters or channel codes
- List of page segments used by this job
- List of page overlays used by this job
- Conditional processing to change page formats, based on the data
- Color selection (for printers that support printing in multiple colors)
- Include and position page segments or overlays
- Rotation of included page overlays

Fonts

A font is a collection of graphic characters sharing the same type family, style, and weight. You can use a font for an entire document, for an entire page, or for selected lines or fields of data on a page. A coded font translates your input (keystrokes) into graphic characters for printing.

A font resource is composed of 3 member types:

A *coded font* member associates a *code page* and a *font character set* as a pair. A single-byte coded font contains 1 code page and font character-set pair. A double-byte raster coded font, which requires 2 bytes to identify each graphic character, contains 2 or more code page and font character-set pairs; each pair is called a font section. A double-byte outline font contains 1 code page and font-character-set pair.

A *code page* member associates a code point and a graphic character identifier for each graphic character supported by the code page and specifies how code points that are not valid are to be processed.

A *font character set* member contains a graphic character identifier and a raster pattern or outline for each graphic character in the font or font section, as well as information about how the characters are to be printed. Before each page is printed, the fonts required for the page are sent to the printer (downloaded) if the printer does not already have them in its storage.

Page printers can print fonts with various point sizes, styles, weights, and widths on a single line or on various lines on a page. Multiple fonts can be printed on a page. The printer storage required for a font depends on the size and number of characters in the font.

Page segments

A page segment is an object that can be merged with the variable data on a page being printed. You can include a page segment in a print data set or in an overlay resource. A page segment usually contains image data such as signatures, logos, or graphics converted into image format. Page segments can also contain character data formatted as MO:DCA data; however, limitations exist when you are using page segments that contain text.

Overlays

An overlay is a collection of predefined data that can be merged with other data on a page as the page is printed. An overlay can also be printed on a page by itself. Because an overlay can be printed on a page at the same time as the print data set is printed, overlays can be used as electronic forms to replace preprinted forms. The print data set contains data that fills out the overlay.

An overlay can contain the following elements sometimes found on a preprinted form:

- Vertical, horizontal, and diagonal rules
- Rules with different weight and thickness
- Graphics or company logos
- Bar codes
- Text
- Different inline directions and character rotations for text
- Different fonts, including fonts not used in the print data set
- Boxes with and without shading
- Grids, arcs, and polygons

An overlay can also include page segments; they are retrieved when printing the overlay. However, an overlay cannot include another overlay.

The server supports medium overlays and page overlays. There is no difference in the overlay object structure. The same overlay can be used as a page overlay or as a medium overlay. However, there is a difference in how you specify the overlay to be printed on the page.

You can include any overlay on a page as either a medium overlay or a page overlay. However, medium overlays and page overlays are positioned differently on a page; therefore, when you create an overlay, the size and position you specify for it may need to be specified differently, based on how you will use it.

How the Router/BS2000 manages AFP Printing

Print technologies now exist that allow to describe every dot on the printed page. Often referred to as All Points Addressability (APA), this technology provides almost limitless possibilities for the preparation and presentation of information on the printed page.

APA printers

The printing devices supported by AFP range from very-high-speed, twin & fanfold printers to low-speed cut-sheet printers. The print technologies include LED (Light Emitting Diode), SRA controller for scalability. At the same time, those models provide the end user with a stable, durable interface to printing by introducing a APA-print-services component into the operating system between the application and the printer.

APA print services

In BS2000/OSD, the APA-print-services component for AFP is the Router. The major function of the Router is to provide a device-independent interface to printing. In this environment, the application need only have the ability to place data on the Spool system. The Router then provides the following important functions: data-stream transformations, printer resource management, device driver, and error recovery.

Data-stream transformation

The Router provides its users with 3 different data-stream interfaces.

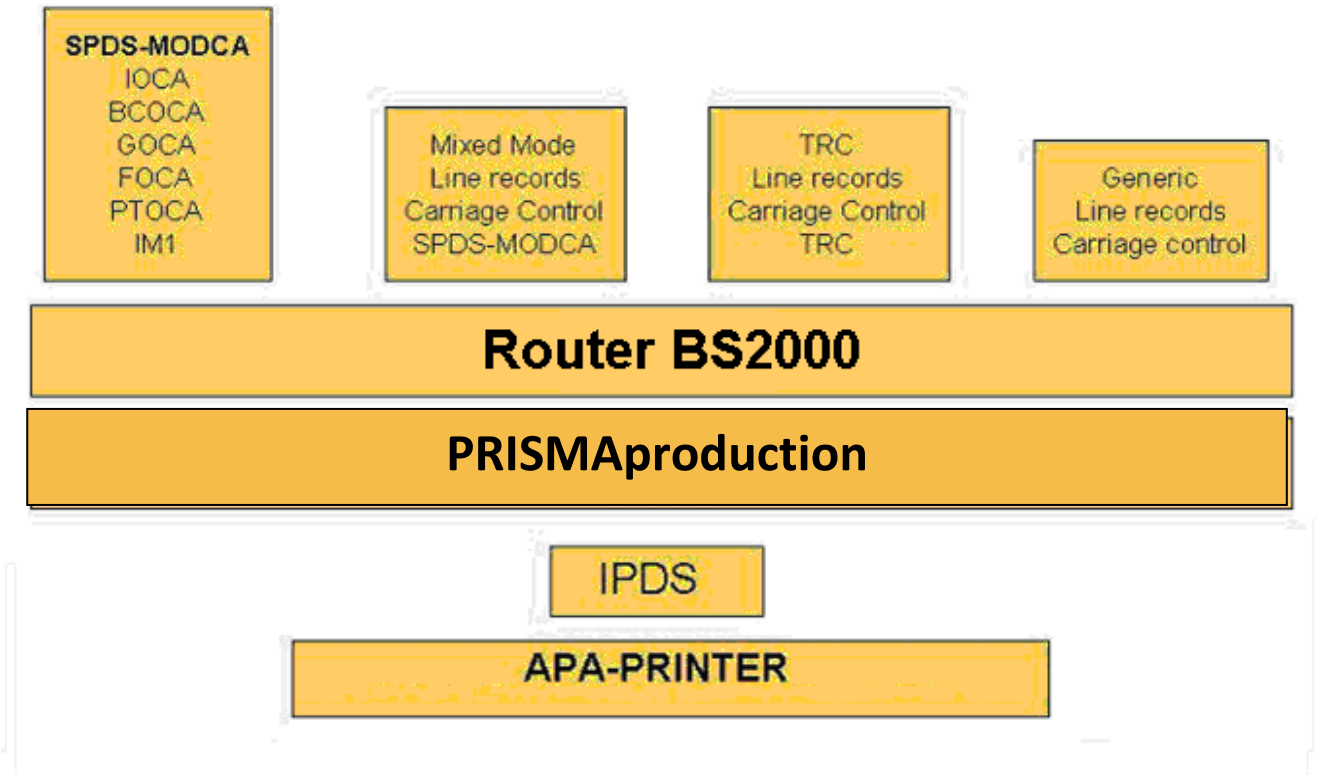

Figure 4: **Data stream transformation**

Currently, used system line-printer data streams (apa Generic printing format) with/without TRC are accepted by the Router and converted by the Print Server into IPDS for printing on an AFP printer. In addition, the Router accepts composed-page data streams in AFPDS format or mixed-mode data streams, which include system line-printer data intermixed with AFPDS control structures.

APA printing applications

APA printing applications can be classified as follows:

	APA1	APA2	APA3
Printing Formats	AFPDS-MODCA	Line mode-TRC	Line mode-Generic
Document Production	Printer type APA		
	User SPSLIB specification		
	Form definition		
		Page definition	Page definition
	Substituted fonts list	Fonts list for TRC mapping	Substituted fonts list
	APA-Steuermodus		
Prerequisites	APA printer defined		
	APA form defined		
BS2000 Software	Router		
SPOOL Device Type	2050-APA/2090-APA/2090-TWIN		
Océ Printer Models	VarioStream/VarioPrint in I-Mode		
BS2000 Attachment	LAN		

Figure 5: BS2000/OSD Printing applications - classification

Printer resource management

The Router manages resources required to print, which include forms, page definitions and form definitions. These are used to generate the print data stream and the page segments, typographic fonts, and overlays that are sent to the printer for use during the print process. A set of predefined resources are provided with the AFP product set in different resolutions. Also more complex functions can be provided with resources that can be created with a set of Océ utility programs.

An application can reference resources in the input data stream, or these resources can be specified externally to the print data when scheduling a document for printing. the Router, either transfer this information to the server, or inegrates the concerned resources in the data stream, so as to be independent of the available resources on the server itself.

Router devices

The Router devices receive APA jobs from Spool, open a connection to a PRISMAproduction server and send the data and print parameters to the server. They are defined and managed, exactly like Spool printer controllers.

What can the Router/BS2000 do for you?

The Router system management functions create a fully integrated, automated printing system. You can use the Router for BS2000/OSD to do the following:

- Receive print jobs, access resources required by the print jobs, and send the data to the server.
- Manage resources required for the print job, such as form definitions, page definitions, fonts, page segments, and overlays.
- Handle print jobs that are formatted at different resolutions and select the resource libraries with the correct resolution to print the data.
- Provide problem diagnosis and error recovery.
- Restart printing from checkpoints.
- Write accounting records.
- Write separator pages between print jobs or copies of print jobs.
- Let installations manage resources; modify output records, separator pages, and accounting records; and inspect messages.

Some useful Features

The following features are available:

- Colour mapping table
  Used to correlate colour information of application data parts without changing the original document.
- Define and manage colour ID's
  This is a printer colour resource that may be invoked during a print job.
- Override form definition values for logical page offsets
  Job parameters allow specifying the offset in the x and y direction of the logical page origin from the media origin for the front and backside of each sheet.
- Specify medium overlays on the front and backside of the paper
  In addition to overlays specified in a form definition, inline invoked, it is also possible to include a list of medium overlays on the front and back side of each sheet.
- Print directions: Portrait and Landscape 180 degrees
  Serviceability improved by Trace extension
  Upgrade colour support: PTOCA, IOCA, GOCA, BCOCA
  Colour is also provided by these triplets support in the AFP datastream: (0x4E for Colour Specification, 0x70 for Presentation Space Reset Mixing, 0x71 for Presentation Space Mixing Rules).
- Relative Baseline/Inline positioning
  PRISMAproduction supports for relative Baseline/Inline positioning. This can be used together with a page definition activating this feature.
- Media Names
  A media name is defined in a structured field Map Media Type MMT in the Document Environment Group of the form definition. PRISMAproduction will try to connect this with a physical input tray in the printer which carries the same media name. SIt will translate the media name to the media source-ID (Bin-Number).

Features and Related Products

Migration to AFP

The trends for migrating to an AFP technology entail that data centers increasingly want to be able to print on IPDS-capable printers. This means among others that print jobs resulting from existing non-APA Printing Applications should be able to be channelled to local High Performance IPDS printers. So end-users applications with respect of their document original layouts can take profit transparently of the high involved printer capabilities.

Actual requirements of real cases, Océ Printing System strategy and long-term printer language positioning dealing with robustness, and industry standard printing environment motivate mainly to supply a migration support for existing BS2000

printing applications toward AFP. Traditional applications have been built to the restrictions of mainframe impact-like printers. Maintenance of these programs is a nightmare to most organisations and it can take weeks or even months, with the associated huge overhead, to get even a simple change to the print format of a particular report.

Additionally, for customers that are involved in a renewal of their printing systems, the AFP/IPDS technology has an important dimension since it is one standard dominating the mainframe print output strategy and since it is offering the required printing reliability level. Therefore, Migrating-to-AFP will address the gap between the technological capabilities of the printers and the inadequacies of traditional programming techniques for output reporting. It then helps implementing a corporate-wide printing standard and give an efficient printing.

It is essential to secure the customer's legacy applications, that are mostly designed for the H(igh) P(erformance) printers. A BS2000 product suite must thus be able to convert the HP data stream into an AFP one, without modification of the application itself.

Migration to AFP - Step 1

In a first step of migration to AFP, the most common "Old-technology" printing applications (HP Line mode) can be channelled to the new AFP printing systems without any user application changes.

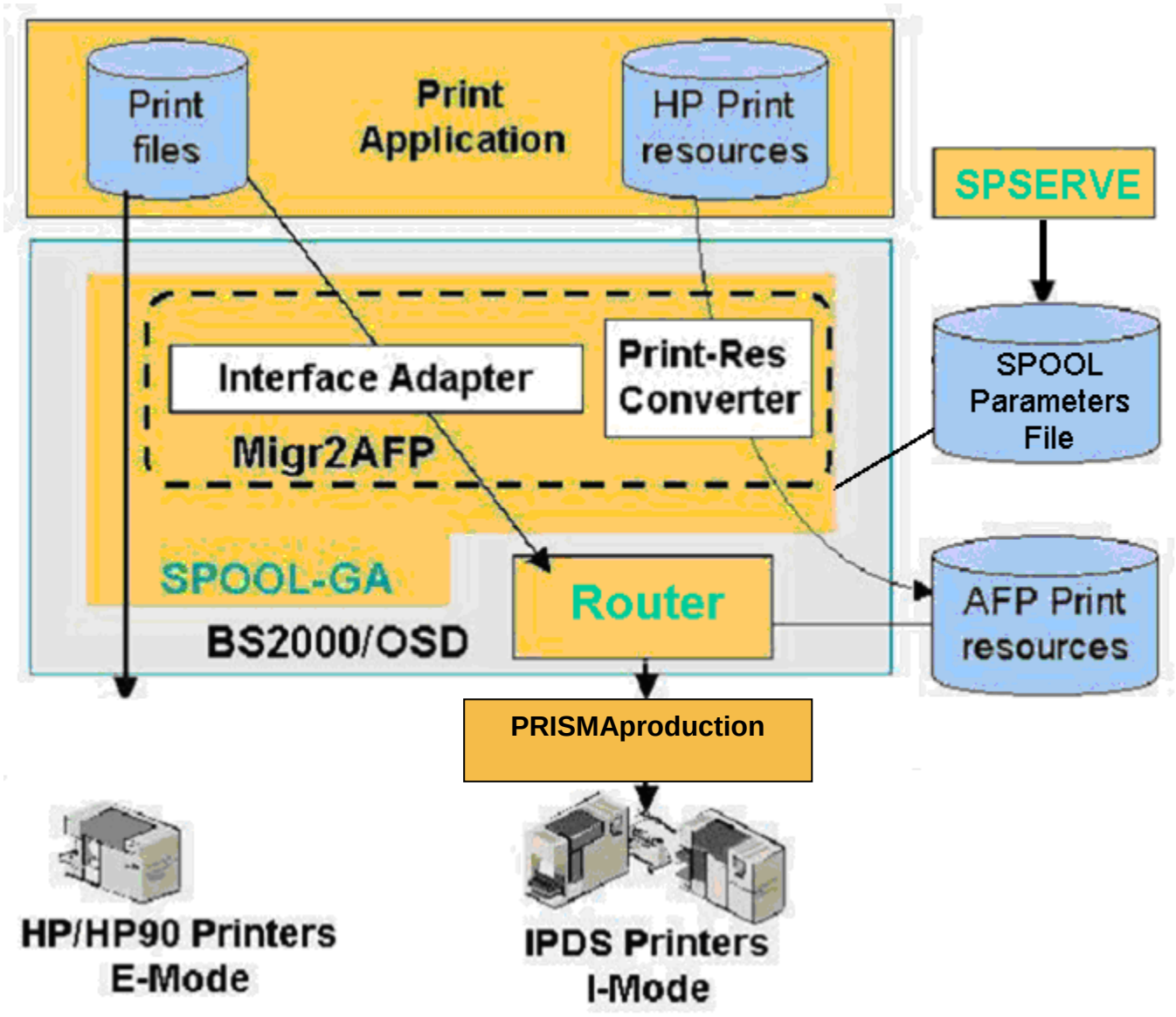

Figure 6: Migration to AFP - Step 1

- SPCONV: It leaves printing applications unchanged and provides a transparent way for print data conversion. A dedicated converter provides the key for HP line mode migration to IPDS. While a print resource converter utility can produce AFP print resource counterpart on basis of HP resources (VFB, character set, and FOB).
- SPSERVE: It lets the administrator define and manage the needed APA printing resources on basis of old HP and HP90 definitions.

Migration to AFP - Step 2

The second step of Migration to AFP deals with the support of BS2000 HP Page mode (also known as CONTROL=PHYSICAL) printing applications, achieving the support for online BS2000 HP printing applications. This function is realised by the HP2AFP product palette, a priced Océ option for the Router.

Print jobs containing model 2 escape sequences (X'FFyz') may now be converted into an AFP compliant document.

The processing is divided into two stages automatically:

- verification and modification of the print job attributes into an AFP suitable print job (First stage: Filtering)
- conversion of the document contents into an AFP data set (Second stage: Conversion)

This second stage can however be operated either automatically in the frame of the Transform technology of the BS2000/OSD Spool & Print Services, or as a normal application program with SDF interface..

PACK-AFP-RESOURCES

This function allows integrating the print-resources in the file to print itself, making the document fully portable. This function can be specified in the Router configuration.

Windows-to-BS2000 IPDS Printing

The former migration approach & strategy will grant our customer accessing another Printing World Dimension. Entering the AFP opens the corporate to a wide range of capabilities that was not provided with the usual Spool Printing model. By migrating to AFP, one can continue to print existing applications either without change or with added values. AFP can provide quality, throughput, and reliability profits. But its main benefits lie in the area of an integrated information management where the printing capability is just an aspect included into a new Communication dimension: the *Advanced Function Presentation*.

The Windows-to-BS2000 IPDS Printing is a products Suite of Fujitsu Technology Solutions that encompasses the ability of printing for Windows users onto IPDS high performance printers. It consists of the Wprint product that allows to print from a networked PC any kind of Windows document as transparent as for an office printer such as a laserjet or an inkjet. In addition to the print submission function, Wprint allows to track the print jobs evolution or even to discard them.

Provided with Windows printer drivers, any Windows documents can be reproduced according to the principle: what you see, it's what you print.

In a complementary way, the product Distributed Print Services (Dprint) provides the necessary software for print job management in a distributed printing environment towards an adequate BS2000 printer driver. This server sustained by a mainframe drives the conversion into AFP and compression of Windows print jobs document, freeing the PC of an heavy duty and so ensures better and more reliable performances gained by the power of mainframe.

Distributed Printing

The use of the optional product Dprint with the Router permits distribution of APA print jobs and thereby gives access to high-performance printers with graphics mode amongst different BS2000 systems.

The APA printers are used in conjunction with a central print server, where the server checks the resources. the Router only permits the use of server resources; no APA resources are transferred between client and server.

The installation is exactly the same as in the case of the model "One central printer server in one cluster" (see Dprint user guide). In addition, however, the Router must be installed and started on each system (client and server) wishing to use the APA printers.

Also interoperability between UNIX-based systems and BS2000 enables users to access the high speed APA printers provided the Router is loaded on the BS2000 gateway host and the BS2000 server to which the printer is connected. A user can reach any Router defined on the BS2000 server, provided that it is defined in the Dprint configuration file of the BS2000 cluster. However, it should be noted that APA printers can only be addressed from UNIX-based systems by way of a printer pool name. This means that the routers must be defined in the configuration file as part of a Dprint printer pool. The UNIX user then specifies the printer pool together with the BS2000 cluster name as the destination specification.

The supported printer functions are heavily dependent on the available filters, however. the printing of text documents (consisting of data without printer commands) and of documents having structured fields (AFPDS format) is possible on any APA printer.

Software requirements:

- SPOOL must be loaded on the gateway host of the BS2000 cluster and on the BS2000 host to which the printer is connected (can also be the gateway).
- The Router must be loaded on the gateway host of the BS2000 cluster and on the BS2000 host to which the printer is connected (can also be the gateway).
- Xprint must be loaded at least on the gateway host of the Xprint domain (with the gateway package) and on the UNIX system on which the print job is issued (client).
- The client part of Dprint (subsystems DPRINTCL and DPRINTCM) must be loaded on the gateway host of the BS2000 cluster. The server part of Dprint (subsystem DPRINTSV) must be loaded on the BS2000 host to which the printer is connected. The software prerequisites pertaining to the individual products are described in the respective manuals.

Print Data Imaging

Getting printed documents back into the electronic data flow has always been a problem for archiving up to now. The Océ product IMAGESTREAM is a system that creates electronic copies of the printed paper. It takes AFP print data straight from the host and passes it to any archiving application with relevant recording and storing abilities. A one-to-one imaging of the 240 dpi data stream creates images of the print pages which are exact down to the last pixel along with an index and control information for later retrieval and search.

IMAGESTREAM behaves like a virtual I-Mode printer involving that printing application does not need to change.

Print Resources Issues

Modern printing systems offer a wide choice of application options. In consequence, the emphasis in printing has moved away from data generation functions to the production of layouts, (which includes selecting fonts and positioning and including graphics). Layout production tasks are increasingly being carried out on Windows platforms, since Windows offers far more options in this aspect than a BS2000 system could (WYSIWYG display capabilities, for instance).

However, users are then faced with the problems of exchanging data between both systems involving to find a reliable and standardised method for transferring the resources created on the PC to the host system, and solving the loss of print resources internal structure, encoding, and information.

To counter these problems, OPS Windows-based print resource generation programs produce fonts, overlays, macros, fobs, etc, in a so-called TRANS format. This transport format is supported in BS2000/OSD for all AFP print resource objects though the TRANSCON program for the SPSLIB management.

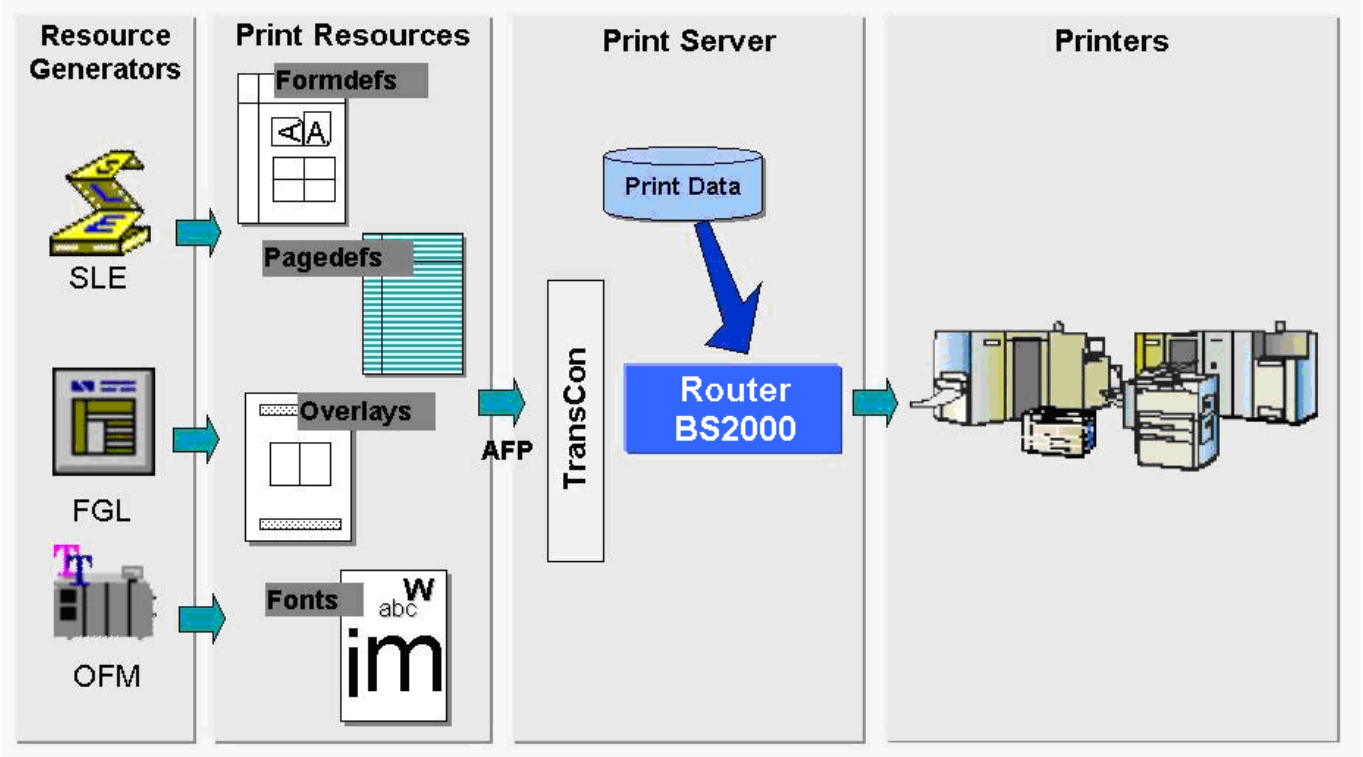

Figure 7: Print Resources Management

OPS high-performance printers provide everything you need for volume production of high impact, high quality documents – all at top output speed. Among the typical applications are the printing of bank account statements or invoices from energy providers and utilities. These print jobs generally consist of variable data and permanent elements. Customer addresses and the amounts to be paid would be the variable data, while the fonts and forms with the company logo in highlight colour would constitute the permanent elements (or resources). The page description (layout) is also a permanent element. The layout determines which data is to be printed, how it is to be arranged, and which forms are to be used.

Resource Generator

The Océ Document Designer allows users of OPS high performance printers to design layouts, develop forms and generate fonts.

The programs is designed as Windows applications with

- a graphical user interface,
- menu-driven functionality,
- an integrated help system.

The graphical user interface – or GUI – masks the technical details of generating resources, leaving you to concentrate on creation and design. Print preview and proof print features make it easier to evaluate the new resources.

The program is precisely tuned to match the features and performance capabilities of the OPS print servers and high performance printers.

Printing Tasks using the Router/BS2000

This chapter describes how you can use the Router for BS2000/OSD in your particular environment to meet your printing needs.

Printing Centralized Production Output with Post Processing

An investment brokerage firm delivers thousands of statements a week to its clients. To meet weekly print deadlines and control costs, the brokerage firm wants to use a high-speed printer.

Here is how this brokerage firm can use the Router for BS2000/OSD and its related products to meet the firm's requirements:

- The brokerage firm uses SLE to create page definitions and form definitions and FGL to create overlays. These resources are then uploaded and stored into a BS2000 resource library (SPSLIB).
- A batch application submits print files to the SPOOL subsystem.
- SPOOL selects the print job to be printed on high-speed printers. the Router collects the data and optionally the resources to de sent.
- The post-processor attachments on the printer slit and merge the statements and then stuff them in envelopes for mailing.

Figure 9 shows how the Router directs a high volume of data to high-speed printers with automated post processing.

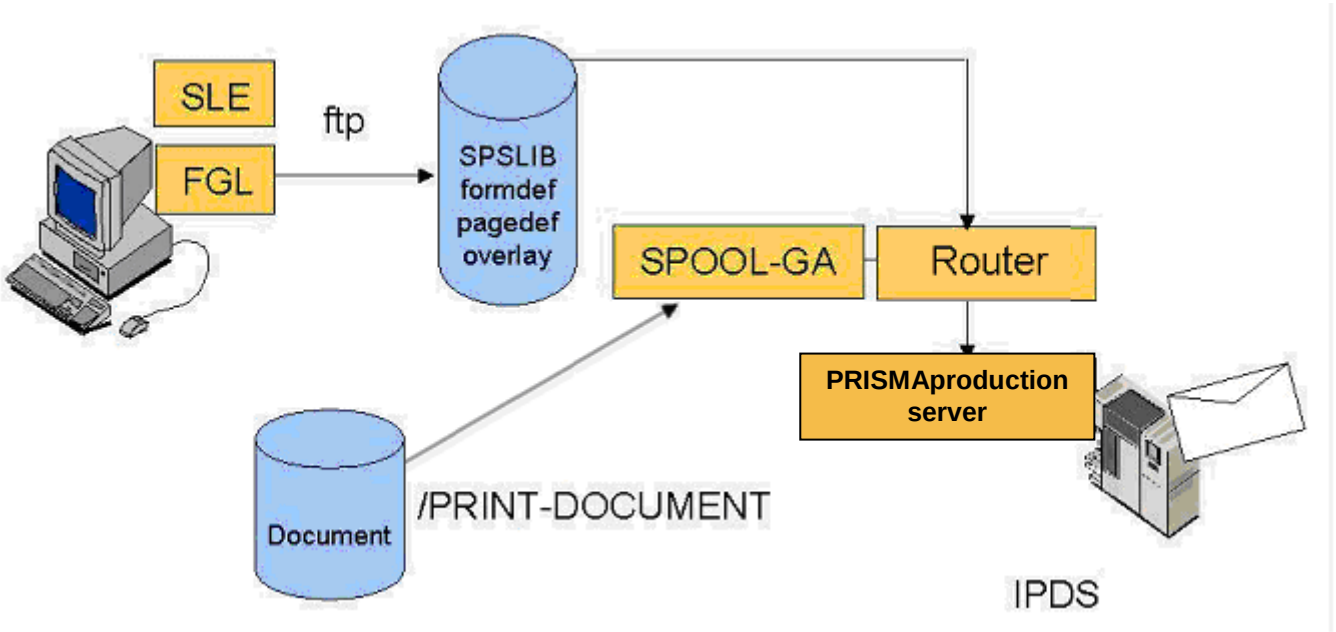

Figure 8: Printing Centralized Production Output with Post Processing

Printing Documents from the Web

A market research firm wants to print Web documents on a high-speed BS2000 supported IPDS printer.

Here is how this company can use the Wprint/DPRINT/Router for BS2000/OSD components to meet its requirements:

- From a workstation, user views document from the Web using a browser or through the IBM AFP Viewer plug-in if the document is in AFP format.
- The user submits the document for printing using the standard print-submission method provided with the browser or viewer. The user selects the printer defined for BS2000 printout.
- The Fujitsu Technology Solutions printer driver creates an output file in a meta file format. The Wprint port monitor automatically transmits the output file across the TCP/IP LAN to the Dprint (Windows) print server component.

- The Dprint component creates an output data set in the desired printing language (AFP in this case) and submits it to the BS2000 distributed print services with additional printing options defined by the Print administrator.
- The Router sends the AFP data set on the PRISMAproduction server for processing.

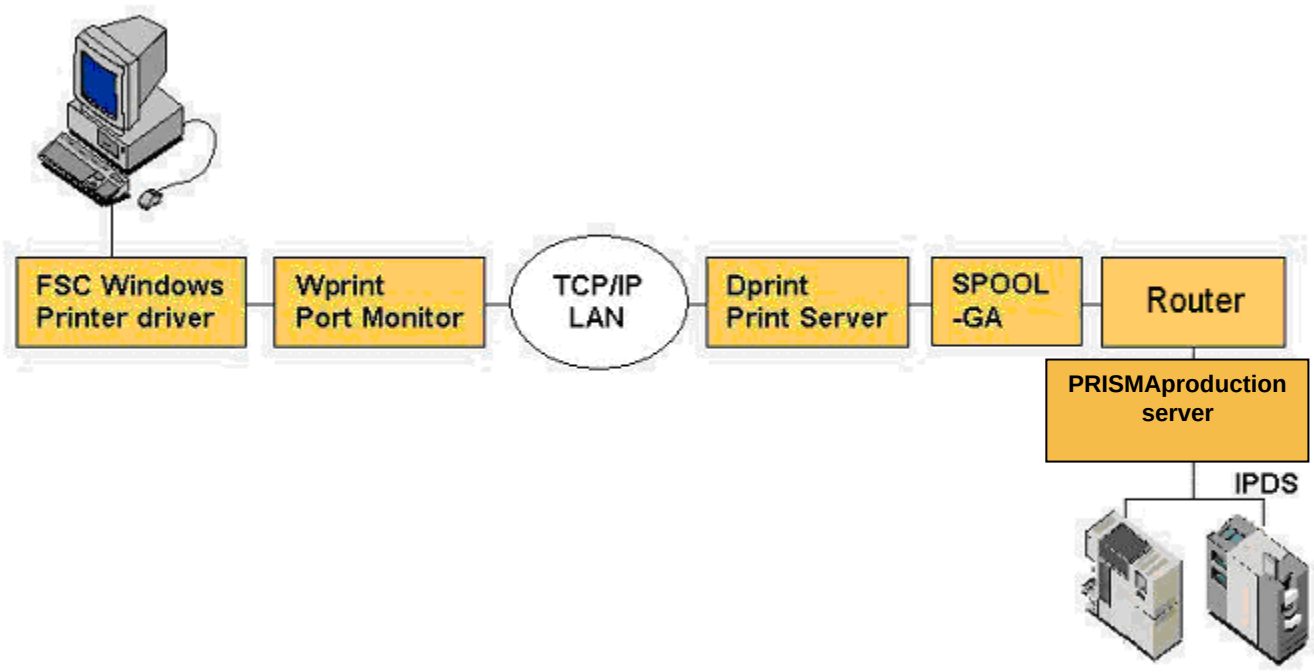

Figure 9: Printing from Windows to BS2000 managed IPDS printers

Formatting Printed Output for Distribution to Remote Printers

A financial institution wants to print bank statements and reports at each of its branch offices throughout Europe with the confidence that every statement is printed, but not duplicated.

Here is how this financial institution can use the Router and related products to meet its requirements:

- The financial institution generates statements, segments the statements by branch office, and stores them in separate files for printing.
- Those separate files are submitted to the Print services with regards to the desired destination (in fact a distributed printer pool name).
- Dprint selects the print job to be printed and then transmits the print files with associated print attributes to the concerned server where the Router in installed. The printer notifies PRISMAproduction through IPDS about any errors encountered while printing. The error recovery capabilities ensure that each statement is printed and not duplicated, as long as the documented operational procedures are followed.

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