

z/OS



Infoprint Server Introduction

z/OS



Infoprint Server Introduction

Note:

Before using this information and the product it supports, read the information in "Notices" on page 31.

This edition applies to these IBM products:

- Version 1, Release 12 of z/OS (program number 5694-A01)
- Version 2, Release 1 of Infoprint Coaxial Printer Support for z/OS (program number 5655-N62)

This edition applies to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces S544-5742-09.

Internet

Visit our home page: <http://www.ibm.com>

You can send comments by e-mail to printpub@infoprint.com or by mail to:

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About this publication

This publication is an overview of Infoprint® Server, which is a separately priced feature of z/OS®. This publication applies to z/OS Version 1 Release 12.

This overview includes the benefits of Infoprint Server, how you can use it, and how it works.

Who should read this publication

This publication is for managers, print administrators, and any other users who need to understand the benefits and capabilities of Infoprint Server.

How this publication is organized

This publication is organized into chapters to help you obtain the information you need about Infoprint Server. Instead of reading the entire publication, you can read only the chapters that apply to you:

- Chapter 1, “What Infoprint Server can do for you” explains the overall benefits that Infoprint Server provides.
- Chapter 2, “Using Infoprint Server” contains several scenarios that explain how you can use Infoprint Server in various printing situations.
- Chapter 3, “Understanding the components of Infoprint Server” explains how Infoprint Server works, and explains its components.

The Infoprint Server glossary is located in *z/OS Infoprint Server Customization*.

Where to find more information

This section describes where to find information related to z/OS and Infoprint Server.

Web sites

These Web sites contain related information:

This site:	Contains:
www.ibm.com	Downloads for these products: <ul style="list-style-type: none">• Infoprint Port Monitor for Windows®• AFP™ Viewer plug-in for Windows• InfoPrint AFP Printer Driver for Windows• lprafp command
http://www.ibm.com/systems/z/os/zos/	Information about z/OS
http://www.ibm.com/systems/z/os/zos/bkserv/	z/OS documentation, including: <ul style="list-style-type: none">• All z/OS publications• Updates from APARs and PTFs
http://www.ibm.com/redbooks	IBM® redbooks, including one for Infoprint Server
http://www.ibm.com/systems/z/os/zos/features/unix/	Information about z/OS UNIX System Services

Preventive Service Planning information

Before installing Infoprint Server, you should review the current Preventive Service Planning (PSP) information, also called the *PSP bucket*. You should also periodically review the current PSP information. The PSP upgrade ID depends on your z/OS operating system, for example: ZOSV1R12. The subset for Infoprint Server is: INFOPRINT.

To obtain the current PSP bucket, contact the IBM Support Center or use z/OS SoftwareXcel (IBMLink™). If you obtained z/OS as part of a CBPDO, HOLDDATA and PSP information is included on the CBPDO tape. However, this information might not be current if the CBPDO tape was shipped several weeks prior to installation.

Infoprint Server migration information

For information about the tasks required to migrate from previous releases, see:

Publication	Form number
<i>z/OS Migration</i> Describes the tasks required to migrate to z/OS V1R12. Includes the migration tasks for Infoprint Server.	GA22-7499
<i>z/OS Summary of Message and Interface Changes</i> Describes new and changed messages and interfaces in z/OS V1R12. Includes the messages and interfaces for Infoprint Server.	SA22-7505
<i>z/OS Infoprint Server Customization</i> Describes the tasks required to migrate to IP PrintWay™ extended mode from IP PrintWay basic mode. Also, describes the tasks required to use the new functions introduced in z/OS V1R12.	S544-5744
<i>Infoprint Transforms to AFP for z/OS</i> Describes the tasks required to migrate to Infoprint Transforms to AFP V2.2 from Infoprint Transforms to AFP V2.1.	G550-0443
<i>Infoprint Transforms from AFP for z/OS</i> Describes the tasks required to migrate to Infoprint Transforms for AFP V2.1 from Infoprint Server Transforms V1.1.	G550-0444

For information about new functions in z/OS V1R12, see:

Publication	Form number
<i>z/OS Infoprint Server Introduction</i> Describes new functions in Infoprint Server for z/OS V1R12.	S544-5742
<i>z/OS Introduction and Release Guide</i> Describes new functions in z/OS V1R12, including new functions in Infoprint Server.	GA22-7502

Publications

This section lists related publications that can help you use Infoprint Server, Infoprint Transforms V2.1, and other transform products. For a list of the publications referred to in this publication, and for publications that contain

additional information about related products, see “Bibliography” on page 35. For publications for all z/OS products, see *z/OS Information Roadmap*.

Table 1. Publications for Infoprint Server

Publication	Form number
<p><i>z/OS Infoprint Server Introduction</i></p> <p>Introduces Infoprint Server. This publication contains printing scenarios that show how you can use Infoprint Server in your installation.</p>	S544-5742
<p><i>z/OS Infoprint Server Customization</i></p> <p>Describes customization tasks for Infoprint Server. This publication describes Infoprint Server environment variables, configuration files, startup procedures, how to write exit routines and filter programs, and how to use the Infoprint Server API.</p>	S544-5744
<p><i>z/OS Infoprint Server Operation and Administration</i></p> <p>Describes operator procedures and administrative tasks for Infoprint Server. This publication describes how to start and stop Infoprint Server and how operators can use Infoprint Central. It describes how administrators can create entries in the Printer Inventory using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program and define NetSpool™ printer LUs to VTAM®.</p>	S544-5745
<p><i>z/OS Infoprint Server Printer Inventory for PSF</i></p> <p>Describes the Printer Inventory for PSF for PSF customers who do not purchase an Infoprint Server license. It describes the tasks required to customize Infoprint Server, start and stop Infoprint Server, create PSF FSS and FSA definitions in the Printer Inventory, and diagnose problems in Infoprint Server.</p>	S544-5745
<p><i>z/OS Infoprint Server User's Guide</i></p> <p>Describes user tasks for Infoprint Server. This publication describes how to submit print jobs from remote systems (including Windows systems), the local z/OS system, and Virtual Telecommunications Access Method (VTAM) applications. It describes z/OS UNIX commands; the AOPPRINT JCL procedure; the AOPBATCH program; DD and OUTPUT JCL parameters that Infoprint Server supports; and how to download and install the Infoprint Port Monitor for Windows.</p>	S544-5746
<p><i>z/OS Infoprint Server Messages and Diagnosis</i></p> <p>Describes messages from Infoprint Server. This publication also describes how to use Infoprint Server tracing facilities to diagnose and report errors.</p>	G544-5747

Table 2. Publications for IBM transform products

Publication	Form number
<p><i>Infoprint Transforms to AFP for z/OS</i></p> <p>Describes IBM Infoprint Transforms to AFP V2.1 for z/OS (5655-N60). This publication describes using transforms, customizing transforms, administering transforms, diagnosing errors, messages, and migrating from Infoprint Server Transforms V1.1.</p>	G550-0443

Table 2. Publications for IBM transform products (continued)

Publication	Form number
<p><i>Infoprint Transforms from AFP for z/OS</i></p> <p>Describes V2.1 of these IBM products:</p> <ul style="list-style-type: none"> • Infoprint Transform for AFP to HP PCL for z/OS (5655-P19) • Infoprint Transform for AFP to Adobe® PDF for z/OS (5655-P20) • Infoprint Transform for AFP to Adobe PostScript® for z/OS (5655-P21) <p>This publication describes using transforms, customizing transforms, administering transforms, diagnosing errors, messages, and migrating from Infoprint Server Transforms V1.1.</p>	G550-0444
<p><i>Infoprint XT Extender for z/OS: Customization and Usage</i></p> <p>Describes how to customize and use Infoprint XT™ Extender for z/OS (5655-J65).</p>	S544-5879

Table 3. Publications for InfoPrint Solutions Company transform products

Publication
<p><i>InfoPrint Transform Manager for Linux®</i></p> <p>Describes InfoPrint Transform Manager for Linux transforms, including functions, limitations, and transform options.</p>
<p><i>InfoPrint Transform Manager for Linux: afp2pdf Transform Installation and User's Guide</i></p> <p>Describes the InfoPrint Transform Manager for Linux AFP to PDF transform, including functions, limitations, and transform options.</p>

Infoprint Server online help

The Infoprint Server ISPF panels contain integrated online help for each panel and field. To view the help, place your cursor on a panel or in a field on a panel and press the Help function key (F1).

Infoprint Central contains an integrated online help system. To view the help system, select the question mark (?) in the left navigation bar. To view the help for a particular Web page, select the question marks (?) or the **Help** buttons on the Web page.

The z/OS Basic Skills Information Center

The z/OS Basic Skills Information Center is a Web-based information resource intended to help users learn the basic concepts of z/OS, the operating system that runs most of the IBM mainframe computers in use today. The Information Center is designed to introduce a new generation of Information Technology professionals to basic concepts and help them prepare for a career as a z/OS professional, such as a z/OS system programmer.

Specifically, the z/OS Basic Skills Information Center is intended to achieve the following objectives:

- Provide basic education and information about z/OS without charge
- Shorten the time it takes for people to become productive on the mainframe
- Make it easier for new people to learn z/OS.

To access the z/OS Basic Skills Information Center, open your Web browser to the following Web site, which is available to all users (no login required):
<http://publib.boulder.ibm.com/infocenter/zoslnctr/v1r7/index.jsp>

How to send your comments to IBM

We appreciate your input on this publication. Feel free to comment on the clarity, accuracy, and completeness of the information or give us any other feedback that you might have.

Use one of the following methods to send us your comments:

1. Send an e-mail to printpub@infoprint.com
2. Visit the Contact z/OS Web page at <http://www.ibm.com/servers/eserver/zseries/zos/webqs.html>
3. Mail the comments to the following address:
IBM Corporation
6300 Diagonal Hwy 002J
Boulder, CO 80301-9270
U.S.A.

Include the following information:

- Your name and address
- Your e-mail address
- Your telephone or fax number
- The publication title and order number:
z/OS V1R12.0 Infoprint Server Introduction
S544-5742-10
- The topic and page number related to your comment
- The text of your comment.

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

IBM or any other organizations will only use the personal information that you supply to contact you about the issues that you submit.

If you have a technical problem

Do not use the feedback methods listed above. Instead, do one of the following:

- Contact your IBM service representative
- Call IBM technical support
- Visit the IBM zSeries support Web page at <http://www.ibm.com/servers/eserver/support/zseries/>.

Summary of changes

Summary of changes for S544-5742-10 z/OS Version 1 Release 12

This publication contains information previously presented in S544-5742-09, which supports z/OS Version 1 Release 8 through Version 1 Release 11.

New information

- Information about new functions in z/OS V1R12 has been added. See “What’s new in z/OS Version 1 Release 12” on page 8.
- Information about Infoprint Port Monitor V3.0 has been added. See “Windows workstation support” on page 27.

Deleted information

- Information about IBM Infoprint XML Extender for z/OS (5655-J66) has been removed because IBM no longer supports this product.

The “Readers’ Comments - We’d Like to Hear from You” section at the back of this publication has been replaced with a new section “How to send your comments to IBM” on page xiii. The hardcopy mail-in form has been replaced with a page that provides information appropriate for submitting readers comments to IBM.

You may notice changes in the style and structure of some content in this document—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

Summary of changes for S544-5742-09 z/OS Version 1 Release 8 through Version 1 Release 11

This publication contains information previously presented in S544-5742-08, which supports z/OS Version 1 Release 8 through Version 1 Release 11.

It contains information for these PTFs:

- UA31145: Adds support for the AFP to PDF transform that InfoPrint® Transform Manager for Linux provides
- PTF UA37619: Adds support for AFP Download Plus and for the Printer Inventory for PSF

New information

Information has been added about new functions.

Changed information

- The InfoPrint Solutions Company now owns these former IBM products:
 - lprafp command
 - InfoPrint Manager for AIX®
 - InfoPrint Manager for Windows
 - InfoPrint Transform Manager for Linux
 - Network Printer Manager for the Web

This document contains terminology, maintenance, and editorial changes, including changes to improve consistency and retrievability.

Chapter 1. What Infoprint Server can do for you

Infoprint Server is an optional feature of z/OS that uses z/OS UNIX System Services. This feature is the basis for a total print serving solution for the z/OS environment. It lets you consolidate your print workload from many servers onto a central z/OS print server.

Infoprint Server delivers improved efficiency and lower overall printing cost with the flexibility for high-volume, high-speed printing from anywhere in the network. With Infoprint Server, you can reduce the overall cost of printing while improving manageability, data retrievability, and usability.

Some highlights of Infoprint Server are:

- **IP PrintWay**

Provides fast access to TCP/IP-connected printers and to Virtual Telecommunications Access Method (VTAM)-controlled printers.

- **NetSpool**

Automatically directs VTAM application data to the job entry subsystem (JES) spool without requiring application changes.

- **Print Interface**

Receives print requests from clients that run on remote systems, such as Windows and UNIX® systems, and directs data to the JES spool. Accepts data in a variety of formats, including: Advanced Function Presentation™ (AFP), plain text, Printer Control Language (PCL), Portable Document Format (PDF), and PostScript formats. Also provides commands that let you print from z/OS UNIX System Services.

- **Infoprint Central**

Lets help desk operators and other authorized users or job submitters work with print jobs, printers, and NetSpool logical units (LUs); display printer definitions; and check system status. Infoprint Central is a Web-based print management system.

In addition, Infoprint Server works with separately-priced transform products from IBM and InfoPrint Solutions Company. Infoprint Server can automatically transform data streams from one format to another before the data is printed or sent to an e-mail destination. For example, you can use the PDF to AFP transform to convert documents in PDF format to AFP format.

Administrators can set up the transforms to automatically transform documents before they are printed. Users can also use the z/OS UNIX command line to transform documents, which can then be saved in the converted format and later printed or sent to other users.

These topics discuss how printing requirements are changing. They explain why print consolidation with z/OS is the best way to handle printing, describe how Infoprint Server supports printing in the z/OS environment, and explain how Infoprint Server can benefit you.

How printing requirements are changing

With the advent of local area networks (LANs) and new information technologies, printing requirements are changing. For example:

Applications need to print on LAN printers and host printers

Businesses that print statements, such as banking statements, invoices, and bills of materials, need to print both on LAN-attached printers and on higher-volume, host-attached printers. Traditionally, VTAM applications, such as Customer Information Control System (CICS[®]) and Information Management System (IMS[™]), have printed such business statements on coaxially-attached Systems Network Architecture (SNA) printers. Now, these VTAM applications need to print on LAN-attached printers or on high-volume host printers.

Workstation users want to print on host printers

Workstation users want to print documents, such as memos, e-mail, Web documents, and manuals on LAN-attached PCL and PostScript printers. They also want to print on higher-speed, host-attached printers.

Users want easy-to-use software

Users want easy-to-use graphical user interfaces (GUIs) to handle the complex tasks of printing and managing printers.

Applications need to print and run on the same system

Many line-of-business applications, such as payroll, accounting, and inventory-control applications, need to print on the same system where the data resides. Whether these applications are z/OS batch applications or z/OS UNIX System Services applications, they need to print on host-attached printers.

Companies require more print servers

Companies with a combination of stand-alone and host-connected LANs that use a variety of network operating systems and protocols need more print server capacity to meet their distributed printing needs. Adding more print servers increases printing costs.

These requirements introduce new issues:

- How to handle the wide range of printers and formatting options available in an environment and let users of traditional terminals and distributed workstations share these printers.
- How to print from host-based applications that have been ported to z/OS UNIX System Services without reengineering their printing functions.
- How to reduce costs by reducing the number of print servers.

How to handle the changing printing requirements

Print server consolidation is the best way to handle the changing printing requirements. Why? One central print server in a network is more cost-effective than a distributed solution with printers attached to many different LAN servers or local desktop computers. Consolidating onto a central print server lets you use the right printer for specific print jobs.

z/OS with Infoprint Server lets you consolidate your print workload from many servers to a central z/OS print server. z/OS handles high volume printing, logs accounting histories, and provides data security and recovery. With z/OS, you can control host and LAN printing. You do not need to continually upgrade your server so it can handle more print requests.

Figure 1 illustrates the printing solutions that Infoprint Server provides. No matter what type of data you want to print (payroll, invoices, Web documents, sales reports), you can use z/OS batch applications, VTAM applications, applications running on remote workstations, and z/OS UNIX System Services applications to send print requests to Infoprint Server. Infoprint Server then sends the documents to be printed to local printers and remote printers in your TCP/IP or SNA network. Infoprint Server can also send documents over the Internet to printers that use the Internet Printing Protocol (IPP) and to one or more e-mail addresses.

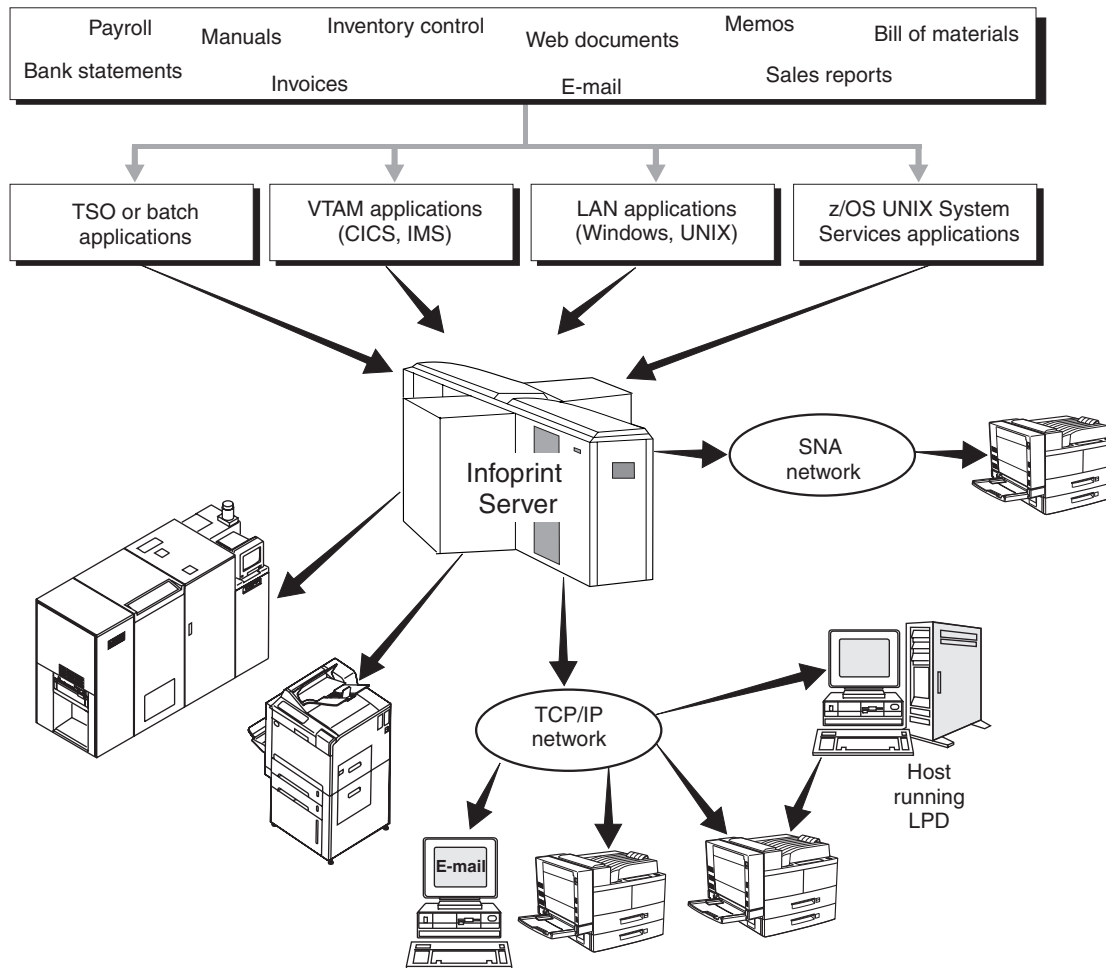


Figure 1. How Infoprint Server handles printing requirements

How Infoprint Server handles printing

Infoprint Server uses the JES spool, one of the most powerful print spoolers available, to manage the printers on z/OS.

In addition to the JES spool's traditional functions of scheduling and recovering print jobs, Infoprint Server has enhanced the use of the JES spool in these ways:

- Users can submit documents to the JES spool in any data format, such as:
 - ASCII text

- Printer Control Language (PCL)
- Portable Document Format (PDF)
- PostScript
- SCS and 3270 data (from VTAM applications)
- Xerox
- Files on the JES spool can print not only on the traditional array of JES-controlled printers and printers driven by Print Services Facility™ (PSF), but also on ASCII printers in a TCP/IP network and on VTAM-controlled printers in an SNA network. Using Infoprint Server, files on the JES spool can also be sent over the Internet to IPP-enabled printers and to e-mail destinations.

Infoprint Server components

Infoprint Server provides these components:

Printer Inventory

Provides a single set of printer definitions that all the components of Infoprint Server use. The Printer Inventory also contains printer customization information that Print Services Facility (PSF) uses.

Print Interface

Provides these functions:

- A line printer daemon (LPD) that extends JES2 and JES3 print capabilities to users and application programs in a TCP/IP network environment.
- Printing support for users and application programs in the z/OS UNIX System Services environment.
- Printing support for users and application programs in the SAP R/3 environment.
- Support for these Windows printing protocols:
 - Server Message Block (SMB)
 - Internet Printing Protocol (IPP)

z/OS UNIX System Services printing commands

Let z/OS UNIX System Services environment applications submit print, query, and cancel requests to Print Interface.

NetSpool

Directs VTAM application data to the JES spool without requiring application program changes.

IP PrintWay

Directs JES2 or JES3 print data from z/OS to a printer in the TCP/IP or SNA network or to another system's spool. IP PrintWay uses the line printer requester/line printer daemon (LPR/LPD) protocol, direct socket printing, or the Internet Printing Protocol (IPP) to transmit data to printers in a TCP/IP network. IP PrintWay uses VTAM services to transmit data to printers in an SNA network. IP PrintWay uses the z/OS UNIX sendmail function to transmit data to one or more e-mail addresses.

Transform Interface

Communicates with transform products that IBM and the InfoPrint Solutions Company provide. Transforms convert data from one format to another. For example, from PDF to AFP format, or from AFP to PCL format.

Infoprint Central

Lets help desk operators and other authorized users or job submitters work with print jobs, printers, and NetSpool logical units (LUs); display printer definitions; and check system status. Infoprint Central is a Web-based print management system.

Infoprint Port Monitor for Windows

Automatically transmits documents to Print Interface for printing, letting users use familiar print-submission methods from Windows applications. Infoprint Port Monitor V3.0 runs on Windows Server 2003, Windows Server 2008, Windows 7, Windows Vista (Business Edition, Enterprise Edition), and Windows XP. You can use the SMB or IPP printing protocol instead of the Infoprint Port Monitor for Windows. However, the Infoprint Port Monitor for Windows lets you specify such things as the number of job copies and whether to print on one or both sides of the paper. It can also improve performance.

Note: The Infoprint Port Monitor V3.0 does not run on 64-bit Windows systems.

NetSpool and IP PrintWay are the strategic replacements for TCP/IP Network Print Facility (NPF) and provide improved usability, performance, capacity, and function.

You can configure Print Interface, NetSpool, and IP PrintWay independently. You determine how you want to configure these Infoprint Server components. For example, if you need to print batch jobs on remote printers, you can configure IP PrintWay. Then, as you need more function, you can configure more components.

Transform products

These IBM and InfoPrint Solutions Company transform products work with Infoprint Server. You can run the transforms as standalone commands from z/OS UNIX System Services, or you can run them automatically when you submit a job to print. The transforms are all separately priced products. You need to purchase the transforms only if you need to use them.

IBM Infoprint Transforms to AFP for z/OS, 5655-N60

Lets you transform documents to Advanced Function Presentation (AFP) format from HP Printer Control Language (PCL), Adobe Portable Document Format (PDF), Adobe PostScript, or SAP R/3 System Generic Output Format (SAPGOF). For more information, see *Infoprint Transforms to AFP for z/OS*.

IBM Infoprint Transform for AFP to HP PCL for z/OS, 5655-P19

Lets you transform documents from AFP format to PCL. For more information, see *Infoprint Transforms from AFP for z/OS*.

IBM Infoprint Transform for AFP to Adobe PDF for z/OS, 5655-P20

Lets you transform documents from AFP format to PDF. For more information, see *Infoprint Transforms from AFP for z/OS*.

IBM Infoprint Transform for AFP to Adobe PostScript for z/OS, 5655-P21

Lets you transform documents from AFP format to PostScript. For more information, see *Infoprint Transforms from AFP for z/OS*.

IBM Infoprint Coaxial Printer Support for z/OS, 5655-N62

Lets you transform line data to Data Stream Compatibility/Data Stream

Extended (DSC/DSE) or SNA Character String (SCS). IP PrintWay requires this transform to print on VTAM-controlled printers in an SNA network.

IBM Infoprint XT Extender for z/OS, 5655-J65

Lets you transform Xerox files to AFP format for printing or e-mailing. The Xerox files can be line-conditioned data streams (LCDS) or metacode data streams. XT is the IBM Xerox Transform technology. For more information, see *Infoprint XT Extender for z/OS: Customization and Usage*.

InfoPrint Solutions Company InfoPrint Transform Manager for Linux

Lets you transform documents to AFP format from Graphics Interchange Format (GIF), Joint Photographic Experts Group (JPEG) File Information Format (JFIF), PCL, PDF, PostScript, or Tagged Image File Format (TIFF). For more information, see *InfoPrint Transform Manager for Linux*.

It also lets you transform documents from AFP format to PDF format. For more information, see *InfoPrint Transform Manager for Linux: afp2pdf Transform Installation and User's Guide*.

Related products for Windows systems

These related IBM products run on Windows systems. You might want to use them if your installation has IBM AFP printers or AFP documents:

AFP Printer Driver for Windows

Creates output files in AFP format. Files in AFP format can be printed on IBM AFP printers.

AFP Viewer Plug-in for Windows

Lets you view documents in AFP format. For example, documents downloaded from the z/OS system or documents on the Web.

Benefits of using Infoprint Server

Users and application programs in a z/OS network, including LAN and z/OS UNIX System Services environments, can take full advantage of Infoprint Server's many benefits, including:

Access all defined printers

In today's network environments, printers are often attached to a single workstation or are only available to users of a LAN. Infoprint Server lets you define all of your printers in a centralized repository. Any user in the network can send print jobs from z/OS and LAN clients to any printer that is defined to Infoprint Server.

Because all components of Infoprint Server use the same printer definition, you only have to configure each printer in one place.

Handle print jobs effectively

Because print jobs are managed by the JES spool, they are secure and recoverable. z/OS accounting information for print jobs is logged automatically.

Detect and transform data streams

Infoprint Server can, in many cases, automatically detect the format of the data stream in print jobs. It can then make sure that the selected printer can print the data stream, thus saving paper and time.

Without requiring a separate transform product, Infoprint Server can transform:

- SCS and 3270 data from VTAM applications to line data for printing on IBM AFP printers, or to PCL data
- Text data to line data for printing on IBM AFP printers
- Line data to text data for printing on ASCII printers

With an Infoprint transform product, Infoprint Server supports printing data streams such as PCL, PDF, and PostScript on IBM AFP printers. It also supports printing data in AFP format on ASCII printers. Infoprint Server protects your investment in printer hardware while providing you with printing enhancements.

Query job status

Users of network printing solutions today spend unnecessary time going to the printer to see if their jobs have printed. If they don't find them immediately, they might resubmit the jobs several times without knowing why they haven't printed. With Infoprint Server, users in the LAN and UNIX System Services environments can query the status of their print jobs to find out if a job is processing or is complete. Local system users can wait for the server to notify them that the job is complete. The users save time, and the business saves paper.

Create AFP output from Windows applications

Because of its capabilities for automatic resource management, error recovery, integrated accounting, and printing from 10 to over 1000 pages per minute without application changes, AFP offers an outstanding solution for high-speed printing. The AFP Printer Driver for Windows creates output in AFP format. Therefore, you can print output from any Windows application, such as Lotus® WordPro or Freelance, on any of IBM's AFP printers.

The AFP Printer Driver for Windows is not part of Infoprint Server. However, you can download it at no extra charge from the Web at: www.ibm.com. Search for "AFP Print Driver".

Browse AFP documents on the Web

Many z/OS applications generate documents that are formatted for AFP/Intelligent Printer Data Stream (IPDS™) printers. You might need to view those documents in an archival system or on a Web server from your desktop. The AFP Viewer plug-in for the Netscape Navigator and Microsoft® Internet Explorer Web browsers lets you view AFP documents from your Web browser. You can also use Infoprint Server to print documents that you are viewing from a Web browser to any defined printer.

The AFP Viewer plug-in is not part of Infoprint Server. However, you can download it at no extra charge from the Web: www.ibm.com. Search for "AFP Viewer".

Send print output to e-mail addresses

With Infoprint Server, you can send print output to one or more e-mail addresses. This support lets you easily distribute documents over the Internet and lets e-mail recipients view the output and print it only when necessary.

Some features of e-mail support are:

- IP PrintWay sends each document as an e-mail attachment.

- The data in the attachment can be in any format, including PDF, PostScript, AFP, and text format.
- Data can be transformed to another format that is suitable for viewing on a workstation. For example, you can transform:
 - Traditional line data and VTAM application data (for example, CICS and IMS data) to text format.
 - Traditional line data, VTAM application data, and AFP data to PDF or PostScript format. An Infoprint transform product is required.
 - PCL data and PostScript data to AFP format. An Infoprint transform product is required.
- When you use IP PrintWay to print VTAM application data, you can send output to an e-mail address list and print it at the same time.

Work with print jobs and printers

With Infoprint Central, help desk operators and other authorized users or job submitters can work with print jobs, printers, and NetSpool logical units (LUs); display printer definitions; and check system status. Infoprint Central works with IP PrintWay extended mode. Infoprint Central is a Web-based print management system.

What's new in z/OS Version 1 Release 12

Infoprint Server has been enhanced in z/OS Version 1 Release 12 with new capabilities that let you print more output through Infoprint Server. Changes include:

- The IP PrintWay extended mode component of Infoprint Server can now print a greater number of data sets in the same print job (JES output group). This means that you can now submit jobs that create a large number of output data sets on the JES spool, up to the limit that JES allows.
- Infoprint Server now supports a greater number of jobs active in the system at one time, up to the maximum that JES currently allows.
- The Infoprint Server Line Printer Daemon (LPD) can now receive files larger than 2 GB. This means that you can use a TCP/IP LPR command or the Infoprint Server Port Monitor for Windows client to print large files through Infoprint Server.
- Infoprint Server now gives higher priority to processing existing print jobs (spooling and printing jobs) versus receiving new print jobs. This change is expected to improve throughput of existing print jobs.
- Infoprint Central now lets authorized users see information about all the documents (output data sets) in a print job, up to a limit that the administrator can set.

In addition, Infoprint Port Monitor V3 for Windows runs on additional Windows platforms and provides new function:

- Runs on Windows Server 2003, Windows Server 2008, Windows 7, Windows Vista (Business Edition, Enterprise Edition), and Windows XP
- Supports Windows Terminal Services and Windows fast user switching

Note: The Infoprint Port Monitor V3.0 does not run on 64-bit Windows systems.

Chapter 2. Using Infoprint Server

These scenarios describe how you can use Infoprint Server in your particular environment to meet your printing needs:

- Printing CICS or IMS output data on network printers
- Printing z/OS UNIX System Services data on AFP printers
- Printing Web documents using the Windows SMB protocol
- Printing Web documents using the Infoprint Port Monitor for Windows
- Printing documents over the Internet using the Internet Printing Protocol
- Printing from batch applications to network printers
- Printing AFP data from batch applications on LAN-based PCL printers and sending it to e-mail destinations
- Creating and printing AFP documents from Windows
- Printing SAP R/3 documents on AFP printers

These scenarios are examples of printing situations, but do not represent all situations that exist. Each scenario includes a figure that shows which components are used. The components are shaded in the figures. If you are viewing the PDF file, Infoprint Server components are displayed in yellow, while the Infoprint transform products are displayed in blue.

The transform products are:

- IBM Infoprint Transforms to AFP for z/OS (5655-N60)
- IBM Infoprint Transform for AFP to HP PCL for z/OS (5655-P19)
- IBM Infoprint Transform for AFP to Adobe PDF for z/OS (5655-P20)
- IBM Infoprint Transform for AFP to Adobe PostScript for z/OS (5655-P21)
- IBM Infoprint Coaxial Printer Support for z/OS (5655-N62)
- InfoPrint Solutions Company InfoPrint Transform Manager for Linux

Printing CICS or IMS output data on network printers

A large international manufacturing company recently has configured a LAN and has purchased network printers to replace its coaxially-attached SNA printers. This company wants to print inventory control reports from its CICS and IMS applications to the network printers, instead of to its usual set of SNA printers. The company wants to route the reports to one or more remote locations, such as warehouses, docks, and the plant floor, while taking advantage of the security, accounting, and recovery capabilities of z/OS.

Here is how this company can use the Infoprint Server components to meet its requirements:

1. The CICS or IMS applications submit print requests by using VTAM in the same way as they submit print requests to SNA printers. No changes to the CICS or IMS applications are necessary.
2. The NetSpool component intercepts the print requests and creates output data sets on the JES spool, using JES output parameters defined by the administrator. The JES output parameters specify routing information that IP PrintWay uses to transmit the output to a particular network printer.
3. The IP PrintWay component transmits the output data sets from the JES spool to one or more network printers on the TCP/IP network. The z/OS IP security function can encrypt the data.

Figure 2 shows how Infoprint Server directs the data to network printers.

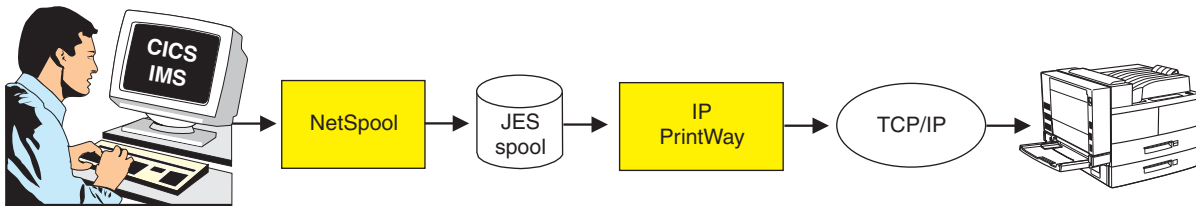


Figure 2. Printing CICS or IMS output data on network printers

Printing z/OS UNIX System Services data on AFP printers

A mid-size retailer runs UNIX applications that have been ported to z/OS UNIX System Services. Until now, the applications have printed business statements to PostScript printers controlled by a print server that runs on a UNIX system. Now, the retailer wants to use a higher-speed AFP printer attached to an IBM System z® for more efficient printing.

Here is how this retailer can use the Infoprint Server components and the Infoprint transform products to meet its requirements:

1. The UNIX user logs onto z/OS UNIX System Services by using the **rlogin** function.
2. Using the z/OS UNIX System Services printing commands that Infoprint Server provides, the UNIX applications print directly to the Print Interface component.
3. The Print Interface component automatically calls the Infoprint transform product to convert PostScript or PDF documents to AFP format.
4. The Print Interface component creates output data sets on the JES spool.
5. PSF selects the output data sets from the JES spool and prints them on an AFP printer. If the retailer has more than one AFP printer, the first available printer can print the data sets.

Figure 3 shows how Infoprint Server directs z/OS UNIX System Services data to AFP printers.

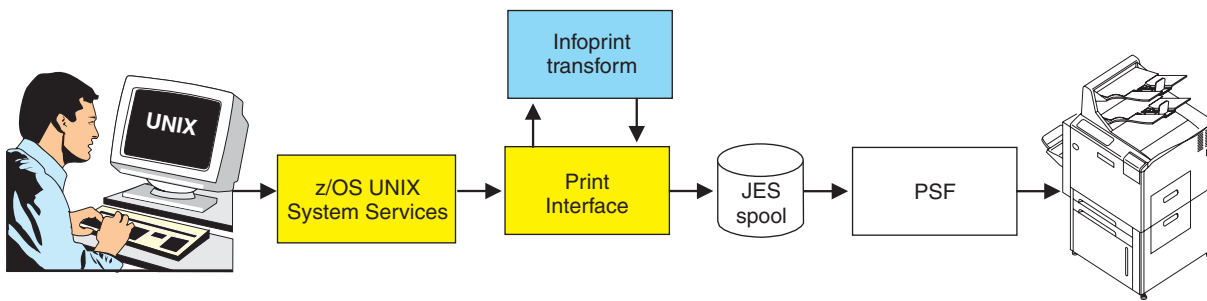


Figure 3. Printing z/OS UNIX System Services data on AFP printers

Tip: Users can also submit print requests from UNIX workstations by using the **lpr** command or the **lprafp** command.

Printing Web documents using the Windows SMB protocol

A market research firm wants to print Web-based documents on LAN-based PostScript printers and on an AFP printer. This company wants to use the standard Windows SMB protocol to submit print requests.

1. From a Windows workstation, a user views a document from the Web using a browser, such as Microsoft Internet Explorer.
2. The user submits the document for printing using the standard print-submission method that the browser provides. The user selects a z/OS printer that is defined to the z/OS SMB server and Infoprint Server, which might be a PostScript printer or an AFP printer. The printer driver associated with the printer creates an output file. For example, a PostScript printer creates an output file in PostScript format.
3. The SMB protocol included in Windows systems automatically transmits the output file across the TCP/IP network to the z/OS SMB server, which is part of the Distributed File Service element of z/OS.
4. The z/OS SMB server calls the Print Interface component to create an output data set on the JES spool.
5. The Print Interface component automatically calls the Infoprint transform product to convert PostScript data into the document format required by the printer, if necessary. For example, if the selected printer is an AFP printer, the PostScript to AFP transform converts data to AFP format.
6. Print Interface then creates an output data set on the JES spool, using JES output parameters defined by the administrator. The JES output parameters specify routing information that PSF and IP PrintWay can use to transmit the output to a printer. The JES output parameters can also specify how the job is printed.
7. If the selected printer is a remote PostScript printer, the IP PrintWay component transmits the output data set to the PostScript printer on the TCP/IP network. If the selected printer is an AFP printer, PSF prints the data set on the AFP printer. The z/OS IP security function can encrypt the data.

Figure 4 shows how Infoprint Server directs data from the Web to PostScript or AFP printers.

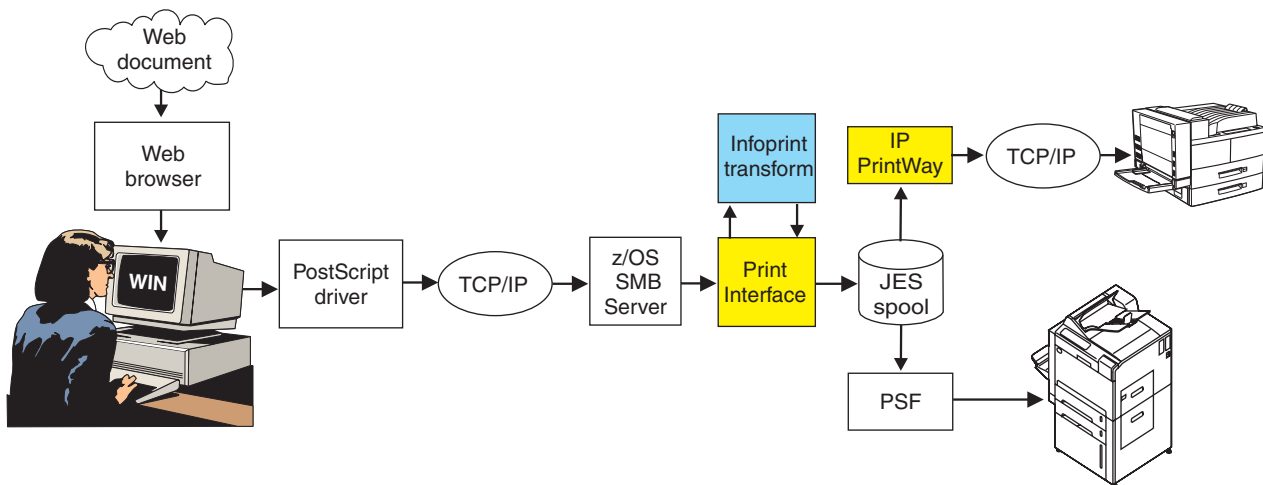


Figure 4. Printing documents from the Web with the SMB protocol

Printing Web documents using the Infoprint Port Monitor for Windows

A market research firm wants to print Web-based documents on LAN-based PCL printers and on an AFP printer attached to an IBM System z. To improve performance and to specify Infoprint Server job attributes, some users install the Infoprint Port Monitor for Windows on their Windows systems.

1. From a Windows workstation, a user views a document from the Web using a browser, such as Microsoft Internet Explorer.
2. The user submits the document for printing using the standard print-submission method that the browser provides. The user selects a Windows printer that the Infoprint Port Monitor manages and, as an option, specifies job attributes in the Infoprint Port Monitor for Windows window. The Infoprint Port Monitor sends the document to a z/OS printer defined to Infoprint Server, which might be a PostScript printer or an AFP printer. The printer driver associated with the printer creates an output file. For example, a PCL driver creates an output file in PCL format.
3. The Infoprint Port Monitor for Windows transmits the output file across the TCP/IP network to the Print Interface component.
4. The Print Interface component automatically calls the Infoprint transform product to convert PCL data into the document format required by the printer, if necessary. For example, if the selected printer is an AFP printer, the PCL to AFP transform converts data to AFP format.
5. The Print Interface component creates an output data set on the JES spool, using the JES output parameters defined by the administrator and the JES output parameters that correspond to the job attributes the user specified. The JES output parameters specify routing information that PSF and IP PrintWay can use to transmit the output to a printer. These parameters can also specify how the job is printed.
6. If the selected printer is a remote PCL printer, the IP PrintWay component transmits the output data set to the PCL printer on the TCP/IP network. If the selected printer is an AFP printer, PSF prints the data set on the AFP printer. The z/OS IP security function can encrypt the data.

Figure 5 shows how Infoprint Server directs data from the Web to PostScript or AFP printers.

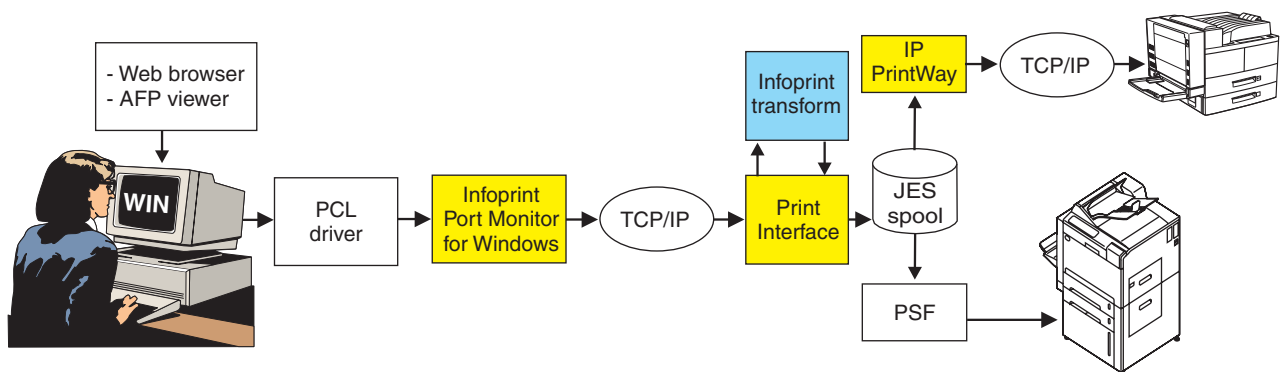


Figure 5. Printing documents from the Web with the Infoprint Port Monitor for Windows

Printing documents over the Internet using the Internet Printing Protocol

A market research firm wants to print documents created by Windows applications over the Internet to PostScript printers and to high-speed AFP printers attached to an IBM System z. The company runs Windows 2000, Windows Server 2003, or Windows XP because these Windows systems provide an integrated IPP client. It also installs printers that support the Internet Printing Protocol (IPP).

1. From a Windows workstation, a user submits a document for printing using the standard print-submission method that the Windows application provides. The user selects a z/OS printer defined to Infoprint Server, which might be a remote PostScript printer or a locally-attached AFP printer. The printer driver associated with the printer creates an output file in the required format. For example, the AFP Printer Driver for Windows creates an output file in AFP format for printing on AFP printers.
2. The IPP printing protocol included in Windows automatically transmits the output file over the Internet to the Print Interface component.
3. The Print Interface component creates an output data set on the JES spool, using JES output parameters defined by the administrator. The JES output parameters specify routing information that PSF and IP PrintWay can use to transmit the output to a printer. They can also specify how the job is to be printed.
4. If the selected printer is a remote PostScript printer, the IP PrintWay component transmits the output data set to the PostScript printer on the TCP/IP network. If the printer supports the IPP protocol, the IP PrintWay component communicates with the printer's IPP server. If the selected printer is an AFP printer, PSF prints the data set on the AFP printer. The z/OS IP security function can encrypt the data.

Figure 6 shows how Infoprint Server directs data to PostScript or AFP printers.

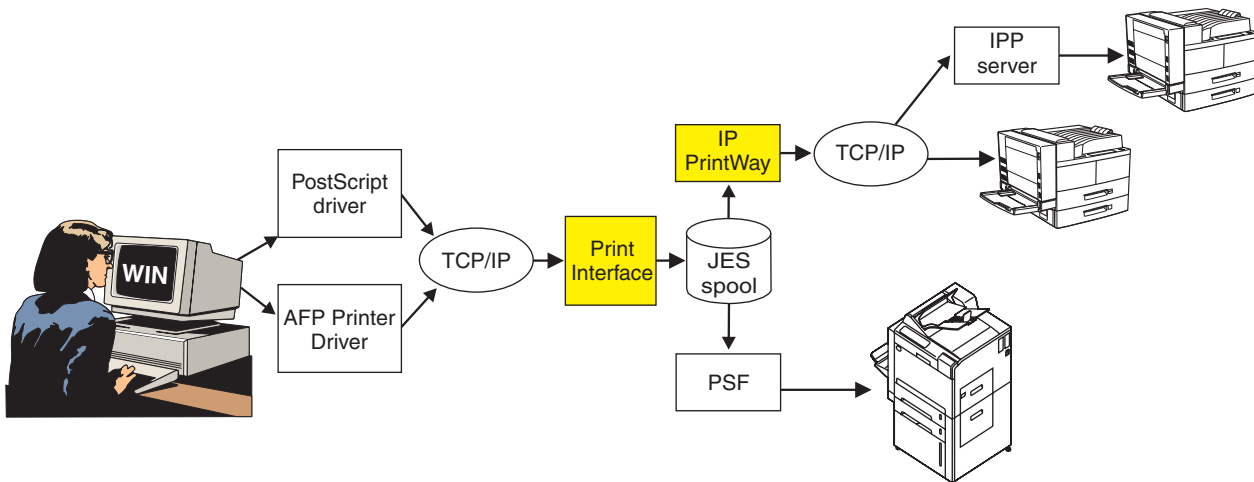


Figure 6. Printing documents with the IPP Printing Protocol

Printing from batch applications to network printers

A financial institution wants to use z/OS to develop all of its statements at one central location. It then wants to print bank statements and reports at each of its branch offices throughout the mid-Atlantic region. The printers are in both TCP/IP and SNA networks.

Here is how this financial institution can use the Infoprint Server components and, for SNA printers, the Coaxial Printer Support product to meet its requirements:

1. The financial institution uses a z/OS batch application to generate statements, segment the statements by branch office, and store them in separate files for printing.
2. The application uses job control language (JCL) to submit the files directly to the JES spool.
3. The IP PrintWay component transmits the files from JES2 or JES3 to branch office printers in TCP/IP and SNA networks. In a TCP/IP network, the z/OS IP security function can encrypt the data. If the printer is in an SNA network, IP PrintWay uses the Coaxial Printer Support product to transform line data to SCS or DSC/DSE format.

Figure 7 shows how Infoprint Server directs batch data to network printers.

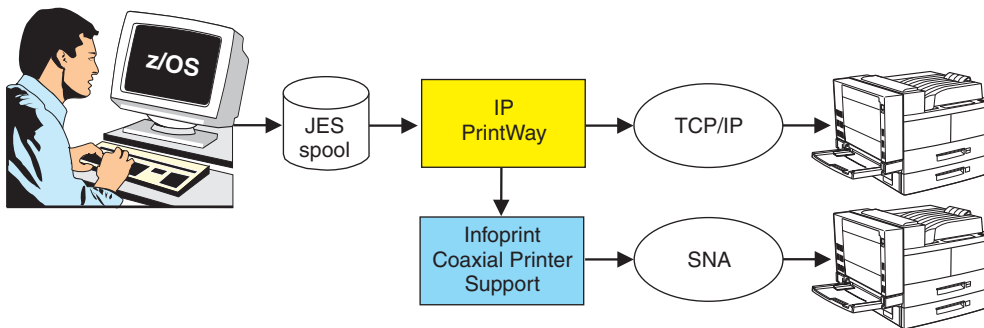


Figure 7. Printing from batch applications to network printers

Printing AFP data from batch applications on LAN-based PCL printers and sending it to e-mail destinations

A bank creates its loan applications in AFP format for printing on high-speed AFP printers. The company also wants to print these documents at their branch offices. However, the printers at their branch offices can print only PCL data. This company also wants to send the loan applications to some branch offices as e-mail attachments in PDF format. These branch offices can view and save the PDF file and print the loan applications at a later time on any type of printer.

Here is how the company can use Infoprint Server and Infoprint transform products to meet its requirements:

1. A batch application running on z/OS submits an AFP document to the JES spool. The application's JCL creates two output data sets with the same data, one to be printed on a PCL printer in the branch office and one to be sent to an e-mail address list.
2. The IP PrintWay component determines that the AFP document must be transformed into PCL format for printing and into PDF format for sending to the e-mail destination. IP PrintWay calls the Infoprint transform product.
3. The AFP to PCL and AFP to PDF transforms use AFP resources, such as a form definition and fonts from the AFP resource libraries, to convert the AFP data to PCL and to PDF format.
4. IP PrintWay transmits the document in PCL format from the JES spool to the PCL printers.
5. IP PrintWay transmits the document in PDF format from the JES spool to the e-mail address list. The e-mail recipients can use Adobe Acrobat Reader to view the document and print it on any printer.

Figure 8 shows how Infoprint Server can print AFP data to a PCL printer and send it to an e-mail destination.

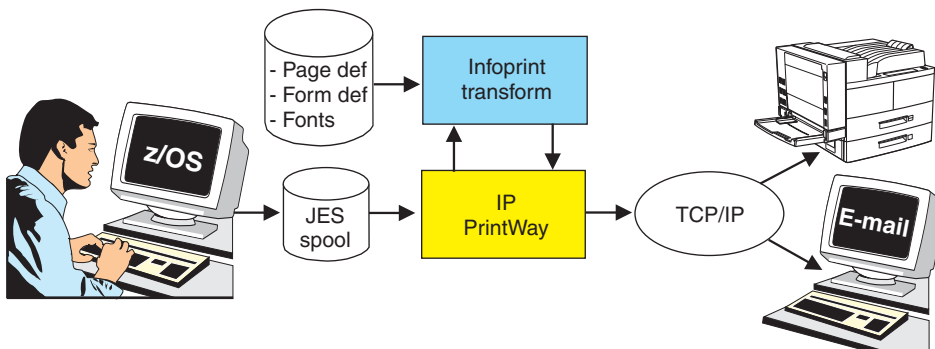


Figure 8. Printing AFP from batch applications to PCL printers and sending AFP data to e-mail destinations

Creating and printing AFP documents from Windows

A large production printing company uses a word processor on Windows workstations to prepare its manuals. It then uses AFP printers on the z/OS system to print the manuals.

Here is how this company can use Infoprint Server to develop and print from a Windows environment:

1. At a Windows workstation, a writer uses a word processor to prepare a manual. The writer then uses the standard print-submission method that the word processor provides to submit the manual to an AFP printer attached to the z/OS system. The AFP Printer Driver associated with the printer creates an output file in AFP format.
2. The Infoprint Port Monitor for Windows automatically transmits the output file across the TCP/IP network to the Print Interface component.
3. The Print Interface component creates an output data set on the JES spool.
4. PSF selects the print job from the JES spool and directs it to the selected AFP printer.

Figure 9 shows how Infoprint Server lets a user create and print AFP documents from Windows.

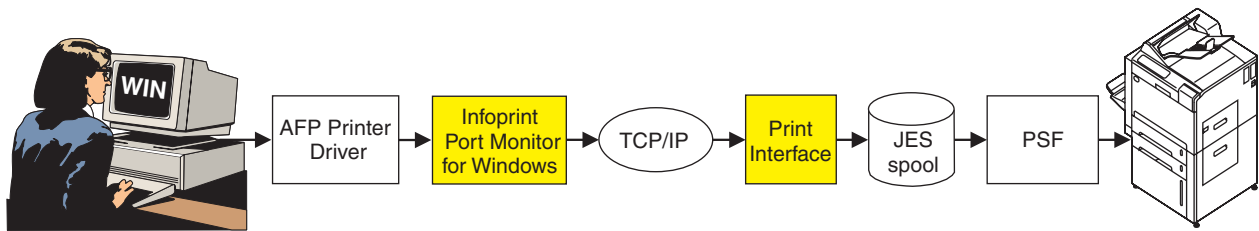


Figure 9. Creating and printing AFP documents from Windows

Printing SAP R/3 documents on AFP printers

A manufacturing company wants to print purchase orders generated by SAP R/3 applications on high-speed AFP printers. With no changes to the SAP R/3 applications, this company can convert SAP R/3 documents to AFP format and print them on AFP printers attached to z/OS.

Here is how the company can use Infoprint Server, Infoprint transform products, and the SAP R/3 Application Server for z/OS to meet its requirements:

1. Using the SAP R/3 GUI, a user submits a document for printing on an SAP R/3 output device, which the SAP R/3 administrator has associated with a printer defined to Infoprint Server. The SAP R/3 application server converts the document to PCL format and sends it to the spool work process of the SAP R/3 Application Server for z/OS. The spool work process must run on the same system as Infoprint Server.
2. The SAP R/3 Application Server's spool work process submits the document (in PCL format) to the Infoprint Server SAP Output Management System (OMS), which is part of the Print Interface component.
3. Print Interface determines that the document must be transformed into AFP format for printing. Print Interface calls the PCL to AFP transform.
4. The PCL to AFP transform converts the data to AFP format.
5. Print Interface creates an output data set on the JES spool.
6. PSF selects the output data set from the JES spool and directs it to the selected AFP printer.
7. When the data set finishes printing or is deleted from the JES spool, the Print Interface SAP Callback daemon sends notification back to the SAP application server that submitted the print request. The notification indicates whether the data set printed successfully.

Figure 10 shows how Infoprint Server lets SAP R/3 users print on AFP printers controlled by PSF.

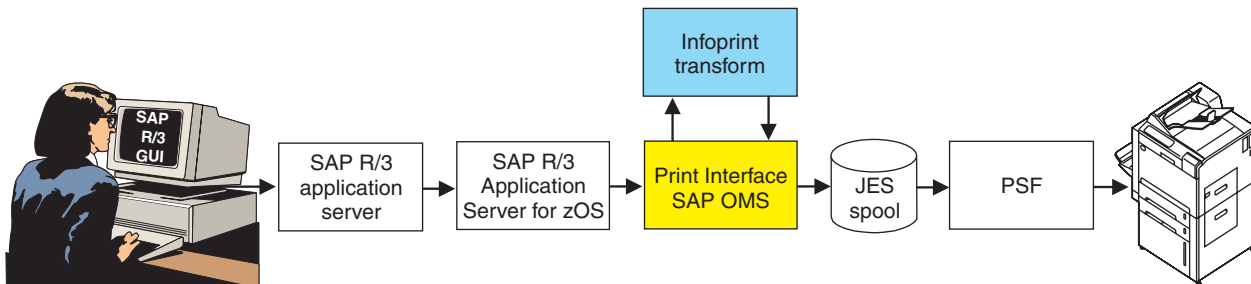


Figure 10. Printing SAP R/3 documents on AFP printers

Chapter 3. Understanding the components of Infoprint Server

Figure 11 shows how most of the components of Infoprint Server fit into your system. The components are shaded in the figure. If you are viewing the PDF file, Infoprint Server components are displayed in yellow, while the Infoprint transform products are displayed in blue.

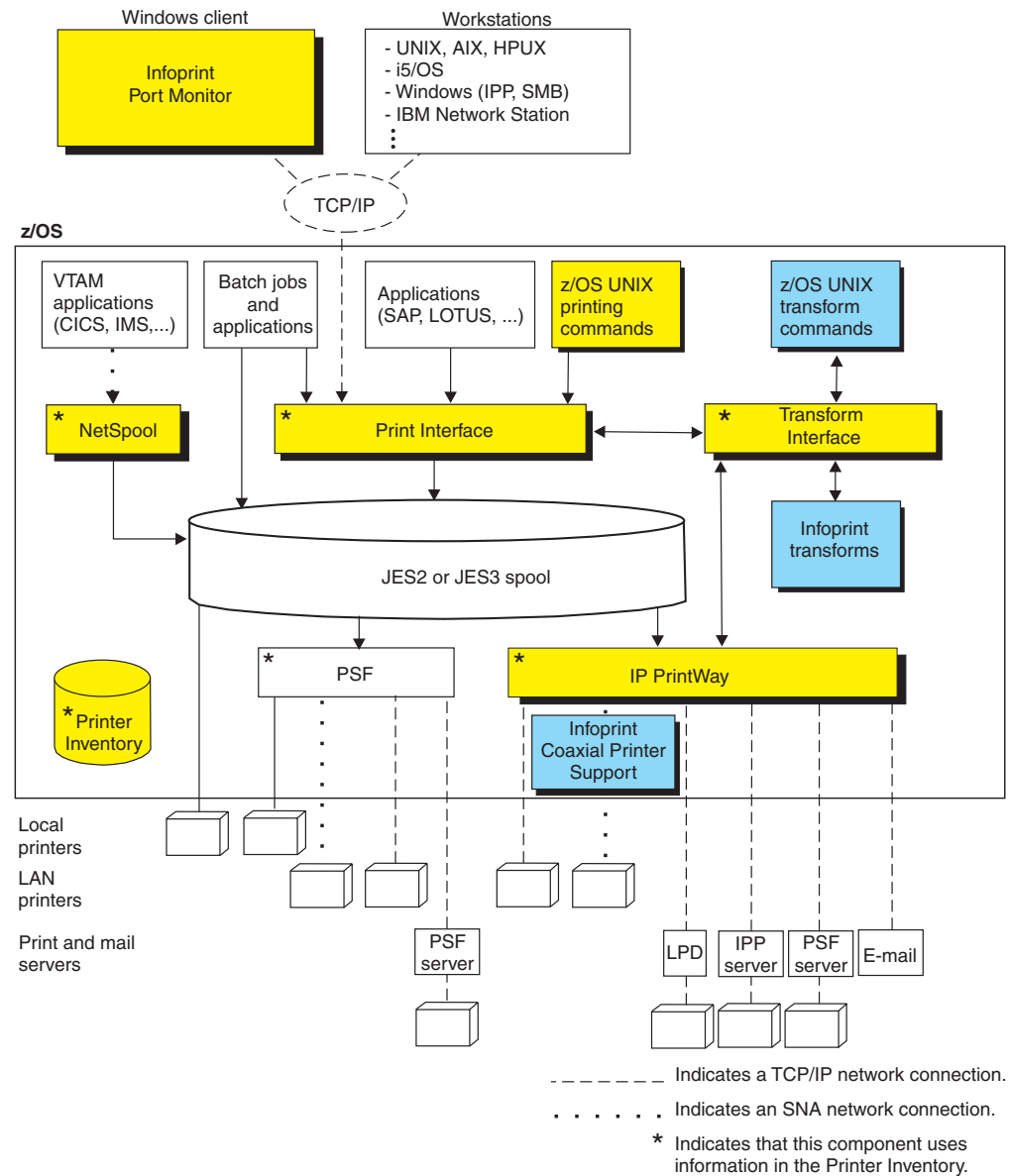


Figure 11. Infoprint Server components. Not shown: Infoprint Central

Printer Inventory

The Printer Inventory, a set of files in the z/OS UNIX file system (HFS or zFS) maintained by the system administrator, contains information about the z/OS printers, including both local and remote printers. In one central location, it contains all the information needed to do these tasks:

- Validate print requests
- Transform data to a format supported by the printer
- Allocate data sets on the JES spool
- Direct data sets to printers

The Printer Inventory is common to the Print Interface, IP PrintWay, and NetSpool components of Infoprint Server. This means that the system administrator can define a printer once for all components of Infoprint Server. The Printer Inventory, however, cannot be shared by Infoprint Server components running on other z/OS systems.

The system administrator can also specify configuration information in the Printer Inventory that PSF and the AFP Download Plus feature of PSF can use. This lets the PSF system administrator change the configuration information more easily without restarting all the PSF printers or AFP Download Plus senders that use the same startup procedure. The PSF operator needs to only restart the one PSF printer or AFP Download Plus sender whose configuration information has changed.

Note: PSF customers can specify configuration information in the Printer Inventory without purchasing Infoprint Server. For information about the Printer Inventory for PSF function, see *z/OS Infoprint Server Printer Inventory for PSF*.

Print Interface

The Print Interface component of Infoprint Server provides z/OS UNIX System Services printing commands and a subsystem so you can print from the local z/OS system. Print Interface accepts different data formats; transforms the data streams to EBCDIC line data, AFP, PCL, PostScript, PDF, or other data formats that the printer accepts; and allocates output data sets on the JES spool.

Print Interface also provides an LPD that lets you submit print requests from remote workstations that have TCP/IP access. In addition, Print Interface can receive print requests from remote workstations that use the Internet Printing Protocol (IPP) or the SMB printing protocol, which is standard on Windows systems. Print Interface also provides an SAP R/3 Output Management System that can receive SAP R/3 print requests.

Print Interface does these functions:

- It creates an output data set on the JES spool for each document to be printed. Print Interface maps the printing options specified on **lp** commands and some of the printing options specified on **lpr** commands to JES output parameters. These parameters are the same parameters that you can specify on JCL statements when you submit batch jobs.
- It responds to query requests with the status of the output data set on the JES spool or a list of the printers defined in the Printer Inventory.
- It responds to cancel requests by removing data sets that are on the JES spool. The data sets must not yet have been selected for printing. For security reasons, Print Interface does not let unauthenticated users on remote systems cancel print requests.

After Print Interface creates output data sets on the JES spool, the data sets can be printed in any of these ways:

- JES or PSF can print the data sets.
- JES can transmit the data sets to another location for printing.

- IP PrintWay can transmit the data sets to a remote printer in your TCP/IP or SNA network.

Some of the benefits of Print Interface are:

- Printing of any data format that the printer supports
Print Interface lets users submit print requests with any data format that the printer supports. These formats include, but are not limited to, PCL, PostScript, MO:DCA-P, line data, XML, and text. Print Interface automatically detects the data format.
- Automatic data transform
Print Interface can automatically transform data to and from the AFP data format on the z/OS system if you have installed IBM transform products. In addition, if you have installed InfoPrint Solutions Company transform products, Print Interface can automatically transform data remotely on AIX, Windows, and Linux systems.
- Validation of print requests
Before accepting print requests, Print Interface validates, with some exceptions, that a document can print as requested on the selected printer. For example, Print Interface rejects a document with a data format that the printer does not support or that cannot be transformed into a supported data format.
- Notification of completion
Print Interface notifies users on the local z/OS system when processing of a document is complete.
- Identification of printed output
Print Interface maintains the user ID of the job submitter for printing on separator pages. Both PSF and IP PrintWay lets installations write an exit to print separator pages.
- Double-byte character set (DBCS) support
Print Interface converts DBCS data from one code page to another before writing the data to the JES spool.
- IPP server
Print Interface includes an IPP server to support printing from Windows 2000 and Windows XP. The IPP server lets Windows users print on z/OS printers without installing the Infoprint Port Monitor for Windows.
- SMB support
Print Interface includes support for SMB printing, which is used by Windows systems. SMB support lets Windows users print on z/OS printers without installing the Infoprint Port Monitor for Windows.
- SAP R/3 Output Management System
Print Interface provides an SAP R/3 Output Management System (OMS) that is SAP-certified as interface software for the SAP R/3 4.0 system. The SAP OMS, with the SAP R/3 Application Server for z/OS, lets SAP R/3 users print on any printer defined in the Printer Inventory, cancel jobs, obtain accurate job status, and receive immediate notification when their documents have completed (successfully or unsuccessfully).
- Print Interface subsystem
The Print Interface subsystem can transform and print output from z/OS applications with minimal changes to the applications' job control language (JCL). The subsystem processes the application's output, transforms it to the format required by the printer or e-mail destination, and writes it to the JES spool. From the JES spool, the transformed data can be printed on any printer,

including AFP printers controlled by PSF and PostScript or PCL printers controlled by the IP PrintWay component of Infoprint Server. Also, the transformed data can be sent to e-mail destinations using the e-mail support that IP PrintWay provides.

z/OS UNIX System Services printing commands

Print Interface includes enhanced z/OS UNIX System Services printing commands, which provide more function than the printing commands available without Infoprint Server. These enhanced commands conform to UNIX standards to facilitate the porting of UNIX applications to z/OS UNIX System Services:

- | | |
|---------------|---|
| lp | The lp command sends files for printing to Print Interface running on the local z/OS system. The files can be UNIX files or traditional MVS™ data sets, such as sequential data sets and partitioned data sets. This command conforms to the Single UNIX Specification Version 3 standard. |
| lpstat | The lpstat command queries the status of print jobs. It also queries the names, locations, and descriptions of printers that the administrator has defined in the Printer Inventory. This command conforms to the X/Open Portability Guide Issue 4 Version 2 (XPG4.2) standard. |
| cancel | The cancel command cancels print requests, provided that the data set allocated on the JES spool has not yet been selected for printing. This command conforms to the X/Open Portability Guide Issue 4 Version 2 (XPG4.2) standard. |

Some of the benefits of these commands are:

- Notification of completion
These commands let users request notification when processing of the data set on the JES spool completes. Notification can be sent to the terminal or can use the electronic mail facility.
- Specifying AFP printing options
On the **lp** command, users can request printing options for printing on AFP printers. For example, users can specify the names and locations of user-defined form definitions and page definitions.
- Specifying printing options in a file
To make specification of printing options easier, the **lp** command lets users specify the printing options in a file and name the file on the command.
- Specifying printing options in an environment variable
The **lp** command also lets users specify printing options in an environment variable. Options specified in a variable take effect automatically. The user can override these options on the command line or in a file.
- Printing on remote printers that are not defined in the Printer Inventory
On the **lp** command, users can specify routing information, such as the Internet Protocol (IP) address or host name and the print queue name, for remote printers in the TCP/IP network. This lets users print on remote printers that the administrator has not defined in the Printer Inventory.

NetSpool

NetSpool intercepts print data from VTAM applications, such as CICS and IMS; transforms the data streams to EBCDIC line data, PCL, PDF, or other formats that the printer accepts; and allocates output data sets on the JES spool. JES or PSF can print the output data sets or JES can transmit them to other locations for printing. IP PrintWay can transmit the output data sets to remote printers in your TCP/IP network.

NetSpool supports these data streams:

- SNA character string (SCS) data over a logical unit (LU) type 1 session
- 3270 data over an LU type 0 or type 3 session
- Binary data over an LU type 0, type 1, or type 3 session

You can configure NetSpool so that you do not need to change existing VTAM applications. That is, existing VTAM applications can send print requests to NetSpool in the same manner as they currently send print requests to SNA network printers.

Some of the benefits of NetSpool are:

- Data integrity

By placing VTAM application output on the JES2 or JES3 spool, NetSpool lets you take advantage of the security, checkpoint and restart, and reprint capabilities that JES provides.

- Printer sharing

NetSpool lets multiple VTAM applications direct output to the JES spool for simultaneous printing on a single shared printer.

- Print broadcasting

NetSpool lets a single VTAM application simultaneously direct output to the JES spool for printing on multiple printers.

- AFP formatting

Users can specify AFP parameters, such as page definition, form definition, and character sets, to take advantage of AFP formatting when printing on AFP printers.

- DBCS support

NetSpool supports DBCS data in both SCS and 3270 data streams.

- Transparent-data support

NetSpool supports transparent data in SCS data streams and provides exits for adding and changing transparent data.

- Owner and job attribute support

VTAM application programmers can embed the **owner** job attribute and other Infoprint Server job attributes in the application's print data that is sent to NetSpool. Also, the administrator can specify a NetSpool default owner in the printer definition.

- Transforms

NetSpool can transform data streams from one format to another, such as from SCS and 3270 data streams to:

- Line data streams for printing on AFP printers (does not require a separate Infoprint transform product)
- Line data streams and then to PDF data for viewing in an e-mail attachment (requires the AFP to PDF transform)

- PCL data streams for printing on network printers (does not require a separate Infoprint transform product)

When converting to PCL, NetSpool can preserve additional print-formatting controls in SCS data streams by generating corresponding PCL commands. This results in greater print fidelity. For example, when converting SCS data, Infoprint Server can:

- Preserve line-density and print-density controls
- Preserve paper-source, output-bin, job-separation, and duplex controls
- Preserve portrait and landscape page-orientation controls
- Automatically change the page orientation and reduce the font size, if necessary, page by page

IP PrintWay

IP PrintWay transmits output data sets from the JES spool to remote printers or print servers and to e-mail destinations.

You can run either IP PrintWay basic mode or IP PrintWay extended mode:

- IP PrintWay basic mode, the original mode of operation, uses the z/OS Functional Subsystem Interface (FSI) to obtain output data sets from the JES spool. IBM does not plan additional enhancements to IP PrintWay basic mode.
- IP PrintWay extended mode, new in z/OS V1R5, uses the z/OS Sysout Application Programming Interface (SAPI) to obtain output data sets from the JES spool. It provides better performance, improved usability, and more function than IP PrintWay basic mode.

IP PrintWay basic mode and IP PrintWay extended mode use the same printer definitions in the Printer Inventory.

In addition:

- IP PrintWay can transmit output data sets to remote printers or host systems in a TCP/IP network. A print server can be running on the host system. The remote printer or host system can support one of these TCP/IP protocols:
 - LPR/LPD protocol
 - Internet Printing Protocol (IPP)
 - Direct socket printing protocol
- IP PrintWay can transmit output data sets to one or more e-mail addresses. Each output data set is sent as an e-mail attachment. If you install an AFP to PDF transform, IP PrintWay can transform line data and AFP data so that the e-mail recipients can view and print the output with Adobe Acrobat Reader.
- IP PrintWay can transmit output data sets to VTAM-controlled printers that are defined to VTAM. The printers must be defined as LU0, LU1, or LU3 printers. Supported output data streams are Data Stream Compatibility/Data Stream Extended (DSC/DSE) and SNA Character String (SCS). VTAM printer support in IP PrintWay requires Infoprint Coaxial Printer Support for z/OS, 5655-N62.

Some of the benefits of IP PrintWay are:

- JCL parameters to route data sets

A user submitting a batch job from z/OS can specify routing information in JCL. For example, the user can specify the name of the remote print queue or the port number, the IP address or the host name of the printer's host system, or the e-mail addresses of the recipients of the e-mail.
- Data integrity

IP PrintWay can retry the transmission of data sets to remote printers. It can also verify that the transmission of data is successful before deleting data sets from the JES spool. (Even though transmission is successful, the data set might not yet have printed.)

In addition, IP PrintWay can retain data sets on the JES spool for a specified amount of time after either successful or failed transmissions.

If you use IP PrintWay extended mode and the direct sockets protocol, IP PrintWay can track the number of pages printed on printers that support Hewlett Packard (HP) Printer Job Language (PJM). IP PrintWay can restart printing after the last page that printed. This can prevent duplicate pages.

- IPsec data encryption

You can use the IP security function of z/OS Communications Server to encrypt data that Infoprint Server sends to printers and print servers that support Internet Protocol security (IPsec). Encrypting data ensures the confidentiality of the data that you send to the printer.

- Distribution of data to a workstation

Transmitting data sets to a print queue on a workstation lets users use workstation applications not only to print data, but also to view, archive, or fax the data.

- Accounting

For each data set processed, IP PrintWay writes a System Management Facility (SMF) type 6 record, which includes the number of bytes transmitted and the IP address of the printer.

If you use IP PrintWay extended mode and the direct sockets protocol, IP PrintWay can track the number of pages printed on printers that support Hewlett Packard (HP) Printer Job Language (PJM). IP PrintWay can record the number of pages that printed successfully for each document. This provides more accurate accounting information in SMF type 6 records.

- Installation exits

IP PrintWay lets system programmers write exits to customize IP PrintWay processing. For example, in an exit you can change routing information, add separator pages, edit SMF accounting records, and notify users of processing events.

- DBCS support

IP PrintWay supports conversion of DBCS data from extended binary-coded decimal interchange code (EBCDIC) to ASCII before transmission to a remote printer for printing.

- Transforms

IP PrintWay can transform data from one format to another. For example, it can transform data from AFP format to PCL, PostScript, or PDF format. IP PrintWay can use transforms that Infoprint transform products and other optional transform products provide. IP PrintWay extended mode can call transforms directly, while IP PrintWay basic mode transforms data by resubmitting it to Print Interface. Calling transforms directly is more efficient because data is not written to the JES spool a second time.

Transform Interface

Transform Interface communicates with IBM and InfoPrint Solutions Company transform products. It works with the transform products listed in “Transform products” on page 5. Transform Interface manages transforms that run on the z/OS system. In addition, it can send data to remote systems, such as Linux, to be transformed.

Infoprint Central

Infoprint Central is a Web-based print management system primarily for help desk operators. However, other authorized users or job submitters can also use it. Infoprint Central works with IP PrintWay extended mode. With Infoprint Central, you can:

- **Work with print jobs:** You can find and work with print jobs that are on the JES spool. Plus, you can see more information about print jobs that Infoprint Server processes. For example, you can see whether an Infoprint Server print job completed successfully and where it printed – even if the print job is no longer on the JES spool.

You can use several different search criteria to find print jobs. After you find a print job, you can delete, hold, release, move, or change the priority of the print job. And, you can see all messages from Infoprint Server for that one print job.

- **Work with printers:** You can find and work with printers that are defined in the Printer Inventory – including AFP printers controlled by PSF (called *PSF printers*), and all printers to which IP PrintWay extended mode sends print jobs (called *IP PrintWay printers*).

You can also work with PSF AFP Download Plus senders as if they were PSF printers. An AFP Download Plus sender sends print jobs to a receiver on another system for printing, e-mailing, or faxing.

You can use a variety of search criteria to find printers. After you find a printer, you can see its status, the printer's job queue, and view other properties of the printer. You can do these printer actions:

- PSF printers: Start, stop, space, interrupt, pause (JES2 only), ping, turn online, turn offline, and reset. Also, you can change forms and other job-selection criteria, and you can link to the printer's Web page. If the PSF printer is an AFP Download Plus sender, you can do a limited set of PSF printer actions.
- IP PrintWay printers: Start, stop, redirect, restore, ping, turn online, turn offline, and reset. Also, you can see all the messages from Infoprint Server for that one printer, and you can link to the printer's Web page.

Some printer actions (ping, turn online, turn offline, and reset) are available only for TCP/IP-attached printers.

- **Work with NetSpool logical units:** You can work with any NetSpool logical units (LUs) that are defined to NetSpool in the Printer Inventory and also defined to VTAM.

You can find LUs by name. After you find a NetSpool LU, you can start and stop it. When you start an LU, that LU is started in both Infoprint Server and VTAM. Likewise, when you stop an LU, that LU is stopped in both Infoprint Server and VTAM. You can also display information about the current VTAM session established with a NetSpool LU.

- **Display printer definitions:** You can display the properties of any printer definition in the Printer Inventory. You can use a variety of search criteria to find printer definitions, including the printer definition name and the printer's location. This can help you find the name of a printer in your area.

- **Check system status:** You can see the status of all Infoprint Server daemons and tasks. This can help you determine the cause of a printing problem. You can also start and stop IP PrintWay job selection rules to change which print jobs IP PrintWay processes.
- **Audit Infoprint Central actions:** You can find out who used Infoprint Central to do an action on a print job, printer, or NetSpool LU. For example, you can find out who deleted a print job.

Windows workstation support

This Infoprint Server Windows client can be downloaded from z/OS or the Web:

Infoprint Port Monitor for Windows

Software that runs on a Windows workstation. It lets you print files on z/OS printers just like you print files on local Windows printers. You can submit the files from any Windows application that has a printing function. After the Infoprint Port Monitor is installed and configured on the Windows system, it automatically sends documents to the Print Interface component of Infoprint Server.

To install Infoprint Port Monitor for Windows, you must meet these requirements on your Windows system, depending on the version of the Infoprint Port Monitor:

- **Version 3:** Windows Server 2003, Windows Server 2008, Windows 7, Windows Vista (Business Edition, Enterprise Edition), or Windows XP
- **Version 2.0.6:** Windows Server 2003 or Windows XP

Note: Version 2.0.6 also runs on Windows NT[®] 4.0, Windows 95, Windows 98, Windows Millennium Edition (ME), and Windows 2000; however, IBM support for these Windows systems has been discontinued.

- TCP/IP protocol configured and operational
- Windows administrator authority

Note: The Infoprint Port Monitor for Windows does not run on 64-bit Windows systems.

The Infoprint Port Monitor is shipped with Infoprint Server. You can also download it directly to your Windows system from this Web site: www.ibm.com/support/docview.wss?rs=727&uid=psd1P1000597.

These related products from InfoPrint Solutions Company also run on Windows systems. You might want to use them if your installation has AFP printers or AFP documents:

AFP Printer Driver for Windows

Creates output files in AFP format. Files in AFP format can be printed on AFP printers. The driver can create output files that contain documents, overlays, or page segments. It can also create inline form definitions for printing documents with special options, such as printing on both sides of the paper. For information about overlays and page segments, see *PSF for z/OS: User's Guide*.

AFP Viewer Plug-in for Windows

Lets you view documents in AFP format. For example, documents downloaded from the z/OS system or documents on the Web. The viewer also lets you print AFP documents on AFP and on non-AFP printers.

Some of the benefits of the Infoprint Port Monitor, AFP Printer Driver, and AFP Viewer Plug-in are:

- Printing using standard Windows printing windows

The Infoprint Port Monitor lets Windows users print on any z/OS printer defined in the Printer Inventory, using standard print-submission methods from Windows applications that support printing.

Print Interface also includes support for these Windows printing protocols:

- SMB, the standard protocol
- Internet Printing Protocol (IPP)

Therefore, Windows users can use standard print-submission methods to print without installing the Infoprint Port Monitor for Windows. However, installing the Infoprint Port Monitor for Windows might improve performance. Also, the Infoprint Port Monitor for Windows lets users specify Infoprint Server job attributes.

- Viewing AFP documents

The AFP Viewer Plug-in lets Windows users view AFP documents, such as documents downloaded from the z/OS system or retrieved from the Web.

- Printing AFP documents on non-AFP printers

The AFP Viewer Plug-in lets Windows users view AFP documents and then print them on non-AFP printers, as well as on AFP printers.

- Printing on AFP printers

The AFP Printer Driver lets Windows users print documents, including Web-based documents in other formats, on AFP printers.

Appendix. Accessibility

Publications for this product are offered in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when using PDF files, you may view the information through the z/OS Internet Library Web site or the z/OS Information Center. If you continue to experience problems, send an e-mail to mhvrcfs@us.ibm.com or write to:

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Attention: MHVRCFS Reader Comments
Department H6MA, Building 707
2455 South Road
Poughkeepsie, NY 12601-5400
U.S.A.

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Vol I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

z/OS information

z/OS information is accessible using screen readers with the BookServer or Library Server versions of z/OS books in the Internet library at:

<http://www.ibm.com/systems/z/os/zos/bkserv/>

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Bibliography

This section lists information that can help you to configure and use Infoprint Server.

Infoprint Server

Title	Order number
<i>z/OS Infoprint Server Customization</i>	S544-5744
<i>z/OS Infoprint Server Introduction</i>	S544-5742
<i>z/OS Infoprint Server Messages and Diagnosis</i>	G544-5747
<i>z/OS Infoprint Server Operation and Administration</i>	S544-5745
<i>z/OS Infoprint Server Printer Inventory for PSF</i>	S510-7703
<i>z/OS Infoprint Server User's Guide</i>	S544-5746
<i>ABCs of z/OS System Programming Volume 7</i>	SG24-6987

Infoprint transforms for z/OS

Title	Order number
<i>Infoprint Transforms to AFP for z/OS</i>	G550-0443
<i>Infoprint Transforms from AFP for z/OS</i>	G550-0444
<i>Infoprint XT Extender for z/OS: Customization and Usage</i>	S544-5879

Print Services Facility (PSF) for z/OS

Title	Order number
<i>AFP Conversion and Indexing Facility User's Guide</i>	S550-0436
<i>IBM AFP Fonts: Font Summary for AFP Font Collection</i>	S544-5633
<i>PSF for z/OS: AFP Download Plus</i>	S550-0433
<i>PSF for z/OS: Customization</i>	S550-0427
<i>PSF for z/OS: Diagnosis</i>	G550-0428
<i>PSF for z/OS: Introduction</i>	G550-0430
<i>PSF for z/OS: Messages and Codes</i>	G550-0432
<i>PSF for z/OS: User's Guide</i>	S550-0435

z/OS

Title	Order number
<i>z/OS XL C/C++ Programming Guide</i>	SC09-4765
<i>z/OS XL C/C++ Run-Time Library Reference</i>	SA22-7821
<i>z/OS Communications Server: IP and SNA Codes</i>	SC31-8791

Title	Order number
<i>z/OS Communications Server: IP Sockets Application Programming Interface Guide and Reference</i>	SC31-8788
<i>z/OS Communications Server: IP Configuration Guide</i>	SC31-8775
<i>z/OS Communications Server: IP Configuration Reference</i>	SC31-8776
<i>z/OS Communications Server: New Function Summary</i>	GC31-8771
<i>z/OS Communications Server: IPv6 Network and Application Design Guide</i>	SC31-8885
<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>	GC31-6850
<i>z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT</i>	GC31-6851
<i>z/OS Communications Server: SNA Messages</i>	SC31-8790
<i>z/OS Communications Server: SNA Network Implementation Guide</i>	SC31-8777
<i>z/OS Communications Server: SNA Operation</i>	SC31-8779
<i>z/OS Communications Server: SNA Programming</i>	SC31-8829
<i>z/OS Communications Server: SNA Resource Definition Reference</i>	SC31-8778
<i>z/OS Distributed File Service SMB Administration</i>	SC24-5918
<i>z/OS HTTP Server Planning, Installing, and Using</i>	SC34-4826
<i>z/OS Information Roadmap</i>	SA22-7500
<i>z/OS JES2 Commands</i>	SA22-7526
<i>z/OS JES2 Initialization and Tuning Guide</i>	SA22-7532
<i>z/OS JES2 Initialization and Tuning Reference</i>	SA22-7533
<i>z/OS JES3 Commands</i>	SA22-7540
<i>z/OS JES3 Initialization and Tuning Guide</i>	SA22-7549
<i>z/OS JES3 Initialization and Tuning Reference</i>	SA22-7550
<i>z/OS Language Environment Debugging Guide</i>	GA22-7560
<i>z/OS Language Environment Run-Time Messages</i>	SA22-7566
<i>z/OS Language Environment Programming Guide</i>	SA22-7561
<i>z/OS MVS Diagnosis: Tools and Service Aids</i>	GA22-7589
<i>z/OS MVS Initialization and Tuning Guide</i>	SA22-7591
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<i>z/OS Planning for Installation</i>	GA22-7504
<i>z/OS Program Directory</i>	GI10-0670
<i>z/OS SDSF Operation and Customization</i>	SA22-7670
<i>z/OS Security Server RACF Security Administrator's Guide</i>	SA22-7683
<i>z/OS Summary of Message and Interface Changes</i>	SA22-7505

Title	Order number
<i>z/OS UNIX System Services Command Reference</i>	SA22-7802
<i>z/OS UNIX System Services Messages and Codes</i>	SA22-7807
<i>z/OS UNIX System Services Planning</i>	GA22-7800
<i>z/OS UNIX System Services User's Guide</i>	SA22-7801

CICS

Title	Order number
<i>CICS Customization Guide</i>	SC34-6227
<i>CICS Diagnosis Reference</i>	LY33-6102
<i>CICS Resource Definition Guide</i>	SC34-6228
<i>CICS Supplied Transactions</i>	SC34-6230

IMS/ESA®

Title	Order number
<i>IMS Version 8: Administration Guide: System</i>	SC27-1284
<i>IMS Version 8: Administration Guide: Transaction Manager</i>	SC27-1285

3270 and SNA data streams

Title	Order number
<i>IBM 3270 Information Display System Data Stream Programmer's Reference</i>	GA23-0059
<i>IBM 3270 Information Display System 3274 Control Unit Description and Programmer's Reference</i>	GA23-0061
<i>IBM 3270 Information Display System Reference Summary</i>	GX20-1878
<i>IBM 3270 Kanji Data Streams</i>	GA18-2980
<i>IPDS and SCS Technical Reference</i>	S544-5312
<i>Systems Network Architecture: Sessions Between Logical Units</i>	GC20-1868

InfoPrint Solutions Company

Title
<i>AFP: Programming Guide and Line Data Reference</i>
<i>Data Stream and Object Architectures: Bar Code Object Content Architecture Reference</i>
<i>Data Stream and Object Architectures: IOCA Reference</i>
<i>InfoPrint Manager: Reference</i>
<i>InfoPrint Manager for AIX: Procedures</i>
<i>InfoPrint Manager for Windows: Procedures</i>
<i>InfoPrint Transform Manager for Linux</i>
<i>InfoPrint Transform Manager for Linux: afp2pdf Transform Installation and User's Guide</i>

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