

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 35.

Fifth Edition (November 2002)

This edition applies to these IBM products:

- Version 1, Release 2 of z/OS (product number 5694-A01)
- Version 1, Release 3 of z/OS.e (product number 5655-G52)
- Version 1, Release 1, Modification Level 1 of Infoprint Server Transforms (product number 5697-F51)

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

This edition replaces S544-5742-03.

Internet

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- <http://www.ibm.com/printers>
- <http://www.ibm.com/servers/eserver/zseries/zos/>

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Contents

Figures	v
About this book	vii
Who should read this book	vii
How this book is organized	vii
Where to find more information	vii
Web sites	vii
Accessing z/OS licensed documents on the Internet	viii
Using LookAt to look up message explanations	ix
Preventive Service Planning information	ix
Books	ix
Summary of changes	xi
Chapter 1. What Infoprint Server and Infoprint Server Transforms can do for you.	1
How printing requirements are changing	1
How to handle the changing printing requirements	2
How Infoprint Server handles printing	3
Benefits of using Infoprint Server.	6
Access all defined printers	6
Handle print jobs effectively.	6
Detect and transform data streams	6
Support common printer languages	7
Monitor printer status	7
Query job status	7
Create AFP output from Windows applications	7
Browse AFP documents on the Web	8
Send print output to e-mail addresses	8
What's new in z/OS Version 1 Release 2.	8
Enhanced printing of VTAM application data	8
Enhanced copies support	9
Query printer status function	9
E-mail support	9
Infoprint Color 130 Plus Printer support	9
Print Interface subsystem for transforming data	10
Infoprint Port Monitor for Windows Me and Windows XP	10
Chapter 2. Using Infoprint Server	11
Printing CICS or IMS output data on network printers.	12
Printing z/OS UNIX System Services data on AFP printers	13
Printing Web documents using the Windows SMB protocol.	14
Printing Web documents using the Infoprint Port Monitor for Windows	15
Printing documents over the Internet using the Internet Printing Protocol.	16
Printing from batch applications to network printers	17
Printing AFP data from batch applications to LAN-based PCL printers and sending it to e-mail destinations	18
Creating and printing AFP documents from Windows	19
Printing SAP R/3 ABAP or OTF data on AFP printers	20
Monitoring printer status	21
Chapter 3. Understanding the components of Infoprint Server	23
Printer Inventory	23

	Print Interface	24
	z/OS UNIX System Services printing commands	26
I	Infoprint Server Transforms and other transforms	26
	Transforms to AFP	26
	Transforms from AFP	27
I	Other transforms	27
	Kanji AFP print feature	28
	Coax printer support feature	28
	NetSpool	28
	IP PrintWay	29
	SNMP subagent	30
	Windows workstation support	30
I	Appendix. Accessibility	33
I	Using assistive technologies	33
I	Keyboard navigation of the user interface	33
	Notices	35
	Trademarks	36
	Bibliography	39
	Infoprint Server	39
	Print Services Facility for OS/390	39
	Advanced Function Presentation (AFP)	39
I	Infoprint Manager for AIX and Windows	40
	z/OS Version 1 Release 2	40
	CICS	41
	IMS/ESA® Version 6	41
	3270 and SNA data streams	41
	Index	43

Figures

	1. How Infoprint Server handles printing requirements	3
	2. Printing CICS or IMS output data on network printers	12
	3. Printing z/OS UNIX System Services data on AFP printers	13
	4. Printing documents from the Web with the SMB protocol	14
	5. Printing documents from the Web with the Infoprint Port Monitor for Windows	15
	6. Printing documents with the IPP Printing Protocol	16
	7. Printing from batch applications to network printers	17
	8. Printing AFP from batch applications to PCL printers and sending AFP data to e-mail destinations	18
	9. Creating and printing AFP documents from Windows	19
	10. Printing SAP R/3 data on AFP printers	20
	11. Monitoring printer status	21
	12. Infoprint Server components	23

About this book

This book is an overview of these products:

- Infoprint[®] Server, an element of z/OS[™] Version 1 Release 2 (5694-A01) and higher, and an element of z/OS.e[™] Version 1 Release 3 (5655-G52) and higher
- Infoprint Server Transforms Version 1 Release 1 Modification Level 1, a separate IBM[®] program product (5697-F51)

This overview includes the benefits of Infoprint Server and Infoprint Server Transforms, how you can use them, and how they work.

Who should read this book

This book is for managers, operators, and system administrators who need to understand the benefits and capabilities of Infoprint Server and Infoprint Server Transforms.

How this book is organized

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

- Chapter 1, “What Infoprint Server and Infoprint Server Transforms can do for you” is for managers. It describes the overall benefits that Infoprint Server and Infoprint Server Transforms provide.
- Chapter 2, “Using Infoprint Server” is for managers, operators, and system administrators. It gives a number of scenarios that show how you can use Infoprint Server and Infoprint Server Transforms in various printing situations.
- Chapter 3, “Understanding the components of Infoprint Server” is for system administrators who want to understand how Infoprint Server and Infoprint Server Transforms work. It describes the component parts of Infoprint Server.

This book also contains a bibliography and an index.

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, Infoprint Server, and Infoprint Server Transforms.

Web sites

These Web sites contain related information:

This site:	Contains:
http://www.ibm.com/printers/	Information about printing products, including: <ul style="list-style-type: none">• An overview of Infoprint Server, including the same printing scenarios that are in <i>z/OS Infoprint Server Introduction</i>• Infoprint Server books and other books related to printing (in PDF format)

This site:	Contains:
http://www.ibm.com/printers/download.html	Downloads for Windows systems, including: <ul style="list-style-type: none"> • Infoprint Port Monitor • AFP Viewer plug-in • AFP Printer Driver • Network Printer Manager (NPM) for the Web
http://www.ibm.com/servers/eserver/zseries/zos/	Information about z/OS
http://www.ibm.com/servers/eserver/zseries/zos/bkserv/	z/OS documentation, including: <ul style="list-style-type: none"> • All z/OS books (in PDF and BookManager formats) • Updates from APARs and PTFs
http://www.ibm.com/redbooks	IBM redbooks, including a redbook for Infoprint Server
http://www.ibm.com/servers/eserver/zseries/zos/unix/	Information about z/OS UNIX System Services

Accessing z/OS licensed documents on the Internet

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3. Select **Request Access to z/OS Licensed books**.
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If you supplied the correct key code, you will receive confirmation that your request is being processed. After your request is processed, you will receive an e-mail confirmation.

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To access the licensed documents:

1. Sign in to Resource Link using your Resource Link user ID and password.
2. Select **Library** located on the left-hand navigation bar.
3. Select **zSeries**.
4. Select **Software**.
5. Select the release of z/OS.

Printed licensed documents are not available from IBM.

You can use the PDF format on either z/OS Licensed Product Library CD-ROM or IBM Resource Link to print licensed documents.

Using LookAt to look up message explanations

LookAt is an online facility that lets you look up explanations for most messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can access LookAt from the Internet at:

<http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/> or from anywhere in z/OS where you can access a TSO/E command line (for example, TSO/E prompt, ISPF, z/OS UNIX System Services running OMVS). You can also download code from the *z/OS Collection* (SK3T-4269) and the LookAt Web site that lets you access LookAt from a handheld computer (Palm Pilot VIIx suggested).

To use LookAt as a TSO/E command, you must have LookAt installed on your host system. You can obtain the LookAt code for TSO/E from a disk on your *z/OS Collection* (SK3T-4269) or from the LookAt Web site's **Download** link.

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 is: ZOSV1R2. 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.

Books

See "Bibliography" on page 39 for a list of the books referred to in this book, and for books that contain additional information about related products. For titles and order numbers of the books for *all* products that are part of z/OS, see *z/OS Information Roadmap*.

Infoprint Server for z/OS Implementation Redbook, SG24-6234, is available on the Web at: <http://www.ibm.com/redbooks>

Table 1 summarizes the books in the Infoprint Server product library.

Table 1. Summary of Infoprint Server books

Book	Form number
<i>z/OS Infoprint Server Introduction</i>	S544-5742
Introduces all components of Infoprint Server, including IP PrintWay™, NetSpool™, and Print Interface. It also introduces Infoprint Server Transforms. This book contains printing scenarios that show how you can use Infoprint Server in your installation.	

Table 1. Summary of Infoprint Server books (continued)

Book	Form number
<p><i>z/OS Infoprint Server Migration</i></p> <p>Summarizes the new functions in Infoprint Server and Infoprint Server Transforms and describes the migration tasks required to implement each new function in your installation. It also describes the Infoprint Server migration program, which converts IP PrintWay, NetSpool, and Print Interface printer information to the format required by Infoprint Server for OS/390® V2R8 and higher.</p>	G544-5743
<p><i>z/OS Infoprint Server Customization</i></p> <p>Describes customization tasks for all components of Infoprint Server, including IP PrintWay, NetSpool, and Print Interface. It also describes customization tasks for Infoprint Server Transforms. This book describes required 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 all components of Infoprint Server, including IP PrintWay, NetSpool, and Print Interface. This book describes how to start and stop Infoprint Server and how the operator can manage the IP PrintWay transmission queue. It describes how the administrator can create entries in the Printer Inventory using either ISPF panels or the Printer Inventory Definition Utility (PIDU) program, define NetSpool printer LUs to VTAM, and use accounting records written by IP PrintWay.</p>	S544-5745
<p><i>z/OS Infoprint Server User's Guide</i></p> <p>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 these z/OS UNIX commands: afp2pcl, afp2pdf, afp2ps, cancel, lp, lpstat, pcl2afp, pdf2afp, ps2afp, and sap2afp; the AOPPRINT JCL procedure; the AOPBATCH program; DD and OUTPUT JCL parameters supported by Infoprint Server; 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 sent by all components of Infoprint Server, including IP PrintWay, NetSpool, and Print Interface. It also describes Infoprint Server Transforms messages and how to use Infoprint Server tracing facilities to diagnose and report errors.</p>	G544-5747

Summary of changes

Summary of changes for S544-5742-04 z/OS Version 1 Release 2

This book contains information previously presented in S544-5742-03, which supports z/OS Version 1 Release 2.

New information

- Information has been added about Infoprint XML Extender for z/OS.

Changed information

- The PDF to AFP transform contains limited support for PDF 1.3. See “Infoprint Server Transforms and other transforms” on page 26.

Deleted information

- Support for Windows 95 has been removed because Microsoft® no longer supports Windows 95.

This book 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.

You might notice changes in the style and structure of some content in this book—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 books.

Summary of changes for S544-5742-03 z/OS Version 1 Release 2

This book contains information previously presented in S544-5742-02, which supports z/OS Version 1 Release 2.

New information

- Information is added to indicate this book supports z/OS.e.
- “What’s new in z/OS Version 1 Release 2” on page 8 describes the new functions that were introduced to Infoprint Server in z/OS Version 1 Release 2 in March 2002. For the PTFs you need to apply to obtain these functions, see *z/OS Infoprint Server Migration*.
 - “Print Interface subsystem for transforming data” on page 10
 - “Infoprint Port Monitor for Windows Me and Windows XP” on page 10

This book 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 S544–5742-02
z/OS Version 1 Release 2**

This book contains information previously presented in S544-5742-01, which supports z/OS Version 1 Release 2.

New information

- “What’s new in z/OS Version 1 Release 2” on page 8 describes the new functions that were introduced to Infoprint Server in z/OS Version 1 Release 2 after the release was shipped. For the PTFs you need to apply to obtain these functions, see *z/OS Infoprint Server Migration*.
 - “E-mail support” on page 9
 - “Infoprint Color 130 Plus Printer support” on page 9
- Chapter 2, “Using Infoprint Server” on page 11 contains these new and changed scenarios:
 - “Printing AFP data from batch applications to LAN-based PCL printers and sending it to e-mail destinations” on page 18
 - “Printing SAP R/3 ABAP or OTF data on AFP printers” on page 20

Deleted information

- The glossary has been removed and is now located in *z/OS Infoprint Server Customization*.

This book 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 S544–5742-01
z/OS Version 1 Release 2**

This book contains information previously presented in S544-5742-00, which supports z/OS Version 1 Release 1.

New information

- New enhancements have been added in z/OS Version 1 Release 2. For a description of the new functions, see “What’s new in z/OS Version 1 Release 2” on page 8.

Changed information

- The AFP™ Printer Driver for Windows and the AFP Viewer plug-in for Windows are no longer part of Infoprint Server. However, these two programs are still available at no charge from the Printing Systems Web site.

With this change, several printing scenarios have been modified to show how you can use the PCL to AFP, PostScript to AFP, and PDF to AFP transforms, instead of the AFP Printer Driver for Windows, to transform documents to AFP format for printing on IBM AFP printers.

This book 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.

Chapter 1. What Infoprint Server and Infoprint Server Transforms 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.

Infoprint Server Transforms, a separate product (5697–F51), provides a set of data transforms that let you convert data to and from the AFP data format. Some transforms (provided at no additional cost to Infoprint Server customers) let you print PCL, PDF, PostScript, and SAP data on IBM AFP printers. Other transforms (available as priced features) let you print AFP and line data on PCL and PostScript printers, convert AFP data to PDF format for posting on the Web, and print line data on VTAM-controlled printers. In addition, Infoprint XML Extender for z/OS, a separate product (5655-J66), lets you transform Extensible Markup Language (XML) files to AFP format for printing or viewing.

An administrator can set up the transforms to automatically convert data when printing. A user can also transform documents to and from the AFP data format from the z/OS UNIX command line. Documents transformed from the command line can be saved in the converted format and printed later or sent to other users.

The IP PrintWay/NetSpool feature that was available in OS/390 Version 1 Release 3 and Version 2 Release 4 is now a part of Infoprint Server. IP PrintWay gives you fast and reliable 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.

This chapter discusses how printing requirements are changing. It explains why print consolidation with z/OS is the best way to handle printing, describes how Infoprint Server supports printing in the z/OS environment, and explains 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 Printer Control Language (PCL) and PostScript printers. They also want to print on higher-speed, host-attached printers, such as the IBM Infoprint 60.

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 on page 3 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.

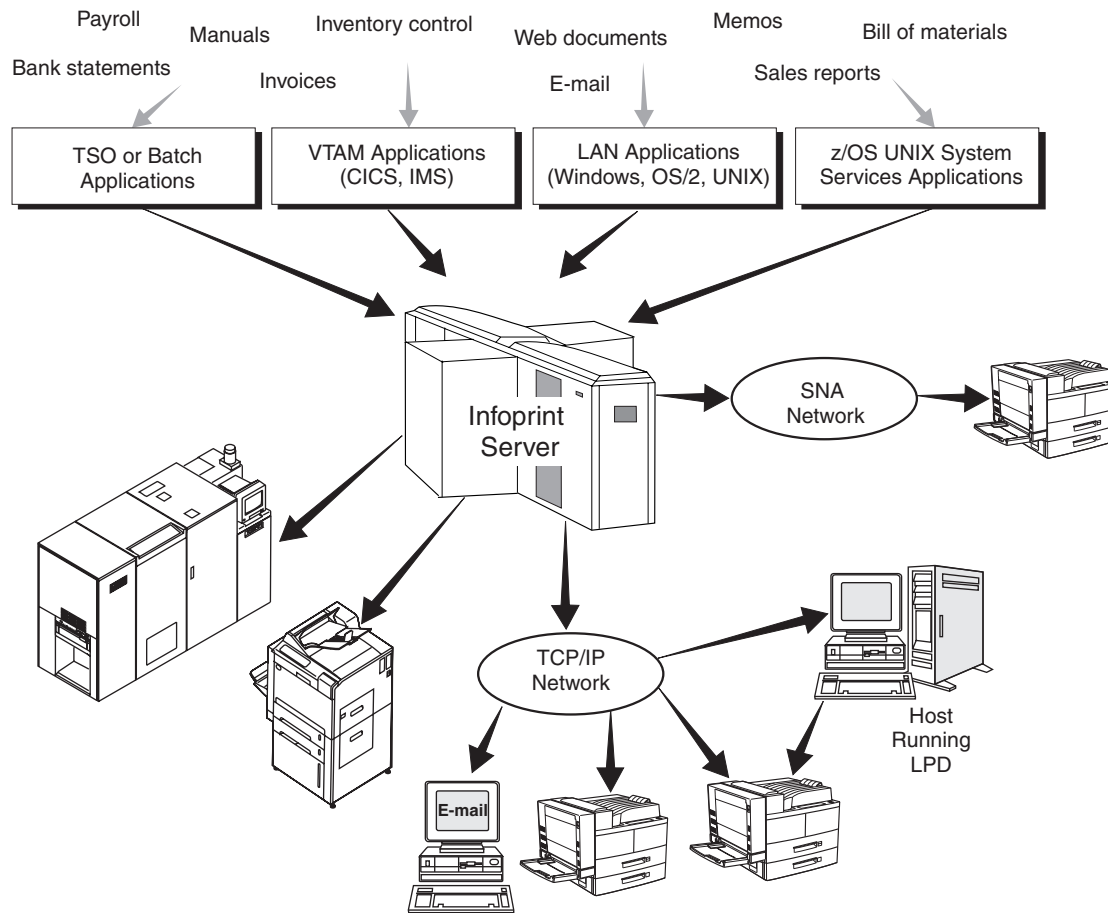


Figure 1. How Infoprint Server handles printing requirements

How Infoprint Server handles printing

Infoprint Server uses the z/OS 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 more data streams to the JES spool, specifically:
 - PostScript
 - Printer Control Language (PCL)
 - American National Standard Code for Information Interchange (ASCII)
 - Data from VTAM applications (such as CICS and IMS) that traditionally print on SNA printers

If you install Infoprint Server Transforms (5697-F51), users can also submit these data streams:

- Portable Document Format (PDF)
- SAP Output Text Format (OTF)
- SAP Advanced Business Application Programming (ABAP)

If you install Infoprint XML Extender for z/OS (5655-J66), users can also submit this data stream:

- Extensible Markup Language (XML)

- 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) for OS/390, 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 provides these components that run on the z/OS host system:

Printer Inventory

Provides a single set of printer definitions that are used by the Print Interface, IP PrintWay, and NetSpool components of Infoprint Server. The Printer Inventory also provides Functional Subsystem (FSS) and Functional Subsystem Application (FSA) definitions, which are used by Print Services Facility (PSF) for OS/390 and IP PrintWay.

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 LAN environment.
- Printing support for users and application programs in the z/OS UNIX System Services environment. Users and applications can print on z/OS-controlled printers, including these printers:
 - Advanced Function Presentation (AFP) printers that are attached to z/OS and that use PSF
 - TCP/IP-attached ASCII printers that use IP PrintWay
 - VTAM-controlled printers that use IP PrintWay
- Printing support for users and application programs in the SAP R/3 environment. Users and applications can print on z/OS-controlled printers, including these printers:
 - Advanced Function Presentation (AFP) printers that are attached to z/OS and that use PSF (SAP to AFP transform is required)
 - TCP/IP-attached ASCII printers
 - VTAM-controlled printers
- Support for these Windows printing protocols:
 - Server Message Block (SMB), used by Windows 98, Windows NT®, and Windows 2000
 - Internet Printing Protocol (IPP), used by Windows 2000 and Windows XP
- Automatic transform of data to and from the AFP data stream if Infoprint Server Transforms (5697-F51) or Infoprint XML Extender for z/OS (5655-J66) is installed.

z/OS UNIX System Services shell 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. IP PrintWay can also automatically transform data to and from the AFP data stream if the Infoprint Server Transforms (Program 5697–F51) product is installed.

Simple Network Management Protocol (SNMP) subagent

Reports the status of printers that do not have their own SNMP subagent to a printer management program, for example, IBM Network Printer Manager for the Web (NPM), which you can download at no charge from the Web. NPM lets an operator monitor printers throughout the network from a Web browser running on any workstation.

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, IP PrintWay, and the SNMP subagent 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.

Also on the z/OS host system, these optional products work like another component of Infoprint Server:

Infoprint Server Transforms

Converts jobs in PCL, PostScript, PDF, SAP ABAP, and SAP OTF format to AFP format, or converts jobs in AFP format or line data to PCL, PostScript, or PDF before printing. You can run transforms as standalone shell commands from z/OS UNIX System Services, or you can run them automatically when you submit a job to print.

Infoprint Server Transforms also provides support for printing Japanese DBCS data streams on IBM AFP printers and for printing line data on coaxially-attached VTAM-controlled printers.

Infoprint Server Transforms is free to Infoprint Server customers. However, the AFP to PCL, AFP to PDF, and AFP to PostScript transforms are priced features of this product. The Coax Printer Support feature is also a priced feature.

Infoprint XML Extender for z/OS

Transforms Extensible Markup Language (XML) files to AFP format for printing or viewing.

To transform XML files to non-AFP data streams, you can use this process:

1. Transform XML to AFP.
2. Transform AFP to another data stream.

Infoprint XML Extender for z/OS (5655-J66) is an optional product. For more information, see *Infoprint XML Extender for z/OS*.

Infoprint Server also provides a client that runs on the Windows 98, Windows NT, Windows 2000, Windows Me, and Windows XP operating systems. This client includes this program:

Infoprint Port Monitor for Windows

Automatically transmits output to Print Interface for printing, letting users

use familiar print-submission methods from Windows applications. 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.

These two related programs for Windows are not part of Infoprint Server; however, they are available at no charge from the Web:

AFP Printer Driver

Creates output in AFP format to let you print on any of IBM's AFP printers controlled by PSF for OS/390.

AFP Viewer plug-in

Displays documents that are in AFP format, such as Web documents or documents that you have downloaded from the z/OS host.

For examples of the Infoprint Server components that are used in different printing scenarios, see Chapter 2, "Using Infoprint Server" on page 11. For more detailed information about the Infoprint Server components, see Chapter 3, "Understanding the components of Infoprint Server" on page 23.

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

Detect and transform data streams

Print Interface automatically detects the data stream for jobs that remote clients and z/OS UNIX System Services clients submit. It can then make sure that the selected printer can print the data stream, thus saving paper and time.

If you install the base feature of Infoprint Server Transforms, Print Interface can use one of these transforms to automatically convert documents to AFP format for printing on IBM AFP printers:

- PCL to AFP transform
- PostScript to AFP transform
- PDF to AFP transform
- SAP ABAP and SAP OTF to AFP transform

If you install the priced features of Infoprint Server Transforms, Print Interface can use these transforms to automatically convert AFP or line data documents to a format supported by the printer:

- AFP to PCL transform
- AFP to PostScript transform
- AFP to PDF transform

If you install Infoprint XML Extender for z/OS (5655-J66), you can transform Extensible Markup Language (XML) files to AFP format for printing or viewing.

To transform XML files to non-AFP data streams, you can use this process:

1. Transform XML to AFP.
2. Transform AFP to another data stream.

For more information, see *Infoprint XML Extender for z/OS*.

Support common printer languages

Infoprint Server provides support for the most commonly used printer languages in the industry, including Postscript, PCL, and AFP or Mixed Object Document Content Architecture-Presentation (MO:DCA-P). With the Infoprint Server Transforms product, Infoprint Server supports printing PDF, SAP OTF, and SAP ABAP data streams on IBM AFP printers and printing line and AFP data streams on PCL and PostScript printers. Infoprint Server protects your investment in printer hardware while providing you with printing enhancements.

Monitor printer status

The SNMP subagent reports printer status of printers controlled by PSF for OS/390 to a printer management program like Network Printer Manager, whose graphical user interface (GUI) lets the operator monitor printers throughout the network. When something goes wrong, the operator can check for more details without leaving the workstation.

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:
<http://www.ibm.com/printers/download.html>

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 at: <http://www.ibm.com/printers/download.html>

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. For more information, see “E-mail support” on page 9.

What’s new in z/OS Version 1 Release 2

Infoprint Server has been enhanced in z/OS Version 1 Release 2 with new capabilities to address your requirements for improved usability and application support.

Enhanced printing of VTAM application data

The NetSpool component of Infoprint Server has enhanced its support for printing data from VTAM applications, such as CICS and IMS. NetSpool can now convert VTAM application print data directly to PCL format. This new support provides greater print fidelity on printers that accept the PCL data format, which includes most IBM, HP, Lexmark, and other manufacturers’ network printers. No changes are required to your VTAM applications to take advantage of this new support.

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 now:

- 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, on a page-by-page basis

The print administrator can use Infoprint Server ISPF panels to easily customize this new 3270 and SCS to PCL conversion function on a printer-by-printer basis.

The NetSpool component also provides two new exits:

- Beginning of File exit for 3270 data streams. Your system programmer can use this exit to add PCL commands to the beginning of PCL data streams. For example, your system programmer can add PCL commands to select a font. This new exit complements the Beginning of File exit for SCS data streams, available also in the previous release.
- Graphic Escape exit for SCS and 3270 data streams. Your system programmer can use this exit to map graphic escape sequences to appropriate printable

characters in an alternate font. For example, a Graphic Escape “T” can be mapped to a telephone symbol in the Wingdings font.

Enhanced copies support

The IP PrintWay component of Infoprint Server now provides support for printing more than one copy of a document on remote printers and print servers that either contain a line printer daemon (LPD) or support the direct sockets printing protocol. IP PrintWay now can transmit data multiple times to a printer, while ensuring that all copies of the data set print together. In the previous release, IP PrintWay could print copies on only the small subset of printers whose LPDs support printing the same document multiple times.

New support in the Print Interface component of Infoprint Server now lets a job submitter or administrator request more than 255 copies to be printed at one time. This support is available when you print through Print Interface with any job submission method.

Query printer status function

The IP PrintWay component of Infoprint Server now lets the operator query the status of a printer from IP PrintWay’s transmission queue ISPF panels. The operator will find this function useful when transmission of a data set to the printer is unsuccessful. This new function is available only when IP PrintWay has attempted to transmit data to the printer’s LPD.

E-mail support

The IP PrintWay component of Infoprint Server now lets you send output from the JES spool to one or more e-mail addresses. Previously, IP PrintWay could transmit output only to printers and print servers. 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 the 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:
 - Transform traditional line data and VTAM application data (for example, CICS and IMS data) to text format.
 - Transform traditional line data, VTAM application data, and AFP data to PDF or PostScript format. The Infoprint Server Transforms product is required.
 - Transform PCL data, SAP OTF data, PostScript Data, and VTAM application data to AFP format. The Infoprint Server Transforms 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.

Infoprint Color 130 Plus Printer support

The Print Interface component of Infoprint Server now lets you use the PostScript to AFP and the PDF to AFP color transform that Infoprint Manager for AIX® provides to print color PostScript and color PDF files on the IBM Infoprint Color 130 Plus printer. This color transform lets you create the FS45 image type that the Infoprint

| Color 130 Plus printer requires. Print Interface lets the administrator and user
| specify options to customize this color transform. Infoprint Manager for AIX V3R2
| (5785–E42) or later is required.

| **Print Interface subsystem for transforming data**

| The Print Interface subsystem, together with transforms that Infoprint Server
| Transforms provides, lets you transform and print output from z/OS applications with
| minimal changes to your applications' job control language (JCL). For example, this
| support lets you use familiar JCL to print PostScript or PDF data on IBM AFP
| printers and to print line data or AFP data on PCL and PostScript printers.

| **Infoprint Port Monitor for Windows Me and Windows XP**

| The Infoprint Port Monitor for Windows, which lets Windows users print on z/OS
| printers defined to Infoprint Server, now runs on Windows Me and Windows XP
| systems. The new Infoprint Port Monitor also contains usability improvements that
| make it simpler to install and upgrade. A new unattended mode of operation makes
| it easier to share the Windows printer definition for a z/OS printer, so that the
| Infoprint Port Monitor does not need to be installed on each Windows system.

Chapter 2. Using Infoprint Server

This chapter describes how you can use Infoprint Server in your particular environment to meet your printing needs. It includes these scenarios:

- Printing CICS or IMS output data on network printers
- Printing UNIX data on AFP printers
- Printing Web documents data using the Windows SMB printing protocol
- Printing Web documents using the Infoprint Port Monitor for Windows
- Printing documents over the Internet using the Internet Printing Protocol
- Printing data from batch applications to network printers
- Printing AFP data from batch applications on LAN-based PCL printers and to e-mail destinations
- Printing AFP documents from Windows environments
- Printing SAP R/3 ABAP and OTF data on AFP printers
- Monitoring printer status

These scenarios are examples of printing situations, but do not represent all situations that exist. Each scenario includes a figure that shows which Infoprint Server and Infoprint Server Transforms 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 Server Transforms component is displayed in blue.

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 LAN.

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

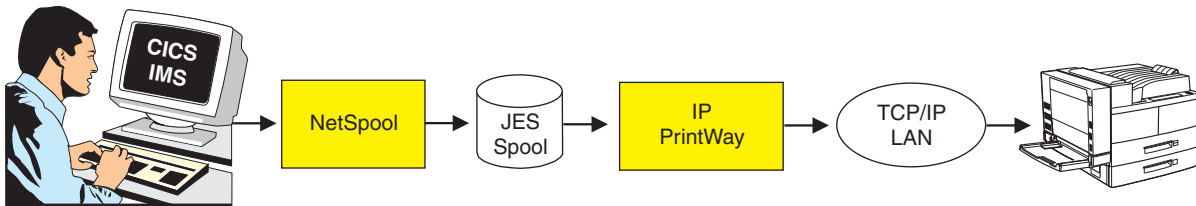


Figure 2. Printing CICS or IMS output data on network printers

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 S/390® or IBM @server zSeries system, such as the IBM Infoprint 2085, for more efficient printing.

Here is how this retailer can use the Infoprint Server components and the Infoprint Server Transforms 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 Server Transforms to convert PostScript or PDF documents to AFP format.
4. The Print Interface component creates output data sets on the JES spool.
5. PSF for OS/390 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.

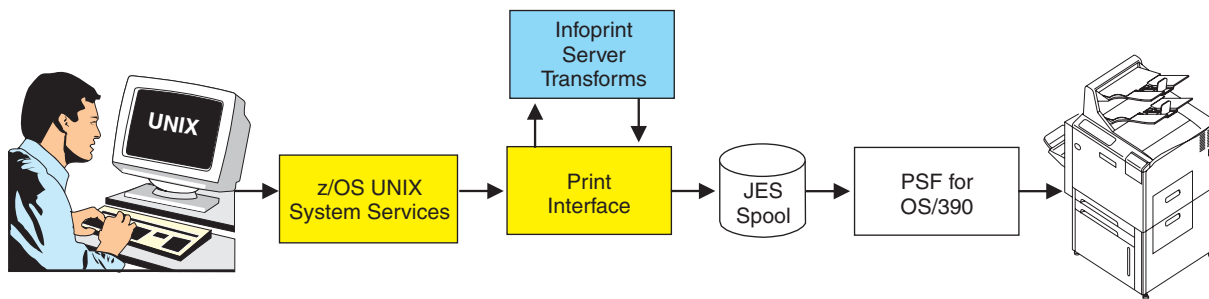


Figure 3. Printing z/OS UNIX System Services data on AFP printers

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

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 high-speed AFP printers, such as IBM Infoprint 70 printers, attached to an IBM S/390 or IBM @server zSeries system. This company wants to use the standard Windows SMB protocol to submit print requests.

1. From a Windows 98, Windows NT, or Windows 2000 workstation, a user views a document from the Web in a browser, such as Netscape Navigator.
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 LAN 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 Infoprint Server Transforms 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 for OS/390 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 LAN. If the selected printer is an AFP printer, PSF for OS/390 prints the data set on the AFP printer.

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

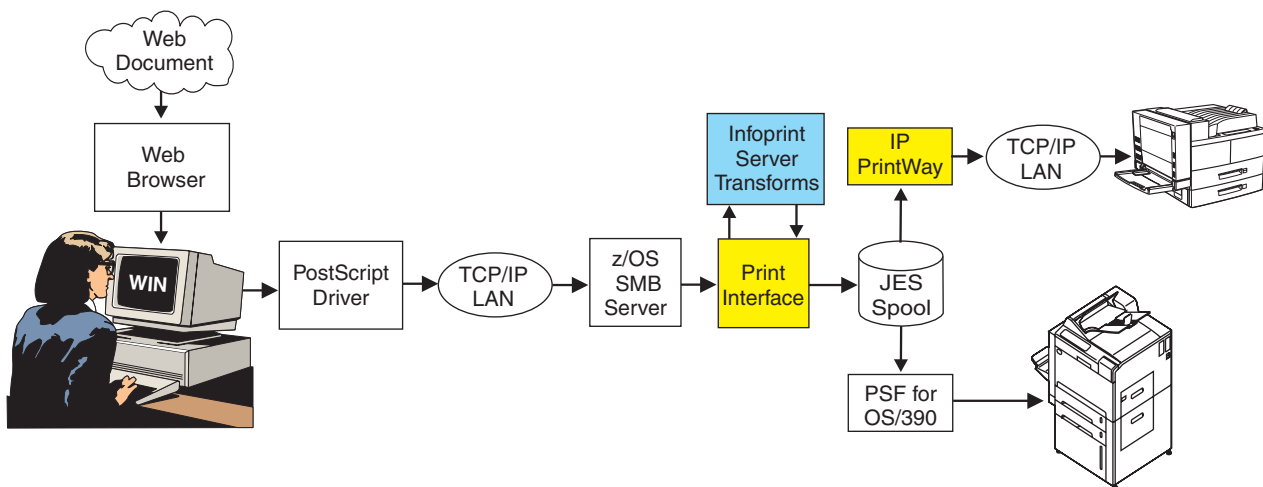


Figure 4. Printing documents from the Web with the SMB protocol

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 high-speed AFP printers, such as IBM Infoprint 70 printers, attached to an IBM S/390 or IBM @server zSeries system. 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 98, Windows NT, Windows 2000, Windows Me, or Windows XP workstation, a user views a document from the Web in a browser, such as Netscape Navigator.
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 dialog. The 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 LAN to the Print Interface component.
4. The Print Interface component automatically calls Infoprint Server Transforms 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 for OS/390 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 LAN. If the selected printer is an AFP printer, PSF for OS/390 prints the data set on the AFP printer.

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

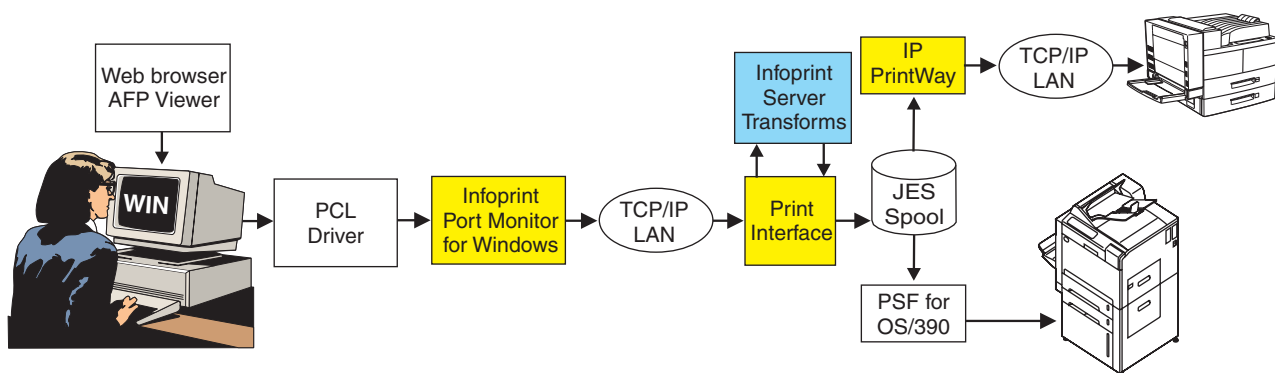


Figure 5. Printing documents from the Web with the Infoprint Port Monitor for Windows

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, such as IBM Infoprint 70 printers, attached to an IBM S/390 or IBM @server zSeries system. The company upgrades to Windows 2000 or Windows XP because these Windows systems provide an integrated IPP client. It also installs printers that support the Internet Printing Protocol (IPP). For example, IBM Infoprint 21 printers.

1. From a Windows 2000 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 creates an output file in AFP format for printing on AFP printers.
 2. The IPP printing protocol included in Windows 2000 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 for OS/390 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 LAN. If the printer, such as the IBM Infoprint 21 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 for OS/390 prints the data set on the AFP printer.

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

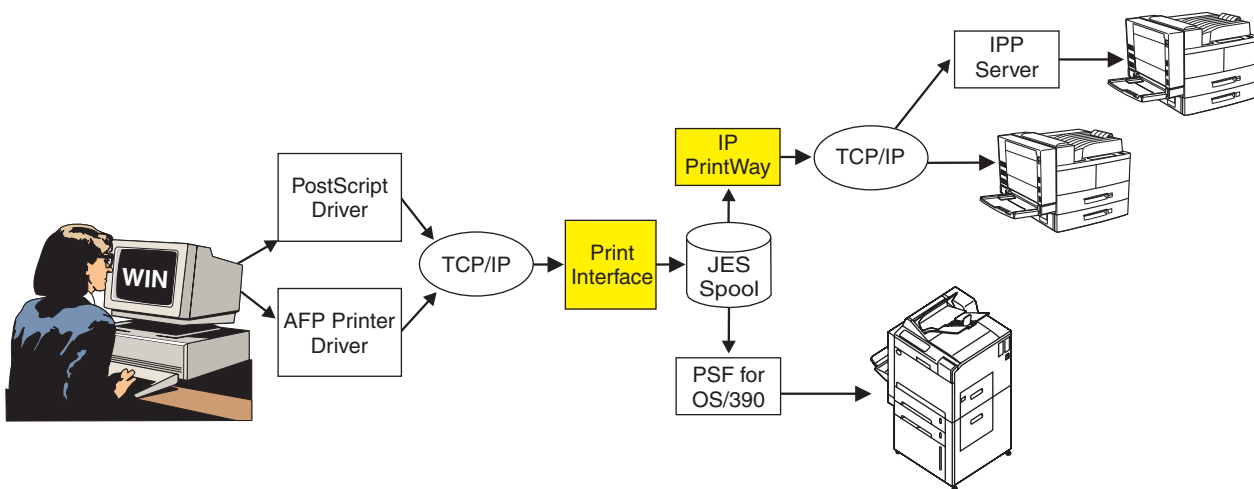


Figure 6. Printing documents with the IPP Printing Protocol

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 Coax Printer Support feature of Infoprint Server Transforms 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. If the printer is in an SNA network, IP PrintWay uses the Coax Printer Support feature of the Infoprint Server Transforms product to transform line data to SCS or DSC/DSE format.

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

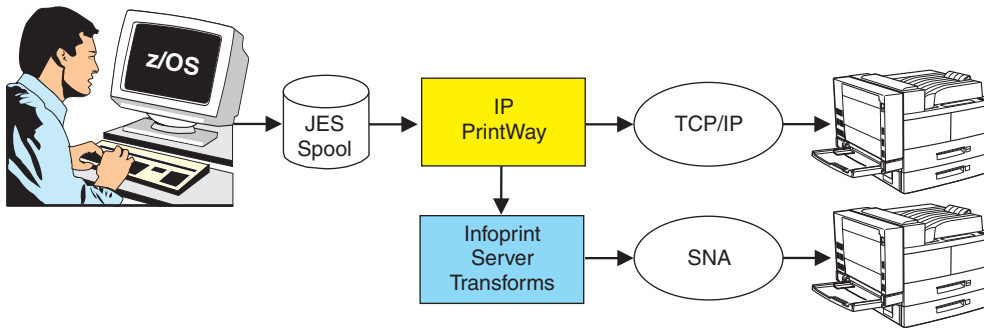


Figure 7. Printing from batch applications to network printers

Printing AFP data from batch applications to 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 IBM 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. For example, the printers might be IBM Network Printer 24s without the optional IPDS cards that let them print AFP 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 Server Transforms 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 uses Print Interface to call Infoprint Server Transforms.
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.

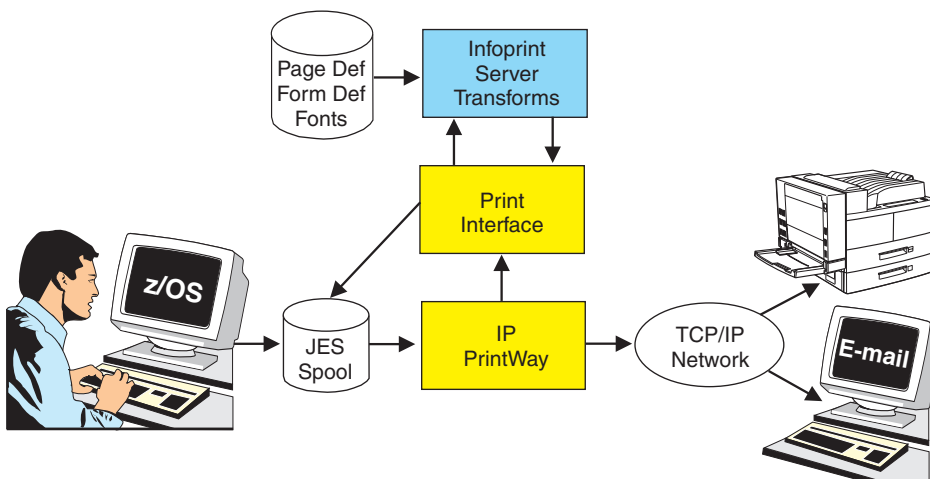


Figure 8. Printing AFP from batch applications to PCL printers and sending AFP data to e-mail destinations

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 IBM AFP printers on the z/OS system, such as the IBM Infoprint 70 or the IBM Infoprint 4000 printer, 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 IBM 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 LAN to the Print Interface component.
3. The Print Interface component creates an output data set on the JES spool.
4. PSF for OS/390 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.

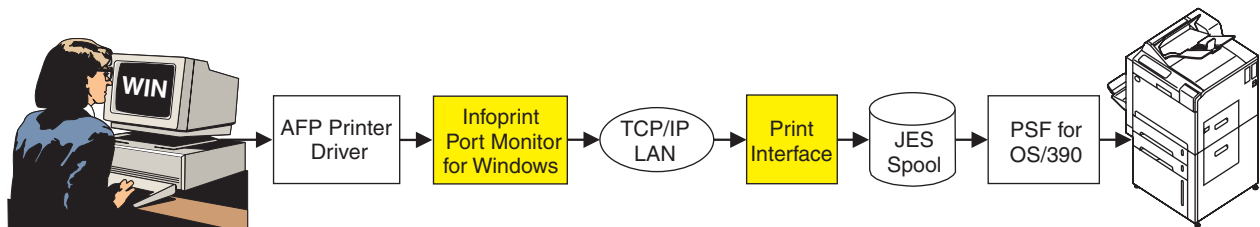


Figure 9. Creating and printing AFP documents from Windows

Printing SAP R/3 ABAP or OTF data on AFP printers

A manufacturing company wants to print purchase orders generated by SAP R/3 applications on high-speed IBM AFP printers, such as IBM Infoprint 4000 printers. With no changes to the SAP R/3 applications, this company can convert SAP R/3 ABAP and OTF documents to AFP format and print them on AFP printers attached to z/OS.

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

1. Using the SAP R/3 GUI, a user submits an SAP ABAP or SAP OTF 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 sends the document 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 print request to the Infoprint Server SAP Output Management System (OMS), which is part of the Print Interface component.
3. Print Interface determines that the SAP document must be transformed into AFP format for printing. Print Interface calls the SAP to AFP transform feature of Infoprint Server Transforms.
4. The SAP to AFP transform converts the SAP R/3 OTF data to AFP format and ABAP data to line data format. The transform selects appropriate AFP resources, such as a form definition, page definition, and fonts for PSF for OS/390 to use when it prints the document.
5. Print Interface creates an output data set on the JES spool.
6. PSF for OS/390 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 for OS/390.

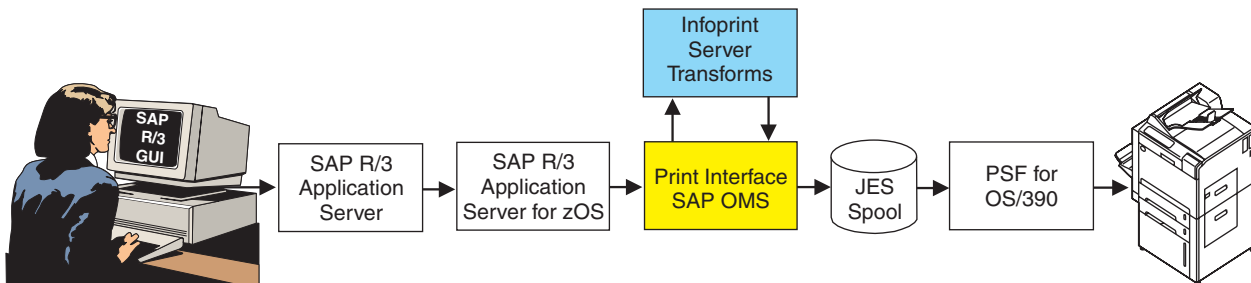


Figure 10. Printing SAP R/3 data on AFP printers

Monitoring printer status

A university engineering department maintains a network of many different computers and printers for a variety of projects. To prevent damage to the printers, they are locked. Only authorized key operators can add toner or clear a paper jam.

Here is how this department can use Infoprint Server and NPM to monitor printer status:

1. A sheet of paper gets caught in a PSF printer. Because the printer is defined in the Printer Inventory, PSF for OS/390 is able to report the paper jam to the SNMP subagent immediately.
2. The SNMP subagent reports the paper jam to NPM.
3. In the NPM GUI running in a web browser on the key operator's Windows workstation, the printer icon turns red to show that something is wrong with the printer.
4. The key operator selects the printer icon to view details about the problem, then goes to the printer and clears the paper jam.
5. PSF for OS/390 reports to the SNMP subagent that the problem has been corrected. The SNMP subagent transmits this information to NPM.
6. Meanwhile, a researcher compiles a report at a UNIX workstation. The researcher then starts a Web browser and checks the NPM GUI to see if the PSF printer is available. The printer icon is now normal.
7. Satisfied that the printer is running, the researcher submits the report to print.

Figure 11 shows how Infoprint Server lets users monitor printer status.

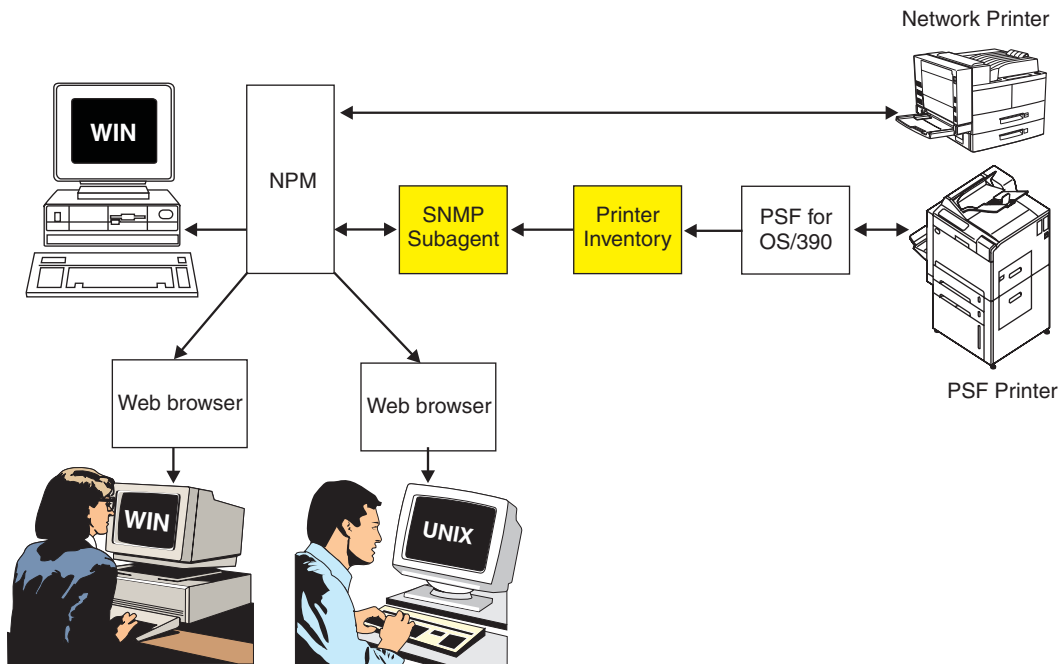


Figure 11. Monitoring printer status

Chapter 3. Understanding the components of Infoprint Server

Figure 12 shows how the components of Infoprint Server and Infoprint Server Transforms fit into your system. The components of Infoprint Server and Infoprint Server Transforms are shaded. If you are viewing the PDF file, components of Infoprint Server are displayed in yellow, while components of Infoprint Server Transforms are displayed in blue.

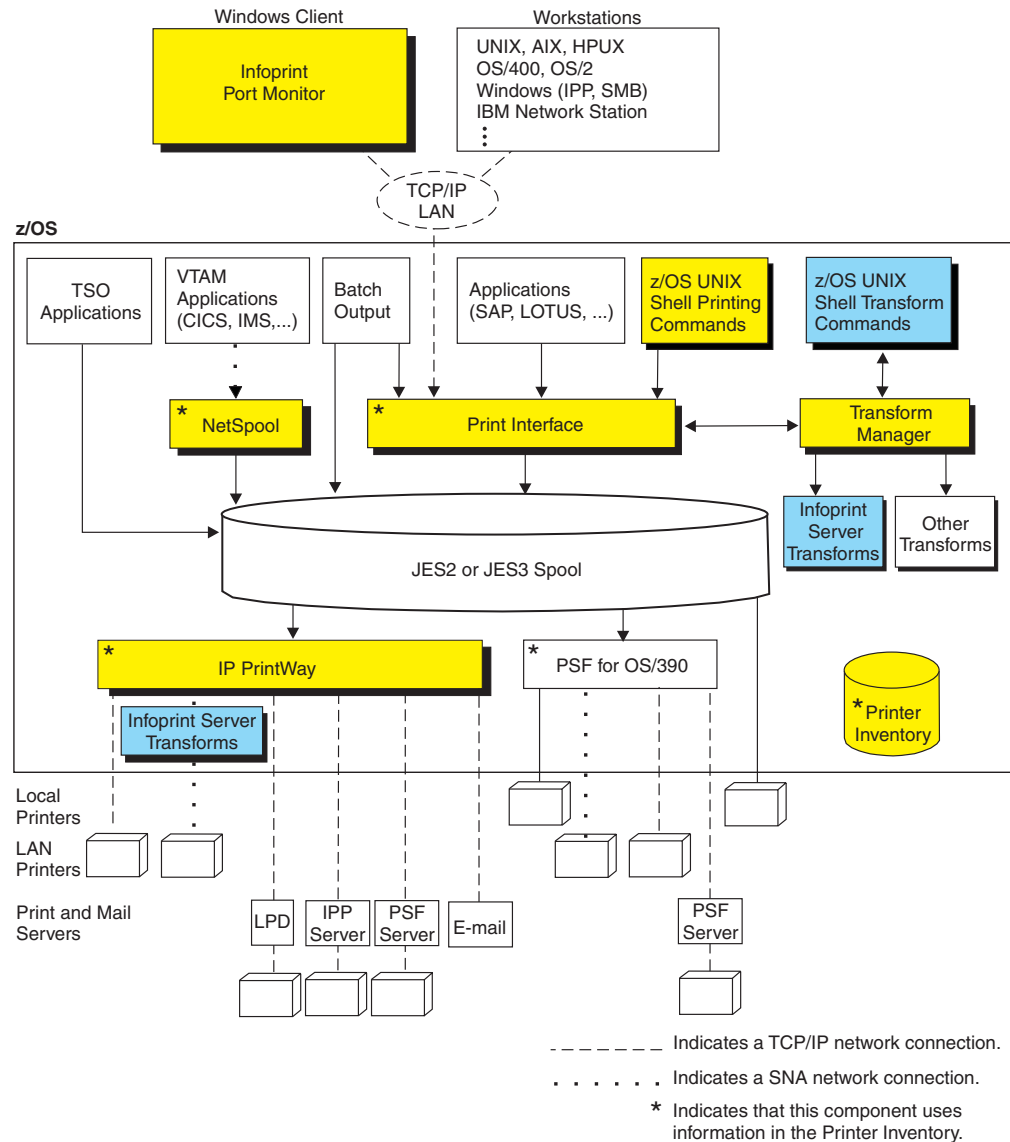


Figure 12. Infoprint Server components. Not shown: SNMP subagent

Printer Inventory

The Printer Inventory, a set of HFS files 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 printer configuration information used by PSF for OS/390 in the same Printer Inventory, instead of in the PSF startup procedure or in a PSF exit. This lets the system administrator change printer configuration information more easily without restarting all printers that use a PSF startup procedure. The operator needs to only restart the one printer whose configuration information has changed.

Print Interface

The Print Interface component of Infoprint Server provides z/OS UNIX System Services printing commands and a subsystem that let you print from the local z/OS system. 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 for OS/390 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, SAP, 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 if you have installed Infoprint Server Transforms (5697-F51) or another optional transform product, such as Infoprint XML Extender for z/OS (5655-J66). Print Interface can also automatically transform data to the AFP data format remotely on an AIX or Windows system using transforms that Infoprint Manager for AIX (5785-E42) and Infoprint Manager for Windows (5639-127) provide.

Print Interface can use the PostScript to AFP and the PDF to AFP color transform that Infoprint Manager for AIX V3R2 provides so that you can print color PostScript and color PDF files on the IBM Infoprint Color 130 Plus printer.
- 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 for OS/390 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 98, Windows NT, and Windows 2000 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 IBM AFP printers controlled by PSF for OS/390 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 shell printing commands, which provide more function than the printing commands available without Infoprint Server. These enhanced commands adhere to the XPG4.2 standard 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.
- 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.
- cancel** The **cancel** command cancels print requests, provided that the data set allocated on the JES spool has not yet been selected for printing.

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.

Infoprint Server Transforms and other transforms

Infoprint Server Transforms (5697-F51) is an optional product that is designed to work with Infoprint Server. It gives you the flexibility to print an increasing variety of outputs on a wide array of printers.

Transforms to AFP

Infoprint Server Transforms convert data streams in any of these formats to AFP format for printing on IBM AFP printers:

- PCL 5e
- PDF 1.2

The PDF to AFP transform also supports PDF 1.3 except for Compact Font Format (CFF) support.

- PostScript Language Level 3
- SAP R/3 Release 4.6C (or earlier) ABAP
- SAP R/3 Release 4.6C (or earlier) OTF

The transforms can run automatically when users submit jobs to print, or users can run them with these z/OS UNIX System Services shell commands:

pcl2afp Transforms a PCL file to an AFP file.

pdf2afp Transforms a PDF file to an AFP file.

ps2afp Transforms a PostScript file to an AFP file.

sap2afp Transforms an SAP R/3 Release 4.6C (or earlier) ABAP or OTF file to an AFP file.

For detailed information about the functions and limitations of the transforms, see *z/OS Infoprint Server User's Guide*.

Transforms from AFP

The priced features of Infoprint Server Transforms can transform files in AFP or line data format to any of these formats for printing on PCL or PostScript printers, or posting on the Web:

- PCL 5, 5e, or 5c (color)
- PDF 1.2 (monochrome or color)
- PostScript Language Level 2 (monochrome or color)

The transforms can run automatically when users submit jobs to print, or users can run them with these z/OS UNIX System Services commands:

afp2pcl Transforms an AFP or line data file to a PCL file.

afp2pdf Transforms an AFP or line data file to a PDF file.

afp2ps Transforms an AFP or line data file to a PostScript file.

For detailed information about the functions and limitations of the transforms, see *z/OS Infoprint Server User's Guide*.

Because the AFP architecture and PSF continue to be enhanced with new functions and because Infoprint Server Transforms is a separate product, the transforms might not support all of the AFP functions available with PSF in the future, or the transforms might support the new AFP functions on a later schedule. Therefore, the documented limitations might be incomplete after the publication date. IBM suggests that you test how your AFP applications print on non-AFP printers to make sure that the transform supports all of the AFP functions that your applications use.

Other transforms

Infoprint XML Extender for z/OS (5655-J66) is an optional product that lets you transform these files to AFP format for viewing or printing:

- Extensible Markup Language (XML) files

To transform XML files to non-AFP data streams, you can use this process:

| **xml2afp** Transforms an XML file to an AFP file. Then, you can transform the
| AFP file to another data stream.

| For more information, see *Infoprint XML Extender for z/OS*.

Kanji AFP print feature

Infoprint Server Transforms provides Heisei Kaku W5 Gothic and Heisei Mincho W3 fonts for the z/OS system. These fonts, together with the PostScript and PDF to AFP transform, let you print Japanese documents on AFP printers. You can also print documents that use other common Japanese fonts, such as Ryumin-Light and Gothic BBB-Medium, which are mapped to the two Heisei fonts. The Kanji AFP Print feature is available at no additional charge to Infoprint Server customers.

Coax printer support feature

The Coax Printer Support feature is a priced feature of Infoprint Server Transforms. This feature lets you print on VTAM-controlled printers that are defined to VTAM as LU0, LU1, or LU3 printers. The supported output data streams are Data Stream Compatibility/Data Stream Extended (DSC/DSE) and SNA Character String (SCS). The IP PrintWay component of Infoprint Server uses the Coax Printer Support feature to print on VTAM-controlled printers.

NetSpool

| NetSpool intercepts print data from VTAM applications, such as CICS and IMS.
| NetSpool converts the data into line data or PCL data and creates output data sets
| on the JES2 or JES3 spool. JES or PSF for OS/390 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.

IP PrintWay

IP PrintWay transmits output data sets from the JES2 or JES3 spool to remote printers and to e-mail destinations:

- 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 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 the Coax Printer Support feature of Infoprint Server Transforms. For information about this feature, see “Coax printer support feature” on page 28.
- 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 the AFP to PDF transform feature of Infoprint Server Transforms, IP PrintWay can transform line data, AFP data, and data from VTAM applications (such as CICS and IMS print data) to PDF format so that the e-mail recipients can view and print the output with Adobe Acrobat Reader.

Tip: IP PrintWay cannot transmit data sets larger than two gigabytes to remote LPDs. Also, depending on the IP PrintWay options the administrator specifies, IP PrintWay might not be able to transmit data sets larger than two gigabytes to printers that use the Internet Printing Protocol (IPP) or direct-sockets printing protocol, or to e-mail destinations.

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, and the IP address or the host name of the printer’s host system.
- 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.
- 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 target system.

- 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.

- AFP transform

IP PrintWay supports transformation of data to and from the AFP data stream if Infoprint Server Transforms (Program Number 5697–F51) is installed.

SNMP subagent

The SNMP subagent reports the status of printers that do not have their own SNMP subagent to a printer management program, for example, the IBM Network Printer Manager (NPM) for the Web, which you can download at no charge from the Printing Systems Division Web site at:

<http://www.ibm.com/printers/download.html>

The SNMP subagent lets an operator use the NPM GUI to monitor the status of printers throughout the system from a Web browser running on a single workstation. When something goes wrong, the interface permits the operator to check for details about any printer. Users can also check the status of printers before they submit jobs.

The NPM server requires Windows NT. The GUI can run on any workstation with a Web browser that supports Java[®] 1.1, for example, Netscape Navigator (in Netscape Communicator 4.51) or Microsoft Internet Explorer 5.0.

NPM supports up to 25 printers per z/OS connection.

Windows workstation support

This Infoprint Server Windows client, which can be downloaded from z/OS or the Web, lets Windows users print documents on IBM AFP printers and other z/OS printers:

Infoprint Port Monitor for Windows

The Infoprint Port Monitor for Windows sends files submitted for printing from Windows 98, Windows NT, Windows 2000, Windows Me, and Windows XP systems to the Print Interface component of Infoprint Server. The Infoprint Port Monitor lets users print from Windows applications that support printing and from the Windows **print** command on any printer that the administrator has defined in the Printer Inventory.

| These two related programs are not part of Infoprint Server but you can download
| them at no extra charge, along with the Infoprint Port Monitor, from the Printing
| Systems Web site at: <http://www.ibm.com/printers/download.html>

AFP Printer Driver for Windows

| The AFP Printer Driver creates output files in AFP format on Windows
| systems so that Windows users can print on AFP printers. The AFP Printer
| 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 OS/390 &*
| *z/OS: User's Guide*.

AFP Viewer plug-in for Windows

| The AFP Viewer plug-in displays files in AFP format from an Internet
| browser on Windows systems. The AFP Viewer plug-in also lets users print
| AFP files on AFP or 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 dialogs

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 used by Windows 98, Windows NT, and Windows 2000
- Internet Printing Protocol (IPP), used by Windows 2000 and Windows XP

Therefore, Windows users can use standard print-submission methods to print on z/OS printers 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 to 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.

| The Infoprint Port Monitor for Windows requires Windows 98, Windows NT Version
| 4 (with Service Pack 6) or higher, Windows 2000, Windows Me, or Windows XP.
| The Microsoft TCP/IP protocol must be configured and operational.

Appendix. Accessibility

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

- 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, work with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.

Keyboard navigation of the user interface

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

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Bibliography

This section lists books that might help you to configure and use Infoprint Server.

Infoprint Server

Title	Order number
<i>Infoprint Server Transforms Licensed Program Specifications</i>	G544-5797
<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 Migration</i>	G544-5743
<i>z/OS Infoprint Server Operation and Administration</i>	S544-5745
<i>z/OS Infoprint Server User's Guide</i>	S544-5746
<i>Infoprint Server for z/OS Implementation Redbook</i>	SG24-6234
<i>Infoprint XML Extender for z/OS</i>	S544-5855

Print Services Facility for OS/390

Title	Order number
<i>AFP Conversion and Indexing Facility: User's Guide</i>	S544-5285
<i>PSF for OS/390 & z/OS: Customization</i>	S544-5622
<i>PSF for OS/390 & z/OS: Diagnosis</i>	G544-5623
<i>PSF for OS/390 & z/OS: Download for OS/390</i>	S544-5624
<i>PSF for OS/390 & z/OS: Introduction</i>	G544-5625
<i>PSF for OS/390 & z/OS: Messages and Codes</i>	G544-5627
<i>PSF for OS/390 & z/OS: User's Guide</i>	S544-5630

Advanced Function Presentation (AFP)

Title	Order number
<i>IBM Printing Systems: Printer Information</i>	S544-5750
<i>IBM Printing Systems: Printer Summary</i>	S544-5749
<i>AFP: Programming Guide and Line Data Reference</i>	S544-3884
<i>IBM AFP Fonts: Font Summary for AFP Font Collection</i>	S544-5633
<i>IBM Data Stream and Object Architectures: Bar Code Object Content Architecture Reference</i>	S544-3766
<i>IBM Data Stream and Object Architectures: IOCA Reference</i>	SC31-6805
<i>IBM Page Printer Formatting Aid: User's Guide</i>	S544-5284

Infoprint Manager for AIX and Windows

Title	Order number
<i>IBM Infoprint Color 130 Plus Installation Planning Guide</i>	G544-5771
<i>IBM Infoprint Manager: Reference</i>	S544-5475
<i>IBM Infoprint Manager for AIX: Administrator's Guide</i>	S544-5595

z/OS Version 1 Release 2

Title	Order number
<i>z/OS C/C++ Programming Guide</i>	SC09-4765
<i>z/OS C/C++ Run-Time Library Reference</i>	SA22-7821
<i>z/OS Communications Server: IP and SNA Codes</i>	SC31-8791
<i>z/OS Communications Server: IP Application Programming Interface Guide</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: IP Migration</i>	GC31-8773
<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>	LY43-0088
<i>z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT</i>	LY43-0089
<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 Information Roadmap</i>	SA22-7500
<i>z/OS ISPF Dialog Developer's Guide and Reference</i>	SC34-4821
<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
<i>z/OS MVS Initialization and Tuning Reference</i>	SA22-7592
<i>z/OS MVS JCL Reference</i>	SA22-7597
<i>z/OS MVS Product Management</i>	SA22-7603

Title	Order number
<i>z/OS MVS Programming: Authorized Assembler Services Reference ALE-DYN</i>	SA22-7609
<i>z/OS MVS Programming: Authorized Assembler Services Reference ENF-IXG</i>	SA22-7610
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I

Index

A

accessibility 33
accounting in IP PrintWay 30
AFP Printer Driver for Windows
 description 7, 31
 scenario 16, 19
AFP to PCL transform 27
AFP to PDF transform 27
AFP to PostScript transform 27
AFP Viewer Plug-in for Windows
 description 8, 31
afp2pcl command 27
afp2pdf command 27
afp2ps command 27

B

books 39

C

cancel command, description 26
CICS print data, scenario 12
Coax Printer Support feature
 description 28
 scenario 17
Color 130 Plus printer support 9
commands for printing, description 26
commands for transform, description 26
copy support 9

D

direct socket printing support in IP PrintWay 29
disability 33
documents, licensed viii

E

e-mail
 description 9
 scenario 18
 support in IP PrintWay 29

I

IMS print data, scenario 12
Infoprint Color 130 Plus printer support 9
Infoprint Manager for AIX requirements for color
 transform 9
Infoprint Port Monitor for Windows
 description 30
 scenario 15, 19
 z/OS V1R2 enhancements 10
Infoprint Server Transforms
 description 26

Infoprint Server Transforms (*continued*)

 IP PrintWay support for 30
 scenario 13, 18, 20
 subsystem support 10, 25
Infoprint XML Extender 7, 27
Internet Printing Protocol (IPP)
 scenario 16
 support in IP PrintWay 29
IP PrintWay
 copy support 9
 description 29
 e-mail support 9
 query printer status 9
 scenario 12, 13, 14, 15, 16, 17, 18
 z/OS V1R2 enhancements 9
IPP
 scenario 16
 support in IP PrintWay 29

K

Kanji AFP Print feature 28
keyboard 33

L

licensed documents viii
LookAt message retrieval tool ix
lp command, description 26
lpstat command, description 26

M

message retrieval tool, LookAt ix

N

NetSpool
 Beginning of File exit for 3270 data streams 8
 description 28
 Graphic Escape exit 8
 PCL support, description 8
 scenario 12
 z/OS V1R2 enhancements 8
Network Printer Manager (NPM)
 description 5
 scenario 21
new function in z/OS V1R2 8
NPM
 description 5
 scenario 21

P

PCL support 8
pcl2afp command 27
pdf2afp command 27

- Port Monitor for Windows
 - description 30
 - scenario 15, 19
 - z/OS V1R2 enhancements 10
- Print Interface
 - description 24
 - scenario 13, 14, 15, 16, 19, 20
 - z/OS V1R2 enhancements 9, 10
- Printer Driver, AFP
 - description 7, 31
 - scenario 16, 19
- Printer Inventory, description 23
- PrintWay
 - copy support 9
 - description 29
 - e-mail support 9
 - query printer status 9
 - scenario 12, 13, 14, 15, 16, 17, 18
 - z/OS V1R2 enhancements 9
- ps2afp command 27
- PSF for OS/390
 - monitor status of printers 7
 - printer driver for 6
 - Printer Inventory 24
 - printing files allocated by Infoprint Server 4
 - scenario 14, 15, 19, 20, 21
 - transform support 10, 25
- PSP bucket ix
- publications 39

Q

- query printer status function 9

S

- SAP R/3
 - description 4
 - Output Management System in Print Interface 25
 - SAP to AFP transform 27
 - scenario 20
- sap2afp command 27
- shortcut keys 33
- SMB
 - scenario 14
 - support in Print Interface 25
- SMF type 6 record in IP PrintWay 30
- SNMP subagent
 - description 30
 - scenario 21
- subsystem, Print Interface 10, 25

T

- Transform commands, description 26
- transform XML to AFP 7, 27
- transforms
 - description 26
 - IP PrintWay support for 30
 - scenario 13, 18, 20
 - subsystem support 10, 25

V

- Viewer, AFP
 - description 8, 31
- VTAM application data, printing
 - enhancements in z/OS V1R2 8
 - scenario 12
- VTAM printers
 - Coax Printer Support feature 28
 - scenario 17
 - support in IP PrintWay 29

W

- Windows support, description 30

X

- XML Extender 7, 27
- XML to AFP transform 7, 27
- xml2afp command 27

Z

- z/OS V1R2 new function 8

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