

Print Services Facility for z/OS



Security Guide

Version 4, Release 2.0

Print Services Facility for z/OS



Security Guide

Version 4, Release 2.0

Note:

Before using this information and the product it supports, read the information in "Notices" on page 33.

Second edition (March 2008)

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About This Publication

This publication is designed to help programmers, analysts, and administrators who install, customize, or maintain Print Services Facility™ (PSF) for z/OS® (hereafter referred to as PSF) as a component of a trusted computing base.¹ PSF runs on z/OS and z/OS.e systems. In this publication, the term “z/OS” refers to both systems, unless otherwise specified.

This publication describes the PSF function called *print labeling*. This function can be used to produce printed output containing special labels. These labels can be used for security purposes or other installation-defined purposes.

Note: Print labeling can be done with PSF even if PSF is not a part of a trusted computing base.

Who Should Read This Publication

You should use this publication if you are a system programmer, a system analyst, a security administrator, a security auditor, or an application programmer who is responsible for data security.

You should be familiar with the material contained in *PSF for z/OS: Customization* and *PSF for z/OS: User's Guide* before attempting any of the procedures described in this publication.

How This Publication Is Organized

This publication is intended to help you perform the tasks in Table 2 on page 6. The information in this publication must not be used for programming purposes.

This publication is organized so that you can read it sequentially or refer directly to individual tasks.

- Use Chapter 1, “Introducing the Print Labeling Function,” on page 1 for an overview of the PSF print labeling function and how PSF operates within a trusted computing base.
- Use Chapter 2, “Using Print Labeling,” on page 7 when working with an operating system that supports print labeling.
- Use Appendix A, “Security Page Layout,” on page 27 when designing pages for printing using the print labeling function of PSF.
- Use Appendix B, “PAPERNAME Table for System-Defined Paper Names,” on page 29 to find a list of system-defined paper names used when establishing a security definitions library.
- Use Appendix C, “Accessibility,” on page 31 to obtain information about the accessibility features available in z/OS.

A notices section, glossary, bibliography, and index are included. The bibliography lists the publications containing additional information about the system, hardware, or software used by PSF, or about installation and maintenance.

1. A trusted computing base consists of components that together enforce a unified security policy over a computing environment. See “Introducing Trusted Computing Base Components” on page 3 for more information.

Fast Path

For a list of security-related tasks, see Table 2 on page 6. This fast path is provided so that you can quickly access task information if you are already familiar with the PSF print labeling function.

Understanding the Syntax Notation Used in This Publication

The following rules apply to syntax examples and coding illustrations throughout this publication:

- The uppercase letters are to be entered as shown; however, you do not need to type them in uppercase.
- The variable data you must provide is printed in italics. Enter specific data to replace the characters in italics; for example, for *PRTnnnn* you could enter PRT2.
- Do not enter any of the following symbols as part of a parameter or an option:

Vertical bar	
Underscore	—
Braces	{ }
Brackets	[]

- A vertical bar between two values means that you are to select only one of the values.
- If one value in a set of values is underscored, that value is the default—that is, the value that PSF uses if no option is specified.
- If values are enclosed in braces { }, one or the other of the values in the braces must be selected.
- If a value is enclosed in brackets [], you do not have to select that value.

Related Information

Publications that are referred to in this document or that contain additional information about AFP™, the z/OS operating system, PSF, and related products are listed in the “Bibliography” on page 41.

For additional information about z/OS and PSF for z/OS, refer to these Web pages:

<http://www.ibm.com/systems/z/os/zos/>
<http://www.ibm.com/systems/z/zos/printsoftware/index.html>
http://www.ibm.com/systems/z/zos/printsoftware/psfhome_z_ww.html

To obtain the latest documentation updates for z/OS base elements and optional features that result from DOC APARs and PTFs, refer to this DOC APARs and ++HOLD DOC Web page:

http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/Shelves/ZDOCAPAR

To obtain the latest documentation updates for PSF for z/OS, refer to the appropriate SYS1.SAMPLIB members in Table 1.

Table 1. SYS1.SAMPLIB Members for PSF Documentation Updates

Member	Publication
APSGADP2	<i>PSF for z/OS: AFP Download Plus, S550-0433</i>
APSGCUS2	<i>PSF for z/OS: Customization, S550-0427</i>
APSGDGN2	<i>PSF for z/OS: Diagnosis, G550-0428</i>

Table 1. SYS1.SAMPLIB Members for PSF Documentation Updates (continued)

Member	Publication
APSGDLG2	<i>PSF for z/OS: Download for z/OS</i> , S550-0429
APSGMAC2	<i>PSF for z/OS: Messages and Codes</i> , G550-0432
APSGSEC2	<i>PSF for z/OS: Security Guide</i> , S550-0434
APSGUSR2	<i>PSF for z/OS: User's Guide</i> , S550-0435

Using LookAt to View Message Explanations

LookAt is an online facility that lets you view explanations for most IBM messages and 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.

To find a message explanation in LookAt, you enter the message identifier (for example, IAT1836 or IAT*). Some messages have information in more than one document. For those messages, LookAt displays a list of documents that contain the message.

You can access LookAt from these locations:

Internet

Access the LookAt Web site at:

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

z/OS TSO/E host system

Install code on your z/OS system to access LookAt from a TSO/E command line, such as TSO/E prompt, ISPF, or z/OS UNIX® System Services.

Microsoft® Windows® workstation

Install code on your workstation to access LookAt from a Windows graphical user interface or a command prompt (also known as the DOS command line).

Wireless handheld device

Link to the LookAt Mobile Edition from the LookAt Web site to access LookAt from a handheld device that has wireless access and an Internet browser, such as Internet Explorer for Pocket PCs; Blazer or Eudora for Palm OS; or Opera for Linux® handheld devices.

To install LookAt on your TSO/E host system or Windows workstation, you can obtain the code from:

- A CD-ROM in the *z/OS Collection*
- The *z/OS and Software Products DVD Collection*
- The LookAt Web site's **Download** link. More information is available in the LOOKAT.ME files available during the download process.

Summary of Changes

Summary of Changes for *PSF for z/OS: Security Guide*, S550-0434-01

This publication contains additions and changes to information previously presented in *PSF for z/OS: Security Guide*, S550-0434-00. The technical additions and changes are marked with a revision bar (|) in the left margin.

These changes have been made throughout the document:

- References to z/OS V1R4–V1R6 have been removed because these releases are no longer in service.

The following information is new or updated:

- The Printer Inventory component of Infoprint® Server can now be used without licensing the Infoprint Server feature of z/OS. See “Updating Print Labeling Parameters” on page 18.

Chapter 1. Introducing the Print Labeling Function

This chapter introduces the concept of print labeling and explains how PSF for z/OS operates within a secure computing environment.

Understanding Print Labeling

The PSF function called print labeling lets you place identification labels on each page of printed output. An identification label can be composed of text, graphics, or a combination of both. Identification labels can be used for security information, such as a TOP SECRET security level, or for other installation-defined purposes. Identification labels can be placed on the top, bottom, or sides of all pages within a job. Up to eight labels can be defined to print on every page of the job.

An identification label is positioned on the page using a resource called a security overlay. The overlays, as well as the resources used by the overlays, such as fonts and page segments, are stored in special security libraries.

Print labeling can be applied to data pages, as well as to separator pages. Figure 1 shows labeling applied to a data page from one job and a separator page from another job.

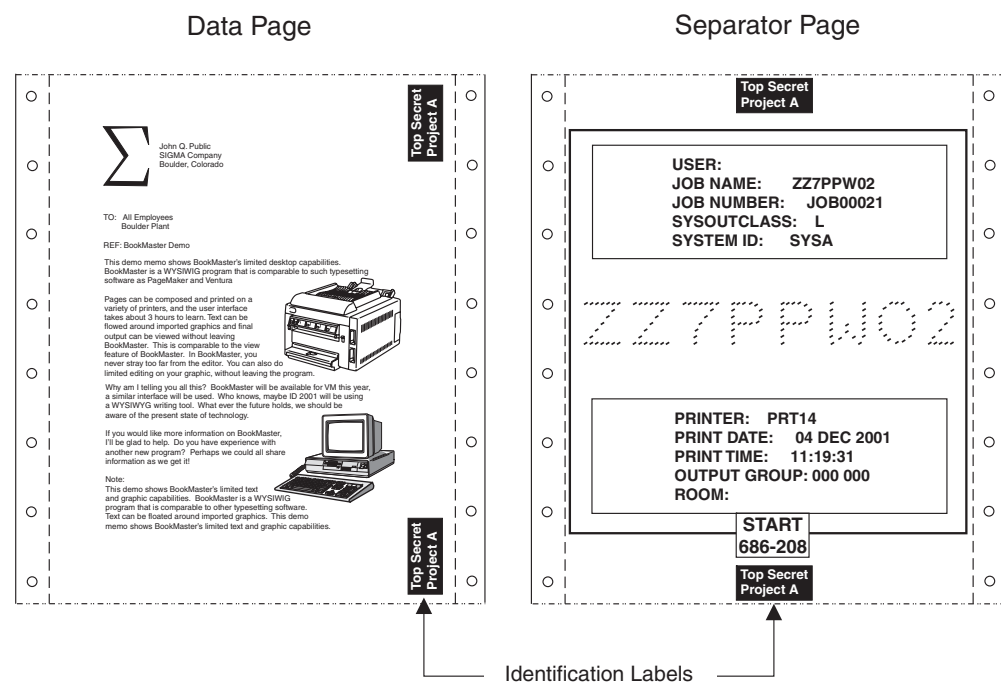


Figure 1. Print Labeling. Identification labels can be placed on the top, bottom, or sides of all pages within a job. This example shows a page from two different jobs.

The two types of print labeling are *guaranteed print labeling* and *nonguaranteed print labeling*. Guaranteed print labeling works with a subset of Advanced Function Presentation™ (AFP) printers and ensures the integrity of the identification label by preventing the user from changing the label. Nonguaranteed print labeling works on most AFP printers, but the integrity of the identification labels cannot be guaranteed. For a list of printers that support print labeling, see “Printer Support in PSF” on page 7.

Print labeling works like this:

1. The end user submits a print request that uses data and resources from host libraries. The print request has a security label associated with it. The label is a combination of both the security level and the security class.
2. Resource Access Control Facility (RACF[®]), a component of z/OS Security Server, checks to ensure that the end user's security label matches the security labels of all requested user data or user resources. If the labels match, the data is placed on the spool.
3. PSF formats the data and resources, using the security label of the print job to apply the appropriate security overlays to all pages of the printed output.

The integrity of the identification label is ensured by the positioning of the label in an area of the page where user data cannot be placed. To enforce this, the valid printable area of a form for user data is reduced by the definition of a user-printable area.

User-Printable Area

The user-printable area (UPA) is the area on the page that contains all user-generated data. If an attempt is made to print user-generated data outside the UPA, an exception condition occurs. Identification labels are placed outside of the UPA, but within the valid printable area of the form. Figure 2 shows a layout of where an identification label can be placed.

When guaranteed print labeling is enabled, an appropriate UPA must be defined by the system programmer for each paper size that can be used to print data with a particular identification label. Different UPAs can be defined for the same paper size when different identification labels are used.

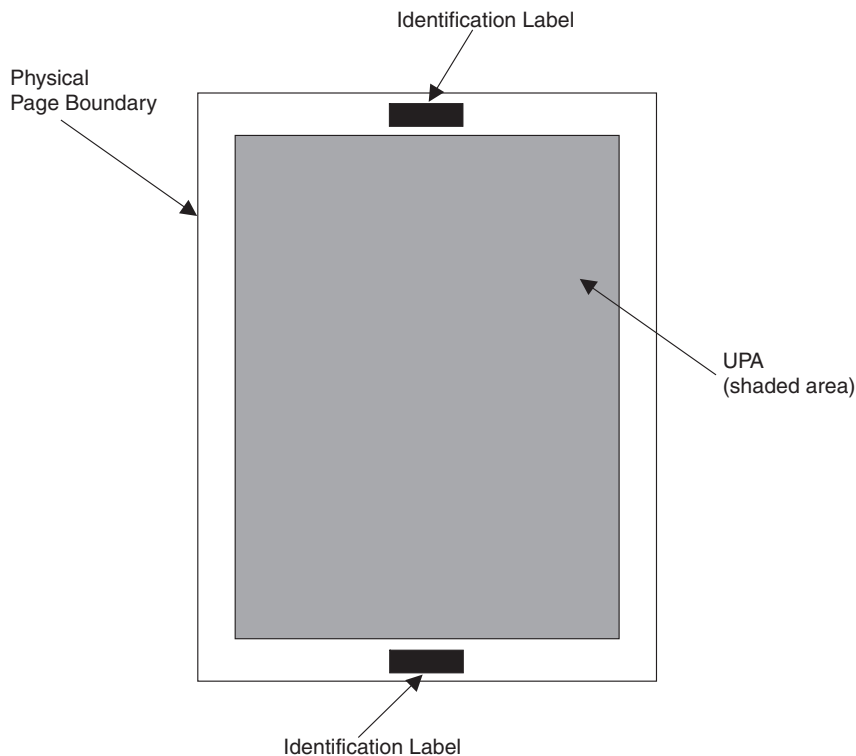


Figure 2. Placing Identification Labels on the Physical Page. Identification labels should be placed outside the UPA but must be placed within the physical page boundaries.

For a template that you can use to lay out your pages and define the UPA, see Appendix A, “Security Page Layout,” on page 27.

Distributing Secure PSF Output

PSF prints a randomly generated number for each job on the header and the trailer pages of the job if guaranteed print labeling is being performed. The printer operator matches the number on the header page to the number on the trailer page before distributing the job output. By ensuring that the numbers match, the printer operator ensures output security. Figure 3 illustrates the printed numbers.

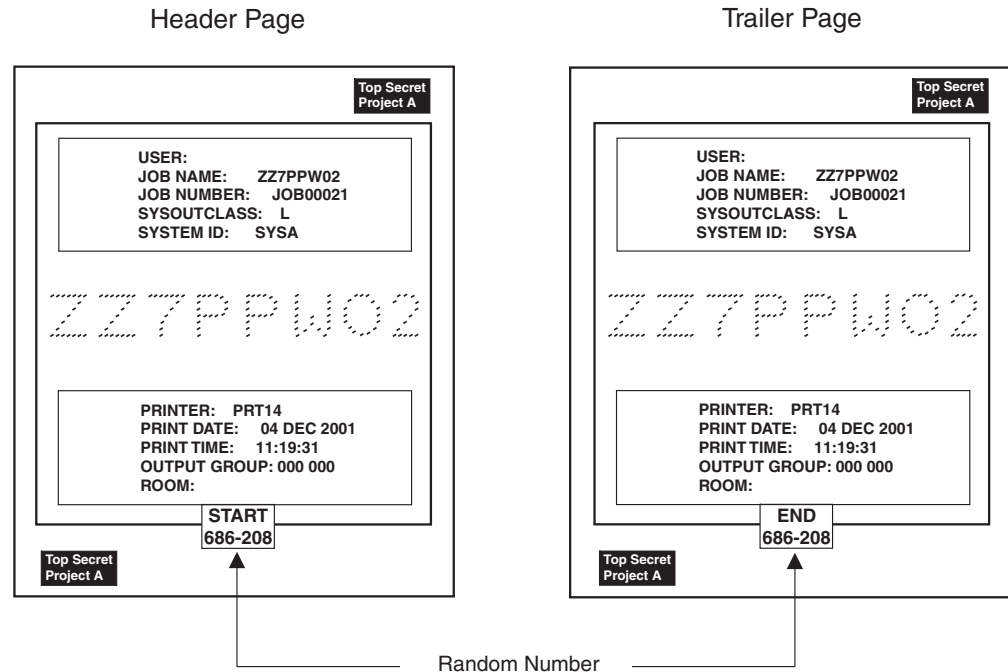


Figure 3. Random Numbering of Printed Output. The printer operator is responsible for matching the random numbers and distributing the printed output.

Auditing PSF Output for Security

PSF and RACF record security exceptions and help the security administrator audit PSF activity. For more information about auditable conditions, see “Auditing PSF Printing” on page 22.

Introducing Trusted Computing Base Components

A *trusted computing base* consists of components that together enforce a unified security policy over a computer environment. Components of a trusted computing base include hardware and software. PSF is a software component used in conjunction with hardware and other software components to provide a trusted computing base. Figure 4 on page 4 illustrates a sample trusted computing base.

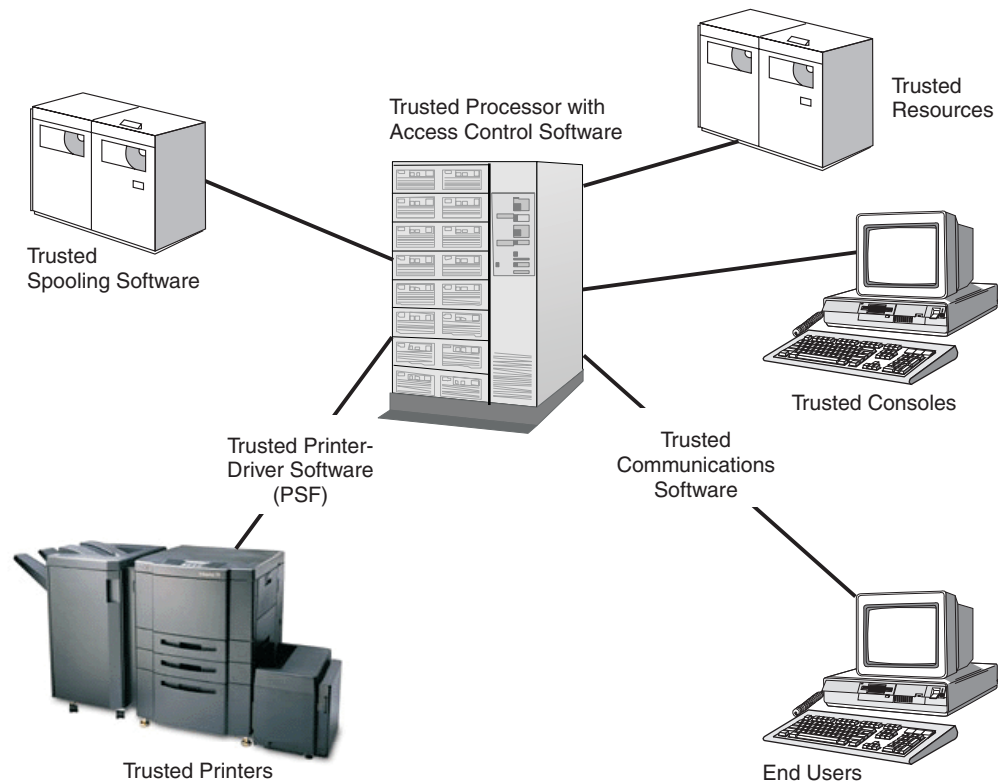


Figure 4. Typical Components of a Trusted Computing Base. Your installation might have different components installed.

Trusted Software

Trusted software is the software portion of the trusted computing base. It includes:

Access control software

Access control is regulated by RACF, which:

- Authorizes user sessions based on user ID.
- Authorizes resource access.
- Ensures that only users identified to RACF can access the processor or resources.

For more information about how to protect processing with RACF, refer to *z/OS Security Server RACF Security Administrator's Guide*.

Trusted spooling software

In a trusted computing base, spool files are protected through RACF and your spooling software. For example, in z/OS, the Job Entry Subsystem (JES) spool is protected by activating the RACF JESSPOOL security class and by defining RACF profiles. For information about defining PSF-related RACF profiles, see "Using RACF with PSF for z/OS" on page 15.

Trusted printer-driver software

In a trusted computing base, secure printed output is controlled through PSF (the printer-driver software) and RACF. Output from a trusted printer has identification labels printed on each page.

Trusted communications software

In a trusted computing base, communications software is used to connect input and output devices to the main processor. For example, Communications Server: IP Services can be used to connect end-user terminals to the main processor and let users communicate with one another.

In a trusted computing base, communication through networking software is controlled through RACF, and communication between users can be restricted or prohibited based on defined security clearances. Refer to your networking software documentation for more information about controlling network access with RACF and for defining security clearances for end-user terminals.

Trusted resources

In a trusted computing base, some resources are defined as security resources and are managed differently from other resources. For example, fonts, overlays, and page segments that are used to print identification labels are stored in secure libraries, and only the printer driver can access these resources for printing.

Trusted Hardware

Trusted hardware is the set of equipment protected through RACF in the trusted computing base. It includes:

Trusted processor

In a trusted computing base, the main processor provides access control for admittance to all resources and end-user processing. Communication between trusted and nontrusted processors is restricted.

Trusted printers

In a trusted computing base, a trusted printer is one that supports guaranteed print labeling. For more information on guaranteed print labeling and printers that support guaranteed print labeling, see “Printer Support in PSF” on page 7.

In addition, a trusted printer is located in a controlled area. Only the printer operator is allowed to distribute output to the end user.

Trusted console

In a trusted computing base, a trusted console is a computer terminal that is defined to RACF with a security label. In addition, a trusted console is located in a controlled area where only authorized personnel are allowed to access the console.

A trusted console, or *security console*, can still be restricted from accepting certain console operator commands. For example, in z/OS, JES3 commands are grouped into command authority levels, and consoles can be defined to accept only certain levels of JES3 commands from the console operator. For more information about defining a console to RACF, refer to the RACF documentation for your operating system.

For information about diverting PSF messages from a master console to a security console, see “Defining a Security Console” on page 13.

End Users

In a trusted computing base, the end user must be defined to RACF using a security level and a security class. Both the security level and the security class make up the *security label* of the end user. Only end users who have a security label assigned to the end-user terminal can use the trusted computing base.

Choosing from a List of Security-Related PSF Tasks

Table 2 matches personnel with security-related tasks described in detail within this publication. You can use this table as a fast path that directs you to security-related tasks contained in this publication.

Note: Your installation might or might not have the unique personnel listed in the table.

Table 2. Security Tasks and the People Who Perform Them

Security-Related Tasks	Personnel	See Page:
Install PSF	System programmer	7
Determine how your printer supports print labeling	System programmer and security administrator	7
Allocate security definitions libraries	System programmer and security administrator	8
Define security definitions library	System programmer and security administrator	9
Define security resource libraries	System programmer and security administrator	13
Design page layouts for each size of paper	System programmer, security administrator, and application programmer	27
Create security overlays	System programmer, security administrator, and application programmer	8
Define security consoles	System programmer and security administrator	13
Update the PSF startup procedure	System programmer and security administrator	17
Enable print labeling	System programmer and security administrator	14
Activate separator page content (random numbering)	System programmer or security administrator	14
Submit a print job that requires identification labels	End user who is RACF authorized	20
Check PSF output for security	Printer operator	3
Diagnose print-labeling problems	System programmer and security administrator	22
Interpret security-related error messages	Console operator, system programmer, security administrator, and application programmers	22
Perform security audits	Security administrator and installation auditor	22

Chapter 2. Using Print Labeling

This chapter describes how to enable, customize, and maintain the print labeling function of PSF for z/OS. The procedures, examples, and parameters given in this chapter apply only to a z/OS operating system.

While using this chapter, you can find helpful information in these publications:

- *PSF for z/OS: Customization*
- *PSF for z/OS: User's Guide*
- *Overlay Generation Language User's Guide and Reference*

You should be familiar with PSF customization before attempting to enable the print labeling function.

These tasks are described in this chapter and could be performed in the following sequence. Your installation might not require all tasks.

1. "Installing PSF"
2. "Designing Pages for Print Labeling"
3. "Allocating the Security Definitions Library" on page 8
4. "Defining a Security Definitions Library" on page 9
5. "Defining Security Resource Libraries" on page 13
6. "Defining a Security Console" on page 13
7. "Assembling Separator Pages" on page 14
8. "Enabling Print Labeling" on page 14
9. "Updating Initialization Parameters" on page 17
10. "Submitting a Print Job that Includes Identification Labels" on page 20
11. "Maintaining PSF for z/OS with Print Labeling Enabled" on page 22

Installing PSF

Install PSF as instructed in the *Program Directory for Print Services Facility for z/OS*, GI10-0281, which is shipped with the PSF licensed program tapes. This directory contains information about the microcode levels for specific printers. You need to make sure that the appropriate level of microcode is installed on your printer before your printer can support guaranteed print labeling.

Printer Support in PSF

AFP printers can support guaranteed print labeling or nonguaranteed print labeling. To determine the type of print labeling your printer supports in PSF for z/OS, use the display printer information function. If the Define User Area is listed in the DEVICE CONTROL COMMAND Set Vector of the Sense Type and Model (STM), the printer supports guaranteed print labeling; if it is not, the printer supports nonguaranteed print labeling. For more information about the display printer information function, refer to *PSF for z/OS: Customization*.

For more information about guaranteed print labeling and nonguaranteed print labeling, see "Enabling Print Labeling" on page 14.

For more information about AFP printers, refer to *Printer Summary* and *Printer Information*.

Designing Pages for Print Labeling

These are the steps required to design pages for print labeling:

1. Identify any fonts or page segments that you want to use in the identification label. For information about identifying fonts and page segments, see “Defining Security Resource Libraries” on page 13 and “Defining Data Definition Names in the PRINTDEV Statement” on page 19.
2. Construct a page layout. See Appendix A, “Security Page Layout,” on page 27 for a page layout tool.
3. Create security overlays as needed. See “Creating Security Overlays.”
4. Create a security definitions library (allocate and define members). Each combination of security label, paper size, and page top must be defined to PSF in a member of a security definitions library. To define members in a security definitions library, see “Defining a Security Definitions Library” on page 9.

Creating Security Overlays

You should create at least one security overlay for each security label that you are using on your system. The same overlay can be used on different paper sizes and orientations but the overlay must be carefully designed, taking into consideration the media origin and the printable area differences. More than one security overlay can be created for each combination of security label, paper size, and orientation, if desired.

Security overlays are created as you would create other overlays, but RACF is used to protect overlays that reside in a secure library from any unauthorized modification. For example, a user of Overlay Generation Language (OGL) would have to be RACF-authorized to access an overlay in a secure library. Refer to your RACF documentation for more information about how users are authorized to access secure libraries. For more information about creating overlays, refer to *Overlay Generation Language User's Guide and Reference*.

Printing with Security Overlays

Printing security overlays is not specified with a form definition but with the SECOVLY option. This option is coded in a member of the security definitions library. See “Defining a Security Definitions Library” on page 9 for more information.

Allocating the Security Definitions Library

The *security definitions library* is a partitioned data set or a series of concatenated partitioned data sets. A security definitions library contains separate definitions for each type of security label available on the system. A single member contains the definitions for one security label that is used with all paper sizes and page orientations. For example, a security definitions library called SECURE.SECDEFS could contain two members, named TOPSEC and UNCL. The member SECURE.SECDEFS(TOPSEC) could contain definitions for printing a top secret identification label. The member SECURE.SECDEFS(UNCL) could contain definitions for printing an unclassified identification label.

A member of a security definitions library contains the size and origin of the user-printable area (UPA) for each paper size and page orientation used by the printer. The security definitions library can optionally contain the names of any security overlays.

You should define the minimum number of paper sizes required for each security label. This reduces PSF search time. For example, you can create a security definitions library for all of your printers that use cut-sheet paper and another library for all of your printers that use continuous-forms paper.

Names used to identify the security definitions library are defined in a PSF startup procedure. The DD statement is used to associate a security definitions library name to the printer that uses that library. See Figure 16 on page 17 for an example of how a DD statement is used to refer to a security library name.

Security Definitions Library Attributes

You should allocate a security definitions library with the attributes listed in Figure 5.

```
DSORG=PO
LRECL=80
BLKSIZE=multiple_of_80
RECFM={FB | F}
```

Figure 5. Library Attributes for the Security Definitions Library

Note: The security definitions library cannot have records that contain machine or American National Standards Institute (ANSI) control characters and cannot use the track overflow feature.

Defining a Security Definitions Library

You should define a member in the security definitions library for each security label that you need.

Syntax for a Security Definitions Member

Figure 6 illustrates the syntax for a security definitions library member.

```
{PAPERNAME papername | PAPERSIZ width_value height_value}
[ TOP { NARROW | WIDE } ]
[ UPAORG xorg_value yorg_value ]
[ UPADIM xlength_value ylength_value ]
[ SECOVLY name1 name2...name8 ]
```

Figure 6. Syntax for a Security Definitions Library Member

The parameters and values for a security definitions library member are:

{PAPERNAME *papername* | PAPERSIZ *width_value height_value*}

Specifies the size of the paper. You must use either PAPERNAME or PAPERSIZ.

PAPERNAME specifies the system-defined paper names for each paper size. See Appendix B, “PAPERNAME Table for System-Defined Paper Names,” on page 29 for a list of valid names and the dimensions for each system-defined paper name.

PAPERSIZ specifies the width and height of the paper and the units of measurement, either in inches (IN) or in millimeters (MM). The PAPERSIZ parameter should be used if the size of the paper loaded in the printer does not correspond to one of the PSF system-defined paper names.

The valid values for inches can be from 0 to 22.75. The valid values for millimeters can be from 0 to 577.97. The values do not need to be in the same units and are entered as follows (the decimal point is optional for integer values):

nnn.nn {IN | MM}

See Figure 7 on page 12 for an example of this parameter.

[TOP { NARROW | WIDE }]

Specifies which edge of the paper is the top by identifying whether the media origin² is located at the top-left corner of a narrow or wide edge of the paper. The TOP parameter has two options:

- NARROW is the default and specifies that the security overlays and UPA in this security definition entry use the top-left corner of a narrow edge of the paper as the media origin.
- WIDE specifies that the security overlays and UPA in this security definition entry use the top-left corner of a wide edge of the paper as the media origin.

For continuous-forms printers, a security definitions member can contain both a NARROW and WIDE entry if:

- Both narrow and wide forms are used for the security label.³
- The form definition contains page-presentation and print-direction controls that change the default media origin.

For cut-sheet printers, only one entry (NARROW) is needed. Because the media origin for cut sheets is always the top-left corner of a narrow edge, the WIDE option is ignored for cut-sheet forms.

Determine whether to use the WIDE or NARROW entry for continuous-forms printers:

- WIDE for wide forms if the form definition contains LANDSCAPE ACROSS or PORTRAIT DOWN controls
- WIDE for narrow forms if the form definition contains PORTRAIT ACROSS or LANDSCAPE DOWN controls
- NARROW for narrow forms if the form definition contains PORTRAIT ACROSS or LANDSCAPE DOWN controls
- NARROW for wide forms if the form definition contains LANDSCAPE ACROSS or PORTRAIT DOWN controls

For more information about the page-presentation and print-direction controls in a form definition, refer to *Printer Information* and *Page Printer Formatting Aid: User's Guide*.

See Figure 7 on page 12 for an example of this parameter.

[UPAORG *xorg_value yorg_value*]

Specifies the origin, in inches (IN) or millimeters (MM), of the UPA.

The origin is expressed as horizontal offsets (*xorg*) and vertical offsets (*yorg*) from the media origin for a particular page size and origin.

The valid values for inches can be from 0 to 22.75. The valid values for millimeters can be from 0 to 577.97. The values do not need to be in the same units and are entered as follows (the decimal point is optional for integer values):

nnn.nn {IN | MM}

See Figure 7 on page 12 for an example of this parameter.

2. Media origin used by any security overlays or the media origin used by the UPA. For more information about media origins and the coordinate system used by AFP printers, refer to *Intelligent Printer Data Stream Reference*.

3. Narrow forms are those that have perforations on the shorter edge of the paper and tractor holes on the longer edge. Wide forms are those that have perforations on the longer edge of the paper and tractor holes on the shorter edge.

Note: This parameter is required if Restrict printable area=YES is specified (or is a default) in the Infoprint Server Printer Inventory, SYSAREA=YES is specified (or is a default) in the PRINTDEV statement for the data set, or UPADIM is specified.

[**UPADIM** *xlength_value ylength_value*]

Specifies the size, in inches (IN) or millimeters (MM), of the UPA.

The size of the UPA is expressed as horizontal (*xlength*) and vertical (*ylength*) dimensions of the UPA for a particular page size and origin.

The valid values for inches can be from 0 to 22.75. The valid values for millimeters can be from 0.1 to 577.97. The values do not need to be in the same units and are entered as follows (the decimal point is optional for integer values):

nnn.nn {IN | MM}

See Figure 7 on page 12 for an example of this parameter.

Note: This parameter is required if Restrict printable area=YES is specified (or is a default) in the Infoprint Server Printer Inventory, SYSAREA=YES is specified (or is a default) in the PRINTDEV statement for the data set, or UPAORG is specified.

[**SECOVLY** *name1 name2...name8*]

Specifies the names of the overlays to be used for this security label on both the separator pages and the data pages.

One to eight overlays can be specified. These overlays must reside in a security overlay library.

See Figure 7 on page 12 for an example of this parameter.

Notes:

1. Overlay names are restricted to six characters; PSF appends a two-character prefix (O1).
2. If fonts or page segments are used in any of these overlays, the fonts must reside in a security font library and the page segments must reside in a security page-segment library.
3. This parameter is required if Label data pages=YES or Label separator pages=YES is specified in the Infoprint Server Printer Inventory, or DPAGELBL=YES or SPAGELBL=YES is specified in the PRINTDEV statement.

Rules for Defining a Security Definitions Member

This list describes the rules for defining a single member in a security definitions library:

- For each PAPERNAME or PAPERSIZE parameter, up to two sets of TOP, UPAORG, UPADIM, and SECOVLY parameters can be specified, one for the TOP WIDE parameter and one for the TOP NARROW parameter. If duplicate parameters within a set are specified, the last option for that parameter is used.
- The TOP parameter, if present, must be specified before the SECOVLY, UPAORG, and UPADIM parameters that correspond to the TOP parameter.
- The UPAORG, UPADIM, and SECOVLY parameters can be specified in any order. Either SECOVLY or both the UPAORG and the UPADIM parameter must be specified. All three can be used together.
- Multiple parameters and options can be specified in a single record.

- The delimiters that separate the parameters and options are one or more consecutive blanks, or the end of the line.
- Comments can be entered in the security member by entering an asterisk (*) as the first nonblank character in a line. The rest of the record is ignored. Comments cannot appear on the same line as the parameters or options.

Note: When the paper is to be cut after printing (for example, 2-up printing), you must take care to create secure overlays that appropriately label each of the subsheets.

Sample Security Definitions Member

The member definition in Figure 7 is used when a SECLABEL of TOPSEC is specified in the print job JCL and can be used for two paper types.

```
* SECURE.SECDEFS(TOPSEC)
*** DEFINITION FOR CUT SHEET PAPER
PAPERSIZ 216 MM 11.00 IN
TOP NARROW
UPAORG 0 IN 1 IN
UPADIM 8.5 IN 10.00 IN
SECOVLY TOPSEC
*** DEFINITION FOR CONTINUOUS FORMS
PAPERNAME LISTING1
TOP WIDE
UPAORG 0 IN 1 IN
UPADIM 13.88 IN 10.00 IN
SECOVLY TOPSEC
* END SECURE.SECDEFS(TOPSEC)
```

Figure 7. Sample Coding of a Member. This member contains two entries, one for cut sheet and one for continuous forms.

The coding for PAPERSIZ in Figure 7 produces a layout as illustrated in Figure 8.

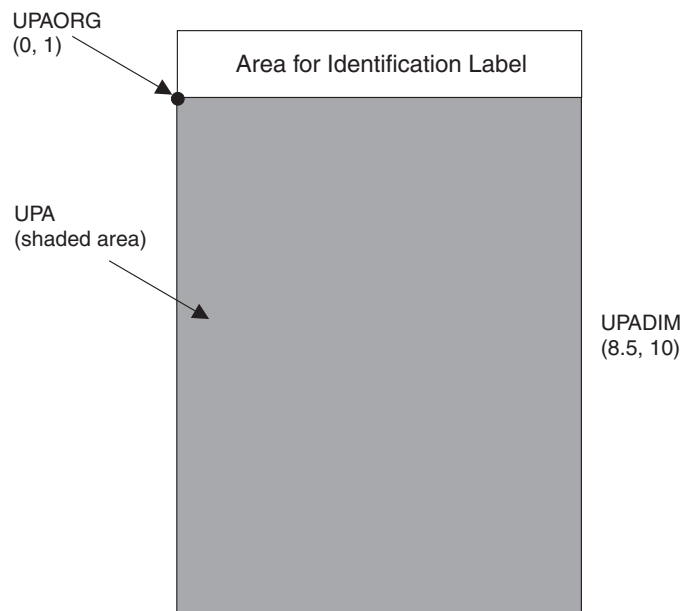


Figure 8. Page Layout for a Cut-Sheet Page

The coding for PAPERNAME LISTING1 in Figure 7 on page 12 produces a layout as illustrated in Figure 9.

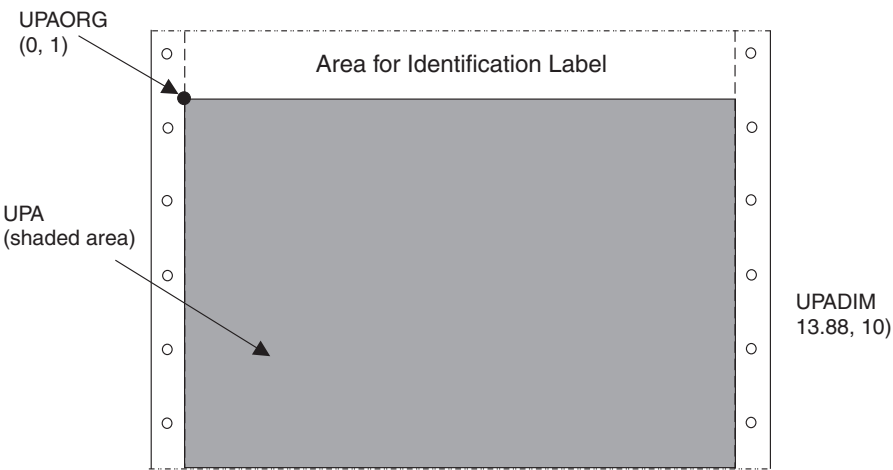


Figure 9. Page Layout for a Continuous Form

Defining Security Resource Libraries

The three types of security resources are overlays, page segments, and fonts. These types of resources are stored in a secure library, and they are managed differently from other resources stored on the system. You should allocate a security resource library with the attributes listed in Table 3.

Table 3. Library Attributes for a Security Resource Library

Overlays and Page Segments	Fonts
DSORG=PO LRECL=8205 BLKSIZE=8209 RECFM=VBM	DSORG=PO LRECL=12284 BLKSIZE=12288 RECFM=VBM

Security overlays are produced for each security label defined. One or more security overlays can be defined for each size paper and page orientation being used. Security fonts and security page segments are those that are used within the security overlay. Security resource libraries are named in the PRINTDEV statement of the PSF startup procedure. See “Defining Data Definition Names in the PRINTDEV Statement” on page 19 for the syntax used in the PRINTDEV statement.

Defining a Security Console

You can optionally receive security-related PSF messages at a security console, and you can optionally elect not to receive PSF security-related messages at the master console.

To route messages to a security console, change the ROUTCODE in the SYS1.PARMLIB(CONSOLxx) as illustrated in Figure 10 on page 14.

ROUTCODE(9)

Figure 10. ROUTCODE Option for Routing Messages

To stop security-related PSF messages from reaching the master console, change the ROUTCODE in SYS1.PARMLIB(CONSOLxx) as shown in Figure 11. This lets all messages except security-related messages reach the master console.

ROUTCODE(1-8,10-128)

Figure 11. ROUTCODE Option for Stopping Messages

Assembling Separator Pages

Optional exits are provided if random numbering of separator pages is needed. For information about the exits that PSF provides, refer to *PSF for z/OS: Customization*.

The installation exits in Table 4 must be modified, assembled, installed, or link-edited with the REPLACE option to print random numbers on job separator pages.

Table 4. PSF Exit Routines in SYS1.SAMPLIB

Sample Routine	Description
APSUX01S	Source routine for security job headers.
APSUX02S	Source routine for security job trailers.

Either use the supplied source or modify the source to meet your needs. Figure 3 on page 3 illustrates the IBM-supplied security header and trailer pages in a printed format.

Notes:

1. If APSUX01S and APSUX02S are used, they must replace APSUX01 and APSUX02. Ensure that APSUC01 and APSUC02 are not used. If they are, delete them because they will override APSUX01 and APSUX02.
2. Separator pages do not have a UPA.

Enabling Print Labeling

PSF supports print labeling in two ways:

Guaranteed print labeling

Guaranteed print labeling ensures the integrity of the identification label by preventing the user from changing the label. (See “Printer Support in PSF” on page 7 for information about determining whether a printer supports guaranteed print labeling.) Ensure that the RACF option PSFMPL is set according to Figure 13 on page 15.

Nonguaranteed print labeling

Printers that do not support guaranteed print labeling can still print identification labels, but the integrity of the labels cannot be guaranteed. For nonguaranteed print labeling, you must:

1. Define the valid security labels to RACF as described in the *z/OS Security Server RACF Security Administrator's Guide*.

2. Activate security label checking through TSO commands as in Figure 12.

In addition, the RACF parameters shown in Figure 13 are optional for nonguaranteed print labeling. Other parameters in the PSF startup procedure are used to enable nonguaranteed print labeling. For more information, see “Updating Initialization Parameters” on page 17.

Note: PSF processing is different if print labeling is enabled. See “PSF Processing Differences When Using the Print Labeling Function” for a list of differences.

```
SETROPTS CLASSACT(SECLABEL)
SETROPTS RACLIST(SECLABEL) REFRESH
```

Figure 12. Activating SECLABEL

Using RACF with PSF for z/OS

Use RACF to activate PSFMPL and create RACF profiles.

Note: RACF CLASS PSFMPL must be refreshed after activating PSFMPL or creating new profiles.

- To activate print labeling, use SETROPTS. To set print labeling defaults to YES, use the RDEFINE command. RDEFINE creates RACF profiles. See Figure 13 for examples of using SETROPTS and RDEFINE.

```
SETROPTS CLASSACT(PSFMPL)
RDEFINE PSFMPL PSF.DPAGELBL UACC(NONE)
RDEFINE PSFMPL PSF.SYSAREA UACC(NONE)
```

Figure 13. Using the RACF SETROPTS and RDEFINE Commands

- If you want to authorize a print job submitter to override printer defaults, issue the PERMIT commands in Figure 14 to add the user ID to the RACF profile.

```
PERMIT PSF.DPAGELBL CLASS(PSFMPL) ID(userid) ACCESS(READ)
PERMIT PSF.SYSAREA CLASS(PSFMPL) ID(userid) ACCESS(READ)
```

Figure 14. Adding a User ID to a RACF Profile

- Whenever any of the commands shown in Figure 13 or Figure 14 are used, issue the REFRESH command illustrated in Figure 15 to refresh RACF.

```
SETROPTS RACLIST(PSFMPL) REFRESH
```

Figure 15. Refreshing RACF

For more information about RACF commands, refer to *z/OS Security Server RACF Security Administrator's Guide*.

PSF Processing Differences When Using the Print Labeling Function

When using the print labeling function, PSF processing is different. The differences include:

- Security resources are accessed only from security libraries. A resource loaded in the printer from a security library cannot be used to print user data.
- User resources are accessed only from user resource libraries. A resource loaded in the printer from a user library cannot be used to print identification labels.
- Security resources are loaded into the printer as required by the print data set. They normally are not deleted at the end of a data set, except when:
 - The resource deletion exit is used to delete the resources.
 - A job-trailer page has been printed.

For more information about resource loading, deleting, and using installation exits, refer to *PSF for z/OS: Customization*.

- Suppression of trailer pages using JES operator commands can impact printer performance because printer storage can be exceeded.
- An audit is performed whenever a data set is printed on a nonguaranteed printer.

Printable Area Considerations

If PSFMPL is active, the Restrict printable area parameter in the Infoprint Server Printer Inventory or the SYSAREA parameter in the PRINTDEV statement defaults to YES.

If PSFMPL is not active, the Restrict printable area parameter in the Printer Inventory or the SYSAREA parameter in the PRINTDEV statement defaults to NO.

If you are using a nonguaranteed printer, these parameters must be set to NO or an abend occurs. For more information, see “Updating Print Labeling Parameters” on page 18.

Updating Initialization Parameters

Before starting a PSF functional subsystem (FSS), you must have a cataloged PSF startup procedure in SYS1.PROCLIB or in a procedure library concatenated to the JES startup procedure. The PSF startup procedure specifies PSF initialization parameters that tell PSF where security resources and security definitions are located. Figure 16 lists a sample PSF startup procedure that includes parameters modified for print labeling.

```
//J2PSF00  PROC
//STEP01   EXEC PGM=APSPPIEP,REGION=4096K,PARM=(,FULL)
//SYSABEND DD SYSOUT=A
//SYSUDUMP DD SYSOUT=A
//JOBHDR   OUTPUT PAGEDEF=A06462,
//          FORMDEF=A10110
//JOBTLR   OUTPUT PAGEDEF=A06462,
//          FORMDEF=A10110
//DSHDR    OUTPUT PAGEDEF=A06462,
//          FORMDEF=A10110
//MSGDS    OUTPUT PAGEDEF=A06462,
//          FORMDEF=A10110
//FONT01   DD DSN=TEST.FONTLIBB,DISP=SHR
//          DD DSN=SYS1.FONTLIBB,DISP=SHR
//PSEG01   DD DSN=TEST.SEGMENT,DISP=SHR
//          DD DSN=SYS1.SEGMENT,DISP=SHR
//OLAY01   DD DSN=TEST.OVERLAY,DISP=SHR
//          DD DSN=SYS1.OVERLAY,DISP=SHR
//FDEF01   DD DSN=TEST.FORMDEF,DISP=SHR
//          DD DSN=SYS1.FORMDEF,DISP=SHR
//PDEF01   DD DSN=TEST.PAGEDEF,DISP=SHR
//          DD DSN=SYS1.PAGEDEF,DISP=SHR
//SFONT1   DD DSN=SECURE.FONTLIBB,DISP=SHR
//SFONT2   DD DSN=SECURE.FONTL240,DISP=SHR
//SFONT3   DD DSN=SECURE.FONTL300,DISP=SHR
//SOLAY1   DD DSN=SECURE.OVERLAY,DISP=SHR
//SPSEG1   DD DSN=SECURE.SEGMENT,DISP=SHR
//SPSEG2   DD DSN=SECURE.SEGMT240,DISP=SHR
//SPSEG3   DD DSN=SECURE.SEGMT300,DISP=SHR
//SDEF1    DD DSN=SECURE.SECDEFS,DISP=SHR
//SDEF2    DD DSN=SECURE.SECDF240,DISP=SHR
//SDEF3    DD DSN=SECURE.SECDF300,DISP=SHR
//PRT10    CNTL
//PRT10    PRINTDEV FONTDD=*.FONT01,
//          OVLYDD=*.OLAY01,
//          PSEGDD=*.PSEG01,
//          PDEFDD=*.PDEF01,
//          FDEFDD=*.FDEF01,
//          JOBHDR=*.JOBHDR,
//          JOBTRLR=*.JOBTLR,
//          DSHDR=*.DSHDR,
//          MESSAGE=*.MSGDS,
```

The statements in **bold** (including ***bold italics***) are DD statements used for print labeling.

A member in one of the libraries in the statements in ***bold italics*** matches the SECLABEL on the job card.

Figure 16. Sample PSF Startup Procedure with Security-Related Parameters Highlighted (Part 1 of 2). A sample startup procedure is provided in SYS1.PROCLIB.

```
// SFONTDD=*.SFONT1,
// SFONT240=*.SFONT2,
// SFONT300=*.SFONT3,
// SOVLY=*.SOLAY1,
// SPSEGDD=*.SPSEG1,
// SPSEG240=*.SPSEG2,
// SPSEG300=*.SPSEG3,
// SDEFDD=*.SDEF1,
// SDEF240=*.SDEF2,
// SDEF300=*.SDEF3,
// PAGEDEF=A06462,
// FORMDEF=A10110,
// CHARS=(60DB),
// TRACE=YES,
// DATAK=BLOCK,
// BUFNO=5,
// SPAGELBL=YES,
// DPAGELBL=YES,
// SYSAREA=YES,
// PIMSG=YES
//PRT10 ENDCNTL
```

Figure 16. Sample PSF Startup Procedure with Security-Related Parameters Highlighted (Part 2 of 2). A sample startup procedure is provided in SYS1.PROCLIB.

For more information about PSF initialization parameters, refer to *PSF for z/OS: Customization*.

Updating Print Labeling Parameters

You can use the Infoprint Server Printer Inventory, the PRINTDEV statement in the PSF startup procedure, or the OUTPUT JCL statement to enable print labeling. Table 5 on page 19 lists the parameters that you can use.

Using the Printer Inventory is more efficient than using the PSF startup procedure because it avoids the need to restart all the printers in a startup procedure when changing parameters. Only the printer for which parameters are changed needs to be restarted.

Keep in mind:

1. Parameters available in the Printer Inventory are ignored in the PSF startup procedure when the Printer Inventory is used. Therefore, if you use the Printer Inventory, you must specify the parameters in the Printer Inventory instead of the startup procedure.
2. You can use the Printer Inventory component of Infoprint Server without licensing the Infoprint Server feature of z/OS if you are using z/OS 1.8 or higher with Infoprint Server PTF UA37619. For more information, refer to *z/OS Infoprint Server Printer Inventory for PSF*.

To use the Printer Inventory, you must specify the Printer Inventory name on the INV parameter in the PARM field of the EXEC statement for the startup procedure:

```
// EXEC PGM=APSPPIEP,PARM=('INV=piname')
```

where *piname* is the four-character name of the Printer Inventory that is specified in the Infoprint Server configuration file. For example,

```
// EXEC PGM=APSPPIEP,PARM=('INV=A0PI')
```

specifies the default name of the Printer Inventory.

You can use either the Printer Inventory Definition Utility (PIDU) or the Printer Inventory ISPF panels to enable print labeling in the Printer Inventory (refer to *PSF for z/OS: Customization* for more information). When you are defining parameters on the ISPF panels, see the online help for information about each parameter.

Table 5. Parameters for Enabling Print Labeling

Printer Inventory		PRINTDEV	OUTPUT	Description
ISPF Panel	PIDU			
Label data pages Values: 1 = Yes 2 = No	label-data-pages Values: yes no	DPAGELBL Values: YES NO	DPAGELBL Values: YES NO	Indicates whether a label is printed on each data page.
Label separator pages Values: 1 = Yes 2 = No	label-separator-pages Values: yes no	SPAGELBL Values: YES NO		Indicates whether a label is printed on a separator page.
Restrict printable area Values: 1 = Yes 2 = No	restrict-printable-area Values: yes no	SYSAREA Values: YES NO	SYSAREA Values: YES NO	Indicates whether the printable area is restricted to the system-defined UPA. If the printable area is restricted, the area outside the UPA is reserved for a security label and any attempt to print in the reserved area results in error messages. If your printer does not support guaranteed print labeling, this parameter must be set to NO.
Note: In these parameters, the default is YES if PSFMPL is active; NO if PSFMPL is not active.				

Defining Data Definition Names in the PRINTDEV Statement

These parameters are used to define security-related data definition names in the PRINTDEV statement:

SFONTDD=*.ddname

Defines the default secure font library. This ddname is required if a security overlay references a font.

SFONT240=*.ddname

Defines the secure font library for 240-pel fonts. This ddname is optional if all referenced 240-pel fonts are found in the default secure font library.

SFONT300=*.ddname

Defines the secure font library for 300-pel fonts. This ddname is optional if all referenced 300-pel fonts are found in the default secure font library.

SOVLYDD=*.ddname

Defines the default secure overlay library. This ddname is required if a security overlay is used to print identification labels.

SOVLY240=*.ddname

Defines the secure overlay library for overlays that print best at 240-pel resolution. This ddname is optional if all such overlays are found in the default secure overlay library.

SOVLY300=*.ddname

Defines the secure overlay library for overlays that print best at 300-pel resolution. This ddname is optional if all such overlays are found in the default secure overlay library.

SPSEGDD=*.ddname

Defines the default secure page segment library. This ddname is required if a security overlay references a page segment.

SPSEG240=*.ddname

Defines the secure page segment library for page segments that print best at 240-pel resolution. This ddname is optional if all such page segments are found in the default secure page segment library.

SPSEG300=*.ddname

Defines the secure page segment library for page segments that print best at 300-pel resolution. This ddname is optional if all such page segments are found in the default secure page segment library.

SDEFDD=*.ddname

Defines the default security definitions library. This ddname is required for print labeling.

SDEF240=*.ddname

Defines the security definitions library for printing at 240-pel resolution. This ddname is optional if all such page segments are found in the default security definitions library.

SDEF300=*.ddname

Defines the security definitions library for printing at 300-pel resolution. This ddname is optional if all such page segments are found in the default security definitions library.

These parameters refer to the libraries named in the startup procedure; see Figure 16 on page 17.

Note: Even if you used the Printer Inventory to enable print labeling, you must still specify these parameters in the PRINTDEV statement.

Submitting a Print Job that Includes Identification Labels

Once you have defined a security definitions library, updated PSF initialization parameters, and created security resources, you are ready to submit a print job. To submit a print job and have that job print with the correct identification label, follow this procedure to ensure that there is a member in the security definitions library with the same name as each SECLABEL that has been defined to RACF by the security administrator:

1. The security administrator defines a set of security labels to be used by the installation.

2. The security administrator associates SECLABELs with every user on the system.
3. The print administrator creates a member in the security definitions library to match the name of every SECLABEL defined to the system.
4. The user submits the job, the user's SECLABEL is matched and the appropriate security labeling is printed on the user's output.

For example, if you want to print the identification label associated with the security label of TOPSEC, you would specify SECLABEL=TOPSEC in the job card and PSF would use the member named SECURE.SECDEFS(TOPSEC) to find the security overlay identified for that security label.

Figure 17 shows an example of using the SECLABEL parameter in the job card. Figure 7 on page 12 shows an example of the definitions used in SECURE.SECDEF(TOPSEC).

```
//TESTER1 JOB (SYS10000),USER=TESTER1,
//  CLASS=A,MSGCLASS=T,MSGLEVEL=(1,1),REGION=4096K,
//  SECLABEL=TOPSEC
.
.
.
```

Figure 17. Sample JCL Job Card. The SECLABEL=TOPSEC points to a member named TOPSEC in a security definitions library .

Overriding Print Labeling Defaults

If authorized by RACF, you can use these JCL keywords in the OUTPUT statement to change the definition of print labeling:

DPAGELBL=YESINO

Indicates whether a label is printed on each data page.

SYSAREA=YESINO

Indicates whether the printable area is restricted to the system-defined UPA.

If SYSAREA=YES is specified, any attempt to print outside the UPA results in error messages.

If your printer does not support guaranteed print labeling, use SYSAREA=NO. To determine if your printer supports guaranteed print labeling, see “Printer Support in PSF” on page 7.

Figure 18 shows an example of the OUTPUT statement used to override PSF defaults.

```
.
.
.
//OUTPUT1 OUTPUT FORMDEF=IPGP00,DATAACK=UNBLOCK,
//  DPAGELBL=YES,SYSAREA=NO
//SYSUT1 DD  SYSOUT=L,DCB=(RECL=VBA,BLKSIZE=8192),
//  OUTPUT=*.OUTPUT1
```

Figure 18. Sample JCL Output Statement. The statement shows an override that activates data page labeling without UPA enforcement.

Maintaining PSF for z/OS with Print Labeling Enabled

The following sections are used to maintain PSF when print labeling is enabled.

Auditing PSF Printing

PSF uses the SMF type 6 record to audit certain events that can indicate a security exception. Only one record is written per data set, but the record can contain numerous conditions.

The following information is included in the SMF type 6 record to support print labeling:

- Indicator that flags JCL keywords that were in effect during printing
- Indicator that flags a successful print operation
- Indicator that flags an error that occurred during overlay processing
- Indicator that flags a hardware error that occurred
- Indicator that flags printed job-trailer pages
- Indicator that flags printed job-header pages
- Indicator that flags that the user suppressed data-page labeling
- Indicator that flags that the user suppressed UPA enforcement
- Identifier for the job or group identifier for the data set
- Identifier for the page definition name
- Identifier for the form definition name
- Identifier for the number of security overlays used
- Identifier for the number of security fonts used
- Identifier for the number of security page segments used

Refer to *PSF for z/OS: Customization* for more information about the SMF type 6 record that PSF generates.

Interpreting Security-Related Messages

If you receive a PSF error message that relates to print labeling, refer to *PSF for z/OS: Messages and Codes* for more information.

PSF security-related messages are received at these locations:

- Within a print job
- At the security console
- At the master console

A PSF message number can be placed in these JES messages:

- HASP704
- IAT706I

Diagnosing Print Labeling Problems

The problems in Table 6 on page 23 can occur when you are using the print labeling function.

Table 6. Print Labeling Diagnosis

Problem	Possible Causes
No identification label printed on any page.	<ul style="list-style-type: none"> • Security definitions library member does not name a security overlay or names an overlay that does not contain any labeling information. • PSFMPL is not active and: <ul style="list-style-type: none"> – Label data pages and Label separator pages are not specified in the Printer Inventory or DPAGELBL and SPAGELBL are not specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=NO and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=YES and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=NO on the OUTPUT statement for the file. – Label data pages=NO and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but separator pages were suppressed by an operator command. – Label data pages=YES and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but separator pages were suppressed by an operator command and the print-job submitter specified DPAGELBL=NO on the OUTPUT statement for the file. • PSFMPL is active and: <ul style="list-style-type: none"> – Label data pages=NO and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=YES and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=NO on the OUTPUT statement for the file and is RACF-authorized to override data page labeling. – Label data pages=NO and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but separator pages were suppressed by an operator command. – Label data pages=YES and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but separator pages were suppressed by an operator command and the print-job submitter specified DPAGELBL=NO on the OUTPUT statement for the file and is RACF-authorized to override data page labeling.

Table 6. Print Labeling Diagnosis (continued)

Problem	Possible Causes
<p>Identification label printed on separator pages, but not printed on data pages.</p>	<ul style="list-style-type: none"> • PSFMPL is not active and: <ul style="list-style-type: none"> – Label separator pages=YES but Label data pages is not specified in the Printer Inventory, or SPAGELBL=YES but DPAGELBL is not specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=NO and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=YES and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=NO on the OUTPUT statement for the file. • PSFMPL is active and: <ul style="list-style-type: none"> – Label data pages=NO but Label separator pages is not specified in the Printer Inventory, or DPAGELBL=NO but SPAGELBL is not specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=NO and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=YES and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=NO on the OUTPUT statement for the file and is RACF-authorized to override data page labeling.

Table 6. Print Labeling Diagnosis (continued)

Problem	Possible Causes
Identification label printed on data pages, but not on separator pages.	<ul style="list-style-type: none"> • PSFMPL is not active and: <ul style="list-style-type: none"> – Label data pages=YES but Label separator pages is not specified in the Printer Inventory, or DPAGELBL=YES but SPAGELBL is not specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=YES and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=NO and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=YES on the OUTPUT statement for the file. – Label data pages=NO and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=YES on the OUTPUT statement for the file and separator pages were suppressed by an operator command. • PSFMPL is active and: <ul style="list-style-type: none"> – Label separator pages=NO but Label data pages is not specified in the Printer Inventory, or SPAGELBL=NO but DPAGELBL is not specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=YES and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=YES and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file. – Label data pages=NO and Label separator pages=NO are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=NO are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=YES on the OUTPUT statement for the file. – Label data pages=NO and Label separator pages=YES are specified in the Printer Inventory or DPAGELBL=NO and SPAGELBL=YES are specified in the PRINTDEV statement for the printer that printed the file, but the print-job submitter specified DPAGELBL=YES on the OUTPUT statement for the file and separator pages were suppressed by an operator command.
Wrong data in identification label.	<ul style="list-style-type: none"> • Print-job submitter specified wrong SECLABEL on job card. • Wrong security overlay specified in the security definitions library member for the SECLABEL on the job card and the size of paper in the printer that printed the file. • Security definitions library member names an overlay that contains the wrong labeling information. • Overlay names were changed in the security overlay library.
Wrong page segment in identification label.	<ul style="list-style-type: none"> • Security overlay named the wrong page segment. • Page segment names were changed in the security page segment library.
Wrong overlay used for identification label.	<ul style="list-style-type: none"> • Print-job submitter specified wrong SECLABEL on job card. • Wrong security overlay specified in the security definitions library member for the SECLABEL on the job card and the size of paper in the printer that printed the file. • Overlay names were changed in the security overlay library.

Appendix A. Security Page Layout

The template in Figure 19 is provided to help you determine the dimensions that you need when designing pages for the print labeling function. This template can be used to help define where identification label placement should occur and to help determine the dimensions of the user-printable area (UPA). For information about using these measurements to code a security definition, see “Defining a Security Definitions Library” on page 9. For more information about printable area dimensions for specific printers, refer to *Printer Information*.

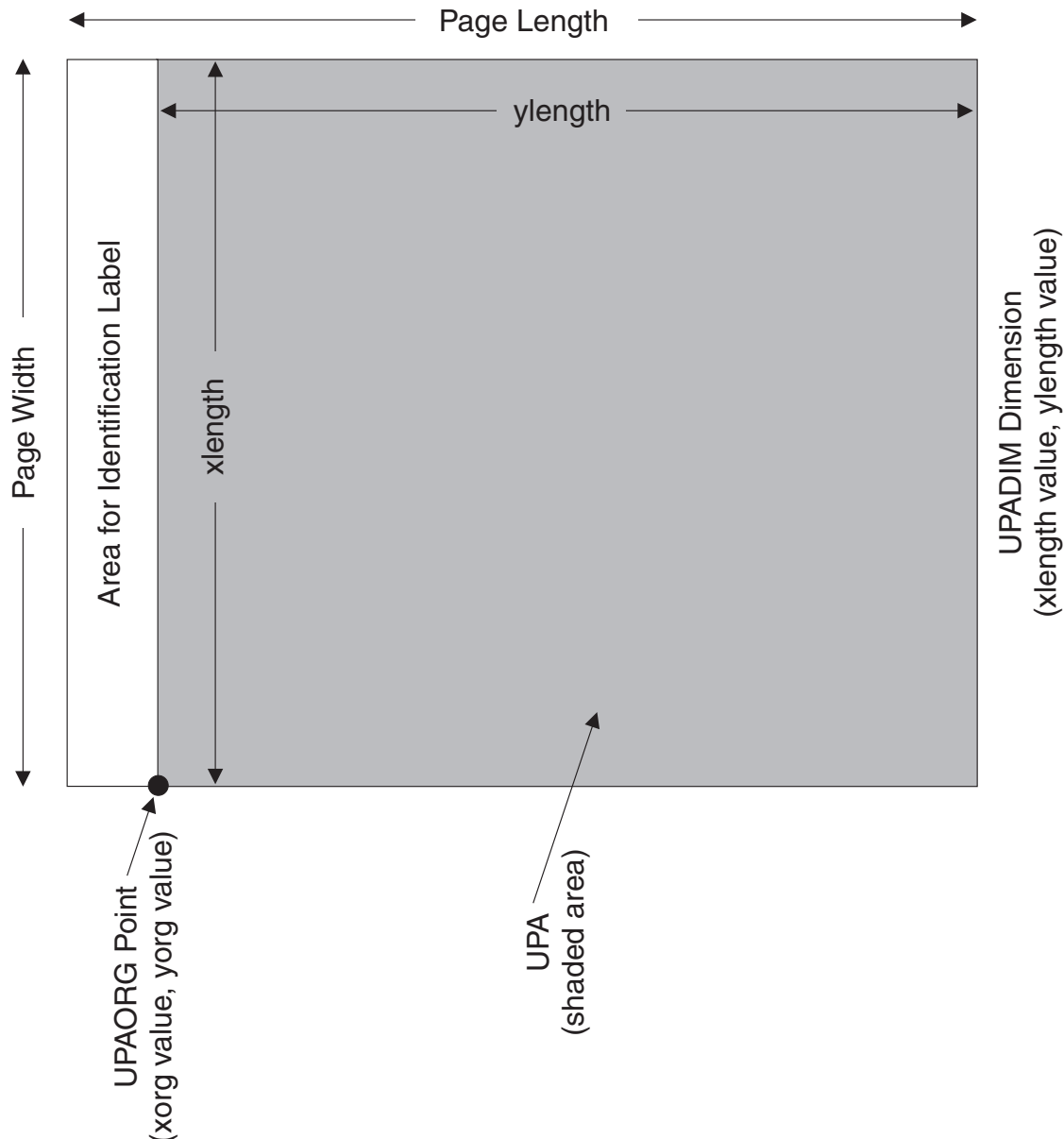


Figure 19. Security Page Layout. This template is for a page defined as TOP=NARROW.

Appendix B. PAPERNAME Table for System-Defined Paper Names

Table 7 lists the paper names that you can select for the PAPERNAME parameter.

Table 7. PAPERNAME Parameter Values

Paper Name	Paper Size: Width by Height in Millimeters	Paper Size: Width by Height in Inches
A4	210 x 297	8.27 x 11.69
B4	257 x 364	10.12 x 14.33
B5	182 x 257	7.17 x 10.12
EXEC1	178 x 267	7.00 x 10.50
EXEC2	184 x 267	7.25 x 10.50
EXEC3	190 x 267	7.50 x 10.50
LEGAL	216 x 356	8.50 x 14.00
LETTER	216 x 279	8.50 x 11.00
LISTING1	378 x 279	14.88 x 11.00
LISTING2	305 x 216	12.00 x 8.50

Appendix C. 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, function 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 more information, refer to *z/OS TSO/E Primer*, SA22–7787, *z/OS TSO/E User's Guide*, SA22–7794, and *z/OS ISPF User's Guide Vol I*, SC34–4822. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

z/OS Documentation

Most z/OS documentation is accessible using screen readers with the BookServer/Library Server versions of z/OS documents in the Internet library at:

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

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Glossary

This glossary defines technical terms and abbreviations used in PSF for z/OS documentation. If you do not find the term you are looking for, see this publication's index or view the IBM terminology Web site:

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These cross-references are used in this glossary:

- **Contrast with.** Refers to a term that has an opposite or substantively different meaning.
- **See.** Refers to multiple-word terms in which this term appears.
- **See also.** Refers to related terms that have similar, but not synonymous, meanings.
- **Synonym for.** Appears in the commentary of a less desirable or less specific term and identifies the preferred term that has the same meaning.

- **Synonymous with.** Appears in the commentary of a preferred term and identifies less desirable or less specific terms that have the same meaning.

A

access control. In computer security, the process of ensuring that only authorized users can access the resources of a computer system in authorized ways.

C

concatenated data set. A group of logically connected data sets that are treated as one data set for the duration of a job step. See also *data set*, *partitioned data set*, and *library*.

console. An input/output device on a computer, reserved for communication between the computer operator or maintenance engineer and the computer.

D

data object resource. An object container resource or IOCA image resource that is either printer resident or downloaded. Data object resources can be:

- Used to prepare for the presentation of a data object, such as with a resident color profile resource object
- Included in a page or overlay through the Include Object (IOB) structured field; for example, PDF single-page objects, encapsulated PostScript® objects, and IOCA images
- Invoked from within a data object; for example, PDF resource objects

data set. The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access. See *file*. See also *concatenated data set*, *partitioned data set*, and *sequential data set*.

data set header. A page in printed output that separates multiple data sets or multiple copies of a data set within a print job. See also *job header*.

F

file. (1) A collection of related data that is stored and retrieved by an assigned name. A file can include information that starts a program (program-file object), contains text or graphics (data-file object), or processes a series of commands (batch file). (2) A collection of

information treated as a unit. (3) Synonymous with *data set*. See *partitioned data set*, *sequential data set*, and *library*.

font. A set of graphic characters with a common design that reflects the font designer's concept of how the graphic characters should appear. The common design specifies the characteristics of its graphic characters. Examples of characteristics are shape, graphic pattern, style, size, weight, and increment. Examples of fonts are fully described fonts, symbol sets, outline fonts, and their internal printer representations.

form definition. An AFP resource object that defines the characteristics of the form or printed media, including: overlays to be used, duplex printing, text suppression, the position of composed-text data on the form, and the number and modifications of a page. Contrast with *page definition*.

FSA. See *functional subsystem application*.

FSS. See *functional subsystem*.

functional subsystem (FSS). The PSF address space created by JES.

functional subsystem application (FSA). An area within the PSF FSS that drives and manages a single printer.

G

guaranteed print labeling. A method of print labeling that ensures the integrity of the identification label by preventing the user from changing the label. If attempts are made to override print labeling, printing is stopped, and an audit record is written. Contrast with *nonguaranteed print labeling*. See also *identification label*.

I

identification label. In PSF, a protected set of resources (fonts, overlays, and page segments) that are used to label PSF output for security purposes. Contrast with *security label*.

Infoprint Server. An element of z/OS that supports printing on local printers and remote printers in a TCP/IP or SNA network. Infoprint Server lets users submit print requests from remote workstations in a TCP/IP network, from z/OS UNIX System Services applications, from batch applications, from VTAM® applications (such as CICS® or IMS™), and from SAP R/3. Infoprint Server consists of these components: IP PrintWay™, NetSpool™, Print Interface, Printer Inventory Manager, Transform Manager, SNMP subagent, Infoprint Central.

J

JCL. See *job control language*.

JES. See *Job Entry Subsystem*.

job. (1) A separately executable unit of work defined by a user and run by a computer. (2) A representation of a unit of work for the operating system, such as a set of programs, files, and control statements.

job control language (JCL). A command language that is used to identify a job to an operating system and to describe the job's requirements.

Job Entry Subsystem (JES). An IBM-licensed program that receives jobs into the system and processes all output data that is produced by jobs.

job header. A page in the printed output that indicates the beginning of a user job. A user job can contain one or more data sets, or one or more copies of a print job. See also *data set header*.

job separation. The ability to identify job boundaries by placing marks or sheets of paper between successive jobs.

job trailer. A page in the printed output that indicates the end of a user job.

L

library. (1) A system object that serves as a directory to other objects. A library groups related objects, and allows the user to find objects by name. (2) A data file that contains copies of a number of individual files and control information that allows them to be accessed individually. A library exists as a partitioned data set or a series of concatenated partitioned data sets in z/OS.

licensed program. A separately priced program and its associated materials that bear a copyright and are offered to customers under the terms and conditions of a licensing agreement.

M

media origin. The reference point from which the logical page origin is positioned by the medium map. This point is represented by $X_m=0$, $Y_m=0$ in the X_m , Y_m coordinate system. The media origin is defined relative to the top-left corner of the form.

N

nonguaranteed print labeling. Some printers that do not support guaranteed print labeling can still print identification labels, but the integrity of the labels cannot

be guaranteed using PSF. Contrast with *guaranteed print labeling*. See also *identification label*.

O

OGL. See *Overlay Generation Language*.

operating system. A collection of system programs that control the overall operation of a computer system.

OS/390®. An IBM operating system for the IBM® S/390® family of enterprise servers that includes and integrates functions previously provided by many IBM software products (including the MVS operating system). See *z/OS*.

overlay. An AFP resource object that is a collection of predefined data, such as lines, shading, text, boxes, or logos, that can be merged with variable data on a page or form while printing. An overlay can be either an electronic overlay or a forms flash. Contrast with *page segment*.

Overlay Generation Language (OGL). An IBM-licensed program used for designing objects (such as lines, boxes, shadings, and irregular shapes, to create graphics) for electronic overlays.

P

page definition. An AFP resource object that defines the rules for transforming line data and XML data into MO:DCA-P data and text controls. Contrast with *form definition*.

Page Printer Formatting Aid (PPFA). An IBM-licensed program with which to create and store form definitions and page definitions, which are resource objects used for print-job management. These stored objects are used to format printed output.

page segment. An AFP resource object containing text, image, graphics, or bar code data that can be positioned on any addressable point on a page or an electronic overlay. Contrast with *overlay*.

parameter. A value or reference passed to a function, command, or program that serves as input or to control actions. The value is supplied by a user or by another program or process.

partitioned data set (PDS). A data set in direct-access storage that is divided into partitions, which are called members. Each partition can contain a program, part of a program, or data. Contrast with *sequential data set*. See also *library*.

PDS. See *partitioned data set*.

physical page. A single surface (front or back) of a form.

PPFA. See *Page Printer Formatting Aid*.

Printer Inventory. In Infoprint Server, a set of files that contain information about printers. Objects in the Printer Inventory include printer definitions, printer pool definitions, FSS and FSA definitions, and IP PrintWay job selection rules.

print job. The print data that has been submitted for printing.

print labeling. A controlled method of placing identification labels on each page of PSF printed output.

Print Services Facility (PSF). An IBM-licensed program that manages and controls the input data stream and output data stream required by supported page printers.

processor. In a computer, a functional unit that interprets and executes instructions. A processor consists of at least an instruction control unit and an arithmetic and logic unit.

PSF. See *Print Services Facility*.

R

RACF. See *Resource Access Control Facility*.

record. (1) In programming languages, an aggregate that consists of data objects, possibly with different attributes, that usually have identifiers attached to them. In some programming languages, records are called structures. (2) A group of related data, words, or fields treated as a unit, such as one name, address, and telephone number.

resource. A collection of printing instructions used by PSF, in addition to the print data set, to produce the printed output. Resources include coded fonts, font character sets, code pages, page segments, overlays, form definitions, and page definitions.

Resource Access Control Facility (RACF). An IBM-licensed program that provides for access control by identifying and verifying users to the system, authorizing access to protected resources, logging detected unauthorized attempts to enter the system, and logging detected accesses to protected resources.

S

security definition. In *z/OS*, a member containing the definitions for one identification label. These definitions include instructions for the overlay name, and the size and origin of paper to be used.

security definitions library. In *z/OS*, a partitioned data set or a series of concatenated partitioned data sets that contain the security definitions for an entire system.

security label. In a trusted computing base, a label used to maintain multiple levels of security on a system. This label is a combination of a security class and a security level. Contrast with *identification label*.

security overlay. An overlay, such as one created by use of Overlay Generation Language, that resides in a secure library and is used to place security resources on a page.

separator page. An identifying sheet of paper between successive jobs. See also *job header* and *job trailer*.

sequential data set. In z/OS, a data set whose records are organized on the basis of their physical positions, such as on magnetic tape. Contrast with *partitioned data set*.

SMF. See *system management facilities*.

SMF type 6 record. The record that PSF uses to record data for each print data set.

spool. The system function of putting files or jobs into disk storage for later processing or printing.

spool file. A file containing output that has been saved for later processing.

spooling. (1) The use of auxiliary storage as buffer storage in order to reduce processing delays when transferring data between peripheral equipment and computer processors. (2) The process of reading and writing input and output streams on an intermediate device, concurrently with job execution, in a format that is convenient for later processing or output.

statement. (1) In programming languages, a language construct that represents a step in a sequence of actions or a set of declarations. (2) An instruction in a program or procedure.

system management facilities (SMF). The part of the operating system that collects and records system and job-related information used in billing users, reporting reliability, analyzing the configuration, scheduling jobs, summarizing direct access volume activity, evaluating data set activity, profiling system resource use, and maintaining system security.

T

terminal. In data communication, a device, usually equipped with a keyboard and display device, capable of sending and receiving information.

trusted computing base. The components in a system (hardware, microcode, and software) that together enforce a unified security policy to protect information on the system.

U

UPA. See *user printable area*.

user ID. User identifier. A string of characters that uniquely identifies a user to a system.

user printable area (UPA). The area within the valid printable area (VPA) where user-generated data can print without causing an exception condition. See also *valid printable area*.

V

valid printable area (VPA). The intersection of the current logical page or current overlay with the physical page in which printing is allowed. See also *user printable area*.

VPA. See *valid printable area*.

X

Xm, Ym coordinate system. The media coordinate system.

Z

z/OS. An IBM operating system for the IBM S/390 or System z™ family of products that includes and integrates functions previously provided by many IBM software products (including the MVS and OS/390 operating systems).

z/OS.e. An IBM operating system available on the IBM eServer™ zSeries® 800 (z800) and zSeries 890 (z890) that provides select z/OS function at a reduced price.

Bibliography

This bibliography lists the titles of publications containing additional information about PSF, AFP, the z/OS operating system, and related products.

The titles and order numbers might change from time to time. To verify the current title or order number, consult your IBM marketing representative.

You can obtain many of the publications listed in this bibliography from the z/OS printing software Web page:

http://www.ibm.com/systems/z/zos/printsoftware/supportmanuals_ww.html

Print Services Facility (PSF) for z/OS

Publication	Order Number
<i>AFP Conversion and Indexing Facility User's Guide</i>	S550-0436
<i>PSF for z/OS: AFP Download Plus</i>	S550-0433
<i>PSF for z/OS: Customization</i>	S550-0427
<i>PSF for z/OS: Diagnosis</i>	G550-0428
<i>PSF for z/OS: Download for z/OS</i>	S550-0429
<i>PSF for z/OS: Introduction</i>	G550-0430
<i>PSF for z/OS: Licensed Program Specifications</i>	G550-0431
<i>PSF for z/OS: Messages and Codes</i>	G550-0432
<i>PSF for z/OS: Security Guide</i>	S550-0434
<i>PSF for z/OS: User's Guide</i>	S550-0435
<i>PSF for AIX: AFP Upload Configuration Guide Using SNA</i>	S544-5422
<i>PSF for AIX: AFP Upload Configuration Guide Using TCP/IP</i>	S544-5423
<i>PSF for z/OS Collection Kit CD-ROM (BookManager)</i>	SK3T-9927
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Infoprint Server

Title	Order Number
<i>z/OS Infoprint Server Customization</i>	S544-5744
<i>z/OS Infoprint Server Introduction</i>	S544-5742
<i>z/OS Infoprint Server Messages and Diagnosis</i>	G544-5747
<i>z/OS Infoprint Server Operation and Administration</i>	S544-5745
<i>z/OS Infoprint Server Printer Inventory for PSF</i>	S510-7703
<i>z/OS Infoprint Server User's Guide</i>	S544-5746

Advanced Function Presentation (AFP)

Publication	Order Number
<i>Advanced Function Printing: Host Font Data Stream Reference</i>	S544-3289

Publication	Order Number
<i>AFP Conversion and Indexing Facility User's Guide</i>	S550-0436
<i>AFP Toolbox User's Guide</i>	G544-5292
<i>AFP Workbench for Windows: Using the Viewer Application</i>	G544-3813
<i>Guide to Advanced Function Presentation</i>	G544-3876
<i>Printer Information</i>	S544-5750
<i>Printer Summary</i>	S544-5749
<i>Overlay Generation Language User's Guide and Reference</i>	S544-3700
<i>Page Printer Formatting Aid: User's Guide</i>	S544-5284
Architecture	
<i>Advanced Function Presentation: Programming Guide and Line Data Reference</i>	S544-3884
<i>AFP Consortium: AFP Color Management Architecture (ACMA)</i>	G550-1046
<i>Bar Code Object Content Architecture Reference</i>	S544-3766
<i>Color Management Object Content Architecture Reference</i>	S550-0511
<i>Font Object Content Architecture Reference</i>	S544-3285
<i>Graphics Object Content Architecture for Advanced Function Presentation Reference</i>	S544-5498
<i>Using OpenType Fonts in an AFP System</i>	G544-5876
<i>Image Object Content Architecture Reference</i>	SC31-6805
<i>Intelligent Printer Data Stream Reference</i>	S544-3417
<i>Mixed Object Document Content Architecture Reference</i>	SC31-6802
<i>Presentation Text Object Content Architecture Reference</i>	SC31-6803
Fonts	
<i>IBM AFP Fonts: Font Samples</i>	S544-3792
<i>IBM AFP Fonts: Font Summary for AFP Font Collection</i>	S544-5633
<i>IBM AFP Fonts: Type Transformer User's Guide</i>	G544-3796
<i>IBM Infoprint Fonts: Font Summary</i>	G544-5846
<i>IBM Infoprint Fonts: Introduction to Type Transformer and Utilities for Windows</i>	G544-5853

Data Transforms

Publication	Order number
<i>Infoprint Transforms from AFP for z/OS</i>	G550-0444
<i>Infoprint Transforms to AFP for z/OS</i>	G550-0443
<i>Infoprint XML Extender for z/OS</i>	S544-5855
<i>Infoprint XT Extender for z/OS: Customization and Usage</i>	S544-5879
<i>Infoprint XT Extender for z/OS: Messages and Diagnosis</i>	G544-5878

Text Processing

Publication	Order number
<i>DCF/DLF General Information</i>	GH20-9158
<i>Document Composition Facility: Bar Code User's Guide</i>	S544-3115
<i>Document Composition Facility: SCRIPT/VS Text Programmer's Guide</i>	SH35-0069
<i>Document Composition Facility SCRIPT/VS Language Reference</i>	SH35-0070
<i>Publishing Systems BookMaster General Information</i>	GC34-5006
<i>Publishing Systems BookMaster User's Guide</i>	SC34-5009

Print Management

Publication	Order Number
<i>InfoPrint Manager for AIX: Getting Started</i>	G544-5817
<i>InfoPrint Manager for AIX: Introduction and Planning Guide</i>	G550-1060
<i>InfoPrint Manager for AIX: Procedures</i>	G550-1066
<i>InfoPrint Manager for Windows: Getting Started</i>	G544-5717
<i>InfoPrint Manager for Windows: Introduction and Planning Guide</i>	G544-5716
<i>InfoPrint Manager for Windows: Procedures</i>	G550-1073
<i>InfoPrint Manager for Windows: PSF Direct Network Configuration Guide</i>	Web-based
<i>InfoPrint Manager: Reference</i>	S544-5475
<i>InfoPrint ProcessDirector for AIX: Planning and Installation</i>	G550-1045
<i>InfoPrint ProcessDirector for AIX: User Documentation</i>	GK4T-4011
<i>InfoPrint ProcessDirector for Linux: Planning and Installation</i>	G550-1042
<i>InfoPrint ProcessDirector for Linux: User Documentation</i>	GK4T-4007
<i>PSF for AIX: AFP Upload Configuration Guide Using SNA</i>	S544-5422
<i>PSF for AIX: AFP Upload Configuration Guide Using TCP/IP</i>	S544-5423

Content Manager OnDemand

Publication	Order Number
<i>IBM DB2 Content Manager OnDemand for Multiplatforms: Administration Guide</i>	SC18-9237
<i>IBM DB2 Content Manager OnDemand for Multiplatforms: Indexing Reference</i>	SC18-9235
<i>IBM DB2 Content Manager OnDemand for Multiplatforms: Installation and Configuration Guide</i>	SC18-9232
<i>IBM DB2 Content Manager OnDemand for Multiplatforms: Introduction and Planning Guide</i>	GC18-9236
<i>IBM DB2 Content Manager OnDemand: Messages and Codes</i>	SC27-1379
<i>IBM DB2 Content Manager OnDemand: Report Distribution Installation, Use, Reference</i>	SC18-9233
<i>IBM DB2 Content Manager OnDemand: User's Guide</i>	SC27-0836

Publication	Order Number
<i>IBM DB2 Content Manager OnDemand for Multiplatforms: Web Enablement Kit Implementation Guide</i>	SC18-9231
<i>IBM DB2 Content Manager OnDemand: Windows Client Customization Guide</i>	SC27-0837

i-data

Publication	Order Number
<i>i-data 7913 IPDS Printer LAN Attachment for Ethernet Installation Guide</i>	none
<i>i-data 7913 IPDS Printer LAN Attachment for Token Ring Installation Guide</i>	none

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<i>SMP/E User's Guide</i>	SA22-7773
<i>z/OS Collection</i>	SK3T-4269
<i>z/OS and Software Products DVD Collection</i>	SK3T-4271
<i>z/OS Communications Server: IP Sockets Application Programming Interface Guide and Reference</i>	SC31-8788
<i>z/OS Communications Server: IP Configuration Reference</i>	SC31-8776
<i>z/OS Communications Server: IP and SNA Codes</i>	SC31-8791
<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>	GC31-6850
<i>z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT</i>	GC31-6851
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<i>z/OS Communications Server: SNA Network Implementation Guide</i>	SC31-8777
<i>z/OS Communications Server: SNA Operation</i>	SC31-8779
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<i>z/OS Communications Server: SNA Resource Definition Reference</i>	SC31-8778
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<i>z/OS Distributed File Service zSeries File System Administration</i>	SC24-5989
<i>z/OS DFSMSdfp Utilities</i>	SC26-7414
<i>z/OS HCD Planning</i>	GA22-7525
<i>z/OS HCD User's Guide</i>	SC33-7988
<i>z/OS HCD Scenarios</i>	SC33-7987
<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 JES2 Messages</i>	SA22-7537
<i>z/OS JES3 Commands</i>	SA22-7540

Publication	Order Number
<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 JES3 Messages</i>	SA22-7552
<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 IPCS User's Guide</i>	SA22-7596
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