05-02-2023

Configuring Infoprint Server on z/OS

Preface:

This paper is intended to help you to configure, customize and use Infoprint Server.

This is intended to be a simple implementation for proof of concept. For full configuration information of Infoprint Server, refer to the Infoprint Server Customization publication.

Contents

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Assumptions before starting this task:

The following assumptions are needed before starting the tasks discussed in this Quick Reference Guide:

- Familiar with Unix System Services.
- Familiar with z/OS Security Server Resource Access Control Facility (RACF) or another access control manager with equivalent function.
- Infoprint Server "Extended mode" is being used, as Infoprint Server "Basic mode" has not been enhanced in many years and IBM discourages its use.
- Printer and connectivity requirements depend on the function to be performed:
  To print output with IP PrintWay, a printer that is connected by way of the z/OS Communications Server base element (IP Services) is required. An IP connection requires a printer that supports LPR, IPP, or TCP/IP direct sockets.
- The following quick reference document is assuming Infoprint Server and its associated configuration files will be installed in the default locations.

Important reference material:

- At a high level, the Infoprint Server install requirements are documented in the z/OS Program Directory, 'Program Directory For CBPDO Installation and ServerPac Referencez/OS', GI11-9848-05.
- Infoprint Server configuration information can be found in the Infoprint Server Customization Publication, SA38-0691-50.
- For almost all printing, fonts are a must. As of z/OS 2.1, IBM has consolidated all fonts products into z/OS Font Collection, a no charge feature. These fonts are available as AFP Raster, Outline and Worldtype for Latin and CJK. By default, the font locations are:
  SYS1.SFNTILIB
  SYS1.SFONDLIB
  SYS1.FONTLIB
  SYS1.FONTLIBB
  SYS1.FONT300
  /usr/lpp/fonts/worldtype

One-time configuration actions

Register Infoprint Server

If not already completed, add this text to your IFAPRDxx parmlib member where the z/OS enablement policies reside.

Note: These instructions are using z/OS 2.5 as a target system, adjust as needed for your target system.

```
/* Enable Infoprint Server */
PRODUCT OWNER('IBM CORP')
        NAME('z/OS')
        ID(5650-ZOS)
        FEATURENAME(INFOPRINT SERVER)
        STATE(ENABLED)
/* */
```

The parmlib member should have this entry as shown highlighted below.

```
 Menu  Utilities  Compilers  Help
 BROWSE    SYS1.PARMLIB(IFAPRDBK) - 01.11          Line 0000000261 Col 001 080
        VERSION(*) RELEASE(*) MOD(*)
        FEATURENAME('HCM')
        STATE(ENABLED)
PRODUCT OWNER('IBM CORP')
        NAME('z/OS')
        ID(5650-ZOS)
        VERSION(*) RELEASE(*) MOD(*)
        FEATURENAME('INFOPRINT SERVER')
        STATE(ENABLED)
PRODUCT OWNER('IBM CORP')
        NAME('PSF for z/OS')
        ID(5655-M32)
        VERSION(*)
        RELEASE(*)
        MOD(*)
        FEATURENAME('PSF for z/OS')
        STATE(ENABLED)
PRODUCT OWNER('IBM CORP')
        NAME('PSF for z/OS')
        ID(5655-M32)
        VERSION(*)
        RELEASE(*)
        MOD(*)
        FEATURENAME('PSF for z/OS')
        STATE(ENABLED)
PRODUCT OWNER('IBM CORP')
        NAME ('PSF for z/OS')
        ID(5655-M32)
```

Then, issue MVS command 'set prod=(xx)' where the xx matches the parmlib member suffix.

You can use the 'Display Prod, State' command on SDSF command line to check if the Infoprint Server product is enabled on your system.

Example:

```
D PROD, STATE
IFA111I 11.53.30 PROD DISPLAY 117
S OWNER            NAME              FEATURE          VERSION  ID
E IBM CORP         z/OS              INFOPRINT SERVER * .* .*  5650-ZOS
```

For more information see IFAPRDxx (product enablement policy) in the z/OS MVS Initialization and Tuning Reference.

Update the BPXPRMxx member of SYS1.PARMLIB if you are configuring z/OS UNIX System Services for the first time

Infoprint Server uses z/OS UNIX domain sockets. The BPXPRMxx member of SYS1.PARMLIB must define an AF_UNIX file system. For example:

FILESYSTYPE TYPE(UDS) ENTRYPOINT(BPXTUINT)
NETWORK DOMAINNAME(AF_UNIX)
DOMAINNUMBER(1)
TYPE(UDS)

For AF_UNIX file systems, the MAXSOCKETS parameter is ignored if specified. The maximum number of AF_UNIX sockets is 10000.

For more information see BPXPRMxx (z/OS UNIX System Services parameters) in the z/OS MVS Initialization and Tuning Reference.

Prepare User IDs to Configure Infoprint Server

Steps are required to set up security for the Printer Inventory, common message log, and Infoprint Server operator commands. They are documented in the Infoprint Server Customization publication, Steps for setting up security for the Printer Inventory, common message log, and operator commands

Tip: The sample CLIST in SYS1.SAMPLIB(AOPRACF) contains the RACF commands for most of the steps that are described in the link above. You must modify AOPRACF before you run it.

Examples from SYS1.SAMPLIB(AOPRACF):

ADDGROUP (AOPADMIN) OMVS(AUTOGID) – AOPADMIN group

```
ADDGROUP (AOPOPER) OMVS(AUTOGID) – AOPOPER group
CONNECT (aaaaaaaa) GROUP(AOPADMIN) – Connect a user(s) to
AOPADMIN group, replace 'aaaaaaaa' with a user id
CONNECT (oooooooo) GROUP(AOPOPER) – Connect a user(s) to AOPOPER
group, replace 'oooooooo' with a user id
ADDUSER AOPSTC OMVS(UID(dd) HOME('/u/aopstc')
PROGRAM('/bin/sh')) DFLTGRP(AOPOPER) NOPASSWORD – Create a
started task user, replace 'dd' with a unique UID
SETROPTS CLASSACT(PRINTSRV) RACLIST(PRINTSRV)
RDEFINE PRINTSRV (AOP.ADMINISTRATOR) UACC(READ)
PERMIT AOP.ADMINISTRATOR CLASS(PRINTSRV) ACCESS(UPDATE)
     ID(AOPADMIN)
SETROPTS RACLIST(PRINTSRV) REFRESH
RDEFINE STARTED AOPSTART.* STDATA(USER(AOPSTC) GROUP(AOPOPER))
RDEFINE STARTED AOPSTOP.* STDATA(USER(AOPSTC) GROUP(AOPOPER))
SETROPTS RACLIST(STARTED) REFRESH
```

Authorize a User ID to Configure Infoprint Server in the UNIX environment

This needs to be done only if you are not a superuser as this is needed to execute the steps in this document:

Superuser (authorized/privileged user). A superuser can be any of the following:

- A z/OS UNIX user with a UID=0.
- A started procedure with a trusted or privileged attribute in the RACF started procedures table.
- A z/OS UNIX user that has READ authority to the BPX.SUPERUSER profile in the RACF FACILITY class.

The concept of superusers comes from UNIX. Sometimes it is also referred to as root authority.

Create/Configure Infoprint Server Directories

The Printer Inventory Manager uses these directories:

-The **/etc/Printsrv** directory, which is the default location for Infoprint Server configuration files. This directory is created automatically when you install Infoprint Server.

-The **/var/Printsrv** directory, which is the default location for Printer Inventory files and other Infoprint Server files. Follow the steps in the Infoprint Server Customization publication to create a separate zFS (OMVS.PRINTSRV.ZFS) and mount at /var/Printsrv. Refer to /var/Printsrv directory in the z/OS Infoprint

Server Customization publication for details. Refer to Calculating DASD space requirements for the /var/Printsrv directory to determine the size of the mount point.

Setup Infoprint Server ISPF panels

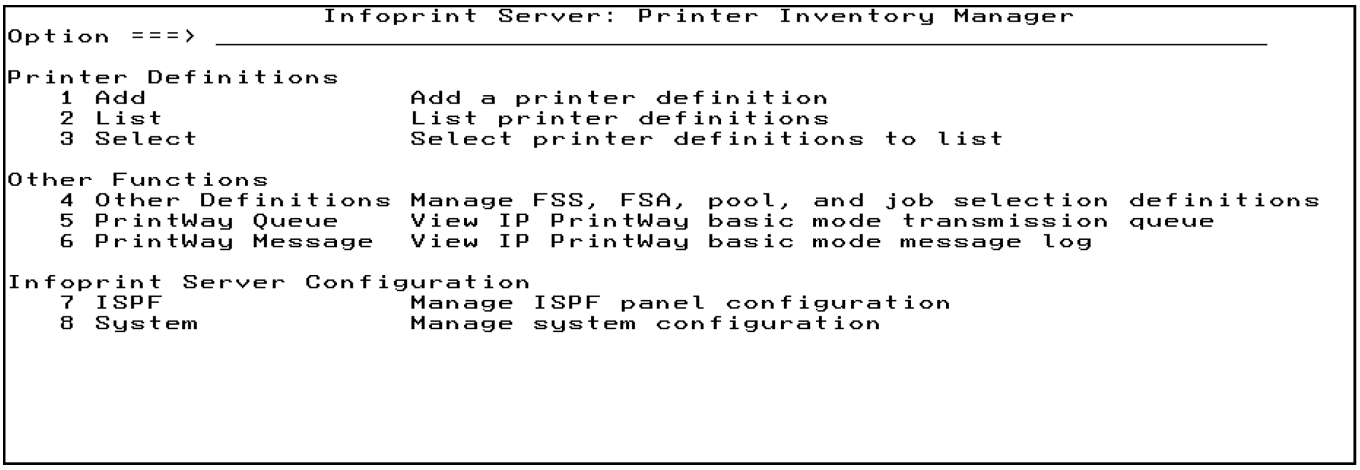
To invoke the Printer Inventory Manager panel, concatenate the following datasets to the TSO (time sharing option) startup PROC:

Dataset name	DD Name
AOP.SAOPEXEC	SYSEXEC
AOP.SAOPPENU	ISPPENU
AOP.SAOPMENU	ISPPMENU

For more information, refer to z/OS Infoprint Server Customization publication.

Note: The **TSO AOPINIT** command opens the panels of the Printer Interface Manager -- it can be opened only after starting Infoprint Server.

Primary Panel for Printer Inventory Manager:



Customize the UNIX environment for Infoprint Server

Create the configuration files for the Infoprint Server daemons:

A sample job is provided in SYS1.SAMPLIB(AOPCPETC) to copy the sample configuration files from /usr/lpp/Printsrv/samples to /etc/Printsrv. Review the comments in the job to determine which

configuration files are required for your installation, and then run the job to create the configuration files.

The defaults provided in the sample aopd.conf file will start the printer inventory manager and the LPD daemon. The daemons that are started are specified in /etc/Printsrv/aopd.conf in the start-daemons parameter. Each daemon has a specific purpose, refer to Infoprint Server Customization, Chapter 3 for more information.

Starting with z/OS 2.4 the role of aopd.conf as bootstrap configuration has changed. Most settings are now available using option 8 (Manage system configuration) from the Infoprint Server: Printer Inventory Manager panel and can be changed dynamically without requiring restarting Infoprint Server daemons. Refer to Dynamic attributes in the z/OS Infoprint Server Customization publication for details.

A sample aopd.conf file was provided in the zip file bundled with this document. You can copy and paste the contents into /etc/Prinsrv/aopd.conf. This sample is starting a more complete list of daemons.

```
Start-daemons                  = { ippd lpd netd outd ssid subd xfd }
```

NOTES: If the Infoprint Server ISPF, System (Option 8) Configuration panel, Operating mode parameter is set to z/OS 2.2 mode, this start-daemons parameter from aopd.conf is ignored. If 2.2 mode is selected, JCL procedures AOPSTAR2 and AOPSTAR2 are included in SYS1.IBM.PROCLIB for starting Infoprint Server. IBM recommends the use of JCL PROCS to start and stop Infoprint server for production runs. A key benefit of using the PROCS is that it allows the use of parameters to manage memory and time allowed for Infoprint server daemons. Refer to Starting and stopping Infoprint Server daemons in the z/OS Infoprint Server Customization publication for details.

To simplify the starting of Infoprint Server, this Quick Reference document is assuming Infoprint Server is started with the aopstart and aopstop UNIX shell commands, which is adequate for a proof of concept in a test environment.

Modify /etc/profile to update the following environment variables:

This step will ensure that if you are running Infoprint Server commands at the UNIX shell command line, the commands will be found.

- **AOPCONF**

Set the AOPCONF path for Infoprint Server.

Example:

```
export AOPCONF=/etc/Printsrv/aopd.conf
```

- **PATH**

Add /usr/lpp/Printsrv/bin to the PATH environment variable.

Note: The /usr/lpp/Printsrv/bin directory must occur before /bin in the PATH environment variable so the InfoPrint Server (Print Interface and IP PrintWay extended mode) version of the lp, lpstat, and cancel commands will be invoked.

Example:

```
PATH=/usr/lpp/Printsrv/bin/:/bin:/usr/sbin:.
```

• LIBPATH

Add /usr/lpp/Printsrv/lib to the LIBPATH environment variable.

Example:

```
LIBPATH=/lib:/usr/lib:/usr/lpp/Printsrv/lib:.
```

• MANPATH

Add /usr/lpp/Printsrv/man/%L to the MANPATH environment variable.

Note: The /usr/lpp/Printsrv/man/%L directory must occur before /usr/man/%L in the MANPATH environment variable so the InfoPrint Server (Print Interface and IP PrintWay extended mode) version of the lp, lpstat, and cancel man pages will be displayed.

Example:

```
MANPATH=/usr/man/%L:/usr/lpp/Printsrv/man/
```

• NLSPATH

Add /usr/lpp/Printsrv/%L/%N to the NLSPATH environment variable.

Infoprint Server may optionally use additional environment variables to set defaults for operation. Refer to z/OS Infoprint Server Customization publication for detailed information on the usage of these parameters.

Example:

```
NLSPATH=
/usr/lib/nls/msg/%L/%N:/usr/lpp/Printsrv/%L/%N:/usr/lpp/Printsrv
/En_US/%N
```

Setup aopstart EXEC:

A sample aopstart file was provided in the zip file bundled with this document. You can copy and paste the contents into /usr/lpp/Printsrv/bin/aopstart.

Change the owner of the aopstart file to UID 0:
chown 0 /usr/lpp/Printsrv/bin/aopstart

Set the set-uid-flag on:
chmod 4754 /usr/lpp/Printsrv/bin/aopstart

Change the group owner of the aopstart file to AOPOPER:
chgrp AOPOPER /usr/lpp/Printsrv/bin/aopstart

For more information about how to set variables in the aopstart EXEC, refer to z/OS Infoprint Server Customization publication.

Ensuring sufficient memory is available to start the Infoprint Server Daemons

The Infoprint Server daemons require at least 200 megabytes (MB) of memory. The recommended size is 512 MB. Therefore, you might need to increase the region size before you start the Infoprint Server daemons.

Run aopsetup

This REXX EXEC checks the setup of Infoprint Server. You must run it from a user ID that has UID=0 or has read access to the BPX.SUPERUSER facility class.

Run this exec from UNIX shell. **`/usr/lpp/Printsrv/bin/aopsetup AOPOPER AOPADMIN`**

You can run aopsetup from an rlogin shell, from an OMVS session, or using BPXBATCH.

For more information about aopsetup, refer to z/OS Infoprint Server Customization.

Run aopcheck

This REXX EXEC checks the setup of Infoprint Server. You must run it from a user ID that has UID=0 or has read access to the BPX.SUPERUSER facility class.

Review the results for any issues.

Run this exec from UNIX shell. **`/usr/lpp/Printsrv/samples/aopcheck . . . AOPADMIN AOPOPER OMVSGRP OMVSKERN`**

You can run aopcheck from an rlogin shell, from an OMVS session, or using BPXBATCH.

Make updates to the Communications Server IP Profile

Print Interface requires the use of TCP port 515 in a default configuration. Ensure dataset hlq.PROFILE.TCPIP does not reserve port 515 for another application. If you want to use the IPP function of Infoprint Server, port 631 should not be reserved.

Refer to Customizing z/OS Communications Server in the z/OS Infoprint Server Customization publication for details.

Start Infoprint Server

Start the Infoprint Server daemons

You can use either:

- aopstart UNIX shell command or AOPSTAR2 procedure to start Infoprint Server
- aopstop UNIX shell command or AOPSTOP2 procedure to stop Infoprint Server

For our simple example, we will be using aopstart UNIX shell command.

```
/home/xxxx> aopstart
AOP075I Daemon aoplpd was started successfully. (program:aopd)
AOP075I Daemon aopippd was started successfully. (program:aopd)
AOPS002I Subsystem established successfully. (program:aopsubd)
AOP075I Daemon aopsubd was started successfully. (program:aopd)
AOP075I Daemon aopnetd was started successfully. (program:aopd)
AOP075I Daemon aopssid was started successfully. (program:aopd)
AOP075I Daemon aopoutd was started successfully. (program:aopd)
AOP075I Daemon aopd was started successfully.
```

Verify Infoprint Server Daemons have been Started

This can be verified using the ‘aopstat’ command at the z/OS UNIX shell command line.

```
/home/xxxx> aopstat
Member           Job ID   System   Status   State
---------------- -------- -------- -------- -----------
-------
AOPIBM00         AOPD     CB8A     ACTIVE   Ready
LPDIBM00         AOPLPD   CB8A     ACTIVE   Ready
IPPIBM00         AOPIPPD  CB8A     ACTIVE   Ready
SUBIBM00         AOPSUBD  CB8A     ACTIVE   Ready
NETIBM00         AOPNETD  CB8A     ACTIVE   Ready
SSIIBM00         AOPSSID  CB8A     ACTIVE   Ready
WSMIBM00         AOPWSMD  CB8A     ACTIVE   Ready
OUTIBM00         AOPOUTD  CB8A     ACTIVE   Ready
```

Create Printers

Configure Printer Definition and job selection rules

There are a couple of ways to configure a printer definition, using IPSF panels or using the PIDU (a UNIX command line utility which can also be invoked using AOPBATCH JCL).

Method 1) Use Infoprint Server ISPF panels to create a printer definition and job selection rule to print to a direct-socket printer.

Note: Before using the Infoprint Server ISPF panels, Infoprint Server must be started. The Printer Inventory Manager daemon, aopd, must be active. For more information, refer to [z/OS Infoprint Server Customization.]

Select (1) Add a printer definition

```
                    Infoprint Server: Printer Inventory Manager
Option ===> 1

Printer Definitions
   1 Add                Add a printer definition
   2 List               List printer definitions
   3 Select             Select printer definitions to list

Other Functions
   4 Other Definitions  Manage FSS, FSA, pool, and job selection definitions
   5 PrintWay Queue     View IP PrintWay basic mode transmission queue
   6 PrintWay Message   View IP PrintWay basic mode message log

Infoprint Server Configuration
   7 ISPF               Manage ISPF panel configuration
   8 System             Manage system configuration
```

The printer definition should have the following settings:

```
                    Infoprint Server: Printer Inventory Manager
                  ---------- Choose a Definition Type and Protocol ----------
 Option ===> 2

   Type                Protocol
 1 IP PrintWay         LPR
 2 IP PrintWay         direct sockets
 3 IP PrintWay         IPP
 4 IP PrintWay         VTAM
 5 IP PrintWay         email
 6 PSF
 7 General

  F1=HELP        F2=SPLIT       F3=END         F4=RETURN      F5=RFIND
  F6=RCHANGE     F7=UP          F8=DOWN        F9=SWAP        F10=LEFT
```

Give the printer definition a name and description

```
Add                          IP PrintWay Printer Definition
Command ==> ____________________________________________________________

Printer definition name . PRINTTXT
Description . Socket Printer to Print text                          (extend)
Location. . . ____________________________________________________  (extend)

                          Component name        Custom values
Section                   (enter to list)       (enter to customize)
Allocation           =>  ____________________   => /
Processing           =>  ____________________   => *
NetSpool options     =>  ____________________   =>
NetSpool end-of-file =>  ____________________   =>
IP PrintWay options  =>  ____________________   =>
Protocol             =>  ____________________   => *

/ Use DEST, CLASS, and FORMS for IP PrintWay printer selection
NetSpool LU name . _________   LU classes . . __  __  __  __  __  __    (extend)
```

Allocation Panel

Choose a CLASS and DEST

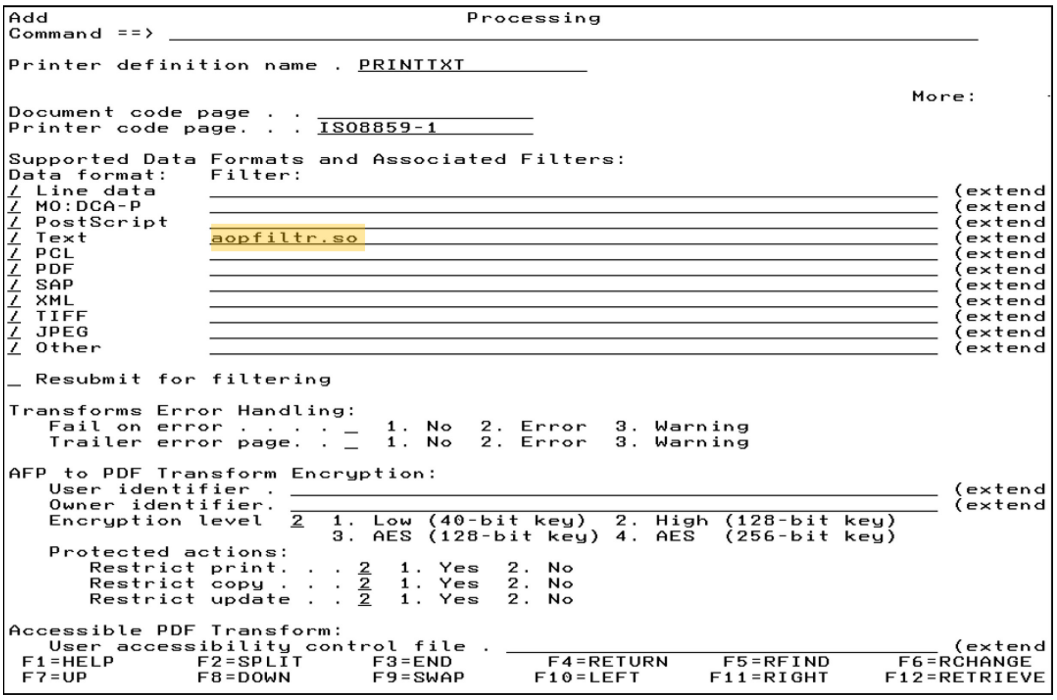
```
Add                                  Allocation
Command ==> ____________________________________________________________

Printer definition name . PRINTTXT

                                                                   More:
Spool allocation values:
   CLASS . . . . J                 GROUPID . . _________
   DEST. . . . . PRINTTXT          LINECT. . . ___
   JES node. . . _________         PRMODE. . . _________
   FCB . . . . . _____             PRTY. . . . ___
   FLASH count . ___               THRESHLD. . _________
   FLASH name. . _____             UCS . . . . _____
   FORMS . . . . _________         WRITER. . . _________
   USERDATA
     . . ____________________________________________________________ (extend
   BURST . . . . _  1. Yes  2. No
   HOLD. . . . . _  1. Yes  2. No
   OUTDISP . . . _  1. Purge (without printing)  2. Leave
                    3. Keep  4. Hold  5. Write
Values for Separator Pages:
   Address
     . . ____________________________________________________________ (extend
   Building . . ____________________________________________________________
   Department . ____________________________________________________________
   Name . . . . ____________________________________________________________
   Room . . . . ____________________________________________________________
   Title  . . . ____________________________________________________________
Resource Related Values:
   Form definition . _________
   Character sets  . _____  _____  _____  _____
   Overlay front . . _________    Back . . _________
   Input tray  . . . ___
   Output bin  . . . ______
   Page definition . _________
   Resource library. ____________________________________________________ (extend)
   Resource directories. ________________________________________________ (extend
   Image shift x-direction front . . _______________   Back . . _______________
               y-direction front . . _______________   Back . . _______________
Error Reporting Values:
   Print error reporting. . _  1. None  2. All  3. Character  4. Position
 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANGE
```

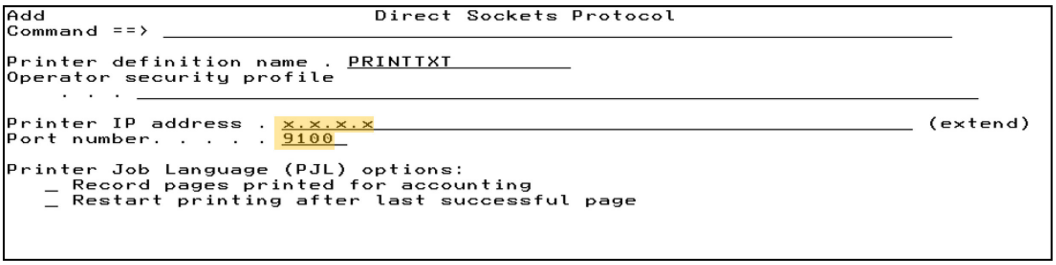
Processing Panel

We are using the defaults for this panel, aopfiltr.so filter for text files. Other data formats might require other filters.

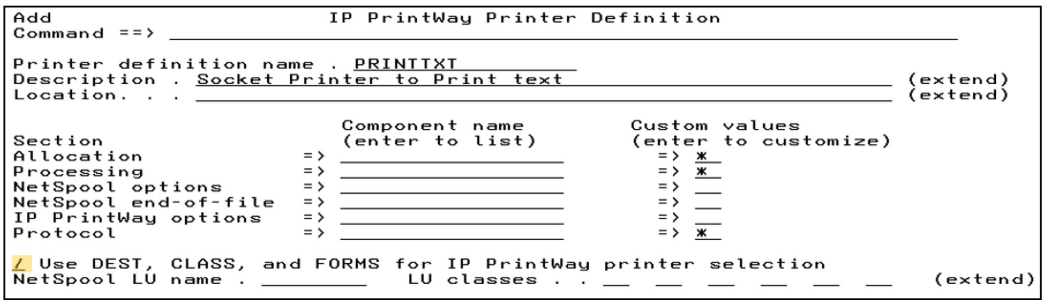


Protocol Panel

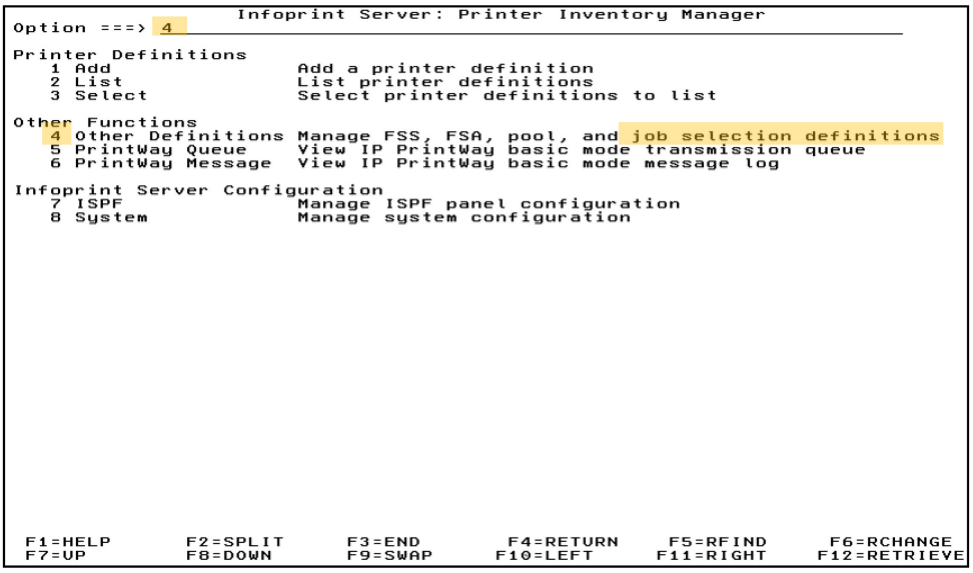
Set the IP address and TCP port number for the printer. The port number can vary for different printer models.

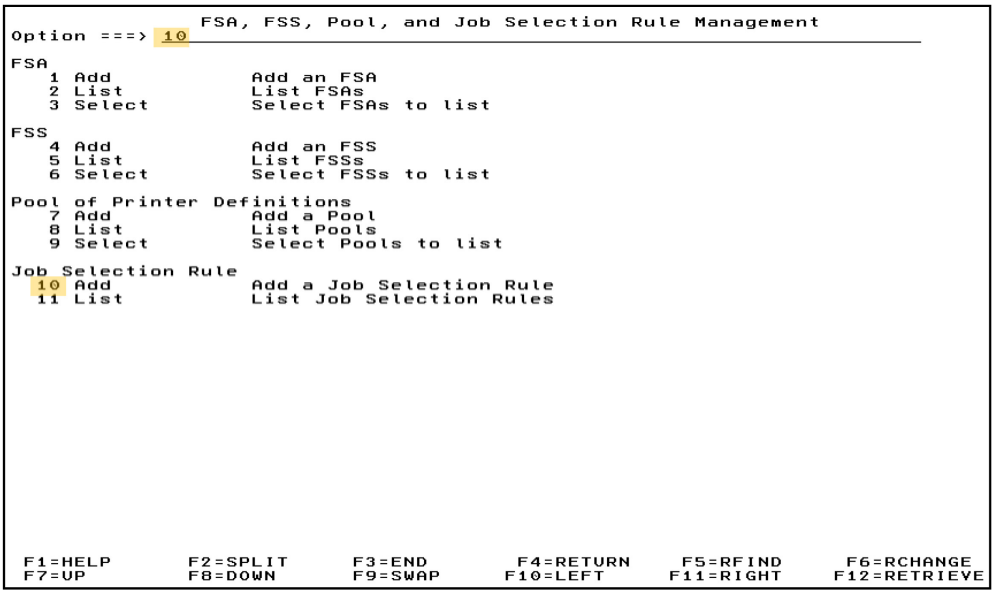


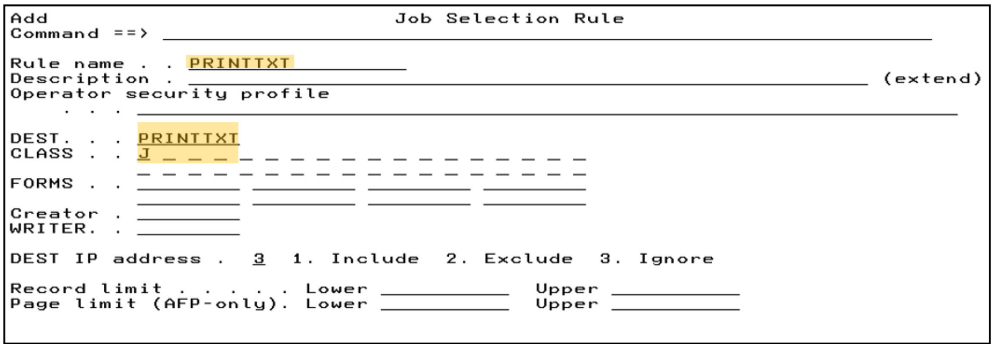
Make sure **Use DEST, CLASS and Form for IP PrintWay printer selection** is checked



Next, create the job selection rule for DEST and CLASS you used above.







Method 2) Use the PIDU utility to create the printer definition and job selection rule

An alternative to using ISPF panels to create printer definition and job selection rules is to use PIDU. This utility is recommended if you want to create several Printers or Job Selection rules. Place the following text in a text file such as 'pidu.txt.' Change printer-ip-address (x.x.x.x) and port-number to match your printer. Upload the file to a target directory on USS and use the 'pidu pidu.txt' command at the z/OS UNIX shell command line to add this printer definition to the Infoprint Server Inventory.

The following pidu example will create one direct-socket printer and one lpr printer. For the difference between the two, see 'Selecting Direct Sockets protocol vs LPR' below.

NOTE: The user profile issuing the pidu command to add printers or printer definitions must be a member of the AOPADMIN RACF group.

pidu examples:

```
#-------------------------------------------------------
# Printer PRINTTXT - Socket Printer to Print text
#-------------------------------------------------------
create printer PRINTTXT
   printer-codepage = ISO8859-1
   filters = {
      text -> aopfiltr.so
   }
   printer-type = ip-printway
   protocol-type = direct-sockets
   port-number = 9100
   destination = PRINTTXT
   output-class = J
   response-timeout = 120
   printer-ip-address = x.x.x.x
   dcf-routing = yes
   description = "Socket Printer to Print text"
;

create dcf-routing-key "PRINTTXT  J"
   printer = PRINTTXT
;

#-------------------------------------------------------
# job-selection-rule PRINTTXT
#-------------------------------------------------------
create job-selection-rule PRINTTXT
   output-class-list = {
      J
   }
   destination-pattern = PRINTTXT
;

#-------------------------------------------------------
```

```
# Printer PRINTLPR - LPR Printer to Print text
#-------------------------------------------------------
create printer PRINTLPR
   printer-codepage = ISO8859-1
   filters = {
      text -> aopfiltr.so
   }
   printer-type = ip-printway
   protocol-type = lpr
   destination = PRINTLPR
   output-class = J
   print-queue-name = DEST
   printer-ip-address = x.x.x.x
   dcf-routing = yes
;

create dcf-routing-key "PRINTLPR J"
   printer = PRINTLPR
;

#-------------------------------------------------------
# job-selection-rule PRINTLPR
#-------------------------------------------------------
create job-selection-rule PRINTLPR
   output-class-list = {
      J
   }
   destination-pattern = PRINTLPR
   job-selection-status = enabled
;
```

The PIDU command output should show that the printer and job selection rules were created.

```
/home/xxxx> pidu pidu.txt
AOP062I printer PRINTTXT was created.
AOP062I dcf-routing-key PRINTTXT  J was created.
AOP062I job-selection-rule PRINTTXT was created.
AOP062I printer PRINTLPR was created.
AOP062I dcf-routing-key PRINTLPR J was created.
AOP062I job-selection-rule PRINTLPR was created.
```

NOTE: You can confirm the new Printer was created using option 2 (List Printer Definitions) from the primary Infoprint Server: Printer Inventory Manager panel. You can confirm the new Selection rule was created using option 4.11 (List Job Selection Rules) from the primary Infoprint Server: Printer Inventory Manager panel.

Sample Print Scenarios

Once the system is configured as explained, here are a few ways to print to these printers.

Scenario 1) Print simple Line Data to a Direct-Socket Printer

Create or name an input file to pass into the configured direct-socket printer:

Input data can come in various forms. For this example, we will use a simple line data file.

Here is sample input data we are using for this simple example:

```
 BROWSE    XFORM.AFPDOC.FB80(ONEPAGE) - 01.12        Line 0000000000 Col 001 080
******************************** Top of Data ********************************
PAGE-01 LINE-001 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0001
PAGE-01 LINE-002 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0002
PAGE-01 LINE-003 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0003
PAGE-01 LINE-004 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0004
PAGE-01 LINE-005 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0005
PAGE-01 LINE-006 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0006
PAGE-01 LINE-007 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0007
PAGE-01 LINE-008 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0008
PAGE-01 LINE-009 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0009
PAGE-01 LINE-010 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0010
PAGE-01 LINE-011 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0011
PAGE-01 LINE-012 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0012
PAGE-01 LINE-013 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0013
PAGE-01 LINE-014 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0014
PAGE-01 LINE-015 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0015
PAGE-01 LINE-016 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0016
PAGE-01 LINE-017 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0017
PAGE-01 LINE-018 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0018
PAGE-01 LINE-019 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0019
PAGE-01 LINE-020 ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ  REC-0020
******************************** Bottom of Data ********************************
```

Input data set XFORM.AFPDOC.FB80 is a PDS with Organization = PO, Record format = FB, Record length = 80, Block size = 12960

Next, create JCL to output the data above to JES Spool. Note, we are using CLASS=J and DEST=PRINTTXT which matches the printer definition we created above. Once the JCL job is submitted, if all is working correctly, IP Printway should select the input from JES spool and send it to the printer.

Note: This example is using a default form and page definition.

```
//ONEPAGE JOB (TST10000),ONEPAGE,CLASS=A,MSGCLASS=T,
//  MSGLEVEL=(1,1),TIME=1440,REGION=0M
//*
//STEP01   EXEC PGM=IEBGENER,REGION=0M
//OUTPRT  OUTPUT CLASS=J,
//         FORMS=STD,
//         DEST=PRINTTXT
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD DISP=SHR,DSN=XFORM.AFPDOC.FB80(ONEPAGE)
//SYSUT2   DD SYSOUT=(,),DCB=RECFM=FB,
//         OUTPUT=(*.OUTPRT)
//SYSIN    DD DUMMY
```

Scenario 2) Print a UNIX text file to an LPR printer

If you have a text file in your UNIX shell environment, you could run the 'lp' UNIX shell command to send the output to printer PRINTLPR using the following command:

```
lp -d PRINTLPR /usr/lpp/Printsrv/samples/cfilter.h
```

The lp command will place the file on the JES spool and IP Printway will process the file and print it to PRINTLPR.

Additional Reference Information

Infoprint Server Daemons

aopd, a Printer Inventory Manager daemon. This daemon manages the Printer Inventory.

aopippd, the IPP Server daemon. This daemon supports printing from remote clients that use the Internet Printing Protocol (IPP).

aoplpd, the line printer daemon (LPD). This daemon supports printing from remote clients that use the TCP/IP line printer requester (LPR) protocol.

aopnetd, the NetSpool daemon. This daemon, together with the NetSpool task, supports printing from VTAM applications such as CICS and IMS.

aopoutd and **aopwsmd**, the IP PrintWay extended mode daemons. These daemons select output data sets from the JES spool and send them to remote printers in an Internet Protocol network.

aopsapd, the SAP Callback daemon. This daemon handles callback notification for the SAP Output Management System (OMS). It starts automatically when a print request is received from SAP R/3.

aopssid, an Infoprint Central daemon. This daemon communicates with JES to display information and do actions on output groups (print jobs) and PSF printers.

aopsubd, the Print Interface subsystem daemon. This daemon processes output data sets that specify the Print Interface subsystem on the SUBSYS parameter of the DD statement.

aopxfd, the Infoprint Server Transform Manager daemon. This daemon manages other transform daemons, which transform data from one format to another. The Infoprint Server Transform Manager daemon starts and stops transform daemons that are configured in the aopxfd.conf configuration file. The transforms are separately priced products that require Infoprint Server.

How to Restart a Daemon:

o Do one of these to stop aoplpd:

- Use the AOPSTOP2 JCL procedure on the SDSF command line:

START AOPSTOP2,OPTIONS='-d lpd'

- At a UNIX command prompt enter:

```
aopstop -d lpd
```

o Do one of these to restart aoplpd:

- Use the AOPDEMON JCL procedure on the SDSF command line:

START AOPDEMON,TYPE=LPD

- At a UNIX command prompt enter:

```
aopstart
```

Note: Using the AOPSTAR2 JCL procedure is the preferred method

for starting the daemons because it lets you set the

TIME=NOLIMIT or REGION=<size> JCL parameters.

Selecting Direct Sockets protocol vs LPR

In an IP PrintWay printer definition, you can select the transmission protocol that IP PrintWay uses to transmit output data sets from the JES spool to the printer, print server, or email destination. IP PrintWay supports these transmission protocols: LPR, direct sockets, IPP, and email.

Select the IP PrintWay direct sockets protocol if you want IP PrintWay to use the TCP/IP direct sockets printing protocol to transmit data sets directly to a designated port on a printer or print server. When you select this protocol, the printer or print server must support direct sockets printing.

Tips:

- Some printers support the direct sockets printing protocol as well as other protocols, such as the LPR protocol. For large data sets, the direct sockets printing protocol can provide better performance. However, you might want to select the LPR protocol to take advantage of the formatting options that IP PrintWay can specify in the LPD control file. For example, printing a banner page.
- When you select the direct sockets protocol, IP PrintWay extended mode can record the number of printed pages in the SMF type 6 record and can restart printing after the last page that printed successfully. For information, see Tracking the number of printed pages (extended mode).

When you select the direct sockets protocol, IP PrintWay transmits data to the printer or print server at the IP address (or host name) and port number that you specify in the printer definition. A job submitter

can override the IP address and port number specified in the printer definition by specifying the IP address in the DEST=IP: parameter and the port number in the PORTNO parameter on the OUTPUT JCL statement.

Because the job submitter can override the IP address and port number, you can create one printer definition for several printers that share the same attributes. To use this printer definition, the job submitter must specify the name of the printer definition, the IP address, and the port number on the OUTPUT JCL statement. If the job submitter does not specify the name of the printer definition on the OUTPUT JCL statement, IP PrintWay uses printer attributes specified in the default IP PrintWay printer definition described in Creating an IP PrintWay default printer definition. For more information about job submission, see z/OS Infoprint Server User's Guide.

IP PrintWay prints multiple copies by transmitting the data set to the printer the requested number of times. This is because the direct sockets printing protocol cannot print multiple copies of a single data set.

IBM documentation references:

IBM Print Transforms from AFP for Infoprint Server for z/OS, G325-2634-40

IBM Infoprint Transforms to AFP for z/OS, G550-0443-06

z/OS Infoprint Server Introduction, SA38-0692-50

z/OS Infoprint Server User's Guide, SA38-0695-50

z/OS Infoprint Server Customization, SA38-0691-50

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z/OS Infoprint Server Printer Inventory for PSF, SA38-0694-50

z/OS Font Collection, GA32-1048-50

z/OS MVS Initialization and Tuning Reference, SA23-1380-50