

ThinPrint .print Server Engine/400

Version 1.1



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Index

ThinPrint Server Engine/400	4
Problem	4
ThinPrint Server Engine	4
Summary	5
Installation	6
System Requirements	6
Operating System Requirements	6
Hardware Requirements	6
Installation on OS/400	6
Installing ThinPrint Server Engine/400	6
Access privileges ThinPrint Server Engine/400	7
Creating a virtual printer	8
Setting the print output characteristics	11
Creating a configuration file	13
Starting and Stopping	14
Starting ThinPrint Server Engine/400	14
Stopping ThinPrint Server Engine/400	14
Statistics	15

ThinPrint Server Engine/400

Problem

Despite the rapid increase in available network bandwidth in recent years, network traffic is often still limited by bandwidth availability. Network bandwidth is still a significant cost item and should be optimized wherever possible.

This applies particularly to printer output. The amount of bandwidth consumed by printing is not always easily visible and should therefore be carefully examined and if possible optimized.

IBM AS/400 or iSeries machines often play a central and strategic role in a company's IT infrastructure and as such are a frequent platform for print output generation and distribution.

ThinPrint Server Engine

The patented ThinPrint .print technology is based on communications between server and client parts.

The server component negotiates the maximum usable bandwidth with the client and then transmits the print data in a compressed format.

Network optimization is twofold. First, THINP400 can limit the total network bandwidth used for printer output. Secondly, from the network bandwidth which is assigned to print output, the data is reduced by up to 85% by data compression.

The client component reconstructs the original data and passes it for printing. The client component can be supplied as software or directly implemented in hardware.

The THINP400 printer driver allows AS/400 spool files to be sent compressed and bandwidth optimized to .print clients. Output settings can be defined as part of printer descriptions.

As soon as print output is available for a ThinPrint output target, THINP400 makes an IP connection and transfers the data as defined.

Summary

By embedding ThinPrint .print technology in modern network print components, server based print processes can be optimized to output on devices directly connected to the data network. Server-attached printers can become a thing of the past.

When strategically implemented, it will reduce your overall network loadings and therefore costs, it will speed up printer output to network attached devices, it will visibly reduce administrative effort and reduce hardware costs.

Installation

System Requirements

Operating System Requirements

ThinPrint Server Engine/400 runs on OS/400 from version V4R2M0.

Hardware Requirements

ThinPrint Server Engine/400 is designed for installation on IBM AS/400 or compatible machines running a supported operating system. Installation requires around 500 KB disk space for the program library. The product is delivered on CD and can be installed either via a CD-ROM drive on an AS/400 or via a client-PC with a CD-ROM drive and an FTP connection to the AS/400.

Installation on OS/400

Installing ThinPrint Server Engine/400

FTP Installation:

- Allocate SAVF THINP400 (CRTSAVF FILE(mylib/THINP400))
- File transfer via FTP
- Restore the installation library

```

AS/400:
CRTSAVF mylib/THINP400

PC:
Syntax
ftp <Internet-Address>
<Enter user name>
<Enter password>
cd <AS400-library>
binary
put <pc-file> <as400-file.mbr>
quit

Example entries
ftp 192.168.0.100
root
pass
cd mylib
binary
put thinp400.savf thinp400
quit

AS/400:
RSTLIB SAVLIB (THINP400) DEV(*SAVF) SAVF(mylib/THINP400) RSTLIB(instlib)

```

CD Installation:

- Insert the CD
- Restore the installation library

```
RSTLIB SAVLIB (THINP400) DEV(OPT01) OPTFILE (XPSTAPE) RSTLIB(instlib)
```

Access privileges ThinPrint Server Engine/400

The THINP400 driver uses published APIs to access the spool files. For this reason, the program must be given sufficient privileges to do so.

The level of privilege required can be taken from the “System API Reference Handbook”. Look for the QSPOPNSP API.

To be sure the driver program is authorized to process all spool files, the program has been set to use the user profile of the program user “USRPRF(*OWNER)”. The user should have sufficient authorizations, e.g. QSYS.

Creating a virtual printer

You should create a printer description for each .print printer. Use this description to setup the IP address and port number where the .print client is installed. This is also where you define print characteristics like font or page format. There is no limit to how many printer descriptions can be allocated per THINP400 driver.

Allocate printer descriptions using the **CRTDEVPRT** command. The following parameters are required:

Parameter	Value	Description
Device Class (DEVCLS)	*LAN	Defines the device class for this printer.
Device Type (TYPE)	3812	Defines the type of printer this is.
Device Model (MODEL)	1	Defines the model type of the printer.
LAN Attachment (LANATTACH)	*USRDFN	Specifies the type of connection for the printer.
Port number (PORT)	4000	Port number of the .print client.
Font (FONT)	11	Specifies the default font. Specifying Font (11) defines the standard value of courier 10cpi.
Form Feed (FORMFEED)	*AUTOCUT	Defines the type of paper feed. *AUTOCUT means the printer will be fed with single sheets.
Print Error Message (PRTERMSG)	*INFO	Defines the message level for the printer. *INFO specifies that informational level messages and upwards will be displayed.
Host Print Transform	*YES	Specifies whether the printer should use host-based data stream conversion. When *YES OS/400 uses the Host Print Transform (HPT) function to convert SCS and AFPDS spool files to the correct printer data stream.
Manufacturer Type and Model (MFRTYPMDL)	*HP4	Specifies the exact type of printer. This value is used by HPT to ensure the correct data stream conversion from SCS or AFPDS.
Paper Source 1 (PPRSRC1)	*A4	Specifies the type of paper in drawer 1. Valid paper types are shown in the following table.
Paper Source 2 (PPRSRC2)	*A4	Specifies the type of paper in drawer 2. Valid paper types are shown in the following table.

Remote Location (RMTLOCNAME)	IP-Address	Specify the remote IP address of the .print client here.
User-defined Driver program	mylib/THINP400	Define ThinPrint Server Engine/400 as the driver for this printer.
Text description (TEXT)	'ThinPrint '	Free form text to describe the printer.

Valid paper types for parameters PPRSRC1 and PPRSRC2:

*LETTER	Letter (8.5 x 11 inch)
*LEGAL	Legal (8.5 x 14 inch)
*LEDGER	Ledger (11 x 17 inch)
*EXECUTIVE	Executive (7.25 x 10.5 inch)
*A3	A3 (297 x 420 mm)
*A4	A4 (210 x 297 mm)
*A5	A5 (148 x 210 mm)
*B4	B4 (257 x 364 mm)
*B5	B5 (182 x 257 mm)
*CONT80	Continuous (8.0 inches)
*CONT132	Continuous (13.2 inches)
*NONE	No paper source specified

The following example shows a **CRTDEVPRT** command to create a ThinPrint .print device description:

```

Create Device Desc (Printer) (CRTDEVPRT)

Type choices, press Enter.

Device description . . . . . > TPRINT           Name
Device class . . . . . > *LAN                 *LCL, *RMT, *VRT, *SNPT, *LAN
Device type . . . . . > 3812                 3287, 3812, 4019, 4201...
Device model . . . . . > 1                   0, 1, 2, 3, 4, 10, 13, 301...
LAN attachment . . . . . > *USRDFN          *LEXLINK, *IP, *USRDFN
Switched line list . . . . . >              Name
+ for more values
LAN remote adapter address . . . >          000000000001-FFFFFFFFFFFFE
Adapter type . . . . . > *INTERNAL          *INTERNAL, *EXTERNAL
Port number . . . . . > 4000                0-65535
Online at IPL . . . . . > *YES              *YES, *NO
Font:
Identifier . . . . . > 11                   3, 5, 11, 12, 13, 18, 19...
Point size . . . . . > *NONE                000.1-999.9, *NONE
Form feed . . . . . > *CONT                 *TYPE, *CONT, *CONT2, *CUT...
Separator drawer . . . . . > *FILE          1-255, *FILE
Separator program . . . . . > *NONE         Name, *NONE
Library . . . . . >                        Name, *LIBL, *CURLIB
Printer error message . . . . . > *INFO     *INQ, *INFO
Message queue . . . . . > *CTLD            Name, *CTLD, *SYSOPR, QSYSOPR
Library . . . . . >                        Name, *LIBL, *CURLIB
Activation timer . . . . . > 170            1-2550, *NOMAX
Inactivity timer . . . . . > *SEC15        1-30, *ATTACH, *NOMAX...
Host print transform . . . . . > *YES       *NO, *YES
Manufacturer type and model . . . > *HP4
Paper source 1 . . . . . > *A4             *MFRTYPMDL, *LETTER...
Paper source 2 . . . . . > *A4             *MFRTYPMDL, *LETTER...
Envelope source . . . . . > *MFRTYPMDL    *MFRTYPMDL, *MONARCH...
ASCII code page 899 support . . . > *NO    *NO, *YES
Image configuration . . . . . > *NONE      *NONE, *IMGA01, *IMGA02...
Character identifier:
Graphic character set . . . . . > *SYSVAL   1-32767, *SYSVAL
Code page . . . . . >                    1-32767
Remote location:
Name or address . . . . . > '192.168.0.104'
User-defined options . . . . . > *NONE     Character value, *NONE
+ for more values
User-defined object:
Object . . . . . > *NONE                   Name, *NONE
Library . . . . . >                        Name, *LIBL, *CURLIB
Object type . . . . . >                    *DTAARA, *DTAQ, *FILE...
Data transform program . . . . . > *NONE   Name, *NONE
Library . . . . . >                        Name, *LIBL, *CURLIB
User-defined driver program . . . > THINP400 Name, *NONE
Library . . . . . > XPSLIB                 Name, *LIBL, *CURLIB
Secure connection . . . . . > *NO         *NO, *YES
Validation list . . . . . > *NONE         Name, *NONE
Library . . . . . >                        Name, *LIBL, *CURLIB
Publishing information:
Support duplex . . . . . > *UNKNOWN        *UNKNOWN, *SIMPLEX, *DUPLEX
Support color . . . . . > *UNKNOWN        *UNKNOWN, *NOCOLOR, *COLOR
Pages per minute black . . . . . > *UNKNOWN 1-32767, *UNKNOWN
Pages per minute color . . . . . > *UNKNOWN 1-32767, *UNKNOWN
Location . . . . . > *BLANK
Data streams supported . . . . . > *UNKNOWN *UNKNOWN, *PCL, *PS, *PDF...
+ for more values
Text 'description' . . . . . > 'ThinPrint Server Engine/400'
    
```

The resulting **CRTDEVPRT** command would look like this:

```
CRTDEVPRT DEVD(TPRINT) DEVCLS(*LAN) TYPE(3812) MODEL(1) LANATTACH(*USRDFN)
PORT(4000) FONT(11) FORMFEED(*CONT) PRTERMSG(*INFO) INACTTMR(*SEC15)
PARITY(*NONE) STOPBITS(1) TRANSFORM(*YES) MFRTYPMDL(*HP4) PPRSRC1(*A4)
PPRSRC2(*A4) ENVELOPE(*MFRTYPMDL) RMTLOCNAME('192.168.0.104')
USRDRVPGM(XPSLIB/THINP400) TEXT('ThinPrint Server Engine/400')
```

Setting the print output characteristics

The THINP400 printer driver can also process SCS and AFP spool files. The following example commands show how the characteristics and page orientation of the printer output can be customized. A complete description of the setting of a printer file can be found in the book “Printer Driver Programming” (SC41-5713-05), chapter 2 “Printer file support”.

Setting	Command
Portrait	CHGPRTF FILE(qprint) PAGRTT(0)
Landscape	CHGPRTF FILE(qprint) PAGRTT(90)
Duplex	CHGPRTF FILE(qprint) DUPLEX(*YES)
Font size	CHGPRTF FILE(qprint) LPI(6) CPI(12)

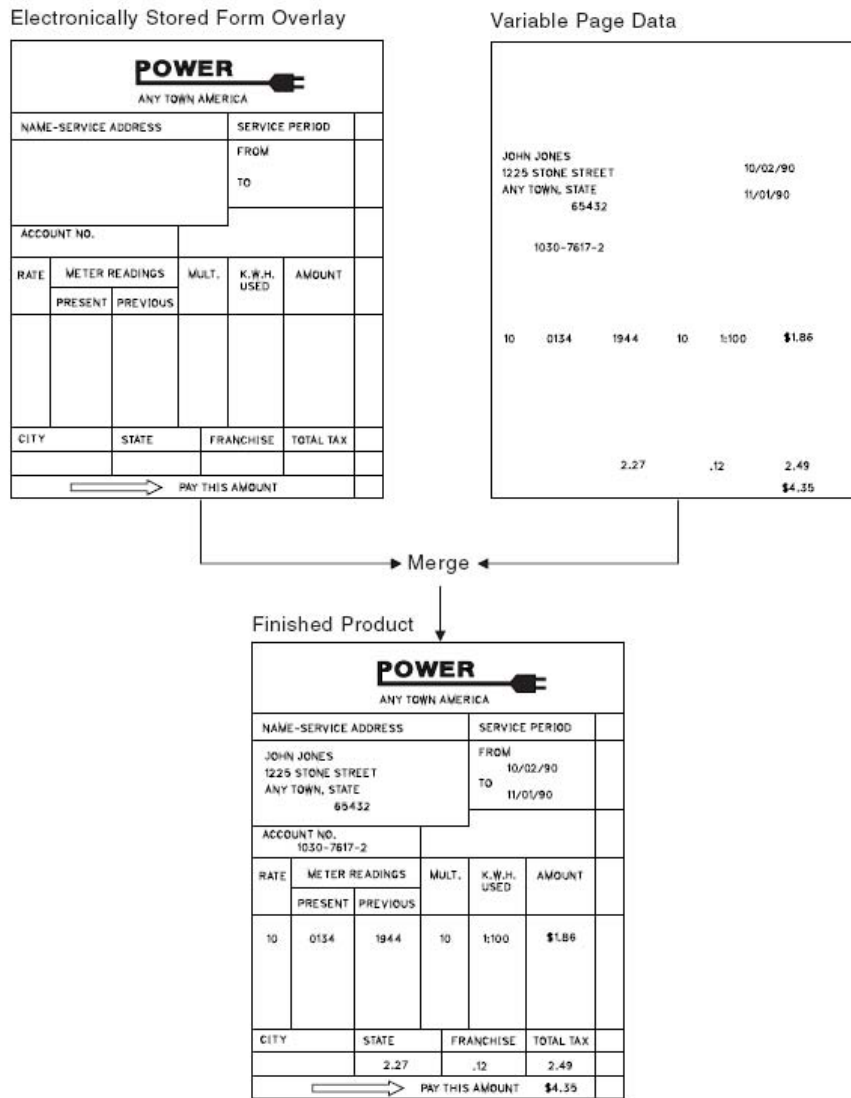
Additionally, printer overlays can be defined for printer files. This way Jpeg and Tiff form definitions can be printed on a page at the same time as the variable print output. For this purpose, the IBM AFP-printer driver should be installed on a PC. The driver is freely available from the following URL:

<ftp://ftp.software.ibm.com/as400/products/clientaccess/win32/afpprinter/win2000xp>

This is what you need to do to create an overlay:

Create the forms overlay (i.e. scan it, or create it with Visio, PowerPoint, Paintshop etc.).
Print the form via the IBM AFP printer driver you downloaded from IBM. Be sure to set the printer properties (advanced) to “overlay”. The output will then be saved as a PC file.
Create an empty overlay file on the AS/400 with the following command: CRTPF FILE(mylib/overlay) RCDLEN(32766) MBR(*NONE) MAXMBRS(*NOMAX) LVLCHK(*NO)
Upload the PC AFP file to the AS/400 overlay file.
Create the overly on the AS/400 with the following command: CRTOVL OVL(mylib/muster) FILE(mylib/overlay) MBR(overlay)
Assign the device type AFP to the print file with the following command: chgprt file(qprint) DEVTYPE(*AFPDS)
Assign the overlay to the print file with the following command: chgprt file(qprint) frontovl(mylib/muster)

The following diagram shows how the printer output gets combined when using overlays:



Creating a configuration file

For each virtual printer defined with **CRTDEVPRT** a configuration file with the same name needs to be created. These configurations files must be located in the same library as the printer driver. The following example configuration file can be found on the installation medium and is named **TPRINT**.

```
<CONFIG>
License=/xps/test/xpslic.lic
ClientPrinter=HP LaserJet 4050 Series PCL6
SSL=No
ServerCert=/xps/test/xps.p12
CertPW=testPW
Trace=No
SSLTrace=No
```

Parameter	Description
License=	Specifies the location of the ThinPrint ServerEngine/400 license file. This file has to be transferred in binary mode to the AS/400 IFS file system.
ClientPrinter=	This parameter can be used to select a specific printer from the pool of printers associated with the ThinPrint Client.
SSL=	Choosing SSL=Yes results in a SSL/TLS encrypted printer session. If selected the following parameters for ServerCert and CertPW must be specified, too. Requiring SSL/TLS encryption makes the use of at least version 6.2 of the ThinPrint Client Software a prerequisite.
ServerCert=	Specifies the location of the server certificate. This file has to be transferred in binary mode to the AS/400 IFS file system. How to create a server certificate can be learned from the ThinPrint Support Paper "Creating SSL/TLS certificates for printing with ThinPrint .print".
CertPW=	This parameter is used to specify the password for the server certificate. Caution: certificate passwords are case sensitive!
Trace=	For the purpose of analysis a program flow trace will be written if Trace=Yes is specified.
SSLTrace=	For the purpose of analysis of a SSL connection a flow trace will be written if SSLTrace=Yes is specified.

Starting and Stopping

Starting ThinPrint Server Engine/400

A virtual printer is started using the following command:

```
STRPRTWTR DEV (TPRINT)
```

This command assigns an output queue to a printer. Executing this command passes spool files in the output queue to the printer.

Stopping ThinPrint Server Engine/400

Stop a virtual printer using the following command:

```
ENDWTR WTR (TPRINT) OPTION (*IMMED)
```

The spool output program will be stopped and the assigned device freed for system use.

Statistics

At time of installation, a file called “statistic” was created in the installation library. This file is used to register the print jobs, compression ratios and compression savings.

The following shows example contents of this file:

```

ThinPrint compression statistics
-----
Total:  KB before: 17814          KB after: 2216          Ratio: 87.56%
-----
Printer  Spoolfile  Jobname  User      JobNr      Bytes before/after compress  Ratio
TPRINT   THINP400  QPADEV0002  GEORG    031811     1536512      181939     88.16%
TPRINT   QPJOBLOG  SCPF       QSYS     031688     85996        4455       94.82%
TPRINT   QPJOBLOG  QZRCSRVS   QUSER    031675     56281        3248       94.23%
TPRINT   QPJOBLOG  QSYSARB   QSYS     031520     26912        2302       91.45%
TPRINT   QPJOBLOG  QPWFSERVSD  QUSER    031607     29179        2317       92.06%
TPRINT   QPJOBLOG  QPWFSERVSD  QUSER    031607     29179        2333       92.00%
TPRINT   QPSRVDMP  TPRINT    QSPLJOB  031816     141691      27154      80.84%

```

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