

ThinPrint Host Integration Service 8.6

Optimized printing from host systems to Remote Desktop or Citrix environments

– specified for Citrix XenApp and ICA printing –

For ThinPrint Application Server Engine 8.0 and 8.6

Manual

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Introduction

How does the Host Integration Service work?

The ThinPrint Host Integration Service is a software solution that enables print support for application servers such as SAP, AS/400, or Unix systems – hereafter referred to as host systems. The Host Integration Service is installed on an application server (here, on a Citrix XenApp server).

The Host Integration Service receives print jobs as a Line Printer Daemon (LPD) and forwards them to the XenApp session from which the print job was initiated. In turn, the ThinPrint Engine compresses the print jobs and then forwards them via ICA protocol across limited bandwidth to the ThinPrint Client.

Once at the client side, the ThinPrint Client decompresses the files to be printed. If necessary, an application is started using parameters (e.g., Adobe Reader) to convert the received data to a print file. Lastly, the ThinPrint Client sends the data to its *current printer*.

Tip! The Host Integration Service will only work if run together with the Application Server Engine. For information about system requirements, installation, and configuration of the Application Server Engine, please consult the respective user manual ([Page 24](#)).

Constellations

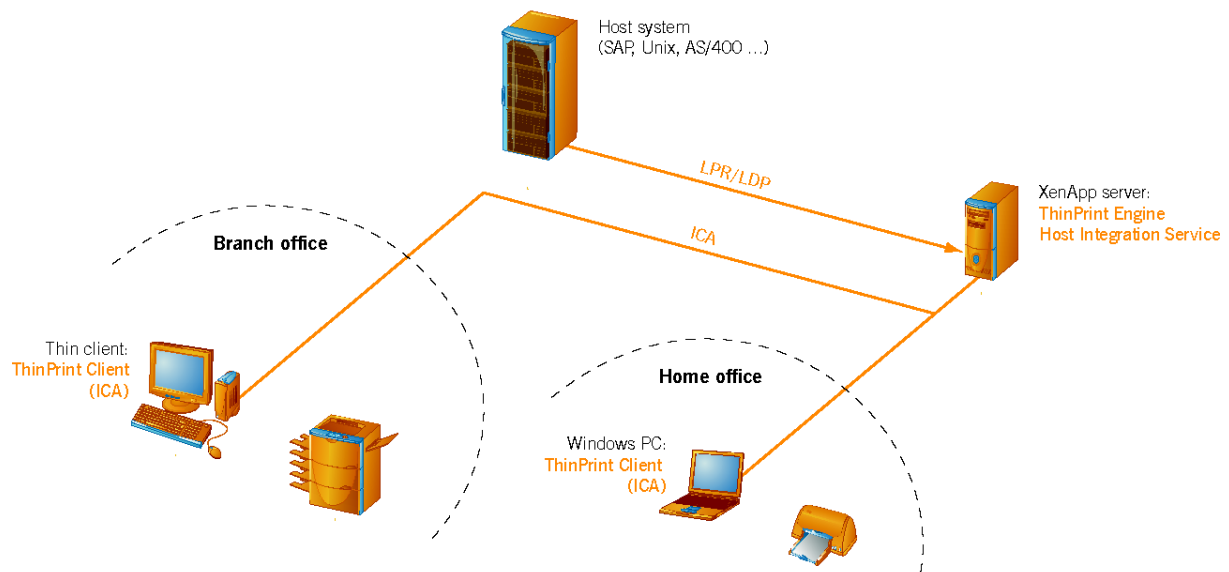
A typical environment for the Host Integration Services could be as follows: The users in an SAP system use Windows PCs. They connect to a XenApp server with ICA clients installed on the PCs. The Citrix server is connected to the SAP system and provides the users with the *SAP GUI for Windows*. Protocol for the Citrix sessions is ICA, which is also to be used as print protocol (Illus. 1 and 2).

There are two possible constellations:

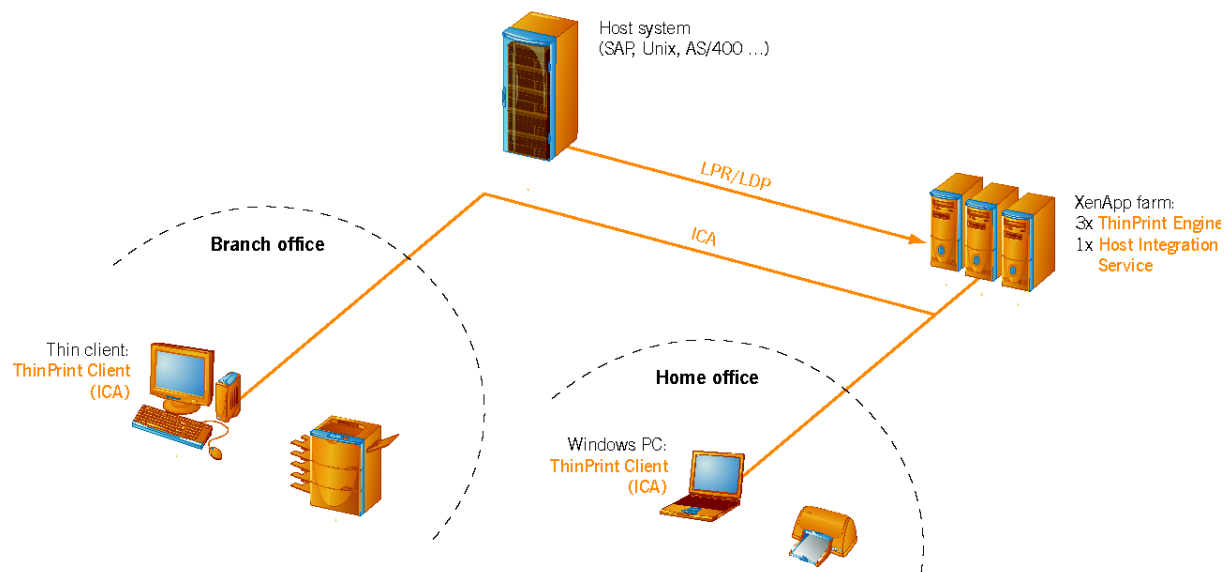
1. A standalone XenApp server on which the Host Integration Service is installed (Illus. 1).
2. A XenApp farm in which the Host Integration Service is installed on one of the servers (Illus. 2).

In each of these cases, the Host Integration Service (LPD) receives print jobs from the host system (LPR). The print job contains information about the user who initiated it. In case 2 the Host Integration Service must first use this information to identify the server on which the user's session is running. It then sends the print job to that XenApp server (protocol: TCP/IP¹); from there, ThinPrint Engine compresses the print data and forwards it via ICA protocol over controlled bandwidth to the user.

¹ strictly speaking: SMB (Server Message Blocks)



Illus. 1 Constellation 1: Host Integration Service on a standalone XenApp server

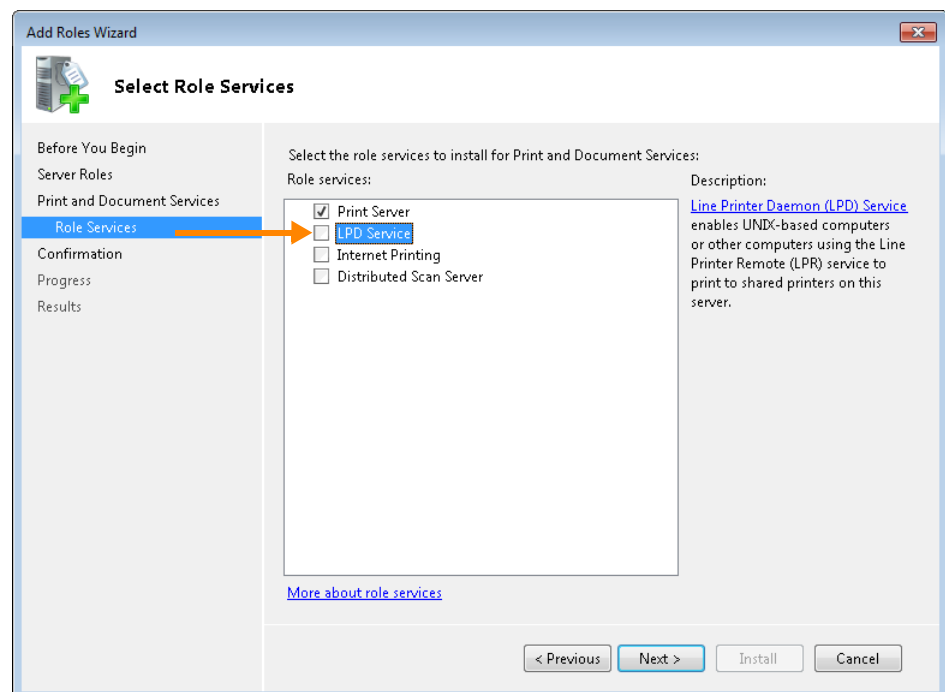


Illus. 2 Constellation 2: Host Integration Service on a member of a XenApp farm

System requirements

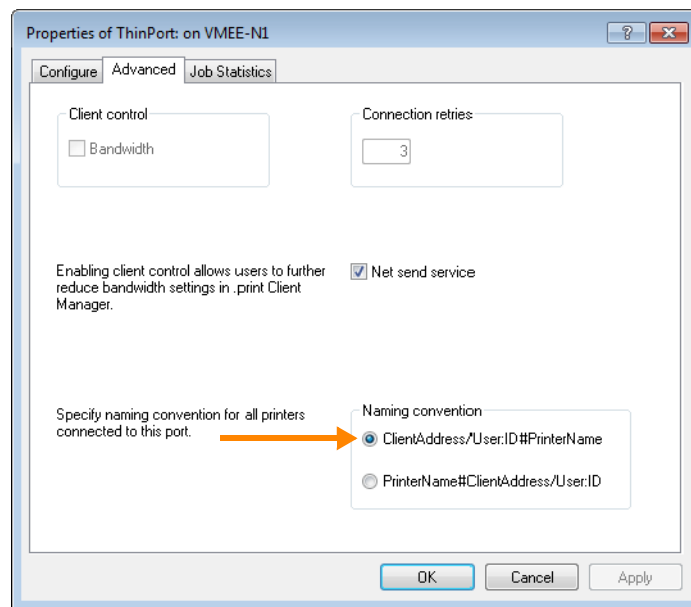
- The host environment is installed and configured; i.e., the host system incl. LPR, the XenApp server as well as the ICA clients.
- The host system sends the user names with the print jobs; either they are added to the *control file*, or to the print job's banner page, or to the print job name, or to the printer queue name by the host system's LPR ([Page 17](#) and RFC 1179).
- A Host Integration Service is required per domain (Active Directory).
- The LPD SERVICE must be **disabled** on the server running Host Integration Service (LPD is a Role Service of the PRINT AND DOCUMENT SERVICES, Illus. 3).

- The XenApp servers running Windows Server 2008 R2 SP1 (or later) and XenApp 6.0 or 6.5.
- A ThinPrint Engine (version 8.0 or 8.6) must be installed on all XenApp servers; see also the “Application Server Engine” user manual ([Page 24](#)).
Use of the Host Integration Service requires that a special printer is connected to a **VIRTUAL CHANNEL PROTOCOL (ICA OR RDP)** ThinPrint port.² This printer uses a native printer driver ([Page 12](#)).
The name convention for the ThinPrint port must be: **client_address:printer_ID#printer_name** (Illus. 4). And the printer name may not include either a colon (:) or a hash mark (#) – here, Lexmark Optra.
- All of the XenApp servers must be configured identically (and must be members of the same farm and the same domain).
- All necessary printers and a **ThinPrint Client** (type: **ICA**) are installed on the respective PCs and/or thin clients; see also the manuals for ThinPrint Client Windows and ThinPrint Client WinCE and the supported devices list ([Page 24](#)).



Illus. 3 Print and Document Services Role: Don't enable LPD Service

² Recommendation: For enhancing print performance use ThinPrint port pooling.



Illus. 4 Selecting the ThinPrint Port naming convention

Licensing

The Host Integration Service is only necessary on one of the XenApp servers. There, a license key³ with the following format must be installed (Illus. 5):

TPHS-0593-1-XXXXXX-XXXX

If the XenApp servers belong to different farms or domains, a Host Integration Service is required for each farm or domain.

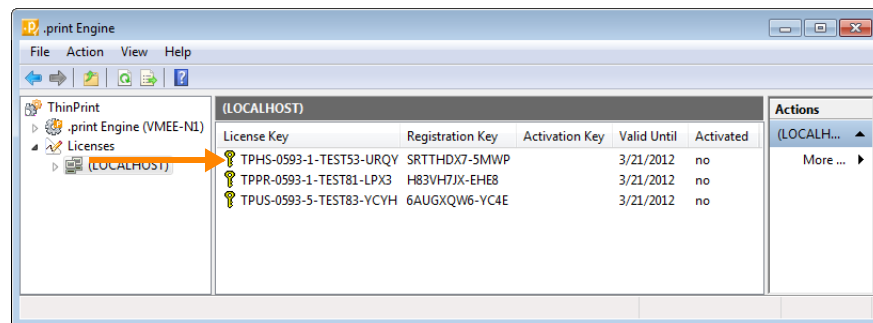
For entering the license key using the License Manager see the Application Server Engine manuals ([Page 24](#)). Furthermore, each XenApp server served by the Host Integration Service must have an "Application Server Engine" license with one of the following formats:

THPR-0538-1 or THPR-0593-1 (x86) or
 TAPR-0538-1 or TAPR-0593-1 (x64) or
 TPPR-0538-1 + TPUS-0538 or TPPR-0593-1 + TPUS-0593 (x86/x64)

³ A 30-day valid license key is provided with the software.

License overview

Host Integration Service installed on ...	License key type
<ul style="list-style-type: none"> • ... a standalone XenApp server 	THPR/TAPR/TPPR and TPHS
<ul style="list-style-type: none"> • ... a XenApp server in a farm 	THPR/TAPR/TPPR on each farm server as well as TPHS on one of the farm servers



Illus. 5 License Manager: License key for the Host Integration Service

Installation

Installing Host Integration Service (on one XenApp server only)

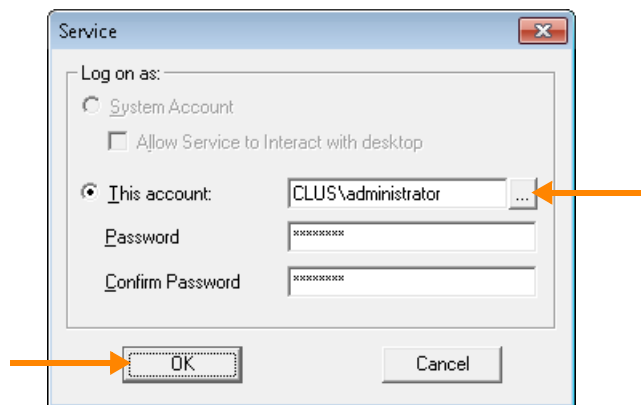
1. Copy the Host Integration Service file **TPLPDSrv.exe** in an own program directory; e. g.:

C:\Program Files\ThinPrint Host Integration Service

2. Open the Command Prompt and change to this directory.
3. Register TPLPDSrv.exe as a Windows service with:

```
TPLPDSrv -install
```

4. Log on with the administrator account – preferably a domain administrator –; enter the password twice and confirm with OK (Illus. 6).

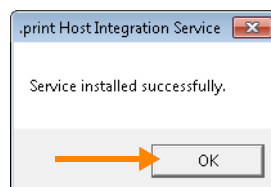


Illus. 6 Selecting an Administrator account as the service account

Note! The user account under which the Host Integration Service was installed must have local administrator permissions on all XenApp servers. Furthermore, it may need to be set up as Citrix administrator in the Citrix Management Console (read permission is sufficient).

5. Acknowledge the following message with OK.

You will receive the message that the .print Host Integration Service has been registered (Illus. 7). The service should only be started once its configuration has been completed; see “Accepting changes”, [Page 17](#).



Illus. 7 Host Integration Service registered as a Windows service

Preparing the host systems

Example for AIX

– In the `/etc/qconfig` file, add a printer that prints to the Host Integration Service:

```
lphis:
    device = @hisServer
    up = TRUE
    host = xenapp01
    s_statfilter = /usr/lib/lpd/bsdshort
    l_statfilter = /usr/lib/lpd/bsdlong
    rq = optra
@xenapp01:
    backend = /usr/lib/lpd/rembak
```

With **host**, you are specifying the Host Integration Service address. It must be possible to resolve the name of the computer on which the Host Integration Service is installed – here, **xenapp01**. Check the entries in `/etc/hosts`.

For the local printer (lphis) and the remote printer's queue name (rq) you can specify any name.

Example for Linux

- In the `/etc/printcap` file, add a printer that prints to the Host Integration Service:

```
lphis:\
    :lp=\
    :rm=192.168.201.139:\
    :rp=optra:\
    :sd=/var/spool/lpd/remote:\
    :mx#0:\
    :sh:
```

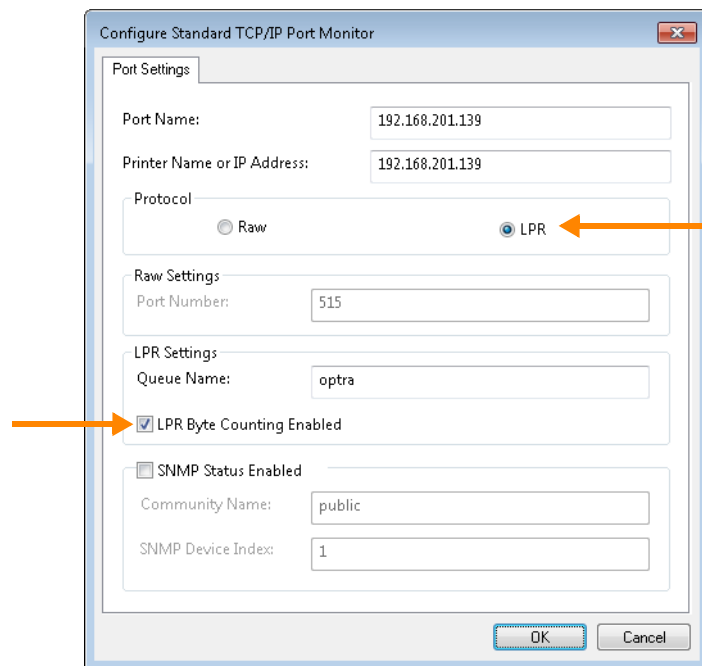
With **:rm** (remote machine), you are specifying the Host Integration Service address.

For the local printer (lphis) and the remote printer's queue name (:rp) you can specify any name.

Example for Windows

- Add a printer that prints to the Host Integration Service; connect it to an LPR or Standard TCP/IP port (Illus. 8).
With **PRINTER NAME OR IP ADDRESS**, you are specifying the Host Integration Service address. Enable **LPR BYTE COUNTING** for Standard TCP/IP ports.

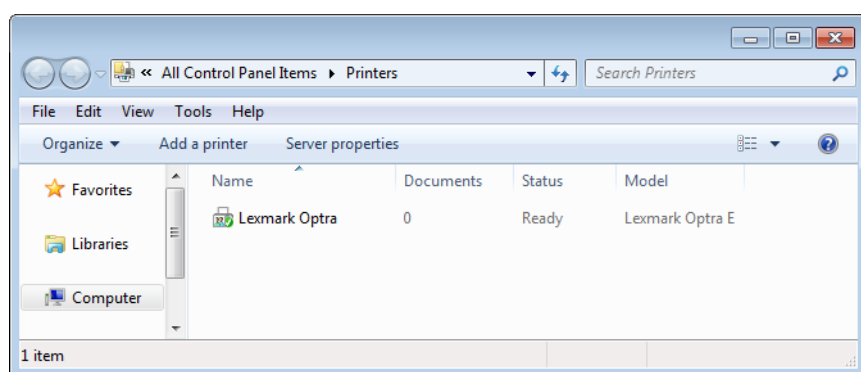
For the local printer and the remote printer's **QUEUE NAME** you can specify any name (exception: using the queue name for user name transmission; for this see [JOBINFO, Page 23](#)).



Illus. 8 Standard TCP/IP port: enter Host Integration Service's IP address, select LPR, and enable LPR BYTE COUNTING

Preparing the XenApp servers

- Install any printer – e.g. **Lexmark Optra** – (Illus. 9) and connect it to a ThinPrint port; port type: VIRTUAL CHANNEL PROTOCOL (ICA OR RDP).
- Share the printer (the Host Integration Service can use both the printer name and the share name).



Illus. 9 Printer created, shared and connected to a ThinPrint Port (here: Lexmark Optra)

Note! The printer should have the permissions of the user in whose context the Host Integration Service is running (Illus. 6). If users are not to see the printer, only assign this account and the accounts SYSTEM and Administrator with FULL CONTROL (= PRINT, MANAGE PRINTERS AND DOCUMENTS) to this printer.

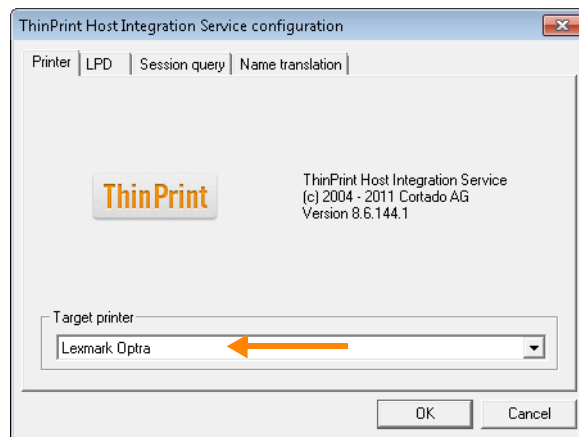
Configuring Host Integration Service

On the XenApp server with Host Integration Service

TARGET PRINTER – Start the Host Integration Service configuration in its installation directory from the command prompt:

```
TPLPDSrv -setup
```

– Select⁴ or type⁵ the printer **Lexmark Optra** as TARGET PRINTER (Illus. 10) which the Host Integration Service uses for forwarding print jobs to the ThinPrint Engine.



Illus. 10 Host Integration Service configuration panel: PRINTER (example)

Selecting LPRs

CHANGE The LPD tab card offers LPR and LPD settings. The most important setting is the specification of the host systems that are allowed to send print jobs via LPR to the Host Integration Service (Illus. 11). The default setting of 0.0.0.0 means that no host has been specified yet; you can *CHANGE* this entry.

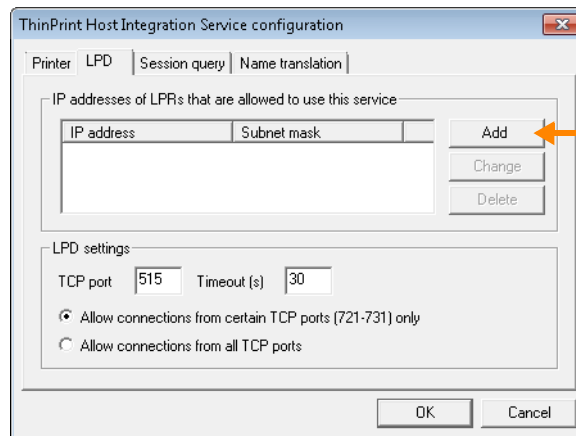
ADD New entries are added with *ADD*. Clicking this button opens the window shown in Illus. 12. Enter the IP address and subnet mask of, for example, the SAP server:

```
192.168.130.20
255.255.252.0
```

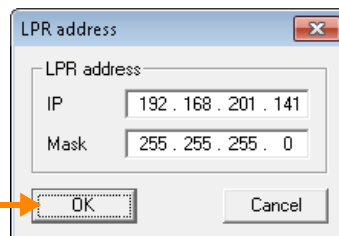
The result is shown in Illus. 13.

⁴ In case of version “Standalone Remote Desktop Host or XenApp Server (local)” (Illus. 14)

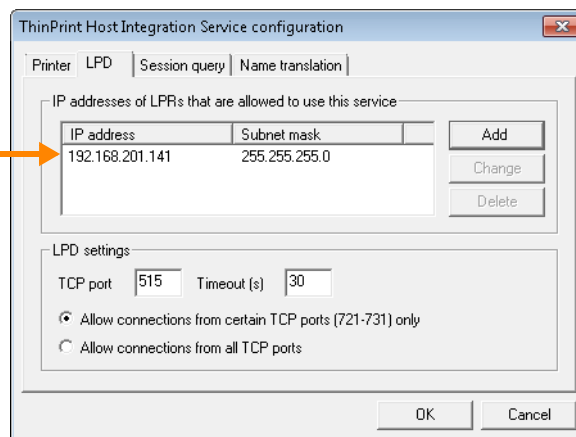
⁵ In case of version “XenApp farm (XenApp 6 or higher)” (Illus. 15)



Illus. 11 Adding a host system



Illus. 12 Specifying a host that is allowed to send print jobs to the Host Integration Service



Illus. 13 One host system added

DELETE Click DELETE to remove individual entries from the list.

LPD and LPR configuration

TCP PORT – Enter the TCP port where the Host Integration Service should “listen” for incoming data. Default: 515 (Illus. 13).

TIMEOUT – Enter the amount of time the Host Integration Service is to wait for a response from the host system before canceling the transmission. Default value: 30 s.

ALLOW CONNECTIONS FROM CERTAIN TCP PORTS ONLY – Specify whether print jobs are only to be sent from LPRs with TCP port numbers from 721 to 731 or are to be sent from TCP ports with any port number.

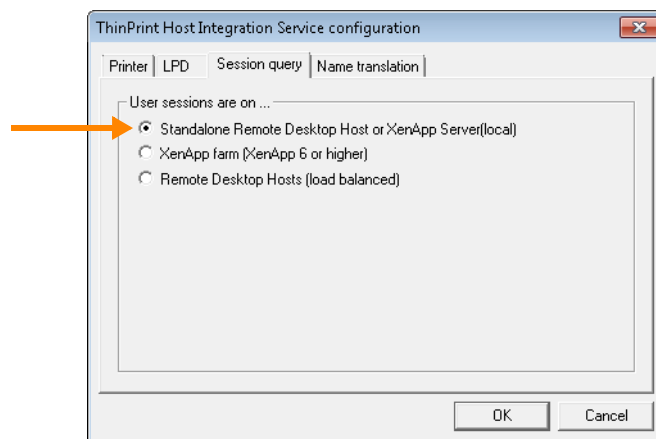
Specifying a server for session query

The Host Integration Service must detect the server on which the relevant user's session is running. There are two possible constellations here (see [Page 5](#)).

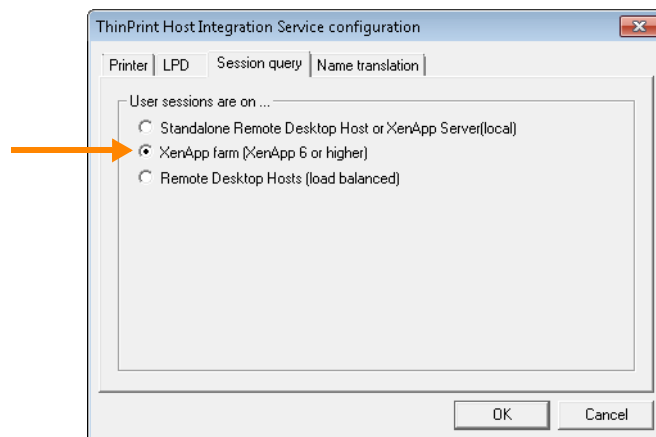
On the SESSION QUERY tab (Illus. 14), you can configure according to the constellation:

Host Integration Service installed on ...	Configuration
1 ... a standalone XenApp server	<ul style="list-style-type: none"> • Select STANDALONE REMOTE DESKTOP HOST OR XENAPP SERVER (LOCAL), Illus. 14
2 a Citrix farm server	<ul style="list-style-type: none"> • Select XENAPP FARM (XENAPP 6 OR HIGHER), Illus. 15^a

a Click ADD, enter the IP address, and click OK.



Illus. 14 Session queried on local standalone XenApp server



Illus. 15 Specifying a local XenApp farm server for session query

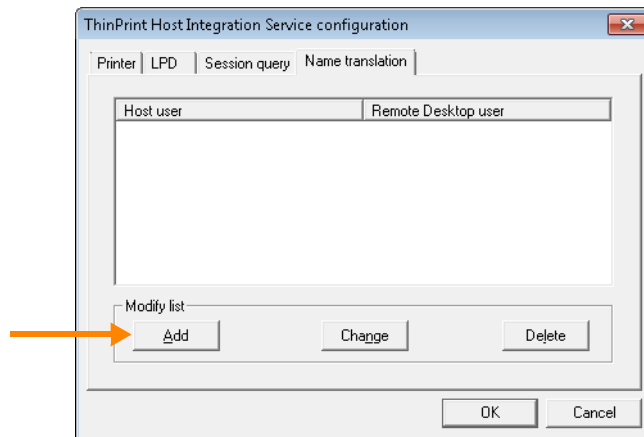
The option REMOTE DESKTOP HOSTS (LOAD BALANCED) isn't supported with Host Integration Service version 8.6.

Name translation

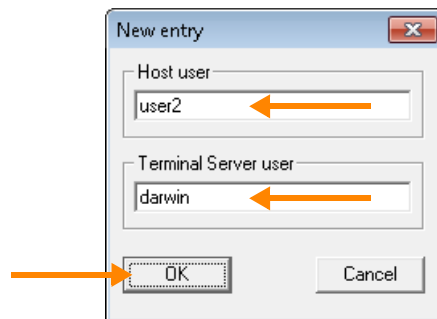
If different user names are to be used on the one hand for the host system and on the other hand for the XenApp farm, these can be associated with each other on the NAME TRANSLATIONS tab (Illus. 16).

Example: XenApp server user Darwin uses the user account “user2” in the SAP GUI for Windows; the Host Integration Service forwards print jobs from “user2” to Darwin’s user station (see also [Page 17](#)).

Table entries can be edited with the ADD, CHANGE, and DELETE functions. Clicking ADD or CHANGE opens a window in which assignments can be edited (Illus. 17).



Illus. 16 Associating host's user names to XenApp farm's or domain user names



Illus. 17 Name translation: new entry

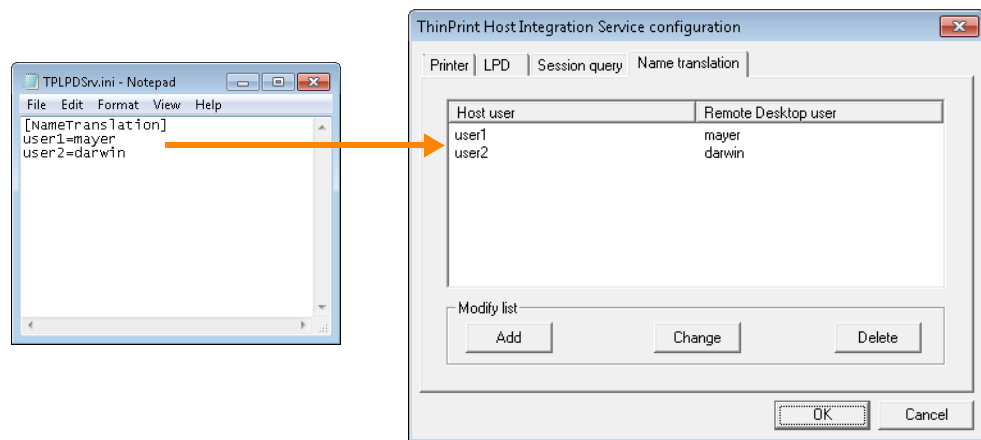
Importing user names for name translation

If you need to add several entries to the name translation table, you can simply edit the TPLPDSrv.ini file. This, the Host Integration Service creates automatically with a (re)start. It’s found in the same folder as TPLPDSrv.exe (= program directory; [Page 9](#)). Copy all name translations into TPLPDSrv.ini. Each translation requires on line. Host user names and terminal server user names are separated by an equal sign (=) (Illus. 18).

Or:

1. Create a text file from a database.
2. Paste the header **[NameTranslation]** into the first line.
3. Separate user names with an equal sign (=).
4. Name the file TPLPDSrv.ini.
5. Use this file to overwrite the TPLPDSrv.ini in your program directory ([Page 9](#)).

The new TPLPDSrv.ini file is thereafter immediately available. In this case, it is unnecessary to restart the **.print Host Integration Service** Windows service.



Illus. 18 Name assignment in the TPLPDSrv.ini file

Finishing configuration

- OK
- Lastly, save your settings with OK (Illus. 16).
 - Start **.print Host Integration Service** from the Windows SERVICES folder.

Accepting changes

Later changes made with the Host Integration Service configuration first take effect after restarting the Windows service.

1. Open the Windows SERVICES folder.
2. Restart the service **.print Host Integration Service**.

Detecting user names from the host system

Example of a RFC 1179 control file

A control file as per RFC 1179 is usually created by print systems under Unix. For the Host Integration Service, it does not matter whether the control file is sent from the LPR (host print system) to the LPD (Host Integration Service) before or after the print data. The control file could contain the following information:

```

HSAP_SERVER
Puser2
JMicrosoft PowerPoint - Multibit500.ppt [Read-Only]
ldfA123SAP_SERVER
UdfA123SAP_SERVER
NMicrosoft PowerPoint - Multibit500.ppt
  
```

An orange arrow points from the text "Host user 'user2'" to the "Puser2" line in the control file example.

Legend:

- H** = Host name (= LPR)
- P** = User name on the host system (see also [Page 16](#))
- J** = Document name
- I** = Data file for which no filter is to be used
- U** = Data file name
- N** = Document name

Alternative user name transmission

As an alternative to the *control file*, the user name from the host system can also be embedded as follows:

- In the print job's banner page
- In the print job name
- In the printer queue name

You can set the syntax for the embedding yourself. Simply make sure that the Host Integration Service can retrieve the user name from the received data. To do so, you have to define the following registry keys for the Host Integration Service by hand:

```
hkey_local_machine\software\thinprint\tplpd\jobinfo [reg_dword]
hkey_local_machine\software\thinprint\tplpd\formatstringre [reg_sz]
```

As the content of JOBINFO, enter the source of the user name (control file, banner page, print job name or queue name; see JOBINFO on [Page 23](#)).

As the content of FORMATSTRINGRE, enter a character string in form of a Regular Expression⁶. This specifies where the user name is found in the received data ([Page 23](#)).

Examples for user names embedded in print job names:

Print job name	FormatStringRE	Meaning
<i>user2.text.ps</i> = print file <i>text.ps</i> from <i>user2</i>	<code>([^ .]*).*</code>	All characters up to the first period (.) belong to the sought user name. The rest is ignored. (default value)
<i>1234user2.text.ps</i> = print file <i>text.ps</i> with job ID <i>1234</i> from user <i>2</i>	<code>[0-9]*([^ .]*).*</code>	All digits at the start belong to a job ID. The following characters give the sought user name – up to the first period (.). The rest is ignored.
<i>text.ps:user2</i> = print file <i>text.ps</i> from <i>user2</i>	<code>.*(.*)</code>	All characters up to the first colon (:) are ignored. The following characters give the sought user name.

⁶ see *Regular expression* in [Wikipedia](#)

Printing

The print process

Printing with the Host Integration Service could proceed as follows: From within a SAP session, a user initiates a print job (Illus. 2, [Page 6](#)). The host system (here: an SAP server) sends the file to be printed via LPR/LPD to the server where the Host Integration Service is installed.

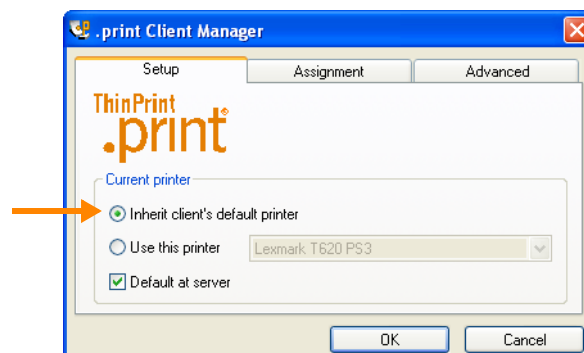
The Host Integration Service detects the XenApp server to which the user is logged on, then forwards the print job to the ThinPrint Engine installed on that server. The ThinPrint Engine sends the print job via ICA protocol compressed and across controlled bandwidth to the user who initiated the print job within his SAP session.

The ThinPrint Client decompresses and decrypts the print job and forwards it to its CURRENT PRINTER (Illus. 19).

Changing printers

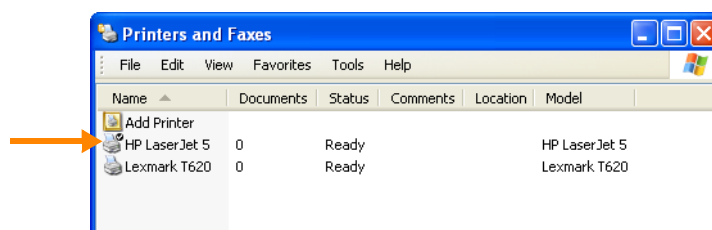
Alternative 1 (Windows PCs only)

Requirement: the CURRENT PRINTER in the ThinPrint Client must be the same as the PC's Windows default printer (Illus. 19).



Illus. 19 Current printer = Windows default printer "Lexmark T620 PS3" (example)

- The users disconnect the current XenApp session (it is not necessary to log off).
- They select a different Windows default printer in the PRINTERS folder on the client computer (Illus. 20).
- They reconnect the XenApp session.



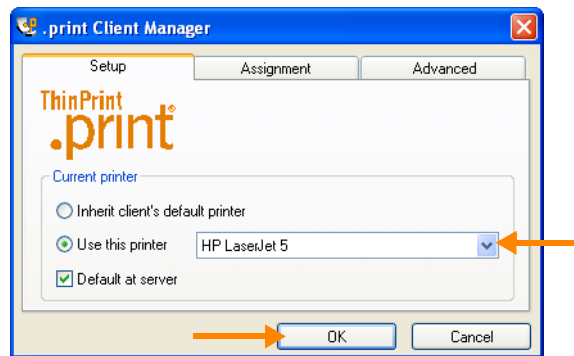
Illus. 20 Changing Windows default printer; new default printer: "HP LaserJet 5" (example)



Illus. 21 ThinPrint Client in the task bar

Alternative 2 (Windows PCs only)

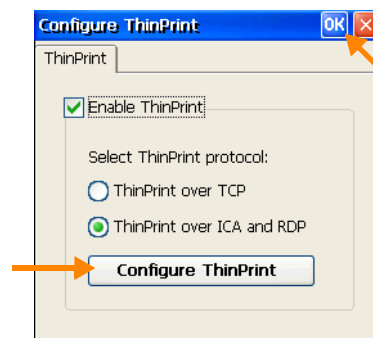
- The users open the ThinPrint Client Manager during a XenApp session by clicking its icon in the local machine's task bar (Illus. 21).
- They change the CURRENT PRINTER and select OK (Illus. 22).
- They disconnect the current XenApp session and reconnect it.



Illus. 22 Changing current printer to "HP LaserJet 5" (example)

Alternative 3 (thin clients only)

- The users disconnect the current XenApp session (it is not necessary to log off).
- They open the control panel on the thin client and select THINPRINT.
- They open the ThinPrint Client configuration menu (CONFIGURE THINPRINT; Illus. 23).



Illus. 23 Opening ThinPrint Client WinCE configuration menu (example for Neoware terminals)

- They change the CURRENT PRINTER; and select OK (Illus. 24).
- They reconnect to the XenApp session.



Illus. 24 Changing Current printer of ThinPrint Client WinCE

If you still can't print • Checklist

If printing does not work properly, please check the following before contacting ThinPrint support ([Page 22](#)).

- Is the same protocol selected for the ThinPrint Client and the ThinPrint port?
 - Is the ICA version of the ThinPrint Client installed on the client machine? ([Page 24](#))
 - To which ThinPrint port is the printer for this ThinPrint Client connected (= Host Integration Service's target printer)? VIRTUAL CHANNEL PROTOCOL (ICA OR RDP) must be selected in the ThinPrint port configuration (MMC) on the XenApp server(s).
- Check the name convention of the ThinPrint port to which the Host Integration Service's target printer is connected; see ThinPrint port configuration (MMC) on the XenApp server(s). The name convention for the ThinPrint port must be: **client_address:printer_ID#printer_name**.
- Are printer(s) installed on each client machine?
- Is/are the host system's IP address/es entered in the Host Integration Service configuration? (Illus. 13)
- Is the Host Integration Service's IP address entered in the printer settings on the host system(s)? ([Page 10](#))
- Are you sure that the TCP port number(s) (515 for the Host Integration Service) is/are not being used by another program? (Illus. 3)
- Test the option ALLOW CONNECTIONS FROM ALL TCP PORTS instead of ALLOW CONNECTIONS FROM CERTAIN TCP PORTS (721–731) ONLY. (Illus. 13)
- Are name translations entered for host user names and XenApp server user names? (Illus. 16)
- The Windows service .PRINT HOST INTEGRATION SERVICE must be restarted after configuration.
- Is the Windows service .PRINT HOST INTEGRATION SERVICE running?
- Is the Windows service LPD SERVICE disabled on the Host Integration Service machine?
- If you selected USE ENCRYPTION in the port configuration, continue reading the section "SSL encryption" in the "Application Server Engine" user manual ([Page 24](#)), or disable encryption for now.
- Debugging (Host Integration Service):
 - Create the Registry entries DEBUGFILE and DEBUGLEVEL ([Page 23](#)).
 - Restart the .PRINT HOST INTEGRATION SERVICE (Windows service).
 - Try to print from a host session.
 - Search for "_ERR_" entries in the logfile.

Appendix

Customer service and technical support

Customer Service www.thinprint.com/ → SUPPORT
www.thinprint.com/Support/SupportRequest.aspx

Uninstalling Host Integration Service

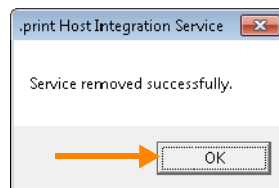
1. Pause the Host Integration Service; e.g., from the command prompt in the installation directory with:

```
net stop TPLPDSrv
```

2. Uninstall the Host Integration Service with:

```
TPLPDSrv -uninstall
```

You will receive the message depicted in Illus. 25.



Illus. 25 Host Integration Service successfully uninstalled

It could be that the Windows service is first only marked for deletion (disabled) in the list of services; after Windows has been restarted, it will no longer be included in the list.

Note! The SERVICES configuration must be closed to uninstall a Windows service (here: .PRINT HOST INTEGRATION SERVICE).

Relevant entries in Windows Registry

The Host Integration Service creates the following registry entries or they can be created by hand under:

hkey_local_machine\software\thinprint\tplpd

Name	Menu item (Host Integration Service)	Description	Type	Default value
DEBUGFILE	—	Path to the log(book) file; e.g., c:\temp\host_integration.log	reg_sz	none
DEBUGLEVEL	—	Level of log(book) file entries: 0 = No entries in the log file 1 = Only error messages will be logged 2 = Only error messages and warnings will be logged 3 = Log everything	reg_dword	none
EXPORT-RANGE	ALLOW CONNECTIONS FROM CERTAIN TCP PORTS (721–731) ONLY (Illus. 13)	Print jobs are only received from all LPRs (value: 1) or with TCP port numbers from 721 to 731 (value: 0)	reg_dword	0
FORMAT-STRINGRE	—	Sets how the user name will be retrieved from a string – using a regular expression (see also JOBINFO and Page 18) Example: <i>file_name.user2.ps</i> (= print job name) FormatStringRE = [^ .]*\.([^ .]*)\.ps	reg_sz	([^ .]*) .*
IPLIST	IP ADDRESSES OF LPRs, THAT ARE ALLOWED TO USE THIS SERVICE (Illus. 13)	Host servers that are allowed to send print jobs via LPR to the Host Integration Service, incl. subnet mask; examples: 192.168.130.20/22 127.0.0.1/8	reg_multi_sz	none
JOBINFO	—	Sets where the user name will be retrieved from (see also FORMATSTRINGRE as well as Pages 11 and 18): 0 from the control file 10 (hex) from the banner page or from the print job name 20 (hex) from the queue name 30 (hex) from the print job name	reg_dword	0

Name	Menu item (Host Integration Service)	Description	Type	Default value
PORT	TCP PORT (Illus. 13)	TCP port were the Host Integration Service receives data (= "listen")	reg_dword	515
SELECTED- PRINTER	TARGET PRINTER (Illus. 10)	Printer to which the Host Integration Service sends print jobs for the ThinPrint Engine; example in Illus. 10: Lexmark Optra	reg_sz	1st
SERVICETYPE	USER SESSIONS ARE ON ... (Illus. 14)	0 = standalone XenApp server (local machine) 1 = Citrix farm server	reg_dword	0
TIMEOUT	TIMEOUT (S) (Illus. 13)	Time (in seconds) the Host Integration Service is to wait for a response from the host system before canceling the transmission	reg_dword	30

Additional sources

Further information about ThinPrint can be downloaded from our website.

Manuals

- At www.thinprint.com/ → PRODUCTS → OVERVIEW → Application Server Engine → MANUAL(S) you will find the user manuals for the server and client components of **ThinPrint**.

White papers

- At www.thinprint.com/ → PRODUCTS → OVERVIEW → Application Server Engine → WHITE PAPERS or ... → SUPPORT → WHITE PAPERS you will find additional documentation on ThinPrint.

Thin clients

- At www.thinprint.com/ → SUPPORT → SUPPORTED DEVICES you will find terminals with embedded ICA version of ThinPrint Client. These can be used for Virtual Channel Gateway.

Downloads

- Download the Host Integration Service: www.thinprint.com/ → PRODUCTS → OVERVIEW → HOST INTEGRATION SERVICE → DEMO VERSION
- Download the ThinPrint Client Windows: www.thinprint.com/ → SUPPORT → CLIENTS & TOOLS

Abbreviations

DCOM	Distributed Component Object Model
GUI	Graphical User Interface
Host system	SAP R/2 or R/3, AS/400, Unix, or other servers
ICA	Independent Computing Architecture (Citrix)
ID	Identification number
IP	see TCP/IP
LAN	Local Area Network
LPD	Line Printer Daemon
LPR	Line Printer Remote
NLB	Network Load Balancing (Microsoft)
RDP	Remote Desktop Protocol (Microsoft)
s	Second(s)
SMB	Server Message Blocks
TCP/IP	Transmission Control Protocol/Internet Protocol
TP	ThinPrint
UNC	Name convention for accessing network resources under Microsoft operating systems (universal naming convention); example: \\server\directory
WAN	Wide Area Network

See also the list of abbreviations in the “Application Server Engine” user manual ([Page 24](#)).