ThinPrint®

ThinPrint Desktop Engine

Print management for virtual and real desktops
(version 7.6)

Manual

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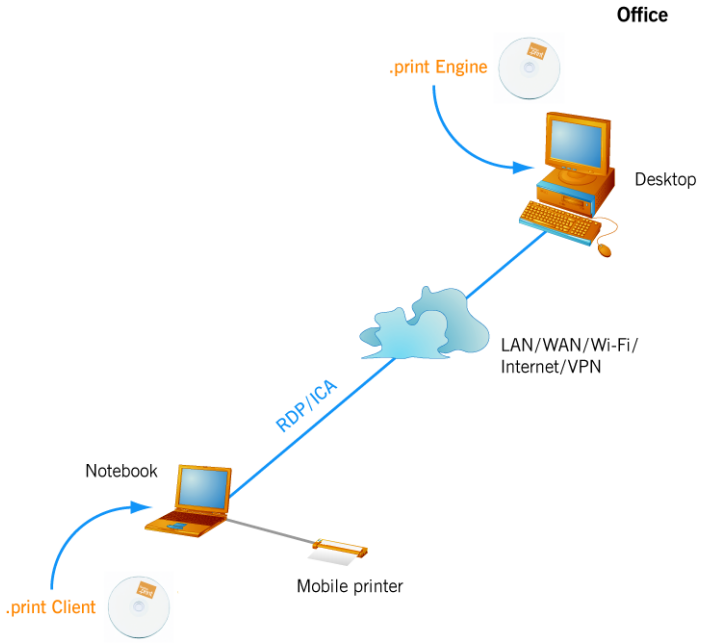
Safety warning

All ThinPrint products are pure software solutions. Please note the safety warnings in the technical documentation from your hardware vendor and from the manufacturer of each device and component.
Before beginning installation, we recommend closing all windows and applications and deactivating any virus scanner.

Introduction

What is ThinPrint?

ThinPrint is a software solution and consists of two components – the **ThinPrint Engine** and the **ThinPrint Client** (Illus. 1).



Illus. 1 Using of ThinPrint with ThinPrint Engine as the desktop component and ThinPrint Client as the client components

Desktop component

The desktop component **ThinPrint Engine** is the actual core of the ThinPrint framework. It provides complete printer driver management including **Driver Free Printing**. The ThinPrint Engine performs the following main functions:

- Bandwidth controlled transmission of print jobs
- Print data compression and streaming
- Print data SSL/TLS encryption
- Provisioning of the virtual printer driver ThinPrint Output Gateway (enables a radical reduction of printer drivers on printing computers = Driver Free Printing).
- Auto-created client printers are created by AutoConnect, a component of the product ThinPrint Desktop Engine.

Driver Free Printing

Thanks to this technology, time-consuming desktop-side installation and administration of printer drivers under Windows are no longer necessary. The printer drivers are only installed on the client machines or on print servers in branch offices. That means that any type of printer can be used on any printer port; e.g., multifunctional devices (printer, fax, copier, and scanner in one device) on a USB interface or a laser printer on a bidirectional interface.

The **V-Layer**[1] component is applied to use ThinPrint Clients on non Windows computers (refer to “ThinPrint Engine for print servers” manual, Page 73).

Advanced Adaptive Compression

Any print job send via a ThinPrint Port is compressed. Furthermore, ThinPrint Engine combines the efficient Driver Free Printing system with a new kind of compression, the Advanced Adaptive Compression. This method analyzes the individual components of a print job and compresses each with the respective best algorithm before transmitting the data.

Additionally, user errors that can occur when saving a document are corrected. In this way, data volume is reduced by 98%.

Client component

On the client side, **ThinPrint Client** is generally responsible for receiving print data, decompressing it, and sending it to the print device. Many ThinPrint Clients are available for different end devices and areas of deployment: for all Windows versions incl. Windows CE, for Linux, Solaris, DOS, Java, ActiveX, as well as for internal and external print servers of network printers.

ThinPrint Clients can be downloaded from ThinPrint’s website (see Page 74). It also includes devices which are already embedded with ThinPrint Clients. If you require a ThinPrint Client which is not listed on the website, please send an e-mail to info@thinprint.com.

Package contents

The **ThinPrint Desktop Engine** product CDs for ThinPrint version 7.6 contain:

- This manual
- The installation program Setup.exe for ThinPrint Engine (under ...\Software\.print Engine)

The ThinPrint Engine contains a demo license key to test the software for 30 days (full functionality). Afterwards, enter a valid license key or an update subscription.

Depending on the purchased Product version (32 bit or x64), select the license key from the following types:

Product version	Type of license key
32 bit	THPR-0388-2
64 bit	TAPR-0388-2

Software

For software downloads see Page 74. For updates of ThinPrint Engines older than one year, valid license keys are required. These license keys can be purchased via ThinPrint’s Update Subscription Program. Please contact your reseller or send an e-mail to info@thinprint.com.

1 Printer Virtualization Layer

Scenarios

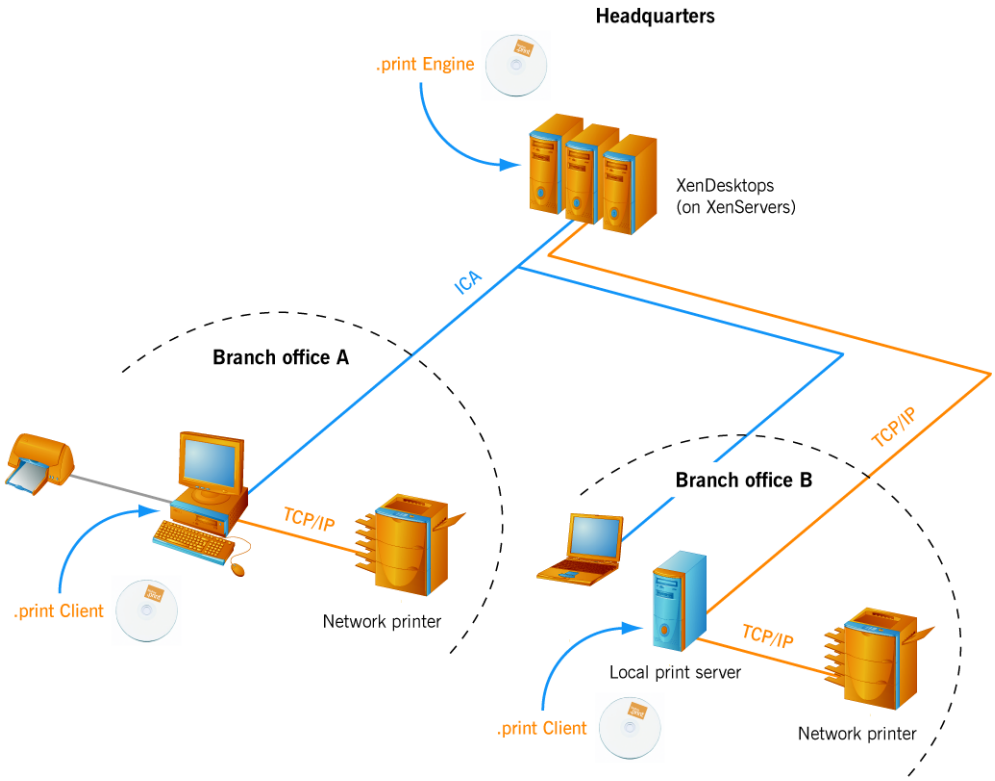
The following scenarios illustrate typical environments in which ThinPrint Desktop Engine PR can be deployed. The depicted scenarios can also be combined – flexibility in mixed environments is one of the many strengths of ThinPrint.

Basically, only the printing machines are licensed; i.e., all computers in which ThinPrint Desktop Engine PR is installed. All ThinPrint Clients are free. More information about ThinPrint licensing is found starting on Page 68.

Virtual desktops (an example with Citrix XenDesktop)

An ICA connection is a protocol for accessing the virtual “desktop” in a XenDesktop environment in your company (Illus. 2). Example: You work in a branch office (e.g. on your PC) and open an ICA session on the virtual desktop in the headquarters. Now you can print out files on any printer in the branch office or in the headquarters – very fast. And no setup is necessary if the ThinPrint Desktop Engine is installed on the virtual desktop.

The printers installed in the printers folder on the PC are automatically created in the printers folder on the virtual desktop when the session is established and are deleted again when the session is ended.



Illus. 2 ThinPrint Desktop Engine for virtual desktops an example with Citrix XenDesktop

Remote access to the PC in the office

An RDP connection is a protocol for accessing the “desktop” of an office PC from a remote client machine (Illus. 1). Example: Your PC is located in your office. You work remote on your notebook (e.g. at home) and open an RDP session on the office PC. Now you can print out files on any printer at home or in the office – very fast. And

no setup is necessary if the ThinPrint Desktop Engine is installed on the PC in the office.

The printers installed in the printers folder on the notebook are automatically created in the printers folder on the office PC when the session is established and are deleted again when the session is ended.

Further information can be found in this manual starting on Page 54.

Blade PCs

Blade PCs are comprised of groups of actual Windows Desktops with remote desktop connections (Illus. 3). PCs as well as Thin Clients (Terminals) can be used as clients to connect to the Blade PCs - in the case of Thin Clients, it's recommended to use a print server for easy driver administration.

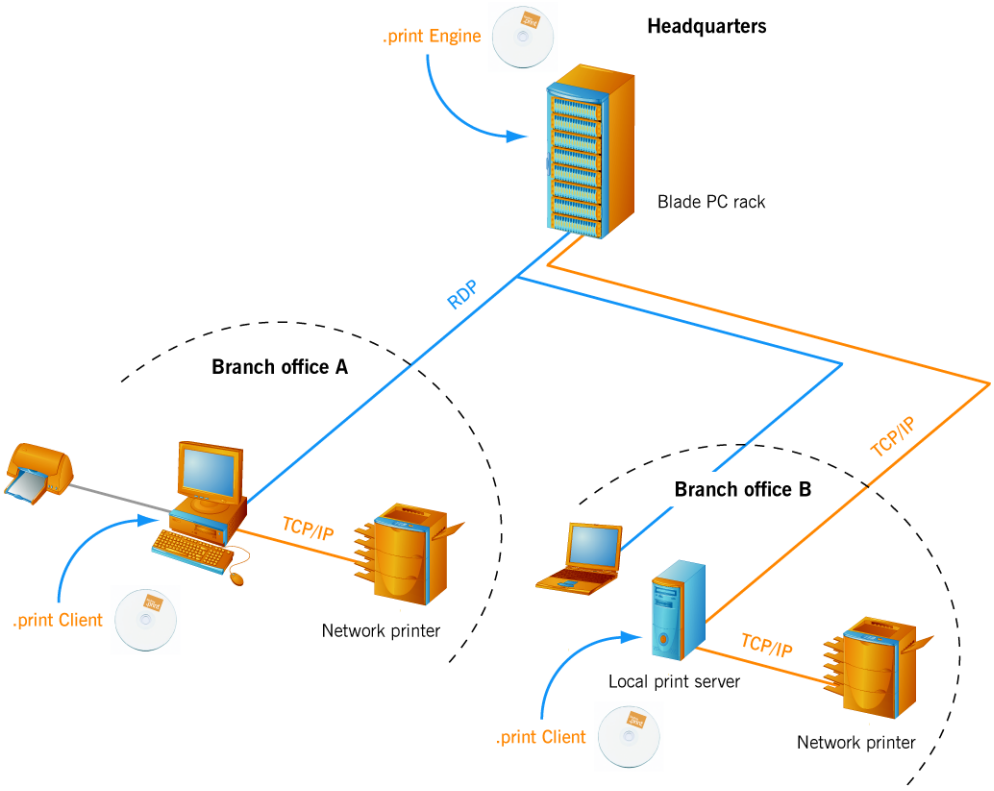
ThinPrint Engine is installed on each Blade PC; it supports:

- Bandwidth control, compression, streaming and encryption of print data
- Sending print jobs to client devices, to local print servers and directly to network printers (with external or internal print servers)
- All client printers
- Print protocols: RDP and TCP/IP (with and without Connection Service[2])

To set up the Thin Clients refer to the manuals “ThinPrint Client WinCE”, “ThinPrint Client Linux” and “ThinPrint Engine for print servers” (Page 73).

Note! Please also consult the documentation for your Blade PC environment.

2 Additional licenses are required; refer to the manual “ThinPrint Connection Service” (Page 73)



Illus. 3 ThinPrint Desktop Engine for Blade PC environments

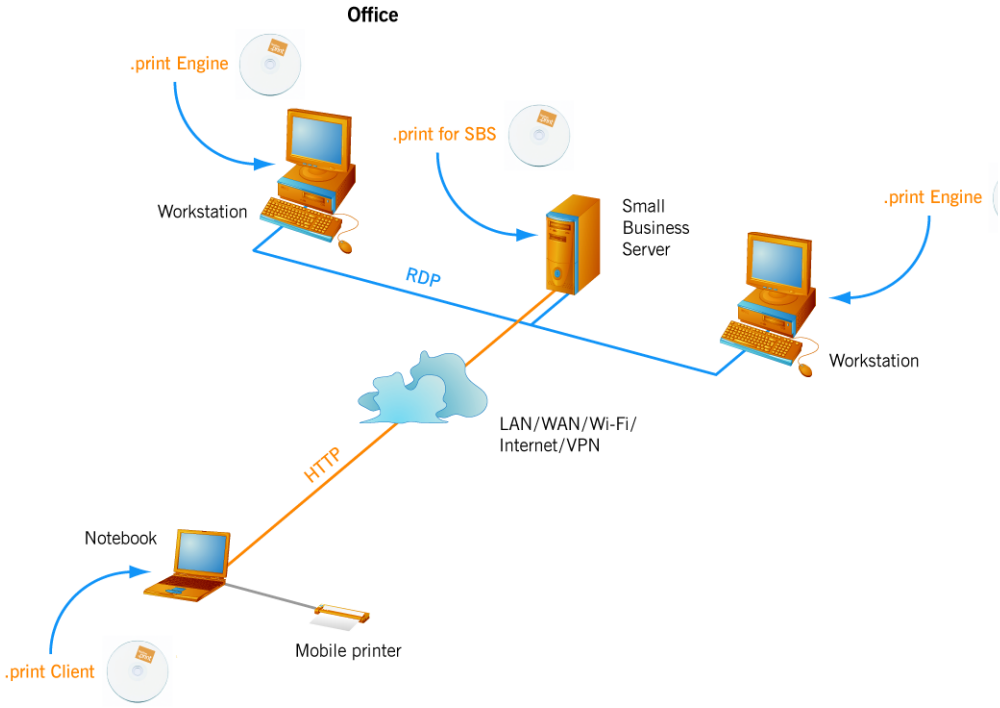
Small Business Server

The **Windows Small Business Server** and its **Remote Web Workplace** function enables all employees to securely access company computers over the internet, making it easy to work from home or while on the go. You can always work on the same desktop and in the same computer environment (Illus. 4).

ThinPrint also makes printing from the Remote Web Workplace quick and easy. The print data are transmitted at high compression and thus reach the printer faster – with a notebook while on the go or on a private PC at home. And with DRIVER FREE PRINTING technology it doesn't matter which printer you use at home because neither the Small Business Server nor the workstation in the company requires a printer driver.

To make your computer environment ThinPrint capable, install the following ThinPrint components (all three are Plug & Play):

- **ThinPrint Desktop Engine** on every workstation in the office
- **ThinPrint for SBS** on the Small Business Server 2003 or 2008
- **ThinPrint Client (RDP type)** on the notebooks or home PCs (alternative: thin clients with embedded ThinPrint Clients)



Illus. 4 components: *ThinPrint (Desktop) Engine*, *ThinPrint for SBS* and *ThinPrint Client*

Installation

Technical restrictions

Please ensure that the following network, desktop and client requirements are met.

ThinPrint Engine

Supported operating systems for the ThinPrint Engine

- Windows XP Professional (32 bit) with Service Pack 2 or later
- Windows XP Professional x64 with Service Pack 2 or later
- Windows Vista Business/Enterprise/Ultimate with Service Pack 1 or later
- Windows Vista Business/Enterprise/Ultimate x64 with Service Pack 1 or later
- Windows 7 Professional/Ultimate/Enterprise
- Windows 7 Professional/Ultimate/Enterprise x64

Minimum hardware requirements

32 bit: Intel Pentium/Celeron, AMD K6/Athlon/Duron
or compatible processor with 733 MHz, 256 MB RAM,
3.5 MB of available hard disk space

x64: AMD Opteron, AMD Athlon 64, Intel Xeon with Intel EM64T,
Intel Pentium with Intel EM64T,
system clock 1.4 GHz, 512 MB RAM,
10 MB of available hard disk space

ThinPrint Clients

Available ThinPrint Clients:

- Windows XP[3]/Vista/7/8/8.1 (TCP/IP, RDP and ICA)[4]
- Windows 2003/2008/2008 R2/2012/2012 R2 as a Windows service
- Linux (TCP/IP)
- Mac OS X (TCP/IP and ICA)
- Thin Clients with embedded ThinPrint Client
- other ThinPrint Client types upon request

Administrator permissions

Administrator permissions are required for all installation and configuration procedures. It is therefore best to log on under Windows as ADMINISTRATOR.

To open the PRINTERS folder on Windows 7 machines as an administrator use START→ ALL PROGRAMS→ .PRINT ENGINE→ PRINTERS.

Prerequisite for installation on XenDesktops

The picawsapi.dll was provided by Citrix to fix a memory leak inside the XenDesktop Virtual Desktop Agent 3.1. The update is included in Citrix Virtual Desktop Agent version 3.1.3242 (Citrix Document ID: CTX122445 on http://support.citrix.com), but picawsapi.dll can be used meanwhile to prevent loss of memory in the virtual machines.

Note! You are not allowed to give away this software without explicit permission from ThinPrint GmbH or Citrix Systems Inc.

Sample configuration of ThinPrint Engine and ThinPrint Client

Scenarios

The standard installation of ThinPrint Desktop Engine is plug and play. That means, if you have installed ThinPrint Engine on a **desktop**[5] and ThinPrint Client as well as at least one printer on a **client** computer[6], then you can print immediately after opening a desktop session.

At the same time the choice of the ThinPrint Clients depends on the one hand on the operating system of the client computers and on the other hand on the connection protocol between client computer and desktop. If the desktop is part of a Citrix XenDesktop environment, then install the ICA type of ThinPrint Client. For all other types of desktops you can install the RDP type of ThinPrint Client on the client computer.

If Thin Clients are going to be used, select a Thin Client type for which the ICA or RDP type of ThinPrint Client is available (Page 74). You have at your disposal Thin

3 XP: Service Pack 1 and later

4 For older operating systems use ThinPrint Client 7.0.

5 virtual desktop, Blade PC or workstation in office (designated in the following as “desktop”)

6 personal computer, Notebook or home PC (designated in the following as “client computer”)

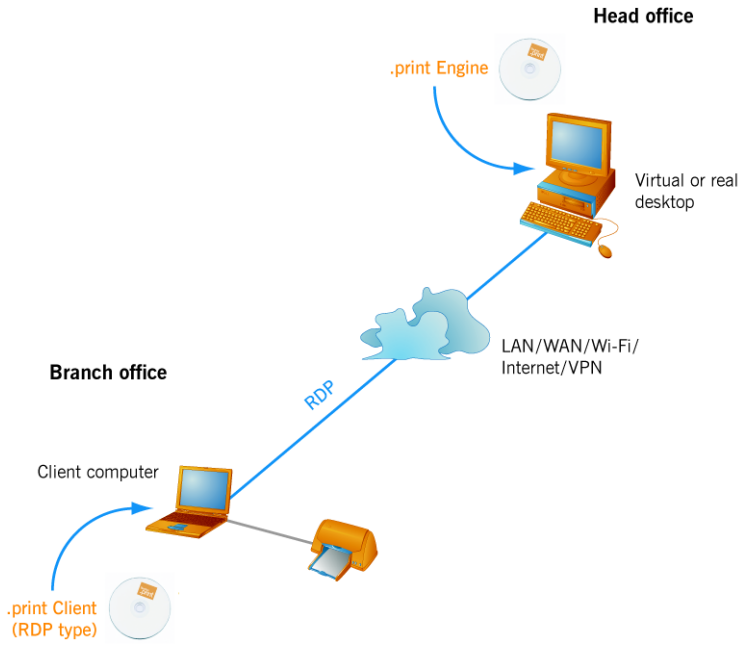
Clients with the TCP/IP type of ThinPrint Client, or you can use Linux or Mac workstations or local print servers, and then it becomes possible to send the print data independently of the session protocol. (ICA and/or RDP).

However, in this case the installation is no longer plug and play, because the transmission of print data over TCP/IP requires special settings.

In the following, four consecutive scenarios are clearly described. Screenshots show examples of the installation of ThinPrint Engine under Windows 7 and of ThinPrint Clients under Windows XP.

1. Plug and play installation of ThinPrint Engine on a virtual desktop and of ThinPrint Client on a workstation (Illus. 5, Page 13). Followed by: Sending a print job from a desktop session to a workstation. Thereby the TP Output Gateway printer driver is used on the desktop, and the print data is compressed with the help of the assigned RDP session protocols
1. . The configuration of ThinPrint Engine and ThinPrint Client (see. 1.) is altered so that the print data will be sent to the workstation, or alternatively, to the local print servers via TCP/IP rather than via RDP (Illus. 16 and 17, Page 20).

Scenario 1: Plug&play installation of ThinPrint Engine and ThinPrint Client

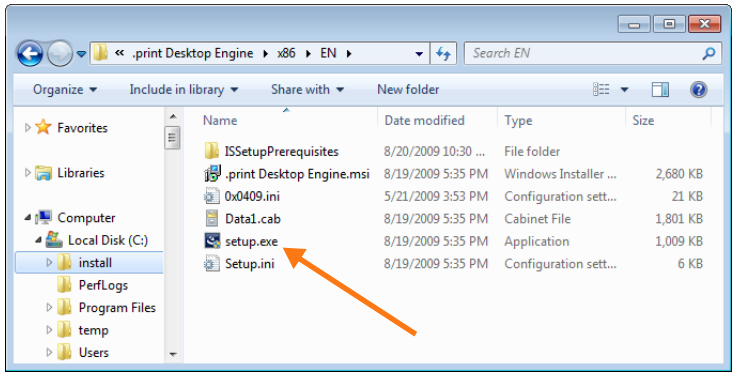


Illus. 5 Plug&play installation of ThinPrint Engine and ThinPrint Client

Note! Before beginning installation, we recommend closing all windows and applications and deactivating any virus scanner. Also be aware that after installation of ThinPrint Engine a Windows restart could be necessary.

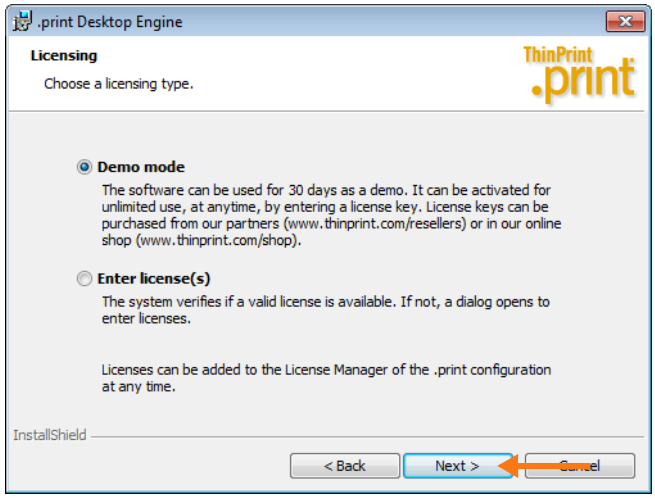
ThinPrint Engine installation

1. Copy the ThinPrint Engine software to the virtual or real **desktop**'s hard disk and start **Setup.exe** (Illus. 6).
(For an update installation see Page 69.)



Illus. 6 Starting installation program Setup.exe

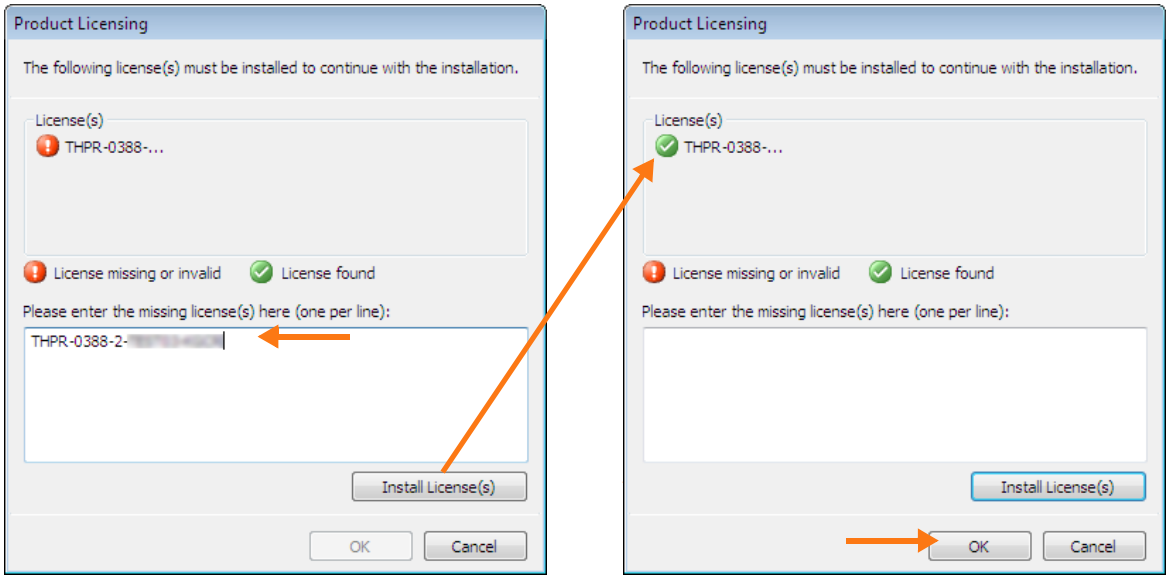
2. Click OK to confirm the Welcome window.
3. Read the license agreement, accept it, and click NEXT to confirm.
   The menu in Illus. 7 will open.
4. To enter a license key select INSTALL LICENSE(S), click NEXT to confirm and continue with step 5. If you have not yet obtained a license key, then select DEMO MODE, click NEXT to confirm and continue with step 6.



Illus. 7 No license key available? If so select DEMO MODUS. Otherwise select ENTER LICENSE(S).

Register a License Key

5. In the next window, copy your license key for ThinPrint Desktop Engine into the white field on the left in Illus. 8 and click INSTALL LICENSE(S).

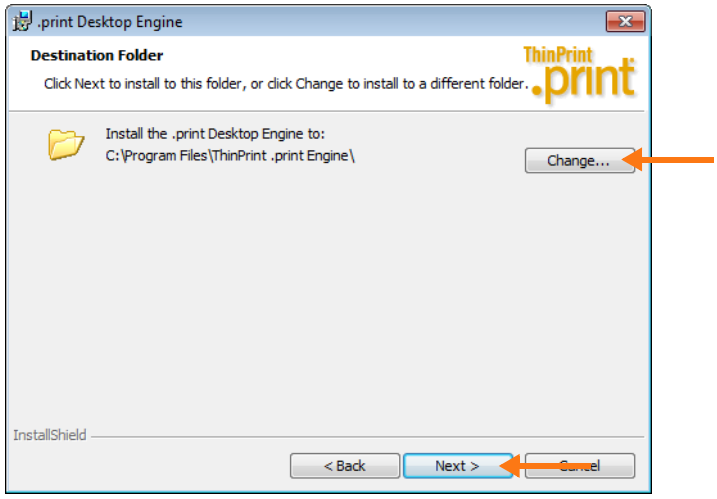


Illus. 8 Enter license key: Copy license key into the white field, click INSTALL LICENSE(S) and OK to confirm

That causes the exclamation mark in the red circle to change to a checkmark in the green circle (above right in Illus. 8). Click OK to continue.

Note! Once a license key has been entered, it is valid without activation for 30 days. See Page 68 for information about activating licenses.

6. In the next dialogue box you can select the installation path by clicking on CHANGE (Illus. 9). Click NEXT to continue.

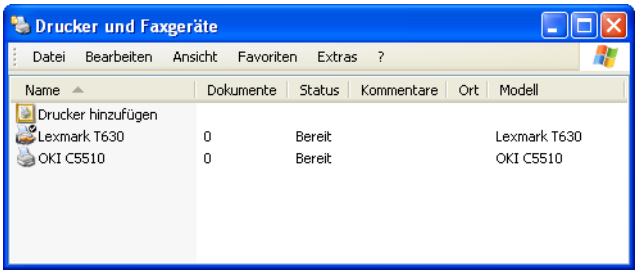


Illus. 9 Choose an installation path

7. Click on INSTALL in the next dialogue box to start the actual installation process. Click FINISH to close the last window. Windows XP requires a reboot here.

ThinPrint Client installation

1. Install at least one printer on the **client computer** (Illus. 10).

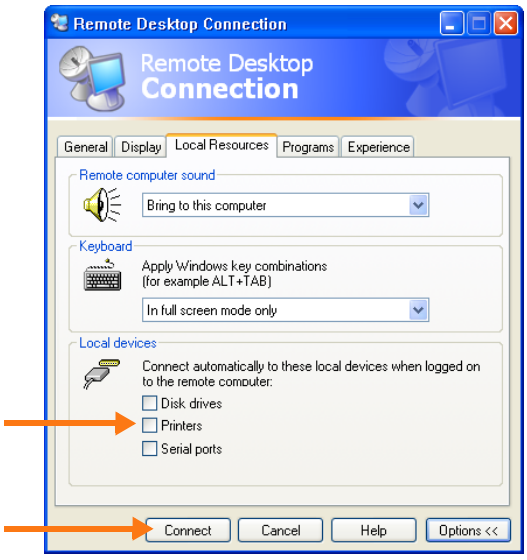


Illus. 10 Client computer's Printers folder

2. Copy the ThinPrint Client software to the client computer's hard disk. With Windows XP, Vista or 7, start **TPRDP_x86_enu.msi** (or **TPRDP_x64_enu.msi** for 64 bit machines).
3. Click OK to confirm the Welcome window.
4. Read the license agreement, accept it, and click NEXT to confirm.
5. Enter your user information, and click NEXT to confirm.
6. In the next dialogue box you can select the installation path by clicking on CHANGE. Click NEXT to continue.
7. Click INSTALL in the next dialogue box to start the actual installation process. Click FINISH to close the last window.

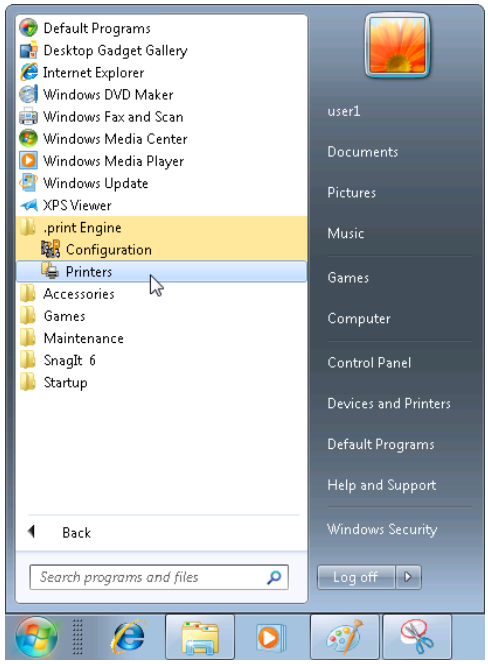
Printing a test page

8. Start a desktop session from the client computer without enabling the local printers of RDP protocol (Illus. 11). Click CONNECT to confirm.

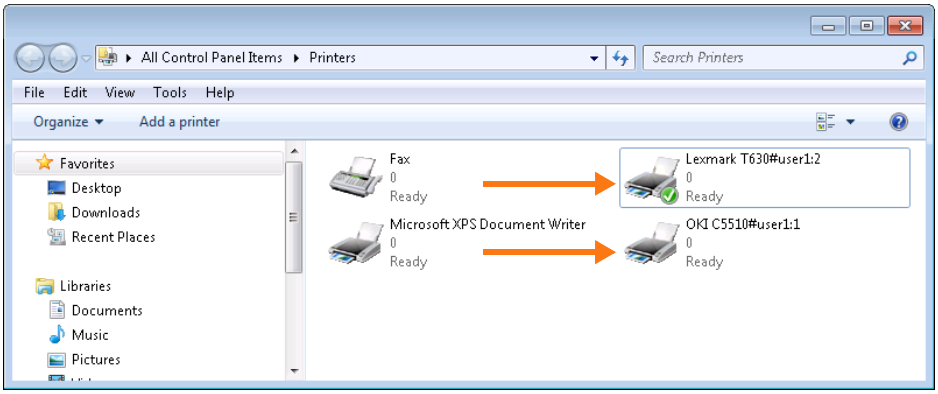


Illus. 11 Starting a desktop session

9. In the desktop session open the Printers folder – with Windows 7 using START→ ALL PROGRAMS→ .PRINT ENGINE→ PRINTERS (Illus. 12), otherwise using START→ SETTINGS→ PRINTERS (AND FAXES).

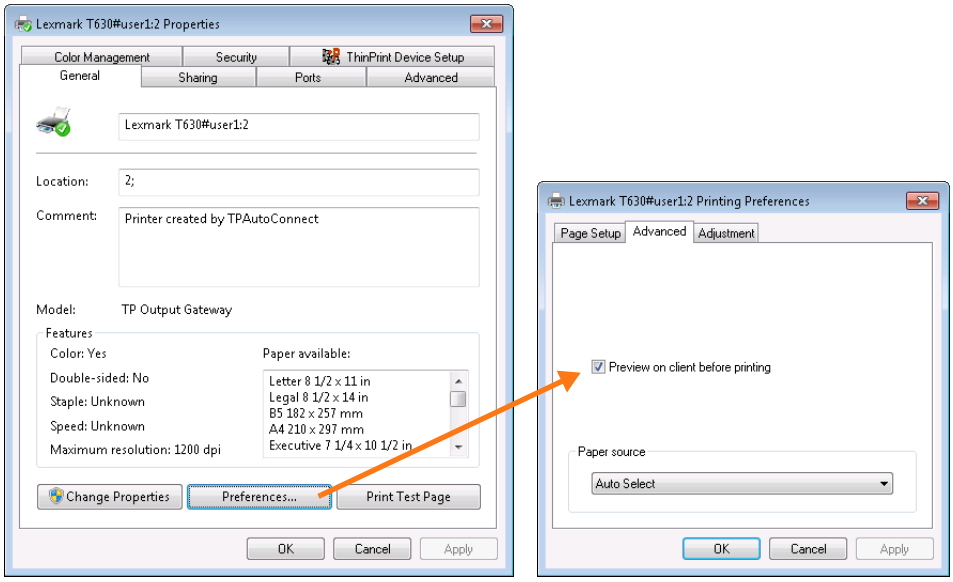


Illus. 12 Open the Printers folder (Windows 7)



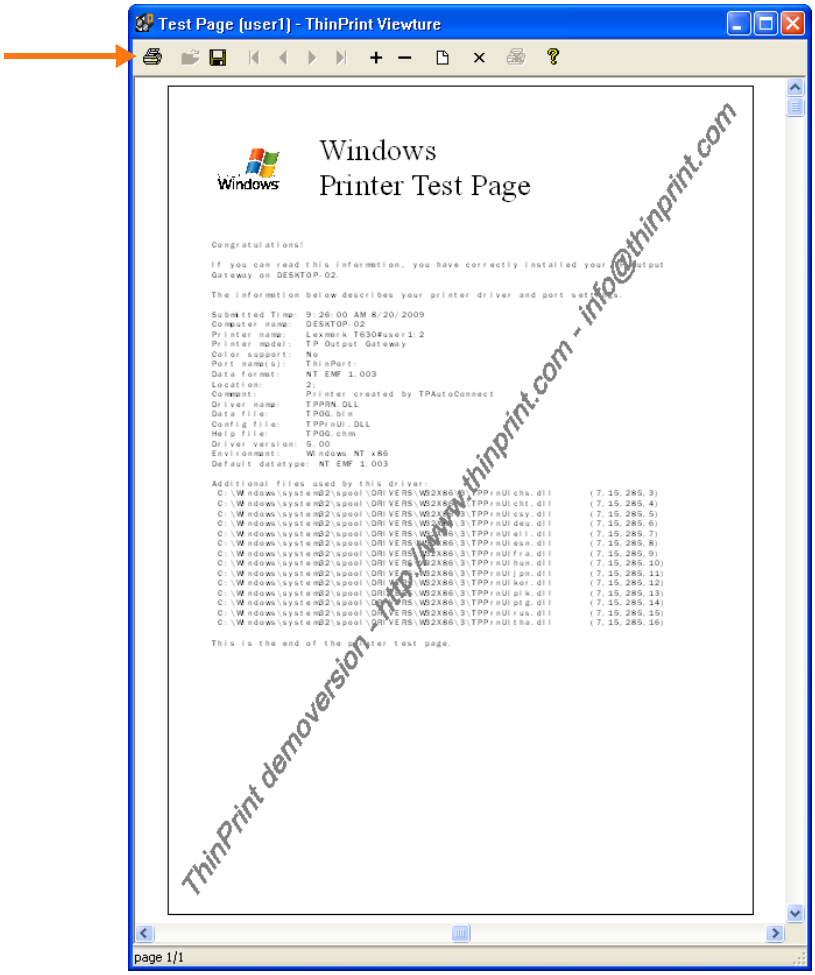
Illus. 13 Printers in the desktop session created by AutoConnect

10. Enable a preview for one of the printers using PROPERTIES→ PREFERENCES → ADVANCED→ PREVIEW ON CLIENT BEFORE PRINTING (Illus. 14). Click OK to confirm.



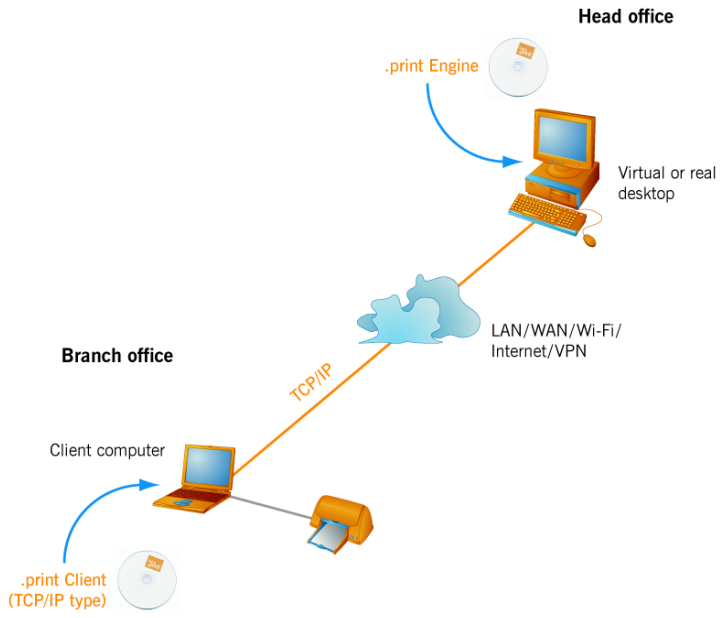
Illus. 14 Enabling a preview on the client computer

11. Click on the PRINT TEST PAGE button to print a test page (Illus. 14). The preview is shown in Illus. 15. Click on the print button here.



Illus. 15 Windows test page received on the client computer

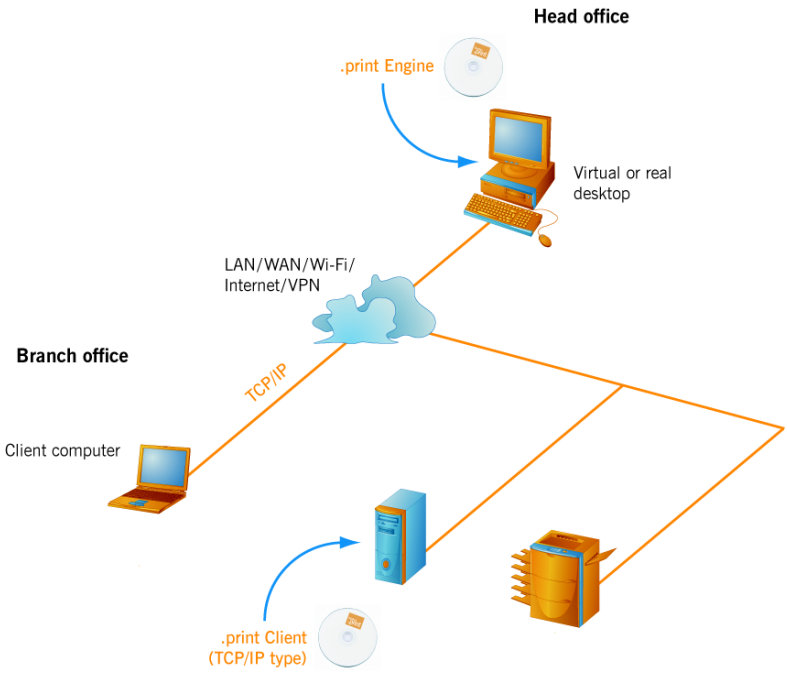
Scenario 2: Print protocol TCP/IP



Illus. 16 Print protocol: TCP/IP instead of RDP or ICA

You can also print directly via TCP/IP. To do this a TCP/IP type ThinPrint Client needs to have been installed on the client computer (Illus. 16).

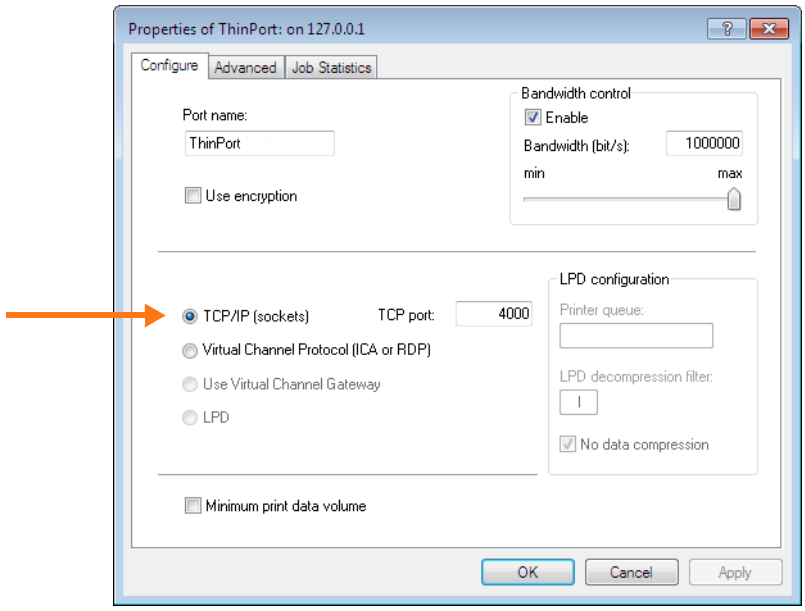
It is also possible to print to a local print server with ThinPrint Desktop Engine. The precondition here is that the local print server is a Windows computer (server or PC). You can install ThinPrint Client TCP/IP here as the service (cf. Illus. 17), which runs even if no users are logged on.



Illus. 17 Sending the print data to a local print server

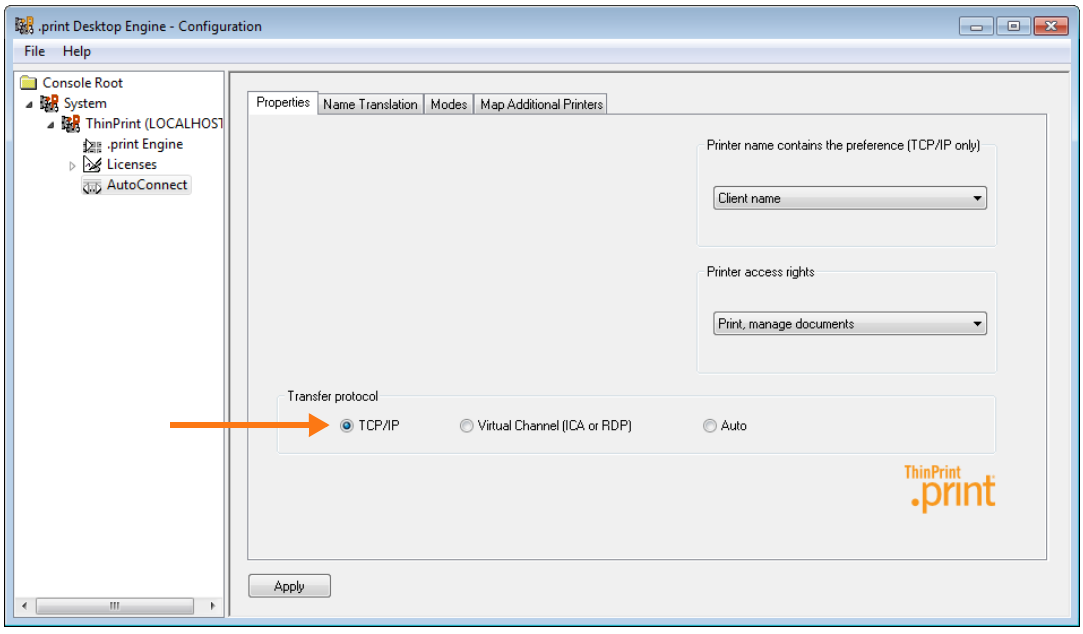
Configuration: Printing via TCP/IP

1. Install ThinPrint Client TCP/IP on the client computer. For this you need the file **TPTCP_x86_enu.msi** (or **TPTCP_x86_enu.msi**). For local print servers, it's best to use the client as a service: **TPSRV_x86_enu.msi** (for x64 clients **TPSRV_x-64_enu.msi**).
2. Open the ThinPort (default port) and select TCP/IP as protocol (Illus. 18).



Illus. 18 Port configuration: appoint protocol TCP/IP to ThinPrint Port

3. If you want to print via TCP/IP, take note that the connection protocol of Auto-Connect is set as either “Auto” or “TCP/IP” (Illus. 19).



Illus. 19 Port configuration: set AutoConnect to the protocol TCP/IP

If you still can't print • Checklist

If AutoConnect does not create the desired printers or printing itself does not work properly, please check the following before contacting ThinPrint support (Page 68).

- Is the same protocol selected for the ThinPrint Client, the ThinPrint Port, and AutoConnect? Example for RDP:
  - Is the RDP type of the ThinPrint Client installed on the client machine?
  - To which ThinPrint Port is the specified printer template connected? VIRTUAL CHANNEL PROTOCOL (ICA OR RDP; Illus. 22) must be enabled in the port configuration (MMC).
  - For AutoConnect, either VIRTUAL CHANNEL (ICA OR RDP) or AUTO must be set as connection protocol (Illus. 71).
  - Is TP AUTOCONNECT SERVICE (Windows service) running on each desktop?

Note! For printing using ThinPrint Ports the Windows service **TP AutoConnect Service** has to be run together with the **ThinPrint Engine**.

- If TCP/IP is the selected protocol:
  - Are the TCP port numbers the same on desktop and on client (see port configuration in MMC – Illus. 22 – and ThinPrint Client Manager)?
  - Are you sure that the TCP port number is not being blocked by the firewall or by another program?
  - Is the client in a masked network (NAT)? If so, you must either select ICA or RDP, or additionally install the ThinPrint Connection Service (see also the "ThinPrint Connection Service" manual; Page 73).
- If a printer was created manually, check the naming convention of the ThinPrint Port (see port configuration in MMC, Illus. 23).
- If you selected USE ENCRYPTION on the desktop (Illus. 60), continue reading the section "SSL encryption" (Page 48), or disable encryption for now.
- Testing the TCP/IP connection: For printing via TCP/IP, a TCP/IP connection must exist between desktop and client machine which allows direct communication to the ThinPrint Client and its TCP port. Masked client networks (NAT) in this case can often cause difficulties. Test to see if the connection exists by trying a **`telnet`** from the desktop to the client's TCP port. To do this, enter the following at the desktop's Command Prompt:

  `telnet` *`IP port`* (blank space between IP address and TCP port number)

  IP is the client machine's IP address; *port* is the TCP port the ThinPrint Client is using. (See also the ThinPrint Client user manuals; Page 73.)

Example 1: `telnet 192.168.131.224 4000`

After executing this command, a telnet window should open **without error message**. If so, the connection is OK.

- If using Driver Free Printing and although the printers are created in the desktop session with AutoConnect but printer options such as paper formats and sources are unavailable, check whether the following functions have been enabled:
  - ENABLE SENDING PROPERTIES in the ThinPrint Client Manager
  - APPLY CLIENT PRINTER PROPERTIES in the AutoConnect configuration (Illus. 76, lower arrow)
- No network printers were created? Delete the parameter -N from the AutoConnect entry in the Windows registry if necessary.

Setting up ports and printers

Overview

General information about ThinPrint's printer ports can be found in the "ThinPrint Ports" documentation (Page 73). This chapter describes configuration of the ThinPrint Engine with special attention to adding ThinPrint Ports and adapting them to specific requirements for print job transmission.

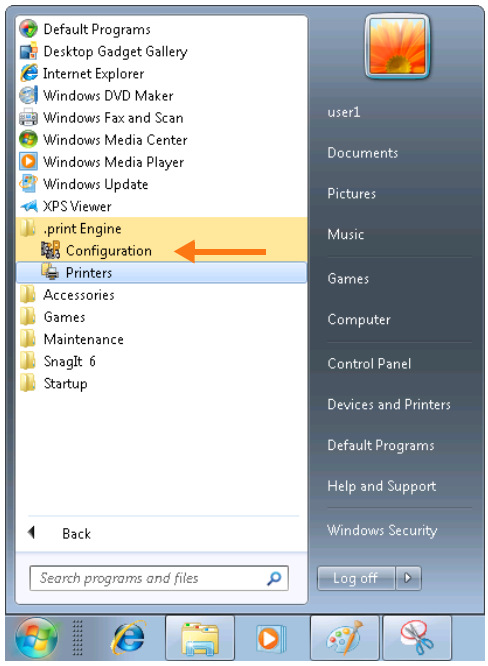
The Port Manager offers the following option for ThinPrint Ports:

- Add a ThinPrint Port – local and remote
- Configure a ThinPrint Port – local and remote
- Delete a ThinPrint Port – local and remote
- Send ports and their properties to other Windows machines on which a ThinPrint Engine is installed
- Export and import port properties
- Make encryption settings for the local ThinPrint Engine

ThinPrint Ports

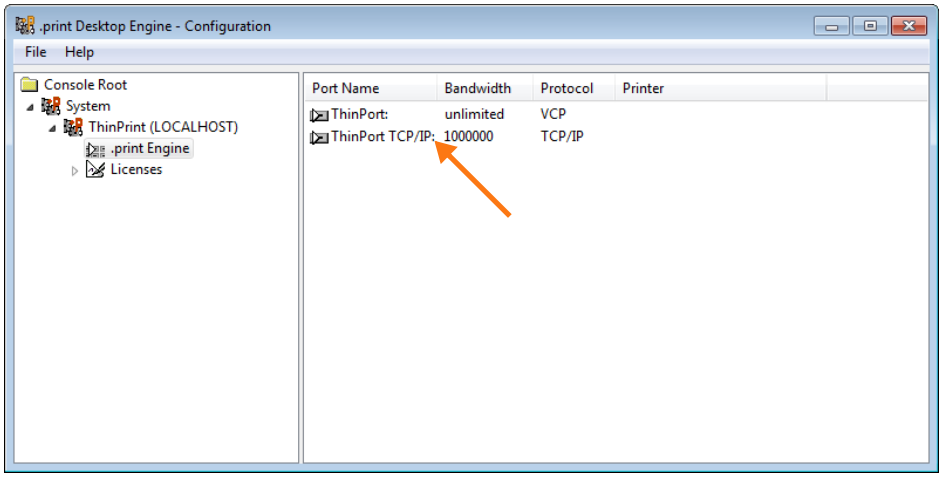
Starting Port Manager

1. On the desktop open the ThinPrint Port configuration – with Windows 7 using START→ ALL PROGRAMS→ .PRINT ENGINE→ CONFIGURATION (Illus. 20).



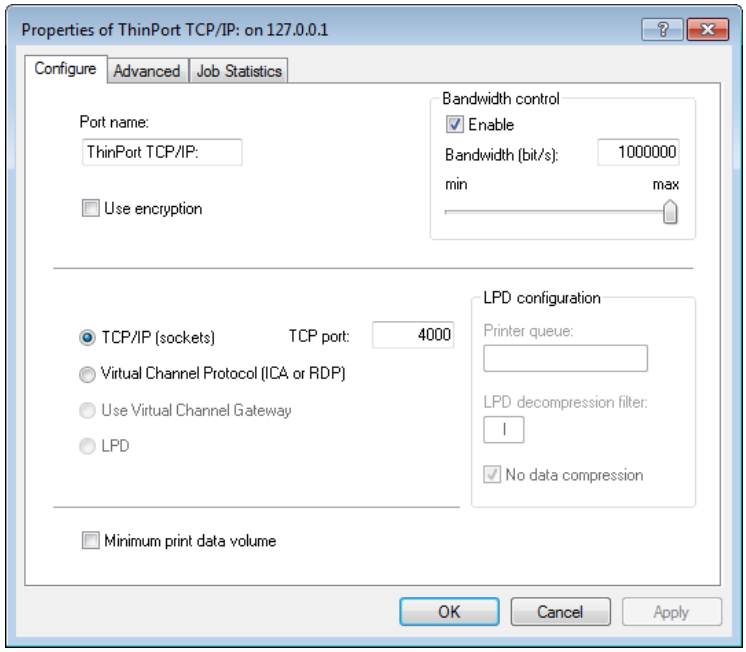
Illus. 20 Open the ThinPrint Port configuration (Windows 7)

2. Double click a port name (Illus. 21) to open the port configuration (Illus. 22).



Illus. 21 ThinPrint Port configuration with ThinPrint Ports (Windows 7)

Configure tab



Illus. 22 Port configuration

The ThinPrint Ports can be configured as follows:

USE ENCRYPTION	Enables SSL/TLS encryption; a valid and corresponding certificate must be available on both ThinPrint Engine and ThinPrint Client (Page 48).
BANDWIDTH CONTROL	• ENABLE: Bandwidth control on • Max. bandwidth available for printing with ThinPrint; minimum: 1600 bit/s, default: unlimited

Print protocol	• TCP/IP (sockets) For printing to local print servers, workstations or network printers with ThinPrint Client installed • ICA/RDP (Virtual Channel Protocol) For printing to workstations or thin clients (terminals) with ThinPrint Client installed • (LPD) For printing from central print servers only; see the “ThinPrint Engine for print servers” manual (Page 73). • (USE VIRTUAL CHANNEL GATEWAY) For printing from central print servers via ICA or RDP; see the “ThinPrint Engine for print servers” manual (Page 73).
MINIMUM PRINT DATA VOLUME	• Enabled: always high compression (classic case) • Disabled: transfer rate optimized compression – depends on bandwidth settings

You can also select the TCP port (default: 4000) for the TCP/IP print protocol. With TCP/IP, the TCP port numbers of the ThinPrint Clients must be the same as those of the ThinPrint Ports.

Creating new ThinPrint Ports

How to create a new ThinPrint Port?

To create new ports use the buttons in MMC’s menu bar (Illus. left) NEW THINPRINT PORT or NEW THINPRINT CONNECTION SERVICE PORT[7]. Choose the port settings: port type (protocol), bandwidth and/or encryption.

We recommend assigning port names from which port properties can be easily deducted.

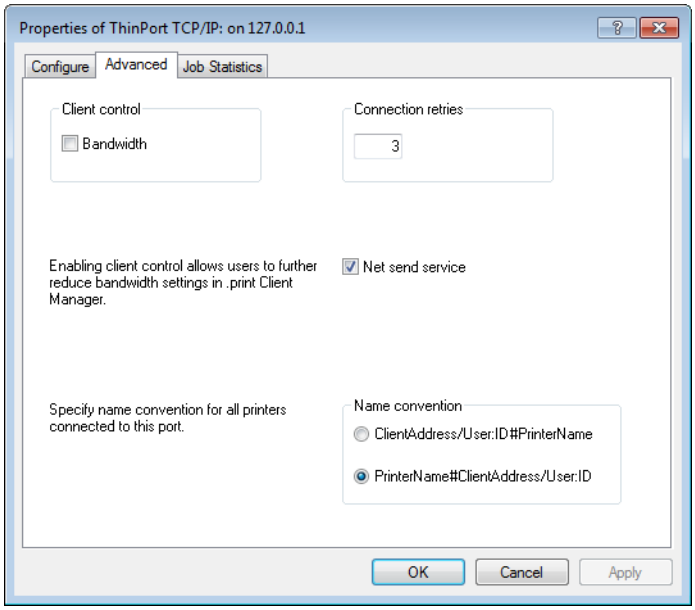
Note! In principle, there is no limit to the length of printer port names. Some applications, however, only support port names with a length of four or six characters; if longer port names are used, this could cause problems (printer is not visible in the application, etc.).

Save

– Confirm changes by clicking APPLY or OK.

7 For Connection Service Ports see “ThinPrint Connection Service” manual (Page 73)

Advanced tab



Illus. 23 Port configuration: ADVANCED

Under ADVANCED are the options:

CLIENT CONTROL: BANDWIDTH

If this option is enabled, the client user can set his own bandwidth value (in the ThinPrint Client Manager).

Client bandwidth settings must be lower than settings on the desktop; otherwise, ThinPrint Engine settings are applied.

CONNECTION RETRIES (TCP/IP only)

Enter the number of times ThinPrint Engine should attempt to establish a connection with the machine the ThinPrint Client runs on.

NET SEND SERVICE

Net Send Service can be used to notify users if ThinPrint experiences print errors. If a problem occurs during data transmission, an error message is generally not sent to the user. If this box is checked (= default), ThinPrint Engine will send error messages to the relevant account.

NAME CONVENTION

You can select for a ThinPrint Port whether the address information is at the beginning or the end of the printer name. Examples:

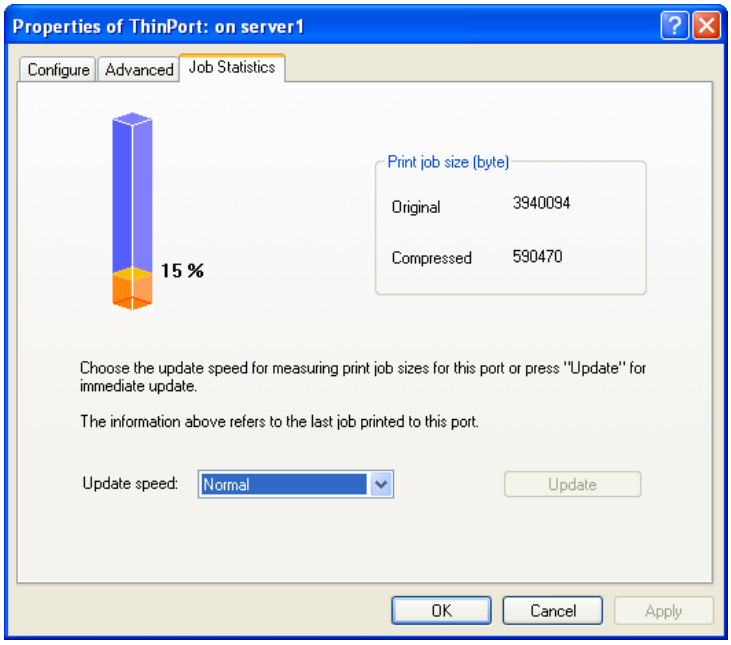
Default addressing	Reversed addressing
TCP/IP	
Lexmark T620 PS3#192.168.1.100	192.168.1.100#Lexmark T620 PS3
Lexmark T620 PS3#192.168.1.100:1	192.168.1.100:1#Lexmark T620 PS3
HP LaserJet 1200 PCL#client1	client1#HP LaserJet 1200 PCL
HP LaserJet 1200 PCL#client1:2	client1:2#HP LaserJet 1200 PCL
ICA/RDP	
HP LaserJet 1200 PCL#	HP LaserJet 1200 PCL
Lexmark T620 PS3#:1	:1#Lexmark T620 PS3
Example for auto-created printers (AutoConnect):	
HP LaserJet 1200 PCL#user1:2	user1:2#HP LaserJet 1200 PCL

Job Statistics tab

Print statistics must be activated per port.

– Select the relevant ThinPrint Port; click PROPERTIES→ JOB STATISTICS and then **High** (every second), **Normal** (every 10 seconds), **Low** (every 30 seconds), **No update**, or **Statistics off** (default) under UPDATE SPEED as in Illus. 24.

Note! Use this function only part-time, as it may affect print performance.



Illus. 24 Port configuration: JOB STATISTICS

Additional functions

For other functions, please refer to the table on Page 71.

OK

Save your settings by clicking OK.

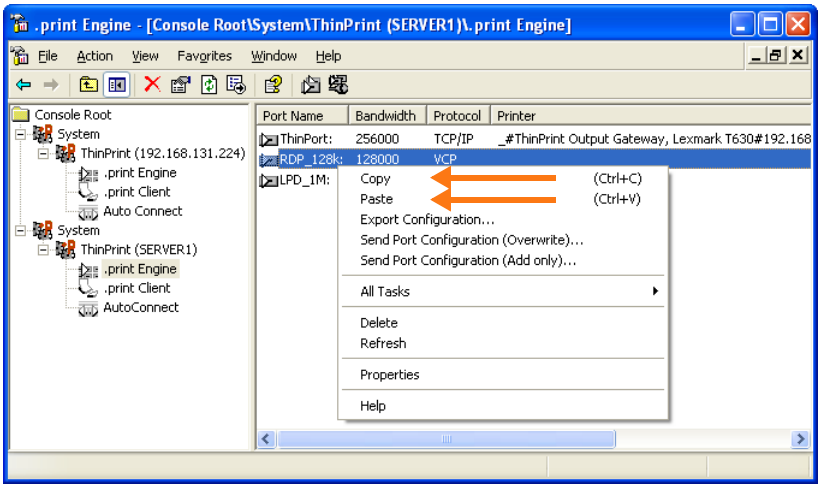
Distributing port configuration

The following strategies are available for creating the same configuration for ThinPrint Ports on multiple machines:

- Setting up and cloning a desktop template
- Remote configuration of ThinPrint Ports (see below)
- Copying port properties with “copy-and-paste” (see below)
- Export to an .xml file and import to target desktops (see below)
- Sending port configuration to target desktops (see below)

Copy-and-Paste

– Open the MMC for remote configuration of ThinPrint Ports.
– Mark a port in the ThinPrint Engine of a ThinPrint node (e.g., 192.168.131.224 in Illus. 25) and select COPY from the context menu.
– Mark a ThinPrint Engine in another ThinPrint node (e.g., server1 in Illus. 25) and select PASTE from the context menu.

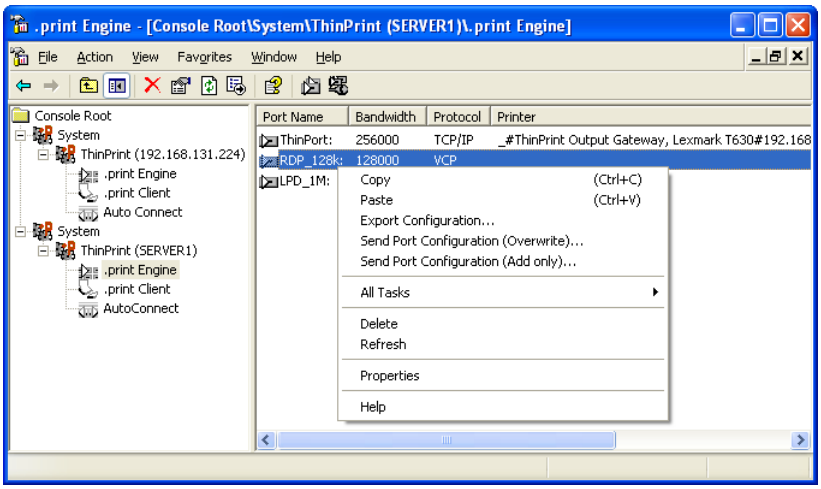


Illus. 25 Copy and paste a ThinPrint Port

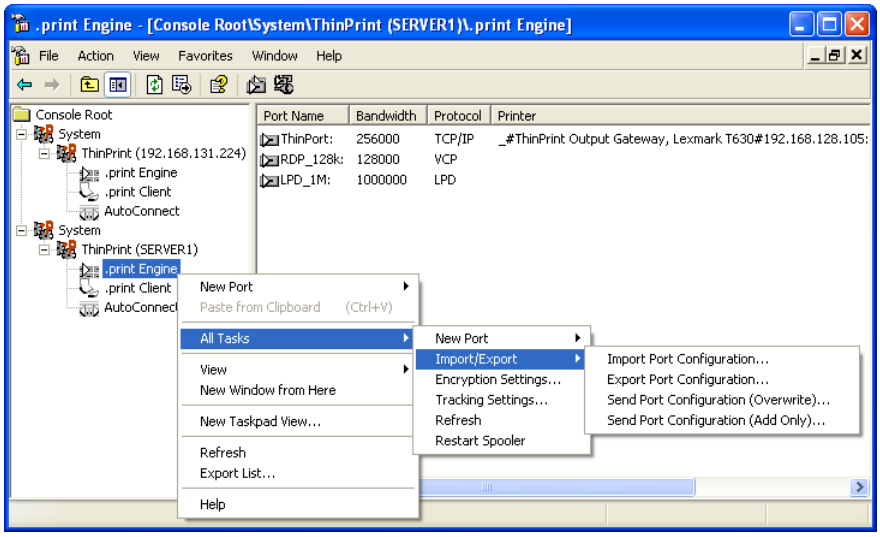
Export/Import

The following export and import functions are available:

EXPORT CONFIGURATION	Exports the selected ThinPrint Port to an .xml file (Illus. 26)
IMPORT/EXPORT→ EXPORT PORT CONFIGURATION	Exports all ThinPrint Ports to an .xml file (Illus. 27) if no port is selected
IMPORT/EXPORT→ IMPORT PORT CONFIGURATION	Imports ThinPrint Ports from an .xml file (Illus. 27)



Illus. 26 Exporting a ThinPrint Port



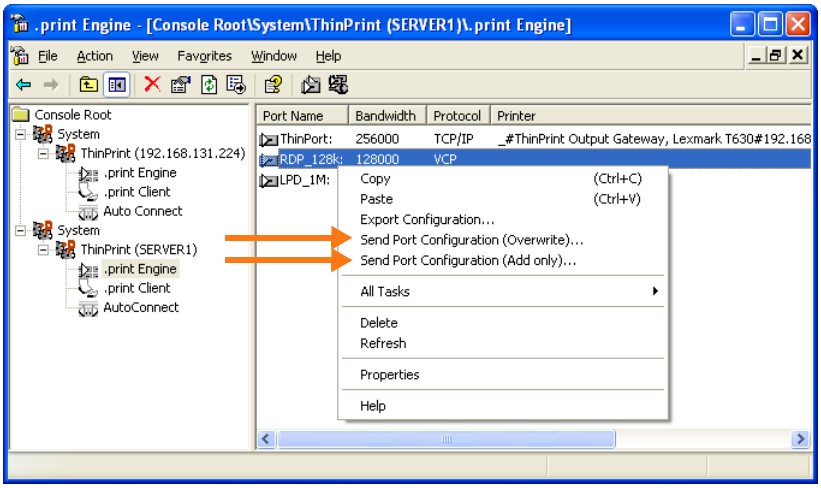
Illus. 27 Exporting, importing or sending all ThinPrint Ports

Sending port configuration

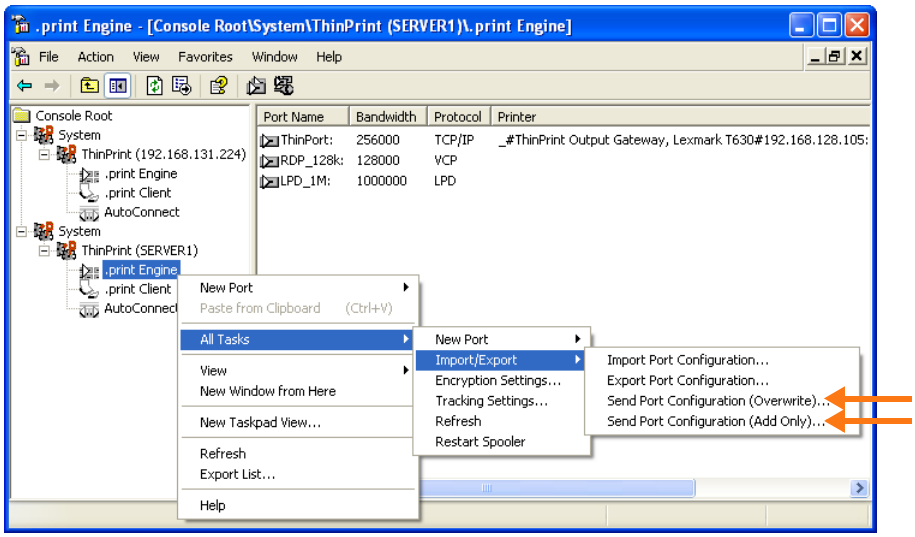
The SEND PORT CONFIGURATION function sends ThinPrint ports to other machines or groups. There are various modes:

SEND PORT CONFIGURATION (OVERWRITE)	Sends the selected ThinPrint port (top arrow in Illus. 28); ports with the same name on the target system will be overwritten
SEND PORT CONFIGURATION (ADD ONLY)	Sends the selected ThinPrint port (bottom arrow in Illus. 28); ports with the same name on the target system will not be overwritten
IMPORT/EXPORT→ SEND PORT CONFIGURATION (OVERWRITE)	Send all ThinPrint ports (top arrow in Illus. 29); ports with the same name on the target system will be overwritten
IMPORT/EXPORT→ SEND PORT CONFIGURATION (ADD ONLY)	Send all ThinPrint ports (bottom arrow in Illus. 29); ports with the same name on the target system will not be overwritten

If ThinPrint ports already exist on the target computers that are not available on the sending computer, they are not changed.



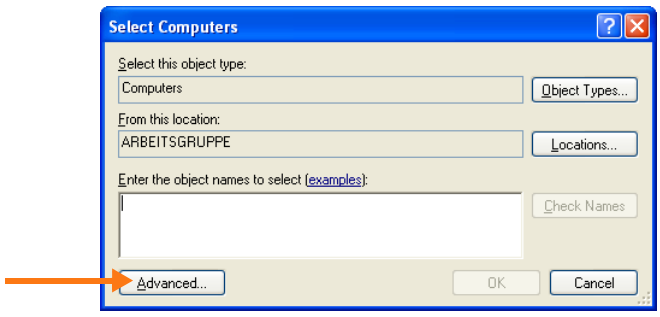
Illus. 28 Sending a ThinPrint port



Illus. 29 Sending all ThinPrint ports

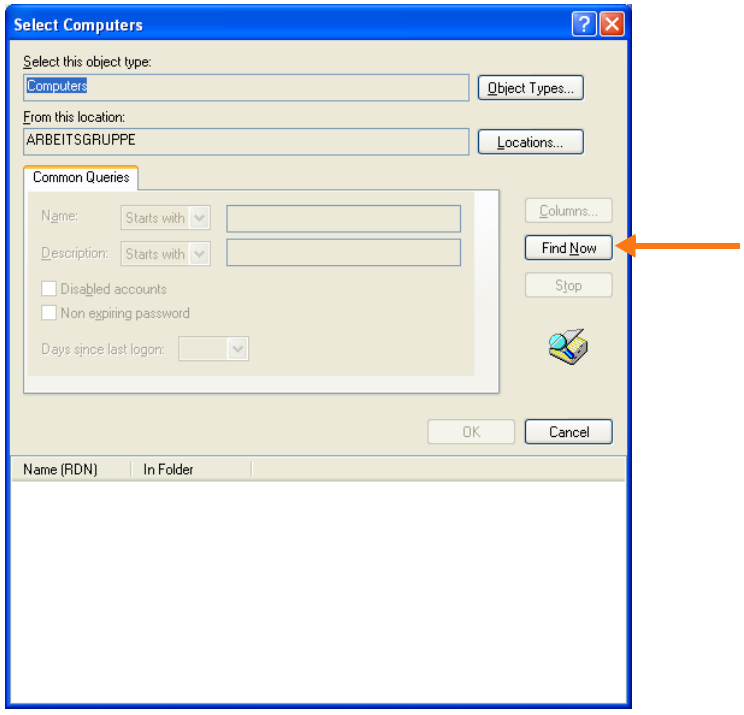
Procedure when sending

Selecting the send option opens the dialog in Illus. 30.



Illus. 30 Dialog for sending properties

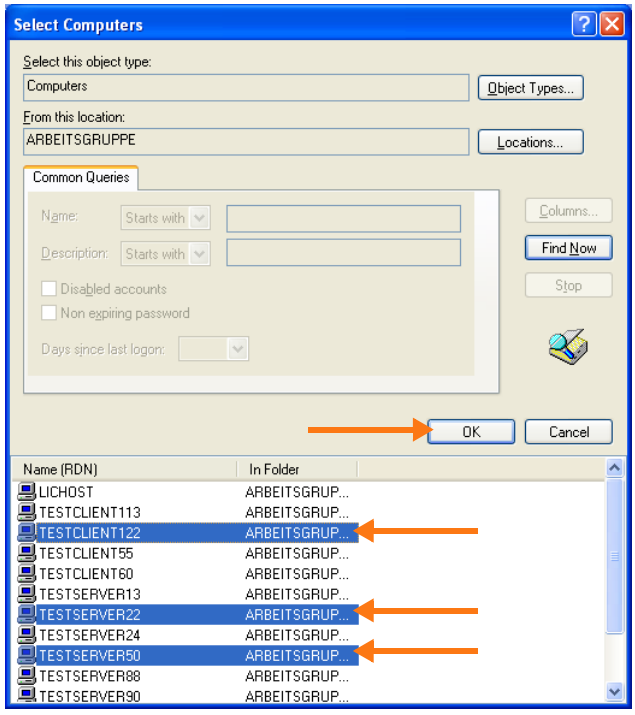
– Select ADVANCED (Illus. 30) and then FIND NOW (Illus. 31).



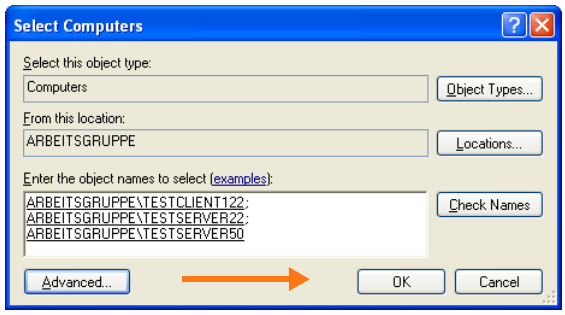
Illus. 31 Finding target computers

– Mark all target computers and click OK twice to confirm (Illus. 32 and 33).

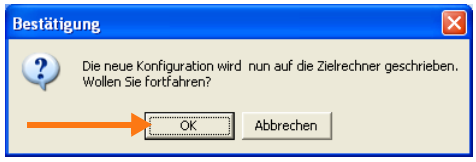
Caution! You are influencing the configuration of remote computers. Check once more that you really want to send the configured ThinPrint ports to the selected computers. A confirmation prompt allows you to cancel the process (Illus. 34).



Illus. 32 Selecting target computer(s)

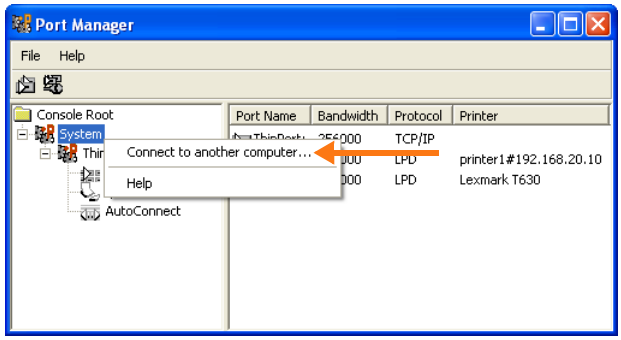


Illus. 33 Confirm sending with OK



Illus. 34 Confirmation prompt

Tip! If you receive an error message when sending, open a **new windows of ThinPrint Port configuration**, create a connection to the target computer (Illus. 35) and repeat send process from the old Port or AutoConnect configuration window (Illus. 28, 29, or 80).



Illus. 35 Create a connection to the target computer in a new Port Manager window

Installing printers on the ThinPrint Port

Note! For **Plug&play** installation of ThinPrint Engine and ThinPrint Client (Page 13) **no templates** are necessary in the Printers folder.

Templates

What are templates?

With ThinPrint, a template is a printer in the desktop's PRINTERS (AND FAXES) folder from which the client or session printers created with AutoConnect inherit their properties (see chapter "Auto-created client printers (AutoConnect)", Page 54).

Note! Open the PRINTERS folder of Windows 7 as an Administrator to be able to see all printer objects including templates. To do so open it using START→ ALL PROGRAMS→ .PRINT ENGINE→ PRINTERS (Illus. 20).

Which properties are inherited?

Among other things, client printers that are created by AutoConnect in the desktop session's PRINTERS (AND FAXES) folder inherit the following properties from templates:

- Printer properties (compression level, paper trays, duplex, print preview on the client, color, page format ...)
- (Original) printer driver or Driver Free Printing
- Printer port and thus:
  - Bandwidth
  - Print protocol (TCP/IP, ICA, RDP)
  - Printing with or without the ThinPrint Connection Service
  - Printing with or without print data encryption
  - Name convention for ThinPrint printers

Template denominations

Network protocol	Names of printer objects (for templates)
TCP/IP, **ICA**, **RDP**	**Either:** *_#printer* Example: _#Kyocera FS-850 **Or:** *_#class* Example: _#HPLaser Printers can be connected via a template with a specific name (e.g., *_#printer*) if their printer name or class name corresponds with the template name (after the **#**). Using class names is sensible if printers with different names shall use the same template (this is possible if the *driver in the template* is appropriate for the different client printers). The underscore ("_") marks the template as such and is replaced with client-specific information for the automatically created printers.

Manually created printers

If you also want to create printers on the desktop manually, please refer to the following information.

For simplicity's sake, only standard addressing is treated here; reversed addressing can be found in the chart on Page 28, and addressing ThinPrint Connection Service Ports is explained in detail in the "ThinPrint Connection Service" manual (Page 73). It is irrelevant to a ThinPrint printer name whether the object represents a traditional (native) printer driver. or the Output Gateway "printer driver". The ThinPrint printer name is composed according to the network protocol in use:

Printer names

Network protocol	Names of printer objects
TCP/IP	**Either:** *printer_name#client_name:printer_ID* Example: Kyocera FS-850#client1:3 **Or:** *printer_name#IP_address:printer_ID* Example: Kyocera FS-850#191.168.1.17:3
ICA/RDP	**Either:** *printer_name#user_name:printer_ID* Example: Kyocera FS-850#administrator:3 **Or:** *printer_name#_:printer_ID* Example: Kyocera FS-850#_:3

client_name

Client name with **TCP/IP** means the real name of the client in the network (= host name). Alternatively, the client's IP address can be used; this is especially necessary when there are difficulties with name resolutions

Note! With TCP/IP it is possible to send print data to any client installed with ThinPrint Client – independent of the desktop session.

printer_ID

At the client, the ThinPrint Client automatically assigns every installed printer an ID. The printer_ID can be omitted if there is only one printer installed on the client, or if printing should take place on the *current printer*.

printer_name

The printer name can be anything you like. It is nonetheless recommended that it be the same as the printer name at the client.

Example 2:

Client

Client nameclient1

IP Address 192.168.1.17

Printer HP LaserJet 1200 PCL

ThinPrint Client assigns this printer ID **2**.

Desktop `HP LaserJet 1200 PCL#client1:2`

Or

`HP LaserJet 1200 PCL#192.168.1.17:2`

The **ICA** and the **RDP** protocols assume all communication with the client, including the client's unambiguous identification. The printer name is composed of:

Description of the **Printer** and the **Printer ID**

Note! With the ICA/RDP protocol print data is automatically sent to the client from whose desktop session the print data was created.

Example 3:

A Kyocera FS-850 shall print via ThinPrint with the ICA protocol. If several printers are installed and ThinPrint Client assigned the printer the ID **3**, the printer name could be something like:

`laser_printer #:3` (# before the :)

Or `Kyocera# :3` (blank space before the :)

Or `Kyocera FS-850#_:3` (underscore before the :

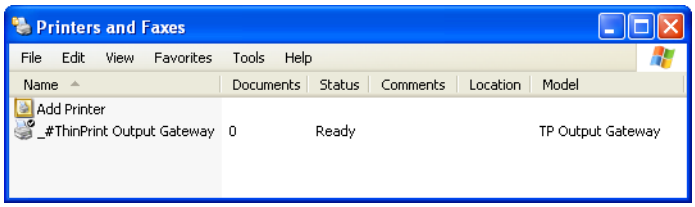
If Kyocera FS-850 is the *current printer* (in the ThinPrint Client), the printer name could be:

```
laser_printer
```

ThinPrint Output Gateway

The “TP Output Gateway” is a virtual printer driver (see the MODEL column in Illus. 36) that makes it possible to render print data using original (native) printer drivers installed on the client side. Because no other, native printer driver is required on the desktop in addition to the Output Gateway, this print method is called **Driver Free Printing**. In this sense, of course, “Driver Free” only refers to the desktop (Illus. 1).

Note! ThinPrint Output Gateway will only function with ThinPrint Clients installed on Windows machines; exception: V-Layer (see “ThinPrint Engine for print servers” manual; Page 73). Relevant printer drivers must be installed on the client machines.



Illus. 36 TP Output Gateway driver in the desktop’s Printers folder

With Driver Free Printing, print data is sent from the desktop to the client machine in Windows’ own EMF data format – bandwidth controlled, compressed, streamed, and, if desired, encrypted.

Name convention

You can treat the printer objects based on TP Output Gateway like any other printer object. To use it instead of a native (conventional) printer driver, it must usually be renamed according to the ThinPrint naming conventions. Output Gateway is either used as a **template** for AutoConnect, **or** is renamed for **targeting a specific printer**. Examples:

Example 4: Template for AutoConnect

Client

Client name	*any name*
Printer ID	*any name*
IP address	*any name*

	Printer name	*any name*
	Class name	**TPOG**
Desktop		
	Printer name	_#**TPOG**
	(Set permissions for *Administrators* and *System*: *Full access* for both.)	

Example 5: Addressing the printer directly (TCP/IP printing)

Client		
	Client name	client1
	ID	3
	IP address	192.168.1.17
	Printer name	HP LaserJet 5L
Desktop		
	Printer name	`HP LaserJet 5L#client1:3`
	or	
	Printer name	`HP LaserJet 5L#192.168.1.17:3`

Additional Output Gateway printers

Additional Output Gateway printers can be created with the ADD PRINTER function in the desktop's PRINTERS (AND FAXES) folder using THINPRINT as manufacturer. The printers are to be connected with a ThinPrint Port.

Compression

ThinPrint combines the efficiency of Driver Free Printing with adaptive ThinPrint compression (OPTIMAL option in Illus. 37). If high quality printout is not an important issue, data volume (and toner usage) can be even further reduced by selecting maximum compression[8] or by completely omitting images from the document (MAXIMUM, EXTREME and NO IMAGES options). With Driver Free Printing, of course the standard, no-loss compression known from native printer drivers is also still available (NORMAL option).

Paper formats and trays

After initial installation, a few default options are available for paper formats (Illus. 41) and paper sources[9] (Illus. 42). You can add further options – provided they are supported by the printer drivers on the client machine(s). The ways to do

8 Don't confuse with the MINIMUM PRINT DATA VOLUME option (Page 25).

this: Printer properties are uploaded automatically from the ThinPrint Client to the desktop (Illus. 42 and 45).

Presettings on the desktop (administrators only)

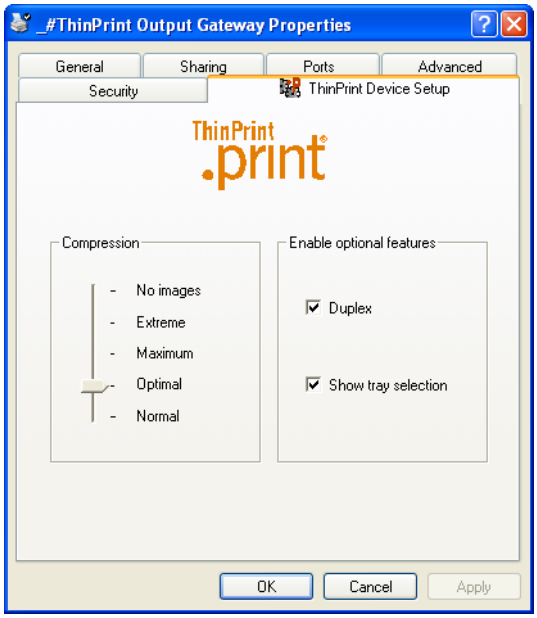
The following settings need to be set in the desktop's PRINTERS (AND FAXES) folder for all templates using "TP Output Gateway" as their printer driver (e.g. "_#ThinPrint Output Gateway"); as such they affect all printers using these templates during a desktop session.

– Select for example FILE→ PROPERTIES→ THINPRINT DEVICE SETUP for _#ThinPrint Output Gateway in the desktop's PRINTERS (AND FAXES) folder:

There are five options available for print data compression (Illus. 37):

- Normal — Lossless
- Optimal — Text without loss, good image quality
- Maximum — Text without loss, medium image quality
- Extreme — Text without loss, low image quality
- No images — Only text will be printed

Additionally the options DUPLEX and TRAY SELECTION can be enabled or disabled for users.

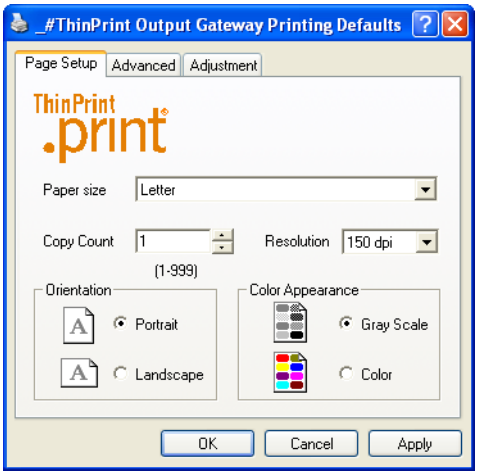


Illus. 37 Setting compression and enabling duplex and paper source selection

The settings shown in Illus. 37 can only be made by an admin on the desktop for the template and for manually created Output Gateway printers and cannot be changed by the users in a desktop session – unlike the settings below (Illus. 38–40).

Select ADVANCED→ PRINTING DEFAULTS to edit page and color settings (Illus. 38); e.g., A4 or LETTER as paper size.

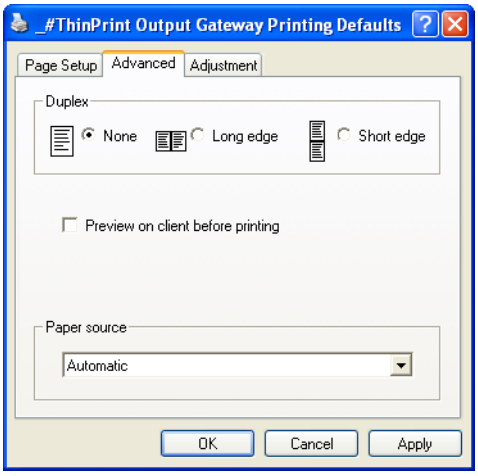
9 Selection of paper trays or manual feed



Illus. 38 Presetting paper size, print resolution, color, etc.

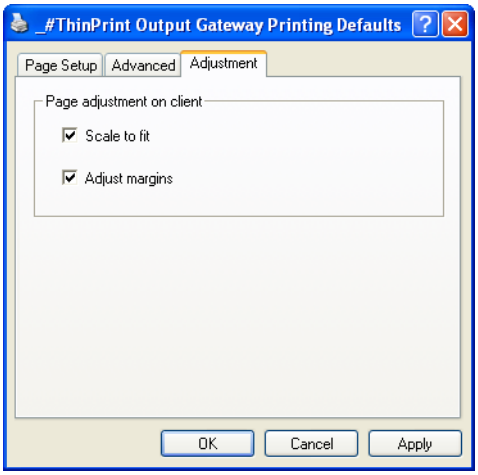
You can edit the following settings for double-sided printing under ADVANCED (Illus. 39): LONG EDGE or SHORT EDGE (= turn over edge).

If duplex and paper source are enabled on the desktop (as in Illus. 37), have the choice between simplex/duplex and of paper source, as in Illus. 39 – provided the original printer driver supports this function. If they are not enabled on the desktop, the corresponding user interface will not be available and it is only possible to select the preview (PREVIEW ON CLIENT BEFORE PRINTING: Illus. 46).



Illus. 39 Presetting preview, duplex, and paper source

ADJUSTMENT offers options for the default procedure if the printable area of the document and of the printer driver's paper format don't match. The option SCALE TO FIT changes the size of the printout, ADJUST MARGINS moves the zero point (Illus. 40). It is recommended to leave the template settings enabled.



Illus. 40 Presetting scaling and margin adjustment

The template settings from Illus. 38–40 are the shown as default options in a desktop session. Users can change them within their sessions.

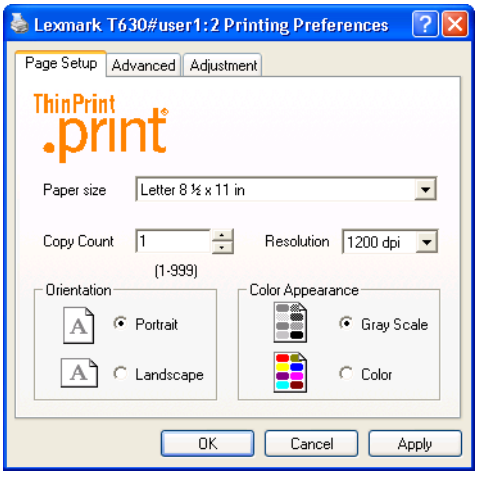
Settings in a desktop session

The following properties of the printers installed on the client machine can be sent from the client to the desktop via AutoConnect:

- Color/grayscales (Illus. 41)
- Paper sources (Illus. 42)
- Duplex/simplex (Illus. 42)
- Print resolution (Illus. 44)
- Paper size (Illus. 45)

In a desktop session the users can change some printer settings before printing in the printer properties dialogue.

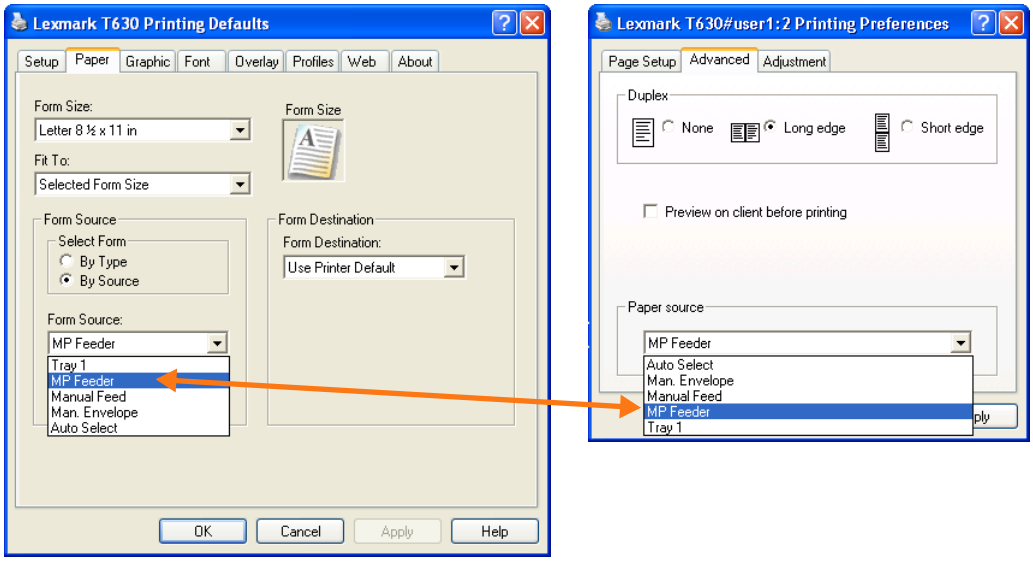
The following settings can be edited under GENERAL→ PRINTING DEFAULTS (Illus. 41): PAPER SIZE, COPY COUNT, PRINT RESOLUTION, PORTRAIT or LANDSCAPE, and COLOR or GRAY SCALE.



Illus. 41 Specifying paper size, print resolution, color, etc., in a desktop session

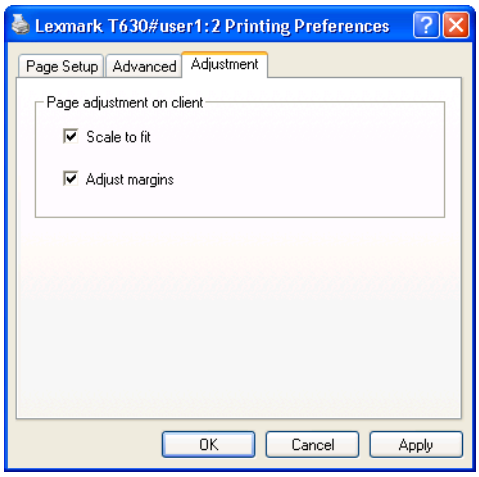
If the printer supports it, there are settings for double-sided printing under ADVANCED (see Illus. 42, right; LONG EDGE or SHORT EDGE) as well as paper tray or PAPER SOURCE.

Users can choose to see a preview before printing (Illus. 46), by selecting PREVIEW ON CLIENT BEFORE PRINTING.



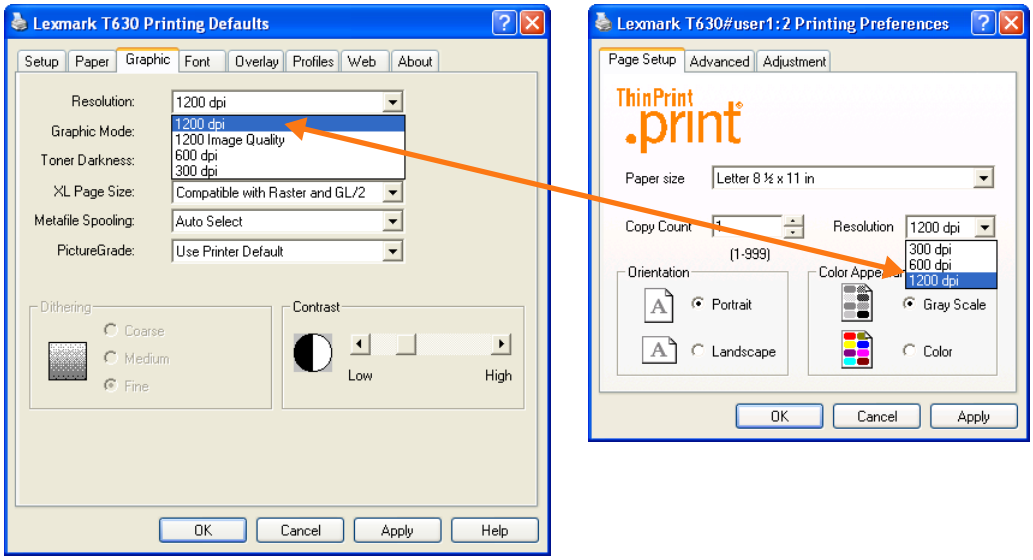
Illus. 42 Display of paper sources on the client (left) and in a desktop session (right)

ADJUSTMENT offers options if the printable area of the document and of the printer driver's paper format don't match. The option SCALE TO FIT changes the size of the printout, ADJUST MARGINS moves the zero point (Illus. 43).

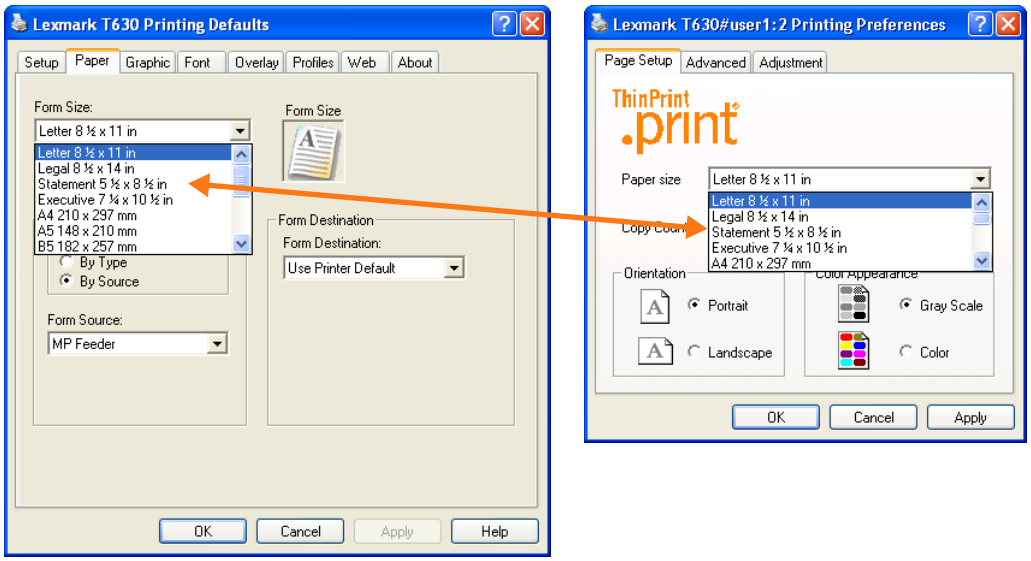


Illus. 43 Modifying scaling and margin adjustment in a desktop session

Illus. 44 and 45 show further print options such as *resolution* and *paper formats*. The client computer options (left) and the options available in a desktop session (right) are shown.



Illus. 44 Display of print resolution on the client (left) and in a desktop session (right)



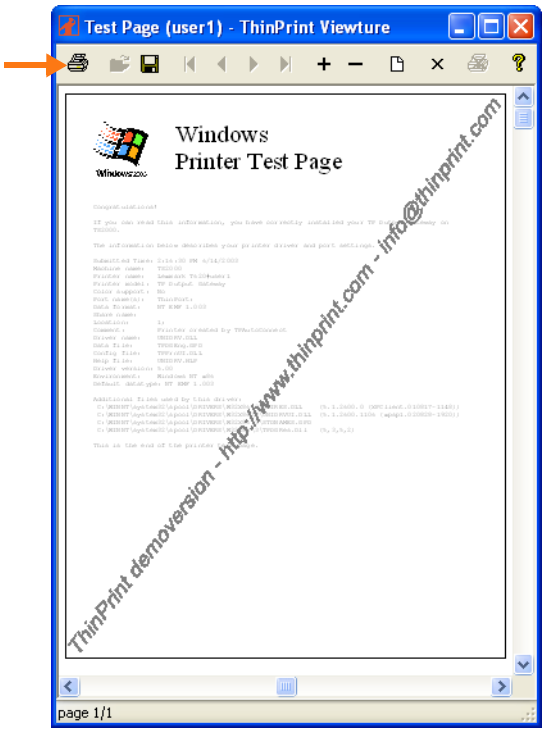
Illus. 45 Display of paper sizes on the client (left) and in a desktop session (right)

Printing with preview

Once the users have enabled the print preview (Illus. 42: checkmark on PREVIEW ON CLIENT BEFORE PRINTING) the print job appears in the ThinPrint viewer (= ThinPrint Viewture; Illus. 46). Here the users can:

- Print to any printer that is connected to the client computer or can be reached from it
- All client printer settings are available, even if they cannot be uploaded to the desktop session.
- Navigate in documents with more than one page
- Zoom

- Cancel print job reception
- Save print job[10]



Illus. 46 Preview with ThinPrint Viewture on the client computer (water mark = demo version)

When printing with preview, the print options appear in the desktop session in an Output Gateway design (on the right in Illus. 42, 44, and 45, respectively). Once the client machine receives the print job, the print job is displayed in a preview window (Illus. 46). The print options now appear in the design of the original printer driver (on the left in Illus. 42, 44, and 45, respectively).

– Confirm all settings by clicking OK.

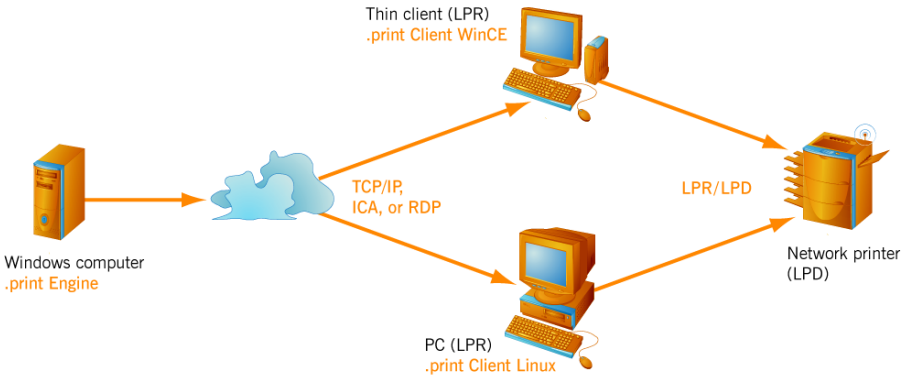
LPR/LPD printing with Windows CE or Linux clients

Overview

Windows CE and Linux clients are capable of forwarding print jobs to LPD devices. The ThinPrint Client WinCE or ThinPrint Client Linux is installed on a thin client or PC and can then receive ThinPrint print jobs (via TCP/IP, ICA, or RDP) and send them directly to internal or external print servers of network printers (via LPR/LPD, Illus. 47).

All ThinPrint Clients Linux support LPR/LPD printing as well as all ThinPrint Clients WinCE in version 5.5 and later.

10 File extension: .tpf (compressed EMF data); the Viewture program (= TPView.exe) is needed for reloading a saved print job; see Page 74).



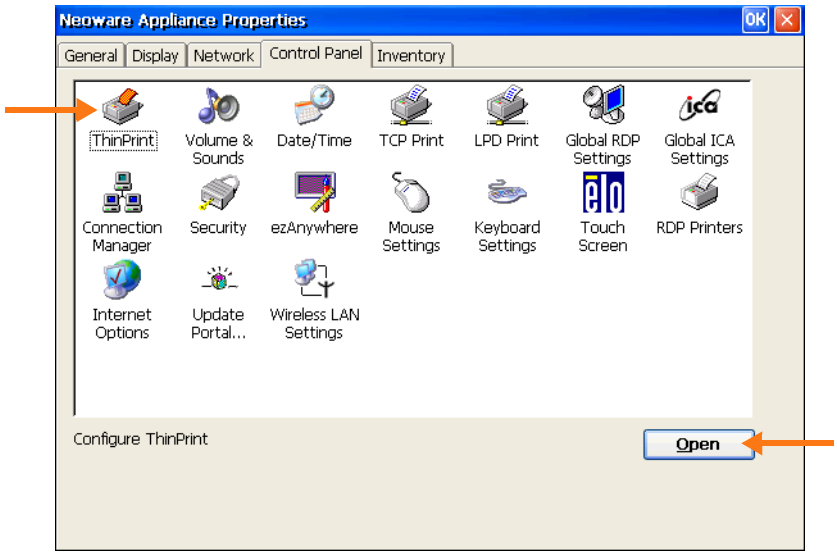
Illus. 47 LPR/LPD printing via Windows CE or Linux clients

Preparations on the desktop

- Set up a new template on the desktop (e.g. #hplaser) and connect it to a ThinPrint Port (e.g. ThinPort:). Use a native printer driver to do this. (e.g. HP LaserJet 4).
- Make sure that the printers completely spool the print data on the hard drive before sending. To do so, open the template's printer properties and select GENERAL. Select START PRINTING AFTER LAST PAGE IS SPOOLED. Additionally disable the ADVANCED PRINTING FEATURES. Click OK to confirm.
- Select the appropriate settings in AutoConnect to ensure that the relevant Windows-CE or Linux clients' printers operate with the new template (_#hplaser) in the desktop sessions. Refer to the configuration example in the paragraph "Auto-created client printers (AutoConnect)" on Page 54.

Preparing ThinPrint Client (example for Windows CE)

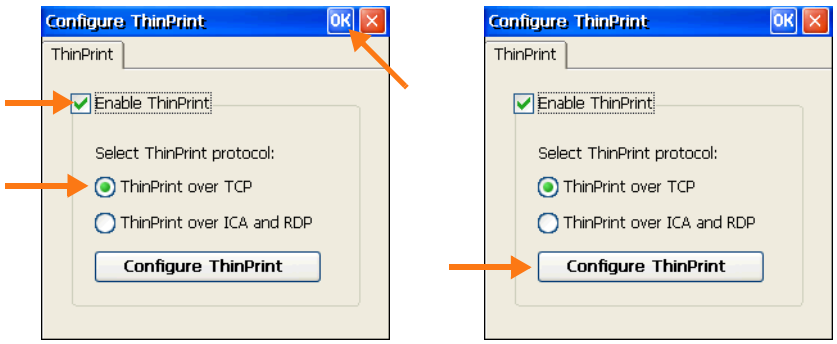
- Open the control panel on the Windows CE device and select THINPRINT (click OPEN, Illus. 48).



Illus. 48 ThinPrint Client WinCE in the control panel (example for Neoware terminals)

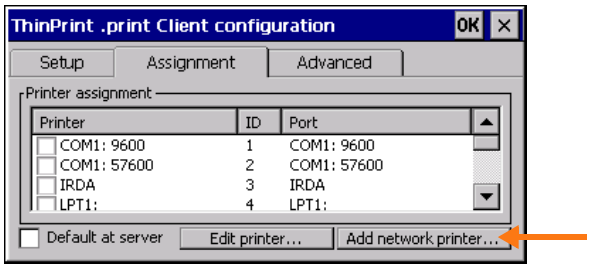
- Enable the ThinPrint Client (ENABLE THINPRINT, Illus. 49 left).

– Select the protocol you selected for the corresponding template (TCP/IP, ICA, or RDP) and click OK (Illus. 49 left).
– Open the ThinPrint Client configuration menu by clicking CONFIGURE THINPRINT (Illus. 49 right).

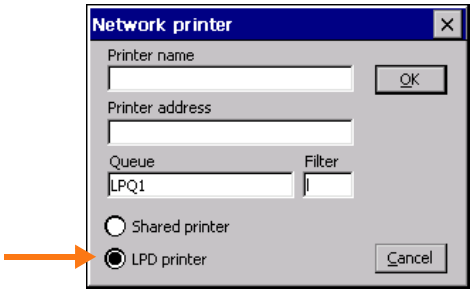


Illus. 49 Selecting a protocol, enabling ThinPrint Client and opening configuration menu

– Use ASSIGNMENT to list available printers (Illus. 50). Select ADD NETWORK PRINTER and then LPD PRINTER (Illus. 51).

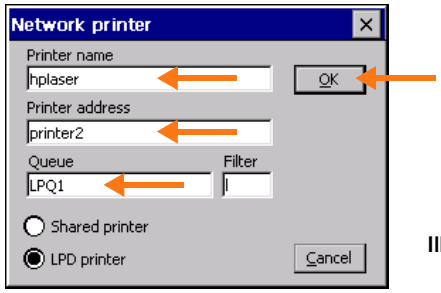


Illus. 50 Select ADD NETWORK PRINTER



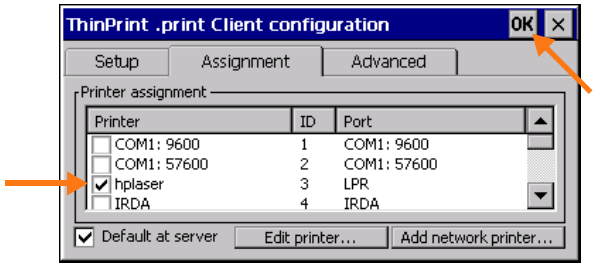
Illus. 51 Select LPD PRINTER

– Enter any PRINTER NAME and the printer's IP address or client name (PRINTER ADDRESS) and, for external print servers with more than one printer port, the name of the printer QUEUE (e.g., "LPQ1") according to the print server's user manual (Illus. 52); leave LPD FILTER "**l**" unchanged. Click OK to confirm.



Illus. 52 Enter a network printer (example)

– Enable this printer in the ASSIGNMENT tab and finish configuration with OK (Illus. 53).



Illus. 53 Enabling the new printer and finishing with OK

Printing

– Establish an ICA or RDP connection from the terminal to the desktop. The new printer appears in the session's PRINTERS (AND FAXES) folder.
– Open an application and print with this printer.

SSL encryption

The ThinPrint Engine has been expanded to include SSL encryption for printing, which ensures a secure connection between the ThinPrint Engine and the ThinPrint Client (available with ThinPrint Client version 6.2 and later). To do so, the following SSL certificates must be imported:

– one "personal" desktop certificate and one root certificate on each machine with ThinPrint Engine
– one "personal" client certificate on each client computer, to which the encrypted print jobs are to be sent

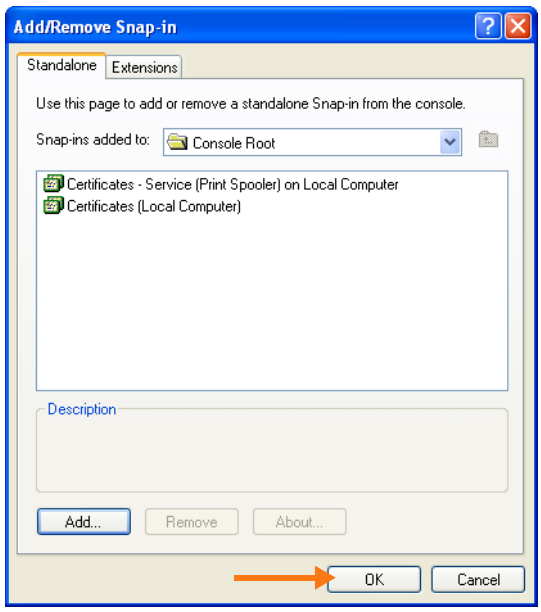
The ThinPrint Engine checks whether the client computer is authorized to receive print data. For information on generating certificates, please consult the "Creating SSL certificates for printing with ThinPrint" documentation (Page 73).

Importing SSL certificates on the desktop

Install your own SSL certificates on the desktop as follows:

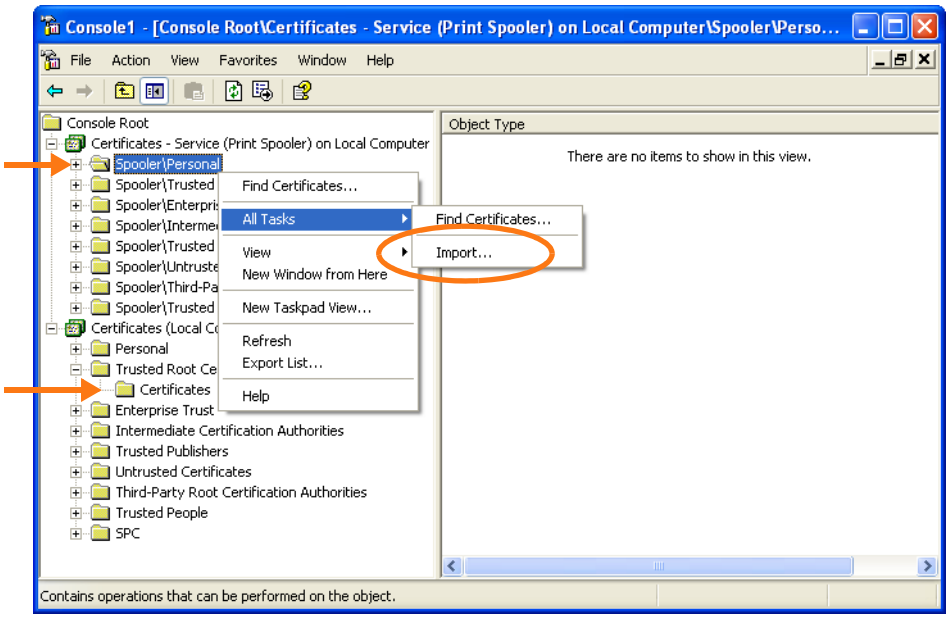
1. Log on as a member of the ADMINISTRATORS user group and open the Microsoft Management Console from the command prompt with:

   mmc
2. In the MMC, select:
   FILE→ ADD/REMOVE SNAP-IN→ ADD→ CERTIFICATES→ ADD→ SERVICE ACCOUNT→ NEXT→ LOCAL COMPUTER→ NEXT→ PRINT SPOOLER→ FINISH
3. Select immediately thereafter:
   ADD→ COMPUTER ACCOUNT→ NEXT→ LOCAL COMPUTER→ FINISH→ CLOSE
4. Lastly, click OK (Illus. 54).



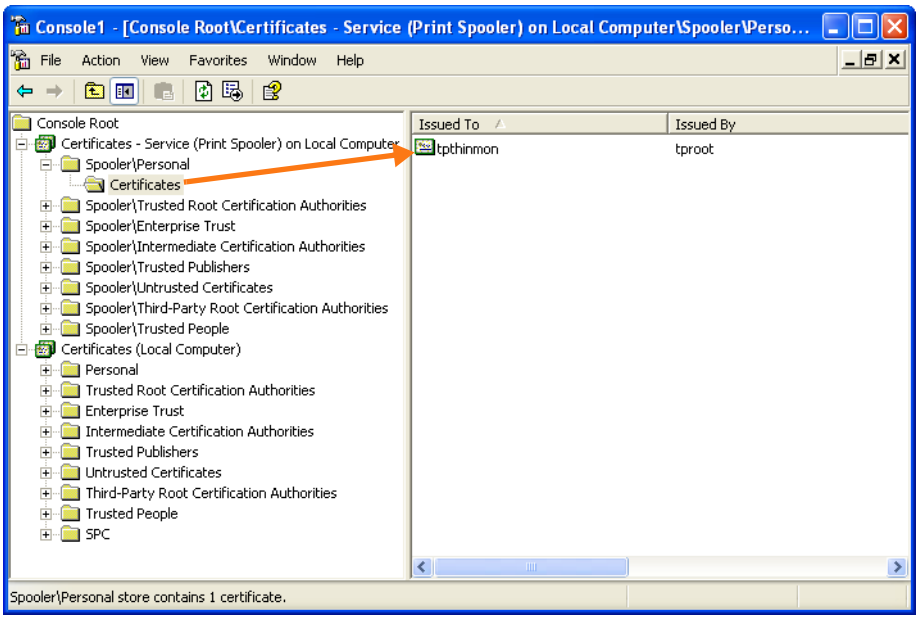
Illus. 54 Adding snap-ins for SSL certificates to the MMC

5. Import the certificate(s) to the two places shown in Illus. 55 (see arrows). To do so, select each time ALL TASKS→ IMPORT in the context menu and then NEXT→ BROWSE→ OPEN→ NEXT→ PASSWORD→ NEXT→ PLACE ALL CERTIFICATES IN THE FOLLOWING STORE→ NEXT→ FINISH→ OK. The CERTIFICATES subdirectory will be created automatically, if necessary.
   The “personal” desktop certificate will be imported under CERTIFICATES – SERVICE (PRINT SPOOLER) ON LOCAL COMPUTER→ SPOOLER\PERSONAL and the root certificate under CERTIFICATES (LOCAL COMPUTER)→ TRUSTED ROOT CERTIFICATION AUTHORITIES.

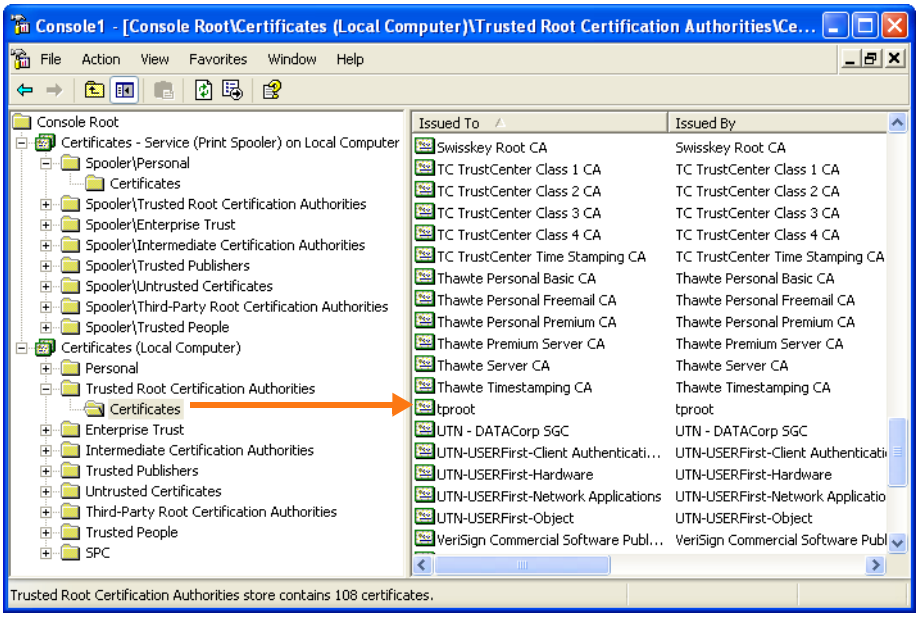


Illus. 55 Importing two SSL certificates to the server

Two examples for imported certificates can be found in Illus. 56 and 57.



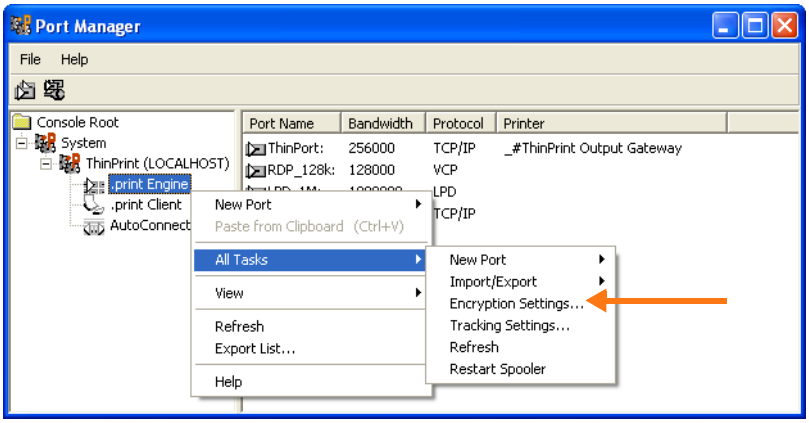
Illus. 56 First SSL certificate imported on the server (example for server certificate)



Illus. 57 Second SSL certificate imported on the server (example for root certificate)

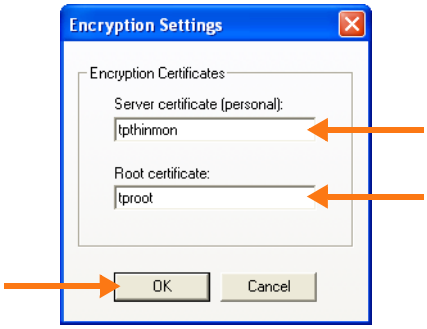
Selecting certificates

6. To enable use of the imported SSL certificates with the ThinPrint Engine, open port configuration in the MMC [START→ (ALL) PROGRAMS→ .PRINT ENGINE → CONFIGURATION].
7. Select ENCRYPTION SETTINGS in the .PRINT ENGINE context menu (Illus. 58).



Illus. 58 Selecting ENCRYPTION SETTINGS

8. Enter the names of the desktop and root certificates under ENCRYPTION CERTIFICATES (Illus. 59). Use the names that are displayed in the ISSUED TO column of the MMC's certificate overview (in Illus. 56 and Illus. 57, `tpthinmon` and `tproot` as examples).

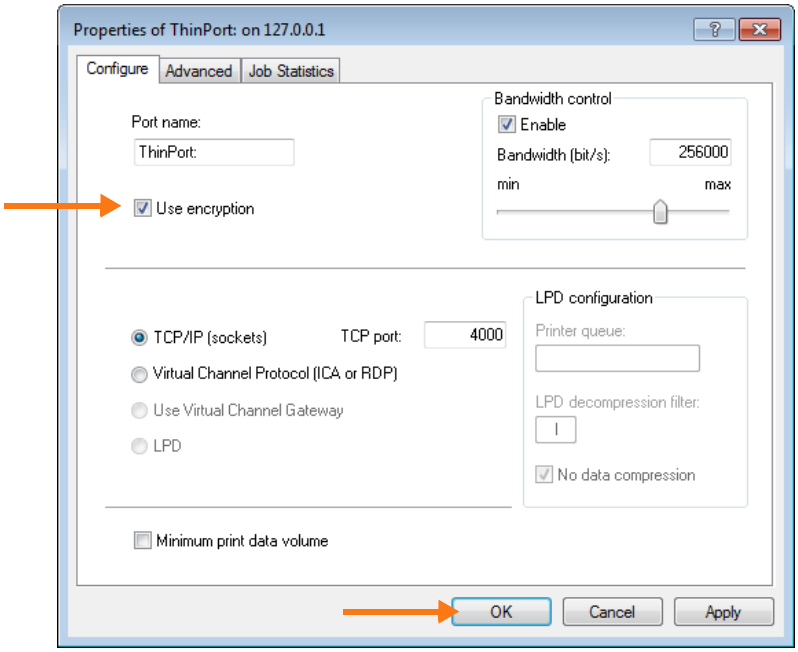


Illus. 59 Selecting imported SSL certificates (example)

9. Fill in both fields and check that each certificate is installed on the desktop (Page 49) and that the certificates installed on the client computers are trusted by the desktop certificates[11] (see “ThinPrint Client Windows” user manual; Page 73). Otherwise, print jobs will not be executed.

Enabling encryption

SSL encryption is enabled per ThinPrint port in the MMC (Illus. 60).



Illus. 60 Enabling encryption in the port configuration (MMC)

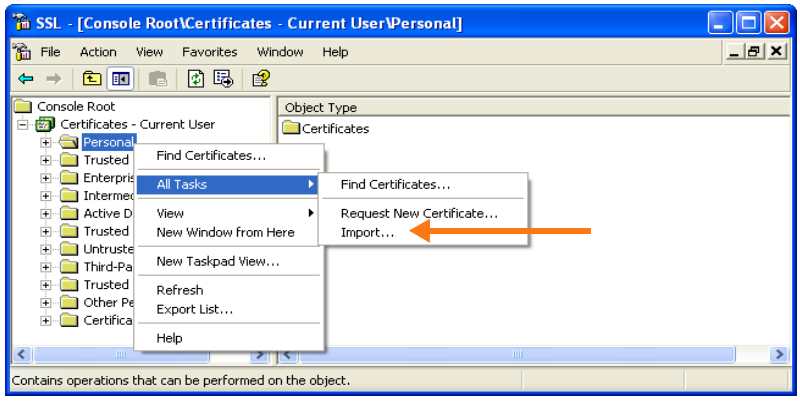
Importing SSL certificates on the client computers

For client-side installation of SSL certificates, please consult the relevant ThinPrint Client user manual (Page 73). Below, installation is described with the example of the ThinPrint Client Windows.

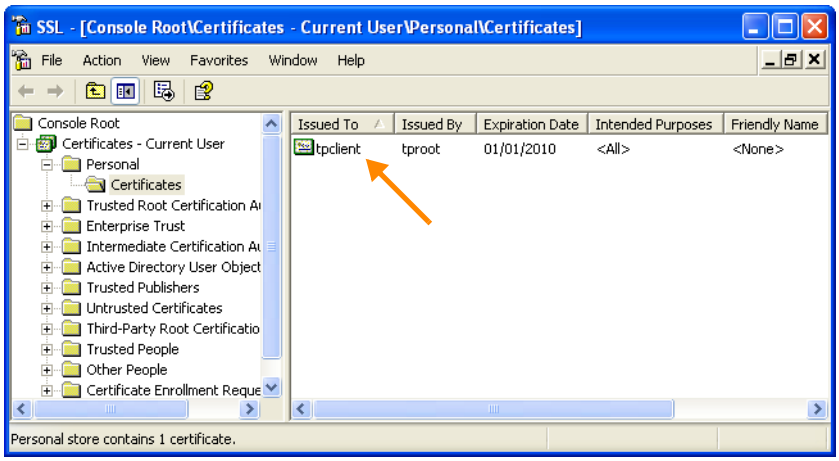
1. To install a client certificate, select the following in the MMC on the client PC: File→ Add/Remove Snap-In→ Add→ Certificates→ Add→ My User Account→ Finish→ Close→ OK

11 If desktop, root, and client certificates were all created on the same computer (=certificate authority) and exported with a password, the certificates will trust each other automatically.

2. Now import the certificate by selecting ALL TASKS→ IMPORT in the context menu (Illus. 61) and then:
   NEXT→ BROWSE→ OPEN→ NEXT→ PASSWORD→ NEXT→ PLACE ALL CERTIFICATES IN THE FOLLOWING STORE→ NEXT→ FINISH→ OK



Illus. 61 Starting import of a SSL certificate



Illus. 62 SSL certificate imported to a client

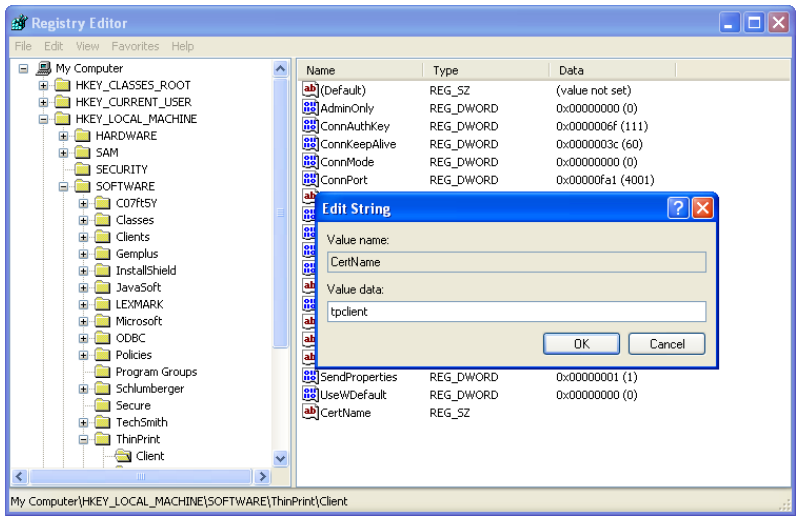
Tip! If different users on a client computer are to receive encrypted print data, the certificate must be imported to CURRENT USER→ PERSONAL for each user.

Registry entry CertName

Before sending encrypted data, ThinPrint Engine requests the client certificate from the ThinPrint Client. The ThinPrint Client selects the certificate to be sent based on the `CertName` entry in the Windows registry. The `CertName` entry is entered manually in the Windows registry, as described below:

1. After the certificate has been imported, create the following registry value on each client computer with REGEDIT (Illus. 63; data type: reg_sz):

   `hkey_local_machine\software\thinprint\client\CertName`



Illus. 63 Registry entry for SSL encryption on Windows clients (example for `tpclient` certificate)

2. Enter as data the name of the imported certificate as displayed in the ISSUED TO column of the MMC's certificate overview (`tpclient` as example in Illus. 63).
3. Restart ThinPrint Client Windows.

The `CertName` registry value is only needed for encrypting print data; receipt of unencrypted print data is always possible.

Auto-created client printers (AutoConnect)

Where and how to install AutoConnect?

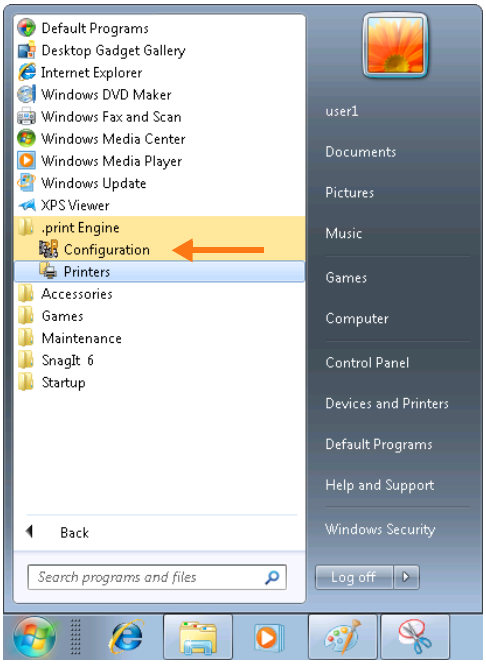
AutoConnect is installed automatically on the desktop together with the ThinPrint Engine (Page 12).

AutoConnect configuration

You can configure AutoConnect both on the computer to which you are currently logged on (local) and from another computer (remote); AutoConnect must be installed on both computers.

Local

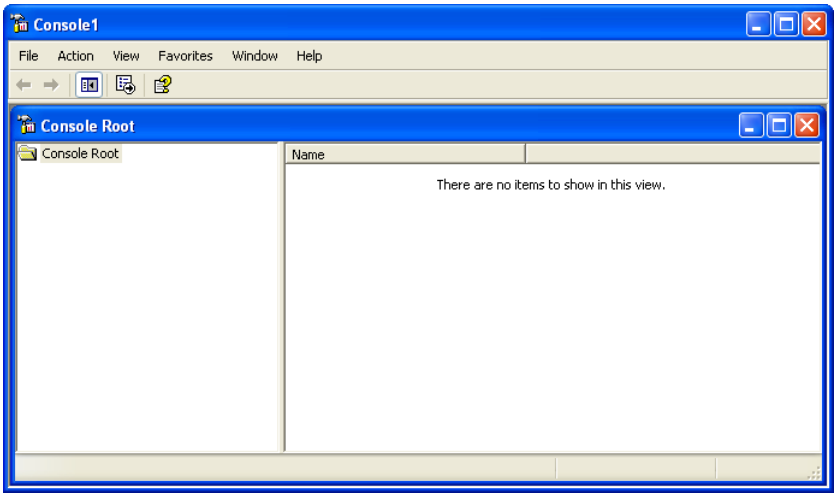
– On the desktop open the ThinPrint Port configuration with START→ (ALL) PROGRAMS→ .PRINT ENGINE→ CONFIGURATION (Illus. 64).



Illus. 64 Open the AutoConnect configuration (Windows 7)

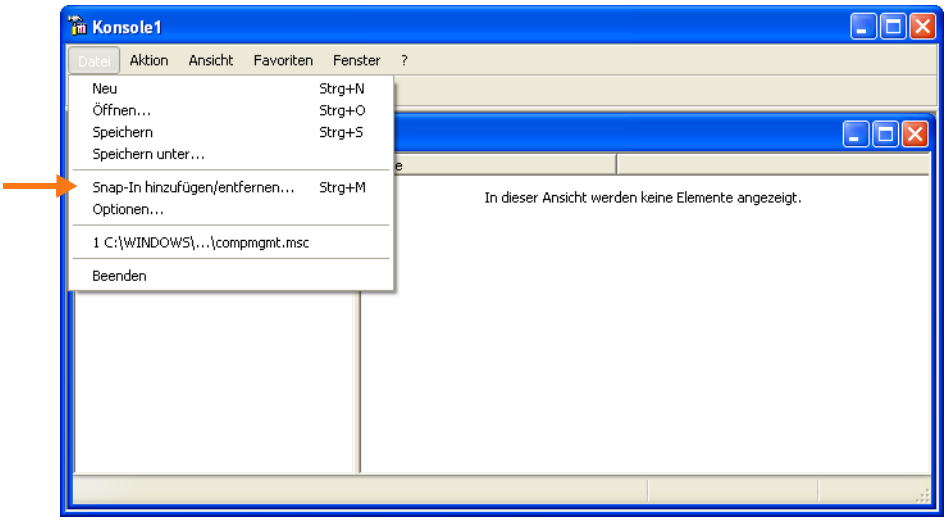
Remote

1. The computer's firewall must be disabled for LANs if you want to use remote port configuration. Therefore, open the WINDOWS FIREWALL in the control panel and disable the LOCAL AREA CONNECTION on the ADVANCED tab. Click OK to confirm.
2. For remote AutoConnect configuration, open the Microsoft Management Console from the command prompt with: **mmc**. This opens the window shown in Illus. 65.



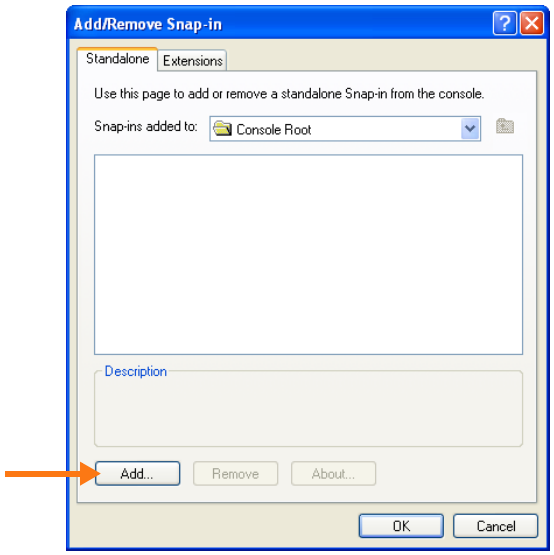
Illus. 65 Microsoft Management Console

3. Select CONSOLE→ ADD/REMOVE SNAP-IN (Illus. 66).



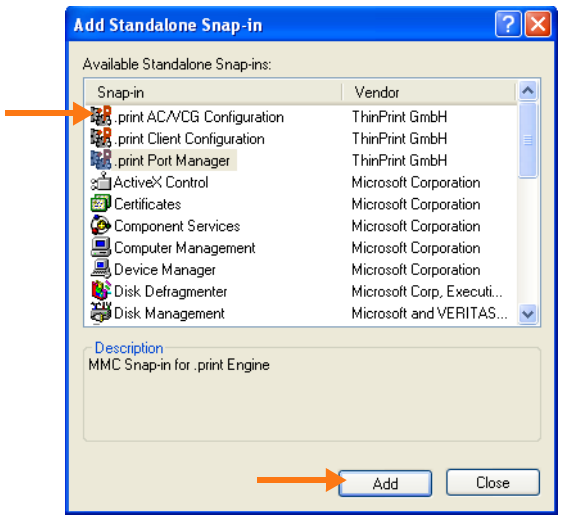
Illus. 66 MMC: add Snap-in

4. Select ADD (Illus. 67).



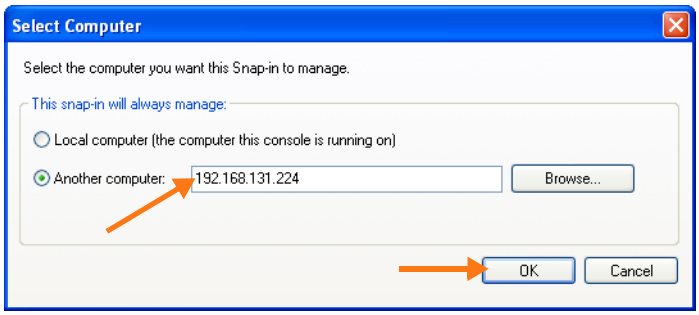
Illus. 67 MMC: select ADD

5. Select .PRINT AC/VCG CONFIGURATION for AutoConnect configuration (Illus. 68) and click ADD.



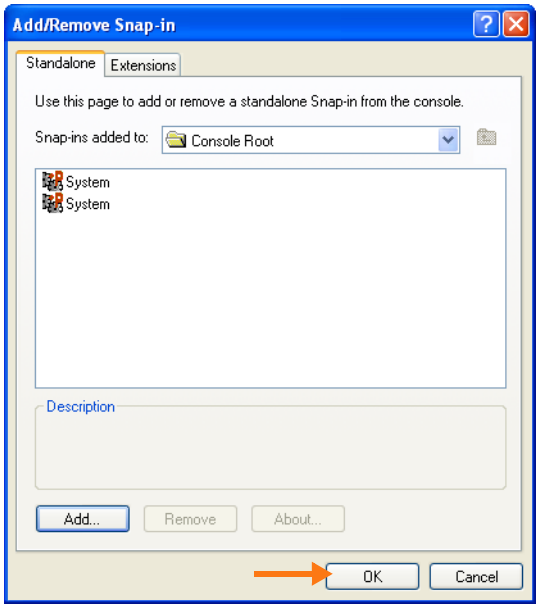
Illus. 68 MMC: select a ThinPrint component (example)

6. Select ANOTHER COMPUTER and enter all computers you want to manage. Click OK (Illus. 69).



Illus. 69 MMC: Select another computer to be managed

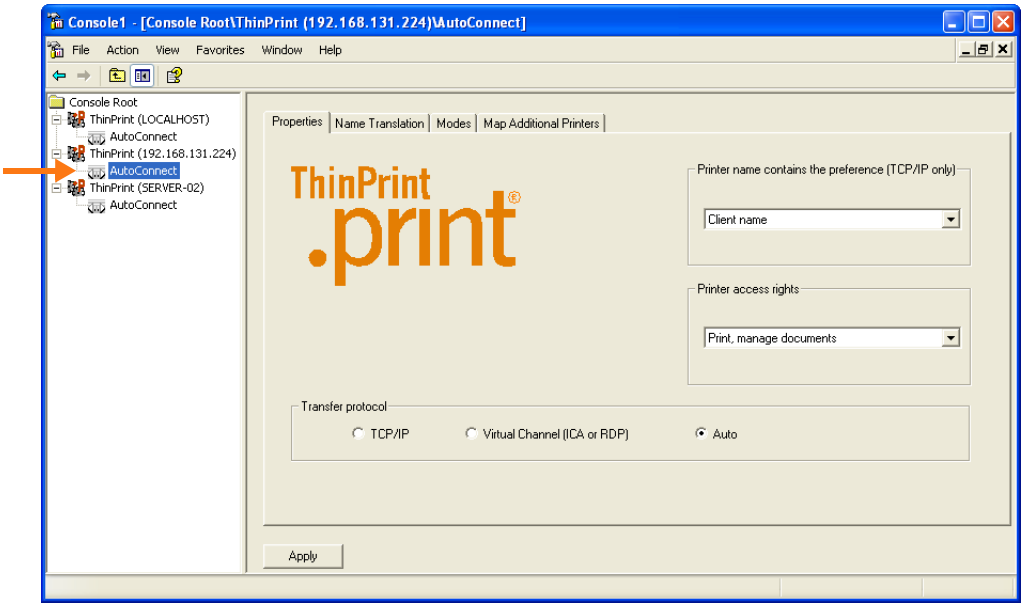
7. Repeat steps 5 and 6. Click CLOSE and OK once you have added all computers you need to manage (Illus. 70).



Illus. 70 MMC: all ThinPrint components and computers to be managed selected

Configuration

– Click an AutoConnect node (arrow in Illus. 71) to open the AutoConnect configuration.



Illus. 71 AutoConnect configuration

Properties

On the PROPERTIES tab (Illus. 71) under PRINTER NAME CONTAINS THE PREFERENCE, specify whether the printer names to be created should include the CLIENT NAME (= computer name) or the CLIENT IP ADDRESS. If the client name cannot be detected, the client IP address is automatically entered (TCP/IP only).

Under PRINTER ACCESS RIGHTS, you can set user permissions for the printers to be created: PRINT, MANAGE DOCUMENTS (default) or PRINT, MANAGE PRINTERS AND DOCUMENTS. The permission MANAGE DOCUMENTS allows, among other things, deletion of "hanging" print jobs. MANAGE PRINTERS allows, among other things, deletion of printers.

At the bottom of the screen, you can specify the connection protocol. If you select TCP/IP or VIRTUAL CHANNEL (ICA OR RDP), you restrict the communication to a protocol family. The AUTO setting allows both protocol families and is therefore recommended if you use both RDP and TCP/IP types of ThinPrint ports.

– Click APPLY to confirm your entries.

Tip! The protocol must agree both with the type of ThinPrint port to which the applied template is associated and with the type of ThinPrint Client in use (TCP/IP or RDP; see also the user manual for the specific ThinPrint Client).

Name translation (Dynamic Printer Matrix)

You can create templates for specific printers or groups of printers (classes). However, besides using the names of templates, printers, and classes, the name translation

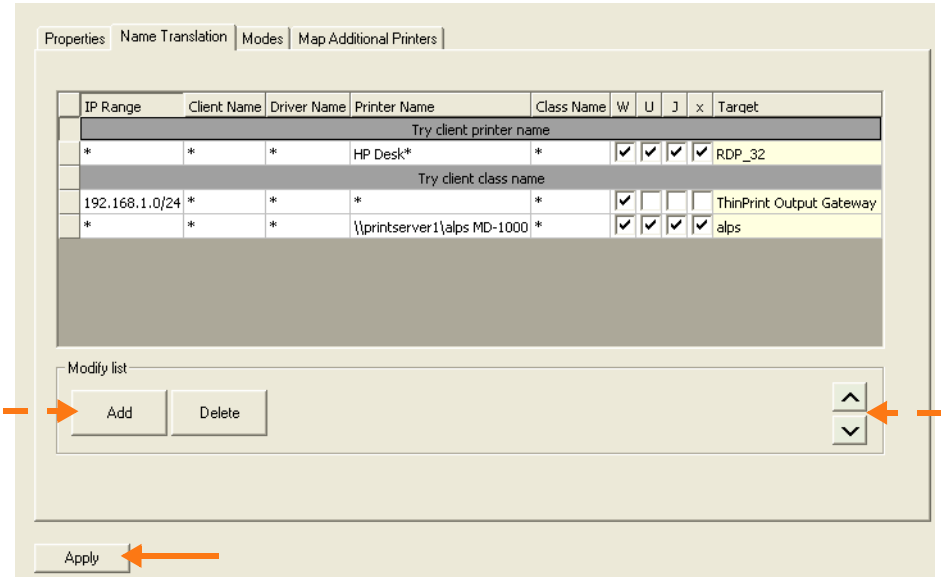
table (Dynamic Printer Matrix) entries described below can be used for specifying which templates are to be used for creating a printer in a remote desktop session .

– Select NAME TRANSLATION tab. Use the ADD, DELETE, or ARROW buttons to edit the table.

Assigning templates

The name translation table makes it possible to assign any printer(s) to a specific template. For example, the *_#RDP_32* template is assigned to the *HP DeskJet 460* printer in Illus. 72; the *Brother HL-10DV* printer is given the *_#ThinPrint Output Gateway* template.

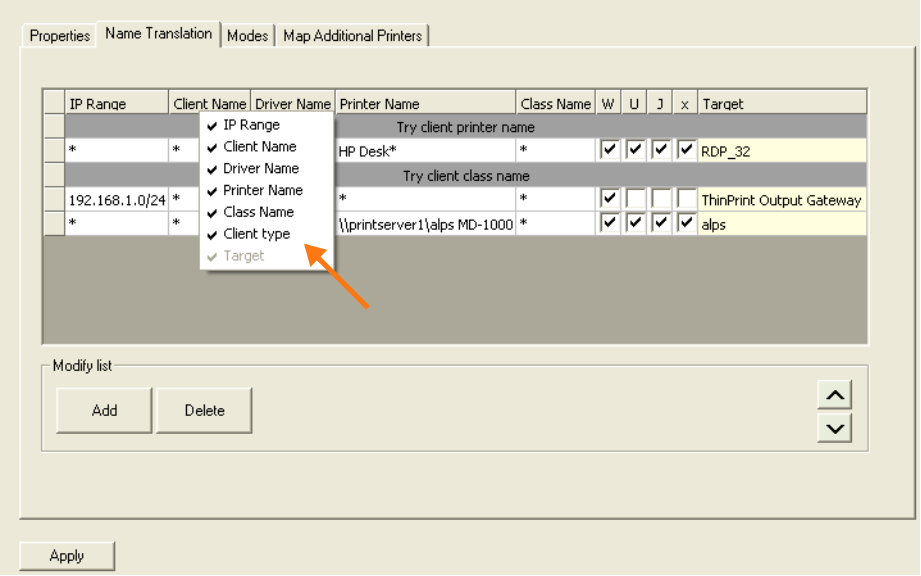
All printer and class names listed in the ThinPrint Client can be translated, including printers which are connected to a shared printer; e.g., the printer *Alps MD-1000* (last entry in Illus. 72). * and ? can be used as wild cards for name translations.



Illus. 72 Name translation table

Table functions

The name translation table still offers the options of moving and deleting lines as well as showing or hiding columns (Illus. 73). Hiding a column (and therefore the translation rule) disables the corresponding function.



Illus. 73 Hiding columns

The table has the following columns/functions: IP RANGE, CLIENT NAME, DRIVER NAME, PRINTER NAME, CLASS NAME, and CLIENT TYPE. The TARGET column represents the template name (without _#).

IP range

The IP RANGE column in the name translation table could contain, for example, the following entries:

192.168.1.136
192.168.1.1–192.168.1.150
192.168.1.0/24
192.168.0.0/16
192.0.0.0/8

A separate template or other printer share is given as each target; printers with different properties will thus be mapped in the respective remote desktop session.

The default entry in IP RANGE is: 0.0.0.0–255.255.255.255

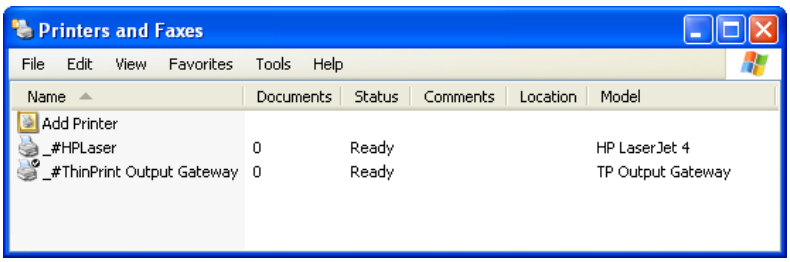
The “24” represents the following subnet mask: 255.255.255.0; i.e., 3x8=24 set bits (16 is equivalent to 255.255.0.0 and 8 is equivalent to 255.0.0.0).

Client type

You can select between Windows clients (**W**), Unix clients (**U**), Java clients (**J**), and other (**X**). By default, all client types are selected. If specific translation rules are only to apply to selected client types, then they are easily selected by simply adding or removing a checkmark. In the following table, as an example, the “_#ThinPrint Output Gateway” template is assigned to all Windows clients[12]. All other client types use the “_#HPLaser” template, which uses a native printer driver (Illus. 74).

					W	U	J	X	Target
*	*	*	*	*	✓	–	–	–	ThinPrint Output Gateway

					W	U	J	X	Target
*	*	*	*	*	–	✓	✓	✓	HPLaser



Illus. 74 Templates for printing with native printer driver (_#HPLaser) and for Driver Free Printing (_#ThinPrint Output Gateway)

Try client printer name/client class name

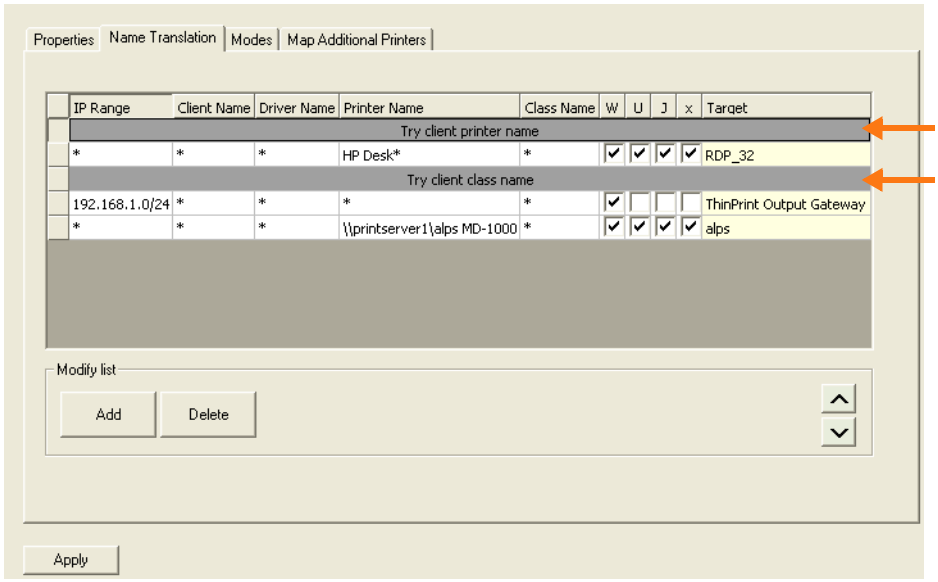
There are two special lines in the name translation table:

TRY CLIENT PRINTER NAME and
TRY CLIENT CLASS NAME

Unlike the other lines, these two lines do not include line subdivisions. These lines show that AutoConnect is trying to find a suitable template for the printer names or the class names on the client machine.

If a grey line (TRY CLIENT PRINTER NAME or TRY CLIENT CLASS NAME) is found for which a template exists, the relevant printer is created and no further lines underneath in the table are searched through. If, on the other hand, matches for all columns (except TARGET) are found a white (editable) line, a printer is created according to the entry under TARGET. In this case, too, the lower lines will not be checked. The order of the lines in the table specifies the priority of the templates.

12 from Windows 2000



Illus. 75 Special lines

In the example in Illus. 75, the special line TRY CLIENT PRINTER NAME is used as the first line. In this case, AutoConnect first checks whether a template (_#HP LaserJet 4) exists for the printer name to be mapped (e.g., for HP LaserJet 4). If so, a printer is created in the session using this template.

The special line TRY CLIENT CLASS NAME is used as the third line. In this case, AutoConnect checks whether a class (e.g., HPLaser) has been defined in the ThinPrint Client Manager for the printer name to be mapped. If there is a template (_#HPLaser) for this class, a printer is created in the session using this template.

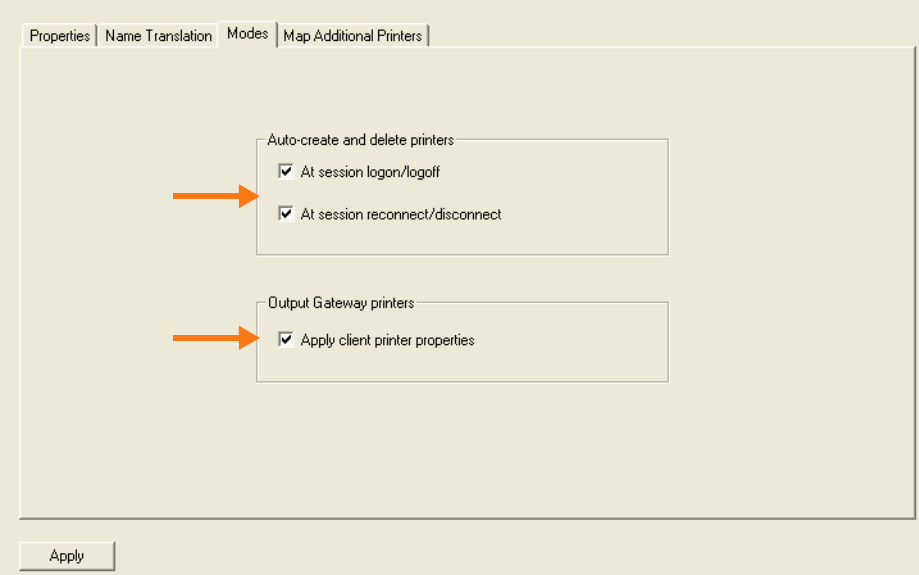
Variables

Variables can also be used in the column TARGET, however, they are restricted to connections to printer shares. Refer to the handbook “ThinPrint Engine for print servers” (Page 73).

Modes

There are two ways to activate AutoConnect:

- **Auto mode**: In the AutoConnect configuration, activate the option AUTO-CREATE AN DELETE PRINTERS for all users (upper arrow in Illus. 76):
  - At each remote desktop session logon/logoff *or*
  - When disconnecting and reconnecting a remote desktop session.



Illus. 76 Enabling auto mode and sending printer driver options from client to server

- **Script mode**: If you want AutoConnect to start only for specific users, it can be run by script or from the command prompt.

Script mode

Parameters for the script call are:

Parameters	Function
`-v`	(Verbose) Display messages; run AutoConnect to provide detailed information
`-d`	Delete printers for a specific session
`-d all`	Delete all printers created with templates (members of the administrator user group only)
-d *session_ID*	Delete all printers of a specific session (admins only); the session ID is found in the PRINTERS AND FAXES folder under LOCATION
`-q`	(Quiet) Error messages are not sent to the client machine's desktop
`-r`	(Repair) Compares saved session information with actually existing printers (members of the administrator user group only)
`-p` *port*	(Port) TCP/IP port number (if other than port 4000) Note: The TCP port numbers in the ThinPrint port, AutoConnect, and ThinPrint Clients must match.
`-i` *protocol*	(Interconnection) Select protocol for connection to the ThinPrint Clients; overwrites AutoConnect dialog settings (acceptable values: TCPIP, VC, AUTO); see Illus. 71)

Parameters	Function
`-a` *address*	For printer connections via TCP/IP where no session exists: IP address or client name of the computer on which a ThinPrint Client is running
`-?` or `-h`	(Help) Opens parameter help

Script control also works for network printer objects that are created with the name translation table.

Using logon/logoff script

To run AutoConnect by script or from the command prompt:

1. Enter the AutoConnect cue in a logon script on the desktop. For example:

```
tpautoconnect
```

2. Enter the option *disconnect printer* in a desktop logoff script:

```
tpautoconnect -d
```

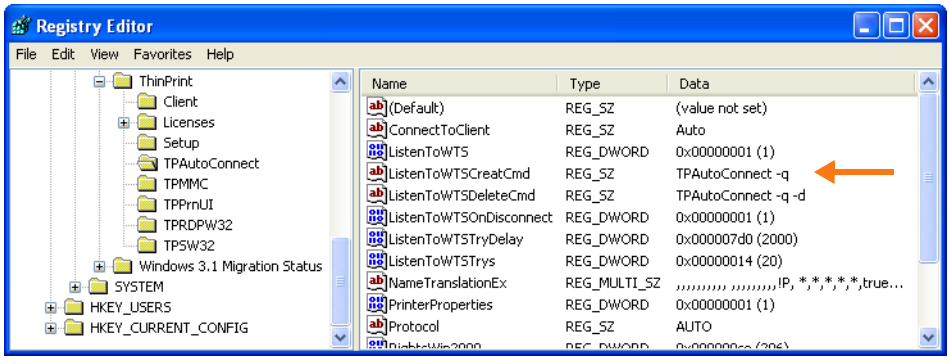
Parameters in Auto mode

The parameters `-i`, `-q`, and `-p` can also be used in Auto mode. To do so for logon, the following value must be changed in the registry (Illus. 77):

```
hkey_local_machine\software\thinprint\
TPAutoConnect\ListenToWTSCreatCmd
```

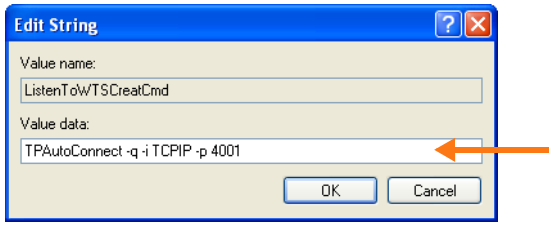
An example of this is depicted in Illus. 78. All three parameters have been added; they specify that:

- The Windows error messages are suppressed (quiet) for all users (-q)
- The connection to a ThinPrint Client is always established via TCP/IP (-i TCPIP)
- An alternative TCP port is used (-p 4001)[13]



Illus. 77 Using AutoConnect parameters in Auto mode: *ListenToWTSCreatCmd* in the registry (example)

13 Tip: The TCP port numbers in the ThinPrint port, AutoConnect, and ThinPrint Client must match.

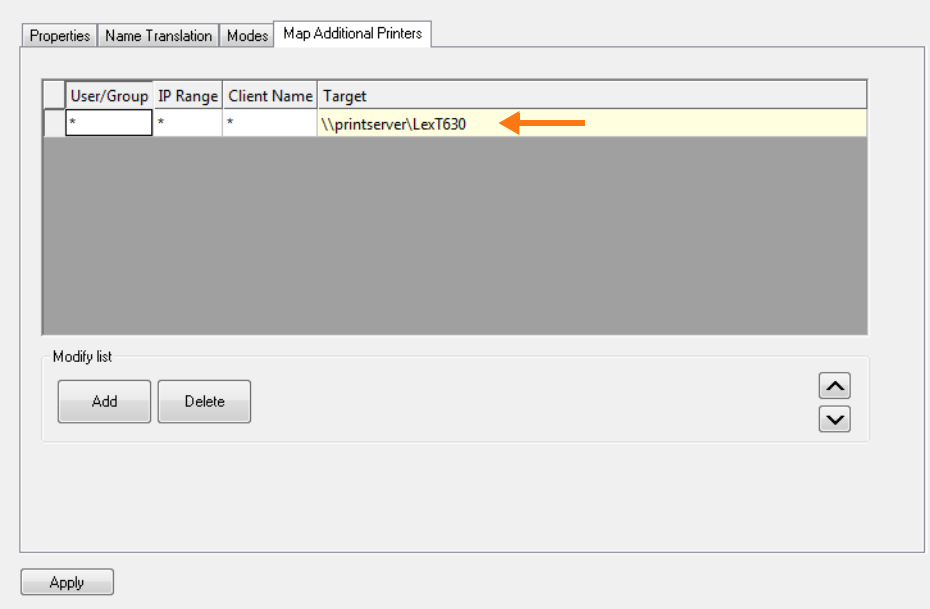


Illus. 78 AutoConnect parameters added for Auto mode: -i and -p (example)

The registry value for logoff is:

```
hkey_local_machine\software\thinprint\
TPAutoConnect\ListenToWTSDeleteCmd
```

Map additional printers



Illus. 79 Mapping shares from client machines on which no ThinPrint Client is running

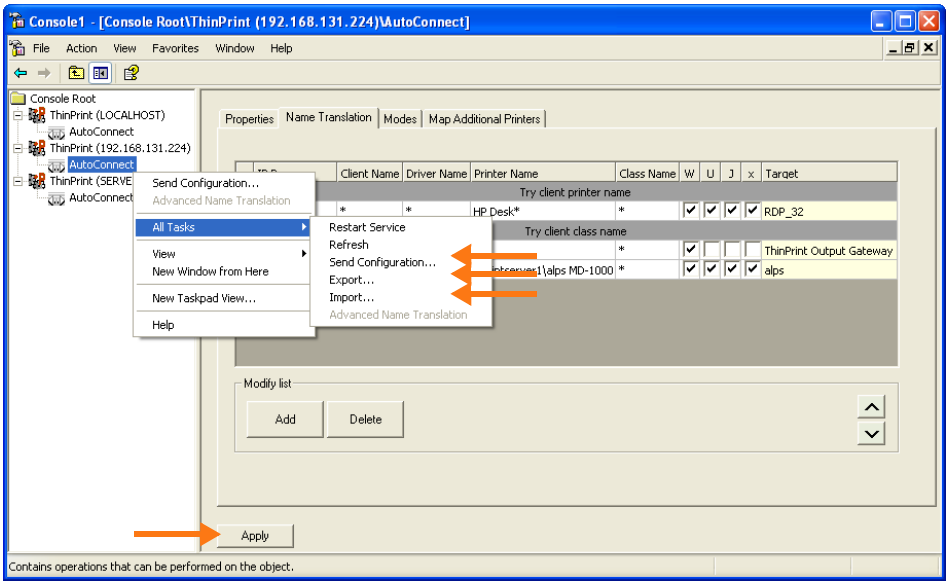
All entries in the name translation table (Illus. 72) require a ThinPrint Client on the client side. However, if there is no ThinPrint Client on the target computer, any number of network printers can be added with the MAP ADDITIONAL PRINTERS function in the AutoConnect configuration (Illus. 79):

IP range	Client name (computer name)	Target
*	*	\\printserver\LexT630

If a share entered as target belongs to a printer that is connected to a ThinPrint port, the resulting (=created by AutoConnect) printers will print with ThinPrint; if not, then without.

Context menu

The SEND CONFIGURATION, EXPORT, and IMPORT functions (Illus. 80) let you distribute configuration to other computers. You can apply the “Name Translation” and “Map Additional Printers” tables to other AutoConnect installations.



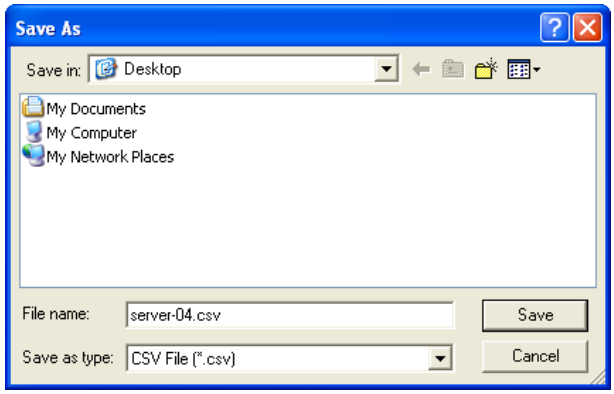
Illus. 80 Context menu

Send configuration

The SEND CONFIGURATION function lets data from the AutoConnect configuration be sent to groups of computers; see “Procedure when sending” (Page 32).

Export/Import

The EXPORT function (Illus. 80) lets the contents of the “Name Translation” and “Map Additional Printers” tables be opened in other programs, such as Microsoft Excel. Regardless of whether changes are made, the current status can be applied to the name translation table on any computer using the IMPORT function. The file type for export and import is .csv[14] (Illus. 81) with semicolon as list separator.



Illus. 81 Saving data in a .csv file

14 A .csv file is a text file for saving or exchanging simply structured data. The extension “csv” stands for Character Separated Values or Comma Separated Values, because the individual values are separated by a special character, such as a comma.

Applying changes
Once you are finished configuring AutoConnect, click APPLY (Illus. 80).

Appendix

Customer service and technical support

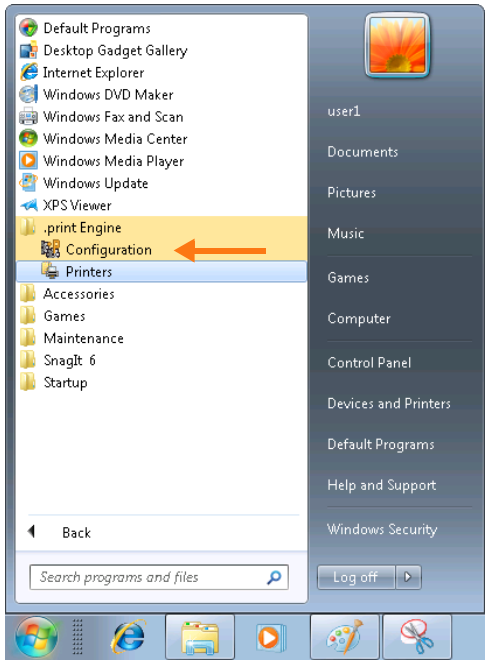
www.thinprint.com/—> RESOURCES & SUPPORT
www.thinprint.com/en-us/resourcessupport/supportrequest.aspx

Entering and activating licenses

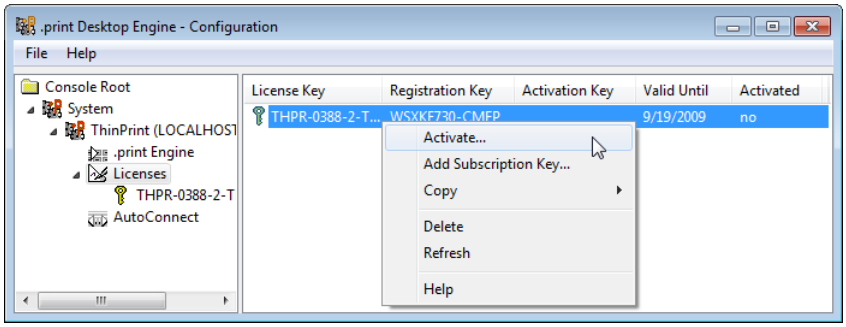
Note! Activating a ThinPrint license
All license keys are **valid for 30 days** after they have been entered. They **must be activated within this time** to continue printing. Demo license keys cannot be activated.
Once you have successfully tested the ThinPrint Engine, you can purchase a full license. You will receive new license keys, which are then entered in the License Manager.
To activate the license keys upload them together with their registration keys to the **Cortado Enterprise Portal** (enterpriseportal.cortado.com→ CUSTOMER VIEW). For further information about the activation procedure see the technical information *Licensing* (www.thinprint.com).

1. Open the License Manager from START→ (ALL) PROGRAMS→ .PRINT ENGINE → CONFIGURATION to enter license keys, check registration keys (for activation), and activate licenses (Illus. 82).
2. The window depicted in Illus. 83 will open; select the desired function: Add, Activate, Copy, Export, or Delete a license key.

Caution! License Manager offers the possibility of deleting license keys. Be aware however, that once license keys have been deleted they can not be reentered on the same machine – not even if they had been previously activated! Please read the message in the popup window carefully when you delete a license.



Illus. 82 Open the License Manager (Windows 7)

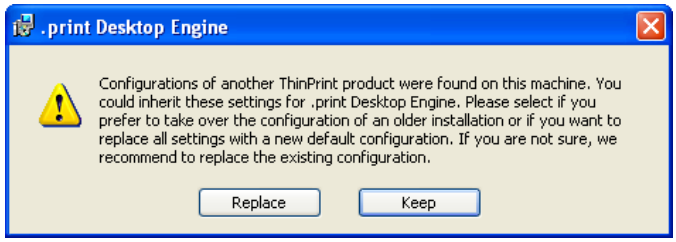


Illus. 83 License Manager: Activating a license key (example)

Update of older Desktop Engine versions

With an update installation of ThinPrint Desktop Engine you'll be asked if you want to replace old setting with new ones or if you want to keep the old ones.

– If you don't be sure, select KEEP (Illus. 84).

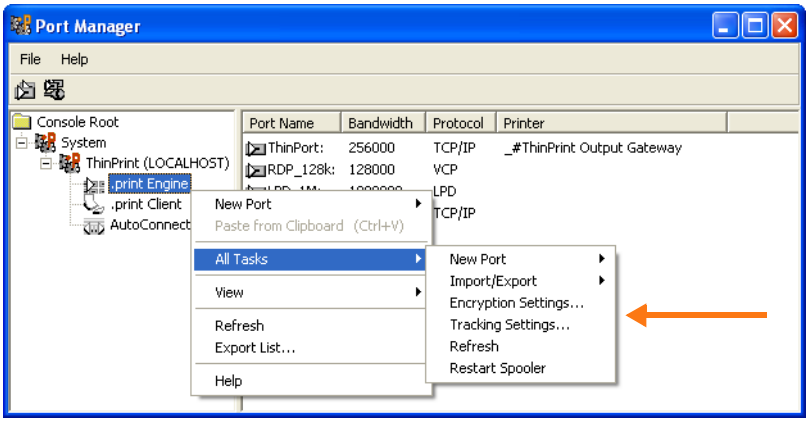


Illus. 84 Replace or keep all settings of older Desktop Engine versions?

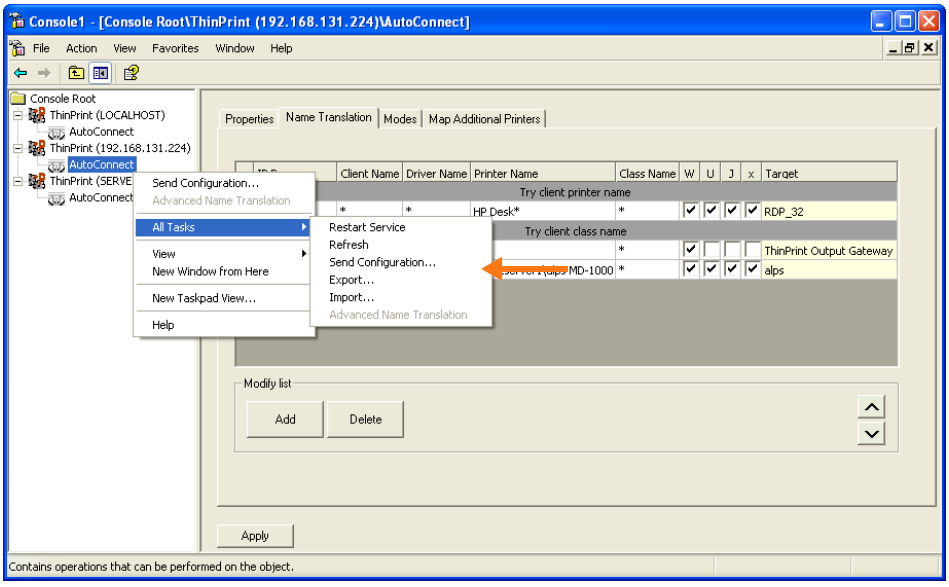
– If the installation of the new version fails, uninstall all ThinPrint components in CONTROL PANEL→ ADD OR REMOVE PROGRAMS, and retry the installation of ThinPrint Desktop Engine.

MMC functions

Examples of context menus in the MMC



Illus. 85 Example 1: ThinPrint Engine context menu



Illus. 86 Example 2: AutoConnect context menu

Context menu functions at a glance

Use the following options to configure each ThinPrint component with the Microsoft Management Console:

ThinPrint component	Function	Context menu
System (computer node)	• Remote configuration of ThinPrint Ports, licenses, AutoConnect, ThinPrint Clients, and/or Virtual Channel Gateways	Connect to another computer
ThinPrint Engine	Create new ThinPrint Port (TCP/IP, ICA, or RDP)	New Port→ ThinPrint Port
	Create new ThinPrint Port for ThinPrint Connection Service	New Port→ ThinPrint Connection Service Port
	Insert ThinPrint Port from another ThinPrint Engine from Windows clipboard	Paste from Clipboard
	Import ThinPrint Port data from an .xml file	All Tasks→ Import/Export→ Import Port Configuration
	Export all ThinPrint Port data to an .xml file	All Tasks→ Import/Export→ Export Port Configuration
	Send ThinPrint Port data to (an)other computer(s)	All Tasks→ Import/Export→ Send Port Configuration (Overwrite) or All Tasks→ Import/Export→ Send Port Configuration (Add Only)
	Register name of SSL/TLS certificates	All Tasks→ Encryption Settings
	Register tracking server, enable print job tracking, and select tracking mode (ThinPrint Engine for print servers only)	All Tasks→ Tracking Settings
	Reload port data into MMC	Refresh
	Restart print spooler	All Tasks→ Restart Spooler
	Write port data to a text file	Export List
Selected ThinPrint Port	Copy port data into clipboard (can be inserted in another ThinPrint Engine only)	Copy
	Insert ThinPrint Port of another ThinPrint Engine from Windows clipboard	Paste
	Export port data into an .xml file	Export Configuration

ThinPrint component	Function	Context menu
	Send ThinPrint Port to (an)other computer(s)	SEND PORT CONFIGURATION (OVERWRITE) or SEND PORT CONFIGURATION (ADD ONLY)
	Delete ThinPrint Port	DELETE
	Reload port data into MMC	REFRESH
	Run ThinPrint Port configuration; see Page 24	PROPERTIES
Licenses	• Enter a new license key	ADD LICENSE KEY
	• Enter or activate multiple license keys (including Subscription keys); see the "Unattended installation and licensing of ThinPrint server components" documentation	LICENSE/ACTIVATION SET
	• Reload license data in the MMC	REFRESH
	• Copy the complete table to a text file	EXPORT LIST
Selected license	• Activate a license key	ACTIVATE
	• Enter a Subscription key for an activated license key	ADD SUBSCRIPTION KEY
	• Copy one or all keys to the clipboard	COPY→ LICENSE KEY, COPY→ REGISTRATION KEY, COPY→ ACTIVATION KEY, or COPY ALL
	Be aware, that once license keys have been deleted they can not be reentered on the same machine – not even if they had been previously activated! (Page 68)	DELETE
	• Reload license data in the MMC	REFRESH
ThinPrint Client	Reload ThinPrint Client settings in the MMC (see also the "ThinPrint Client Windows" user manual, Page 73)	ALL TASKS→ REFRESH
AutoConnect	Send all AutoConnect properties to (an)other computer(s)	SEND CONFIGURATION
	Convert old name translation table to new format (only necessary after an update)	ADVANCED NAME TRANSLATION

ThinPrint component	Function	Context menu
	Restart “TP AutoConnect Service“	ALL TASKS→ RESTART SERVICE
	Reload AutoConnect data into MMC	ALL TASKS→ REFRESH
	Write NAME TRANSLATION and MAP ADDITIONAL PRINTERS tables to a .csv file	ALL TASKS→ EXPORT
	Read NAME TRANSLATION and MAP ADDITIONAL PRINTERS tables from a .csv file	ALL TASKS→ IMPORT
Virtual Channel Gateway	Send all Virtual Channel Gateway properties to (an)other computer(s)	SEND CONFIGURATION
	Restart “TP VC Gateway Service“	ALL TASKS→ RESTART SERVICE
	Reload Virtual Channel Gateway data into MMC	ALL TASKS→ REFRESH

Additional sources

Further information about ThinPrint can be downloaded from our website.

Manuals

The following manuals and further technical information are – amongst other – available at www.thinprint.com/manuals:

- License Server
- ThinPrint Engine on terminal servers • Quick installation
- ThinPrint Engine on print servers
- ThinPrint Tracking
- Connection Service
- Unattended installation and licensing of ThinPrint Engine components
- Licensing
- Solving problems with fonts
- Tips for configuring ThinPrint
- ThinPrint addressing
- ThinPrint Ports
- ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD
- Creating SSL certificates for printing with ThinPrint
- Windows machine as a Client Gateway
- SEH ISD as a Client Gateway
- SEH TPG as a Client Gateway
- Preconfiguration and unattended installation of ThinPrint Client Windows
- ThinPrint Client manuals

Thin clients and gateways

Thin Clients or terminals with embedded ICA/RDP type of ThinPrint Client as well as ThinPrint gateway appliances can also be found at www.thinprint.com.

Downloads

The current version of **ThinPrint Engine**, can be downloaded at: www.thinprint.com/demo.

ThinPrint Clients as well as tools like **Finishing Detector** and **ThinPrint Preview** (TPView.exe) can also be found at www.thinprint.com.

Glossary

ActiveX

Microsoft technology that enables software components to interact with one another in a networked environment regardless of the language in which they were created. ActiveX is built on the Component Object Model.

Activation key

Entering the activation key in License Manager enables unlimited application of the ThinPrint software. An activation key is obtained by submitting license and registration keys to ThinPrint GmbH.

AutoConnect

The ThinPrint component for auto-created printers is called *AutoConnect*. It can be run on any Windows computer. AutoConnect enables the printers needed for each client to be created automatically on the computer.

Autocreated printers

see *AutoConnect*

Bandwidth

The capacity of a network or data connection for digital transmission, usually measured in bit/second (bit/s, bits/sec, or bps) or in Kilo-bit/ second (kbit/s, kbits/sec, or kbps).

Bandwidth control

A *ThinPrint Port* regulates bandwidth for print jobs. Because bandwidth is controlled separately per printer port and can be set individually, optimal performance can be achieved with the following ThinPrint settings:

- Number of ThinPrint Ports
- Different bandwidth settings for each ThinPrint Port
- Assignment of printers to ThinPrint Ports

Class

see *Printer Class*

Client

The term client signifies a device which connects to, requests data from, and/or starts an application on, a server or desktop. It receives, for example, print data from the desktop and forwards it to a printer. Typical clients are: desktop PCs, notebooks, thin clients, print servers, PDAs, and mobile telephones.

Client Gateway

see *Gateways*

COM

Component Object Model; fundamental communication model for icon communication under Windows NT.

Compression

In addition to bandwidth control, ThinPrint compresses print data. Typical compression rates for PCL and Postscript printer drivers lie somewhere between 55% and 95% – depending on printer driver, application, and type of data (e.g.: pixel/vector fonts, pixel/vector graphics). With Driver Free Printing there are four available compression options (normal, optimal, maximum and extreme; Page 40) Nonetheless, when printing with either Driver Free Printing or with the original printer driver (native printing) a higher or lower compression may be chosen without compromising the print quality (Page 25).

Connection Service

ThinPrint Connection Service enables printing to ThinPrint Clients that are hidden behind Network Address Translation (NAT). But in contrast to Virtual Channel Gateway the print data is sent over pure TCP/IP and not over the ICA or RDP channel.

ThinPrint Engine sends all print jobs to the ThinPrint Connection Service, which passes them on to the ThinPrint Clients. No IP addresses are used for addressing the ThinPrint Clients, but a ThinPrint specific Client ID. This Client ID is assigned automatically by the ThinPrint Connection Service (dynamic mode) or is created manually in the ThinPrint Client (static mode).

Current printer

Setting in the ThinPrint Client Manager: A document is printed with the current printer if a client has only *one* printer, or if the printer can't be determined by *ID*. Current printer can also be used to set the default printer at the desktop when using AutoConnect (with the option DEFAULT AT SERVER).

Data type

Several types are usually supported for printing under Windows. The two most commonly used – expanded metafile (EMF) and print-ready (RAW) – affect performance on both client and print server machines differently. See also *EMF*

Dedicated print server

A server “dedicated” to a single task: printing. A desktop does not send print data directly to clients, but to central, dedicated print servers. There, it is first rendered and then sent to the clients or printers. The desktop or server load is thus lightened. (see also *Print server*)

Desktop

Here: virtual desktop, Blade PC or workstation in the office, which is connected to using a *Remote Desktop Connection*

Device

Here: thin client, print server, printer (print device), print appliance or print server (print box)

Driver Free Printing

Printing using the *ThinPrint Output Gateway* (see also Page 6)

EMF

EMF (enhanced metafile) is default data type for most Windows NT/2000/XP/2003/2008/Vista/7 programs. Unlike RAW format, printed documents in EMF are converted to metafile format.

With Driver Free Printing, EMF files are smaller than RAW files containing the same print job. In server-based computing, only the first half of a print job is generated on the desktop (in consideration of system performance). The main work is performed by the client machine, which improves the desktop’s or server’s performance. See also *Data type*

Encryption

see *SSL*

Gateways

ThinPrint differs between four kinds of gateways:

1. ThinPrint Output Gateway:
   ThinPrint's "virtual" printer driver for *Driver Free Printing*
2. Virtual Channel Gateway:
   With our Virtual Channel Gateway, we actually put print data coming from a print server into the ICA or RDP virtual channel and send it directly to the client.
3. ThinPrint Client Gateway:
   Local print server with installed ThinPrint Client

ICA

Independent Computing Architecture (from Citrix); network protocol for communication between Citrix XenApp or XenDesktop and ICA clients.

License key

All ThinPrint software requires a license key. The key has the format: THxx-xxxx-x-xxxxxx-xxxx (32 bit) or TAxx-xxxx-x-xxxxxx-xxxx (x64). License Manager uses the license key to generate a registration key according to system configuration. Both license key and registration key are required to request the activation key.

Local resources

Local in this sense means available to or installed upon the selected computer. Client operating systems always search first for a local printer driver. When printing on the client side, then, the printer driver is first sought on the client computer, and only if necessary is a driver downloaded from the server.

LPD client

An LPD client is a network end device which supports the Line Printer Daemon (LPD); e.g., a print server (print box), network printer, or Linux terminal.

LPR

Line Printer Remote; Program for issuing a print job (Client component for LPD)

Network Address Translation (NAT)

Multiple private addresses are transformed into a single public IP address. This lets several PCs in a LAN use the IP address for internet access, while the LAN hides behind the router's IP address registered in the internet.

Output Gateway

see *Gateways*

Print device

Contrary to popular nomenclature, hardware which produces printed material is called a print device and NOT a printer. Print resolution is measured in DPI (Dots Per Inch). The higher the DPI value, the better the resolution. See also *Printer*

Printer

The point of interface between operating system and print device is called the printer. In NT architecture alone, many possible terms exist: logical printer, printer software, or printer object. Printer settings include, among others, the designation of a connection (i.e., LPT1 or ThinPort), the printer driver (this is normally included by the manufacturer), authorization of share names, etc. In Windows, every printer is represented in the PRINTERS (AND FAXES) folder by an icon with an obvious name.

There is generally not a one-to-one relationship between printer and print devices. Several printers for a single print device, for example, signify that either the print device is connected to several computers, or that many printers with different parameters for the same print device have been set up on a computer.

For better understanding, this manual only distinguishes between printers, printer objects, and print devices when the specific context makes it necessary.

Printer class	Printers whose drivers are compatible can be grouped in a class. For example, many laser printers are compatible with HP LaserJet (class could be: *HPLaser*). Only *one* AutoConnect template is necessary for all printers in a class.
Printer driver	Printer drivers are programs which enable communication between client applications and print devices. Each print device requires unambiguous commands which are specific to that device, to employ such print functions as color, margin, format, etc. An operating system comprehends these individual commands for specific print devices through the printer driver.
Printer object	Under Windows: a printer created over START→ SETTINGS→ PRINTERS (AND FAXES); it appears with its name in the PRINTERS (AND FAXES) folder.
Printer queue	The number of documents which are to be printed from a particular print device and/or are already waiting for processing is referred to in NT terminology as the printer queue. Under NetWare and OS/2, the term *printer queue* is synonymous for *printer*.
Printer software	Printer software is the commonly used name for *logical printer* or *printer*.
Print job	Print jobs are composed of a source code in the language of the relevant printer. This source code contains both print data, such as a text or picture, and print device commands such as form feed or page format.
Print server	A print server is that hardware which connects print devices with a network. The print server is thus responsible for the printer queues of connected print devices. A print server can also be a specific hardware device which exclusively embodies the network connection and a serial or parallel connection (print appliance/external print server/print box). A print server can also be pre-integrated within a printer, so that separate hardware is unnecessary and the print device can be directly connected with the network (internal or onboard print server). (Illus. 1; see also *Dedicated print server*)
Print server services	Print server services is the term for the print server software which handles communication with non-Windows clients. Because a print job from a UNIX client is different than one from a Macintosh client, there are different print server services. These can change the parameter for data type as needed, for instance.
Print spooler	see *Spooler*
Queue	see *Printer queue*
RDP	Remote Desktop Protocol; communication protocol between virtual or real desktops and client machines under a Windows operating systems (Windows XP, Windows Vista or Windows 7). The name of the Windows service is *Terminal Services*, and the connection type is named *Remote Desktop Connection*.
Remote Desktop Connection	see *RDP*

Rendering	A printer driver is used to translate a print job into printer-specific format.
Server based Computing	A server-centric basis for enabling user access to applications, with application logic being run on a desktop or server and only user interface transmitted through the network.
Spooler	Print spooler describes the number of those programs or DLLs (Dynamic Link Libraries) which receive, process, temporarily save, chronologically sort, and distribute queued print jobs. With network printers, the spooler has a client component and a server component. The client component is normally found where the application is being run. The server component is generally where the print device is installed, at the print server, for example (Windows service denomination: “Print Spooler”).
Spooling	Simultaneous Peripheral Operation On Line: Print jobs are temporarily stored as files on a hard disk. This procedure is known as spooling and is only one of the several functions of the spooler. Unspooling is the process of reading this file and sending it to the print device.
SSL	To establish a secure connection with SSL/TLS, the communication partners must first agree on the cryptographic methods and parameters to be used. Basically, SSL/TLS offers the options of key exchange, systematic encryption, and the calculation of a cryptographic proof sum. There are various methods that can be used with each of these options.
Template	Printer object used as a “model” to enable automatic client printer connection to ThinPrint Engine over AutoConnect.
Terminal Services	a Windows service under Windows XP (Professional), Windows Vista or Windows 7 (Business, Enterprise, or Ultimate)
Thin client	a minimum performance computer with only elementary hardware and/or software components (no hard drive) In a server/client architecture, a client system on which no application programs are run. Instead, all applications are processed at the server.
ThinPrint Client	On the client side, *ThinPrint Client* is generally responsible for receiving print data, decompressing and decrypting it, and sending it to the print device. Many ThinPrint Clients are available for different end devices and areas of deployment: for all Windows versions incl. Windows CE, for Linux, Solaris, DOS, Win OS/2, Java, ActiveX, as well as for internal and external print servers of network printers.
ThinPrint Client Gateway	see *Gateways*
ThinPrint Client Service Windows	The Windows service version of ThinPrint Client is automatically started when a client machine is activated (only WinNT machines). Thus, it is not necessary for a user to be logged on for the Client Service Windows to function. This ThinPrint Client is therefore particularly well suited for local print servers under Windows (ThinPrint Cli-

ent Gateways). ThinPrint Client Service Windows is not designed for print preview with Driver Free Printing.

ThinPrint Connected Gateway

see *Connection Service*

ThinPrint Connection Service

see *Connection Service*

ThinPrint Engine

The component ThinPrint Engine is the actual core of the ThinPrint framework. It provides complete printer driver management including Driver Free Printing. The ThinPrint Engine performs the following main functions:

- Bandwidth controlled transmission of print jobs
- Print data compression and streaming
- Print data SSL/TLS encryption
- Provisioning of the virtual printer driver ThinPrint Output Gateway (enables a radical reduction of printer drivers on printing computers = Driver Free Printing).

ThinPrint Output Gateway

see *Gateways*

ThinPrint Port

To print with ThinPrint, printers are linked to ThinPrint Ports on the machine that creates the print jobs. These printer ports are created and configured with the MMC. It is, however, not necessary to create a port for every printer; many printers can be configured to the same port. With *port pooling*, however, one or more printers are connected to several ports.

ThinPrint Viewture

ThinPrint component for the client-side print preview with Output Gateway. Viewture consists of the components *TPView.dll* and *TPView.exe* with the following functions and features:

	TPView.dll	**TPView.exe**
page preview	×	
zoom	×	×
leaf	×	×
save in .tpf file format	×	
open .tpf file format		×
print	×	×
installation with ThinPrint Client	×	
can be downloaded (Page 74)		×

ThinPrint Virtual Channel Gateway	see *Gateways*
TLS	see *SSL*
Virtual Channel Gateway	see *Gateways*
V-Layer	See “ThinPrint Engine for print servers” manual
x64	Identifies all 64-bit processors from Advanced Micro Devices (AMD) as well as Intel processors with an AMD compatible 64-bit extension (e.g. Xeon and Pentium with EM64T). In contrast **ia64** identifies the 64-bit processor Itanium from HP and Intel.

Abbreviations

COM	Component Object Model
DLL	Dynamic Link Library
EMF	Enhanced Metafile (see glossary)
ICA	Independent Computing Architecture (see glossary)
ID	Identification (number)
IPv4	Internet Protocol address space with 2^{32} addresses; example: 192.168.1.1
IPv6	Internet Protocol address space with 2^{128} addresses; example: 2001:0db8:85a3:08d3:1319:8a2e:0370:7344
LAN	Local Area Network
LPD	Line Printer Daemon (see glossary)
LPR	Line Printer Remote (see glossary)
LPT	Windows Line Printer Port
MMC	Microsoft Management Console
NAT	Network Address Translation
OS	Operating System
Output Gateway	ThinPrint Output Gateway
PCL	Printer Command Language
PDA	Personal Digital Assistant
RAW	Standard print data type
RDP	Remote Desktop Protocol (see glossary)
SQL	Structured Query Language
SSL	Secure Socket Layer (see glossary)
TCP/IP	Transport Control Protocol/Internet Protocol
TLS	Transport Layer Security
TP	ThinPrint

TPOG	ThinPrint Output Gateway
TPVC	Virtual Channel Gateway
VC	Virtual Channel (= ICA or RDP)
VC G(ateway)	Virtual Channel Gateway
VCP	Virtual Channel Protocol (= ICA or RDP)
VDI	Virtual Desktop Infrastructure (e.g. VMware VDI, Citrix XenDesktop)
V-Layer	Printer Virtualization Layer
WAN	Wide Area Network
Wi-Fi	Wireless LAN = WLAN
WinCE	Windows CE
WLAN	wireless LAN = Wi-Fi