ThinPrint Engine on print servers
ThinPrint version 11

Manual
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Safety warning
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.
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Introduction

What is ThinPrint?

The ThinPrint product line offers premium print management for all IT environments. This includes server-based, virtualized or distributed PC architectures, using homogeneous or heterogeneous hardware and operating features, with or without an integrated print server. Mobile workers, home offices, as well as complete branch offices can be easily integrated into the existing corporate IT infrastructure, with no restrictions on printing flexibility, performance or convenience.

ThinPrint meets all the requirements of professional print management, thanks to high levels of print data compression, secure encryption, connection-oriented bandwidth control and dynamic printer deployment, as well as technology solutions such as Driver Free Printing, ThinShare and V-Layer.

The technology

ThinPrint consists of a server as well as a client component – i.e. ThinPrint Engine and the ThinPrint Client (Illus. 1).

Note! If all properties of native printer drivers (e.g. finishing options) shall be accessible in Output Gateway’s user interface we recommend V-Layer as print mode. Otherwise with pure Driver Free Printing the use of Management Center is necessary to transmit the printer properties from the ThinPrint Clients to the printer objects on the central print server.

Server components

The server component ThinPrint Engine is the core of the ThinPrint framework. It provides complete printer driver management including Driver Free Printing. ThinPrint Engine performs the following main functions:
• Bandwidth controlled transmission of print jobs
• Print data compression and streaming
• Print data encryption
• Provision of the (virtual) printer driver TP Output Gateway (enables a radical reduction of printer drivers on printing computers = Driver Free Printing).
• In sessions on terminal servers (or remote desktop session hosts), virtual desktops or workstation printers are mapped by AutoConnect, a component of ThinPrint Engine.

**Driver Free Printing, V-Layer and Native Printing**
Thanks to Driver Free Printing, time-consuming server-side installation and administration of printer drivers under Windows is no longer necessary. Printer driver conflicts are also a thing of the past. The native printer drivers are only installed on Windows machines (usually print servers). On terminal servers, virtual desktops or workstations, only ThinPrint's universal driver TP Output Gateway is installed. That means that any type of printer can be used on any printer port; e.g., multifunction devices (printer, fax, copier, and scanner all-in-one) on a USB interface or a laser printer on a bidirectional interface. Just as with V-Layer, the native printer drivers are not installed on the client side, but rather on the central print server (Illus. 2).

![Illus. 2](image)

V-Layer: native drivers are installed exclusively on the central print server

Irrespective of that, ThinPrint can also send its print data conventionally – without the use of Output Gateway – using the native printer driver: so-called Native Printing.

**Print data compression**
The compression of ThinPrint print data can be influenced as follows:

• In Driver Free Printing mode, one option is Advanced Adaptive Compression level of the Output Gateway driver (see THINPRINT COMPRESSION in Illus. 3 as well as Illus. 19 on Page 27). This method analyzes the individual components of a print job and compresses each with the corresponding best algorithm before transmitting the data. Additionally, user errors that can occur when
inserting images into a document are corrected. This reduces data volume by up to 98%. Alternatively, you can also influence the compression in the ThinPrint Port configuration (Page 23).

- In V-Layer and Native Printing modes, the compression can only be influenced in the ThinPrint Port configuration (see THINPRINT COMPRESSION in Illus. 3 as well as the section Configure tab on Page 23).

- In the case of printer shares connected to computers in branch offices, it’s additionally possible to compress the print data in the opposite direction – between the computers in the branch office – where the applications run – and the central print server. This compression of the share’s print data is called ThinShare; it’s available with Driver Free Printing and V-Layer print modes (see THINSHARE COMPRESSION in Illus. 3 as well as the section Workstations and virtual desktops on Page 19).

![print data compression diagram](image)

**Illus. 3 Print data compression**

**Client component**

On the client side, ThinPrint Client is generally responsible for receiving print data, decompressing it, and sending it to the print device. There are many ThinPrint Clients available for different end devices and types of use: for all Windows, for Mac OS and Linux as well as for both internal and external print servers of network printers. Please note that there are different ThinPrint Client types for the protocols RDP, ICA and TCP/IP – the latter as both an application and a Windows service. Furthermore, the PCoIP type is embedded in the VMware Horizon View Client.

ThinPrint Clients are not necessary on workstations or thin clients, if neither printer mapping with Dynamic Printer Matrix nor compression or encryption is required and if the print jobs are to be rendered on the central print server (e.g. using V-Layer). In this case all printer drivers will be installed on the central print server, and the print jobs are sent directly to network printers, gateway appliances or local print servers.
The ThinPrint Clients can be downloaded from the ThinPrint website. The website also includes information on 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.

Print routes
The ThinPrint Engine can send print jobs via the following routes:

1. Via TCP/IP directly to network printers, gateway appliances or local print servers (Illus. 1). Here, ThinPrint Client (TCP/IP type) is required only if the target device needs to be able to decompress or decrypt print data or to render the print jobs using the native printer driver.

2. Via TCP/IP directly to workstations or thin clients (Illus. 2). Here, the TCP/IP type of ThinPrint Client is required on the workstations and thin clients.

3. Via RDP, ICA or PCoIP to workstations or thin clients using the Virtual Channel Gateway (Illus. 4). Here, the RDP or ICA type of ThinPrint Client is required on the workstations and thin clients – for PCoIP a VMware Horizon View Client with embedded ThinPrint Client is necessary.

4. Via LPR/LPD directly to network printers (Illus. 30). Print data can be sent bandwidth controlled, but not compressed. ThinPrint Clients are not necessary.

Irrespective of the chosen print route: You can use Driver Free Printing if the target device is a Windows machine. Otherwise select V-Layer (always recommended). For more information see the section Driver Free Printing, V-Layer and Native Printing (Page 8).
Licenses

The ThinPrint Engine has user-based licensing. The License Server installer can install a license key. But for productive purposes you should have received license keys from your reseller; these are also installed on the License Server (ILLUS. 4). License keys of the following types are available:

- **TLUS-0900-10...** annual ThinPrint Engine Premium license (ALM)
- **TPUD-0888-10...** perpetual ThinPrint Engine license
- **TPUS-0888-10...** perpetual ThinPrint Engine Premium license

The third block of the key indicates the number of licensed named users (here: 10).

More information about ThinPrint licensing can be found in License key overview in the Licensing manual as well as in the License Server manual.

**Premium licenses**

Premium licenses contain the following additional components or products:

- Mobile Print
- High availability and load balancing of ThinPrint servers
- ThinPrint Self Service
- Print job tracking
- Host Integration Service
- Connection Service
- Management Center and Management Services
- Support of Microsoft Failover Clusters (Windows Server 2008 R2 only)

**Note!** If License Server and either of the components Host Integration Service, Connection Service or Management Center are installed on different machines, then the license keys of ThinPrint Engine Premium (TLUS or TPUS) must be installed on the License Server, but those of the other components on the respective computers:

- TPHS on the Host Integration Service machine
- TPMC on the Management Center machine

Print server scenarios

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

See also the scenarios in the section Praxis: Creating and connecting printers (Page 102).
Terminal servers, host systems and virtual desktops – Printing via TCP/IP

The main purposes of centralized, dedicated print servers are to centralize print administration and to remove workload from other servers and/or host systems. ThinPrint Engine makes it possible to compress print data received by terminal servers, hosts or virtual desktops, to encode it and, within bandwidth limits, send it to client computers or to network printers (Illus. 1). If Windows hosts or virtual Windows desktops are being employed, it is also possible to use Driver Free Printing and V-Layer.

Each user can use all printers in the network which are accessible via TCP/IP – regardless of whether she/he is using a workstation, a thin client, or any other type of client. Further information can be found in Setting up ThinPrint Ports and printers (Page 21).

If necessary, addressing ThinPrint Clients in masked networks via TCP/IP is made possible with the Connection Service. It is also the ideal gateway component for the DMZ. Further information can be found in theThinPrint Connection Service manual.

Terminal servers and virtual desktops – Printing via RDP, ICA or PCoIP

Central, dedicated print servers generally print to a computer, network printer or appliance via TCP/IP (Illus. 1 and 2). If, however, TCP/IP is not possible or not wanted as print protocol, the Virtual Channel Gateway allows print data to be sent through the RDP, ICA or PCoIP virtual channel to the workstation or thin client (Illus. 4).

The Virtual Channel Gateway receives print jobs from the ThinPrint Server, converts addressing from TCP/IP to RDP, ICA or PCoIP, and forwards the print data on to the session user. Further information can be found in Setting up ThinPrint Ports and printers (Page 21).

Client/Server printing – via TCP/IP

Print servers can also be used for Windows workstations, in order to centralize all native printer drivers on a print server using V-Layer, as well as to centralize the printer administration.

Each user of a Windows workstation can use all printers in the network which are accessible via TCP/IP. This way only a single printer driver is necessary on the workstations – the TP Output Gateway (Illus. 5).

A ThinPrint Client (TCP/IP type) is required only if the target device needs to be able to decompress or decrypt print data or to render the print jobs using the native printer driver.
Installation

Technical requirements

Be sure that the TCP ports for printing via TCP/IP are not being blocked by another program or by a server-side or client-side firewall. Default ports are:

- **License Server inbound:**
  - 4004 (for access to the web console)
  - 4005 (for license queries)

- **ThinPrint Engine outbound:**
  - 4000 (for print jobs)
  - 4005 (to the license server)

- **ThinPrint HA on print servers inbound:**
  - 4100 (from AutoConnect via RPC)

- **Tracking on the SQL server inbound:**
  - 1434 (UDP, from ThinPrint Engines)
  - 1433 (TCP, from ThinPrint Engines)

- **Connection Service inbound:**
  - 4001 (from ThinPrint Clients)
  - 4000 (from ThinPrint Engines, Management Center or Management Services)

- **ThinPrint Client inbound:**
  - 4000 (for print jobs from ThinPrint Engines as well as for printer list queries)

- **ThinPrint Client outbound:**
  - 4001 (to the Connection Service)
Note! IPv4 must be activated for all computers involved. IPv6 should be disabled. Especially in mixed environments with old and new AutoConnect versions, do not use IPv6 or MAC addresses!

ThinPrint Engine

ThinPrint requires the following:

**Supported server operating systems**
- Windows Server 2016
- Windows Server 2012 R2
- Windows Server 2012 R2 Core
- Windows Server 2012
- Windows Server 2012 Core
- Windows Server 2008 R2 SP1 including Failover Clusters
- Windows Server 2008 R2 SP1 Core
- Windows Server 2008 x86 + x64 SP2

Also required:
- **.NET Framework** version 3.5
  For Windows 2012, please also install .NET Framework 3.5.
- Server role **Print and Document Services** is enabled
- minimum one printer is shared (requirement for **High availability and load balancing**)
- If necessary: Microsoft SQL Server 2005 Express or later for the Tracking and the Management Center databases

Note! Depending on the operating system in use, the installation of Microsoft hotfixes may be required. To check this, please use the ThinPrint Diagnostic Utility.

ThinPrint Engine can be installed together with the following ThinPrint components on the same server (provided it’s supported by the respective operating system):

- License Server
- Mobile Print
- Management Center¹
- Management Services²
- Connection Service
- Host Integration Service

License Server

**Supported server operating systems**
- Windows Server 2016
- Windows Server 2012 R2
- Windows Server 2012
- Windows Server 2008 R2 SP1
- Windows Server 2008 SP2

ThinPrint Client

- Workstations or local print servers: Windows 10, 8.1, 8, 7, 2016, 2012 R2, 2012, 2008 R2
- ThinPrint gateway appliances, e.g. ThinPrint Hub or SEH TPG
- other ThinPrint Client versions are available for Apple MacIntosh, Linux, Windows 2008, 2003, 2000, NT 4, Vista, XP, ME, 98, 95 (with Windows-Installer version 2.0 and later)
- Thin clients with embedded ThinPrint Client

**Administrator permissions**

For all stages of installation and configuration, you will need a normal domain user account with local administrator permissions:

- To install and configure the software, set up a normal user account in the AD (Active Directory). LicService used here as an example.

- Then give this account local administrator permissions on the license server.

**Installing ThinPrint Engine, License Server and ThinPrint Client**

Follow the instructions in the [ThinPrint Engine on print servers](#) quick installation guide.
Global settings

ThinPrint Configuration console

– Open the THINPRINT CONFIGURATION console (Illus. 6).

Illus. 6 start configuration

The ThinPrint Engine console appears (Illus. 7).

Illus. 7 ThinPrint Engine console

Here, you will find all events generated by ThinPrint components. Additionally you can display and filter print spooler events as well as manage the ThinPrint services and the print spooler.

Note! Saved server settings will only be effective after a spooler restart. With Windows Server 2008 R2 or later, spooler events cannot be shown here at present.
– Scroll down and select EDIT SETTINGS (Illus. 8).

**Illus. 8** ThinPrint configuration: Select EDIT SETTINGS

### License Server

– In the **ThinPrint License Server** tab (Illus. 9), you can:
  - change the license server address (hostname, FQDN or IP address) and the TCP port (restart the TP LICENSE AND USER CONFIGURATION SERVICE afterwards)
  - open the license server’s configuration website by clicking its link
  - change the address of the configuration website by clicking **Edit**

**Illus. 9** License Server settings
AutoConnect

For global AutoConnect settings see the section AutoConnect configuration using the MMC (Page 66).

The AutoConnect configuration using group policies is described in the ThinPrint group policies manual.

Note! Please also note the section Storage destination for AutoConnect settings in the ThinPrint Engine on Terminal Servers manual.

Print spooler events

– In the PRINT SPOOLER EVENTS tab, you can select which print spooler events from the Windows event viewer are to be displayed. This menu differs depending on the Windows version. Windows Server 2008 R2 and 2012 show LOG ADMIN EVENTS and LOG OPERATIONAL EVENTS (Illus. 10). In contrast, Windows Server 2008 and 2012 R2 show the settings LOG PRINT SPOOLER ERRORS, LOG PRINT SPOOLER WARNINGS and LOG PRINT SPOOLER INFORMATION.

Note! The ThinPrint Engine configuration using group policies is described in the ThinPrint group policies manual.
ThinShare

In the THINSHARE tab, you can globally:

- enable or disable ThinShare for Output Gateway printer objects which will be created in the future (left arrow in Illus. 11)
- enable or disable ThinShare for all (already) existing Output Gateway printer objects (right arrow in Illus. 11)

Alternatively, you can enable or disable ThinShare:

- for specific printer objects in the Output Gateway user interface (Illus. 35 on Page 42) or
- for groups of printer objects using Management Center/Services templates

Enabling ThinShare sets the sharing option RENDER PRINT JOBS ON CLIENT COMPUTERS at the relevant Output Gateway printer objects (Illus. 12).³

³ This means – in the case of native printer drivers – that print jobs would be rendered on the terminal server instead of the print server. In contrast, with the use of TP Output Gateway this “rendering” function is used for ThinShare compression.
Enabling ThinShare for terminal servers is completely different from doing so for workstations and virtual desktops, because the option RENDER PRINT JOBS ON CLIENT COMPUTERS is by default disabled on terminal servers – independent of its setting (Illus. 12). That’s why the group policy ALWAYS RENDER PRINT JOBS ON THE SERVER is used here instead (Illus. 13). It can be found in the Group Policy Management Editor in: COMPUTER CONFIGURATION → POLICIES → ADMINISTRATIVE TEMPLATES → PRINTERS.

- The group policy can be set as follows:

<table>
<thead>
<tr>
<th>Setting</th>
<th>ThinShare</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISABLED</td>
<td>on</td>
</tr>
<tr>
<td>ENABLED</td>
<td>off</td>
</tr>
<tr>
<td>NOT CONFIGURED</td>
<td>off</td>
</tr>
</tbody>
</table>

- Run `gpupdate /force` on the terminal server’s command prompt to assign the group policy to the server.
Setting up ThinPrint Ports and printers

ThinPrint Port Manager

ThinPrint prints with its own printer ports (ThinPrint Ports) which will be automatically created during installation. Thus, ThinPrint does not affect printing with conventional printer ports, such as Standard TCP/IP Ports.

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 options 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 port configuration to other Windows machines on which a ThinPrint Engine is installed
- Export and import port properties
- Encryption settings

Starting Port Manager

1. Open the ThinPrint Configuration console (Illus. 6).
2. In case of remote configuration: In the THINPRINT node (Illus. 14), click ADD and specify the computer address (Illus. 15).

**Note!** In principle, there is no limit to the length of printer port names. Some old 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.).

**Note!** Pool not more than 20 to 25 ports because each printer of a pool must be assigned to all ports. Because of Windows restrictions the general rule is: \[ \text{Length of port name} \times \text{Number of ports} < 200 \]
3. To configure ports, select from the Console Tree on the left: ThinPrint → ThinPrint Engine → Port Manager (Illus. 16).

4. Double clicking a port name (Illus. 16) will open the port configuration (Illus. 17).

ThinPrint Ports can be configured as follows:
Setting up ThinPrint Ports and printers

<table>
<thead>
<tr>
<th>USE ENCRYPTION</th>
<th>Enables encryption; a valid and corresponding certificate must be available for both ThinPrint Engine and ThinPrint Client machine (not for LPD; see also Page 56).</th>
</tr>
</thead>
</table>
| BANDWIDTH CONTROL | • ENABLE: Bandwidth control on  
• Max. bandwidth available for printing with ThinPrint; minimum: 1 kbit/s, default: unlimited |
| Print protocol | • TCP/IP (sockets)  
• USE VIRTUAL CHANNEL GATEWAY (Print data will be sent to the terminal server or virtual desktop and then sent via RDP, ICA or PCoIP with the Virtual Channel Gateway installed there)  
• LPD (Unix print protocol LPR/LPD)  
• VIRTUAL CHANNEL PROTOCOL (ICA/RDP)  
This function is not relevant here. It's intended for direct printing from terminal servers or virtual desktops. |
| MINIMUM PRINT DATA VOLUME | • Enabled: always highest compression  
• Disabled: transfer rate optimized compression – depends on bandwidth settings |

You can also select the TCP port (default: 4000) for the TCP/IP and USE VIRTUAL CHANNEL GATEWAY print protocols (see also section TCP port starting on Page 101). With TCP/IP, the TCP ports of the ThinPrint Clients must be the same as those of the ThinPrint Ports. With USE VIRTUAL CHANNEL GATEWAY the TCP ports of the Virtual Channel Gateway(s) must be the same as those of the ThinPrint Ports.

For LPD printing, see the technical description ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD.

Save – Confirm changes with APPLY or OK.
Setting up ThinPrint Ports and printers

Advanced tab

Under **ADVANCED**, you have the following options:

**CLIENT CONTROL: BANDWIDTH**

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

Client bandwidth settings must be lower than server-side settings; otherwise, ThinPrint Port settings are applied.

**CONNECTION RETRIES (TCP/IP and LPD only)**

Enter the number of times ThinPrint Engine should attempt to establish a connection to the client.

**NET SEND SERVICE**

Net Send Service is used to notify users if ThinPrint experiences print errors. If this box is checked (= default), ThinPrint Engine will send error messages to the relevant account.

*Note:* This function can become irksome if several users are logged on using the same account.
### Naming Convention

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

<table>
<thead>
<tr>
<th>Default addressing</th>
<th>Reversed addressing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TCP/IP</strong></td>
<td></td>
</tr>
<tr>
<td>Lexmark T620</td>
<td>192.168.1.100#Lexmark T620</td>
</tr>
<tr>
<td>PS3#192.168.1.100</td>
<td>PS3</td>
</tr>
<tr>
<td>Lexmark T620</td>
<td>192.168.1.100:1#Lexmark T620</td>
</tr>
<tr>
<td>PS3#192.168.1.100:1</td>
<td>PS3</td>
</tr>
<tr>
<td>HP LaserJet 1200 PCL#client1</td>
<td>client1#HP LaserJet 1200 PCL</td>
</tr>
<tr>
<td>HP LaserJet 1200 PCL#client1:2</td>
<td>client1:2#HP LaserJet 1200 PCL</td>
</tr>
<tr>
<td>recommended: Lexmark T620</td>
<td></td>
</tr>
<tr>
<td>PS3#client1:2</td>
<td></td>
</tr>
</tbody>
</table>

| **Use Virtual Channel Gateway (RDP/ICA/PCoIP)** |                     |
| HP LaserJet 1200 PCL# |                  |
| Lexmark T620 PS3#:1 | 192.168.1.101#HP PhotoSmart P1000 |
| recommended: HP LaserJet 1200 PCL |          |

| **LPD** |                     |
| HP PhotoSmart P1000#192.168.1.101 | 192.168.1.101#HP PhotoSmart P1000 |
| HP PhotoSmart P1000#printer3 | printer3#HP PhotoSmart P1000 |
| recommended: HP PhotoSmart P1000 |          |

### Job Statistics tab

Print statistics can 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. 19.

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

See also the *ThinPrint Tracking* manual.
OK

– Save your settings by clicking OK or APPLY.

Distributing port configuration

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

- Remote configuration of ThinPrint Ports (Page 21)
- Copying port properties with Copy&Paste (see below)
- Export to an .xml file and import to target servers (see below)
- Sending port configuration to target servers (see below)

Copy-and-Paste

– Open the ThinPrint Engine configuration console (Page 21).

– Mark a port in a server's Port Manager (e.g. ts020 in Illus. 20) and select COPY from the context menu.
Setting up ThinPrint Ports and printers

- Mark the Port Manager of a target server (e.g. ts012 in Illus. 21) and select PASTE from the context menu.

**Illus. 20**  copy a port on a server

**Illus. 21**  paste the port onto another server

**Export/Import**

The following export and import functions are available:

**EXPORT PORT CONFIGURATION**  Exports the selected ThinPrint Port to an .xml file (Illus. 20)
## Setting up ThinPrint Ports and printers

**Import/Export → Export Port Configuration**

Exports all ThinPrint Ports to an .xml file if no port is selected (Illus. 22)

**Import/Export → Import Port Configuration**

Imports ThinPrint Ports from an .xml file (Illus. 22)

### Sending port configuration

The **SEND PORT CONFIGURATION** function sends ThinPrint Ports to other servers or server groups. There are various modes:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SEND PORT CONFIGURATION (OVERWRITE)</strong></td>
<td>Sends the selected ThinPrint Port; a port with the same name on the target system will be overwritten (Illus. 20)</td>
</tr>
<tr>
<td><strong>SEND PORT CONFIGURATION (ADD ONLY)</strong></td>
<td>Sends the selected ThinPrint Port; a port with the same name on the target system will not be overwritten (Illus. 20)</td>
</tr>
<tr>
<td><strong>IMPORT/EXPORT → SEND PORT CONFIGURATION (OVERWRITE)</strong></td>
<td>Send all ThinPrint Ports; ports with the same name on the target system will be overwritten (Illus. 22)</td>
</tr>
<tr>
<td><strong>IMPORT/EXPORT → SEND PORT CONFIGURATION (ADD ONLY)</strong></td>
<td>Send all ThinPrint Ports; ports with the same name on the target system will not be overwritten (Illus. 22)</td>
</tr>
</tbody>
</table>

ThinPrint Ports that already exist on the target computer, but not on the sending computer remain unchanged.
**Procedure**

*when sending*

- Selecting the send option will open the dialog in Illus. 23.

![Dialog for sending properties](image)

**Illus. 23** dialog for sending properties

- To improve clarity, first select **OBJECT TYPES**, and disable **GROUPS** (Illus. 24). Click OK to confirm.

- Select **ADVANCED** (Illus. 23) and then **FIND NOW** (Illus. 25).

![Object Types](image)

**Illus. 24** limiting the selection to computers

- Mark all target servers and click OK to confirm (Illus. 26).
**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 servers. A confirmation prompt gives you the option to cancel the process.

**Note!** If you receive an error message when sending, create a connection to the target computer with the MMC, using the relevant ThinPrint Engine node for remote configuration (Page 21) and repeat the send process from the source computer while keeping the console open (Illus. 27).
Attaching printers to ThinPrint Ports

General information about creating ThinPrint printers can be found in the technical descriptions ThinPrint addressing and ThinPrint Ports.

There's one last step after installing and configuring the ThinPrint Engine: setting up printers on the ThinPrint Ports.

Which protocol? If you are working with several ThinPrint Ports, each with a different protocol, then check port configuration before printer installation to see which ThinPrint Port supports which protocol (Page 23).

ThinPrint naming conventions

Please also refer to the following information when adding printers to the server manually (without Management Center or Management Services).

For simplicity's sake, only standard addressing is considered here; reversed addressing can be found in the chart on Page 26, and addressing THINPRINT CONNECTION SERVICE PORTS is explained in detail in the ThinPrint Connection Service manual.

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:

<table>
<thead>
<tr>
<th>Network protocol</th>
<th>Names of printer objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP/IP</td>
<td>Either: printer_name#client_name:printer_ID</td>
</tr>
<tr>
<td></td>
<td>Example: Kyocera FS-850#client1:3</td>
</tr>
<tr>
<td></td>
<td>Or: printer_name#IP_address:printer_ID</td>
</tr>
<tr>
<td></td>
<td>Example: Kyocera FS-850#191.168.1.17:3</td>
</tr>
<tr>
<td>Use Virtual Channel Gateway (RDP/ICA/PCoIP)</td>
<td>Either: printer_name#user_name:printer_ID</td>
</tr>
<tr>
<td></td>
<td>Example: Kyocera FS-850#administrator:3</td>
</tr>
<tr>
<td></td>
<td>Or: printer_name#:printer_ID</td>
</tr>
<tr>
<td></td>
<td>Example: Kyocera FS-850#:3</td>
</tr>
<tr>
<td>LPD</td>
<td>Either: printer_name#client_name</td>
</tr>
<tr>
<td></td>
<td>Example: Kyocera FS-850#printer1</td>
</tr>
<tr>
<td></td>
<td>Or: printer_name#IP_address</td>
</tr>
<tr>
<td></td>
<td>Example: Kyocera FS-850#191.168.1.18</td>
</tr>
</tbody>
</table>

client_name

Client name with TCP/IP and LPD 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 the name resolution.
Note! With TCP/IP it is possible to send print data to any client computer running a ThinPrint Client – independent of a session (on a terminal server or virtual desktop).

printer_ID

At the client\(^5\), the ThinPrint Client automatically assigns every installed printer an ID (see Illus. 94, Page 84). The printer_ID can be omitted if

- there is only one printer installed on the client
- printing should take place on the ThinPrint Client's current printer
- if, firstly, all the print jobs are sent via Virtual Channel Gateway and, secondly, the share name entered in Dynamic Printer Matrix' TARGET PRINTER column and the printer name on the client machine match (= if the variable %LCPRN% can be used in the TARGET PRINTER column, Illus. 150).

printer_name

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

**Example 1:**

**Client**

Client name  \(\text{client1}\)
IP Address  \(192.168.1.17\)
Printer  \(\text{Lexmark T644}\)

ThinPrint Client assigned this printer ID 2 (Illus. 94).

**Server**

Lexmark T644#client1:2

Or

Lexmark T644#192.168.1.17:2

With the **Use Virtual Channel Gateway** protocol type, it is possible to print from print servers via RDP, ICA or PCoIP. Print jobs are then sent via TCP/IP from the ThinPrint Engine installed on the print server to the Virtual Channel Gateway on the terminal server or virtual desktop and from there via RDP, ICA or PCoIP to the client. The naming convention for the printers on the print server is the same as for RDP, ICA or PCoIP.

---

4 See the technical description *ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD*

5 i.e., a workstation, a thin client (terminal), a gateway appliance or a local print server
The RDP, ICA and PCoIP protocol assumes 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**

**Example 2:**
Kyocera FS-850 is to be printed via ThinPrint using RDP. If multiple printers are installed and ID 3 was assigned to the printer by the ThinPrint Client, the printer name could be:

- Kyocera#:3 (# before :)
- Kyocera FS-850#:3 (underline before :)

If Kyocera FS-850 is ThinPrint Client’s Current Printer or the Dynamic Printer Matrix is in use (and share name and client printer name match), this name is sufficient:

Kyocera FS-850

**Note!** With the RDP, ICA or PCoIP protocol print data is sent automatically to the client from whose session the print data was created.

**Port pooling**

Pooling printer ports with ThinPrint means you can attach printer objects to several ThinPrint Ports (Illus. 28 and 29) – also known as printer pooling. This has the following advantages:

- Improved performance
- Little chance of blockage from very large or “hanging” print jobs
- Fewer printer ports on the server (because multiple printers can be connected to a few ports)
- Bandwidth limitation is more clearly defined
ThinPrint Port pooling is supported by:

- ThinPrint Ports
- Output Gateway
- AutoConnect
- Virtual Channel Gateway
- Connection Service
- Management Center
- Management Services

Port pooling is mainly used to improve print performance. It should be remembered though, that all ThinPrint Ports in a pool should have the same settings – this can be done automatically using the Management Center\(^6\) or Management Services\(^7\). Port pooling with ThinPrint Ports in combination with Output Gateways, Management Center/Services and AutoConnect, however, brings more than maximum performance; it also makes administration particularly easy and convenient.

When setting bandwidth, note that the bandwidths of a pool are added to each other when all ThinPrint Ports print simultaneously. Detailed information can be found in the technical description *ThinPrint Ports*.


\(^7\) [http://download.cortado.com/docu/ThinPrint/Tpms/en/1.0/](http://download.cortado.com/docu/ThinPrint/Tpms/en/1.0/)
LPR/LPD printing with Linux, Mac or Windows CE clients

Linux, Mac OS and Windows CE clients are capable of forwarding print jobs to LPD devices. Either the ThinPrint Client Linux, Mac or WinCE is installed on a thin client or workstation 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. 30).

ThinPrint Clients for Linux, Mac and Windows CE operating systems support LPR/LPD printing.

Note! For more information on sending print jobs directly via LPR/LPD with ThinPrint Engine, see also the technical description ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD.
Preparations on the ThinPrint Server

- Create a new printer. For TCP/IP this must contain the Linux, Mac or Windows CE client’s address in its name. Assign a ThinPrint Port that uses TCP/IP, ICA, or RDP as print protocol (e.g., ThinPort:) and share the printer (Illus. 31).

![printer set up, printing to a Linux, Mac or Windows CE device](Illus. 31)

- Make sure that the printer completely spools the print data on the hard drive before sending. To do so, select GENERAL under PRINTER PROPERTIES (Illus. 32).

- Select START PRINTING AFTER LAST PAGE IS SPOOLED.

- Disable the Advanced Printing Features.
Setting up ThinPrint Ports and printers

ThinPrint Output Gateway

TP Output Gateway is a virtual printer driver (see the Model column in Illus. 33) that makes it possible to render print data on a remote machine (workstation or print server) using the native printer driver which is installed there. Because no other printer driver besides the Output Gateway is required on a terminal server, virtual desktop or workstation, this print method is called Driver Free Printing. In this sense, of course, “Driver Free” only refers to the terminal server or the desktop (Illus. 34). See also V-Layer (Page 51).

Note! ThinPrint Output Gateway will only function with ThinPrint Clients installed on machines with a Windows operating system; exception: V-Layer. Relevant printer drivers must be installed on these machines.
Driver Free Printing: Output Gateway on terminal servers, virtual desktops and ThinPrint Server; native printer drivers on workstations and local print servers running Windows.

With Driver Free Printing, print data is sent from the terminal server, virtual desktop or workstation to the ThinPrint Server and sent from there to the client machine in Windows’ own EMF data format. From the print server to the client machine, it is also bandwidth controlled, compressed and streamed, and, if desired, encrypted.

**Naming convention**

You can treat the printer objects based on TP Output Gateway like any other printer object. Output Gateway printer objects can be created:

- Manually (using ADD PRINTER in the printers folder or in Print Management) or
- Using AutoConnect or
- Using ThinPrint Management Center
- Using Management Services

If printer objects are created manually, they’ll show only the default printer properties. When creating printer queues bear in mind the ThinPrint naming conventions. Example:

**Example 3: Addressing the printer directly (TCP/IP printing)**

<table>
<thead>
<tr>
<th>Client</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Client name</td>
<td>client1</td>
</tr>
<tr>
<td>ID</td>
<td>3</td>
</tr>
</tbody>
</table>


Output Gateway printer objects can be created manually with the `ADD PRINTER` function in printers folder or in Print Management using `THINPRINT` as the manufacturer. The printers are to be connected to a ThinPrint Port.

**Paper formats and trays**

After adding an Output Gateway printer, a few default options are available for paper formats and paper sources (= selection of paper trays or manual feed, Illus. 42). You can add further options – provided they are supported by the printer drivers on the client machine(s).

To do so, the following alternatives are available:

- For printers created by AutoConnect or Management Center:
  Automatic upload of printer properties from the ThinPrint Client to the server (see the *ThinPrint Engine on terminal servers* or *ThinPrint Management Center* manuals)

- For manually created printers:
  Set the Windows registry values for paper formats and sources on the server

- For V-Layer printer pairs ([Page 51](#))

**Presets on the print server (administrators only)**

The following settings can be configured in the server’s printers folder or Print Management for all shared printer objects which use TP Output Gateway as their driver; as such they affect all printers which will be connected to a user session on a terminal server, virtual desktop or workstation (= desktop session).

If it’s too time-consuming to configure all Output Gateway objects one after another, you can use the Management Center which allows you to set up only the respective template printers on its template server. For more information see the *ThinPrint Management Center* manual.

- Select for example `FILE → PROPERTIES → DEVICE SETUP` for an Output Gateway object in the server’s printers folder or Print Management.
Setting up ThinPrint Ports and printers

Compression range

There are five options available for print data compression (Illus. 35):

<table>
<thead>
<tr>
<th>Compression range</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>No images</td>
<td>only text will be printed</td>
</tr>
<tr>
<td>High image compression</td>
<td>text without loss, low image quality</td>
</tr>
<tr>
<td>Good compression</td>
<td>text without loss, medium image quality</td>
</tr>
<tr>
<td>High image quality</td>
<td>text without loss, high image quality</td>
</tr>
<tr>
<td>Lossless compression</td>
<td>text and images without loss</td>
</tr>
</tbody>
</table>

At this point you can set the range of compression levels that the users will be able to set. Select, for example, HIGH IMAGE QUALITY, and the level LOSSLESS COMPRESSION is no longer available to users. The default compression level itself is set in the tab ADVANCED → PRINTING DEFAULTS → COMPRESSION (Illus. 41, on Page 46).

ThinShare

see Page 19

SpeedCache

Additionally the option SPEEDCACHE can be enabled or disabled for users of a desktop session (Illus. 35). A ThinPrint Client v8.6 or later is required.

SpeedCache makes printing even faster and more efficient. It checks every print job, for whether it replicates graphic elements (such as logos) and, if so, sends them once only. Thereby, the volume of server/client communication is cut down, without creating additional processor load.

SpeedCache is not available for V-Layer printers – so even if chosen, it won't have any effect when using them.
Setting up ThinPrint Ports and printers

**Note!** From Windows 2012 R2 type-4 drivers can't be connected to third-party printer ports. That's why use type-3 drivers with ThinPrint Ports (Illus. 36).

**User policies**

The USER RESTRICTIONS group offers the options GRAY SCALE ONLY for presetting gray-scale printing and ALWAYS PRINT ON BOTH SIDES for printing on both sides (Illus. 35 bottom). As a result, the respective options will be grayed out for users in their sessions (see the arrows pointing to the options COLOR and NONE – for print on both sides – in Illus. 37).
Setting up ThinPrint Ports and printers

**Page Setup**

Select the **Page Setup** tab in **Advanced → Printing Defaults** to change paper and color presettings; e.g., LETTER or A4 as paper size (Illus. 38). Additionally you can select from the following settings for double-sided printing: LONG EDGE or SHORT EDGE (= turn over edge).

**Advanced**

In the **Advanced** tab you can preset for print jobs to be sent to the printer without a pop-up menu (PRINT DIRECTLY). Alternatively, either a PRINT PREVIEW (Illus. 45) or the native printer driver’s user interface (OPEN MY PRINTING PREFERENCES, Illus. 46) can...
appear on a Windows workstation; both options allow the user to access all other printer specific settings. With V-Layers only PRINT DIRECTLY is possible.

PAGE ADJUSTMENT offers options to alter the default settings if the printable area of the document and the printer driver’s paper format don’t match. The option SCALE TO FIT changes the size of the printout, ADJUST MARGINS moves the print area (Illus. 39). It is recommended to leave both settings enabled.

You can use the option PRINT AS IMAGE to solve layout problems. To maintain print quality, please follow the steps described in the Solving problems with fonts guide beforehand.

**Finishing**

Which finishing options are visible in the Output Gateway user interface (Illus. 40) depends, firstly on the printer driver being used, and secondly, on which version of the file TPPrintTicket.dll is present. This file provides the finishing options of specific native printer drivers in the Output Gateway GUI, and is located on the ThinPrint Server in C:\Program Files\Common Files\ThinPrint

- The current version of TPPrintTicket.dll can be downloaded here:
  https://www.thinprint.com/en/resources-support/software/clientsandtools/

- After updating the TPPrintTicket.dll, re-create the relevant V-Layer printer objects. To do so:
  • either – using the V-Layer component – disable the relevant V-Layers, then re-enable them (Page 51)
  • or – using the Management Center\(^{10}\) – remove the relevant V-Layer pairs, then re-create them
  • or – with Driver Free Printer mode using the Management Center – remove the relevant Output Gateway printers, then re-create them

\(^{10}\) http://download.cortado.com/docs/ThinPrint/2.2/
If one of your printers has finishing options that are not available in the Output Gateway user interface, please use the Finishing Detector to send this information to ThinPrint or Cortado.\(^\text{11}\)

**Illus. 40**  finishing options – retrieved from a Lexmark driver

**Compression level**

In the **COMPRESSION tab**, you can set the default level of compression for users (Illus. 41). The number of levels shown depends on the configured compression range (Illus. 35).

---

\(^\text{11}\) Requirement: The printer must support Print Tickets from Microsoft. Download ThinPrint Finishing Detector to find out which finishing options are supported by your printer models. Install this tool on the machine where the printer drivers are installed.
The settings shown in Illus. 38 to 41 will be the default options in a desktop session. Users can change them within the sessions (see below).

**Settings in a desktop session**

Assuming the Output Gateway printer objects have been created using the V-Layer component of ThinPrint Engine (Page 51) or by using ThinPrint Management Center on the print server, the following properties of native drivers can be displayed in the Output Gateway user interface:

- color/grayscale
- paper sources
- print on both sides (duplex/simplex)
- finishing options such as staple, punch, binding
- print resolution
- paper size
- comment and location
In their desktop session the users can change these printer settings (except comment and location):

- either in their printers folder or Print Management – in which case the changes will apply to all applications of this session
- or within an application in the printer properties dialogue before printing – in this case they apply only to this application

The following settings can be edited in the PAGE SETUP tab (Illus. 42): PAPER SIZE, PRINT QUALITY, PAPER SOURCE, COLOR, ORIENTATION and PRINT ON BOTH SIDES.

![Illus. 42](image)

**Illus. 42** display of paper sources in a native driver’s user interface (left) and in the Output Gateway interface (right)

**Finishing**

If a printer supports finishing options, the users can find them in the FINISHING tab (Illus. 43). Here they can set, for example, where staples should be located on the printout, where bindings should be set or hole punches made. They can also determine here how many pages should be printed per sheet, and in which order they are printed.
Printing with preview

For printer objects that use Output Gateway as their driver, users can select a print preview (lower arrow in Illus. 44). In that case the print job will appear in the ThinPrint viewer (Illus. 45); this requires that the print jobs are sent to a Windows workstation, where the jobs are rendered using the native driver (and not with V-Layer). Here the users can:

- print to any printer that is connected to the client computer or can be reached from it
- navigate through documents with more than one page
- zoom
- cancel print job reception
- save print job

12 File extension: .tpf (compressed EMF data); the ThinPrint preview program (= TPView.exe) is needed for reloading a saved print job.)
Setting up ThinPrint Ports and printers

When printing with preview in a desktop session, the print options can be opened in the Output Gateway interface (Illus. 42 right), before printing. Once the client machine has received it, the print job is displayed in a preview window (Illus. 45). The print options can then be opened in the interface of the native printer driver (Illus. 42 left).
Open my printing preferences

If there is a printer function which is not supported by the Output Gateway’s user interface the users can use the native driver’s own interface (Illus. 46). To do this, they select OPEN MY PRINTING PREFERENCES (upper arrow in Illus. 44). This also requires that the print jobs are sent to a Windows workstation, on which the jobs are rendered using the native driver (and not with V-Layer).

Changing Output Gateway print dialogue’s language

The Output Gateway print dialog (Illus. 41) is displayed for the users in the language that was chosen during the installation of the ThinPrint Engine or of the Desktop Agent (English, German, Spanish or French). This is set using the Windows registry value:

```
hkey_local_machine\software\ThinPrint\Lang
```

With Windows multi-language packs this print dialog can be displayed in the display language of the respective user (Illus. 47). To do so, the registry value `Lang` is to be changed from enu, deu, fra or esn to `def`. This single setting is sufficient if, for instance, each terminal server user is to be shown the Output Gateway print dialogue in the same language as her or his Windows desktop.
If, however, individual users are to be assigned a different language, the following value must be set – within the sessions – to one of the Language abbreviations in the table below:

```
hkey_current_user\software\ThinPrint\Lang
```

<table>
<thead>
<tr>
<th>Language</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese, traditional (CHT)</td>
<td>CHT</td>
</tr>
<tr>
<td>Chinese, simplified (CHS)</td>
<td>CHS</td>
</tr>
<tr>
<td>Czech (CSY)</td>
<td>CSY</td>
</tr>
<tr>
<td>English, United States (ENU)</td>
<td>ENU</td>
</tr>
<tr>
<td>French (FRA)</td>
<td>FRA</td>
</tr>
<tr>
<td>German (DEU)</td>
<td>DEU</td>
</tr>
<tr>
<td>Greek (ELL)</td>
<td>ELL</td>
</tr>
<tr>
<td>Hungarian (HUN)</td>
<td>HUN</td>
</tr>
<tr>
<td>Italian (ITA)</td>
<td>ITA</td>
</tr>
<tr>
<td>Japanese (JPN)</td>
<td>JPN</td>
</tr>
<tr>
<td>Korean (KOR)</td>
<td>KOR</td>
</tr>
<tr>
<td>Portuguese (PTG)</td>
<td>PTG</td>
</tr>
<tr>
<td>Russian (RUS)</td>
<td>RUS</td>
</tr>
<tr>
<td>Spanish (ESN)</td>
<td>ESN</td>
</tr>
<tr>
<td>Swedish (SVE)</td>
<td>SVE</td>
</tr>
<tr>
<td>Thai (THA)</td>
<td>THA</td>
</tr>
<tr>
<td>Traditional Chinese (CHT)</td>
<td>CHT</td>
</tr>
<tr>
<td>Simplified Chinese (CHS)</td>
<td>CHS</td>
</tr>
<tr>
<td>Chinese, Traditional (CHT)</td>
<td>CHT</td>
</tr>
<tr>
<td>Greek (ELL)</td>
<td>ELL</td>
</tr>
<tr>
<td>Portuguese (PTG)</td>
<td>PTG</td>
</tr>
<tr>
<td>Chinese, Simplified (CHS)</td>
<td>CHS</td>
</tr>
<tr>
<td>Czech (CSY)</td>
<td>CSY</td>
</tr>
<tr>
<td>English, United States (ENU)</td>
<td>ENU</td>
</tr>
<tr>
<td>German (DEU)</td>
<td>DEU</td>
</tr>
<tr>
<td>Greek (ELL)</td>
<td>ELL</td>
</tr>
<tr>
<td>Hungarian (HUN)</td>
<td>HUN</td>
</tr>
<tr>
<td>Italian (ITA)</td>
<td>ITA</td>
</tr>
<tr>
<td>Japanese (JPN)</td>
<td>JPN</td>
</tr>
<tr>
<td>Korean (KOR)</td>
<td>KOR</td>
</tr>
<tr>
<td>Portuguese (PTG)</td>
<td>PTG</td>
</tr>
<tr>
<td>Russian (RUS)</td>
<td>RUS</td>
</tr>
<tr>
<td>Spanish (ESN)</td>
<td>ESN</td>
</tr>
<tr>
<td>Swedish (SVE)</td>
<td>SVE</td>
</tr>
<tr>
<td>Thai (THA)</td>
<td>THA</td>
</tr>
<tr>
<td>Traditional Chinese (CHT)</td>
<td>CHT</td>
</tr>
<tr>
<td>Simplified Chinese (CHS)</td>
<td>CHS</td>
</tr>
</tbody>
</table>

**Illus. 47** Output Gateway’s localization (examples for JPN and ELL)

**V-Layer**

**Scenario**

With V-Layer, print data is sent from the terminal server, virtual desktop or workstation to the ThinPrint Server in Windows’ own EMF data format (Illus. 48). On the ThinPrint Server, it is sent from the ThinPrint Output Gateway to the native printer driver. One advantage of V-Layer is that shared printers on the ThinPrint Server are not connected to ThinPrint Ports and thus do not have to conform to any particular naming convention. Furthermore ThinShare can be used here [Page 19].

Use the V-Layer component if:

- Non-Windows clients are used or
- Printer drivers are to be centralized on a print server or
Setting up ThinPrint Ports and printers

- VirtualCopy is required (see below) or

- Specific printer properties, such as finishing options, are required and Management Center/Services isn't available or not used

Illus. 48  V-Layer: Output Gateway on terminal servers, virtual desktops or workstations, but native printer drivers only on the ThinPrint Server

Setup

- Install ThinPrint Engine on the central, dedicated print server (see the quick installation guide).

- Install ThinPrint Output Gateway on each terminal server, virtual desktop or workstation (included in ThinPrint Engine and Desktop Agent).

- On the ThinPrint Server, add all necessary printers with their native printer drivers, and share them.

- If you want to send the print jobs using the ThinPrint Engine rename the printers according to the ThinPrint naming conventions (Page 32) – e.g. HP Color LaserJet 4700 and Kyocera FS-C8650DN in Illus. 49 – and attach them to ThinPrint Ports.\(^\text{13}\) Otherwise attach them to Standard TCP/IP Ports or to LPR ports.

---

\(^{13}\) It is recommended to use Port pooling (Page 34) or to attach each printer to a separate ThinPrint Port.
Setting up ThinPrint Ports and printers

**V-Layer configuration**

To convert the printers, you use the **V-Layer** configuration tool, which is a component of **ThinPrint Engine**. For each (selected) printer, the V-Layer configuration (Illus. 50) creates a second printer, which uses TP Output Gateway as the driver. Then it moves the share from the old to the new printer. Later, the new, shared printer receives the print jobs (from a desktop session) and transmits them to the second printer of the pair (Illus. 52).

- Mark the relevant shared printers and select **ENABLE V-LAYER** in the context menu (Illus. 50). Through this, the Output Gateway object gets the share name of the native printer object.

- Additionally, decide whether only the Output Gateway object is to be shared, or both it and the (old) native printer object as well (Illus. 51). Its share name has an _n_ added (Illus. 52).

**Note!** Enabling the V-Layer transfers the name of the native printer object to the Output Gateway object. The suffix _n_ is added to the native printer object at the end of the printer name. For printers that are connected to a ThinPrint Port and whose address information is contained in the printer name, _n_ is inserted before the hash sign (#).

To subsequently rename the printer or its share name, use **RENAME PRINTER** in the context menu (Illus. 50).
Setting up ThinPrint Ports and printers

---

**Illus. 50** enabling V-Layer (example)

**Illus. 51** Also share the native printer object(s)?

**Illus. 52** V-Layer printer pairs: The first printer of a pair uses the TP Output Gateway and the second one uses the native driver (example)

Please note that the following Output Gateway features cannot be used with V-Layer: **OPEN MY PRINTING PREFERENCES** and **PRINT PREVIEW** (Illus. 44) as well as the compression level settings (Illus. 41). That way, the compression used by ThinPrint Ports and ThinShare is not affected.

**VirtualCopy**

With VirtualCopy, documents can be printed to up to five printers (and/or locations) simultaneously. As an administrator you can provide users with the corresponding printer object.
– Select a printer with V-Layer already enabled. Then open the context menu and select VIRTUALCOPY (Illus. 53).

![Illus. 53 select VirtualCopy](image)

– Now you can choose up to four more printers to which print jobs are automatically sent, when this V-Layer is selected. Then click OK (Illus. 54).

Note: You can also find the VirtualCopy option in the settings of Output Gateway objects (of V-Layers), either in the printers folder or in Print Management.

![Illus. 54 VirtualCopy: Add more printers](image)

If this printer (in the example: HP Color LaserJet 4700) is selected by the users in a desktop session (e.g. on a terminal server), then the printout occurs on all pre-installed printers simultaneously. The users cannot make any changes to this selection. Only in the printers folder under printer properties can they see which printers were preset by the Administrator.
Encryption of print data

See also:

- the instruction Creating certificates for printing with ThinPrint
- the section Configuring ThinPrint Client Windows (Page 63)
- Configuring ThinPrint Hub
- Configuring ThinPrint Client Linux
- Configuring ThinPrint Client for HP Printers

The ThinPrint Engine has been extended to include encryption for printing, which ensures a secure connection between the ThinPrint Engine and the ThinPrint Client. Using encryption requires the following types of certificates to be imported:

- one “personal” server certificate and one root certificate on each server with ThinPrint Engine
- one “personal” certificate on each client for sending encrypted print jobs

Certificates can be ordered at a certification authority or can be created by yourself (see the instruction Creating certificates for printing with ThinPrint).

Using the root certificate the ThinPrint Engine checks the certificates received from the clients. It checks whether the respective client is authorized to receive print data.

Encryption is also available for use with the Connection Service.

Installing server and root certificates on ThinPrint servers

Request the server certificate from the ThinPrint server in the certification authority's web interface. To use the certificate for encrypted printing, it must be imported into the print spooler’s certificate store in the MMC. Alternatively, for testing purposes, you can export the certificate already installed on the client printer and then import it onto the ThinPrint server.

With newer Windows versions, the root certificate of the CA will be automatically imported together with the server certificate. Otherwise, it can also be manually imported into the computer’s certificate store.

Importing the server certificate into the print spooler’s certificate store

The server certificate that you exported from the user’s certificate store (Illus. 65) is imported into the print spooler service’s certificate store on the ThinPrint server (Illus. 55).
Illus. 55  ThinPrint server’s certificate store: importing the server certificate

To proceed with the import, enter the password that was assigned during the export, leave the INCLUDE ALL EXTENDED PROPERTIES option enabled (Illus. 56), and select SPOOLER\PERSONAL as the certificate store (Illus. 57).

Illus. 56  importing the server certificate: entering the key’s password
Moving the root certificate into the computer's certificate store

- With newer Windows versions, the CA's root certificate will be automatically imported with the server certificate. Move it to **LOCAL COMPUTER → TRUSTED ROOT CERTIFICATION AUTHORITIES** (Illus. 58). Otherwise, import the previously exported root certificate to **LOCAL COMPUTER → TRUSTED ROOT CERTIFICATION AUTHORITIES** (Illus. 59).
**Note!** If you use an Intermediate Certification Authority, import its issuer certificate to LOCAL COMPUTER → INTERMEDIATE CERTIFICATION AUTHORITIES additionally.

---

**Configuring ThinPrint Engine**

**Encryption settings**

- To make the imported certificate usable for ThinPrint Engine, select the path THINPRINT → THINPRINT ENGINE → PORT MANAGER in the ThinPrint Engine's console, and then, in the context menu: ALL TASKS → ENCRYPTION SETTINGS (Illus. 60).

---

Under ENCRYPTION SETTINGS enter the names of the server and root certificates (Illus. 61), both of which are displayed in the column ISSUED TO in the MMC certificate overview (Illus. 58). Confirm with OK.
Enabling encryption

- Enable encrypted printing for each ThinPrint Port with the USE ENCRYPTION (Illus. 62 and 63). Confirm with OK.

- To finish, restart the print spooler.

**Note!** If you need to configure many ThinPrint Ports, you can use the (older) Management Center and the (newer) Management Services.
Installing certificates on the client side

When you install the certificate on a client computer (Illus. 55), you decide whether you want your certificate to be linked to the user or the computer.

- **User-based**: If only one person uses the computer, install the certificate in the user's certificate store in `CURRENT USER → PERSONAL`. That means that the certificate is linked to that actual user and is located in the user's certificate store (Illus. 65).

- **Computer-based**: If more than one person is using a single computer (or if, in addition to the user account, there is also an administrator account), you can instead make the certificate computer-based and place it in the `LOCAL COMPUTER → PERSONAL` container (Illus. 64). A single certificate per client computer will suffice for all users who share this computer.
Note! If you store your certificate in computer-based mode (under LOCAL COMPUTER → PERSONAL) you then need to assign user permissions for encryption on the client computer (see the section Assigning user permissions for encryption on client computers on Page 62) and set the CERTSTORE registry value to "1" (lower arrow in Illus. 69).

Computer-based certificate storage

To store a certificate in computer-based mode, export it from the user's certificate store (arrow in Illus. 65) and then import it into the computer's certificate store (arrow in Illus. 66).

Assigning user permissions for encryption on client computers

If you link your certificates to the computer (as described in the previous section), i.e. you have imported them into LOCAL COMPUTER → PERSONAL, you can now assign permissions to the individual users of that computer.
To do this, select **ALL TASKS → MANAGE PRIVATE KEYS** (Illus. 66) in the context menu of the imported certificate. This will take you to the certificate permissions (Illus. 67).

![Illustration 66: Opening the Key Management](image)

Click on **ADD** to add the individual users or user groups who will be printing with encryption with ThinPrint and give them, as a minimum, read permission (Illus. 67).

![Illustration 67: Setting the Permissions of a Certificate: Adding Users](image)

To enable printing with encryption, you also need to make one or two registry entries after you have imported the certificate to the client computer. You can read the directions for this in the following section.

**Configuring ThinPrint Client Windows**

If you want to print with encryption to a client computer, a certificate must be imported onto that computer and at least one entry needs to be made in the registry.

Before encrypted data is sent, the ThinPrint server remotely checks whether the client's registry contains the entry `CERTNAME` with the name of the imported certifi-
cate and also that the certificate is stored on the client. The `CertName` entry in the registry must – as described in the following – be carried out manually:

1. After the certificate has been imported onto the client, make one of the following registry entries:

   either per user (Illus. 68):
   
   ```
   hkey_current_user\software\appdatalow\software\thinprint\client\CertName [reg_sz]
   ```

   or computer-based (upper arrow in Illus. 69):
   
   ```
   hkey_local_machine\software\thinprint\client\CertName [reg_sz]
   ```

2. As the value, enter the name of the imported certificate, which can be seen in the `ISSUED TO` column in the certificate overview in the MMC (Illus. 64).
3. Finally, restart ThinPrint Client Windows (to do this when the client type is an application, terminate it and start it again. If it is a Windows service, restart the service).

The `CertName` registry entry is only required for encrypted print jobs; the passage of unencrypted print jobs is still possible.

**Note!** If you have placed your certificate in the computer's certificate store (i.e. computer-based; see Page 61), you must set the registry value `CertStore` to "1" (lower arrow in Illus. 69).

---

**AutoConnect**

**Introduction**

With AutoConnect it's possible to **map printer objects automatically** if shared printers can be used on a central, dedicated print server (Illus. 70). AutoConnect is installed as a Windows service, and is supplied with the ThinPrint Engine package and Desktop Agent.

**AutoConnect features**

- Dynamic connection to shares on ThinPrint Servers (= printer mapping), based on various criteria, e.g.:
  - Active Directory user or group name
  - Printer name or printer group name
  - Client (or host) name
  - Client IP address, IP range or IP group

- Two methods for AutoConnect configuration:
  - Using an MMC snap-in (recommended for single terminal servers)
  - Using a Group Policy Object (recommended for virtual desktops and large environments)

- Support for Output Gateway

- Support for Virtual Channel Gateway

- Support for Connection Service

- Support for Management Center

- Support for Management Services
AutoConnect configuration using the MMC

Where and how to install AutoConnect?

AutoConnect is installed on the same computers on which the applications run. When using VMware Horizon View the AutoConnect installer is not required because AutoConnect is embedded in the View Agent. To update AutoConnect on VMware Horizon View desktops, and in other desktop environments use the Desktop Agent installation routine.

Alternatively, AutoConnect and Output Gateway can also be installed on workstations – again, using the Desktop Agent installer.

AutoConnect configuration using the MMC

The description below is recommended for configuring AutoConnect for *single* terminal servers.

Basic configuration

- ThinPrint Engine on a ThinPrint Server
- AutoConnect, Virtual Channel Gateway and Output Gateway on the machine on which the applications run: terminal servers, workstations or virtual desktops
- ThinPrint Clients on workstations and/or local print servers and/or gateway appliances
Note! The AutoConnect configuration using group policies is described in the ThinPrint group policies manual.

Using the MMC, you can configure AutoConnect locally as well as remotely; for remote configuration AutoConnect must be installed on both machines.

1. Open the ThinPrint configuration.

2. In case of remote configuration: In the THINPRINT node, click ADD (Illus. 71) and then specify the computer address for each remote ThinPrint Engine to be configured.

3. The ThinPrint Engine console appears (Illus. 72). Select on the left, i.e., in the Console Tree: THINPRINT → THINPRINT ENGINE → AUTOCONNECT.
Configuration

- Clicking on Edit (arrow in Illus. 72) will open the AutoConnect configuration (Illus. 73).

![Settings](image)

**Illus. 73** AutoConnect configuration: GENERAL tab

**Settings**

**General**

In the **GENERAL tab** (Illus. 73) the default value for the connection protocol between AutoConnect and ThinPrint Clients can be selected. 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 for ICA/RDP as well as TCP/IP ThinPrint Ports. In Dynamic Printer Matrix (see below) you can limit this setting per rule; here, the columns T, R and I correspond to the protocols TCP/IP, ICA and RDP.

Furthermore, you can decide here which AutoConnect events are to be logged and displayed in the AUTOCONNECT DIAGNOSTICS table (Illus. 72).

For **CONFIGURATION DATABASES** see **Storage destination for AutoConnect settings** in the ThinPrint Engine on terminal servers.

**Printer Creation**

In the **PRINTER CREATION tab** (Illus. 74) you can determine

- whether the users may manage their session printers themselves.
- See also the **ThinPrint Self Service** manual.
• when the printers are to be created or mapped:
  • Either at each session logoff/logon
  • Or when disconnecting and reconnecting a session.

– Restart the TP AUTOCONNECT SERVICE afterwards.

**Note!** From the time when the option *Printer Self Service* is enabled, the printers of users who log on to a session for the first time aren’t mapped automatically anymore (see the Self Service manual). The tables Map Additional Printers and Dynamic Printer Matrix then provide the input for printers to be selected.

In case you use only the Map Additional Printers table for connecting printer shares you can speed up AutoConnect using the option *DISABLE DYNAMIC PRINTER MATRIX*.

![AutoConnect configuration: PRINTER CREATION tab](Illus. 74)

**Default Printer**

Using the settings in the **DEFAULT PRINTER** tab (Illus. 75) you can set *whether* the session’s default printer should be changed by AutoConnect and – if yes – which information is to be used to change it:

• either the last CHOICE by the users in the session or in ThinPrint Self Service
  (**APPLY DEFAULT PRINTER FROM USER SETTINGS**)
• or the current printer of the relevant ThinPrint Client in case of using Dynamic Printer Matrix (DEFAULT PRINTER SET BY ADMINISTRATOR FOR THINPRINT CLIENT HAS PRIORITY)

• or the Default column of the Map Additional Printers table (Illus. 105; DEFAULT PRINTER SET BY ADMINISTRATOR IN MAP ADDITIONAL PRINTERS HAS PRIORITY)

Some settings in the PRINTERS tab are provided for printer creation using templates (Illus. 76). Since templates are only relevant for environments without ThinPrint Servers, this is described in the ThinPrint Engine on terminal servers manual.
Other settings in the PRINTERS tab relate to all printers, including those that are mapped from ThinPrint Servers (Illus. 77 below).

If users carry out changes to printers themselves, then these will be stored in the configuration database for USER-SPECIFIC PRINTER PREFERENCES (see the GENERAL tab), if the AUTOMATICALLY SAVE CHANGES TO PRINTER PROPERTIES option is enabled here.

If these stored settings are to be applied to newly created printer objects, or those yet to be connected, then the CREATE PRINTERS WITH USER-DEFINED PROPERTIES option must also be enabled.
**Note!** For transfer of printer properties from ThinPrint Clients to Output Gateway objects on print servers, Management Center or Management Services can be used alternatively.

**High Availability**

See the *High availability and load balancing* manual.

**IP groups**

When using the AutoConnect tables *Dynamic Printer Matrix* (Page 80) and *Map Additional Printers* (Page 91) you don't need to enter each IP address or IP range individually. For simplicity, you can instead – optionally – define groups and use these in the tables.
In the AutoConnect configuration console, select **GROUPS** → **IP GROUPS** → **ADD GROUP** (arrow in Illus. 78).

Enter a name for the group (e.g. **building 1** in Illus. 79), use the **button** to add lines (see arrow), and enter in all the relevant IP addresses or IP address ranges. Confirm with OK or APPLY. The result is shown in Illus. 80.
Other options available here (see Illus. 80):

<table>
<thead>
<tr>
<th>Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add Group</td>
<td>create an IP group</td>
</tr>
<tr>
<td>Edit Group</td>
<td>change the properties of an IP group</td>
</tr>
<tr>
<td>Duplicate Group</td>
<td>generate a second IP group with the same members – for example, to create additional groups more quickly</td>
</tr>
<tr>
<td>Remove Group</td>
<td>delete the IP group in question</td>
</tr>
<tr>
<td>Refresh</td>
<td>update information from the AutoConnect database</td>
</tr>
</tbody>
</table>

– Now you can assign the IP group to a currently selected row in the AutoConnect tables Dynamic Printer Matrix or Map Additional Printers. Do so using the APPLY SELECTED function (arrow in Illus. 81). Confirm with OK or APPLY. The result is shown in Illus. 82 (arrow).
Illus. 81  Map Additional Printers: applying an IP group

Illus. 82  Map Additional Printers: IP group applied (example)

When you've done all changes then you need to acknowledge them (Illus. 83).

Illus. 83  Publish or discard changes

By clicking PUBLISH you acknowledge your changes and they will be saved in the given AutoConnect database (see Storage destination for AutoConnect settings) or by clicking DISCARD ALL no changes will be saved.

Printer groups

Similarly as for the IP groups, and especially in the AutoConnect table Map Additional Printers, you don't need to individually enter every network printer shared on
a ThinPrint Server. For simplicity, you can instead – optionally – define and apply groups. The printers are then displayed sorted by groups in the Self Service console.

**Note!** If you create printer groups to display them in the Self Service console, avoid adding printers to multiple groups, as these printers will only appear to users in one of these groups.

For similar printers in the *Dynamic Printer Matrix*, you can use *Variables* instead.

– In the AutoConnect configuration console, select **GROUPS** → **PRINTER GROUPS** → **ADD GROUP** (arrow in Illus. 84).

![Illus. 84 AutoConnect configuration: GROUPS](image)

– Enter a name for the group (e.g. *Marketing* in Illus. 85).

– Select one of the two options **SELECT PRINTERS FROM** → **PRINT SERVER** (upper arrow in Illus. 85) or **SELECT PRINTERS FROM** → **HIGH AVAILABILITY PRINT SERVER GROUP** (middle arrow). Your choice here is determined by whether the printers you are getting are from a single print server in the printer group or from a print server in an HA group\(^\text{14}\).

\(^{14}\) HA = High Availability
For each printer, use the button to add a line manually, or simply use the button to select the desired printers from either the print server or the HA group specified above (lower arrow).

Illus. 85 defining the printer group

If you used the button, all the shared printers from the specified print server or the server group (HA) will appear (Illus. 86). Use the checkboxes to select the desired printers. Confirm with OK.

Illus. 86 selecting printers
The selected printers now appear in the printer group (Illus. 87). In the DEFAULT column, select a default printer for the session, if it has not already been determined by other means (e.g. designated in the user’s ThinPrint Client or selected by ThinPrint Self Service). Confirm the printer group creation with OK or APPLY.

Legend (for Illus. 87):

<table>
<thead>
<tr>
<th>Icon/Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer Group Name</td>
<td>a name for the printer group</td>
</tr>
<tr>
<td>Select printers from → Print server</td>
<td>specify a single print server from which the printers in a printer group should be received</td>
</tr>
<tr>
<td>Select printers from → High Avail-</td>
<td>specify a print server group (see the High Availability and Load Balancing manual), from which the printers in a printer group should be received</td>
</tr>
<tr>
<td>ability Print Server Group</td>
<td>color printing possible</td>
</tr>
<tr>
<td></td>
<td>grayscale/black &amp; white printing</td>
</tr>
<tr>
<td></td>
<td>print on both sides (duplex) possible</td>
</tr>
<tr>
<td></td>
<td>print on one side (simplex)</td>
</tr>
<tr>
<td>London</td>
<td>Location field of the original printer</td>
</tr>
<tr>
<td>Created by Management Center</td>
<td>Comments field of the original printer</td>
</tr>
</tbody>
</table>
More options available here (see Illus. 84):

<table>
<thead>
<tr>
<th>Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add Group</td>
<td>create a group</td>
</tr>
<tr>
<td>Edit Group</td>
<td>change the properties of a group</td>
</tr>
<tr>
<td>Duplicate Group</td>
<td>generate a second group with the same members – for example, to create</td>
</tr>
<tr>
<td></td>
<td>additional groups more quickly</td>
</tr>
<tr>
<td>Remove Group</td>
<td>delete the group in question</td>
</tr>
<tr>
<td>Refresh</td>
<td>update information from the AutoConnect database</td>
</tr>
</tbody>
</table>

– Now you can assign the printer group to a currently selected row in the AutoConnect tables *Dynamic Printer Matrix* or *Map Additional Printers*. Do so using the APPLY SELECTED function (arrow in Illus. 88). Confirm with OK or APPLY. The result is shown in Illus. 89 (arrow).
When you've done all changes then you need to acknowledge them (Illus. 90).

By clicking PUBLISH you acknowledge your changes and they will be saved in the given AutoConnect database (see Storage destination for AutoConnect settings) or by clicking DISCARD ALL no changes will be saved.

**Dynamic Printer Matrix**

The Dynamic Printer Matrix lets AutoConnect map the printer shares created on the central, dedicated print servers to the desktop sessions. You can precisely control which user is to get what printer. This table requires a ThinPrint Client on the user’s workstation or terminal as well as a ThinPrint Engine on the print server(s). For all other shares, use the Map Additional Printers (Page 91).

- Select Dynamic Printer Matrix in the console tree (Illus. 91)
**Configuration**

Double-clicking in the table (Illus. 91) will open the Dynamic Printer Matrix configuration console (Illus. 92). Use the buttons (top left) to edit the table.

**Legend:**

<table>
<thead>
<tr>
<th>Table element</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Insert above]</td>
<td>inserting a row above the current one</td>
</tr>
<tr>
<td>![Insert below]</td>
<td>inserting a row below the current one</td>
</tr>
</tbody>
</table>
Table element | Meaning
--- | ---
![remove selected rows] | removing selected rows
![move a row up] | moving a row up
![move a row down] | moving a row down
- rule 1: locally on a client machine created printers won’t be included
- rule 2: shared printers connected to a client machine won’t be included; their names contain a backslash (\) at the first position (see Printer Name column)
- import from a CSV file (this can be exported from the Management Center or created using the Management Services)
- **Caution:** Existing rows will be overwritten – without warning!

**IP Range / Group**
IP address, IP range or IP group in which the client is located

**Client Name**
client’s hostname

**Driver Name**
printer driver name

**Printer Name**
printer name; with local connected printer shares a backslash (\) is on the first position

**Class Name**
name of (any) printer class

**User / Group**
user or group from the Active Directory

**W**
Windows clients allowed

**A**
Apple Macintosh clients allowed

**L**
Linux clients allowed

**J**
Java clients allowed

**T**
Thin clients allowed

**x**
other client types allowed

**T**
protocol: ThinPrint TCP/IP

**R**
protocol: RDP

**I**
protocol: ICA

**Target Printer**
- shared printer in the network
- syntax: \print-server\share-name
- variables can be used here
Note! In ThinPrint versions before 11.0, AutoConnect has treated a single hidden protocol column as not matching. If, for example, an ICA type of ThinPrint Client was detected by AutoConnect and the ICA column was hidden then no rule (row) of Dynamic Printer Matrix was matching. With version 11, the new functionality of a hidden column is that this column is ignored within each rule (row). This means that it would not matter whether the respective protocol or client type is true or not.

Input modes for search

The search box can be used in two ways:

1. Direct search:
   Even when entering just one character, all matches are listed immediately. With every additional character, the number of matches decreases accordingly.

2. Debug search:
   By using keywords, an AutoConnect query can be simulated. Here, the entries are not only compared to the entries in the table (as opposed to Direct Search), but the entries are evaluated.
   So, you can easily see the relevant rows for a specified client or user. This can be helpful for support purposes.
   When entering more than one key, use commas to separate.
   Keys: IP, CLIENT, DRIVER, PRINTER, CLASS, USER
   If you enter a user name, also user groups in which the user is a member will be found.
   With IP addresses also IP ranges will be found in which the entered IP address is enclosed.
   If you enter words, items with wildcards will be found if the entered string and an item match.
   Checkbox search in columns <key>:true
   Keys: WIN, MAC, LINUX, JAVA, THIN (for thin clients), CE (for Windows CE), TCPIP, RDP, ICA
Example for debug search:

*User5* from the domain *ourdomain.local* establishes a session from *Client7* with the IP address *192.168.14.10*. To figure out the very rows used by *AutoConnect*, you could enter:

IP:192.168.14.10, Client:Client7, User:ourdomain\user5

**Table functions**

You have the option of hiding unneeded columns (Illus. 93). In all cases, hidden columns (and their rules) are deactivated.

**Functional principle**

When *AutoConnect* is executed, it processes the table from top to bottom, for each printer activated in ThinPrint Client (Illus. 94). If all criteria (columns) in one line are met for the first printer *AutoConnect* searches for the share specified in the column *TARGET PRINTER* and establishes a connection to this printer share during the session. *AutoConnect* now stops the search for this printer in the table and, if applicable, continues the same procedure for the next activated printer in ThinPrint Client etc. etc.

You can change *AutoConnect*'s processing sequence by using the arrow keys (↑↓) to switch the line order. You can also add or delete lines. In the table, *•* and *?* can be used as wild cards. The *TARGET PRINTER* column represents the shares on the central, dedicated print server(s).

These features are explained in the scenarios below; the scenarios can also be combined with each other.
In addition to IP groups, the IP RANGE/GROUP column of Dynamic Printer Matrix or Map Additional Printers 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
- 192.168.128.0/22
- 192.0.0.0/8

A separate printer share is to be given as each target; printers with different properties will thus be mapped in the respective session.

The default value is: 0.0.0.0–255.255.255.255

The 24 represents the following subnet mask: 255.255.255.0; i.e., $3 \times 8 = 24$ set bits (22 is equivalent to 255.255.252.0; 16 is equivalent to 255.255.0.0; and 8 is equivalent to 255.0.0.0).

**Scenario: Network printers in remote offices or office floors.**

Each remote office (or floor) uses a different client name (both for workstations and for local, external and internal print servers). In this way, different printers on different workstations can be mapped using the client name (Illus. 95).

The CLIENT NAME and TARGET PRINTER columns on Dynamic Printer Matrix or Map Additional Printers table could contain the following entries:

<table>
<thead>
<tr>
<th>Client name</th>
<th>Target Printer</th>
</tr>
</thead>
<tbody>
<tr>
<td>floor_1*</td>
<td>\cps47\floor_11</td>
</tr>
<tr>
<td>floor_2*</td>
<td>\cps47\floor_21</td>
</tr>
</tbody>
</table>
As an alternative to the **CLIENT NAME** column, you can also use the **IP RANGE** column. Only printer shares are entered in the **TARGET PRINTER** column. (The default entry in **CLIENT NAME** and **IP RANGE** is: *)

### Client type

On the one hand you can select between the client platforms Windows (W), Mac OS X (A), Unix or Linux (U), Java (J), thin clients (T) and other (X), and on the other hand between the connection protocols TCP/IP (T), RDP (R) and ICA (I); see also Page 68. By default, all client types are selected. If specific translation rules are only to apply to selected client types, they are easily selected by simply adding or removing a checkmark. In the following table, as an example, the ThinPrint Output Gateway share is assigned to all Windows clients\(^ {15} \). All other client types use the HPLaser share, which uses a native printer driver.

<table>
<thead>
<tr>
<th>Client Name</th>
<th>Target Printer</th>
</tr>
</thead>
<tbody>
<tr>
<td>floor_3*</td>
<td>\cps47\floor_31</td>
</tr>
</tbody>
</table>

### Variables

To simplify printer administration, it is possible to use variables. Several printers can thus be mapped with one single entry where the variables are replaced by e.g. the printer name or the print server name of the printer in the ThinPrint Client respectively.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>%LCPRN%</td>
<td>printer name as shown in ThinPrint Client Manager (Illus. 94)</td>
</tr>
<tr>
<td>(Local Client Printer)</td>
<td></td>
</tr>
<tr>
<td>%LCCLA%</td>
<td>class name, as shown in ThinPrint Client Manager (Illus. 94)</td>
</tr>
<tr>
<td>(Local Class)</td>
<td></td>
</tr>
<tr>
<td>%LHOST%</td>
<td>client machine's host name (= client name)</td>
</tr>
<tr>
<td>(Local Host Name)</td>
<td></td>
</tr>
</tbody>
</table>

\(^{15}\) Windows 95 or later
The entries are made in the **TARGET PRINTER column** in Dynamic Printer Matrix. Either variable can be used as desired, and they can also used in combination. (The share names the Management Center creates for printer objects on ThinPrint Servers are compatible with these variables.) Further examples can be found on **Page 107**.

Below are two examples of how entries in the Dynamic Printer Matrix can be simplified by using variables.

### Example without local print servers.

The main office has a terminal server or a VDI, plus a ThinPrint Server with a ThinPrint Engine installed (Illus. 96). The goal is to map the printers of the respective workstation (or terminal) in each user’s session with only one entry in Dynamic Printer Matrix.

The individual printers of the Windows workstations are created according to ThinPrint naming conventions (in this example: TCP/IP) and shared on the ThinPrint Server (cps47) in the main office, for example:

<table>
<thead>
<tr>
<th>Printer name</th>
<th>Share name</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP DeskJet#192.168.131.124:1</td>
<td>HP DeskJet</td>
</tr>
<tr>
<td>Lexmark T620#192.168.131.124:2</td>
<td>Lexmark T620</td>
</tr>
</tbody>
</table>
Only one entry is then necessary in Dynamic Printer Matrix, namely

```
\cps47\%LCPRN%
```

where cps47 is the ThinPrint Server (Illus. 98):

The printers folder is then displayed in the user’s session as shown in Illus. 99.

**Example with local print servers.**

The main office has a terminal server or a VDI, plus a ThinPrint Server with the ThinPrint Engine. Each of the branch offices has a local print server installed, with the ThinPrint Client as a Windows service (Illus. 100). The goal is to map the printers of
the respective branch offices in the session of each user, using only one entry in Dynamic Printer Matrix.

**Illus. 100** example scenario 2 for the use of variables in Dynamic Printer Matrix

The printers of each branch office are created and shared on the local print servers (in this example: Berlin and Paris).

The individual printers of the various branch offices are created according to ThinPrint naming conventions (in this example: TCP/IP) and shared on the ThinPrint Server (in this example: cps47) at the main office, for example:

<table>
<thead>
<tr>
<th>Printer name</th>
<th>Share name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lexmark Optra#berlin:1</td>
<td>Lexmark Optra_berlin</td>
</tr>
<tr>
<td>HP Color#berlin:2</td>
<td>HP Color_berlin</td>
</tr>
<tr>
<td>Lexmark Optra#paris:1</td>
<td>Lexmark Optra_paris</td>
</tr>
<tr>
<td>Epson Stylus#paris:2</td>
<td>Epson Stylus_paris</td>
</tr>
</tbody>
</table>

The printer ID (:1, :2) is the ID, as used in the ThinPrint Client on the local print server. Berlin and Paris are the names of the local print servers. In this example, we are printing via TCP/IP. Only one entry is then necessary in Dynamic Printer Matrix, namely

```
\\cps47\%LCPRN\_%LPSRV\%
```

where cps47 is the ThinPrint Server (Illus. 101):
The variable combination `%LCPRN%_%LPSRV%` is then translated based on the printer name in the ThinPrint Client of the user machine as follows: HP COLOR_BERLIN or EPSON STYLUS_PARIS. It thus exactly matches the share name on the ThinPrint Server. Using this share, you can then print directly to the corresponding printer on the local print server: for example HP COLOR on the BERLIN print server.

The Printers folder is then displayed in the user’s session as shown in Illus. 102 (example for Berlin).

For more examples of using variables see Page 102 as well as the ThinPrint Management Center manual.

When you've done all changes then you need to acknowledge them (Illus. 103).

By clicking PUBLISH you acknowledge your changes and they will be saved in the given AutoConnect database (see Storage destination for AutoConnect settings) or by clicking DISCARD ALL no changes will be saved.
Map Additional Printers

In contrast to the Dynamic Printer Matrix, with MAP ADDITIONAL PRINTERS you can map any network printer (share on a print server) – regardless of that ThinPrint Clients or a print server with a ThinPrint Engine installed on are available (Illus. 105)

Legend:

<table>
<thead>
<tr>
<th>Table element</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Image" alt="Insert Row Above" /></td>
<td>inserting a row above the current one</td>
</tr>
<tr>
<td><img src="Image" alt="Insert Row Below" /></td>
<td>inserting a row below the current one</td>
</tr>
<tr>
<td><img src="Image" alt="Remove Row" /></td>
<td>removing selected rows</td>
</tr>
<tr>
<td><img src="Image" alt="Move Up" /></td>
<td>moving a row up</td>
</tr>
<tr>
<td><img src="Image" alt="Move Down" /></td>
<td>moving a row down</td>
</tr>
<tr>
<td><img src="Image" alt="Import CSV" /></td>
<td>• import from a CSV file (this can be exported from the Management Center or created using the Management Services)</td>
</tr>
<tr>
<td><img src="Image" alt="Caution" /></td>
<td>• Caution: Existing rows will be overwritten – without warning!</td>
</tr>
</tbody>
</table>
The search box can be used in two ways:

1. Direct search:
   Even when entering just one character, all matches are listed immediately. With every additional character, the number of matches decreases accordingly.

2. Debug search:
   By using keywords, an AutoConnect query can be simulated. Here, the entries are not only compared to the entries in the table (as opposed to Direct Search), but the entries are evaluated.
   So, you can easily see the relevant rows for a specified client or user. This can be helpful for support purposes.
   When entering more than one key, use commas to separate.
   Keys: USER, IP, CLIENT
   If you enter a user name, also user groups in which the user is a member will be found.
   With IP addresses also IP ranges will be found in which the entered IP address is enclosed.
   If you enter words, items with wildcards will be found if the entered string and an item match.
   Checkbox search in columns <key>:true

Example for debug search:
User5 from the domain ourdomain.local establishes a session from Client7 with the IP address 192.168.14.10. To figure out the very rows used by AutoConnect, you could enter:
IP:192.168.14.10, Client:Client7, User:ourdomain\user5
When you've done all changes then you need to acknowledge them (Illus. 106).

**Illus. 106** Publish or discard changes

By clicking PUBLISH you acknowledge your changes and they will be saved in the given AutoConnect database (see Storage destination for AutoConnect settings) or by clicking DISCARD ALL no changes will be saved.

**Sending and importing the configuration**

Similar to the port configuration, AutoConnect also has additional options of SEND CONFIGURATION (Illus. 72) and IMPORT FROM MANAGEMENT SERVICES.

When sending, the AutoConnect configuration is sent to other computers with the exception of Dynamic Printer Matrix or Map Additional Printers tables – these are included in AutoConnect's configuration database and can be assigned by setting the storage destination (see Storage destination for AutoConnect settings in the ThinPrint Engine on terminal servers manual) or by copying the database file.

Using the import function, CSV files which come from Management Center or Management Services can be read in (see above IMPORT FROM A CSV FILE).

**Caution!** With Send and Import, an existing AutoConnect configuration will be overwritten – with Import without warning!

**Send configuration**

The ACTION → SEND CONFIGURATION function lets data from the AutoConnect configuration be sent to groups of servers; see also Procedure when sending (Page 30).

Once you are finished configuring AutoConnect, click APPLY or OK.

**Saving und importing the AutoConnect database**

Saving the AutoConnect database can be done in two different ways. First of all you could save the database after changing something via SAVE TABLE AS (as you can see in Illus. 106).

It can be done as an alternative via rightclicking the snap-in AutoConnect and choose SAVE TABLE AS (Illus. 107).
As well via rightclick on the snap-in AutoConnect you can choose Open Tables from and import a saved AutoConnect database (Illus. 108). You can import the database on the same server you saved it or on a other server with a ThinPrint Engine installed.

**Script control**

If you want to run AutoConnect from the Command Prompt or using a script, the following parameters (amongst other) can be used:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>-v</td>
<td>(Verbose) Display messages; give detailed information at startup</td>
</tr>
<tr>
<td>-d</td>
<td>Delete the printer(s) for a specific session</td>
</tr>
<tr>
<td>-dl</td>
<td>Delete only local printers (on terminal servers)</td>
</tr>
<tr>
<td>-dn</td>
<td>Delete only connections to printer shares</td>
</tr>
<tr>
<td>Parameter</td>
<td>Function</td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>-d session_ID</td>
<td>Delete all printer(s) of a specific session (admins only). The session ID can be found in the printers folder under LOCATION</td>
</tr>
<tr>
<td>-d all</td>
<td>Delete all printers created with templates (admins only)</td>
</tr>
<tr>
<td>-r</td>
<td>(Repair) Compares saved session information at actually existing printer objects (admins only)</td>
</tr>
<tr>
<td>-f</td>
<td>shares the printer with the specified share name; possible placeholders: %N = printer name, %A = printer address, %I = client ID, %U = user name</td>
</tr>
<tr>
<td>-F x</td>
<td>Keep AutoConnect running and restart every x seconds</td>
</tr>
<tr>
<td>-p port</td>
<td>(Port) TCP/IP port number (if other than port 4000) Note: The TCP port numbers in ThinPrint Port, AutoConnect, and ThinPrint Client must match.</td>
</tr>
<tr>
<td>-i protocol</td>
<td>(Interconnection) Select protocol for connection to the ThinPrint Clients; overwrites AutoConnect dialog settings (acceptable values: TCPIP, VC, AUTO); see Illus. 73)</td>
</tr>
<tr>
<td>-a address</td>
<td>Specification of IP address or client name of the computer on which a ThinPrint Client is running – i.e., of local print servers or external print servers of network printers (e.g., ThinPrint Hub or a device from SEH).</td>
</tr>
<tr>
<td>-L</td>
<td>Display ThinPrint Client’s printer list</td>
</tr>
<tr>
<td>-I printer ID</td>
<td>Specification of selected printer IDs from ThinPrint Client – comma separated</td>
</tr>
<tr>
<td>-I d</td>
<td>Map only ThinPrint Client’s CURRENT PRINTER</td>
</tr>
<tr>
<td>-? or -h</td>
<td>(Help) Will open parameter help panel</td>
</tr>
</tbody>
</table>

**Applying changes**

Once you have finished configuring AutoConnect, click APPLY or OK.
# AutoConnect: Syntax

## Syntax: Dynamic Printer Matrix

The table shows some examples how you can use the filtering techniques of the Dynamic Printer Matrix.

<table>
<thead>
<tr>
<th>Column</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Range/Group</td>
<td>• 192.168.1.0/24</td>
</tr>
<tr>
<td></td>
<td>• 192.168.1.0-192.168.1.255</td>
</tr>
<tr>
<td></td>
<td>• 192.168.2.110</td>
</tr>
<tr>
<td>Client Name</td>
<td>• HHPC01234</td>
</tr>
<tr>
<td></td>
<td>• HHPC*</td>
</tr>
<tr>
<td></td>
<td>• *PC01234</td>
</tr>
<tr>
<td></td>
<td>• HH*01234</td>
</tr>
<tr>
<td></td>
<td>• <em>PC</em></td>
</tr>
<tr>
<td></td>
<td>* placeholder for one or more characters</td>
</tr>
<tr>
<td>Driver Name</td>
<td>• HP Color Laserjet CP3505</td>
</tr>
<tr>
<td></td>
<td>• *CP3505</td>
</tr>
<tr>
<td></td>
<td>• HP*CP3505</td>
</tr>
<tr>
<td></td>
<td>• HP*</td>
</tr>
<tr>
<td></td>
<td>• <em>CP</em></td>
</tr>
<tr>
<td></td>
<td>* placeholder for one or more characters</td>
</tr>
<tr>
<td><strong>Column</strong></td>
<td><strong>Example</strong></td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Printer Name</td>
<td>HP Support CP33505&lt;br&gt;HP*&lt;br&gt;<em>Support</em></td>
</tr>
<tr>
<td></td>
<td>* placeholder for one or more characters</td>
</tr>
</tbody>
</table>
| User/Group          | **User:**
|                     | • \domänename\AD-Accountname<br>Bsp.:\n|                     | • \ourdomain\max.mustermann                                               |
|                     | **Active Directory Group:**
|                     | • \domänename\Gruppenname<br>Bsp.:\n|                     | • \ourdomain\marketing                                                    |
|                     | *Tip: If you have just a simple domain without subdomains you can use only the account name of the user without specifying the domain name as well.* |
|                     | *Wrong: \ourdomain.com\marketing*                                           |
Syntax: Map Additional Printers
The table shows some examples how you can use the filtering techniques of the Dynamic Printer Matrix.

<table>
<thead>
<tr>
<th>Column</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>User/Group</td>
<td><strong>User:</strong></td>
</tr>
<tr>
<td></td>
<td>• \domänennname\AD-Accountname</td>
</tr>
<tr>
<td></td>
<td>Bsp.:</td>
</tr>
<tr>
<td></td>
<td>• \ourdomain\max.mustermann</td>
</tr>
<tr>
<td></td>
<td><em>Tip: If you have just a simple domain without subdomains you can use only the account name of the user without specifying the domain name as well.</em></td>
</tr>
<tr>
<td>Active Directory Group</td>
<td><strong>Active Directory Group:</strong></td>
</tr>
<tr>
<td></td>
<td>• \domänennname\Gruppenname</td>
</tr>
<tr>
<td></td>
<td>Bsp.:</td>
</tr>
<tr>
<td></td>
<td>• \ourdomain\marketing</td>
</tr>
<tr>
<td></td>
<td>*Tip: You have to enter the domain name without suffix. Wrong:</td>
</tr>
<tr>
<td>IP Range / Group</td>
<td>• 192.168.1.0/24</td>
</tr>
<tr>
<td></td>
<td>• 192.168.1.0-192.168.1.255</td>
</tr>
<tr>
<td></td>
<td>• 192.168.2.110</td>
</tr>
<tr>
<td>Client Name</td>
<td>• HHPC01234</td>
</tr>
<tr>
<td></td>
<td>• HHPC*</td>
</tr>
<tr>
<td></td>
<td>• *PC01234</td>
</tr>
<tr>
<td></td>
<td>• <strong>H</strong>*01234</td>
</tr>
<tr>
<td></td>
<td>• <em>P</em>C*</td>
</tr>
<tr>
<td></td>
<td>* placeholder for one or more characters</td>
</tr>
<tr>
<td>MAC Address</td>
<td><strong>MAC Address</strong></td>
</tr>
<tr>
<td></td>
<td>(This filter only works when you use VMware Horizon)</td>
</tr>
<tr>
<td></td>
<td>• XX-XX-XX-XX-XX-XX</td>
</tr>
<tr>
<td></td>
<td>*Tip: You need to use a hyphen as seperator. Wrong: XX:XX:XX:XX:XX:XX</td>
</tr>
</tbody>
</table>
Virtual Channel Gateway

Introduction

Virtual Channel Gateway is only necessary if printers have to be targeted over RDP, ICA or PCoIP. It enables print jobs from ThinPrint Servers to be sent to the client through a virtual channel of an RDP, ICA or PCoIP connection (Illus. 109). This also allows the targeting of printers that can’t be reached over TCP/IP – for example, behind firewalls or with Network Address Translation (NAT).16

Virtual Channel Gateway is installed onto terminal servers or virtual desktops – while ThinPrint Engine runs on the ThinPrint Server(s).

![Diagram of Virtual Channel Gateway](image)

Illus. 109 print jobs are sent (back) from the ThinPrint Server via TCP/IP to the Virtual Channel Gateway on terminal servers or virtual desktops and then via RDP, ICA or PCoIP to workstations or thin clients

Installing Virtual Channel Gateway

Only use unambiguous accounts for printing over the Virtual Channel Gateway (i.e., not a guest account), and make sure that the desktop and the ThinPrint Servers are not in different domains.

On terminal servers

Virtual Channel Gateway can be installed on terminal servers with the ThinPrint Engine installer (see quick installation guide) and on desktop with the Desktop Agent installer.

---

16 As an alternative to the ICA, RDP or PCoIP protocols, the Connection Service can also be used – e.g. for local print servers or for gateway appliances.
Virtual Channel Gateway

On virtual desktops

Note that there is a slight difference between the Virtual Channel Gateway for virtual desktops and that for terminal servers. With the terminal server’s version the IP addresses of print servers have to be set up.

In VMware Horizon View environments the Virtual Channel Gateway is a component of View Agent. In all other VDIs, install it with the Desktop Agent installer. This Virtual Channel Gateway type requires no administration at all.

Configuring Virtual Channel Gateway

On terminal servers

– On terminal servers, open VIRTUAL CHANNEL GATEWAY in the ThinPrint configuration (Illus. 110).

– Select Edit Settings.

Add (terminal servers only) On terminal servers, select Add to enter IP addresses of print servers, on which ThinPrint Engine is installed and on which Virtual Channel Gateway is to be used for printing (Illus. 111). For failover clusters add the IP addresses of all cluster nodes.
Virtual Channel Gateway

**Illus. 111** add IP addresses of ThinPrint Servers

<table>
<thead>
<tr>
<th>Change</th>
<th>Modify IP addresses for print servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete</td>
<td>Delete a print server’s IP address</td>
</tr>
<tr>
<td>TCP port</td>
<td>TCP Port number for TCP/IP communication with the ThinPrint Engine (default: 4000). Tip: The TCP port numbers in ThinPrint Ports (on print servers) and Virtual Channel Gateway (on terminal servers or virtual desktops) must match. Make sure that no other application is using this port.</td>
</tr>
<tr>
<td>Apply</td>
<td>Client APPLY or OK to confirm. The result is shown in Illus. 112.</td>
</tr>
</tbody>
</table>

**Illus. 112** Virtual Channel Gateway configured
Further steps

- On the ThinPrint Server: create ThinPrint Ports and select USE VIRTUAL CHANNEL GATEWAY in the port configuration (Illus. 113). (This can also be done with Management Center or Management Services.)

![Properties of VCG on CPS47](image)

Illus. 113 set ThinPrint Port to USE VIRTUAL CHANNEL GATEWAY

- Create printers, attach them to these ports and share them.
  - For Windows devices, create exactly one printer per printer model or per class of printer that uses TP Output Gateway as its printer driver (Illus. 146).
  - In contrast, for non-Windows devices create exactly one V-Layer pair per printer model (Illus. 149).

- Configure Dynamic Printer Matrix on the terminal server (Page 80) or in the respective Group Policy (see the ThinPrint group policies manual).

- Establish an RDP, ICA or PCoIP connection from a workstation to the terminal server or to the virtual desktops.

- In the session, open an application and perform a test print to each of these printers.

Praxis: Creating and connecting printers

In the following, we present typical scenarios to show, firstly, how the required printers are created on the central print servers and then, how those printers, with the help of AutoConnect, can be connected (= mapped) to users in their sessions.
Running applications on terminal servers or virtual desktops

For the installation of single components, see the Quick Installation guide of ThinPrint Engine on print servers.

Network printers – ThinPrint Clients on Windows print servers

Preconditions (see Illus. 114)

- The following components are installed on terminal servers or virtual desktops:
  - the virtual printer driver TP Output Gateway
  - the ThinPrint mapping component AutoConnect

- The ThinPrint Engine is installed on the ThinPrint Server.

- The following components are installed on a local Windows print server:
  - printers
  - ThinPrint Client (TCP/IP type)

Illus. 114 print data route: terminal server → ThinPrint Server → local Windows print server → printers

Determining printer IDs

1. On the local print server (in this example: lps-8): Open the ThinPrint Client Manager to determine the IDs of the printers (in this example: ID 1 for Lexmark and ID 2 for HP, see Illus. 115).

---

17 The same scenarios can be found in the Management Center documentation. There, the same printers and ports are created automatically using the Management Center.

18 Included in VMware Tools/Horizon View Agent as Virtual Printing
Creating ThinPrint Ports and printer template

2. On the ThinPrint Server: Open the ThinPrint configuration.

3. In the tree on the left side, select THINPRINT → THINPRINT ENGINE → PORT MANAGER (Illus. 116).

4. Create at least one ThinPrint Port (with default settings). To do so, click NEW THINPRINT PORT (top arrow in Illus. 116).

AutoConnect on the ThinPrint Server

To avoid having to create each printer manually you can use AutoConnect to retrieve the printer list from the ThinPrint Client and, thereby, have them created on the ThinPrint Server automatically.19

5. To do so, open the ThinPrint Server’s printers folder or the Print Management and create a ThinPrint printer template (in this example: _#TPOG) which, with the help of AutoConnect, can be used to retrieve the printers from the local print

---

19 In larger environments you can use Management Center or Management Services.
server. Select TP Output Gateway as the printer driver (Illus. 117), so you can use the ThinPrint Driver Free Printing print mode. Connect the printer object to the new ThinPrint Port (Illus. 116).

6. In the properties for the template (here: _#TPOG), enable port pooling on the ThinPrint Ports, if you want more than one printer to be able to print at the same time (Illus. 118).

7. To let AutoConnect know which template will be used for printer creation, a new row must be added to the Dynamic Printer Matrix: THINPRINT → THINPRINT ENGINE → AUTOCONNECT → DYNAMIC PRINTER MATRIX. Enable at least the columns W (for Windows) and T (for TCP/IP) and in the TARGET PRINTER column, enter the template name without an underline (_) and without hash sign (#), i.e.: TPOG (Illus. 119).
8. On the ThinPrint Server, run AutoConnect from the Command Prompt (Illus. 120). In doing so, specify the address of the ThinPrint Client in question (in this example: lps-8) using the parameter \(-a\):

\texttt{tpautoconnect -a lps-8}

9. Share the printer objects. Include both the client machine's own printer names and the client machine's name in the share name to ensure that the share names are unique on the ThinPrint Server (Illus. 134), in this example:

- Lexmark T630_lps-8
- HP Color LaserJet 4700_lps-8

The result is shown in Illus. 121.
10. Verify that the option **AUTO-CREATE AND DELETE PRINTERS → AT SESSION LOGON/LOGOFF** is disabled on the ThinPrint Server (Illus. 122) to avoid deletion of auto-created printers (Illus. 121) by AutoConnect with session logoff.

**Illus. 122** ThinPrint Server: disabling printer deletion with admin’s logoff

**AutoConnect in the terminal session**

The ThinPrint component AutoConnect connects the above applied printers into a session on a terminal server or virtual desktop (= printer mapping). AutoConnect has two tables to set up the mapping rules:

- Dynamic Printer Matrix and
- Map Additional Printers

**Dynamic Printer Matrix** is the more easily operated of the two tables. Functioning under the assumption that there is a ThinPrint Client present on the client side, it requests information from the client about its printers, then uses that information for processing the mapping rules. Thus, AutoConnect attempts to create *exactly one printer object for each printer* for which it receives a report back from ThinPrint Client.

In contrast, when using the Map Additional Printers table, *all those printers* that are in the table and for which a rule applies, are *created* in the session, regardless of the presence of a ThinPrint Client.

**Alternative 1 • Dynamic Printer Matrix.**

*Advantage:* Printer names don’t have to be entered

*Disadvantage:* Requires ThinPrint Client
Proceed as follows:

1. Go to Dynamic Printer Matrix on the Active Directory server, on the terminal server, or on the virtual or physical desktop (see the ThinPrint group policies manual).

2. Enter a new row with the following content in its TARGET PRINTER column: `\server_address\share_name`, in this example: `\cps47\%LCPRN\_lps-8` (%LCPRN% is a variable for printer names. To run properly, the print server’s share names and the client machine’s printer names must match.)

3. Click OK to close Dynamic Printer Matrix.

4. Create logon scripts for the users, with the following content (Illus. 124, example):
   ```
   c:
cd C:\Program Files\Common Files\ThinPrint\tpautoconnect -d
   tpautoconnect -a lps-8
   ```
   (-dl deletes local printers, -dn deletes connections to printer shares, -a specifies ThinPrint Client’s address)

5. Perform an update of the group policy for the terminal servers and/or virtual desktops.
6. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 125).

![Devices and Printers](image)

*Illus. 125*  two printers mapped in a session by AutoConnect

**Alternative 2 • Map Additional Printers.**

*Advantage:* ThinPrint Clients are not required

*Disadvantage:* A rule has to be entered for every printer.

1. Go to *Map Additional Printers* table on the Active Directory server, on the terminal server, or on the virtual or physical desktop (see the *ThinPrint group policies manual*). Enter a new row with the following content in its TARGET PRINTER column:

```
\server_address\share_name
```

In this example:

```
\cps47\Lexmark T630_lps-8
\cps47\HP Color LaserJet 4700_lps-8
```

Click OK to close Map Additional Printers table.

![Map Additional Printers](image)

*Illus. 126*  Active Directory: Map Additional Printers

2. Perform an update of the group policy for the terminal servers and/or virtual desktops.
3. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 127).

**Network printers — ThinPrint Clients on gateway appliances**

- The following components are installed on terminal servers or virtual desktops:
  - the virtual printer driver **TP Output Gateway**
  - the ThinPrint mapping component **AutoConnect**

- The **ThinPrint Engine** is installed on the ThinPrint Server.

- The following components are installed on a gateway appliance – e.g. ThinPrint Hub or TPG-25/65/125 or ISD300/4x0 from **SEH** – (or on a local print server running a non-Windows OS):
  - printers
  - ThinPrint Client (TCP/IP type)

---

**Preconditions (see Illus. 128)**

- The following components are installed on terminal servers or virtual desktops:
  - the virtual printer driver **TP Output Gateway**
  - the ThinPrint mapping component **AutoConnect**

- The **ThinPrint Engine** is installed on the ThinPrint Server.

- The following components are installed on a gateway appliance – e.g. ThinPrint Hub or TPG-25/65/125 or ISD300/4x0 from **SEH** – (or on a local print server running a non-Windows OS):
  - printers
  - ThinPrint Client (TCP/IP type)
**Determining printer IDs**

1. In the gateway appliance’s ThinPrint Client: Determine the IDs of the printers (in this example: ID 1 for Lexmark and ID 2 for HP; see Illus. 129 or 130 respectively).

   ![Illus. 129 example ThinPrint Hub: determining printer IDs](image)

**Creating ThinPrint Ports and printers**

2. On the ThinPrint Server: Open the ThinPrint configuration.


   ![Illus. 131 ThinPrint Port(s) in the configuration console (= Port Manager)](image)

4. Create multiple ThinPrint Ports with their default settings. To do so, click NEW THINPRINT PORT (top arrow in Illus. 131).
5. Open the ThinPrint Server’s printers folder or Print Management and create ThinPrint printer objects with which it is possible to send print jobs to the local print server. In each case select the native printer driver (Illus. 132). Please observe the printer name syntax:

\[ \text{printer\_name} \# \text{client\_address}\text{:printer\_ID}, \text{in this example:} \]
- Lexmark T630#lps-8:1
- HP Color LaserJet 4700#lps-8:2

![Creating printer objects manually](illus_132.png)

**Note!** From Windows 2012 R2 type-4 drivers can’t be connected to third-party printer ports. For this reason, you use type-3 drivers with ThinPrint Ports (Illus. 133).

![Example using a type-3 driver, in this example: Lexmark T644 (MS)](illus_133.png)
6. Share the printer objects. Include both the client machine’s **printer names** and the client machine’s own name in the share name to ensure that the share names are unique on the ThinPrint Server (Illus. 134), in this example:

- Lexmark T630_lps-8
- HP Color LaserJet 4700_lps-8

![Illus. 134](sharing-a-printer-example-share-name-contains-both-printer-name-and-target-machine-hostname-separated-by-an-underscore_.jpg)

7. Enable port pooling on the ThinPrint Ports, for both printers, if you want more than one printer to be able to print at the same time (Illus. 135).

![Illus. 135](enable-port-pooling-if-required.jpg)
8. Use the V-Layer mode to connect the Output Gateway, rather than the native printer drivers to the terminal sessions. To do so, navigate to THINPRINT → THINPRINT ENGINE → V-LAYER in the console tree. Then select ENABLE V-LAYER (in the context menu, Illus. 136) for all printers that use a native driver. The result is shown in Illus. 137.

**V-Layer**

![Illus. 136](image1)

**Illus. 136** enabling V-Layer for all printers that use a native driver

![Illus. 137](image2)

**Illus. 137** V-Layer printer pairs on the ThinPrint Server

**AutoConnect**

For information on mapping printers from the ThinPrint Server to the terminal sessions see the section *AutoConnect in the terminal session* of the first scenario (Page 107).

**Printers connected locally to workstations or thin clients**

**Requirements (see Illus. 138)**

- The following components are installed on terminal servers or virtual desktops:
  - The virtual printer driver TP Output Gateway
  - The ThinPrint mapping component AutoConnect
  - ThinPrint Engine is installed on the ThinPrint Server.
The following components are installed on the workstation or the thin client:

- **Printers**
- **ThinPrint Client (TCP/IP type)**

**Illus. 138** print data route: terminal server → ThinPrint Server → workstation → printer

**Determining printer IDs**

1. On the workstation (in this example: ws-87): open the ThinPrint Client Manager to determine the IDs of the printers (in this example: ID 1 for Kyocera, see Illus. 139).

**Illus. 139** workstation: determining printer ID

2. Proceed as described in *Creating ThinPrint Ports and printer template* (Page 104). Add a printer with the following name:

   Kyocera FS-C8100DN#ws-87:1

3. Assign this printer to the same port pool (Illus. 135).

**Configuring Auto-Connect**

In this scenario, ThinPrint Engine sends the print output to printers installed locally, either on workstations or on thin clients (Illus. 138), so the ThinPrint Client is installed on those. Consequently, the printer mapping is carried out here with Auto-Connect’s Dynamic Printer Matrix. Proceed as follows:

1. Go to *Dynamic Printer Matrix* on the Active Directory server, the terminal server or the virtual or physical desktop (see the ThinPrint group policies [manual]).
2. Enter a row with the following content in the TARGET PRINTER column (Illus. 140):
   \server_address\share_name, in this example:
   \cps47\%LCPRN\_ws-87
   (%LCPRN\% is a variable for printer names. To run properly the print server’s share names and the client machine’s printer names must match.)

3. Click OK to close Dynamic Printer Matrix.

**Note!** For multiple workstations with locally attached printers, the variable \%LHOST\% can be used (Page 86) instead of the workstations’ host name. So only a single row is needed for all clients. For example, enter in the TARGET PRINTER column:
   \cps47\%LCPRN\%_\%LHOST\%

4. Perform an update of the group policy for the terminal servers and/or virtual desktops.

5. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 141).
Local printers for mobile or home users

- The following components are installed on terminal servers or virtual desktops:
  - the virtual printer driver TP Output Gateway
  - the ThinPrint mapping component AutoConnect
  - Virtual Channel Gateway, to deliver the print output via RDP, ICA or PCoIP

- ThinPrint Engine is installed on the ThinPrint Server.

- The following components are installed on the workstation or the thin client:
  - printers
  - ThinPrint Client (RDP type) or ThinPrint Client (ICA type) or VMware Horizon View Client (with embedded ThinPrint Client PCoIP type)

Procedure

6. In the ThinPrint Engine configuration, select PORT MANAGER on the left side (Illus. 143).
7. You can create multiple ThinPrint Ports with the property USE VIRTUAL CHANNEL GATEWAY (Illus. 144). Do so by selecting, in each case, NEW THINPRINT PORT (top arrow in Illus. 143).

![Illus. 144](image) selecting ThinPrint Port of the type USE VIRTUAL CHANNEL GATEWAY

8. Open the ThinPrint Server’s printers folder, or Print Management, and create ThinPrint printer objects with which it will be possible to send print jobs to mobile or home users.

When creating the printer objects on the ThinPrint Server, there are three cases to be distinguished:

- **Case 1**: Windows clients are used, and print jobs are sent only to the local default printer.

- **Case 2**: Windows clients are used. If more than one printer is used these are to be selected directly in the session.

- **Case 3**: Non-Windows clients are used. To be able to print using V-Layer, the native printer driver has to be assigned.
9. Case 1: Create a printer that uses TP Output Gateway as driver, and assign it to the ThinPrint Port of the type USE VIRTUAL CHANNEL GATEWAY, or to the respective port pool (Illus. 145). Do not specify a printer ID. Share this printer: share name = printer name.

10. Case 2: For each printer model, create a printer that uses TP Output Gateway as driver. Assign the printers to the port pool of the type USE VIRTUAL CHANNEL GATEWAY (Illus. 146). Do not specify printer IDs. Share these printers: share name = printer name.

11. Case 3: For each printer model, create a printer that uses its native driver. Assign the printers to the port pool of the type USE VIRTUAL CHANNEL GATEWAY (Illus. 147). Do not specify printer IDs. Share these printers: share name = printer name.
12. If you created printers with native drivers (case 3), switch to V-LAYER in the console tree. For each printer with a native driver, select ENABLE V-LAYER (Illus. 148). The result is shown in Illus. 149.
In this scenario, ThinPrint Engine sends the print jobs to printers installed locally, either on the workstations or on thin clients (Illus. 142), the ThinPrint Client is installed on those. Consequently, printer mapping is carried out there by AutoConnect's Dynamic Printer Matrix. Proceed as follows:

1. Go to Dynamic Printer Matrix on the Active Directory server, on the terminal server, or on the virtual or physical desktop (see the ThinPrint group policies manual).

2. Add one or more row(s) with the following content in the TARGET PRINTER column (Illus. 150):
   \server_address\share_name, in this example:
   \cps47\mobile or home
   \cps47\%LCPRN%

Choose mapping rules so that for each client or user, only one row will match – here R (RDP) and I (ICA) for the ThinPrint Client type (in other words: printing via Virtual Channel Gateway), as well as W (Windows), and L (Unix/Linux), J (Java), and x (Mac OS or other) for the client machine's OS.

Click OK to close Dynamic Printer Matrix.

3. Perform an update of the group policy for the terminal servers and/or virtual desktops.
4. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 151).

![Devices and Printers](image1)

**Illustration 151** printer mapped in a session by AutoConnect (example for case 1)

---

**Running applications on workstations**

**Preconditions**

(see Illus. 152)

- **Network printers**
  - ThinPrint Engine is installed on the ThinPrint Server
  - The following are installed on the local print server:
    - Printers
    - ThinPrint Client Windows (TCP/IP type)
  - Desktop Agent is installed on the Windows workstations

![Print data route](image2)

**Illustration 152** print data route: Workstation→ThinPrint Server→local print server→printer

**Procedure**

The installation procedure is the same as that described for network printers in *Running applications on terminal servers or virtual desktops* (Page 103). In this case, however, the group policies don’t relate to the terminal servers or virtual desktops,
but to the workstations. And finally, AutoConnect will be started with the same script when logging on to the workstation.

– Log on locally to a workstation, and perform test prints on the automatically created printers (Illus. 153).

![Printers and Printers](image)

**Illus. 153** printers mapped on workstation by AutoConnect

---

**Preconditions**

(see Illus. 154)

- ThinPrint Engine is installed on the ThinPrint Server
- The following are installed on the Windows workstation:
  - Printers
  - ThinPrint Client (TCP/IP type)
  - Desktop Agent

![Printers and Printers](image)

**Illus. 154** print data route: workstation → ThinPrint Server → workstation → printer

---

**Procedure**

The installation procedure is the same as that described for Printers connected locally to workstations or thin clients in the section Running applications on terminal servers or virtual desktops (Page 114).

However, in this case, AutoConnect requires a script-controlled on the startup workstation, as follows:

1. Create logon scripts for all users – with the following content:

   ```
   c:
   cd C:\Program Files\Common Files\ThinPrint\tpautoconnect -d
   tpautoconnect -a %computername%
   ```
2. Perform an update of the group policy for the workstation.

3. Log on locally on the workstation, and perform test prints on the automatically created printer (Illus. 155).

Appendix

Customer service and technical support

www.thinprint.com/ → RESOURCES & SUPPORT
https://www.thinprint.com/en/resources-support/support-request/

Troubleshooting

If AutoConnect does not create the desired printers or if printing itself fails to work properly, check the following before contacting ThinPrint support.

To generate configuration reports and to troubleshoot problems, please use the ThinPrint Diagnostic Utility.

For AutoConnect issues, please also use AUTOCONNECT DIAGNOSTICS (Illus. 156).
Select the DETAILED DIAGNOSTICS option for a selected entry, then you will get information about the operations carried out by AutoConnect (Illus. 157) or about possible faults (Illus. 158).
• With ThinPrint Engine installation, the following message appears in the THINPRINT LICENSE SERVER window: “License server could not be found. Please enter the address of your primary ThinPrint License Server. (The RPC server is unavailable. (Exception from HRESULT: 0x800706BA))”.
• Use the FQDN instead of the hostname for specifying the license server address.
• With ThinPrint Engine installation on Windows Server 2012, the following message appears: “The installation of Microsoft .NET Framework 4.6 (x64) has failed. Setup will now exit.”
  • Restart the server. Afterwards perform the installation again.

• In the server settings of the ThinPrint Engine MMC component the following message appears in the THINPRINT LICENSE SERVER tab: “License server could not be found. Please enter a valid address.”
  • Use the FQDN instead of the hostname for specifying the license server address.

• The Windows Event Viewer shows the message “No valid license found”.
  • On the license server, verify that the License Manager shows a valid license key. See Entering license keys in the License Server manual.
  • In the Cortado Management Console, verify that the user who has printed is ThinPrint enabled. See Assigning a license to a user in the License Server manual.
  • Verify that the ThinPrint Engine machine can connect to the License Server using the address and TCP port specified there.
  • On the license server, delete the local user group ThinPrint Excluded Users. See Excluding users in the License Server manual.

• If printers aren’t connected automatically from the ThinPrint Server to the session, make sure that:
  • TP AUTOCONNECT SERVICE is running on the same machine on which the applications run (i.e., each terminal server or desktop)
  • AutoConnect is properly configured (see below)

• If AutoConnect does not create or connect any printers after an update to ThinPrint version 11.0.2, and the following message appears in the Event Viewer: Event ID 1004 TaskCategory (4) TPAutoConnect ConfigurationFiles: 13 - The data is invalid. (% PATH-TO-DB \ TPACGlobal.db), 1
  • If the AutoConnect database is no longer consistent. To fix this, proceed as follows:
    • Make sure that your mapping database is specified in the AutoConnect configuration (MMC) or alternatively in the AutoConnect group policy (GPO).
    • Open the Map Additional Printers table in the AutoConnect configuration. Insert a new line, and enter a dummy printer in the TARGET PRINTER/GROUP column, e.g.: \localhost\dummy
      Confirm with OK and PUBLISH.
    • Remove the new line and confirm with OK and PUBLISH again.

• If a ThinPrint license is used as soon as a terminal services user logs on for the first time even if AutoConnect did not map printers for that user, perform an update from ThinPrint version 11.0 to 11.0.1 or higher. Afterwards the ThinPrint Diagnostic Utility shows at least the following versions:
Appendix

ThinPrint Engine 11.1.536 (instead of 11.0.496)
TPAutoConnect.exe 11.0.1278 (instead of 11.0.1266)
TPSvc.dll 11.0.1345 (instead of 11.0.1306)

- If you can’t print with ThinPrint at all, first make sure that:
  - there are enough valid user licenses available on the license server
  - the Print Spooler service is running on the print server
  - TP VC GATEWAY SERVICE is running on the same machine on which the applications run (i.e., each terminal server or desktop)

- If print jobs don’t arrive at the right printer, check whether:
  - the ThinPrint components on the machine where the applications run are out of date. Use the ThinPrint Engine or Desktop Agent to perform an update of these components (i.e., Output Gateway, AutoConnect, Virtual Channel Gateway).

- 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 type of ThinPrint Port is the printer for this ThinPrint Client connected? USE VIRTUAL CHANNEL GATEWAY must be selected in the port configuration of the ThinPrint Engine console on the ThinPrint Server.
  - For AutoConnect, either VIRTUAL CHANNEL (ICA OR RDP) or AUTO must be set as connection protocol (Illus. 73). The respective column in Dynamic Printer Matrix has to be set to enabled (here R for RDP).

- If the TP AutoConnect Service can’t be started: Check the access permissions on the folder/s in which the configuration databases are stored. See Storage destination for AutoConnect settings.

- If you configured AutoConnect using Group Policies (GPOs) in the Active Directory (see the ThinPrint group policies manual).
  - Perform a Group Policy update in a session (gpupdate /force).
  - After performing the Group Policy update, check whether the following value exists in the Windows registry, and whether its data matches with the Dynamic Printer Matrix entries:
    hkey_local_machine\software\policies\thinprint\tpautoconnect\NameTranslationEx2

- If USE VIRTUAL CHANNEL GATEWAY is selected in the ThinPrint Server’s port configuration (see above), please also check the following:
  - Is/are the IP address(es) of the ThinPrint Server(s) entered in Virtual Channel Gateway configuration on the terminal servers (in the case of failover clusters those of all cluster nodes)?
  - Are the TCP port numbers the same for the ThinPrint Port and the Virtual Channel Gateway?
• If TCP/IP is the selected protocol:
  • Are the port numbers the same on both the server and client? (see port configuration of the ThinPrint Engine console on the ThinPrint Server (Illus. 17) and in 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 machine in a masked network (NAT)? If so, you must either select RDP, ICA or PCoIP (and on the client-side use the respective ThinPrint Client21), or additionally, install the ThinPrint Connection Service (see also the ThinPrint Connection Service manual).

• If a printer was created manually, check the naming convention of the ThinPrint Port (see port configuration of the ThinPrint Engine console on the ThinPrint Server and see Illus. 18).

• If you selected USE ENCRYPTION on the server (Illus. 17), read the sections Encryption of print data (Page 56) and Troubleshooting in the instruction Creating certificates for printing with ThinPrint for further information.

• If AutoConnect doesn't install printers, manually establish a once only printer connection (as Administrator) from the terminal server or desktop to a shared Output Gateway printer on the ThinPrint Server. The resulting printer connection (Illus. 159) can be deleted afterwards.

![Illustration](Image)

Illus. 159 connection to an Output Gateway share on the ThinPrint Server (example)

• From the time when the option Printer Self Service is enabled, the printers of users who log on to a session for the first time aren't mapped automatically anymore (see the Self Service manual). The tables Map Additional Printers and Dynamic Printer Matrix then provide the input for printers to be selected.

• When AutoConnect starts (on a terminal server or virtual desktop), are the correct shares on the ThinPrint Server connected? The entries in Dynamic Printer Matrix and Map Additional Printers table must refer to the printer shares. Check

21 PCoIP is supported by the ThinPrint Clients embedded in VMware Horizon View Clients
that AutoConnect is working by starting it manually: open the command prompt in a session and enter – in C:\Program Files\Common Files\ThinPrint\ – the following to create the session printers:

```bash
tpautoconnect -v [-i VMware -a COM1]
```

- If the session printers are able to be created manually, by entering `TPAutoConnect` in the command line, but are not automatically created when the session is started, check all AutoConnect settings.

- VMware Horizon View: If `tpautoconnect -v` returns the message *No suitable client protocol found*:
  - check whether the session was started using a View Client or using a Windows RDP Client (in the case of the Remote Desktop Connection, the RDP type of ThinPrint Client Windows must have been installed beforehand)
  - if you are using VMware Tools, update to version 9.2.2 (or later) or, if using a View Agent, update to version 5.1.2 (or later).

- **Testing the TCP/IP connection:** For printing via TCP/IP, there must exist, between server and client, a TCP/IP connection which allows direct communication between the ThinPrint Client and its TCP port (a TCP/IP type ThinPrint Client is necessary on the relevant client machine). Firewalls or masked client networks (NAT) can often cause difficulties in this situation. Test to see if the connection exists by trying a `telnet` from the server to the client’s TCP port. To do this, enter the following at the server’s command prompt:

```bash
telnet IP_address tcp_port
```

(See also the ThinPrint Client manuals.)

**Example 4:**

```
telnet 192.168.131.224 4000
```

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

Perform the same test from the print server to the terminal server or virtual desktop, if the print jobs are to be delivered to the ThinPrint Client via ICA, RDP or PCoIP (actual Virtual Channel Gateway) instead of TCP/IP.

Additionally, check that the name resolution works properly (both lookup and reverse lookup) and translates the names into IPv4 addresses. If the DNS returns an IPv6 address, disable IPv6 on the target machine.

- If you used variables in the TARGET PRINTER column of Dynamic Printer Matrix (e.g. \cps05\%LCPRN%), check that the printer names on the client machine and the share names on the ThinPrint Server are identical.

- When the V-Layer is activated, the name addition _n_ appears in the wrong position of the native printer object. Example:

```
Lexmark T655#client5:4_n_ instead of Lexmark T655_n#client5:4
```

- Verify that the printer in question is connected to a ThinPrint Port (instead of a Standard TCP/IP Port, for example).
• V-Layer print jobs disappear on the ThinPrint Server. To perform a test, pause both printer objects of a V-Layer. Then print from a session to the Output Gateway object. If the print job arrives at the Output Gateway object and then disappears, perform the following steps:
  • Ensure that the Windows service TP V-LAYER is running on the ThinPrint Server.
  • Share the respective native printer object. Alternatively, you can assign the permission MANAGE PRINTERS to the group EVERYONE.
  • For Windows Server 2008 SP1 (x86 and x64): install SP2 or, the Microsoft hotfixes KB958741 (Print Job Owner) and KB958656 (Client Side Rendering) both on terminal servers and on the ThinPrint Server (see Page 14).
  • Check that the Output Gateway driver version (at least on the ThinPrint Server) is up to date.
  • For VMware Horizon View environments: update the ThinPrint components provided with View Agent to version 8.6 or 10, using Desktop Agent installer software (or manually).

• Incorrect characters or fonts in print output:
  • See the guide Solving problems with fonts.

• Although you enabled ThinShare (Page 19) your print jobs aren't compressed on the way to the ThinPrint Server:
  • One of the messages “ThinShare is in active state, but print job is not compressed. Check Group Policy” or “ThinShare On, CSR On, Job is not compressed” can be found in the ThinPrint Server’s Event Viewer.
  • Check whether the version of ThinPrint’s print processor TPWinPrn.dll is at least 9.4.538 (in C:\Windows\System32\spool\prtprocs\x64).
  • To update the print processor see Page 138.

• If the printer list of ThinPrint Client Service Windows is empty after booting the operating system, it may be because the client started up more quickly than the Print Spooler. In this case, you can delay the TP Client Service Windows start up, using either the start type AUTOMATIC (DELAYED START) start type or using a script (start type: MANUAL):
  ```
  ping 127.0.0.1 -n 30 >NUL
  net start Thn32svc
  ```

• From Windows 2012 R2 type-4 drivers can’t be connected to third-party printer ports. That’s why use type-3 drivers with ThinPrint Ports (Illus. 160).
## Windows registry

In the following you can find a selection of possibly relevant entries in the Windows registry.

**ThinPrint Engine: ThinPrint Ports and ThinPrint Connection Service Ports**

```plaintext
hkey_local_machine\system\CurrentControlSet\Control\Print\Monitors\ThinPrint Port \<port name>:
```

<table>
<thead>
<tr>
<th>Name</th>
<th>ThinPrint Engine MMC</th>
<th>Description</th>
<th>Type</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>BANDWIDTH (KBIT/S (KBPS))</td>
<td>Bandwidth used to send print data (in bit/s, bits per second)</td>
<td>reg_dword</td>
<td>256000</td>
</tr>
<tr>
<td>Bandwidth-Access</td>
<td>CLIENT CONTROL: BANDWIDTH</td>
<td>Enables the ThinPrint Client to reduce the bandwidth</td>
<td>reg_dword</td>
<td>0</td>
</tr>
<tr>
<td>Bandwidth-CtrlEnabled</td>
<td>BANDWIDTH CONTROL: ENABLE</td>
<td>Enables bandwidth control</td>
<td>reg_dword</td>
<td>0</td>
</tr>
<tr>
<td>CConnTries</td>
<td>CONNECTION RETRIES</td>
<td>Number of attempts to establish a connection to the ThinPrint Client, Connection Service or Virtual Channel Gateway</td>
<td>reg_dword</td>
<td>3</td>
</tr>
<tr>
<td>Name</td>
<td>ThinPrint Engine MMC</td>
<td>Description</td>
<td>Type</td>
<td>Default Value</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>--------</td>
<td>---------------</td>
</tr>
</tbody>
</table>
| CLevel       | BANDWIDTH CONTROL: ENABLE + MINIMUM PRINT DATA VOLUME | Compression level  
0 = no compression  
5 = default compression  
8 = high compression  
(BANDWIDTH CONTROL enabled)  
9 = best compression (MINIMUM PRINT DATA VOLUME enabled) | reg_dword | 5             |
| DeleteErrJobs| —                   | Print job handling when ThinPrint Client doesn't take them  
1 = failed jobs will be deleted  
0 = failed jobs will be left in the printer queue (Queue Manager) | reg_dword | 1             |
| Host         | — ;                 | With ThinPrint Ports: ThinPrint Client address; with ThinPrint Connection Service Ports: Connection Service address | reg_sz  | —             |
| IsCSvcPort   | NEW THINPRINT PORT/NEW THINPRINT CONNECTION SERVICE PORT | 0 = ThinPrint Engine doesn't print to the Connection Service  
1 = ThinPrint Engine prints to the Connection Service | reg_dword | —             |
| IsVCGPort    | USE VIRTUAL CHANNEL GATEWAY | 0 = ThinPrint Engine doesn't print to Virtual Channel Gateways  
1 = ThinPrint Engine prints to Virtual Channel Gateways | reg_dword | 0             |
| NetSend      | NET SEND SERVICE    | Inform the users about errors?  
0 = no  
1 = yes | reg_dword | 1             |
| Port         | TCP PORT            | TCP port for communication to ThinPrint Clients, Virtual Channel Gateway or Connection Service | reg_dword | 4000          |
| SignCert     | —                   | Name of certificate that signed the client certificate. Overrides global SignCert setting in hkey_local_machine\system\currentcontrolset\control\print\monitors\ThinPrint Port\ | reg_sz  | —             |
## Appendix

### AutoConnect

hkey_local_machine\software\ThinPrint\TPAutoConnect

<table>
<thead>
<tr>
<th>Name</th>
<th>ThinPrint Engine MMC</th>
<th>Description</th>
<th>Type</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UseEncryption</td>
<td>USE ENCRYPTION</td>
<td>0 = encryption disabled&lt;br&gt;1 = encryption enabled</td>
<td>reg_dword</td>
<td>0</td>
</tr>
<tr>
<td>WTSMsgBox</td>
<td>—</td>
<td>If set to 1 and an error occurred: A message box will be sent to the terminal server session which started the print job.</td>
<td>reg_dword</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>AutoConnect MMC</th>
<th>Description</th>
<th>Type</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConnectToClient</td>
<td>PRINTER NAME Contains preferably (Printing via TCP/IP)</td>
<td>Connection to client with client name or client address (use: Auto, ClientName, ClientAddress)</td>
<td>reg_sz</td>
<td>Auto</td>
</tr>
<tr>
<td>DisableSettingOfDefPrinter</td>
<td>AUTOCONNECT HAS NO INFLUENCE</td>
<td>AutoConnect will not set any default printer</td>
<td>reg_dword</td>
<td>0</td>
</tr>
<tr>
<td>InstallOrder</td>
<td>1, 2: DEFAULT PRINTER TAKEN FROM 4: DISABLE DYNAMIC PRINTER MATRIX</td>
<td>0 = create/connect no printer&lt;br&gt;1 = Dynamic Printer Matrix first&lt;br&gt;2 = Map Additional Printers first&lt;br&gt;3 = Dynamic Printer Matrix only&lt;br&gt;4 = Map Additional Printers only</td>
<td>reg_dword</td>
<td>1</td>
</tr>
<tr>
<td>ListenToWTS</td>
<td>—</td>
<td>AutoConnect is started automatically on session logon (Auto mode)</td>
<td>reg_dword</td>
<td>1</td>
</tr>
<tr>
<td>ListenToWTS-CreatCmd</td>
<td>—</td>
<td>Command that will be launched on session logon if ListenToWTS is not 0</td>
<td>reg_sz</td>
<td>tpautoconnect.exe</td>
</tr>
<tr>
<td>ListenToWTS-DeleteCmd</td>
<td>—</td>
<td>Command that will be launched on session logoff</td>
<td>reg_sz</td>
<td>tpautoconnect.exe -dl</td>
</tr>
<tr>
<td>ListenToWTS-OnDisconnect</td>
<td>AT SESSION RECONNECT/DISCONNECT</td>
<td>Indicates whether printers will be deleted when a session goes to the disconnect state</td>
<td>reg_dword</td>
<td>1</td>
</tr>
<tr>
<td>Name</td>
<td>AutoConnect MMC</td>
<td>Description</td>
<td>Type</td>
<td>Default value</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>NameTranslationEx</td>
<td>DYNAMIC PRINTER MATRIX</td>
<td>Content of Dynamic Printer Matrix</td>
<td>reg_multi_sz</td>
<td>—</td>
</tr>
<tr>
<td>PrinterCreateListEx2</td>
<td>MAP ADDITIONAL PRINTERS</td>
<td>Content of Map Additional Printers</td>
<td>reg_multi_sz</td>
<td>—</td>
</tr>
<tr>
<td>Protocol</td>
<td>TRANSFER PROTOCOL</td>
<td>Protocol for connections to ThinPrint Clients (use: TCPIP, VC, AUTO)</td>
<td>reg_sz</td>
<td>AUTO</td>
</tr>
<tr>
<td>RightsWin2000</td>
<td>—</td>
<td>Define printer permissions on legacy Windows 204 = Print (1) 205 = Manage documents (2) 206 = Print, Manage documents (3) 207 = Print, Manage documents, Manage printers (0) 208 = Print, Manage printers (4)</td>
<td>reg_dword</td>
<td>206 (formerly 3)</td>
</tr>
<tr>
<td>StoreUserSessionSettings</td>
<td>—</td>
<td>Enable storing printer properties in User Settings database (bit mask) 1 = restores the default printer 2 = restores the Registry (Dev-mode) 4 = automatic mode</td>
<td>reg_dword</td>
<td>7 (1 + 2 + 4)</td>
</tr>
<tr>
<td>UserDrivenDefault Printer</td>
<td>DEFAULT PRINTER – GIVE PRIORITY TO THE USER’S CHOICE</td>
<td>Set to 1 if the selection of the default printer will be user driven, so AutoConnect will not interfere it</td>
<td>reg_dword</td>
<td>0</td>
</tr>
<tr>
<td>AddPrinterConnectionTimeout</td>
<td>CANCEL CONNECTION ATTEMPT (S)</td>
<td>Timeout for the AddPrinterConnection in case the spooler is overwhelmed</td>
<td>reg_dword</td>
<td>120 s</td>
</tr>
<tr>
<td>AutoRemappingEnabled</td>
<td>—</td>
<td>Controls the automatic remapping of printers if a print server fails. By default for all sessions that use a failed print server TPAC should be called again to remap the printers. If this value is 0 then the remapping will not be called</td>
<td>reg_dword</td>
<td>1</td>
</tr>
<tr>
<td>Name</td>
<td>AutoConnect MMC</td>
<td>Description</td>
<td>Type</td>
<td>Default Value</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Delete-NetworkPrinter Cmd</td>
<td>—</td>
<td>Command to delete network printers in the respective user sessions, before AutoConnect remaps the network printers</td>
<td>reg_sz</td>
<td>TPAutoConnect -dn 1</td>
</tr>
<tr>
<td>FailToSuspiciousTime</td>
<td>—</td>
<td>Timeout, after which a Printer Server with Status &quot;Fail&quot;, will be set to Status &quot;Suspicious&quot; and its counter 1 step away from failed.</td>
<td>reg_dword</td>
<td>600</td>
</tr>
<tr>
<td>MaxAllowed-FailedMappings</td>
<td>reg_dword</td>
<td>specifies how often a mapping of a network printer for any print server may fail without changing the status of the print server to &quot;failed&quot;. The next failing mapping will set the status then to &quot;failed&quot;, e.g. for default value 4 the 5th failed mapping from a print server will trigger the status change to &quot;failed&quot;.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PrintSvcRenew Interval-InSeconds</td>
<td>—</td>
<td>time interval for renewing working RPC connections</td>
<td>reg_dword</td>
<td>30</td>
</tr>
<tr>
<td>PrintSvcMin-Reconnect-Interval-InSeconds</td>
<td>—</td>
<td>min interval value in sec to retry RPC-connection</td>
<td>reg_dword</td>
<td>5</td>
</tr>
</tbody>
</table>
Server roles and custom setup

Selecting a server role (Illus. 161) leads to the installation options listed below:

![Server roles and installation options diagram]

Illus. 161  select a server role or the CUSTOM SETUP

<table>
<thead>
<tr>
<th>Server role</th>
<th>Installation options</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERMINAL SERVER</td>
<td>Print Controller (= ThinPrint Engine) incl. Tracking Service, Output Gateway, Output Gateway PS, AutoConnect, Virtual Channel Gateway, Session in Session, Administration Tools (= MMC components) and Client for License Server</td>
</tr>
<tr>
<td>PRINT SERVER</td>
<td>Print Controller incl. Tracking Service, Output Gateway, AutoConnect, Administration Tools and Client for License Server</td>
</tr>
<tr>
<td>ADMINISTRATION TOOLS</td>
<td>MMC components only</td>
</tr>
<tr>
<td>CUSTOM SETUP</td>
<td>Free choice of component</td>
</tr>
</tbody>
</table>

**Custom installation**

Here you can specifically select and install individual ThinPrint components (Illus. 162). The following components can be selected:

- Print Controller (= ThinPrint Engine)
  - Tracking Service
  - V-Layer Service

- ThinPrint Output Gateway, see Page 38

- ThinPrint Output Gateway PS (native driver for printing to non-Windows clients)

- AutoConnect, see Page 65
• Virtual Channel Gateway, see Page 99

• Session-in-Session (see ThinPrint Engine on terminal servers manual)

• Administration Tools (ThinPrint MMC component to remotely configure – from this computer – another one with ThinPrint components installed on it, can be installed on both workstations and servers)

• License Manager (License Server component for managing the license keys)

• Self Service (component for choosing printers by the users)

---

**Update and uninstallation**

**Update order**

1. ThinPrint License Server

2. ThinPrint components on ThinPrint Servers (central print servers)

3. ThinPrint components on terminal servers, virtual desktops and workstations

**Update from ThinPrint version 10.x to 11**

- On servers with ThinPrint version 10.0.2 (= 10.0 + hotfix HF2), 10.6.1 or 10.6 FR1, simply run the version 11 installer on the respective servers – license server and ThinPrint Engine.
– For updating the ThinPrint group policy objects see the section *Update from GPO v10 to GPO v11.0* in the *Group policies* manual.

### Updating Output Gateway to ThinPrint version 11

After sharing printers the printer driver TP Output Gateway can be delivered automatically using Point and Print to terminal servers, virtual desktops and workstations. But with the printer driver update maybe the print processor isn’t updated automatically by Windows if an older version already exists. In this case it’s possible to print but ThinShare doesn’t work – in other words: The print data won’t be compressed on the way to the ThinPrint Server.

To make sure to update ThinPrint’s print processor (tpwinprn) there are two alternatives:

- Either you update the printer driver directly on the target machine using its driver package. This can be found on the ThinPrint Server in the directory `C:\Program Files\Common Files\ThinPrint\Virtual Printer\TPOG3`

- Or you enable the group policy POINT AND PRINT RESTRICTIONS (Illus. 163) in the domain for all target machines including the option **DO NOT SHOW WARNING OR EVALUATION PROMPT** (Illus. 164).
Update from ThinPrint version 9.0 to 11

To update from ThinPrint 9 to 10, proceed as follows:

1. Apply for new license keys in the Cortado Enterprise Portal (free of charge for customers with an update subscription): https://enterpriseportal.cortado.com

2. Install the License Server 10.0.2 (= 10.0 + hotfix HF2) on a separate machine. This allows you to continue working with the old version until the new one is fully functional. Here, install the integrated 30-days license key.

3. Perform an update of the ThinPrint Engine(s) to version 10.0 and specify the license server.

4. Perform a License Server update to version 11. Here install your version 11 licenses key (or older keys with their update subscription keys).

5. Perform an update of the ThinPrint Engine(s) to version 11.

6. Delete your old license keys and complete the letter of destruction, which you then send to ThinPrint or Cortado.

7. Activate your (new) license keys.

8. Activate your users/user groups for ThinPrint, if necessary, see Activating license keys in the License Server manual.
9. Perform an update of the Terminal Server Extension to version 10.0 and then to ThinPrint Engine 11.

**Note!** Make sure that no user sessions run during the update.

**Update from older ThinPrint versions**

When you wish to retain your settings, perform the update step by step, e.g. from 8.0 to 8.6, then to 9.0, to 10.0 and then to 11.

**Update from ThinPrint version 7.6 FR1 to 8.0**

If you have installed 7.6 FR1 (V-Layer), proceed as follows:

1. Disable all V-Layers (see Illus. 50 on Page 54)
2. Uninstall FR1
3. Install version 8.0 (uninstalling 7.6 is not necessary)
4. Re-enable all V-Layers

**Uninstallation**

To uninstall a ThinPrint component open **PROGRAMS AND FEATURES** in **CONTROL PANEL.**
Mark the ThinPrint Engine and then select **UNINSTALL** (Illus. 165).

![Uninstall ThinPrint Engine](image-url)
Upgrade to ThinPrint Engine Premium

See Upgrade from ThinPrint Engine Standard to Premium.

Disabling Windows printer mapping

To simplify the selection of a ThinPrint printer within a session, the Windows automatic printer mapping function should be disabled within and outside of the session. To do so, configure the following on the terminal server:

*Windows Server 2012*

1. On the terminal server, go to Administrative Tools, and open the Remote Desktop Services folder

2. Select Remote Desktop Gateway Manager (Illus. 167)

3. Select Connection Authorization Policies

4. Click on the policy RDG_CAP_ALLUSERS and go to the Device Redirection tab. Place a checkmark at Printers while selecting Disable Device Redirection for the following client device types (right arrow in Illus. 167).

*Windows Server 2008*

1. In Windows Control Panel, select Administrative Tools → Server Manager → Roles → Terminal Services Configuration (Windows Server 2008).

2. Click on the RDP-TCP connection and select Properties in the context menu (Illus. 167)
3. Disable the mapping functions (arrows in Illus. 168). Click OK to confirm.

4. If available, click on the ICA-TCP connection and select PROPERTIES in the context menu. Disable the mapping functions. Click OK to confirm.

Additional resources

Further information about ThinPrint can be downloaded from our website.

Manuals and descriptions

Manuals and other technical information are available at https://www.thinprint.com/en/resources-support/guides-manuals/.
Thin clients and gateways

Thin Clients or terminals with embedded ICA/RDP type of ThinPrint Client as well as ThinPrint gateway appliances can be found at https://www.thinprint.com/en/resources-support/supported-devices/.

Software 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 be found at https://www.thinprint.com/en/resources-support/software/clientsandtools/.

Glossary

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

ThinPrint component for automatic connection to printer shares of print servers; it can be run on any Windows machine.

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. It receives, for example, print data from the server and forwards it to a printer. Typical clients are: workstations, notebooks, thin clients, print servers, gateway appliances and network printers.

Client Gateway

see Gateways

COM

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

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 (high image compression, good compression, high image quality, lossless compression). Nonetheless, when printing with either Driver Free Printing, or with the native printer driver, a higher or lower compression may be chosen without compromising the print quality (Page 23).

**Connected Gateway** see Connection Service

**Connection Service** 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 via an RDP, ICA or PCoIP channel.

ThinPrint Engine sends all print jobs to the Connection Service, which passes them on to the ThinPrint Clients. No IP addresses are used for addressing the ThinPrint Clients, but rather a ThinPrint specific Client ID. This Client ID is created in ThinPrint Client.

**Current printer** A setting in the ThinPrint Client Manager: A document is printed with the current printer if a client has only one printer, or no printer ID was given with addressing. Current printer can also be used to set the default printer at the server when using AutoConnect (with the option DEFAULT AT SERVER).

**Data type** Several types are usually supported for printing using 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 served “dedicated” to a single task: printing. A terminal server, virtual desktop or workstation does not send print data directly to clients, but to central, dedicated print servers. There it is rendered, and then sent to the clients or printers. (see also Print server)

**Device** Here: thin client, print server, printer (print device), gateway/print appliance or print server (print box)

**EMF** EMF (enhanced metafile) is the default data type for most Windows programs. Unlike those in 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 terminal server or virtual desktop (for the sake of system performance). The main work is performed by the client machine, thus improving the terminal server’s or virtual desktop’s performance. See also Data type

**Encryption** see TLS

**Gateways** ThinPrint uses the following kinds of gateways:

1. ThinPrint Output Gateway: ThinPrint’s virtual printer driver
2. Virtual Channel Gateway: With our Virtual Channel Gateway, we actually put print data coming from a print server into the RDP, ICA or PCoIP 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 Windows terminal servers (or virtual desktops) and ICA clients.

ICA is a 3-part technology for server-based computing, that separates application logic from the user interface, and allows the application to run entirely on the server.

ICA requires Citrix XenApp on the server; XenApp requires Microsoft Terminal Services.

**IP masking**

see Network Address Translation

**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 (64 bit). License Manager uses the license key to generate a registration key according to system configuration. Both the license key and the 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. Thus, when printing on the client side, 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 that supports the Line Printer Daemon (LPD); e.g., an internal or external print server of a network printer, or a Linux terminal. It is also possible to print with ThinPrint to LPD devices, even if there is no ThinPrint Client available there. Although compression cannot be used, bandwidth control is available to improve printing in this environment.

**LPD filter**

An LPD filter is run on LPD clients to decompress print jobs which have been processed by ThinPrint.

**LPR**

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

**Network Address Translation (NAT)**

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

**Output Gateway**

see Gateways

**Port pooling**

s. the section Port pooling (Page 34)

**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 Windows architecture alone, many possible terms exist: logical printer, printer soft-
ware, or printer object. Printer settings include, among other, 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 folder or in the Print Management 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 have been set up on a computer, with different parameters for the same print device.

For better understanding, this description 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: \textit{HPLaser}). Only one entry in Dynamic Printer Matrix of AutoConnect 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** | In Windows: a printer created in the printers folder or in the Print Management. |
| **Printer pool** | see \textit{Port pooling} |
| **Printer queue** | The list of documents which are ready to be printed from a particular print device, and/or are waiting for processing, is referred to, in Windows terminology, as the printer queue. Under NetWare and OS/2, the term \textit{printer queue} is synonymous with \textit{printer}. |
| **Printer software** | Printer software is the commonly used name for \textit{logical printer} or \textit{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 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 that exclusively embodies the network connection, plus 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 \textit{Dedicated print server}) |
| **Print server services** | Print server services is the term for the print server software that 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, for instance, change the parameter for data type, as needed. |
**Print spooler**  
See Spooler

**Queue**  
See Printer queue

**RDP**  
Remote Desktop Protocol; communication protocol between Remote Desktop Session Hosts or virtual desktops and clients, in a Windows operating system. The name of the service is Terminal Services, and the connection type in Windows is called Remote Desktop Connection.

**Remote Desktop Connection**  
See RDP

**Remote Desktop Services**  
See Terminal Services

**Remote Desktop Session Host**  
See Terminal server

**Rendering**  
A printer driver is used to translate a print job into printer-specific format.

**Server based Computing**  
A server-centric system for facilitating user access to applications. Application logic is run on a server or virtual desktop, and only the user interface is transmitted through the network. See also Terminal server

**Session-in-Session**  
When printers are assigned by AutoConnect in a terminal session, they are still available if a further session is configured from a terminal server, onto another machine.

**Spooler**  
Print spooler describes those programs or DLLs (Dynamic Link Libraries) which together, 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, for example, at the print server (Windows service denomination: Print Spooler).

**Spooling**  
Simultaneous Peripheral Operations 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**  
See TLS

**Terminal server**  
= Remote Desktop Session Host: a Windows server with Microsoft Terminal Services or Remote Desktop Services

**Terminal Services**  
= Remote Desktop Services: a Windows service for remote desktop sessions

**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, for Mac OS and Linux as well as for internal or 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. 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 Client Gateways). ThinPrint Client Service Windows does not support print preview with Driver Free Printing.

**ThinPrint Connection Service**

*see Connection Service*

**ThinPrint Engine**

The server 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 encryption
- Provides the virtual printer driver ThinPrint Output Gateway (enabling 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 Viewer**

ThinPrint component for client-side print previews with Output Gateway. Consists of the components *TPView.dll* and *TPView.exe* with the following features:

<table>
<thead>
<tr>
<th>Feature</th>
<th>TPView.dll</th>
<th>TPView.exe</th>
</tr>
</thead>
<tbody>
<tr>
<td>page preview</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>zoom</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>leaf</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Action</td>
<td>TPView.dll</td>
<td>TPView.exe</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>save in .tpf file format</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>open .tpf file format</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>print</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>installation with ThinPrint Client</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>can be downloaded as ThinPrint Viewture at</td>
<td></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.thinprint.com">www.thinprint.com</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TPView.dll is also installed, together with ThinPrint Engine, on ThinPrint Servers. In that case, it helps with V-Layer.

**ThinPrint Virtual Channel Gateway**

see Gateways

**ThinShare**

see the section Print data compression (Page 8)

**TLS**

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 for each of these options.

Since SSL is now obsolete, ThinPrint prefers encryption with TLS, but still supports SSL 3.0.

**V-Layer**

Printing with ThinPrint Output Gateway; see the section Driver Free Printing, V-Layer and Native Printing (Page 8)

**Virtual Channel Gateway**

see Gateways

**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.

**XenApp**

Server-based software (Citrix) for Microsoft Terminal Services
### Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>Active Directory</td>
</tr>
<tr>
<td>AD DS</td>
<td>Active Directory Domain Services</td>
</tr>
<tr>
<td>AD-LDS</td>
<td>Active Directory Lightweight Directory Services</td>
</tr>
<tr>
<td>ALM</td>
<td>Annual License Model</td>
</tr>
<tr>
<td>ARR</td>
<td>Application Request Routing (Microsoft)</td>
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<tr>
<td>COM</td>
<td>Component Object Model</td>
</tr>
<tr>
<td>DLL</td>
<td>Dynamic Link Library</td>
</tr>
<tr>
<td>DMZ</td>
<td>Demilitarized Zone</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name System</td>
</tr>
<tr>
<td>EMF</td>
<td>Enhanced Metafile (see glossary)</td>
</tr>
<tr>
<td>FR</td>
<td>Feature Release (ThinPrint)</td>
</tr>
<tr>
<td>GPO</td>
<td>Group Policy Object</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>HA</td>
<td>High Availability</td>
</tr>
<tr>
<td>ICA</td>
<td>Independent Computing Architecture (the Citrix session protocol, see glossary)</td>
</tr>
<tr>
<td>ID</td>
<td>Identification (number)</td>
</tr>
<tr>
<td>IIS</td>
<td>Internet Information Services (Microsoft)</td>
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<tr>
<td>IPv4</td>
<td>Internet Protocol address space with $2^{32}$ addresses; example: 192.168.1.1</td>
</tr>
<tr>
<td>IPv6</td>
<td>Internet Protocol address space with $2^{128}$ addresses; example: 2001:0db8:85a3:08d3:1319:8a2e:0370:7344</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>LPD</td>
<td>Line Printer Daemon (see glossary)</td>
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<tr>
<td>LPR</td>
<td>Line Printer Remote (see glossary)</td>
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<tr>
<td>LPT</td>
<td>Windows Line Printer Port</td>
</tr>
<tr>
<td>MMC</td>
<td>Microsoft Management Console</td>
</tr>
<tr>
<td>NAT</td>
<td>Network Address Translation</td>
</tr>
<tr>
<td>OU</td>
<td>Organizational Unit</td>
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<tr>
<td>Output Gateway</td>
<td>ThinPrint Output Gateway</td>
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<tr>
<td>PCL</td>
<td>Printer Command Language</td>
</tr>
<tr>
<td>PColIP</td>
<td>PC over IP (VMware’s session protocol)</td>
</tr>
<tr>
<td>RAW</td>
<td>Standard Print Data Type</td>
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<tr>
<td>RDP/RemoteFX</td>
<td>Remote Desktop Protocol (Microsoft’s session protocol, see glossary)</td>
</tr>
<tr>
<td>SQL</td>
<td>Structured Query Language</td>
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<tr>
<td>SSL</td>
<td>Secure Socket Layer (see glossary)</td>
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<tr>
<td>TCP/IP</td>
<td>Transport Control Protocol / Internet Protocol</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>TLS</td>
<td>Transport Layer Security</td>
</tr>
<tr>
<td>TP</td>
<td>ThinPrint</td>
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<tr>
<td>UI</td>
<td>User Interface</td>
</tr>
<tr>
<td>UPN</td>
<td>User Principle Name</td>
</tr>
<tr>
<td>URL</td>
<td>Uniform Resource Locator (web address)</td>
</tr>
<tr>
<td>VC</td>
<td>Virtual Channel (= RDP, ICA or PCoIP)</td>
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<tr>
<td>VCG (VC Gateway)</td>
<td>Virtual Channel Gateway (ThinPrint)</td>
</tr>
<tr>
<td>VCP</td>
<td>Virtual Channel Protocol (= RDP, ICA or PCoIP)</td>
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<tr>
<td>VDI</td>
<td>Virtual Desktop Infrastructure (e.g. VMware Horizon View, Microsoft Hyper-V, Citrix XenDesktop)</td>
</tr>
<tr>
<td>V-Layer</td>
<td>Printer Virtualization Layer (ThinPrint)</td>
</tr>
<tr>
<td>WinCE</td>
<td>Windows CE</td>
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<tr>
<td>WMI</td>
<td>Windows Management Instrumentation (Microsoft)</td>
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