



BANDWIDTH-OPTIMIZED NET-WORK PRINTING IN SERVER-BASED COMPUTING APPLICATIONS

ThinPrint Technology for Bandwidth Optimization and Control in Print Servers and Gateways

Insufficient usable bandwidth is a key issue in server-based computing applications. The reason for this is the typical structure of these environments: At the center there is a server or a server farm which provides all applications and files for the connected workstations (e.g. single workstations, local networks, branch offices etc.). The network devices in such WANs (Wide Area Network) are connected via narrow bandwidth connections (dial up connections, lease lines). This whitepaper gives a short overview of ThinPrint® technology, and looks at how implementing this technology in network printing components such as print servers and print spoolers enables the continuous transmission of compressed and bandwidth optimized print jobs from the server to the output device. In server-based computing-environments this greatly relieves LAN and WAN infrastructures and allows the efficient operation of network printers.

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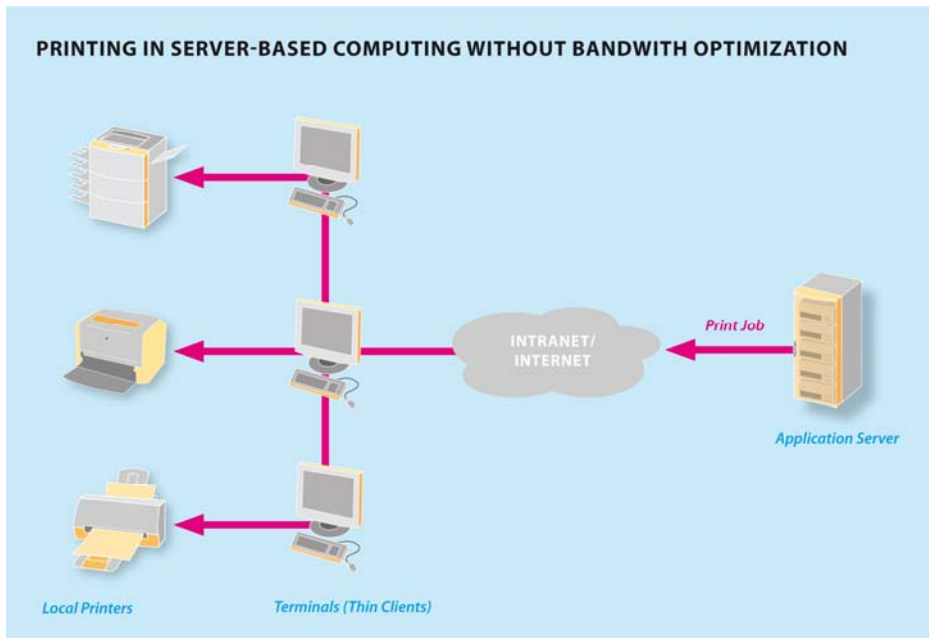
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CONTENTS

1. COMPRESSING PRINT JOBS VIA THINPRINT®	3
1.1. Compression Process	4
1.1. Supported Operating Systems	4
2. NETWORK PRINTING COMPONENTS BY SEH WITH INTEGRATED THINPRINT® TECHNOLOGY	5
2.1. Print Servers as .print Clients	6
2.2. Local Print Spooler as ThinPrint Gateway	7
2.3. ThinPrint Gateways TPG60 and TPG120	8
5. FURTHER INFORMATION	8

1. COMPRESSING PRINT JOBS VIA THINPRINT TECHNOLOGY®

In server-based computing (SBC) architectures print jobs are triggered locally at the workstation – terminal or ThinClient – generated on the server and sent via the WAN and LAN connection to the local printer. In the event of large or frequent print jobs, this puts a heavy strain on the network infrastructure, plus potentially entirely blocks all of the usable bandwidth. This leads to a considerable loss of applications performance, and may even cause a total connection breakdown.

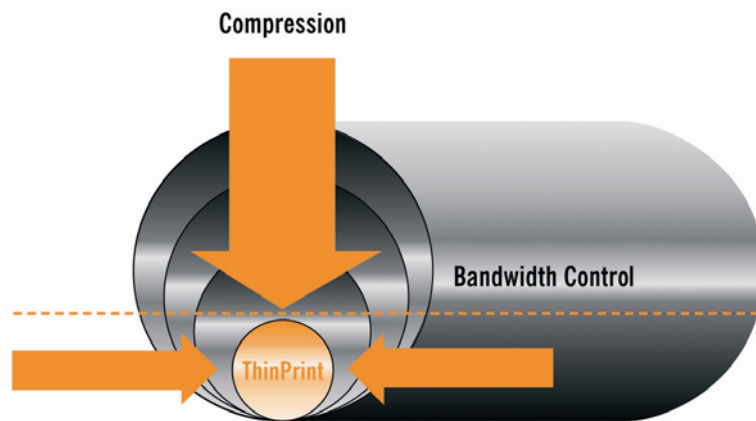


Print job transmission in SBC

As a consequence, in recent years we have seen the development of various compression technologies that target and solve this issue. One of these technologies is ThinPrint®, a software-based compression technology for print jobs.

Relating to the issue outlined above, ThinPrint® compressed print jobs offer the following advantages:

- ▶ The limitation of the print job to a small part of the usable bandwidth secures the application performance
- ▶ Considerably shorter transfer times



Print job compression with ThinPrintTechnology¹

¹ Image provided by ThinPrint.

Using ThinPrint® to compress print jobs therefore results in a considerable reduction of the data traffic between server and printer, freeing a large part of the usable bandwidth for other crucial tasks. Another positive effect is cost-reductions that can be achieved during dial-up connections.

1.1 COMPRESSION PROCESS

Print jobs are compressed using the server component of the .print technology, the so-called .print Engine. Depending on the environment, this software module will be installed on the central application server or print spooler/server and sends the compressed, bandwidth-optimized print job to the relevant, local .print Client. This client then decompresses the print data, transferring it to the respective printer.

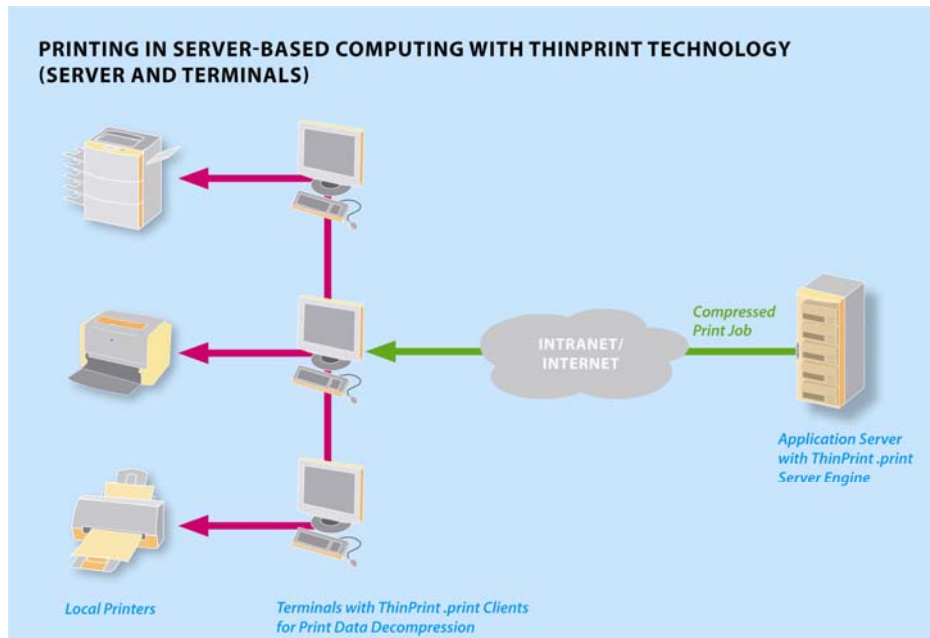
1.2 SUPPORTED OPERATING SYSTEMS

.print Servers may be installed on the following server platforms:

- ▶ Citrix MetaFrame/MetaFrame XP
- ▶ Windows NT 4.0/2000/XP
- ▶ Windows NT 4.0 Terminal Server
- ▶ Windows .net
- ▶ Tarantella

2. NETWORK PRINTING COMPONENTS BY SEH WITH INTEGRATED THINPRINT .PRINT TECHNOLOGY

In most cases the .print Client is installed on local Thin Clients or terminal computers. These serve to decompress the print data received from the servers and forward the decompressed data to a local workstation printer attached to the respective terminal or Thin Client.



.print Client in terminal computers and Thin Clients

Disadvantages of such an approach are:

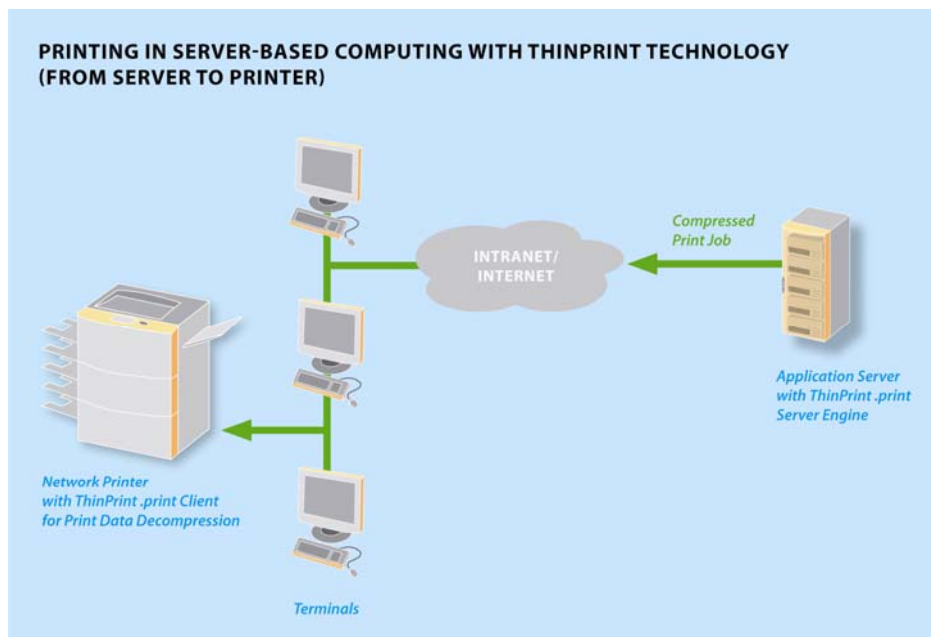
- ▶ Only local workstation printers are supported
- ▶ Each local workstation requires a .print Client to be installed
- ▶ No direct transfer of compressed print data to a network printer

2.1 PRINT SERVERS AS .PRINT CLIENTS

Most SBC environments consist of a number of LANs and individual workstations linked via WAN connections. While using local workstation printers may not be an issue with individual distributed workstations, it will have negative effects within a LAN, resulting in administrative problems, insufficient performance and an unnecessary number of printers. This can be resolved by means of print servers. These network components act as adaptors directly connecting printers to the LAN infrastructure, therefore, allowing multiple users to share the available printing resources.

Integrating a .print Client directly into a print server enables decompression of the print data received from the .print Server directly at or even in the network printer. Advantages of such a solution are:

- ▶ Print job output via a few, central network printers in the LAN
- ▶ The entire WAN and LAN infrastructures are optimally relieved, up to the end device
- ▶ The local workstations do not require a .print Client to be installed



.print Client im Printserver/Netzwerkdrucker

SEH is one of the few manufacturers that have yet looked into the possibility of implementing the .print Client into print servers. To date, the .print Client is an integral part of almost all SEH print servers.

2.2 LOCAL PRINT SPOOLER AS THINPRINT GATEWAY

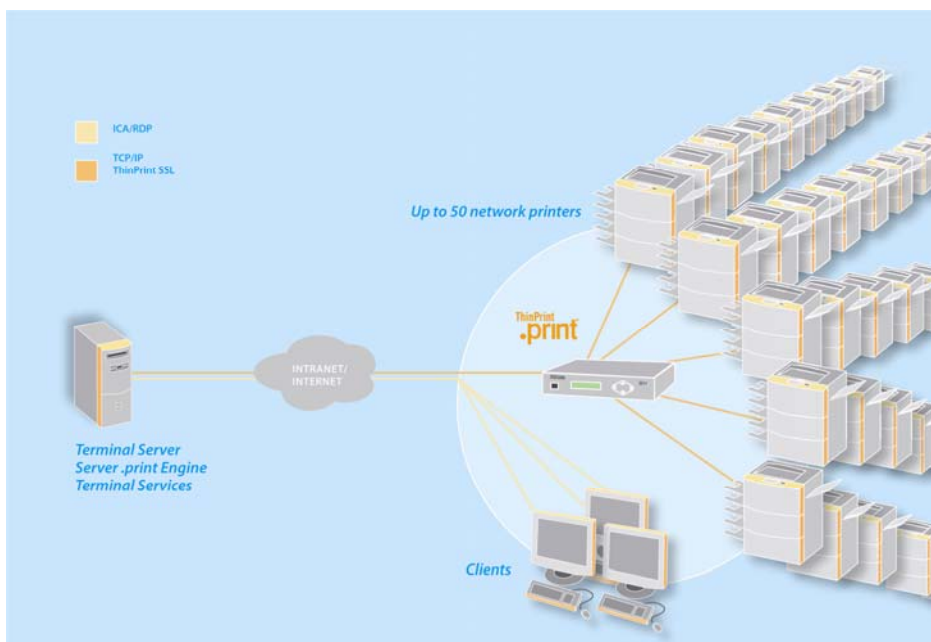
Due to lacking support by most manufacturers, though, many administrators often face the problem that the print servers used throughout their networks do not support ThinPrint® and, therefore, do not enable to decompress the print data.

This problem can be solved by means of a so-called .print Gateway. This .print Gateway serves as an upstream .print Client that receives the print data from the .print Server, decompresses the data after the bottleneck of the narrow-band WAN connection in the LAN and, in case of ThinPrint® SSL, decrypts the print job and then transfers the original, uncompressed data to the print servers available in the local network.

A .print Gateway offers the following advantages:

- ▶ Print job output via a few, central network printers in the LAN
- ▶ Support of print servers without integrated .print Client
- ▶ Decompression of print jobs after the bottleneck of the WAN connection, directly in the LAN
- ▶ Decryption of print jobs encrypted with ThinPrint® SSL
- ▶ Support of ThinPrint® AutoConnect and ThinPrint® Services for the simple and seamless integration into ThinPrint® environments
- ▶ The local workstations do not require a .print Client to be installed

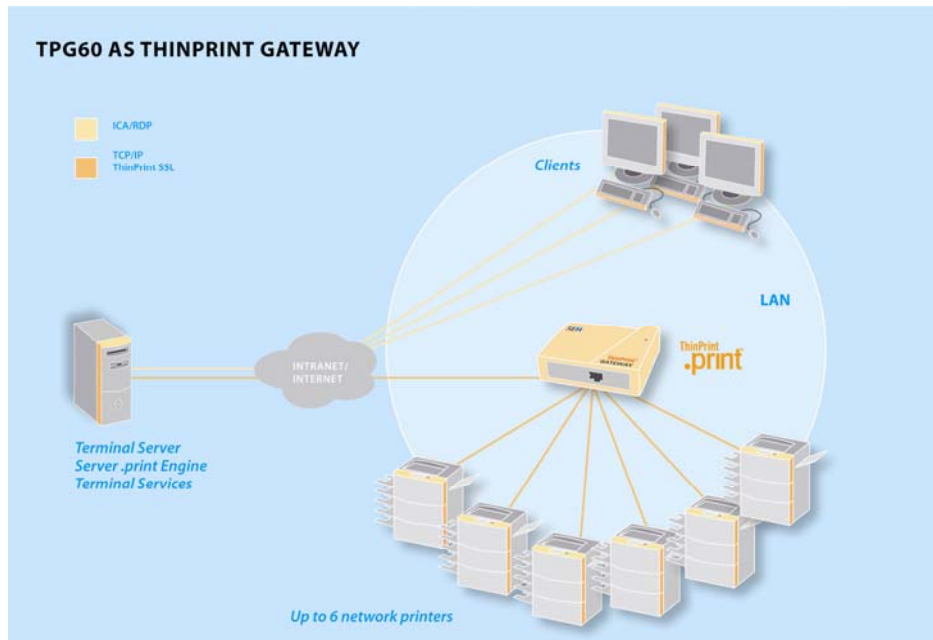
SEH has integrated this technology into its ISD300 print appliance – a compact, dedicated and easy-to-use print spooler. This can be operated as ThinPrint Gateway for up to 50 network printers.



ISD300 Appliance deployed as ThinPrint Gateway

2.3 THINPRINT GATEWAYS TPG60 AND TPG120

In cooperation with ThinPrint SEH has developed two cost-efficient ThinPrint Gateways for networks with only a few network printers. The TPG60 connects up to six network printers to a network with ThinPrint® technology. The TPG120 does the same for up to twelve network printers. The benefits and functional range is identical with those of the ISD300. Users can choose the suitable solution for their network among the three SEH ThinPrint Gateways.



TPG60 deployed as ThinPrint Gateway

2.4 PRINTING PROTOCOLS AND SUPPORT

With the SEH solutions, communications between .print Server and .print Client is exclusively via TCP/IP or LPD. This applies to both, the direct communications with a .print Client enabled print server and the indirect communications via ThinPrint Gateways (ISD300, TPG60, TPG120).

Since 2003 almost all SEH network components have been shipping with an integrated .print Client. Previously purchased ISD300 appliances and print servers can be upgraded with a .print Client by means of a simple, free firmware update.

3. FURTHER INFORMATION

- ▶ ThinPrint Whitepaper: SEH TPG60 as a .print Client Gateway
- ▶ ThinPrint Whitepaper: SEH ISD300 as a .print Client Gateway