CORTADO

Printing in Wi-Fi Networks

More Bandwidth with Print Data Compression

ThinPrint
Whitepaper

Contents

Introduction

Situation. **Increasing burden on Wi-Fi networks in companies**
With the ever-growing number of laptops, smartphones and tablets in companies, use of Wi-Fi networks also continues to grow rapidly. Within one year, the use of company smartphones alone increased from 37% to 60%.[1] For example, insurance brokers and bankers also use the laptop as a key productivity tool for completion of important work-related tasks.[2]

Problem. **Printing is one of the main burdens on the Wi-Fi network**
Your first thought is probably that file transfer is the main burden on the Wi-Fi network. But printing consumes just as much bandwidth in the local wireless network. The reason for high network loads when printing is the exorbitant increase in the size of the print file when compared to the original file size. This means work processes are restricted, because the entire Wi-Fi network reaches its performance limits.

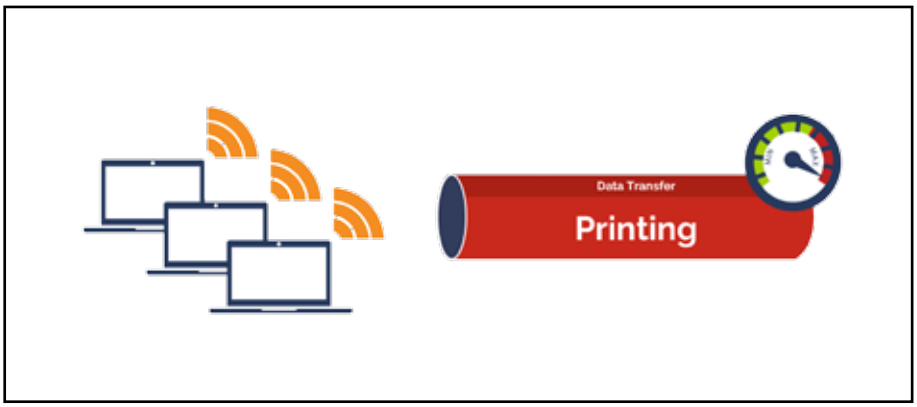
Solution. **Compress print data effectively**
Traditional compression technologies often fall short here. However, if print data is compressed effectively, then the Wi-Fi network user's productivity can be optimized. With ThinShare technology included in ThinPrint 10, print data can be compressed already during transfer from the client to the server.

Result. **Solve bandwidth problems and thus increase performance**
During transfer with ThinShare, print data is compressed by up to 98%. This solves bandwidth problems without the need for additional bandwidth, routers or software.

1 Mobile Statistics for the Modern Day Business, in: Inside Mobile Apps, http://www.insidemobileapps.com/2013/11/08/mobile-statistics-for-the-modern-day-business/ (21.03.2014)

2 Gfk: Finding Simplicity in a Multi-Device World, https://www.facebook.com/business/news/Finding-simplicity-in-a-multi-device-world (21.03.2014)

1. Increased Use of Wi-Fi Networks



There are now around 7 billion mobile devices in the world. If you compare this with the size of the world's population, then there is theoretically one mobile device for every person.

But what is the situation in the business world? Here too, the use of mobile devices is increasing. Within one year, the use of corporate smartphones alone increased from 37% to 60%.[3] Growth in the numbers of tablets in enterprise use is expected to increase significantly in the coming years[4] and in 2014, companies are set to buy 52% more tablets than in 2013.[5] For example, insurance brokers and bankers also use the laptop as a key productivity tool for completing important, work-related tasks.[6] Switching between mobile devices is now taken for granted as a means of completing our work.[7]

So, it's clear: The data burden on the Wi-Fi network due to increased data transfer resulting from mobile devices can only continue to increase in the coming years.

3 Mobile Statistics for the Modern Day Business, in: Inside Mobile Apps, http://www.insidemobileapps.com/2013/11/08/mobile-statistics-for-the-modern-day-business/ (21.03.2014)

4 One in Every Five Tablets will be an Enterprise Device by 2017 http://www.zdnet.com/one-in-every-five-tablets-will-be-an-enterprise-device-by-2017-7000019038/

5 Pierra, Patrick: Tablet Sales to businesses growing 3 times faster than sales to consumers, http://tabtimes.com/news/ittech-stats-research/2014/03/08/tablet-sales-businesses-growing-3-times-faster-sales-consumers

6 Gfk: Finding Simplicity in a Multi-Device World, https://www.facebook.com/business/news/Finding-simplicity-in-a-multi-device-world (21.03.2014)

7 ebd.

2. Printing – One of the Main Burdens on Wi-Fi Networks

Your first thought is probably that transferring files is the main burden on the Wi-Fi network. But it soon becomes apparent that it is not only multimedia data that generates traffic, but that print data, due to its size, can compete with multimedia data. Printing presents a significant burden on the bandwidth of the local wireless network. The reason for high network loads when printing is the exorbitant increase in the size of the print file when compared to the original file size.

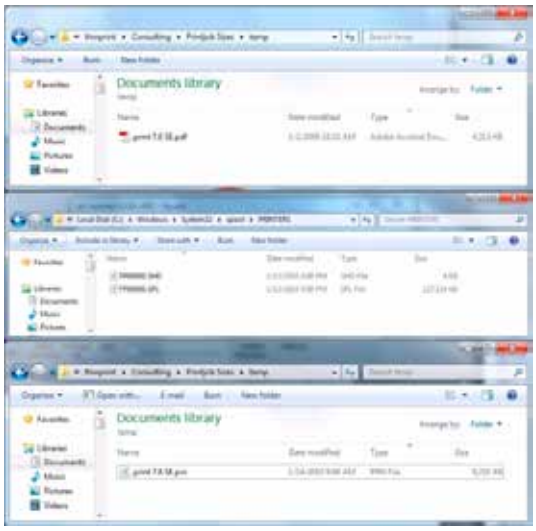
For example, a **1 MB** PowerPoint presentation on the user's desktop increases to a **28 MB** print file during data transfer through rendering with a printer and a native driver (RAW file) **or even to 42 MB** with a shared printer (EMF file). Traditional compression technologies fall short here and cannot offer the levels of compression required to reduce the data volume significantly enough during printing.

At this point, you would be entitled to ask why print jobs are actually so large? The size of the print job is dependent on the data volume that runs into the print system. The printer driver, which converts this data volume into commands that can be understood by the printer, is also crucial. So we have to contend with the size of the spool file as well as the data that is sent from the printer driver to the printer. To be able to analyze the spool and print data volumes, the correct information must be read out for data that enters and exits the print system.

First, with the printer queue paused, we view the spool file for the print job, which is located in the computer's spool folder. At this stage, it already becomes clear that the size of the spool file is not directly related to the size of the document to be printed. This is due to the different data formats that are used to save a document for a specific application or to transfer it to the print system universally for all printers as Enhanced Metafile Format (EMF). One objective of EMF files is fast transfer of print data to the print system. Time-consuming optimization and compression methods are therefore not provided for. This means that file formats are usually smaller than the spool files created from them.

Two indicators for significant size increases are embedded pictures and the abilities of an application to prepare the images for the print system. While many applications use the JPEG picture format, the transfer of images to the print system is carried out in the form of bitmaps, which results in a data volume 10 to 100 times larger. Applications that do not adapt the resolution of the images to the resolution of the printer, and that do not reduce multi-layer images to a single layer, or transfer minimized images in the original resolution, generate additional data in the spool file.

The print system, together with the printer driver, is able to adapt the data volume to the actual requirements of a printer. When using a file port as the printer port, it becomes apparent that the print data is smaller than the spool data. However, here too it is difficult to specify distinct factors which can reduce the data volume. In any case, the quality of the printer driver and the printer language used are relevant.



As you can see in the diagram, the size of a sample **PDF document** is **4,313 KB**. From this, Acrobat Reader 9 generates a **127,154 KB spool file**, which the print system then converts into a **print data volume of 9,221 KB**. This is the print data ultimately used by the printer. After adding the protocol overheads, we get the actual burden on a network caused by a print job.

To summarize, work processes are restricted due to the vast increase in the print file size, because the entire Wi-Fi network reaches its performance limits: For example, even e-mails with no attachments take forever to send or it takes far longer than usual to load a website. Wi-Fi networks usually offer 54 MBit/s, but the rate actually available is significantly lower in practice, as the nominally available bandwidth is split between the number of network subscribers.

As a result, it is far from beneficial for the Wi-Fi network for printing to further reduce available bandwidth. And even though the business world has been dreaming of paperless offices for many years, printing remains an essential part of everyday office life. Despite the digitalization of the business world, companies still print

more than desired .[8] According to an IDC study, "you could cover an area 237 times the size of New York City with the number of A4 pages printed out each year."[9]

3. Compressing Print Data Effectively

Traditional compression technologies fall short, or in some cases no compression at all is provided in the normal printing process. However, if print data is compressed effectively, then the Wi-Fi network user's productivity can be optimized in day-to-day work.

With ThinShare technology which is included in ThinPrint 10, print data can be compressed already during transfer from the client to the server, which is crucial for relieving the burden on the Wi-Fi network bandwidth.

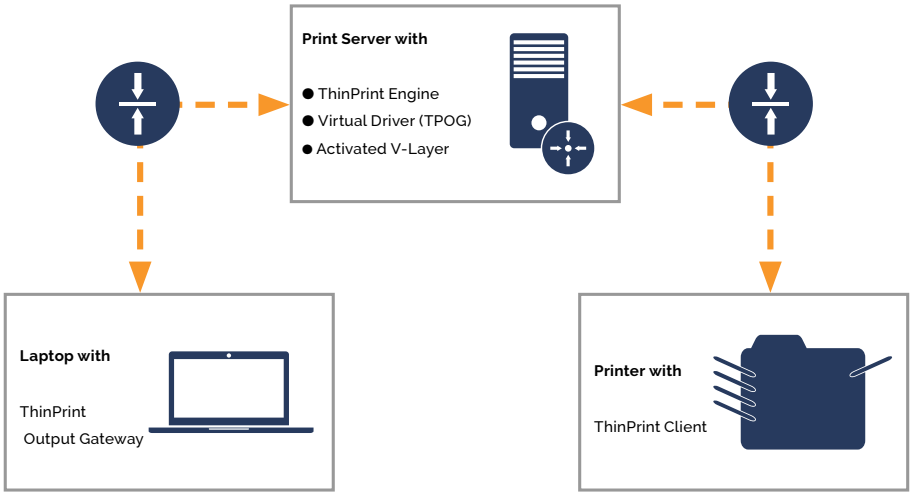
ThinShare is based on the **Advanced Adaptive Compression** of the print software ThinPrint, Cortado's printing technology which has been continuously developed for 15 years. The compression of print data from the print server to clients such as network printers has been one of the strengths of ThinPrint for over a decade now. However, with ThinPrint 10, it is now also possible to compress print data from the client to the print server.

8 SMBs: Are green campaigns missing the mark?. Lexmark International. 12 Februar 2012.

9 Srirangpatna, Dinesh/ Shirer, Michael: Worldwide Page Volume Continued Slow Decline in 2012 as Gains in Developing Regions Failed to Offset Slowdown in Developed Regions, According to IDC, http://www.businesswire.com/news/home/20130729005300/en/Worldwide-Page-Volume-Continued-Slow-Decline-2012#.VZvGE_m8pIM

A prerequisite for this is the ThinPrint Output Gateway. Print jobs are compressed wherever a printer with the virtual driver (the ThinPrint Output Gateway) is mapped. This virtual driver is located on the print server as a printer driver. This means no native printer driver is required at the client side, but only the ThinPrint Output Gateway. This sends the print data to the print server in a device-neutral form. At the print server, it can be rendered with a downstream printer driver called V-Layer. This makes it possible to manage native printer drivers centrally and distribute them to the real and virtual desktops via the virtual driver.

So, if the ThinPrint Output Gateway is used on a laptop, for example, ThinShare can be used to compress the data transferred to the print server. ThinShare ensures that the printers that have been released on the print server, assigned to the users and at the same time use the ThinPrint Output Gateway, are compressed and sent to the print server. This means the clients can remain free of printer drivers.



3.1 Step-by-Step Guide

It is worth giving you a brief overview of the scenario and just how easy it is to configure ThinShare:

1. The printers are made available to the users via policies.

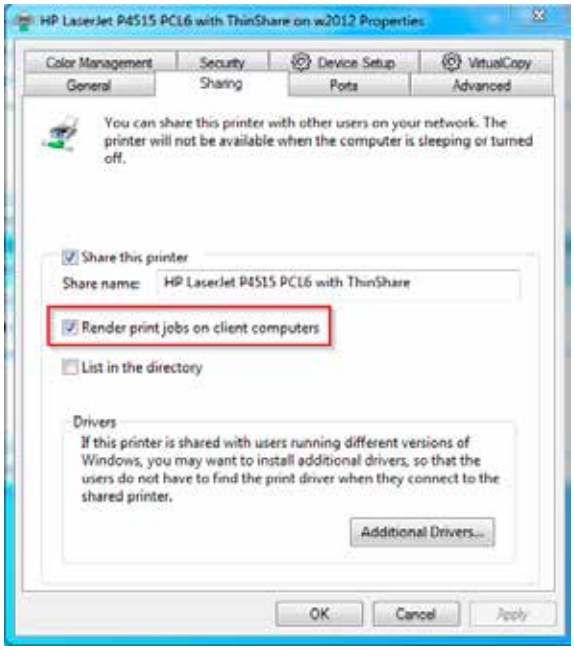
2. The laptop connects to the shared printers and the ThinPrint Output Gateway virtual driver is transferred to the laptop.

3. This makes it possible to compress the print data, which use the route between the laptop and server using the standard SMB protocol (Server Message Block) or the extended version of SMB called CIFS (Common Internet File System).

4. The ThinPrint Client installed on the network printer transfers the compressed print file to the respective printer. This printer is then able to decompress the print data.

No additional software is required to enable compression, as the ThinPrint Output Gateway replaces the printer drivers on individual desktops. For printer driver distribution, the standard Windows sharing process is used, hence the name ThinShare.

ThinShare is activated centrally on the print server for all print objects that use the ThinPrint Output Gateway virtual driver.



On the client side, "Client Side Rendering" must be activated, which can be managed centrally and easily via group policies.

4. Solve Bandwidth Problems, Increase Performance Roundup

ThinShare enables significant rates of compression. During transfer of print data between the client and the print server in the Wi-Fi network, the print data is **compressed by up to 98 percent**. This solves bandwidth problems without the need for additional bandwidth, routers or software.

The screenshot shows the transfer volume saved for this print job with and without ThinShare. In this case, a compression rate of 95.8% is achieved. The compression rate depends on the content of the document and the particular application providing the print file.

Summary

Due to the ever-growing number of laptops, smartphones and tablets in companies, use of Wi-Fi networks continue to grow rapidly. Many people initially think of file transfer as the main burden on the Wi-Fi network. But printing consumes just as much bandwidth of the local wireless network. This restricts work processes because the entire Wi-Fi network is pushed to its performance limits. Traditional compression technologies often fall short. However, if print data is compressed effectively, the Wi-Fi network user's productivity can be optimized. With ThinShare technology included in ThinPrint 10, print data can be compressed already during transfer from the client to the server. During transfer, print data is compressed by up to 98%. This solves bandwidth problems without the need for additional bandwidth, routers or software.

To summarize, only ThinShare and ThinPrint offer real benefits:

- **Increased Productivity:** Uncompressed print data is no longer an unnecessary burden on your Wi-Fi network. Thanks to 98% print data compression, you can create space for other services in your local wireless network.

- **No expensive new investments required:** ThinPrint's ThinShare is a purely software-based solution, and no additional hardware has to be procured.

- **Simplified central driver management:** The native drivers are now only located on the print server. Thanks to the ThinPrint Output Gateway virtual driver, no native drivers are required on the client side.

- **User-friendly application**: There is a uniform user interface for printing on all devices, even mobile.

Additional white papers or questions:
You can download this and many other white papers on relevant IT subjects here:
www.thinprint.com/whitepaper

What customers think of ThinPrint?
Independent, third-party research on how customers view ThinPrint products can be found at: **www.techvalidate.com/product-research/thinprint**

Any questions?
The ThinPrint experts are happy to help. Contact us via one of our local offices listed on the next page or send an e-mail to **info@thinprint.com**.

Headquarters

ThinPrint GmbH
Alt-Moabit 91 a
10559 Berlin, Germany

Tel.: +49 (0)30-39 49 31-0
Fax: +49 (0)30-39 49 31-99

E-Mail: info@thinprint.com
www.thinprint.com

USA (Colorado)

Cortado, Inc.
7600 Grandview Avenue, Suite 200
Denver, CO 80002, USA

Tel.: +1-303-487-1302

E-mail: info@cortado.com
www.cortado.com

Cortado Pty Ltd. Australia
Level 12, Plaza Building,
Australia Square, 95 Pitt Street
NSW 2000 Sydney, Australia

Tel.: +61-(0)2-8079 2989

Cortado Japan Japan
20th Floor, Marunouchi Trust Tower Main,
1-8-3 Marunouchi Chiyoda-ku,
Tokyo 100-0005

Tel.: +61-(0)2-8079 2989
Fax: +81-(0)3-52 88 53 81

ThinPrint®

Follow ThinPrint: facebook twitter youtube linkedin