

RICOH

Ricoh HotSpot Printer/MFP Whitepaper Version 4_r4



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Introduction

The purpose of this whitepaper to address some of the most frequently posed security and system reliability questions.

What is a HotSpot Printer?

The Ricoh HotSpot printer allows people to print simply by sending an email or submitting print requests from a webpage.

This simple and intuitive interface allows use without the need for print drivers or any extra software. This eliminates IT overhead and time used in setup and configuration for mobile or temporary users.

There are two methods for submitting print jobs:

Email – Users submit their print jobs by simply forwarding an email to the printer’s email address. This can be done from any computer or handheld device that supports email. The user will then receive an email response with a release code for the body of the email and a separate email and release code for each attachment. Simply enter this release code at the printer keypad to begin printing the document or email.



Web Submission – Documents may also be submitted through a web browser by visiting the printer’s webpage. Users simply select the browse button to identify the document they would like to submit for printing and then provide an email address before submitting the print request. They will receive a release code on the webpage as well as a copy of the code via email. When the code is entered at the printer keypad the job will begin printing.

Printing Services

RICOH Print to the Ricoh Hotspot Printer

Print using this webpage
or
Send print jobs via email to:
ricoh-hotspot-printer@printsports.com

221 McIntyre Drive
Building E
Kitchener, ON, N2R 1G1
Canada
7/24 hours of operation

1 - Select Document

File:

Browse your computer files to select the document you wish to print.
You may also enter the URL of a web page you want printed.

2 - Privacy

Email address:

You will be provided with a release code to obtain your document from this printer. This code will be sent to your email address specified above.

3 - Send

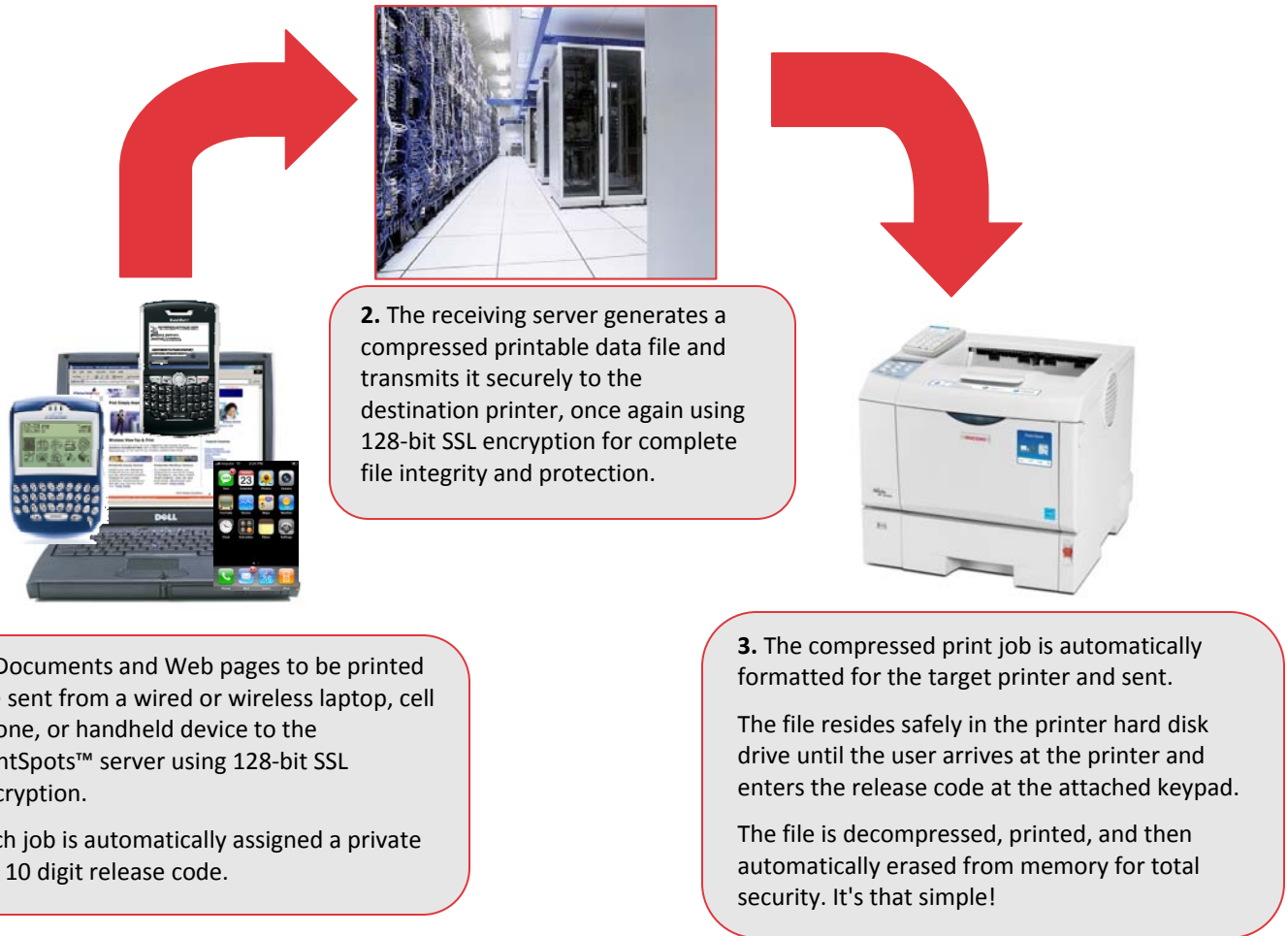
Submit your print request.

[How to print email](#)
 [How to print boarding passes](#)

Powered By **PRINTEROn**
PRINT SIMPLY. REVOLUTION.

Understanding the HotSpot System Architecture

To better understand the technology being leveraged for HotSpot printing it is important to know that when users email or submit print requests through the website there is a service operating in the background to allow the printing function. This is completely seamless to the end user. The real workflow of printing to a HotSpot will look something like this:

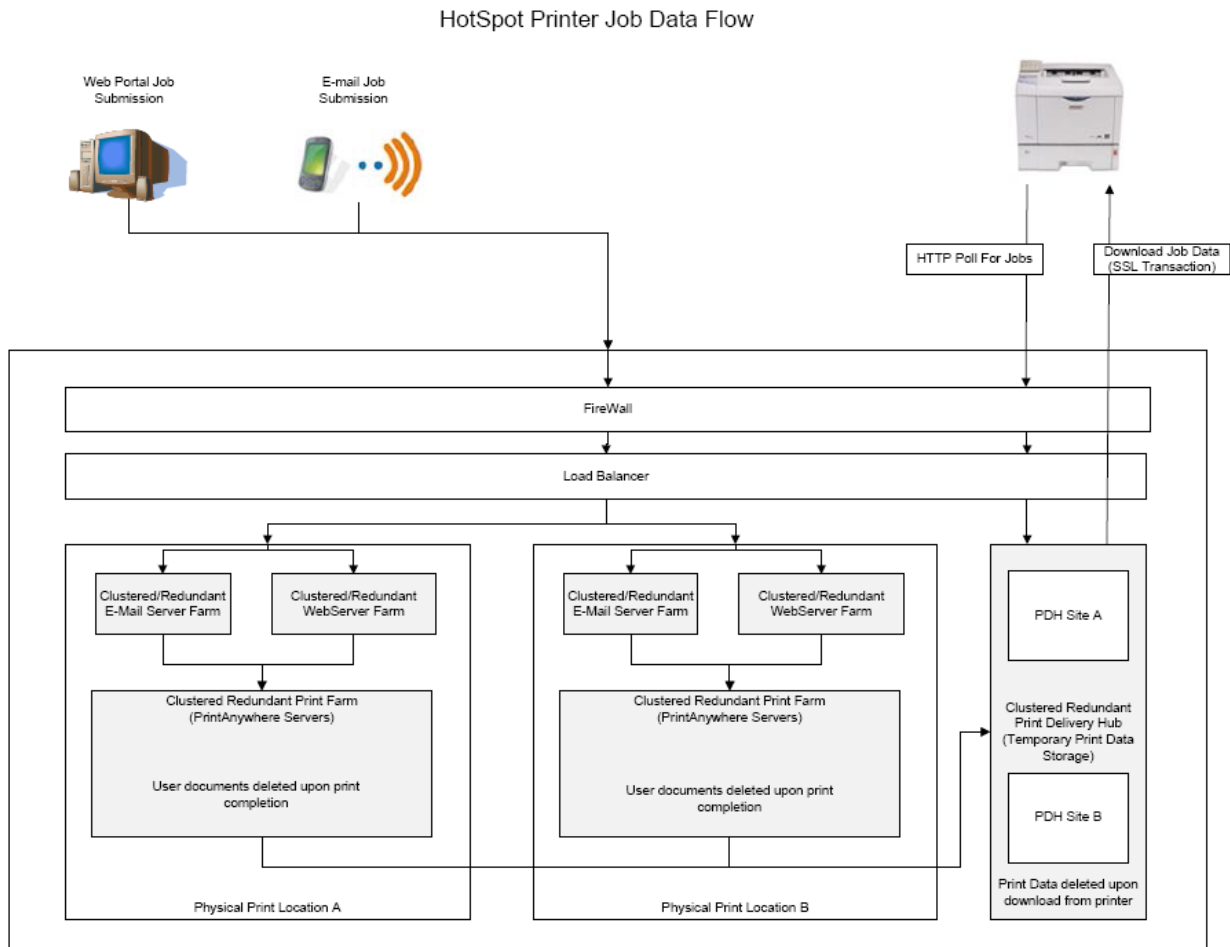


Reliability of HotSpot Service

The HotSpot printing system architecture ensures the security and reliability of HotSpot printing.

The diagram on the next page provides a better overview of the service infrastructure. The system's design is intended to address problems if either of the 2 physical network operations centers is removed from service. The Internet reliability is managed using 3 physically distinct inbound Internet connections, which are provided by 2 separate ISPs. The goal is to minimize downtime caused by the loss of any single physical connection or the loss of an ISP.

Each of the physical locations also incorporate battery backup systems, which are further backed up by generators for long term outages where the battery backups are not sufficient.



Security Considerations

When considering security it is important to understand the steps involved when a print job is submitted to a hotspot printer:

Before data can be submitted to the HotSpot printer, the printer must have access out to the Internet. The printer uses two forms of communications with the PrinterOn service.

1. HTTP – Before the printer can be used it must first validate its license agreement with the PrinterOn Servers. This is done through HTTP communications.
2. HTTPS – All print data and communications regarding print job transmission is encrypted with 128-bit SSL.

Using both HTTP and HTTPS requires that data be allowed to pass through any firewall on the customer network by using TCP ports 80 and 443. As most environments allow for secure Internet communications on client PCs the HotSpot printer does not require any special firewall configuration. If a proxy server is used the printer will need to be configured with a proxy user account.

There are two forms of encryption available to be used for data transmission to the PrinterOn service.

1. If submitting print jobs through a HotSpot webpage all data will be encrypted with SSL.
2. When emailing documents the PrinterOn mail servers will accept requests for TLS authentication.*

Any print job submitted to the HotSpot printer will actually first go to the PrinterOn web server for print processing. Both physical locations are equipped with secure access to the server rooms. Only 4 employees and 1 executive have keys with access to these rooms. No remote access is possible to the servers requiring direct physical access to the servers to view any data they may process.

**The TLS protocol is designed to allow communications privacy over the internet by allowing client/server applications to communicate in a way that is designed to prevent eavesdropping, tampering, or message forgery. Further information on this encryption is available through RFC 5246.*

The initial email or web submission will pass through the PrinterOn firewall and the service Load Balancer will direct the job request to one of the two, mirrored physical locations. The print job will then arrive at the appropriate web or email server farm depending on the print job submission method. Here the print job is stripped from the rest of the data communications used to submit the job and the email text and each attachment are assigned in queue to the print service. Once the print service has received the jobs from the email or web servers the data is deleted from these servers using standard windows deletion. The print server will then process the print job and generate the release code for the email and each attachment. For jobs submitted via the web service the release code will display on the webpage and will also be emailed to the address that was provided. For jobs submitted by Email a return email will be sent with the release code or codes.

Now that the print data has been processed, and the release codes created, the data is transferred to a temporary data storage site for transmission to the HotSpot printer. Once again when the data move is confirmed all records of the print data on the print server are deleted from the windows file system. The data is encrypted at the new storage location and transmitted to the HotSpot printer. It will download directly to the hard drive installed on the printer and remain there, encrypted, for 72 hours. If the release code that was assigned to it by the HotSpot service is not entered into the device keypad within 72 hrs the print file is deleted from the printer hard disk.

HIPAA Compliance For Health Care Providers

Ricoh HotSpot Printers can fulfill a critical role in any organization concerned about HIPAA compliance. Criteria outlined in the Security Considerations section demonstrates how providers can maintain confidentiality of patient personal information while data is printed.

The basic mechanism which ensures only users with a release code can obtain hard copy from Ricoh HotSpot Printers by using a keypad to release print jobs complies with all aspects of compliance related to printing output including:

- Ensuring documents printed to a shared printer are promptly removed (output is not left unattended and open to compromise).
- Information being printed to equipment located in a public location must be strictly monitored.

Bandwidth Considerations

Ricoh HotSpot Printers were developed with the full understanding that this technology would be deployed in multiple environments, including those with low speed and high-speed Internet connections. In addition to state-of-the-art compression techniques, the Ricoh HotSpot Printers have been designed with a number of features relevant to lower bandwidth installations and have been successfully tested and deployed in high bandwidth connections (DSL or better) as well as limited bandwidth situations. Note that in the limited bandwidth case, we are still assuming that the service is essentially “always connected”.

By way of example, we will assume a DSL caliber connection with a download speed of 1 Mbit/second and an upload speed of 384 Kbits/second. During operation of the Ricoh HotSpot Printer service, there are two types of conversations that consume bandwidth: “print job polling” and “print job downloading”.

Print Job Polling

Polling occurs on a regular basis, in which the embedded printer software asks a simple question: do you have a print job for me? The answer is almost always no, and the system goes back to sleep until the next poll. The polling query is usually less than 200 bytes. Most of that is HTTP overhead, plus a message of roughly 50 bytes that varies depending on the logical name of the printer. The response is a bit shorter, say 150 bytes.

Some sample math:

1 poll request: 200 bytes = 2000 bits (some extra for framing, parity, etc)

Maximum polling frequency: 1 poll/minute = 2000bits/minute

DSL Bandwidth Capacity: 384,000 bits/second = 23,040,000 bits/minute

Polling capacity use = $2000/23040000 = 0.0087\%$ of bandwidth

Overall, the polling mechanism that checks for print jobs consumes an insignificant portion of the available bandwidth. Furthermore, the administrator can change the polling interval or frequency.

Print Job Download

If print job polling indicates that one or more print jobs are available, then the portion of the HotSpot service downloads the print job. Print jobs can vary in size immensely. And large print jobs can consume a large percentage of available bandwidth. Therefore, controlling the size of the print jobs is a key objective, and there are 4 key variables that are under our control.

Print Job Compression – All print data is compressed before presenting it for download. This minimizes the amount of print data that needs to be transferred.

Print Job Page Limits – The printer administrator can set upper boundaries on the number of pages that can be printed. As a general rule, this is more useful for controlling abuse, but can be of value for limiting data usage.

Data Limits – The administrator can specify the maximum allowable compressed print data size. This setting will reject any attempts to send print jobs that exceed the comfort level for the network.

Printer Type – Another key method for minimizing the print job size is to select a printer that uses efficient data types. All Ricoh HotSpot Printers support PCL and PostScript and are far more efficient than GDI, Quartz or other host-based printers.

Recommendations to Limit Bandwidth Usage

- Choose a black and white Ricoh HotSpot Printer model
- Set the data size limit to 3 Mbytes. 3 Mbytes can contain a typical print job of up to 18 pages, which is more than 95% of all requests.
- The median 4 page print job will be about 660 Kbytes in size, consuming a significant portion of the available bandwidth for less than 7 seconds. As a general rule, assume, roughly, 30 seconds per page.
- Assuming 20 print jobs per day are sent with the upper limit of 3 Mbytes per job, the data will be transmitted in roughly 8 to 10 minutes. (3,000,000.00 bytes * 10 bits / 1,000,000 bit (a second) = 30 seconds

Supported File Formats

Ricoh HotSpot Printers support a wide range of file formats including the following popular file formats:

- Microsoft Word 2.0 > 2010
- Microsoft Excel 2.0 > 2010
- Microsoft PowerPoint 4.0 > 2010
- Microsoft Visio 5 > 2007
- OpenOffice.org
- Adobe PDF
- Web Pages (htm, html, mhtml)
- Text and TRFT files
- JPEG, TIFF, BMP, PNG, GIF

For more information regarding HotSpot Technology:
www.ricoh-usa.com/hotspotprinters



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