



Ready



# How to Leverage Virtual Printing in a Healthcare Citrix VDI Environment



Perhaps no workplace environment is more stressful than healthcare. At its most basic level, healthcare revolves around a never-ending cycle of critical emergencies. Dealing with this most elemental form of stress is just a part of many clinicians' lives.

While not every clinician must cope with such extremes on a daily basis, all healthcare professionals must face another stark reality: Ongoing changes in the healthcare industry place increasing pressure on workers to accomplish more in less time.

Indeed, all healthcare professionals spend every day in a very demanding, very stressful environment. It is not a place for printing problems.

Yet many healthcare professionals are plagued with printing problems every single day. As clinicians bounce from room to room and patient to patient, they regularly have to print a variety of materials: medical records, prescriptions, patient wristbands and even doctors' notes for school or work. The lack of an efficient, effortless, secure printing solution plagues many healthcare institutions and only adds to the burdens of an already stressful job.

This paper details some of the printing-related challenges faced by clinicians and healthcare IT personnel. It shows how virtualized printing can reduce or eliminate all of these challenges. Finally, the paper discusses the ways in which virtualized printing can complement VDI environments, enabling healthcare organizations to benefit from the full potential of virtualization.



## Business Challenge Summary

Healthcare professionals work in hectic, fast-paced, high-pressure environments. True life-and-death scenarios play out every day within the walls of healthcare institutions. It is a very challenging profession. And perhaps more than in any other profession, healthcare workers depend on having the best tools at hand to do their jobs.

Healthcare administrators recognize the importance of providing their staff with the best tools. The recent explosion of virtual desktop infrastructure (VDI) in healthcare environments provides testimony to that fact. VDI improves clinician access, workflow and experience, helping to drive better productivity and enhancing the patient experience. VDI strengthens security and supports HIPAA compliance efforts and it also makes healthcare IT more agile and flexible. For all of these reasons, healthcare institutions are adopting VDI at a faster rate than any other industry vertical.

However, in the drive to provide healthcare professionals with the best possible tools, one toolset has been strangely overlooked: printing infrastructure. Managing printing activities in a healthcare environment is considerably more challenging — and considerably more critical — than in any other industry.

Clinicians are constantly on the move. One minute they might be printing a document from one location, and five minutes later they might be printing from a different floor, or even from a different building. But typically those documents print to a single designated printer (or small group of designated printers), regardless of the origin of the print job. It is up to the clinician to find and retrieve that document from the designated printer, no matter the distance from his or her current location.

Label printing is a constant source of trouble in most healthcare environments as well. Healthcare workers must print a variety of different specialty labels, such as prescription bottle labels and patient wristbands that incorporate barcode printing. Only certain printers are capable of handling label printing jobs. And again, the mobility of healthcare workers assures that they are likely to be located far from the designated label-capable printer.

Printing blunders are frequently the source of squandered operating costs at most healthcare organizations. Consider, for example, a common scenario: A clinician mistakenly assigns a print job to a printer that is designated for printing prescriptions. The printer dutifully executes the print job — perhaps a massive report comprised of dozens or hundreds of pages — on one dollar per page prescription paper! It is a costly mistake, and one that occurs with great regularity.





Finally, the printer infrastructures at most healthcare institutions put those organizations' HIPAA compliance at risk. Throughout the healthcare industry, great effort has gone into bolstering the security of patient data. Much progress has been made. And recent record-breaking HIPAA enforcement actions have provided ongoing incentives to strengthen the security of patient data.<sup>1</sup>

Print output management is commonly overlooked. Print jobs containing sensitive information commonly route to publicly assessable printers, or completed jobs

containing patient data are never retrieved. The *HIPAA Journal* recently published an article in which it was noted that the only industry where insiders pose the largest single security threat is healthcare. Printing security is so weak at most healthcare organizations that the author recommends: "As far as is possible, employees should be discouraged from printing documents containing sensitive information."<sup>2</sup> Unfortunately, enforcing the restricted use of printers will also reduce productivity.

But there is a better solution to strengthening print output management: UniPrint's

virtualized printing solution. Virtualized printing tightens printer security in a number of ways, including advanced encryption capabilities. It prevents the mobility problem, assuring that a clinician's print job is always routed to a nearby printer. Virtualized printing can even automatically route print jobs to appropriate printers, eliminating costly mistakes such as dollar-per-page reports.

And when teamed with Citrix VDI, UniPrint virtualized printing enables the full range of convenience, productivity and security potential that virtualization promises.



<sup>1</sup> <http://www.hipaajournal.com/ocr-hipaa-enforcement-summary-2016-hipaa-settlements-8646/>

<sup>2</sup> <http://www.hipaajournal.com/healthcare-industry-insiders-pose-biggest-threat-8787/>



## Overview of UniPrint

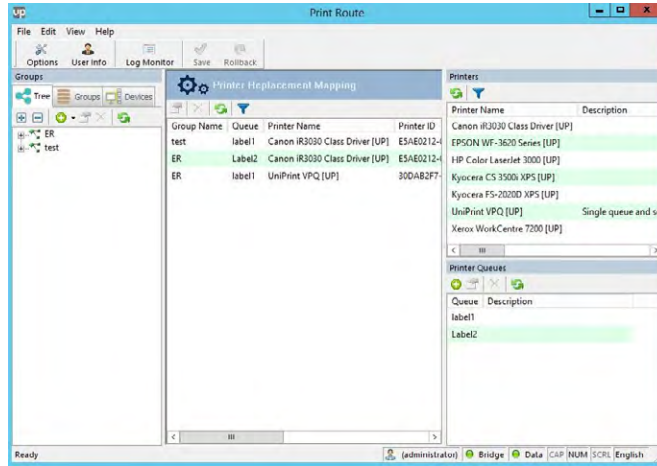
UniPrint.net pioneered the use of PDF-based universal printer driver technology for streamlining and enhancing printing. Today, UniPrint is the recognized leader in printing virtualization.

UniPrint Infinity provides a comprehensive range of enterprise print management and output solutions for healthcare environments. UniPrint optimizes printer functionality, simplifies printer management, improves print security and HIPAA compliance, and reduces bandwidth consumption.

UniPrint Infinity's Healthcare Printing Suite (HPS) enables fast, error-free, on-demand secure printing from major EHS/EMR applications, including Epic, Meditech, McKesson and Allscripts, with 100 percent uptime in Citrix environments. When teaming UniPrint Infinity HPS with Citrix VDI, healthcare organizations benefit from optimized clinical workflows, reduced printing costs and an improved quality of patient care. Data breaches that commonly occur during the printing process may also be eliminated.

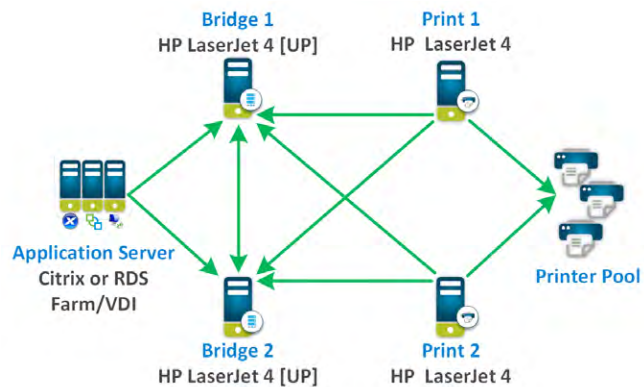
The following are among the most valued features that UniPrint virtualized printing offers to healthcare organizations:

- **High Availability (HA):** The HA module ensures 100 percent printing uptime by eliminating all single-points-of-failure in the organizational printing infrastructure. Maximized printing uptime helps enable and maintain a fast, efficient, uninterrupted workflow process for healthcare workers.
- **Secure Pull Printing:** Printed documents are released only when users authenticate their credentials, eliminating many potential security breaches.
- **Mobile Support:** The use of mobile devices is becoming an integral component of the healthcare worker's toolset. UniPrint supports printing from all mobile devices (Android and iOS), and also enables the authorized release of secure print jobs via the user's mobile device.



- **Smart Routing:** Imagine a printer following a healthcare worker around everywhere, every day, enabling arm's-reach convenience and security for every print job. In essence, that is what Smart Routing provides: printers virtually follow users.
- **Smart Label Printing:** Inherent in virtualized printing is the use of universal printer drivers. However, UPDs do not support specialized printers like barcode printing or label printing particularly well. UniPrint's Smart Label Printing is designed to support label makers such as Zebra and Brother printers allowing ASCII text characters to be sent directly to the correct printers, eliminating any potential misprints.

The benefits of convenience are obvious. But Smart Routing also reduces clinicians' workloads by self-directing print jobs to the proper printers. Prescription print jobs are automatically routed to the closest prescription printer; patient wristbands are automatically directed to the closest label printer, etc. Smart Routing helps eliminate printing mistakes, strengthens security and makes clinicians more productive and less stressed.



With the HA setup, both the Bridge Server and Print Server are duplicated. The two Print Servers are connected to separate Bridges so that if the primary Bridge or Print Server fails, users are redirected to the secondary Bridge or Print Server and can continue to print.



UniPrint virtualized printing fulfills all of the key objectives of the Citrix Ready Healthcare program, including each of the following:

- **Make IT More Agile and Flexible:**

UniPrint's PDF-based Universal Printer Driver (UPD) simplifies the task of managing multiple printer drivers in any healthcare environment, increasing flexibility. All organizations are familiar with and use PDF technology, and among healthcare organizations, UPD is one of UniPrint's most popular features.

UniPrint's virtualized printing eliminates the difficulty of changing printer vendors, a common headache that diminishes IT agility and cost effectiveness in healthcare organizations. Since printing is virtualized, there is no need for new hardware with each vendor change, and no need to recertify all printers to the new vendor. And when vendors or printers *are* changed, there is no impact to the end user, since the UniPrint user interface remains unchanged.

Both security and cost effectiveness are enhanced through UniPrint's Smart Route Printing Module and/or VPQ (Virtual Print Queue), which ensures that jobs are routed to printers that most closely match the user's location.

Smart Route also ensures that print jobs are sent to appropriate printers (e.g. a prescription print job to a printer loaded with prescription paper).

The VPQ saves time and allows users to reprint print jobs without having to go back to workstation. For example, if a doctor needs to print out five patient records, she can easily walk over to any vPad terminal release station to print them out. But sometimes, printers themselves will malfunction. Instead of going back to the doctor's office to log into the EMR app and reprint the jobs, they simply just need to go to another vPad print appliance and tap to reprint the two missing printing jobs. A 30-minute task can be cut down to five minutes or less.

Perhaps the single most important feature UniPrint offers is the company's customer-centric stance. UniPrint doesn't tell customers what they need. Instead, the company listens to customers' descriptions of what they need to make their jobs easier, more productive and more efficient. UniPrint then designs product features that specifically fulfill those wants and needs. UniPrint's most popular features, including High Availability and Smart Routing, were inspired by customer requests.

- **Improve Clinician Access, Workflow and Experience:** Healthcare workers have challenging jobs. The last thing they need is to spend time worrying about the location of printers or finding the right printer for a job. Put simply, UniPrint Infinity eliminates printing concerns for healthcare workers. They can execute any

print job securely, on demand, from any device — with no more thought or effort than clicking a button.

And UniPrint's Delegate Printing together with VPQ feature permits users to selectively and securely assign their printing rights to another user using PIN-coded user authentication.

For example, administrators can create a delegate print queue with UniPrint and assign a group of 150 nurses to this queue. When a nurse goes to submit some blood work for a patient to the lab, which can take three to eight hours for the results to come back, it will automatically print to the delegated print queue. Because the nurse who submits the blood work will not always be the same nurse who retrieves it, all nurses in the group will receive an email with a PIN on it for retrieval. Delegate printing eliminates a gap in user workflow.

- **Enhance Data Security and Compliance:** UniPrint's secure pull printing assures that documents are released only after users authenticate their credentials on a vPad print appliance — a particularly important feature for back-office functions. Smart Route and/or VPQ dramatically reduces occurrences of the lost or un-retrieved print jobs that pose a significant security risk at most organizations. And PDF end-to-end 256-bit encryption further enhances security. UniPrint even ensures that on-hold print jobs are encrypted in the buffer.

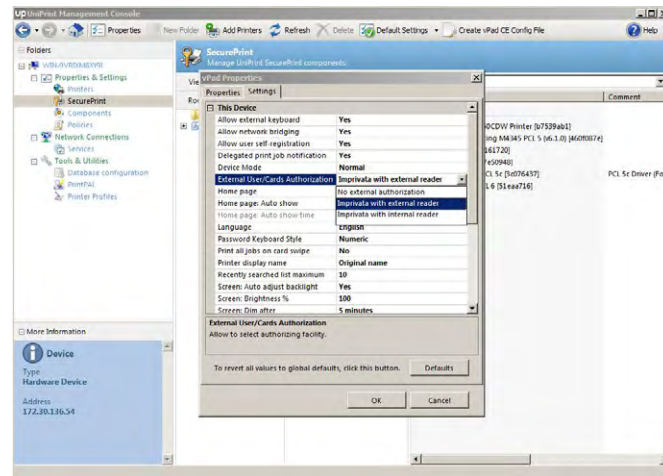


1. Connecting to the UniPrint Application Server, a user prints from any application to the VPQ.
2. UniPrint UPD converts and encrypts the print data into a PDF print job and stores it in a holding server.
3. The user authenticates on the vPad and selects the document for printing.
4. The document is released for printing to the selected printer.

UniPrint's virtualized printing solution is designed to interface seamlessly with Citrix solutions, leveraging the mobility and flexibility benefits of applications and desktop virtualization offered by Citrix XenDesktop and XenApp in healthcare environments. UniPrint provides the flexibility to serve organizations that utilize either a private cloud or a public cloud.

UniPrint is installed on XenServer for healthcare organizations using a private cloud. A bridge server manages the routing of jobs, while a print server manages print drivers ("talking" to the printers). When a Citrix user initiates a print job, UniPrint renders the job as a PDF, encrypts it and routes it to the most appropriate printer.

For organizations using a public cloud, Citrix serves as a conduit through which everything is routed through the data center. UniPrint Print servers and the vPad can run externally without being part of the AD Domain structure to route print jobs to and from the data center, render them as PDFs, encrypt and then route them to the most appropriate printer.



UniPrint's virtualized printing solution offers several innovative and unique features, including:

- Superior Security:** PDF compression and encryption reduce printing-related security vulnerabilities and HIPAA compliance risks that exist in most healthcare organizations.
- Delegate Printing:** Delegate printing further enhances security by requiring a second level of authorization. But it also enhances clinician workflow and productivity by enabling the sharing of printing tasks to authorized delegates — a doctor may delegate printing tasks to a nurse, for example.
- SSO Integration:** UniPrint offers single sign-on capability through Imprivata, enabling smoother workflows.
- EMR/EHR Integration:** UniPrint easily integrates with the most popular electronic health records applications, including Epic, Meditech, McKesson and Allscripts. This capability ensures the simplified printing of medical records.
- Rule-Based Printing:** UniPrint's Smart Route assures that each print job is automatically routed to the most appropriate, most convenient printer — a prescription printout, for example, is routed to a designated prescription printer. No user input is required; Smart Route evaluates the content of the document in selecting the best printer for the job.

## UniPrint Solution Detail

UniPrint has been selected to participate in the Citrix Ready Healthcare program because UniPrint's virtualized printing solution provides value that is particularly relevant to healthcare organizations.

Security is a key and increasing concern for every healthcare organization. UniPrint's Universal Printer Driver modernizes the security of the printing process by ensuring end-to-end 256-bit encryption for every print job. Some printers encrypt automatically, depending on the manufacturer. And if a printer does not encrypt, UniPrint enables encryption within the hardware box, and encrypts traffic sent to the printer.

UniPrint also helps to make IT more agile for healthcare organizations. Accessibility and availability are simplified by providing administrators with the controls they need to most effectively manage end users. UniPrint continuously strives to improve efficiency, flexibility and utility.

Case-in-point: A recently released UniPrint feature helps organizations that deploy Epic, the world's largest [EMR application](#), over VDI. This new feature dramatically improves performance and reduces the number of print servers required for organizations using Epic in a Citrix VDI environment.

UniPrint enables extensive integration across all Citrix products typically deployed by healthcare organizations, including XenApp, XenDesktop, Receiver and StoreFront. UniPrint's easy integration with Citrix further supports a key objective of the Citrix Ready Healthcare program: improving clinician access, workflow and experience.

Organizations can deploy UniPrint without disruption to users. UniPrint will handle printing on the back end, operating with complete transparency to end users. Clinicians will continue to use the same process they are accustomed to using in printing through Citrix XenServer, or through other systems. The user experience remains unchanged, but IT efficiency is improved. All print jobs are automatically routed to the best printer by UniPrint — a change that users *will* notice.

Healthcare professionals at St. Joseph Hospital certainly appreciate UniPrint's elimination of the organization's many printing-related headaches. UniPrint's secure, on-demand printing has helped save time, which clinicians have refocused on helping improve patient care.

Like many healthcare organizations, St. Joseph had moved from a traditional end-user compute model into a VDI environment. But the hospital's legacy printing system continued to cause all the usual problems:

lost print jobs, lack of support for mobility and centralized management, driver incompatibility problems — all the printing-related headaches that most healthcare organizations endure daily. The implementation of UniPrint has resulted in reduced staff stress levels, enhanced security, and has given caregivers more time to focus on patient care. IT has also benefitted: since implementing UniPrint, IT and help desk support calls have **plummeted 75 percent**. ([View the St. Joseph customer success story.](#))

Sunrise Health Region, too, has transitioned to a virtual environment in recent years. But they also wanted to extend the benefits of virtualization to the printing process. Sunrise Health searched for a virtual printing solution that would safeguard patient confidentiality, guarantee security and improve productivity. They selected UniPrint.

With more than 300 printers deployed, it was important to the organization that the selected solution would support the continued use of legacy printers. UniPrint provided that capability, along with all of the security and productivity benefits of virtualized printing. ([View the Sunrise Health Region customer success story.](#))






## A Proven Partnership that Maximizes the Virtualization Benefits of Security, Convenience and Productivity

Healthcare organizations are adopting VDI technology faster than any other industry. Soaring VDI adoption rates are driven by the benefits of security, worker convenience and productivity that virtual desktop deployments offer to healthcare organizations.

But an interesting dichotomy exists in the drive toward virtualization in healthcare: many organizations have not yet availed themselves of the benefits of *printing* virtualization. Legacy printing systems are the source of many deficiencies in healthcare.

Legacy printing solutions leave gaping holes in the security defenses and HIPAA compliance efforts at many healthcare organizations. The majority of healthcare organizations, in fact, have suffered data breaches at some point of the printing process.

Legacy printing solutions negatively impact the productivity of both clinicians and healthcare IT support staff — and boost stress levels in an already intense environment. And legacy printing solutions diminish the many benefits of mobility that modern technology has made possible.

UniPrint pioneered the use of PDF-based universal printer driver technology and is now recognized as the world leader in printing virtualization. UniPrint's virtualized printing solution eliminates print-related problems that plague most healthcare organizations. UniPrint Infinity's Healthcare Printing Suite — comprised of Smart Route Printing, Smart Label Printing and High Availability Printing — can be built into any computing environment, and accessed from any device.

UniPrint's solution offers healthcare organizations the most secure, convenient and productivity-enhancing printing solution on the market. Adoption of UniPrint's solution is completely transparent to end users, and does not require the replacement of legacy printing hardware. And more importantly, UniPrint's virtualized printing solution has been proven to integrate seamlessly and easily with the Citrix VDI environments so commonly deployed by healthcare organizations worldwide.

For more information about UniPrint, please visit: <https://www.uniprint.net>

For more information about Citrix application and desktop virtualization, please visit: <https://www.citrix.com/virtualization/>



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## Appendix

Learn more about the Citrix Ready Vertical Solutions Program for Healthcare at: [http://citrixreadyprogram.com/2017/citrix\\_ready\\_vertical\\_solution\\_programs/](http://citrixreadyprogram.com/2017/citrix_ready_vertical_solution_programs/)

To learn more about the Citrix Ready Program partnership with UniPrint, please visit: <https://citrixready.citrix.com/uniprint-net/uniprint-infinity.html>

To learn more about virtualization solutions for healthcare enterprises, contact [Citrix](#) and [UniPrint.net](#).

## Citrix Ready Healthcare Program Overview

The Citrix Ready Healthcare Solutions Program has been launched with the sole objective of building and sharing a library of white papers and case studies that portray the best integrated joint solutions for healthcare. Each of these documents illustrates the teaming of a Citrix partner and Citrix solution in helping healthcare institutions further enhance seamless, instant and secure access to patient information and optimized patient care.

This program will serve to identify and showcase partner technologies that add tremendous value in Citrix ecosystem. All spotlighted partner technologies work to seamlessly enhance healthcare solutions

that help clinicians become more productive and provide a better patient experience, without compromising regulatory compliance. All solutions selected to the Citrix Ready Healthcare program support smooth and reliable integration with the latest Citrix XenDesktop and XenApp versions. These solutions address one or more of the below key objectives that have been identified as essential needs for healthcare institutions today:

1. Making IT more agile and flexible
2. Improving clinician access, workflow and experience
3. Enhancing data security and compliance



### About Citrix Ready

Citrix Ready identifies recommended solutions that are trusted to enhance the Citrix Delivery Center infrastructure. All products featured in Citrix Ready have completed verification testing, thereby providing confidence in joint solution compatibility. Leveraging its industry-leading alliances and partner ecosystem, Citrix Ready showcases select trusted solutions designed to meet a variety of business needs. Through the online catalog and Citrix Ready branding program, you can easily find and build a trusted infrastructure. Citrix Ready not only demonstrates current mutual product compatibility, but through continued industry relationships also ensures future interoperability. Learn more at [citrixready.citrix.com](http://citrixready.citrix.com).

### About UniPrint

UniPrint.net pioneered the use of PDF-based universal printer driver technology to streamline and enhance printing in server-based computing environments. Today, we are the recognized leader in printing virtualization. The UniPrint Infinity™ Healthcare Printing Suite (HPS) offers one PDF-based vendor-agnostic Universal Printer Driver (UPD), and one Virtual Print Queue (VPQ), built on one central management platform, to eliminate printing issues in any healthcare VDI or Cloud environment. UniPrint Infinity HPS enables speedy, error-free and on-demand secure printing from EHR/EMR apps, with 100% uptime. Our solution enables health organizations to optimize clinical workflow and improve quality of patient care, while complying with industry regulations. For further information, please visit [www.uniprint.net](http://www.uniprint.net).

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