VMware Solutions for an Epic Environment

Transforming Healthcare IT with an Electronic Medical Records Solution and VMware vCloud for Healthcare

TECHNICAL WHITE PAPER
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Executive Summary

Healthcare organizations have spent the last few years installing or upgrading their electronic medical records (EMR) systems. This effort has been undertaken worldwide to increase efficiency and improve patient care. In the United States, EMR system deployments have been expedited by the need to meet reform mandates and avoid penalties outlined in the American Recovery and Reinvestment Act (ARRA) and Health Information Technology for Economic and Clinical Health (HITECH) Act.

With a majority of U.S. hospitals currently meeting requirements for stage 1 meaningful use, healthcare IT has turned its attention to stage 2 meaningful use criteria. Yet as IT teams begin the process of codifying even more data to advance clinical processes, they are finding that the federal investment awards designed to offset the cost of successful adoption and sharing of electronic health information have been insufficient. Facing steadily increasing costs, healthcare IT is looking for ways to optimize current EMR investments. This whitepaper explores options for IT infrastructure optimizations for healthcare organization using Epic—from the data center to the point of care.

New Opportunities for Existing Systems

Concerns over rising costs, the quality and delivery of patient care, and healthcare reform have healthcare IT teams assessing how they can better address ongoing changes in the way they deliver services to clinicians and patients. Concurrently, healthcare IT is examining new service and end-user compute models, such as flexible cloud-based services, while looking for ways to manage unprecedented collaboration and consolidation—from hospital mergers and health network acquisitions to alliances with specialty clinics and labs—and improve regular software migrations and upgrades to critical applications.

“For the last few years, we’ve been focused on EMRs and meaningful use,” reflects Scott Lundstrom, group vice president at IDC Health Insights, in an HIMSS13 interview. Now, he says, healthcare organizations are asking how they can create “whole new businesses, whole new models of care, and whole new opportunities to improve the health and performance of health infrastructure.”

An investment in VMware solutions for an Epic environment provides healthcare IT with a highly reliable, available, and secure foundation to meet current service needs and accelerate modernization efforts. Organizations gain a complete set of applications, infrastructure, and support optimized for healthcare IT.

Proven Technologies and a Solid Relationship

Over the years, VMware has worked closely with customers, Epic, and other infrastructure companies to help improve the cost, efficiency, operation, and support of its applications. For example, VMware successfully virtualized Epic applications running on Windows servers using KLAS-rated VMware vSphere®, the world’s leading virtualization platform. Rapid customer adoption led to using vSphere to virtualize the InterSystems Caché database engine running on Linux.

Most recently, VMware® Horizon View™ achieved “Target Platform” status for EMR delivery through a virtual clinical desktop. VMware was the first virtual desktop infrastructure (VDI) solution provider to receive this status by passing a wide range of usability, performance, and scalability tests. As a result, today’s healthcare organizations have access to a fully virtualized VMware environment that meets their care contract and uptime requirements as they move from paper to electronic health records; this environment also improves the management of distributed endpoints such as desktops, laptops, tablets, and smartphones used by caregivers and administrative staff members.
“The successful implementation of Epic software began our organization’s move to a new level of connected care. Now by delivering Epic as a VMware vCloud for Healthcare service, we are even better positioned to improve patient care because the solution enables us to be agile and adaptable to more easily scale up and extend services to our affiliated hospitals and physician offices with virtually unlimited room for growth. This allows the delivery of healthcare—with the right information, to the right person, in the right format, at the right time—in a secure, safe, and cost-effective manner, which is in line with the Institute for Healthcare Improvement’s (IHI) triple aim (better health and better care at lower cost) and the Institute of Medicine’s (IOM) six specific aims for improvement.”

— Dr. Shafiq Rab, Vice President and Chief Information Officer, Hackensack University Medical Center

Why Virtualization and Cloud Computing?

VMware pioneered virtualization, the common practice of subdividing centralized resources using virtual-machine software to help lower capital expenses and maximize the use of computing resources. Since the company’s inception, virtualization has been extended to servers, network devices, storage, and desktops—and it is widely regarded as the foundation for cloud computing.

Virtualization creates pools of virtual hardware resources and provides secure, compliant logical partitions. With logically partitioned critical-care systems on fewer, more powerful, and more intelligent servers and devices, IT administrators can remove complexity and enhance security because they are introducing a centralized management layer between the hardware and care systems. Using virtualization as a means to deliver patient-care systems enables a consolidated view of risk, a key capability for effective compliance and a proven way to lower costs.

In hospitals around the world, virtualization benefits are also being extended to the point of care. VDI solutions provide secure and mobile access to patient-care systems, enabling clinicians and caregivers to securely access patient data from nearly any device inside or outside their hospitals. Remote clinics and employees, including ICD-9 and ICD-10 coders, also benefit by gaining reliable, consistent access to all applications available to them in a virtualized workspace. With EMRs capturing every patient service, IT teams must additionally ensure that personal health information (PHI) remains protected—or face brand-damaging, public penalties and fines.

The VMware platform, vSphere, is the most extensively installed virtualization platform worldwide. With support from global independent software vendors (ISVs), including Epic and medical imaging vendors, healthcare IT has accelerated its adoption of virtualization—and cloud computing—to help power even the most critical patient-care systems.

From large hospitals to rural community health networks, virtual and cloud infrastructure is addressing unique reliability, availability, security, compliance, and mobility requirements. Now healthcare organizations more can effectively

• Meet ever-changing government requirements.
• Support the integration and portability of complex, disparate clinical applications that share PHI.
• Enable increasing numbers of mobile caregivers who prefer the use of laptops, tablets, and other mobile devices to access patient-care information, applications, and images.

“Healthcare providers continue to look for the positive return on their compliance investments in EMR. Creating value from information requires the delivery of actionable advice and information to the caregiver at the point of care. Advanced solutions to support improved communications, mobility, and analytics at the point of medical decision making require new, agile, and flexible deployment options. We expect cloud-based solutions that focus on delivering data to any device at any time will dominate this market in the long term.”

— Scott Lundstrom, Group Vice President, IDC Health Insights

Introducing VMware vCloud for Healthcare

As healthcare organizations adopt or upgrade their Epic software, many are choosing virtualization and VMware vCloud® for Healthcare to support their entire healthcare IT environment, from point-of-care applications to critical patient-care systems. And behind those efforts, VMware commits dedicated resources to joint testing with Epic and ongoing support of shared customers.

vCloud for Healthcare is the only full-featured and completely integrated cloud computing solution for end-to-end care. (see Figure 1). It includes everything healthcare IT needs for building and managing agile, reliable cloud infrastructure. vCloud for Healthcare deployed together with Epic solutions can offer significant value, including cost savings, improved performance, and greater compliance, to hospitals of all sizes.
Considering New Deployment Models

Although large health systems have primarily deployed Epic EMR systems, today midsized healthcare organizations are increasing their adoption. IT can deploy vSphere architecture with Caché on Linux at its core, and continue to extend the Epic infrastructure from the health services data center to individual physician practices.

In addition to Caché on Linux, VMware supports the deployment of Epic’s Web and Service servers on vSphere, examples of these include Epic’s Care Everywhere, Interconnect, Print Services, Web Blob, and MyChart. vSphere has been a “Target Platform” for these servers since early 2012.

Through a virtual desktop architecture, healthcare IT can simplify the delivery of Epic applications without having to extend physical desktops to various locations. IT teams can also use vCloud for Healthcare to extend the vSphere platform and services through a cloud model without additional cost and complexity—enabling a truly service-centric model.

Previously, many healthcare IT organizations chose to run the database engine, Caché, on UNIX and a mixed physical and virtual environment to run their other services. Today, IT teams can streamline Epic deployment using VMware solutions. Figures 2 and 3 depict current logical architectures with the Epic “sizing guide” ultimately driving choices through the consideration of many factors.

In Figure 2, which shows the traditional model, Epic technology leverages UNIX servers for Caché and vSphere for the Windows platform.

![Figure 2. Traditional Deployment Model: Epic Logical View](image)
Figure 3 shows the complete Epic infrastructure running on vCloud for Healthcare. In this model, all components are designed as “Target Platforms” for Epic. This model is currently designed for midsized health systems.

For the very largest health systems, there is an additional optimized infrastructure option when adopting or upgrading Epic applications. It features Caché on UNIX, Windows, and x86 servers running vCloud for Healthcare, and the potential addition of Enterprise Caché Protocol (ECP) nodes running vCloud for Healthcare. This model may add minor complexity, but it can also extend the life and performance of the Caché database without additional UNIX engines. Also, once critical systems are virtualized, advanced VMware automation, security, and management technologies that were unavailable in the traditional models can be used to further reduce costs and complexity while improving IT agility.

Resources have been invested in these options. Epic prefers virtualization for Windows servers. For the database engine, customers work with Epic to choose the deployment platform that best meets their needs. Virtualization with VMware speeds deployment and improves the uptime and cost of Epic server platforms.

**Inside VMware vCloud for Healthcare**

Beyond cost savings, health organizations adopting and upgrading Epic applications should consider vCloud for Healthcare because it includes technologies that can help improve patient outcomes by addressing critical healthcare IT concerns. Highly scalable, vCloud for Healthcare provides proven performance to immediately support existing patient-care infrastructure; it also delivers critical automation and cloud-based services that will become increasingly valuable to hospitals as Epic deployments and use cases mature.
Clinical Point of Care
With vCloud for Healthcare, health organizations can save time and improve workflows by securely authenticating (e.g., through the touch of a finger or tap of a badge) to clinical workspaces and patient-care applications at the point of care—a capability that facilitates meaningful use compliance. Using virtual desktop infrastructure technologies such as VMware® Horizon™ Suite or VMware® AlwaysOn Point of Care™, a validated reference design that integrates products from VMware and the VMware partner network, Epic customers can significantly improve clinical desktop availability, security, and mobility and help better support industry compliance requirements. Whether caregivers are in a hospital, clinic, or lab environment, they can use mobile, wireless, and wired networks and single sign-on to gain nonstop access to critical patient-care applications and data across endpoints.

For example, vCloud for Healthcare supports clinician requests for healthcare dictation and transcription. Physicians can dictate prescriptions, case notes, and diagnoses directly into clinical applications rather than using a keyboard to enter data. Speech recognition and speech-to-text conversion work well for customer deployment. Critical functionality of a leading speech recognition and dictation software application performs as expected in a VMware environment.2

Care Systems Analytics
vCloud for Healthcare helps healthcare IT reduce the downtime of critical patient-care applications and remediate issues before they affect end users. Just as powerful analytics today inform better healthcare outcomes, they can also help increase the health of underlying systems and computing infrastructure. To gain additional system insight, VMware is working towards capturing key indicators from Epic System Pulse. With timely analytics, healthcare organizations can better assess the health and risk of dynamic healthcare IT infrastructure, maintaining and restoring service levels—all while continuously optimizing operations for efficiency and cost.

Industry Security Compliance
Because of increasing mandates and changing requirements, regulated healthcare organizations must continuously monitor IT systems for security and compliance. vCloud for Healthcare enables proactive regulatory compliance for the cloud and delivers dynamic clinical IT services in a trusted infrastructure.

At the same time, clinicians can seamlessly access all applications from any device inside or outside the hospital. Whether healthcare IT requisitions devices on behalf of caregivers or supports bring your own device (BYOD) policies, vCloud for Healthcare enables healthcare IT teams to create and manage policies governing end users and VDI sessions. These capabilities help prevent data loss, and they control when and where users can print information—both critical to complying with the Health Insurance Portability and Accountability Act (HIPAA).

The only complete and integrated solution, vCloud for Healthcare delivers all of the components healthcare organizations need to establish and operate a virtual, cloud environment while providing the necessary control and transparency to maintain compliance. Healthcare organizations can deploy vCloud for Healthcare to help reduce HIPAA and HiTECH risk while helping to improve the cost, quality, and delivery of patient care. With VMware security and compliance capabilities, healthcare organizations can protect Epic applications and the IT environment from end to end.

Care Systems Continuity
Because downtime can be catastrophic, vCloud for Healthcare helps healthcare IT keep systems up and running. For organizations considering Epic software or running it today, meaningful use requirements are creating urgency to improve disaster-recovery plans. Disaster recovery has traditionally been provided through a warm site or other means, such as high availability, but today it is imperative for healthcare IT to have an active, multilocation disaster-recovery plan. vCloud for Healthcare includes disaster-recovery capabilities for primary, secondary, and trusted cloud service provider sites.

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2 VMware. “Nuance Dragon Medical Compatibility with VMware View.” April 2012.
Care Systems Automation

Healthcare organizations can improve efficiency by simplifying and automating IT operations using vCloud for Healthcare. Through customized, self-service provisioning and life-cycle management of cloud services, healthcare organizations can ensure that systems and end users comply with established business policies. vCloud for Healthcare provides a secure portal through which authorized administrators, developers, or business users can request new IT services, as well as manage existing computer resources from predefined user-specific menus. These resources may include training, testing, and development systems and AlwaysOn Point of Care environments.

vCloud for Healthcare also includes application management and catalog services to streamline processes with efficient self-service access and management of approved end-user applications; mobility collaboration to improve connected care with access to patient-care applications, including EMRs and computerized physician order entry (CPOE) systems, from any device, anywhere; and VMware® vCloud Connector™ for healthcare to help ensure that regulated workloads can be safely moved to public clouds by means of a hybrid model.

“In our hospitals, virtualizing both Epic and MEDITECH solutions on the VMware platform has enabled us to more effectively move forward with EMR upgrades and a common set of tools as we work to meet meaningful use requirements. We’ve seen improvements in our patient-care application availability and data exchange, with very high levels of performance, as a result of virtualization. We believe a move to VMware vCloud for Healthcare will allow us to better partition our services to other organizations and improve physician access to information and applications, such as mobile dictation services, through virtual desktops from home.”

— Phil Wasson, President and CEO, TriRivers Health Partners, LLC

Tracking Costs

Easily deployed in conjunction with vCloud for Healthcare, VMware® IT Business Management Suite™ provides transparency into the cost, quality, and value of IT services and cloud environments to enable fact-based sourcing decisions. VMware IT Business Management Suite offers the following benefits to organizations with an Epic environment:

• **Transparency** – Understand where the organization is today—the cloud resources and IT services it offers, as well as the costs, quality, users, and consumption—and know how it performs against peers to identify opportunities for improvement. With this transparency, enhance collaboration with users by providing access to relevant IT cost data.

• **Cost avoidance** – Eliminate the manual work of data collection, cost calculation, and invoicing. Simplify and avoid unnecessary disputes over invoices and reducing costs.

• **Controlled and optimized IT budgeting** – Increase economies of scale, reducing IT unit costs and TCO, by establishing demand management. Furthermore, improve analysis to drive fact-based vendor management and sourcing decisions about cloud resources and IT services.

• **CIO transformation agenda** – Enable the CIO to share the value of new IT investments to accelerate business growth. Provide the baseline data necessary to understand ROI and TCO for complex initiatives such as application rationalization, data center consolidation, storage optimization, end-user computing rationalization, and hybrid cloud management.
Moving to a Hybrid Cloud

As healthcare organizations embrace cloud computing, healthcare IT must transition from implementers to service brokers. Through VMware service provider partners or VMware vCloud® Hybrid Service™, healthcare IT can integrate infrastructure and existing Epic applications with next-generation applications and the agility of the public cloud.

vCloud Hybrid Service enables hospitals to quickly and seamlessly extend data centers into the cloud using tools and processes they already own. There is no need to rewrite code or change existing applications because the service leverages a common management, orchestration, networking, and security model.

Operated by VMware and built on the trusted vSphere foundation, vCloud Hybrid Service delivers the reliability and security healthcare organizations need, plus full compatibility with the existing environment. It provides a new level of agility because IT can now deploy an application anytime, anywhere, and easily manage it across clouds. The best and fastest route to a hybrid cloud, vCloud Hybrid Service is backed by VMware support and the global ecosystem of VMware partners. The VMware approach to the hybrid cloud keeps IT in control as a broker of services to be sourced from a variety of providers. It empowers clinicians by giving them the freedom and agility they need while IT staff maintains the control necessary to mitigate risk.

Transform the Cost, Quality, and Delivery of Patient Care

The combination of Epic applications and VMware vCloud for Healthcare can enable healthcare organizations to improve outcomes by creating more agile healthcare IT environments that better serve caregiver and patient needs. Moreover, because of efforts to virtualize and cloud-enable Epic applications, healthcare organizations can reduce infrastructure and operating costs while driving a self-service care model.

If you would like to learn more about deploying Epic technology and vCloud for Healthcare in your organization, contact your VMware account representative by calling 1-877-4VMWARE (outside North America, +1-650-427-5000) or visit http://www.vmware.com/go/healthcare.