Achieving Real-Time Healthcare IT

How a Software-Defined Strategy Can Improve Healthcare Outcomes

WHITE PAPER
“By delivering secure, electronic health record applications via a private cloud to physicians, we’ve helped deliver on the vision of a healthcare system that puts the needs and values of the patient first, and gives patients and medical professionals the information they need to make clinical and economic decisions.”

— Bill Gillis, eHealth Technical Director, Beth Israel Deaconess Medical Center, and Chief Information Officer, Beth Israel Deaconess Care Organization

Summary
Healthcare organizations have rapidly adopted electronic health records (EHRs) and caregivers must now rely on them to treat their patients. Because these critical-care systems are fully digitized, healthcare information technology (HIT) organizations can turn their attention to addressing how to ensure their teams provide more robust, agile, and optimized HIT services to their patients and new business partners.

Overview
Tomorrow’s care-delivery models require that systems and data—both old and new—are highly reliable and can be accessed anytime, anywhere. HIT organizations that embrace a software-defined strategy as the foundation for their IT infrastructure and applications will be able to more quickly respond to new demands and their systems will become more intelligent, automated, mobile, and secure. A software-defined strategy is one in which all infrastructure is virtualized and delivered as a service.

VMware vCloud® for Healthcare is a portfolio of solutions powering the real-time healthcare system (RTHS). Gartner describes RTHS as aware, mobile, collaborative and demanding.1 vCloud for Healthcare solutions support the new challenges of population health and patient engagement, organizational change, and always-on healthcare while helping to better secure enterprise assets and protected health information (PHI). Built on a software-defined foundation, vCloud for Healthcare solutions enable HIT teams to simplify IT complexity and meet healthcare industry transformation demands.

Key Findings
• Policy, regulations, and declining reimbursements will continue to tax already stretched HIT organizations’ budgets and resources.
• The post-EHR era will require HIT teams to re-examine infrastructure readiness, consider a software-defined approach, and adopt solutions that power the RTHS.
• Mobility has become a critical-care capability, making it necessary for HIT organizations to ensure hospitals’ new and legacy applications and architectures coexist and can be seamlessly delivered on mobile devices.
• Confidence in, and acceptance of, private, public, and hybrid cloud computing models will continue to grow and mature.
• HIT teams will encounter few, if any, technical and vendor support barriers when virtualizing critical, Tier 1 patient-care applications, databases, and desktop-mobile environments.
• Expanding virtualization from compute to storage and networking will provide a more intelligent and secure platform for applications and data.

Achieving Real-Time Healthcare IT

Policy, Regulations, and Declining Reimbursements Will Continue to Tax Already Stretched HIT Organizations’ Budgets and Resources

Nothing about HIT has been simple over the past 25 years. InformationWeek observes, “Healthcare’s adoption of information technology has gone from a virtual standstill to a fast-paced marathon, started by government mandates and fueled by a potent mix of financial incentives, consumer demand, shifting payment models, and strapped margins.”

Ever-changing political and regulatory environments are introducing levels of business and IT agility never historically seen, nor required, in healthcare. Securing increasingly sought after patient records from hackers, as well as maintaining compliance with legislation and industry standards such as the Health Insurance Portability and Accountability Act (HIPAA) and PCI, is exhausting IT resources and leaving little budget for innovation. Although healthcare organizations have enjoyed increased outside investment during Meaningful Use, Stages 1 and 2, nearing stimulus deadlines will usher in a new period of cost reduction requiring HIT teams to consider budget reduction even as requirements continue to rise.

Moreover, a new generation of tech-savvy caregivers, consumers, and patients are demanding ubiquitous access to data and systems anytime, anywhere—and HIT organizations must deliver. They must provide always-on services and help ensure data is always available for care treatment while at the same time reducing complexity and enhancing security.

The Post-EHR Era Will Require HIT Teams to Re-Examine Infrastructure Readiness, Consider a Software-Defined Approach, and Adopt Solutions that Power the RTHS

According to HIT Consultant, 96 percent of healthcare organizations say their infrastructure is not fully prepared for the evolution of their EMR today. Yet forward-thinking HIT teams are not waiting to embrace change. They are rethinking their infrastructures and implementing a software-defined approach to introduce critical new capabilities that effectively move their organizations to the future state (see Figure 1).

---


---
Achieving Real-Time Healthcare IT

In a software-defined environment, all elements of the infrastructure—compute, network, storage, and security—are virtualized to enable applications to leverage a fully virtualized platform that is completely abstracted from the hardware layer. Because environments become more application and service focused, HIT organizations improve efficiency, agility, flexibility, and control.

Introducing vCloud for Healthcare – A Portfolio of Solutions Powering the RTHS

The proven portfolio of vCloud for Healthcare solutions include the fundamental services (or building blocks) required to deliver tomorrow’s robust, always-on IT-care platform today. The solutions are intelligent, automated, secure, and mobile, enabling healthcare organizations to achieve a range of critical IT outcomes and move safely toward a RTHS. vCloud for Healthcare is built on VMware vSphere®, the industry’s most widely deployed virtualization platform and trusted KLAS category leader in virtualization. It provides an evolutionary approach to transformation for healthcare organizations interested in leveraging existing investments and skill sets. Because the software-defined approach extends vSphere virtualization beyond compute to storage and networking, all data center services become as easy and inexpensive to configure and manage as virtual machines.

vCloud for Healthcare features comprehensive mobility, private cloud, and public cloud services that enable HIT teams to help improve delivery outcomes and address the compounding cost, quality, and delivery challenges of patient care (see Figure 2).

---

“Why cloud computing? It is the game-changer between the haves and have-nots. We are now trying to analyze and understand how to make healthcare efficient, and VMware actually cares about healthcare.”

— Shafiq Rab, M.D., M.P.H., Vice President and Chief Information Officer, Hackensack University Medical Center

---

Figure 2. vCloud for Healthcare is a Portfolio of Intelligent, Automated, Secure, and Mobile Solutions Powering the RTHS

vCloud for Healthcare Services

The vCloud for Healthcare portfolio of solutions includes the following key capabilities:

• **Mobility services** – Virtual desktop infrastructure, cloud workspaces, and mobility management

• **Private cloud services** – Security and compliance, systems analytics, IT financial management, automation, and business continuity

• **Public cloud services** – Hybrid cloud deployment
Mobility has Become a Critical-Care Capability, Making It Necessary for HIT Organizations to Ensure Hospitals’ New and Legacy Applications and Architectures Coexist and Can Be Seamlessly Delivered on Mobile Devices

Care providers require 24x7x365 access to patient information from the right device, at the right time, and from any location—whether they are rounding with an iPad, dictating notes in an office, or using a personal Mac to review an x-ray at home.

vCloud for Healthcare mobility services provide flexibility for care providers to move seamlessly and securely between the devices and applications they need to deliver the most efficient provider and patient experiences. Built on a validated platform, the following VMware mobility services enable the secure delivery of patient care across inpatient, outpatient, and community settings:

• **VMware AlwaysOn Point of Care™ desktops** – Multiple levels of redundancy, single sign-on, and policy-driven control with identity-based access keep IT in control while enabling caregivers to spend more time with patients because clinical workspaces follow them from device to device.

• **Secure, cloud-based workspaces** – Clinicians gain 24x7 access to the most current patient data and all of the resources needed for treatment, improving collaboration and enabling comprehensive care plans that support better patient care.

• **AirWatch® by VMware mobility management** – HIT teams secure and manage their environments within a single enterprise mobility management platform, simplifying all aspects of healthcare mobility, including mobile security, workspace, bring your own device (BYOD), application, content, email, and browsing management.

Confidence In, and Acceptance of, Private, Public, and Hybrid Cloud Computing Models Will Continue to Grow and Mature

Taking the next step on the journey to enabling a RTHS requires a cloud strategy as part of the IT service-delivery model, as well as a foundational platform that is intelligent, automated, mobile, and secure.

**Private Cloud Services** – Built on vSphere, vCloud for Healthcare includes the following private cloud services to drive efficiencies and improve outcomes:

• **Compliance** – Integrated, adaptive industry security and compliance in a cloud service improves safeguards, decreases costs, and increases agility because HIT teams can build a trusted cloud infrastructure; easily integrate third-party solutions such as antivirus systems; and isolate critical workloads, leveraging virtual firewalls.

• **Analytics** – Real-time, data-driven optimization is derived from VMware Care Systems Analytics, which ingests data and instantly makes more sense of it to provide a single view of critical information, simplify troubleshooting processes, and decrease mean time to resolution, bringing greater insight to patient-care systems.

• **Financials** – Cloud services improve clinician-IT alignment by delivering complete transparency into the costs and quality of IT services.

• **Automation** – By automating the delivery of personalized IT services based on the role of the requestor, HIT teams drive agility. They simply model a service once and then deploy it anywhere—to a private or public cloud.

• **Continuity** – Data center infrastructure and applications work securely and reliably not just some of the time, but all of the time with automated disaster recovery and business continuity that protects valuable IT investments from unpredictable events.

“Care Systems Analytics enables us to assess the health and risk of our dynamic healthcare IT infrastructure, maintaining and restoring service levels—even if service-impacting events occur—while continuously optimizing operations for efficiency and cost.”

— Pamela Arora, Senior Vice President and Chief Information Officer, Children’s Medical Center Dallas
“Using the VMware vCloud Air platform, we now have the cutover capabilities to a mirror disaster recovery environment to ensure uptime for those critical systems our physicians use to treat their patients. This improves our ability to recover quickly from outages and allows us to reduce expenses from other technologies we used as contingency for any system issues. By utilizing vCloud Air Disaster Recovery technologies, we have reduced our existing RPO by 74% and our RTO by 90%.“

— Bryan Craven, Chief Executive Officer, National Physician Services

Public Cloud Services – Also built on vSphere, VMware vCloud® Air™ is a true hybrid cloud solution currently deployed in the following ways to deliver faster, superior, and more efficient IT services while driving down costs:

- **Testing, training, and development environments** – Hybrid cloud extends applications into a HIPAA-compliant environment, which is integrated into an existing security model, with processes automated using preapproved policies.

- **Legacy-data archiving** – HIT organizations can confidently archive tier-two and tier-three applications by archiving databases—or even complete applications—in a hybrid cloud. Teams can also move data into a common hybrid cloud repository that links current PHI to data from legacy systems.

- **Backup and recovery** – Hybrid cloud provides a platform to ensure the high availability of critical patient-care systems in the event of a disaster.

HIT Teams will Encounter Few, If Any, Technical and Vendor Support Barriers When Virtualizing Critical, Tier 1 Patient-Care Applications, Databases, and Desktop-Mobile Environments

Healthcare’s virtualization journey began with compelling financial and technical business cases for server consolidation. HIT teams initially leveraged virtualization to deploy IT-controlled services such as file/print, DHCP, Active Directory, and more. However, organizations quickly realized how powerful virtualization could be for critical patient-care systems.

In conjunction with leading clinical application developers and healthcare independent software vendors (ISVs), VMware has validated and proven the most demanding, critical-care applications run flawlessly on a virtualized platform. For example, the VMware platform has become a target platform for Epic’s operational database which runs on Intersystems Caché. Because of thorough performance testing and collaboration with ISVs, HIT teams will experience few, if any, technical barriers to virtualizing critical, Tier 1 patient-care applications. Yet leading providers are doing more. They are moving beyond compute virtualization to the platform that can help them evolve to RTHS environments.
Expanding Virtualization from Compute to Storage and Networking Will Provide a More Intelligent and Secure Platform for Applications and Data

A software-defined approach that aligns storage with application demands and improves application speed, efficiency, and security while automating management to redeploy resources will enable HIT teams to more easily deliver the always-on platform caregivers, patients, and business partners are demanding (see Figure 3).

VMware Virtual SAN™ is a software-defined storage solution that brings the efficient model of virtualization to storage. It pools server-side hard-disk drives and solid-state drives to create a flash-optimized highly resilient, shared datastore for virtual environments. It automates with policy-based provisioning, leaving no idle or wasted resources, and scales, delivering enterprise-grade performance. Proven to lower TCO, Virtual SAN is radically simple, high-performance, and elastic.

VMware NSX™ is a software-defined security solution that significantly lowers CapEx and OpEx. While improving security and controls for PHI, it accelerates application deployment and transforms network operations in a nondisruptive manner. VMware NSX virtualizes the network for speed, efficiency, and security, supporting any application, any cloud management system, any hypervisor, and any network hardware.
vCloud for Healthcare Moves HIT Teams Toward RTHS

The comprehensive vCloud for Healthcare portfolio of solutions provides healthcare organizations with a rich set of IT services to quickly and safely move toward a RTHS and enable the following outcomes (see Table 1):

<table>
<thead>
<tr>
<th>DESIRED OUTCOME</th>
<th>VCLOUD FOR HEALTHCARE CAPABILITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliver Always-On clinician access</td>
<td>A reference architecture validated with leading EHR and infrastructure providers delivers 24x7x365 availability</td>
</tr>
<tr>
<td>Improve clinician mobility</td>
<td>Provides caregivers with the flexibility they need to move seamlessly and securely between devices and applications to help deliver fast, effective patient-care decisions</td>
</tr>
<tr>
<td>Deploy and manage mobile clinical applications and devices</td>
<td>Supports tablets and smart devices with single sign-on</td>
</tr>
<tr>
<td>Better protect data from breaches</td>
<td>Provides a way to define and centrally manage security and compliance, and includes an audit model for all virtual machines and virtual desktop resources</td>
</tr>
<tr>
<td>Optimize the EMR to provide clinicians with the best possible service</td>
<td>Improves visibility into the overall performance of the EHR system—from infrastructure to the point of care</td>
</tr>
<tr>
<td>Gain an understanding of the real-time costs of healthcare IT</td>
<td>Aligns IT and executives, providing transparency into the cost and quality of IT services</td>
</tr>
<tr>
<td>Deliver self service</td>
<td>Supports the creation of provisioning profiles for authorized access to resources and self-service standards to help ensure systems are appropriately managed—all without burdening IT</td>
</tr>
<tr>
<td>Keep operations running in the event of an outage or disaster</td>
<td>Provides flexible business continuity and disaster recovery (BC/DR) models to meet recovery needs</td>
</tr>
<tr>
<td>Reduce IT costs</td>
<td>Delivers a cost-effective, modern approach to providing access to offline health records and removing legacy systems from support</td>
</tr>
<tr>
<td>Enable IT to become a service broker</td>
<td>Extends a private data center cloud to a public cloud, resulting in an internally managed hybrid cloud</td>
</tr>
<tr>
<td>Improve cost controls and gain flexibility</td>
<td>Supports aggregating, pooling, and virtualizing compute, network, storage, and security resources to enable the software-defined data center</td>
</tr>
</tbody>
</table>

Table 1. Outcome-Based Solutions that Deliver the Critical Services that Caregivers Require

Summary

Although the dynamics of healthcare continue to change, HIT organizations must rise to the challenge of meeting ever-demanding, clinical-world expectations. They must ensure new and current systems, applications, data, and infrastructure coexist even though budgets are increasingly at risk. HIT teams that understand tomorrow’s patient care requires a RTHS will begin building their service portfolios today, following a strategic software-defined approach that leverages a comprehensive portfolio of intelligent, automated, secure, and mobile solutions.
