VMWARE IN HEALTHCARE

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Mobilize, Protect, Scale:
How VMware is Transforming Healthcare IT

Technology is changing the way healthcare is delivered—how information is shared among care teams...how research is conducted...how information is visualized...and how healthcare organizations interact with each other.

And VMware® is leading the way, helping healthcare organizations stay innovative and relevant on a global scale by becoming digitally based businesses that incorporate next-generation IT architecture.

Given our experience with a variety of institutions, we've identified three core initiatives necessary to accelerate a healthcare organization's digital transformation.

Embrace Mobility.

Physicians need consistent, continual access to vital information so they can be more productive and improve their own quality of life.

Patients want to use mobile devices to get better answers to questions faster, to improve their healthcare experience and to reduce some of the stress associated with medical issues.

And perhaps most important, all parties want to be able to communicate from anywhere, at any time, using any type of device.

Scale on Demand.

To support communities—not just hospitals—healthcare organizations are becoming service providers and taking on an ever-expanding number of roles and access requirements. They need power, agility and flexibility to provide access to the latest clinical information, faster and through more channels.

Maximize Security.

Both patient information and the organization's brand must be totally protected. No organization can afford to fall victim to cyberattacks, particularly healthcare organizations entrusted with sensitive patient data.

To help you fully consider and explore the possibilities within your own organization—on the following pages you'll see how VMware is delivering real solutions to real problems for real customers.

CASE STUDY 1:
USC'S KECK
MEDICAL CENTER

USC's Keck Medical Center Modernizes with Virtual Machine Provisioning to Drive Vital Research Activities

The Center's IT team was struggling to promptly fulfill new, virtual-infrastructure requests from its fast-growing medical research organization, while also supporting the daily operations of two busy hospitals. To improve service quality and reduce administrative workloads on its engineering team, they implemented self-serve provisioning with the VMware vRealize® Automation™ solution. The new system has reduced fulfillment intervals from more than two days to less than one hour, while liberating IT staff for higher value activities and expediting new research partnerships worldwide.

The Challenge

In addition to two acute-care hospitals, the Keck Center's IT organization also supports a federated medical research enterprise that includes the USC Keck School of Medicine and a fast growing, nationwide network of clinical and academic partners. At its Norris Center alone, 200 cancer investigators hold research grants totaling USD $134 million. When these researchers need new computing facilities to support a database or an analytical application, they can request one or more new virtual machines (VMs) in the Keck Center's IT environment.

Responding promptly to such requests had become a challenge for the IT team, which was already managing some 1,200 VMs in a production environment that is 90 percent virtualized on the VMware vSphere® platform. Under the team's manual provisioning process, new facility-request tickets would feed into the engineering work queue with a low priority (relative to management tasks) for existing facilities. Fulfillment was further slowed by a requirement that engineers confirm the availability of authorized funding for each request.

"All these things slowed down the approval process by days or even weeks," says Manu Mishra, the senior engineer responsible for virtualization and storage infrastructure at the time. "Actually deploying the new virtual machines was the easiest part of the process by far." With only two virtualization engineers supporting all clinical and research infrastructure, the center's IT team urgently needed a way to:

• Automate virtual machine provisioning.

• Expedite delivery of new compute facilities

• Reduce bureaucratic drag on vital research activities.

The Solution

Fortunately, Mishra had prior experience using an early version of vRealize Automation to deliver infrastructure resources to application developers. This VMware® solution empowers IT to accelerate the delivery and ongoing management of infrastructure and application services while improving overall IT efficiency. Specific benefits include:

- Policy-based governance and logical application modeling assure that multi-vendor, multi-cloud services are delivered at the right size and service level for the task at hand.
- Full lifecycle management assures that resources are maintained at peak operating efficiency.
- Release automation allows multiple application deployments to be kept in sync through the development and deployment process.

In general, vRealize Automation turns IT into an agile, responsive business partner. Specifically, Mishra chose it because he saw "...that vRealize Automation had the feature set we needed... it would allow us to hand off resource authorization and get new virtual machines deployed with a minimum of human interaction in the process."

VMWARE SOLUTION
An automated, self-serve provisioning solution built on VMware vRealize Automation

Business Results and Benefits

By implementing a self-serve resource provisioning process with vRealize Automation, the Keck Center's IT team has reduced administrative workloads and eliminated bureaucratic delays while ensuring robust financial oversight and strict policy compliance.

Researchers can now see exactly what resources are allocated to them directly in the new provisioning system. "When someone wants a new VM, they can see for themselves whether they can afford it," Mishra pointed out. "If not, they can decide whether to go get more funding or to reallocate the resources they have, maybe power down or reassign an existing machine. There was no way end users could do that themselves with our old manual process. It would have been an impossible task."

Automating its provisioning process has helped the center's IT team reduce fulfillment intervals for new VM requests from days—or even weeks—to less than one hour. "Now we can give our research community the same sort of service they would expect from an organization like Amazon," Mishra observed. "They click and we deploy."

This timely modernization of their IT capabilities arrived just in time to help the Keck Center accommodate new research partnerships with institutions across the country and around the world. One group of researchers—from Harvard University—wanted to host some of their resources on the Center's systems, so the institution built out what they called the Keck Research Environment. It will be a complete IT-as-a-service solution, which wouldn't have been possible without vRealize Automation.

BUSINESS BENEFITS
- Self-serve resource confirmation simplifies administration.
- Service delivery is accelerated from days to hours.
- The stage is set for new research partnerships.

VMWARE FOOTPRINT
- VMware vRealize Automation
- VMware vSphere

Looking Forward

With the success of automated provisioning for the medical research infrastructure, the Keck Center IT team is planning an entirely new research computing environment, wholly separate from its clinical operations. Based on the VCE converged infrastructure—which integrates hardware and software technologies from VMware, Cisco and EMC—the new platform will deliver compute infrastructure as on-demand cloud services.

The team is also actively exploring the possibility of expanding its VMware license agreement to include the complete VMware vRealize® Suite for wider use in operations management and automation.

VMware NSX Network Virtualization Transforms Baystate Health into a Modern Healthcare Center

CUSTOMER PROFILE
Industry: Healthcare
Location: Springfield, Massachusetts

Baystate Health, one of the largest healthcare organizations in New England, needed a new, secure IT infrastructure to: ensure optimal application performance for doctors and staff; contain costs; and accommodate an ever-increasing healthcare demand. With the VMware NSX® network virtualization platform and a Software-Defined Data Center (SDDC), Baystate was able to seamlessly converge three physical data centers into a single, fully integrated "active/active/active" data center. They saved an estimated USD $3.5 million and laid a stable—yet flexible—foundation for secure, long-term growth.

The Challenge

To maintain its leadership position in the rapidly changing healthcare industry, Baystate Health had to provide 12,000 employees, including clinicians, with a technology platform that would ensure optimal performance and availability.

Partnering with VertitechIT—a specialized healthcare and business IT advisor—they launched a rebuild of their entire IT infrastructure. With the emphasis on security, they wanted the new architecture to be simple, easily manageable and scalable; address both CapEx and OpEx savings; and leverage centralization to reduce overhead and converge staff.

Achieving a seamless mobility solution so that Baystate doctors could log in to their desktops—from any device, anytime, anywhere—called for the deployment of 10,000 virtual desktops.

"In addition to the CapEx and OpEx savings, secure business mobility was critical to align with our federal mandates for electronic medical records; specifically, to support regulatory compliance with HIPAA and strengthen our digital perimeter."

PATRICK STRECK

SENIOR DIRECTOR, IT SERVICES
BAYSTATE HEALTH

KEY CHALLENGES
- Redesign IT architecture to control rising costs, meet increasing demand and improve security and services.
- Converge three data centers into one and reduce the traditional expenses of capital, real estate and power.
- Enable doctors and personnel to access the network from any device, anytime, anywhere.

The Solution

Baystate selected VMware solutions and VMware Professional Services to create a streamlined, hyperconverged infrastructure that could accommodate growth and fully support staff and patients. For networking, Baystate chose the VMware NSX platform over the Cisco Application-Centric Infrastructure (ACI).

The key differentiator: The VMware NSX platform enables the pooling (into a unified set) of compute resources that are in different geographical locations but in close proximity; e.g., a local area and a metro area. As a result, applications can be deployed in any location while seamlessly connecting to the resources located at each site.

Baystate converged three physical data centers into a single, three-site "active/active/active" data center with always-on, borderless capabilities. Their VMware NSX sits strategically between applications and the infrastructure layer, offering better integration with the remainder of the VMware cloud stack.

"Healthcare is under tremendous pressure to reduce costs, especially operational costs," says Joel Vengco, Baystate Health's VP and CIO. "With NSX, we are able to create a more fluid, liquid, automated data center that allows us to do more with less."

For deployment of the new virtual desktops, Baystate chose the VMware Horizon® solution over Citrix. According to Vengco, "Now that we've put Horizon in place, we're seeing a lot of adoption and excitement among all our users at being able to work whenever and wherever they want."

SOLUTION
VMware NSX platform to virtualize the network and enable the convergence of three physical data centers into a single logical data center. The VMware Horizon solution helped deliver the deployment of 10,000 virtual desktops.

Business Results and Benefits

Baystate budgeted USD $8 million to upgrade its IT infrastructure. By virtualizing and seamlessly converging its three data centers into one, the organization saved about USD $3.5 million.

In addition, security has been enhanced significantly, aligning with compliance requirements in the healthcare industry.

Specifically, the VMware NSX platform enables Baystate to deliver micro-segmentation and multi-tenancy. With security controls built into the data center fabric, they can control the flow of data at each virtual machine rather than at the perimeter. This allows them to run multiple logical environments securely on the same physical infrastructure. "IT security threats are more numerous than ever, and a micro-segmentation approach is going to be our next line of defense," says Vengco. "Every administrator needs to have control over what goes in and out of the virtual machine, not just at a primitive firewall."

VMware NSX provides everything you need to manage that micro-segmentation approach, as well as third-party plug-ins. "Now, with NSX, the amount of configuration is more straightforward and the reports are more meaningful."

VMware technology has reduced Baystate's service provisioning from days or weeks to mere hours, which allows skilled workers to become more productive. VMware Professional Services experts assisted in configuring the automation and orchestration functionality to Baystate's hyperconvergence use cases. This resulted in workers devoting far less time to mundane tasks—e.g., resetting user IDs—and more time on strategic initiatives.

Baystate's virtual desktop environment will also help the organization to shed the cost of maintaining 12,000 computers in the field. "Now I can give our residents the opportunity to log in and have their session just as they left it an hour ago. And I can stop buying $1,500 computers and start buying endpoints that are $200 to $300 apiece," says Vengco.

The future of Baystate's infrastructure transformation is ongoing, focusing now on its hybrid cloud environment.

BUSINESS BENEFITS
- Approximately USD $3.5 million in savings upfront
- Eliminated the expense of maintaining 12,000 PCs in the field
- Improved data security thanks to easy micro-segmentation
- Third-party solutions easily integrated into the network

VMWARE FOOTPRINT
- VMware NSX
- VMware Horizon Enterprise 6
- VMware vSAN™
- VMware vCloud Suite®
- VMware vCenter Site Recovery Manager™
- VMware Professional Services
- VMware Education Services

CASE STUDY 3:
CLEVELAND CLINIC
ABU DHABI

New Abu Dhabi Hospital Reduces Application Development Time from 2 Weeks to 15 Minutes with VMware

Cleveland Clinic Abu Dhabi is a multi-specialty, primary/tertiary/quaternary care facility with 364 beds (expandable to 490). The hospital has five clinical floors, three diagnostic and treatment levels and 13 floors of critical and acute inpatient units. Management's goal was to establish a new, best-in-class digital environment to ensure that patients would receive the most efficient, coordinated care and comfort possible.

The Challenge

One offsite data center handled all of the Clinic's infrastructure and applications. The development of new solutions was handled in typical fashion (i.e., relying on manual processes with deployment times averaging four weeks).

It quickly became apparent that—to make everything from everyday IT tasks to complex applications as seamless, cost-effective and reliable as possible—a greater commitment to digital automation and orchestration was required. The Clinic determined that the ideal infrastructure would be a fully distributed design setup across two data centers. Providing a single network to enable connectivity between these two sites (and having it managed by a single solution) became the key objective.

"We also had a lack of official processes with no standard approval workflows—different teams were creating virtual machines on their own, without a proper approval mechanism in place."

MIKE REAGIN

THE CLINIC'S FORMER CIO

CUSTOMER PROFILE

Industry: Healthcare

Location: Abu-Dhabi, UAE

KEY CHALLENGES

- Achieve a fully automated environment from the data center to the desktop, so clinicians can deliver a superior patient experience.
- Reduce application deployment time while ensuring a single network connection between the offsite and primary data centers.
- Enable clinicians to access patient records from any device, any time, anywhere.

The Solution

VMware vCloud Suite® Advanced—including VMware vRealize® Automation™ capabilities—was chosen to automate the end-to-end delivery and management of IT services.

The long-term goal was to create a healthcare-focused cloud, where the IT team could become an effective service provider to its internal customers—with the agility to scale out and expand that role for healthcare centers in the wider region.

So, the team fully virtualized the organization's primary data center on a VMware vSphere® platform. That way, they could run all production workloads across their critical applications, specifically:

- Medical applications, such as their Electronic Medical Records (EMR) system
- Lawson, to provide business intelligence and staffing management
- Onbase, to store (and help manage) electronic content relating to patient care

Next step: Deploy VMware Horizon® with View (virtual desktop technology) to support clinical staff with access to medical applications from any device, anywhere, any time.

VMWARE SOLUTION

- VMware vCloud Suite Advanced, including vRealize Automation. (Their onsite data center is also fully virtualized with VMware vSphere.)
- VMware Horizon with View to enable a "follow me" experience for clinicians, with a simple swipe card providing access to medical records from any device.

Business Results and Benefits

With their vRealize Automation in place, it now takes only 15 minutes—not 2 weeks—to deliver applications to the hospital.

Reagin credited VMware® for the Clinic's new ability

> "...to increase agility with a better time to market for our customers, whether that's physicians who may need data for research, or the ability for us to rapidly upgrade and enhance products, enabling new services. And in the long term, we want to be an external service provider to other healthcare centers as well."

MIKE REAGIN

THE CLINIC'S FORMER CIO

With their new digital ability to seamlessly automate new infrastructure as needed, the IT team now knows that everything meets regulatory and compliance controls immediately; therefore, tests on each new piece of a kit are unnecessary.

The hospital's investment in VMware solutions has also given the IT team visibility into its virtual infrastructure: current status, future points of concern and effective-capacity and lifecycle management. "With vRealize Operations, we can predict issues and alert the IT team before they become an issue to the business. This is absolutely invaluable when we are providing business-critical medical applications and access to patient and hospital records 100% of the time," Reagin emphasized.

Cleveland Clinic Abu Dhabi also engaged VMware Professional Services to benefit from the VMware Technical Account Manager (TAM) Program. The TAM has been a trusted advisor for the past three years, and has provided product knowledge and proven skills to help the hospital map its business strategy to digital solutions.

BUSINESS BENEFITS

- Reduced application deployment time from 2 weeks to 15 minutes.
- When deploying new applications and services, compliance and regulation requirements automatically met
- Clinicians now able to access patient data instantly at the bedside, enhancing the patient experience
- A dual, data-center operation providing disaster recovery, test and development, as well as high-availability production workloads, all fully connected via the Software-Defined Data Center

VMWARE FOOTPRINT

- VMware vCloud Suite Advanced
- VMware Horizon with View

Looking Ahead

Cleveland Clinic also wants to provide a next-generation clinician workspace experience—with fast, secure access to all applications and data—so they can reduce the time needed to provide patient care and increase the quality of both the patient and the clinician experience.

With VMware Horizon with View, each clinician can benefit from the "follow me" procedure. A simple swipe card provides access to medical records, as well as specialized medical applications (including Dragon and PACS) from any device. Time-consuming, error-prone paperwork is drastically reduced.

With the influx of mobile devices throughout the hospital, Cleveland Clinic is now exploring VMware AirWatch® for effective and secure mobile-device management.

"We'd like to look at enabling the provisioning of the entire platform in a self-service way. We're also looking at software-defined networking, so that we can we can have a fully functional Software-Defined Data Center. VMware NSX will provide a single network between our two data centers as well as heightened security levels," according to Reagin.

CASE STUDY 4:
WOMEN'S COLLEGE
HOSPITAL

VMware Private Cloud and VDI Deliver Fast, Reliable Patient Data for Women's College Hospital

A world leader in women's health, Women's College Hospital is Canada's leading academic ambulatory hospital. To continue pioneering innovative, ambulatory-treatment practices, the hospital required an upgraded IT environment that would make clinical information and systems more easily accessible. By launching a new Electronic Medical Records (EMR) solution on a VMware® private cloud—coupled with a Virtual Desktop Infrastructure (VDI)—the hospital significantly cut data delivery times, while enabling its lean IT team to easily manage the entire IT environment.

The Challenge

The hospital's highest priority was the construction of a medical center which, by being more digitally efficient, would help reduce patient time in the hospital. "A lot of documentation was still on paper, as was much of the ordering," recalls IT Director Brendan Kwolek. "Doctors would frequently remote-in from their personal laptops back to desktop systems in their offices to access the applications or documents they needed."

An advanced EMR solution was required to consolidate patient health records and make them more easily accessible to caregivers. To run that application (and others), a new private-cloud platform and VDI would have to provide:

• The ability to deploy, scale, manage and deliver applications with a lean IT team

• A competitively priced infrastructure that was flexible, agile and highly reliable

• The power to run a diverse range of applications—and support a large user population with diverse device preferences—with a small, service-desk staff

The Solution

Women's College Hospital chose the VMware vCloud Suite® integrated private cloud solution that combines VMware vSphere® software, the VMware vCenter™ Site Recovery Manager™ solution and the VMware vRealize® cloud-management platform.

For desktop delivery of information, the hospital chose VMware Horizon® 6 Standard Edition. A desktop-virtualization platform purpose-built for the mobile cloud era, Horizon 6 Standard Edition allows an organization to present virtualized desktops or hosted applications through a single unified workspace, ensuring more robust user experiences across devices and operating systems.

The decision to use VMware technologies for both the cloud and the desktop platforms was strategic for IT director Kwolek. "I'm always a fan of the right solution for the right scenario, but when I can leverage the same vendor in multiple layers, I know there will be added benefits and value. And we had great confidence in the VMware platform."

He continued, "We called every customer that was currently running Horizon, and nobody came back with concerns. When you hear that the most advanced and robust EMR sites in the U.S. are doing this routinely and casually because it's rock-solid, you know you're on good footing."

His IT team worked closely with the EMR system provider and Scalar Decisions (their VMware partner and server vendor) to install and configure the new environment and to fine-tune the Horizon 6 Standard Edition system. The systems now support 400 concurrent desktop users across 800 endpoints.

VMWARE SOLUTION

Women's College Hospital and Scalar Decisions, a VMware partner, built a new clinical application environment around EMR. The EMR system runs on a private cloud enabled by VMware vCloud Suite and is delivered to users through the VMware Horizon 6 Standard Edition virtual desktop environment.

Business Results and Benefits

Women's College Hospital caregivers now enjoy fast, reliable access to clinical information and systems, making more time available for actual patient care. As Brendan points out, "The first login builds their profile, which takes about a minute; then subsequent logins are always sub-10 seconds. We watch that closely as an indicator of performance."

Caregivers also get a consistent desktop experience at every access. "We give them the same desktop in the examining room that they have in their office or at home when they connect remotely at night. They don't have to waste time figuring out different views, instructions or interfaces."

The VMware virtualization stack also gives the hospital a very compact footprint in its new data center. "We currently have somewhere between 130 and 170 servers, which all fit in two racks. We have 16 to 20 full-height racks completely empty and available. We're actually looking at offering that space to other hospitals in the area for disaster recovery sites."

The new environment also gives the hospital's lean IT team a new level of business agility. "We can spin up what we need from a template. That kind of agility is absolutely critical when you're running a lean team," he continued.

The vCloud Suite solution and Horizon 6 Standard Edition give the hospital a technology platform it can count on. Concluded Kwolek, "If your virtual infrastructure isn't rock-solid, you're going to spend cycles trying to fix it. But that's the last thing on my mind with this environment."

BUSINESS BENEFITS
- Physicians have fast, flexible access to clinical data and systems.
- Users enjoy a consistent desktop experience on any device.
- Virtualization gives the hospital a compact data center footprint.
- The VMware vCloud Suite solution natively supports business continuity and disaster recovery.

VMWARE FOOTPRINT
- VMware vCloud Suite
- VMware Horizon 6 Standard Edition

APPLICATIONS VIRTUALIZED
- EMR system

PLATFORM
- Dell PowerEdge M-Series blade servers
- Dell Compellent flash storage array
- IBM Storwize V7000 storage system

PARTNER
- Scalar Decisions

Looking Ahead

The hospital is weighing a possible upgrade to VMware Horizon 6 Enterprise Edition, primarily for access to the VMware App Volumes™ component, which allows IT to deliver applications in real time. "When someone asks for a new app on their virtual desktop, you don't want to recompose a whole pool. You want to push App Volumes to them with just that one application. That alone is worth the price of Enterprise," says Kwolek.

He is also evaluating VMware Care Systems Analytics for a single pane of glass view into the desktop, application delivery, storage and compute layers.

vmware®