Introduction

Healthcare reforms mandated by the Health Information Technology for Economic and Clinical Health (HITECH) Act are putting increasing pressure on healthcare IT to provide complex applications at a lower cost without sacrificing quality of care, performance, or security.

Meeting the challenges presented by healthcare reform demands an IT infrastructure that is swift, agile, and economical—enabling healthcare providers and organizations to adapt to change quickly and cost-effectively.

VCE represents the next evolution of IT, one focused on the next generation data center and the future of cloud computing. With Vblock™ Systems, VCE seeks to eliminate challenges that consume today’s data center resources.

Vblock systems are optimized information technology systems that ensure secure and predictable performance through pre-engineered, modular infrastructure that enables standardized processes and operations. Vblock systems enable faster development and deployment of applications, improved utilization of resources, and lower operational costs.

VCE healthcare solutions built on the Vblock system help healthcare IT to accelerate technology adoption and promote innovation, while maximizing adaptability and protecting investments. VCE healthcare solutions provide the technology and support that enable healthcare IT to deliver critical patient data at lower cost to healthcare providers at the point of care.
About VCE and Vblock™ Systems

VCE designs and delivers Vblock systems, which seamlessly integrate leading compute, network, and storage technologies. Through intelligent discovery, awareness, and automation, Vblock systems provide the highest levels of virtualization and application performance.

Each Vblock system has a base configuration, which consists of a minimum set of compute and storage components as well as fixed network resources. Within the base configuration, certain hardware aspects can be customized. Together, the components offer balanced CPU, I/O bandwidth, and storage capacity relative to the compute and storage arrays in the system.

The Vblock System 300 is an agile and efficient data center class system, providing modular and scalable performance. It features a high-density, compact fabric switch, tightly-integrated fabric-based blade servers, and best-in-class unified storage.

The Vblock System 700 is tailored to the needs of the largest enterprises running thousands of virtual machines and is designed to meet the most demanding requirements for business-critical enterprise resource planning (ERP), customer relationship management (CRM), database, messaging, and collaboration services. It includes the industry’s best director-class fabric switch, the most advanced fabric-based blade server, and the most trusted storage platform.

For more information, go to http://www.vce.com/vblock.
Healthcare trends

The HITECH Act, enacted as part of the American Recovery and Reinvestment Act (ARRA) of 2009, was signed into law on February 17, 2009, to promote the adoption and meaningful use of health information technology. The HITECH Act provides the Department of Health & Human Services (HHS) with the authority to establish programs to improve health care quality, safety, and efficiency.

To comply with the HITECH Act and Patient Protection and Affordable Care Act (PPACA) requirements and to manage the resulting massive growth of electronic protected health information (ePHI), healthcare providers and organizations are increasingly adopting strategies and technologies such as:

- Electronic health records (EHR)
- Health information exchange (HIE)
- Computerized provider order entry (CPOE)
- Accountable care organizations (ACOs)

Electronic health records

The Medicare and Medicaid Electronic Health Records (EHR) Incentive Programs provide incentive payments to eligible professionals, eligible hospitals, and critical access hospitals (CAHs) as they adopt, implement, upgrade, or demonstrate meaningful use of certified EHR technology to improve patient care. EHR systems serve many purposes and address some of the key challenges to the healthcare system in several ways. Some of the many benefits EHR provides are:

- Timely, accurate, and easily accessible documentation of interactions with patients
- Secure and compliant access to view medical history and insurance information
- Access to lab work and test results
- Ability to send and receive electronic prescription requests to pharmacies (reducing fraud, risk of error and other problems)
- Alerts to health care providers to dangerous drug interactions
- Ability to make and receive referrals

No single EHR solution can provide an answer to all the challenges the industry faces, but government recognition of healthcare IT and EHRs as a long-term solution has greatly accelerated deployment.
Health information exchange

Health Information Exchange (HIE) enables the process of reliable and interoperable electronic health-related information sharing in a manner that protects the confidentiality, privacy, and security of information.

The HIE implementation challenge is to create a standardized interoperable model that is patient centric, trusted, longitudinal, scalable, sustainable, and reliable. HIEs, enabled by technology, are expected to improve the quality of care and patient safety and reduce healthcare costs.

Computerized provider order entry

The computerized provider order entry (CPOE) program offers financial incentives for medication orders directly entered by any licensed healthcare professional authorized to enter orders into the medical record per state, local, and professional guidelines.

One benefit of directly entering orders into a computer is the reduction of errors due to poor handwriting. Computerized order entry also allows access to drug interaction and patient data to support the professional’s decisions.

Implementation of CPOE is being increasingly encouraged as an important solution to the challenge of reducing medical errors, and improving health care quality and efficiency.

Accountable care organizations

Accountable Care Organizations (ACOs), as provided for in the Patient Protection and Affordable Care Act of 2010, coordinate and direct patient care for Medicare and Medicaid recipients across multiple disciplines while striving to contain costs and emphasize high-quality care.

An ACO is characterized by a payment and care delivery model that seeks to tie provider reimbursements to quality metrics and reductions in the total cost of care for an assigned population of patients. A group of coordinated health care providers form an ACO, which then provides care to a group of patients. The ACO may use a range of payment models. The ACO is accountable to the patients and the third-party payer for the quality, appropriateness, and efficiency of the health care provided.

The fundamental challenge to ACOs is ensuring the rapid, seamless flow of patient information from one organization to another.
Future trends

Stage 3 and beyond of the HITECH Act will present even more challenges to healthcare providers and organizations. These challenges will expand the healthcare provider landscape to include:

- Decision support for national high-priority decisions
- Access to self-management tools
- Electronic transition care plans
- Improved population and public health through access to age-, gender-, and immunization history-based recommendations

To best equip their users with new systems that comply with these evolving regulatory requirements and enable better patient outcomes at a lower cost, healthcare IT professionals will look to invest in:

- Flexible, scalable infrastructure with low operational overhead that speeds simple, reliable systems to caregivers at the point of care
- Business intelligence (BI) applications that combine data from clinical, operational, financial, and other systems to improve patient care, prevent clinical errors, and reduce healthcare operational costs

Vblock systems will help healthcare IT providers and organizations repurpose IT resources to focus on meeting healthcare transformation challenges today, and as they move forward to meet Stage 3 requirements.
Healthcare IT transformation with Vblock systems

In response to government regulations and technological changes affecting the healthcare environment, healthcare IT organizations are being called upon to provide innovative and cost-effective ways to deliver healthcare solutions that demonstrate meaningful use of EHR, and facilitate and support the culture of accountable care.

To comply with current and future regulatory requirements, healthcare IT must create, implement, and support new patient care models that provide coordinated end-to-end delivery of services across the complete patient care continuum from the hospital campus to community-based facilities to the home with realtime data entry by mobile medical personnel and realtime data-driven medical decisions.

Healthcare IT transformation presents many complex challenges. To enable healthcare providers and organizations to achieve meaningful use faster, more efficiently, and cost-effectively, with robust security to help meet privacy and compliance needs, Vblock systems offer:

- Advanced converged infrastructure
- Reduced IT complexity and improved agility
- Low cost through server consolidation and standardization
- Scalability through standardized units of infrastructure and virtualization
- Continuous availability by eliminating downtime and service interruptions
- AlwaysOn Point of Care desktops
- Compliance with industry standard security guidelines
- Data protection solutions utilizing industry-leading technologies

Advanced converged infrastructure

Virtualization and converged infrastructure provide the foundation required for the operational efficiencies necessary to keep up with evolving regulatory requirements and new care delivery models.

VCE, formed by Cisco and EMC with investments from VMware and Intel, accelerates the adoption of converged infrastructure and cloud-based computing models that dramatically reduce the cost of IT while improving time to market for our customers. VCE, through the Vblock System, delivers the only fully integrated and fully virtualized cloud infrastructure system in the industry.

VCE drives roadmap alignment between Cisco, EMC, and VMware. We are particularly focused on VMware alignment and being the best converged infrastructure foundation for VMware technologies. We have deep engineering relationships with the Cisco, EMC, and VMware teams that produce their flagship data center products.

At its December 2011 data center conference, Gartner conducted an audience poll on implementing converged infrastructure projects. The attendees voted VCE as “most competent” of all other vendors, demonstrating the reputation we have earned among large enterprises, even when compared to established IT heavyweights.

Reduced IT complexity and improved agility

Vblock systems reduce IT complexity and improve IT agility through virtualization and automation, which allows limited healthcare IT resources to focus on enhancing the user experience and implementing the innovative healthcare solutions required to meet meaningful use and accountable care objectives.

Some of the ways in which the converged infrastructure of Vblock systems reduce complexity are:

- Automation of standard IT operations allows IT staff to concentrate on implementing EHR and other advanced healthcare technologies
- More efficient operational and clinical workflow improves quality of patient care
- Increased operational efficiency improves staff productivity
- Virtualization reduces time to launch new applications

Case study:
IDC Research

IDC research (April, 2012) performed a primary research study of five companies that implemented Vblock systems in their enterprise data centers.

Findings

- Reduced calendar time for deployment of new infrastructure from five weeks to one week
- Reduced staff time to configure/test/deploy by 75%
- Compared with their prior IT environment, reductions in infrastructure hardware costs and IT staff time lowered the average annual datacenter cost by 68% per 100 users

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Low cost

Vblock systems can serve as a standardized infrastructure for a vast array of business-critical and clinical applications, which means that applications can share pools of compute, network, and storage resources. Moreover, shared infrastructure simplifies IT staffing and training.

Server consolidation and improved resource utilization are only the beginning of the story. VCE customers also realize cost reduction from simplified provisioning and management, integrated patch release, and a single source for warranty and support.

Scalability

Healthcare organizations are at different phases in their IT transformation and have different compute, storage, and virtualization requirements. VCE offers a family of Vblock systems to meet the needs of any provider or business. Each system delivers predictable units of performance and scales across a wide range of application requirements. With Vblock systems, you never have to worry about whether your IT infrastructure can support your growing organization.

Through significant standardization, VCE is able to provide dramatically simplified customer experiences. Infrastructure can be scoped, ordered, installed, and brought up and running faster than any "build your own" or reference architecture methodology. In addition, many of the time-consuming and resource-consuming aspects of running a data center can be aggregated to significantly lower cost of ownership while freeing IT personnel to focus time and energy on improving healthcare service delivery and patient care.

Continuous availability

Today’s healthcare providers and organizations must operate around the clock. Vblock systems provide a virtualized data center tailored to healthcare providers’ needs for continuous performance. Vblock systems provide continuous availability for mission-critical applications that must remain in operation and be recoverable within minutes of a disaster.

EMC VPLEX is an innovative business continuity and workload mobility solution that can easily move business applications within or between Vblock systems located in the same data center or metropolitan area. VPLEX can also mirror business-critical data, deliver zero data loss, and ensure automatic near-zero application recovery time. Working in conjunction with VMware vMotion, VPLEX is a hardware and software solution for Vblock systems that provides enhanced availability for business continuity and dynamic workload mobility.
AlwaysOn Point of Care

Transformation of the point-of-care desktop has become an urgent priority for hospital IT professionals as well as hospital caregivers. Desktops and patient care applications must be immediately accessible and available to caregivers even in the event of site failures and outages.

AlwaysOn Point of Care from VMware and VCE is a managed network/connectivity solution optimized for the specific, stringent requirements of medical organizations. It integrates technology and solutions from VMware, VCE, and our thriving ecosystem of partners. The solution leverages mobile, wireless, and wired networks that are customized to health care industry requirements.

AlwaysOn Point of Care desktops are ideally hosted on Vblock platforms, which are pre-configured infrastructure platforms sized to support specific workloads. These platforms are available to run both on the customer site, as well as in a hosted (cloud) facility.

Security

Today, healthcare providers are using clinical applications such as CPOE, EHR, and radiology, pharmacy, and laboratory systems. Health plans are providing access to claims and care management, as well as member self-service applications. While this means that the medical workforce can be more mobile and efficient, the rise in the adoption rate of these technologies increases the potential security risks and makes protecting the confidentiality, integrity, and availability of electronic protected health information (E PHI) even more critical.

The HIPAA Security Standards for the Protection of Electronic Protected Health Information (the Security Rule) establish a national set of security standards for protecting certain health information that is held or transferred in electronic form. The Security Rule requires appropriate administrative, physical, and technical safeguards to ensure the confidentiality, integrity, and security of EPHI. In general, the standards, requirements, and implementation specifications apply to any healthcare provider, health plan, or healthcare clearinghouse that transmits EPHI.

VCE utilizes parent company and industry standard guidelines and practices in hardening the configuration of Vblock systems to assure confidentiality, integrity, availability, and interoperability. This methodology allows for integration of third-party validated security solutions to allow providers to address the challenges of today’s ever-increasing regulatory requirements such as those defined in the HIPAA Security Rule and HITECH. Additionally, VCE deployment, implementation, and support services can help providers deploy Vblock systems in a secure, compliant state and maintain required security controls throughout the technology lifecycle.

Case study:
Molina Healthcare, Inc.

Molina an agile infrastructure that would meet increased demand for services supporting government-funded healthcare programs.

Solution
Standardize on Vblock System 700 and Vblock System 300.

Benefits
- Deployment of Vblock systems and application migration in only five days
- Improved TCO due to a 4:1 reduction in data center footprint and decreased power and cooling usage
- Application and storage performance boosts of 25-40 percent
- Increased availability of critical health applications, enabling faster and more reliable rollout of EMRs in more than 30 clinics
Data protection

Many healthcare organizations and providers have geographically dispersed sites that create, process, and store data locally. Loss of data at any site could result in economic loss, but more importantly, could result in medical errors leading to patient injury or loss of life. The HIPAA Security Rule requires covered healthcare entities to establish a contingency plan to respond to emergencies that could adversely affect electronic protected health information. The Contingency Plan must include data backup, disaster recovery, and emergency mode operation plans.

VCE Vblock™ Data Protection consists of a family of solutions leveraging technology from EMC, Cisco, and VMware that scale from one to many platforms within and across data centers.

Vblock Data Protection provides enhanced backup and recovery, data replication, business continuity, and workload mobility to deliver reliable and predictable data protection for Vblock systems. Solutions include:

- **EMC Avamar**: Streamlined backup and recovery hardware and software that handles client-side data deduplication before transmission across the network to the backup target. Minimizes backup bottlenecks in data-intensive, virtual environments.

- **EMC Avamar plus Data Domain**: Client-side and target-based deduplication backup and recovery. Leverages high-speed technology to reduce your backup data storage footprint at the target device by 10x to 30x.

- **EMC RecoverPoint**: Replication solution that can roll back to any point in time, using snapshots taken as frequently as seconds apart for an improved recovery point objective (RPO). Efficiently migrates data from an old platform to a new one or from one Vblock platform to another.

- **EMC VPLEX**: Innovative workload mobility and business continuity solution. Easily moves business applications within or between Vblock platforms located in the same data center or metro area. EMC VPLEX can also mirror business-critical data, deliver zero data loss, and ensure automatic near-zero application recovery time.
Support

VCE provides our customers and partner organizations with VCE™ Support for their Vblock systems, dramatically simplifying the infrastructure support process. Our industry-leading support is delivered by people who are expertly-trained in all aspects of Vblock systems and are equipped with state-of-the-art support and collaboration technologies underlying proven support workflow processes.

VCE Support ensures the coordination of technical support resources spanning all aspects of Vblock systems, including the proper functioning and integration of components from Cisco, EMC, and VMware. VCE Support leverages the people, processes, and technology best practices from across this ecosystem to simplify and streamline the support process.

The VCE Support portfolio provides customers with the flexibility to choose the level of support that best aligns with their business objectives.

- **VCE Core Support**: A foundational, integrated level of support that is standard on all Vblock systems.
- **VCE Plus Support**: An enhanced, higher-touch support option with proactive deliverables and capabilities across the Vblock system installed base.
- **VCE Premier Support**: A customer-centric, strategic support relationship for the installed base of Vblock systems.

Case study: Holy Name Medical Center

Holy Name was running out of physical space for its data center and had inadequate disaster recovery capabilities.

Solution

VCE Professional Services and CDI, the integrator and reseller, helped Holy Name implement Vblock systems in just two weeks.

Benefits

- Hundreds of thousands of dollars saved in server expenditures
- Accelerated delivery of new servers from weeks to minutes
- Server restores completed in under an hour versus days

Extensive partner ecosystem

Built upon best practices embodied by VCE’s investor companies, Cisco, VMware, EMC, and Intel, the VCE Technology Alliance Partners (TAP) Program offers participants Vblock Ready certification, validation, or joint solution development, increased market presence and revenue potential, and the ability to provide customer assurance that solutions are tested and will work predictably on a Vblock system.
Summary

The challenge to healthcare IT organizations today is to equip healthcare service providers and caregivers to deliver better patient care at a lower cost. Successful implementation requires both advanced clinical systems and a speedy, flexible, and reliable computing, storage, and network infrastructure.

Implementation of meaningful use technologies such as EHR, HIE, and CPOE is growing in response to regulatory requirements, incentive programs, and the threat of penalties for non-compliance. However, if the IT infrastructure supporting these technologies is inadequate, these initiatives can harm rather than help the customer experience.

The unique converged infrastructure of the Vblock system provides a high-performance, highly reliable environment for critical clinical and business applications without requiring additional data center space or operations staff.

VCE and Vblock systems offer comprehensive solutions that facilitate the transformation of the healthcare IT environment to allow IT providers and organizations to focus on more value-added activities that support the business and improve patient care today and in the future.

Next steps

To learn more about this and other solutions, contact a VCE representative or visit www.vce.com.

Additional references

- Vblock Solutions For Healthcare IT (http://www.vce.com/products/industries/healthcare)
- Holy Name Medical Center Safeguards Critical Health-Care Applications with Vblock Infrastructure Platforms (http://www.vce.com/asset/documents/holy-name-casestudy.pdf)
ABOUT VCE

VCE, formed by Cisco and EMC with investments from VMware and Intel, accelerates the adoption of converged infrastructure and cloud-based computing models that dramatically reduce the cost of IT while improving time to market for our customers. VCE, through the Vblock systems, delivers the industry’s only fully integrated and fully virtualized cloud infrastructure system. VCE solutions are available through an extensive partner network, and cover horizontal applications, vertical industry offerings, and application development environments, allowing customers to focus on business innovation instead of integrating, validating, and managing IT infrastructure.

For more information, go to [http://www.vce.com](http://www.vce.com).