

A close-up photograph of a surgeon wearing a blue surgical cap and a white surgical mask. The surgeon is looking down at a dark screen, likely a computer monitor or a medical display. The background is blurred, showing a bright, possibly operating room environment.

## Building Future-ready IT Platforms

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Few industries face the magnitude of change that healthcare is undergoing today. Accelerated in the U.S. by sweeping and ongoing reforms, a radical transformation is taking place globally, driven in large part by the well-documented rise in chronic diseases and aging populations. These demographics, combined with rising costs, are colliding with fiscal realities, causing healthcare spending to consume an ever-increasing portion of the world economy, widely seen as unsustainable.<sup>1</sup>

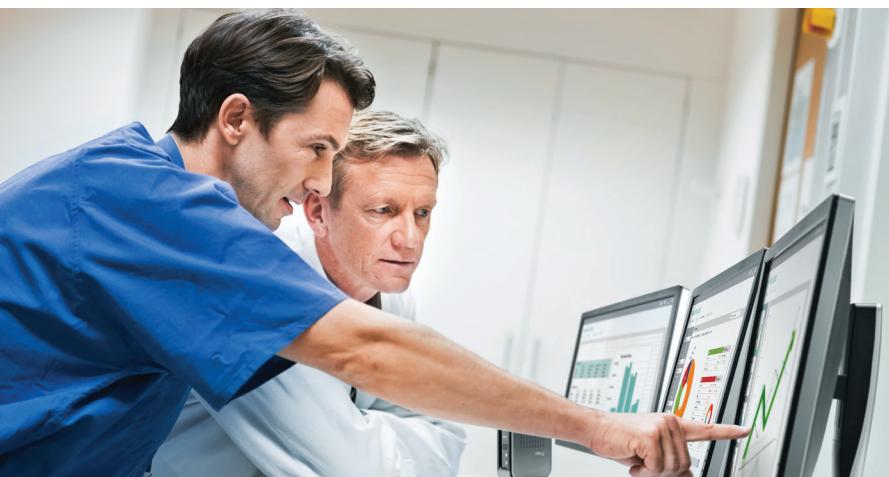
Healthcare organizations around the world — particularly hospitals and major medical centers — are responding by transforming themselves into more coordinated, patient-centered and efficient care delivery systems. And the pressure to change is coming from all directions. Internal business drivers to cut costs and boost efficiency in the face of declining reimbursements are exacerbated by external regulatory and competitive pressures. At the

same time, the healthcare industry is moving toward more value-based payment models that emphasize patient outcomes as well as cost. And the growth of healthcare consumerism is fueling industry consolidation — as providers and payers are merging to form more integrated health systems — and driving greater access to health records and information to engage consumers in their own care. Change is the only constant in today's healthcare marketplace.

Information technology plays a central role in achieving efficiencies and enhancing care delivery to meet these multi-faceted demands. Yet

technology itself is a moving target, advancing relentlessly, requiring frequent updates to stay on the cutting edge and keep up with new regulatory requirements.

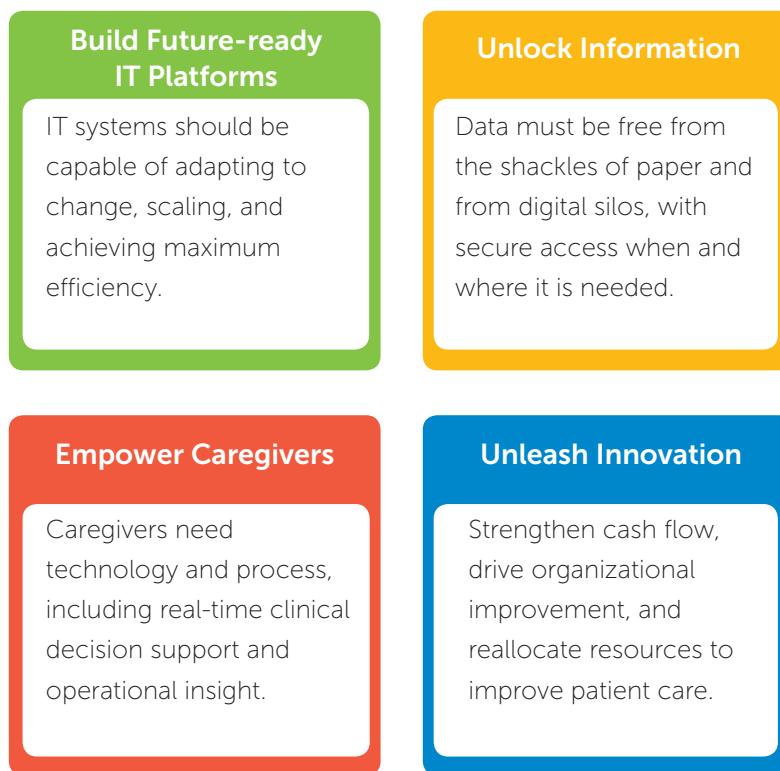
"Electronic medical records are just the beginning," notes Dr. Andrew Litt, Chief Medical Officer at Dell Healthcare and Life Sciences. The volume and velocity of data that hospitals and other healthcare providers generate is exploding, he adds, while the marketplace and the regulatory environment are shifting financial risk from payers to providers. "The only way hospitals will thrive is if there's useful, timely and relevant information delivered along the care continuum."



## Building Future-ready IT Platforms

Adapting to change and positioning organizations for long-term success have become fundamental imperatives for healthcare IT. Hospitals, physicians and integrated delivery systems must facilitate the flow of patient data throughout an expanding community of care, while also securing the information and rigorously protecting patient privacy. To accomplish this, healthcare IT platforms must be as flexible and rapidly scalable as they are highly secure. At Dell, we describe this ability to deliver the right information, at the right time, to all key stakeholders as **Information-driven Healthcare**, comprising four well-defined steps:

### Information-driven Healthcare



### Building future-ready IT platforms in healthcare

This whitepaper explores the critical need to **Build Future-ready IT Platforms** that enable hospitals and medical centers to rapidly, cost-effectively and securely deploy new capabilities and expand capacity as data volumes grow and new regulatory requirements come into play. We will highlight two integral components of an information-driven healthcare environment: cloud and security solutions.

These future-ready platforms — the foundation for information-driven healthcare — enable the business agility and clinical support modern hospitals and healthcare providers need to prosper in the dynamic marketplace. They allow hospitals to adapt to, integrate and securely manage ongoing changes without the massive investments or operational disruptions typical of previous generations of healthcare technology.

In companion whitepapers, we demonstrate how complementary digital technologies are used to **Unlock Information**, **Empower Caregivers** and **Unleash Innovation**, all crucial elements in the transformation of healthcare organizations into more purposeful and collaborative communities of care. Yet each of those steps first requires future-ready platforms that can free hospital personnel to focus on physician support and patient care.

### The big data explosion

Both by operational necessity and legislative mandate, the use and size of electronic health records (EHRs) continues to grow, as does medical imaging and research data, notes Dr. Cliff Bleustein, Managing Director and Global Head of Healthcare Consulting at Dell. The need to integrate this medical information with hospital operational and financial data presents significant challenges for most healthcare providers.

"It's going to force systems to rethink the ways they manage data, and how all of this gets integrated to not only improve business intelligence, but also improve care on a patient-by-patient level," Dr. Bleustein says. Looking ahead, genomics and data generated by gene sequencing hold the potential to further expand data storage requirements exponentially, since a single gene-sequencing study can occupy terabytes.



The volume of patient generated data can be compared to the flow from a firehose, agrees Dr. Litt. Traditional components of medical records — history, physical, medications, lab results, etc. — are increasingly augmented by patient interactions with healthcare websites, hospital portals, social media, and other data. "When you add genomic data on top of that, the scale is absolutely astronomical," he adds. "It then becomes important to think about how organizations will manage that amount of data."

### Images coming into focus

Among the data management challenges for many hospitals is their growing image archive, exacerbated by the use of multiple picture archiving and communication systems (PACS) from different vendors. Separate formats and interfaces of different systems can hamper collaboration among physicians and clinicians, while forcing inefficient duplication of effort by IT staff and slowing adoption of new imaging technology.

That's what led to the creation of a new vendor-neutral image archive at Intermountain Healthcare — an internationally recognized, nonprofit system of 22 hospitals with more than 185 physician clinics and 33,000 employees in Utah and southeastern Idaho. Intermountain partnered with Dell and Siemens Healthcare to implement a system that aggregates data from radiology and cardiology, storing five years of images onsite in the active archive, with cloud storage at Siemens and Dell data centers for a highly redundant system that facilitates fast disaster recovery.

"We've got 1,100 IT staff, and we've done a lot of our own in-house solutions," says Marc Probst, Intermountain's CIO and vice president of information systems.<sup>2</sup> "But medical image storage is growing rapidly and requires dedicated staff to maintain it. It made sense to go with a vendor who has expertise in the area, rather than to create an in-house solution."

Intermountain plans to migrate nearly half a petabyte of data from existing PACS storage to a mix of on-site storage and cloud storage. The hospital system generates approximately 1.6 million radiology files and 350,000 cardiology files annually, which will be stored locally for five years and also uploaded to cloud storage. One big advantage of the new system, according to Probst, is that clinicians won't be required to learn a new interface. As the images are brought into the archive, they are standardized into a common format that allows them to be read using any reader. The system allows clinicians to provide better care to patients at a lower cost. It, in turn, helps Intermountain achieve its mission to provide clinically excellent medical care at affordable rates in a healing environment that's as close to home as possible.

### Send in the Cloud

Intermountain is among the increasing number of hospitals and medical centers migrating data center operations from local hospital premises to hosted, cloud-based environments. Such private clouds shift responsibility for the deployment, maintenance and reliability of the IT infrastructure to an external partner with the requisite expertise and resources. More importantly, they convert IT infrastructure costs from up-front capital expenses into operating expenses that map more directly to a hospital's revenue stream. And they free hospital IT staff to focus on working with clinical staff and developing more specific capabilities that enhance the quality of care.

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Head of Healthcare Consulting,  
Dell

"The cloud provides agility in terms of rapid, cost-effective response to change," says Carrick Carpenter, who leads the healthcare cloud computing business for Dell Services. "Do you want to invest capital dollars in servers and storage, or would you rather invest capital dollars in things that deliver direct value in patient care, like a new MRI machine, a surgical robot or an upgrade of the nursing floor with new facilities?"

Such was the case at West Park Hospital, a 25-bed, acute care facility in rural Cody, WY. Its medical facilities — including an adjacent Long Term Care Center licensed for 94 beds and a 20-bed chemical dependency center — are state-of the-art. Yet its data center and 10-person IT staff had nowhere near the capacity for the MEDITECH 6.X environment it migrated to in December 2011, with the goal of allowing, among other things, physician order entry and management. West Park deployed the new MEDITECH software in a Dell cloud, which has since grown to 70 servers, and counting.

"For us, the cloud means we don't have to worry as much about certain skill sets, about certain devices, about the physical capacity," says West Park IT Director Sharon Phelps. The hospital's onsite data center would have required an expensive upgrade to host the MEDITECH 6.0 environment, not to mention that it lacked the necessary electric and cooling gear to support the number of servers required. "None of that was going to come together quickly or as easily as it did [in the cloud]," she added.

In the 18 months West Park has run MEDITECH in the cloud, system downtime has been virtually eliminated, compared with two to four hours of downtime every few months with its previous on-premises system. Plus, there's been a spike in physician usage, and the IT staff has more time to spend working with the hospital's physicians rather than on system upkeep. Equally important, it's made the IT staff much more flexible.

"Our administration requires a responsive IT department that can quickly react to new directions and new things coming in all the time," Phelps contends. "We use the cloud as our method to get the right skills, the right support and the right uptime, which ultimately means our physicians can practice medicine the way they would in a big city."

### The trust issue

In addition to allowing hospital IT staff to focus on the clinical experience rather than maintaining system uptime, future-ready IT platforms allow hospitals to vigilantly guard the privacy of patient information, an increasingly vital priority for every healthcare organization. More than 21 million individuals had their medical records compromised in large health data breaches from September 2009 through December 2012, according to the U.S. Department of Health and Human Services (HHS).<sup>3</sup> And seven-figure settlements and civil penalties for violations of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule have made headlines in recent years. And that was before April 2013, when HHS implemented tougher penalties for HIPAA violations, which can now reach \$1.5

million per incident. The allure of health information to hackers continues to climb, with estimates that the value of a medical record on the black market is close to 10 times that of a social security number.

"The most important issue is maintaining patient trust," says Dr. Andrew Litt. "Patients trust us with their data. If we don't continue to earn that trust, the industry is going to suffer a huge set back." Studies have shown that people are more concerned about the security of their health information than they are about their financial or other personal information, he adds, and people will act on that concern, potentially avoiding hospitals with a reputation for data security breaches.

The security challenges are particularly acute at academic medical centers such as the University of California at San Francisco (UCSF) Medical Center, where the research and educational components of the school require information to flow freely, while the medical center must safeguard patient data. The medical center has two major sites at its Parnassus and Mount Zion campuses and serves as a referral center for patients requiring highly specialized medical care that involves advanced and complex procedures. The medical center and UCSF Benioff Children's Hospital together have 722 licensed beds and generate about 763,000 outpatient visits per year. And in 2015, UCSF will open a medical center at Mission Bay dedicated to serving women, children and cancer patients.

UCSF has professors who teach classes on campus, treat patients at the hospital and manage research projects in labs. The data center must provide access to specific pieces of information to individual users in only the authorized context. Yet it also must allow collaboration, both among the medical staff and with other academic and research institutions.

The medical center is eying evolving technologies like Advanced Digital Rights Management (ADRM) that will allow it to encrypt and control access to data within its data center, while requiring strong authentication to access that data from any device or conduit, explains Rob Winter, the Information Security Officer at UCSF Medical Center. "It doesn't matter if you're using cloud services such as Dropbox or Box or if the data is on a USB stick, a DVD, a hard drive, or sent over the Internet," he says, "we still need to be able to protect that data while making it efficient and practical to use in the delivery of care to our patients."

### The future is now

Aside from the cost-efficiency and added security that a cloud infrastructure offers, possibly its greatest impact is the way it can foster innovation. By freeing IT staff to focus on the clinical experience and patient care, the cloud offers a critical building block for information-driven, patient-centered healthcare. And by providing the flexibility and

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scalability that enables hospitals and medical centers to be more nimble in the face of constant change, the cloud can help speed and ease that transformation.

"The cloud allows your organization to be more innovative as new technologies hit the market," observes Dr. Bleustein. "If you can harness the power of the web and mobilize data in a safe way to the cloud, you'll be much better positioned when those technologies come to manage them within your current structure."

Healthcare transformation is complex and the ever-shifting market dynamics place a new premium on flexibility and agility. IT platforms that enable rapid, cost-effective and secure deployment of new capabilities and elastic capacity can help healthcare providers build the foundation for truly information-driven healthcare, and deliver higher quality care at lower cost.

We encourage you to share this white paper, and the three companion pieces – [Unlocking Information, Empowering Caregivers](#) and [Unleashing Innovation](#) – with others in your field. And share your stories of information-driven healthcare with us on Twitter by following and engaging with @DellHealth using the hashtag #DoMoreHIT.

See how Dell's integrated solutions create Information-driven Healthcare to improve patient care, enhance efficiency and reduce costs at [dell.com/discoverhealthcareIT](http://dell.com/discoverhealthcareIT)

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<sup>1</sup>Including 33 of the 34 member countries of the Organization for Economic Cooperation and Development. Including 33 of the 34 member countries of the Organization for Economic Cooperation and Development. OECD (2012), "OECD Health Data: Health expenditure and financing", OECD Health Statistics. (Accessed on 30 May 2013 at [http://www.oecd-ilibrary.org/social-issues-migration-health/total-expenditure-on-health\\_20758480-table1](http://www.oecd-ilibrary.org/social-issues-migration-health/total-expenditure-on-health_20758480-table1))

<sup>2</sup>Karen Branz, "Transitioning to a vendor-neutral image archive," Health Management Technology, June 2012, retrieved at: <http://www.healthmgttech.com/articles/201306/transitioning-to-a-vendor-neutral-image-archive.php>

<sup>3</sup>Breaches Affecting 500 or More Individuals, U.S. Department of Health & Human Services, retrieved at: <http://www.hhs.gov/ocr/privacy/hipaa/administrative/breachnotificationrule/breachtool.html>

