



MANAGING HEALTHCARE  
DATA WITHIN THE ECOSYSTEM  
WHILE REDUCING IT COSTS  
AND COMPLEXITIES

With more than 3,000 attendees and hundreds of exhibitors, the annual HIMSS World Health IT Conference in Budapest gave EMC the opportunity to talk directly with healthcare IT vendors and customers. At the 2011 conference, EMC's team of healthcare solution specialists spoke with several vendors and conferees and asked one question: "What is the best way to reduce costs and complexity in a healthcare IT infrastructure?" The overwhelming answer was to enable a cloud environment for patient data and to find a solution for managing so-called "big data." A cloud environment for patient data, stated the respondents, also allows healthcare organizations to set up IT as a Service which ultimately reduces IT costs via a pay-as-you-go model and helps coordinate care. Also mentioned—a cloud infrastructure—especially one that can efficiently manage a healthcare organization's big data, provides an economically sustainable business model, and will increase efficiency in the care cycle and help to enable a much desired eHealth shared infrastructure.

What is big data? It is the result of massive amounts of patient-related data being generated by clinical and imaging applications that are driven by advances in technology. These advances are emerging more quickly than ever before in the healthcare industry. In a recent report, IDC Health Insights predicted that over the next 10 years, the amount of digital data created annually will grow 44 fold. Healthcare organizations are increasingly turning to new architectures and tools to help make sense of this big data phenomenon. Additionally, big data requires people capable of interpreting the data in the rapid, predictive manner required in healthcare. Specialized tools will be needed to help them analyze the resulting petabytes of information. As a result, investment in analytics has increased sharply in recent years as companies use more powerful technology to organize and analyze the sheer volume of data being generated.

As one example, medical image archives are increasing by 20-40 percent annually, and are now considered to be big data. Healthcare IT executives cited the soaring costs and complexities associated with digital medical image storage as one of the most significant challenges they face. Most healthcare providers store multiple copies of a single medical image in their own data centers using a combination of short- and long-term storage in Picture Archiving Communication Systems (PACS), requiring capital for new hardware every three to five years to ensure adequate capacity. Such heterogeneous PACS infrastructures include multiple operating systems, databases, archiving, and viewing and backup capabilities, and have resulted in a complexity that is increasingly difficult and costly to manage. PACS also consume scarce and expensive data center real estate.

According to a new five-year strategic plan from the Office of the National Coordinator (ONC) for Health Information Technology, big data will revolutionize healthcare. The plan, released for public comment in March of 2011, says that clinical information captured from Electronic Health Records (EHR) in machine-readable format can be used to rapidly speed up the creation and dissemination of medical knowledge thereby creating what the ONC calls a "learning health system." Through such a learning health system, the correct information will be available to support a given decision, whether it is about the efficacy of a treatment or medication for an individual patient, predicting a global pandemic, or deciding whether to proceed with the research and development for a potential new clinical treatment. This is what is meant by evidence-based medicine or information-enabled healthcare decisions.

## **BALANCING ACT**

The combination of evidence-based medicine drivers and the current "do more with less" state of IT creates an environment in healthcare companies of constant change. Since change will likely continue for the foreseeable future, healthcare IT managers must focus on controlling and managing that change. Organically, systems and networks tend toward greater complexity, often up to the point where the system architect can no longer adequately manage them. When IT infrastructure is allowed to get too complex, it ends up creating unnecessary challenges for managing the environment. Although the costs of such complexity are hard to specifically quantify, they are almost surely significant. The Standish

Group, a research firm that tracks corporate IT purchases, has found that 66 percent of all IT projects either fail outright or take much longer to install than expected because of their complexity. More complexity also means more training costs (for example, imagine how much money a company saves if their employees are not confused by the systems that they use). Healthcare IT managers are keenly focused on lowering the costs of administration, hardware and software maintenance, and energy, and learning to control the amount of complexity is essential for reducing such costs. Absolute control, however, if it means no growth, won't work. There is clear benefit and need for exploring emerging technologies in healthcare's changing landscape, as is awareness of the benefits versus costs and processes needed for managing tradeoffs. Without this balance, hidden costs may exist, or opportunities for growth may be overlooked.

## REDUCING IT COSTS AND COMPLEXITIES: CLOUD-BASED HEALTHCARE IT

Although cloud computing is embraced by other industries, it is not yet widely used with Electronic Health Records (EHR). However, due to the growth of big data, the time is right to look at the benefits of cloud computing applied to EHR systems. In the world of clinical data analysis, healthcare organizations face increasing pressure to mine clinical data for ways to improve patient care and manage costs. Clouds enable on-demand infrastructure for analytics without significant upfront capital expenditures or delays. In addition, since clouds are scalable, clinicians have the ability to scale up or down when necessary.

While not all cloud deployments are alike, they do share common characteristics. They involve an optimized or virtualized infrastructure, leverage the Internet for shared access, and charge for use based on actual consumption. Specifically for healthcare, clouds must provide high availability and high security; they must be scalable; and they also must provide inroads for HIPAA, HITECH, and EU Data Directives compliance. Since servers are virtualized, different instances can reside on the same hardware. The instances can be moved around depending on the need to make the best use of the hardware without compromising performance. Cloud hardware is distributed and fault tolerant. Cloud provides the promise of 99.95 percent availability. Even with public or hybrid clouds, there is definite knowledge as to the location and ownership of the housed data, thus satisfying privacy and data security requirements. Clouds can enhance collaboration, even for smaller providers who often don't have the ability to build and maintain their own infrastructures or to mine patient and claims data. Clouds allow a shared pool of computing and storage resources to be available to participating hospitals, practices, clinics, and labs on a pay-as-you-go basis.

Clouds for storing and sharing medical images have been called "PACS-on-Demand" systems. Cloud-based storage and sharing of images will reduce the need to invest in IT capacity as well as allow efficient and secure collaboration with radiology specialists and affiliated practices. Clouds are also a collaborative solution for sharing data between healthcare entities (such as providers and payers) which often have disparate data systems that are unable to bring together different types of data to make information-enabled healthcare decisions. Clouds enable different healthcare entities to bring together different types of data without a large upfront investment and with the ability to share with collaborating colleagues. Rapid deployment, the ability to collaborate, no upfront capital expenditures, and laying the ground work for an IT as a Service model make cloud an attractive environment for radiologists and other medical image users.

In addition, healthcare organizations are utilizing EMC OnDemand to save time and money, simplify operations, and move to the cloud with confidence with enterprise content healthcare solutions in an off-premise private cloud. Healthcare organizations benefit from solutions for a hybrid medical record, revenue cycle management, claims processing, and health insurance enrollment.

## CASE MANAGEMENT

The EMC Documentum® xCP provides a complete range of dynamic case management capabilities through reusable components that can be configured into reliable applications that serve any healthcare process or activity. These solutions enable virtual case files (VCFs), which can eliminate the inefficiencies of paper case files and aggregate any type of content relevant to a case, not just documents but audio and video files, images, and discussion threads. In addition, VCFs can orchestrate processes and enforce policies via embedded business rules. A Documentum xCP-based solution incorporates years of industry experience and helps ensure adherence to accepted healthcare best practices, while increasing productivity, providing seamless access to patient information, accelerating revenue, and decreasing operating costs.

## CLOUD MEETS BIG DATA

Since big data is different in scale and significance, it demands a new approach to healthcare IT. Big data is measured in exabytes and billions of files, and increasingly consists of unstructured data. Clouds make big data possible by providing an elastic pool of resources to handle the massive scale of big data. Through cloud computing, IT resources are more efficient and healthcare IT teams are more productive, thus freeing up resources to invest in big data and capitalize on opportunities that can transform business through strategic insight. To fully capitalize on this opportunity, organizations need a big data storage platform and a way to drive “Action from Insight” (see figure 1), and to make information-enabled healthcare decisions. To get to big data scale, organizations need a fully automated, scale-out storage platform that enables them to add capacity at zero operational cost and to scale performance and throughput linearly. EMC® Isilon® and EMC Atmos® are such big data storage platforms. EMC Atmos is optimized for global distribution of big data.

To get big data insight, you also need a big data analytics platform that integrates structured and unstructured analytics with realtime feeds and queries through a self-service interface and built-in collaboration. EMC Greenplum® is purpose-built for big data analytics delivering data in context as a part of all healthcare decision-making processes. EMC Documentum xCelerated Composition Platform (xCP) delivers case management, which takes the content-rich, partnership interaction of ad-hoc collaboration and puts it into a structured process with clear roles, next steps, and outcomes. EMC Documentum xCP is the “action engine for big data.”



Figure 1: End-to-end Cloud Services Platform

## DCA

The EMC Greenplum Data Computing Appliance (DCA) is based on increased flexibility and global control of data management. The DCA is a purpose-built, highly scalable data warehousing appliance that architecturally integrates database, computing, storage, and network into an enterprise-class, easy-to-implement system. It is the industry leader in price and performance. The device also highlights EMC's strengths in virtualization and cloud infrastructure. In addition, the device is agnostic at the application and analytics layer providing flexibility to end users who want a choice of vendors rather than standardizing on a single vendor. The Greenplum DCA family provides a rapidly deployable, scalable, and cost-effective infrastructure that enables you to manage and analyze exploding data volumes while increasing performance and achieving greater business agility.

## HIGH CAPACITY DCA

The High Capacity DCA is designed to host a multi-petabyte of data without taking up additional space, surging power consumption, or increasing costs. For businesses that require detailed analysis of extremely large amounts of data or those looking for a longer term archive, this model offers the lowest cost-per-unit data warehouse.

## DATA INTEGRATION ACCELERATOR

An add-on module that solves the challenges of data loading in a parallel and scalable model, the Data Integration Accelerator is built for customers who need to shorten batch loads and implement micro-batch loading, and leverages a growing catalog of data applications.

Large and small businesses must address the challenge of meeting ever-expanding workload requirements and rapidly delivering ROI while reducing execution risk on tightening budgets. Appliances, or purpose-built devices that pre-integrate hardware and software to address specific workloads, are rapidly becoming a preferred purchase option. Appliances specifically balance the control received through an on-premise deployment with the cost and ease-of-use benefits created through the prepackaging and pre-integration of the components. For example, vendors can deliver virtualized software appliances that are optimized to run on pre-integrated hardware platforms, offering the solution as a capital or lease option for the hardware and a subscription for the software.

## DATA COMPUTING

Following the acquisition of Greenplum, EMC launched a new data computing division that integrates EMC's best-in-class backup and recovery solutions, Greenplum's shared-nothing, MPP analytical database technology, and the VMware® virtualization platform into a single data warehouse platform. EMC benefits data warehousing by leveraging its core assets to transform data warehousing into "data computing." EMC defines data computing as a new data warehouse paradigm that moves processing dramatically closer to the data and analysis closer to the people who need insight. Data computing has the potential to be the next transformative step in data warehousing. This is what is needed in order for healthcare organizations to obtain big data insight and to be able to make more information-enabled healthcare decisions (action from insight).

While data warehouse offerings have traditionally been seen as a powerful lens for the analysis of in-house structured data, EMC's data computing necessitates the need for a data warehouse appliance when specific conditions are met. The data warehouse is redefined to include external data sources in the analysis and integration with third-party business intelligence and analytical tools. The result is a device that targets the management and integration of big data and information and the connection of the data to appropriate analytical tools. Instead of a preconfigured data repository, EMC offers a more dynamic device. Loading and query times—key buyer performance criteria—are simplified to enable easier end-user access to data and to improve speed and performance in the face of increasing data volumes.

## ENABLING INFORMATION-ENABLED HEALTHCARE DECISIONS

Healthcare providers seek to gain greater performance and operational efficiencies to unify fragmented clinical review processes with the clinical build process, with quality performance programs, people, projects, and siloed systems to drive evidence-based decision making. Healthcare payers, including government, are demanding evidence of the efficacy of treatments before they will authorize payment. Data on efficacy is the basis for payer information-enabled decisions.

Cloud computing transforms healthcare IT because it increases overall IT efficiency, increases business agility, enables access to a second opinion and data on efficiency, and enhances secure access to patient history to enable informed healthcare decision making. Cloud computing can also decrease costs and increase accessibility in the PACS arena. PACS in the cloud environment can also easily enable collaboration to increase productivity and quality of patient-related healthcare decisions.

Managing big data, whether it is from medical images, patient-centric analyses, clinical research studies, or translational research, is paramount in today's healthcare IT ecosystems. Clouds can enable healthcare organizations to capitalize on the big data phenomenon to change the way in which value is created from patient-related information. At the same time that big data is transforming business and changing the world, healthcare organizations can harness it to improve their strategies and execution in order to distance themselves from their competitors.

## CONTACT US

To learn about how EMC products, services, and solutions can help solve your business and IT challenges, contact your local representative or authorized reseller—or visit us at [www.EMC.com](http://www.EMC.com).

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