

## Improving patient care at Iowa Health System with the IBM Grid Medical Archive Solution



Iowa Health System, the state's largest integrated healthcare system, is a growing federation of 11 hospitals and 130 clinics. One of the benefits of membership is access to common IT systems. For example, the same GE Centricity PACS environment and Carecast hospital information system are used for all hospitals and clinics throughout Iowa Health System. As a result, member firms can harness technology that may otherwise be unaffordable, says Bob Thompson, director of governance and the "product owner" for the PACS environment.

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### Overview

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#### ■ Challenge

*The growth of digital health records and medical images led to scalability and maintenance issues with Iowa Health System's picture archiving and communication system (PACS) archive*

#### ■ Solution

*The IBM Grid Medical Archive Solution (GMAS) provides an automated, highly reliable multi-site storage archive*

#### ■ Key Benefits

- *Automated management tools enable the entire archive to be managed with less administrative time*
- *Fast access to historical images helps contribute to improved patient care*
- *Redundant architecture helps to ensure image accessibility even in the event of the loss of a data center*

#### **PACS image volume grows dramatically**

The transition to PACS began in 2003. Today, radiology imaging at all but two hospitals in Iowa Health System (who are now installing PACS) is completely digital, and digital cardiology imaging is expected to be in place at all hospitals in 2008. The GE Centricity system is distributed among the hospitals. Digital images from each hospital and a growing number of surrounding clinics are stored at the hospital as well as in a central archive. The hospitals maintain at least one year of studies while the central archive is intended to store images for durations up to the entire life of the patient.

Business is growing rapidly. Today, almost 700,000 digital exams are conducted each year throughout the Iowa Health System. Once the last two hospitals are converted to digital imaging, Thompson expects to exceed one million exams per year.

Archive requirements are growing rapidly due to the addition of more rural hospitals and clinics. Increasing image size is also driving up the amount of storage required. New high-resolution scanners are being deployed each year, including 128-slice scanners that produce 500 MB to 1 GB files for each study. Thompson says, "We see no end to the growth in our image archiving needs."

#### **Paperless processing adds to archiving requirements**

Besides diagnostic imaging, other critical documentation is moving to digital form and must be archived—Iowa Health System clinics are in the process of converting patient health records from paper to electronic form. New information will be maintained electronically using Allscripts Touchworks software. Scanned patient health records from McKesson Horizon Patient Folder (HPF) software are also archived. All work will be conducted on workstations in the exam rooms, which is expected to lower administrative costs and improve staff productivity.

#### **Scalability challenges develop in the central archive**

The PACS archive was initially part of a 40 TB storage area network (SAN) shared by the entire enterprise. The GE Centricity PACS system operated as if the archive was simply additional network-attached storage. Today, the SAN is composed of IBM System Storage™ DS4000™ disk storage systems. An IBM System Storage TS3500 Tape Library provides backup and long-term storage.

But rapid growth in PACS archiving needs—from 4 TB to 12 TB during the first half of 2006 alone—led to scalability and maintenance issues. As a result, the Iowa Health System IT staff began to explore alternative approaches to image archiving. Three vendors were asked to propose solutions—GE (using EMC storage), Hewlett-Packard and IBM.

#### **IBM GMAS archive offered increased flexibility and scalability**

Thompson describes his team's assessment of the vendors, noting, "The EMC archive is based on a proprietary file system, which would have tied us to a particular vendor. Because our medical images need to be retained for many years, it is important to have a

choice of vendors when the time comes to migrate to the next generation of equipment."

When asked about HP, Thompson adds, "The HP archive is managed by the same software as the IBM archive, but the hardware is different. We felt that the storage devices used in the IBM archive were more appropriate for an enterprise environment. IBM Grid Medical Archive Solution uses the same storage systems that we have in our data center. We knew those products were reliable, and we had grown to trust IBM support."

Thompson also liked that IBM System Storage Multilevel Grid Access Manager software is based on open standards. He says, "With IBM GMAS, we could move our data to another device at any time. Overall, IBM GMAS offered the best combination of flexibility and enterprise scalability—exactly what we needed in an archive for our critical medical records."

#### **GMAS helped lower archive costs**

Because Iowa Health System allocates the cost of the archive to the departments that use it, Thompson had concerns that he might have to raise prices to cover the additional cost of GMAS compared to the data center SAN. He says, "After we tallied the cost of GMAS software, hardware,

installation and training, we were actually able to forecast slightly reduced ongoing costs. The move from the Fibre Channel drives used in the previous SAN to SATA disk drives in the GMAS archive saved enough money to more than cover the added software cost.”

### **Redundant deployment added to GMAS resiliency**

It took only three weeks to deploy the GMAS system, which initially included a 30 TB protected solution. GMAS is composed of two redundant systems, a configuration that provides resiliency against failures. Thompson’s team planned to locate each of the redundant GMAS systems in its own data center—one each in two cities in Iowa. Having duplicate data would help improve availability so medical staff could continue to access data even if one of the data centers was inoperable.

One data center location was still under construction when the deployment took place, so the two systems were initially located in the primary data center. In early 2007, one half of the GMAS system was moved to the new facility. Says Thompson, “The move was a non-event because of the automatic failover protection built into GMAS.

We sent our administrator along to observe the process, but the transition was seamless to our users.”

Tape storage is also part of the GMAS archive environment. Once the migration of legacy images from the GE Centricity PACS environment is complete, the Archive Node is planned to be added to GMAS to integrate tape as one of the storage tiers. GMAS allows Iowa Health System to limit the growth of disk storage within GMAS by moving older images to a tape library—flexibility that helps to keep storage costs low.

### **Smooth deployment and enhanced reliability helped improve patient care**

IBM Global Services took responsibility for the entire project. IBM Business Partners also supported the deployment. Iowa Health System selected MSI System Integrators, an IBM Business Partner, to provide the hardware. And GE assisted with the migration of images from the SAN to GMAS.

Commenting on the smooth deployment, Thompson says, “IBM did an excellent job at keeping everything on schedule and on budget. We were

greatly impressed by how the companies worked closely together to provide a complete, integrated solution for us. Execution was flawless.”

Iowa Health System plans to add about 15 TB of data per year to the archive, and scaling needs are more predictable now, thanks to reporting from GMAS. Says Thompson, “We no longer rush to add disk storage because we are about to outgrow the archive. And over time, I know we can add other applications to the archive because GMAS is designed to grow.”

GMAS is transparent to the system’s end users—radiologists, directors of imaging and PACS administrators. “That’s exactly the way we want it,” says Thompson. “Our clinicians know their images are protected in a very reliable archive, enabling them to provide better care to patients for many years to come.”

And from a financial point of view, Thompson adds, “I’m quite happy about the cost—this is clearly an example of how technology can help Iowa Health System provide better health-care to our patients at the same or lower cost.”

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