Partners HealthCare Proves That PACS and FlashDisk Work Flawlessly Together

7 Years of Images - Over 1 PB - Stored at Low Cost

Partners HealthCare was founded in 1994 by two renowned Boston medical institutions, Brigham and Women's Hospital and Massachusetts General Hospital, for the express purpose of bringing together an integrated health-care network of community hospitals and health centers, academic medical centers, specialty facilities, and other health-related entities throughout the Boston metropolitan area. In addition to its founding members, the network includes Newton-Wellesley Hospital, North Shore Medical Center, Partners Community HealthCare Inc. (PCHI), and McLean Hospital, to name just a few.

A Champion of PACS Technology

To maintain its competitive edge as a leader in the delivery of superior medical care, Partners HealthCare continues to invest in advanced technology. To this end, the organization is a leader of a digital imaging technology known as PACS (picture archiving and communication systems). According to Tom Schultz, chief engineer for Enterprise Medical Imaging at Partners HealthCare, "PACS is a natural fit in our network because it offers many advantages over traditional film." Schultz notes some of the key benefits of PACS:
- Images can be distributed in minutes to multiple departments throughout the network and can be accessed simultaneously by several physicians or care providers, which dramatically improves patient care and expedites medical consultation.

- All prior exams are readily available to radiologists, which can aid in diagnosis and eliminate delays associated with traditional film that are not readily available.
- Lost or misfiled images, which is a perpetual problem with traditional film, are eliminated because the original images are stored and indexed electronically.

Summary
-1,500 exams per day
-44 TB grows to 1 PB
-Cost/TB cut 75% in 4 years

The PACS Vendor's Grip

Although the benefits of PACS technology from a medical user perspective are well documented, PACS presents a challenge when it comes to finding compatible storage devices at a reasonable cost. The nature of digital imaging technology in and of itself has enormous storage demands. To this point, Schultz did a quick calculation to emphasize the storage requirements of digital imaging in a medical setting the size of Massachusetts General Hospital, Partners' largest site. "On average, we perform about 1,500 radiology exams a day. Depending on the type of exam, each exam can range from 2 to 16,000 images; the average across all exam types is about 100 images per exam. As a result, we need to store about 55 million images a year. That's a lot of storage. In addition, we have a repository of seven years of images, resulting initially in

about 44 terabytes of data - this is even after allowing for compression of the images, which is done only after the radiologists have completed their reports. After that, a medical legal copy of the exam is transferred to tape and sent to Iron Mountain for storage." Schultz remarks that what compounded the storage cost factor in the early days of digital technology when Partners began investing in PACS technology was the fact that PACS vendors claimed to be constrained by the FDA and its internal practices. This meant storage from a PACS vendor would cost four times as much as it would from another storage vendor, and PACS vendor storage options were limited.

PACS Requirements: Storing Very Large Files

As Partners HealthCare's Enterprise Medical Imaging Group began to grow and become more influential over the past seven years, Schultz's team worked hard to convince the medical imaging industry that purchasing storage separately from software applications is ideal for all parties. Today, most PACS companies accept this arrangement as standard practice.

This freedom ultimately led Schultz and his team about three years ago to purchase storage equipment from the large manufacturers such as EMC, IBM, Hewlett-Packard, and Dell, which represented Partners' first storage purchases made outside of the PACS vendor relationship.

However, over time, Schultz began to see that the solutions from these vendors did not really address Partners Health-Care's needs: "We just need to write data and then retrieve it in a fairly quick timeframe. We realized that if we were to go with a Fibre Channel or SAN solution from a company like EMC, it would take perhaps one second to retrieve the images. And while the retrieval time is impressive, the cost of the storage device is such that we could buy only a small amount of storage, say enough for only a few months."

With this knowledge, Schultz and his team began to search the web and scan trade magazines to find alternative data storage vendors. Having made a commitment to remain hardware agnostic, Schultz's group engaged Winchester Systems as part of the review process several years ago. When Schultz and his team initially met with the sales engineer from Winchester Systems, they were shown a cost-effective, yet scalable, approach to storing large amounts of data. Schultz notes, "We were struck by how low pressure, patient, and competent the sales engineers at Winchester Systems were. After understanding our situation, they recommended a storage configuration that met our requirements - that is, high-density, affordable, storage." The team at Winchester Systems proceeded to install a low cost field proven FlashDisk SATA that directly attached to Partners' PACS. After the system was up and running, Schultz's group recognized the immediate benefits of this storage solution.

FlashDisk SATA Benefits
High-Density Drives Reduce Physical Space. For starters, FlashDisk SATA met Partners HealthCare's basic requirement of reducing the amount of physical storage space needed. The

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Tom Schultz, Chief Engineer

FlashDisk SATA drives initially selected were high density 250 GB drives, which is important when storing the first 44 terabytes of image data. Schultz comments. "With the lack of space in the hospital environment being what it is, if we needed two to three extra racks for our storage, we would be in trouble." From 2004 to 2008 Schultz added higher density disks including 500 GB, 750 GB and 1 TB as capacities increased - lowering cost per terabyte dramatically each time and saving precious rack space. Total capacity increased from an initial 44 TB to over 1 PB (1,000 TB) in just four years.

FlashDisk SATA Drives Are Affordable. The Enterprise Medical Imaging Group was equally pleased to find that they were able to purchase 8 to 10 terabytes using the SATA drives for what it would cost to buy 2 to 4 terabytes as a Fibre Channel SAN solution. Schultz puts it this way: "With the FlashDisk SATA drives, we get the necessary six to seven years of online digital images compared to the cost of only one or two years of online storage using a Fibre Channel SAN solution."

FlashDisk SATA Is Compatible with Different PACS. Partner's HealthCare also found that FlashDisk SATA is compatible with all of its PACS systems, which include FUJI at Newton-Wellesley, AGFA and AMICAS at Mass General, and AMICAS at North Shore Medical Center. Since the first installation

of a year and a half ago, Partners HealthCare has purchased over 65 FlashDisk SATA systems, that are installed at various locations throughout their network.

FlashAlert Provides "Peace of Mind"
At the same time that FlashDisk SATA was installed, Winchester Systems also installed FlashConsole with FlashAlert, included with every solution. FlashConsole is a centralized management appliance that reports any problems with the FlashDisk arrays. FlashAlert is used in conjunction with FlashConsole to provide continuous storage management of all the FlashDisks on Partners' network. In the event of a problem - whether it be a hardware failure or an environment issue - FlashAlert sends an email to a Winchester Systems call center using stringent authentication and encryption standards. Upon receipt of the email, a trained support person quickly diagnoses the problem and responds immediately with corrective action.

A True Partnership: Going the Extra Mile
In essence, the Enterprise Medical Imaging Group sees Winchester Systems as a valued partner. Schultz concludes, "Winchester Systems provides the support we need. If they get a call at 2 or 5 a.m., it is very important that somebody be on site to repair the system with the right part, the right expertise, and, equally important, the right attitude -- meaning, we don't want any quibbling. That's exactly what the service team at Winchester Systems delivers. They put all the minor details aside. They take the extra step that other vendors were not willing to take."