

Next-Generation PACS Improves Patient Care



The University of Rochester Medical Center (URMC) in Rochester, New York, is the medical and dental school for the University of Rochester, as well as a regional health center serving the surrounding area. It is at the heart of medical knowledge and expertise for central and upstate New York, and includes the University of Rochester School of Medicine and Dentistry, a School of Nursing, Dental Center, Medical Faculty Group, Memorial Hospital, and a Children's Hospital. It recently chose Kodak Health Group to overhaul its network, using the Cisco® Connected Imaging approach to improve its picture-archiving and communication system (PACS), so that the health center could better manage its growing number of data-rich medical imaging files.

“PACS is one of the most challenging applications in IT today,” says Gary Scialdone, RIS-PACS administrator at the University of Rochester Medical Center. “It can be compared to computer-assisted design and movies, because they are very large image files, and the nature of images is getting more sophisticated with three-dimensional and even four-dimensional imaging. And because of the quality demands of healthcare, there is little room for error so you do not want to lose any bits of image data.”

According to Al Kinell, director of alliances for Kodak Health, the vast majority of healthcare institutions rely on medical imaging to provide patient care. From a digital imaging perspective, nearly 90 percent of large academic and community medical institutions have a PACS solution in place.

“The problem is, those original solutions from ten years ago or so are reaching the end of their technical lives,” says Kinell. “Needs change, and the size of imaging files have grown tremendously, which drives a need for a system change.” For instance, about 5 years ago the first PACS would process dozens of image “slices” taken for a Computed Tomography (CT) study. Today a single CT study can produce thousands of image slices.

Such was the situation at UPMC. While it had a Kodak Health Group PACS in place, it was a prior-generation solution that the center had outgrown. Kodak Health proposed that the university move to its next-generation PACS, the Kodak DirectView PACS System 5. System 5 is a Web-enabled, image-and-information management system developed to allow radiology departments to store, distribute, and diagnose large volumes of patient medical images from X-rays, CT, digital mammography, positron-emission tomography (PET), PET/CT, and magnetic resonance modalities.

Scialdone and the rest of the center's IT staff wanted the new PACS solution not to be a stand-alone solution but part of an overall Connected Imaging advanced technology strategy built on a Cisco medical-grade network that would integrate storage, a radiology information system (RIS), a hospital information system (HIS), and PACS.

"We shopped really hard and narrowed it down to six or eight proposals," says Scialdone. "We were replacing our first-generation PACS sooner than expected and did not want that to happen again. We had also learned the hard way how demanding these files are on a network. We definitely needed a PACS-grade medical network." The team decided to focus on a seven-year technology roadmap, based on anticipated medical technology lifecycle, to address the network, PACS and RIS, and tried to anticipate every cost and calculate the total cost of ownership. Cisco's Connected Imaging provides secure optimized image transport to meet the demands of PACS.

To ensure optimal performance for this new HIS/RIS/PACS solution, Kodak worked with IBM to design and implement a new advanced technology infrastructure based on Connected Imaging which combines storage area network (SAN) virtualization, security, the Cisco medical-grade network, and integration to support digital imaging operations. IBM designed and implemented its TotalStorage networked storage system to deliver nearly 70 terabytes of scalable, high-performance storage for the PACS

application on Connected Imaging across the medical center locations. IBM Total Storage and Connected Imaging deliver vastly improved performance for image access and delivery thanks to two Cisco MDS 9000 SAN switches and the Medical Grade Network. These Connected Imaging components deliver double the processing power of the former switches and extend the benefits of the new solution throughout the medical center.

"The biggest challenge with this kind of design and deployment is getting complete duplicate access with the high level of bandwidth that these large imaging files demand," says Kinel. "Beefing up storage at all of the locations also can get very costly. We worked hard to design the most appropriate combination of storage and network bandwidth."

And besides the high bandwidth demand, Kodak Health Group had other demands to work within: business continuity, 0.9999 percent (or 'four-nines') availability, and high performance. Scialdone and the IT staff wanted any user at any workstation located at any of the medical center buildings to get the first image of a study with full resolution within three seconds of choosing it.

Now that Connected Imaging delivers the advanced technology services for the new PACS, Scialdone says doctors, staff, and patients all benefit.

"We operate 24 hours a day, and when you measure that in minutes, 99 percent uptime is not acceptable," he says. "Our emergency departments may not have the time to wait 10 minutes for an image file to load or to deal with network downtime. The reliability of the new PACS and Connected Imaging solution gives physicians and surgeons nearly instant access to patient images, enabling them to act more quickly. And Connected Imaging and Total Storage are built to grow with imaging technology. Today we can easily handle those CT body scans that produce five thousand or more image slices. Besides the vastly improved access to images and information, improved reliability, and greater uptime, we have the scalability to keep pace with technology for years to come."



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