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## Image Exchange

**Thin-client and zero-client technologies improve radiology workflow by offering access to imaging studies anywhere, anytime.**

*by Thomas G. Dolan*

Not too long ago, a radiologist was tied to a specific workstation and had to log on to that machine to download and view images. Then he had to put those images on a CD and send them to a referring physician, who then went through a similar downloading process. Now, thanks to new thin-client and zero-client technologies, radiologists and physicians can view and share medical images anytime, and anywhere in the hospital or even on a home computer.

This results in speedier, easier viewing and sharing of medical images with the payoff of more efficient workflow and increased productivity.

The difference between thin-client and zero-client? In brief, thin-client is software based, while zero-client is Internet based, accessed by any standard browser.

What follows are testimonials from three users. The first utilizes a thin-client, the second a thin-client while it is in migration to a zero-client, and the third a zero-client.



## **The Investment Is "Worth It"**

The Swedish Cancer Institute (SCI), a leader in the development, early adoption, and clinical implementation of advanced technologies for the diagnosis and treatment of cancer patients, is based in Seattle, and is a prominent clinical division of Swedish Health Services, the largest, most comprehensive, nonprofit health provider in the greater Puget Sound area. SCI utilizes the thin-client product, called Pinnacle Smart Enterprise, offered by Philips Healthcare, Andover, Md.

David Shepard, PhD, director of physics at SCI, reports that it just had the system installed in January 2011, but, as a fairly new user, has a clear perspective of before and after. "We have a main facility and five satellite centers," Shepard said. "So, historically, each user had his own workstation, and he would often have to drive to the main facility to log in and see patient data. Sometimes you'd have six or seven people in one room doing planning. The thin-client has a much smaller footprint, quieter, controlled, and cooler in a well-managed data center rather than cubicles or offices."

Moreover, with the traditional model of one workstation for each user, many workstations were not in use, Shepard continued. "Patient loads can go up and down, and we never know how busy we'll be on any given day. Now we don't need as many workstations at each outlet, and can get by with fewer licenses."

Shepard also pointed out that as a cancer center, "we're using not only radiology for imaging but also radiation for treating cancer. In our radiation therapy plans, we determine how many beams of radiation are needed, and how to shape them."

This means that the thin-client goes further than convenience for the radiologists and physicians. "Our goal is to deliver the best possible cancer care to every patient in every office in our network," said Vivek Mehta, MD, radiation oncologist at SCI. "The Philips radiation therapy planning system helps us achieve that with easy plan sharing. The expertise at our main campus in Seattle is now available throughout our network of community-based centers, which enables us to deliver even the most complex treatments closer to patients' homes."

Shepard said that the investment for the thin-client "has been very substantial, but we feel good about the investment and believe it is worth it." Shepard added that training for Pinnacle "is significant for we had to learn a new planning system, but the actual use of the system in a distributed way is very straightforward and involves no training. Overall, we've found no significant downsides with our thin-client product."

## **Better Workflow Management for Multiple Sites**

Howard Lee, MD, president of Northeast Radiology, Brewster, NY, reports he has been using the thin-client of the Ridgefield, Conn-based CoActiv Medical—EXAM-PACS—for almost 7 years. "We were one of the original users of the system. They did not insist we buy hardware from them because they also offered a software-only option, which

made them more vendor neutral, which we felt was a big advantage. Migrating to CoActiv was a significant investment, but it priced out much better than other PACS providers, and the investment has certainly been well worth it for the past 7 years. There was some training involved, but it was surprisingly minimal, only a few hours."

Since the practice covers a hospital and five imaging centers, Lee said the system was "crucial to managing our workflow in different sites. It's been simple to download and view the images on the computer for both the radiologists and our referring doctors, both of whom can review the images remotely, even from their homes in an emergency. Because all exams have been archived with multiple levels of redundancy, the system still functioned perfectly when one or more of our locations may have had technical issues with our Internet connectivity or if we had power outages. And referring physicians are able to quickly and easily review images in a HIPAA-compliant format."

As happy as Lee is with the current thin-client product, he is even more excited by the new CoActiv zero-footprint client product called EXAM-BROWSER. "This one doesn't need any software installed, but will work on any computer or electronic device that has a browser built into it," Lee said. "This is still HIPAA compliant and completely secure, but also has the unique ability to do both real-time 3D reconstruction as well as real-time person-to-person consultation from different locations, on different devices. If I have a referring doctor in an intensive care unit with an iPad or tablet, and I'm in my office or home, we can both look at the same images at the same time. If I'm looking at an abscess in the abdomen, I don't have to describe it, but can instantly scroll to the exact image and actually circle the abscess."

Lee added, "I'm anticipating the time when we can have the family physician, the oncologist, the radiologist, the surgeon, and others, even the patient, viewing the same imaging study from remote locations, instead of all being in the same room, as they now have to be."

The EXAM-BROWSER is still in the final testing phase. "We're a beta user and are working on it on an experimental basis to help work with validation and various configurations," said Lee. "But I'm eager to be able to begin using it for actual patients."

### **Operational Efficiencies, Satisfied Users**

Craig Roy, CIO at Radiology Associates of Sacramento (RAS) in California, explains that they worked with their existing vendor to affordably add a zero-client viewing solution. "It's not been a big investment," said Roy.

For some time, RAS had used a PACS from Chicago-based Merge Healthcare for picture archiving and communication. The practice subsequently added Merge's vendor neutral archive (Merge iConnect VNA) to improve image storage and management across their enterprise. Most recently, they added a Merge iConnect Access to improve image distribution. This zero-footprint, zero-download DICOM and XDS viewer replaced an existing solution that required separate caching of images. With the new viewing

technology, Roy reports both cost and operational efficiencies, as well as increased satisfaction among users, both radiologists and physicians.

RAS is a multisite imaging facility with nearly 50 radiologists and 20-plus specialists, including those in radiation oncology, vascular, and nuclear medicine. The physicians contract to read for two different hospitals in their core geographic area.

"The big advantage of the zero-client footprint is that you can pretty much access patient information via the Web through any Web browser of your choice."

Atul Agarwal, vice president research/development for health IT solutions at Merge, illustrates what "zero-client" means through an analogy: "Consider the use of Google Maps, which allows users to find a location, view surrounding areas, pan to a specific point, and zoom to detailed information," Agarwal said. "With a single click, users even bring up satellite images—to view a car in someone's driveway, or catch a bird's-eye view of a neighbor's pool.

"Now draw a parallel to a physician who wants to view a CT image—at a hospital bedside, at his office, at his home, or maybe even en route to the golf course. Just as Google Maps is used for viewing and manipulation of map images, doctors can use the same type of 'zero-client' technology to view and interact with digital medical images."

Roy agreed with the benefits, but said that "a disadvantage is when you move from primary care doctors to specialists, for you need more window leveling and manipulations to give the specialist a closer view. It's not that the screen is necessarily too small, but the tool set allows you to deep dive into the cave only with some hesitation."

But a real advantage, especially from an IT perspective, continues Roy, is doing away with all of the labor-intensive installs and upgrades. For both thin- and thick-client environments, IT professionals are typically required for installation, maintenance, and upgrades. Hospitals with hundreds/thousands of users incur significant costs for IT staff to routinely visit every workstation.

Also, Roy continued, the previous procedures of downloading software ran into roadblocks, since a lot of referring doctors affiliated with hospitals had very strict security rules. "Our ability to allow doctors to view was impeded by those strict security rules. Getting through those desktop policies was a long drawn out process. And then, when an upgrade came out, you had to go back again through the hospital system to get the changes made. It was very challenging."

The zero-client solution solved that difficulty. But it brought another downside having to do with training. "It's not as intuitive as I'd like it to be for either the radiologist or physician," Roy said. "You need to go through a lot of drop-down menus. But the good news is there's not a lot of function, so not a lot of navigation to explore."

Overall, Roy says the upsides far outweigh the downsides.

In sum, the ability of both radiologists and physicians to have timely, hassle-free access to any image, anytime, anywhere, not only saves money, but could help save lives as well.

*Thomas G. Dolan is a contributing writer for Imaging Economics.*