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PACS Commoditization

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The emerging notion of PACS as a commodity seems to promise a “plug-and-play” environment that will not only support near-seamless sharing of imaging data across the enterprise but will also allow for easily adding, dropping, or changing user stations with minimal downtime, whether that involves swapping out hardware or upgrading software functionalities.

The “commodity PACS” is envisioned as an advanced software-only product capable of running on virtually any hardware or under any operating system and of connecting to any other system. Judging from the ongoing history of PC developments in both hardware and software, many predict that PACS will inevitably become a similar off-the-shelf product running on off-the-shelf systems.

“The most important thing happening in the area of PACS technology today is its rapid commoditization,” says Ed Heere, president of CoActiv Medical Business Solutions. “If you can’t play in the commodity market, you have to compete in the specialized market and that immediately defines your product as being more expensive and less flexible.”

Workflow and Integration

However, Lenny J. Reznik, director of enterprise image and information solutions for Agfa Healthcare, disagrees: “There’s a prevalent belief that PACS has turned into a commodity but in the real world, that’s absolutely not true. There definitely will always be differentiators in workflow and integrations that keep PACS software from becoming just another commodity. It’s the hardware that’s become a commodity.”

Current PACS offerings greatly benefit from digital technology advances initially aimed at the consumer and general business markets, where interchangeable PC-based systems are the rule. It’s easy to forget that improvements such as faster microchips and dual channel processors, expanded storage options, enhanced communications, and superlative imaging were never developed with healthcare solely in mind. Although a growing body of scholarly studies document the clinical improvements PACS can provide, it’s more accurate to class PACS as an IT product, regardless of whether it’s controlled by the radiology (or any other) department or by a network administrator.

“Users need to understand PACS as medical imaging over IT,” says Heere. “PACS functionality is basically the movement of IT images—the acquisition, storage, and retrieval of medical images over IT networks and using a DICOM viewing system to read the imaging data. The real issue is distribution, both internal and external.

“It’s now assumed that any full-featured PACS product can handle all DICOM files [including DICOM RT], provide built-in 3D reconstruction, integrate with information systems and electronic records, and allow for custom workflow demands,” he adds. The current deciding factors for PACS implementation are cost and HIPAA archive compliance, according to Heere.

Digital Convergence

While PACS has evolved and penetrated hospitals, IT technology innovations have reduced the direct cost required to implement the technology, says Heere. “For example, the cost of storage is significantly less expensive, with lower cost RAID [redundant arrays of independent disks] replacing old DVD jukeboxes and tape libraries; servers and workstations are less expensive; and the bandwidth needed to move data around is both faster and less expensive. All these IT-related items that drastically affect PACS now cost significantly less money.”

In some ways, the commoditization trend has been ongoing. “When you buy a PACS from some of the very large vendors, what you’re getting is often a blend of other vendors’ products because most of the big vendors have incorporated into their proprietary line products that they’ve acquired or integrated from a third party,” says Heere.

Reznik likens PACS evolution to ongoing cell phone development. “Like cell phones that are also cameras and MP3 players and Internet portals in a single device, people are looking for one system that can handle all of their needs ... even if they don’t know what they need yet,” he explains.

The emergence of large-volume data sets—and accompanying management issues—are making many users rethink the commodity idea, says Reznik. “Multislice modalities like CT and MRI are one of the chief reasons people are buying PACS today; however, they do create unique workflow challenges,” he says. Many facilities using volumetric tools such as 3D, 4D, maximum intensity projections, and multiplanar reconstruction have already discovered that as imaging capabilities move toward infinite slices, radiologists expect more from their systems and clinicians begin to demand more from their radiologists. Couple this trend with the continuing penetration of RIS and its growing complexity, “and we see this great synergy taking place with RIS, PACS, advanced digitalization, extending even to reporting and general digital archiving,” says Reznik. To achieve that goal, Reznik says Agfa creates all the software for its IMPAX line.

In Reznik’s experience, as users become more sophisticated about what they want from their PACS, they also become more cautious about the idea that you can just add basic or off-the-shelf equipment and applications to the network without planning for workflow changes. “Buyers are beginning to realize that for any of these [applications] to work together effectively, you really need to have a digital convergence,” he says.

Archive Innovations

Perhaps the most significant breakthrough in PACS technology has been the ability to use only DICOM data to store and recognize files. That process allows for retrieving and reading imaging and associated data on practically any workstation, regardless of whether that data originated on a particular vendor’s proprietary system.

Reznik terms this approach *vendor-neutral archiving*, and he traces its beginnings to the current ongoing emphasis on standards, especially Integrating the Healthcare Enterprise (IHE) profiles. “Until now, every vendor implemented their archiving strategy based on their specific PACS strategy. In order to change from one vendor to another, you needed to buy very expensive data migration services. Vendors don’t like migrating data any more than users do; it’s very complex and costly for us, and it creates more change for errors,” he says.

Newer systems, such as Agfa’s IMPAX Data Center, adhere closely to DICOM and IHE standards, says Reznik. In addition to virtually eliminating the need for data migration, the vendor-neutral archive better separates the storage aspect of PACS from the workflow aspects. “Ultimately, that saves a lot of money when you look at the big picture for true cost of ownership,” he notes. “The workflow aspect happens in the department—what the radiologist is seeing on the desktop—but the storage part is more an infrastructure issue; it’s more IT based. So the whole concept of standards-based, vendor-neutral DICOM archiving is really becoming key.”

Departmental Data Options

CoActiv has used an IT-based, vendor-neutral archiving solution since inception, linking all clients to its EXAM-Vault system. Archiving included as part of CoActiv’s EXAM-PACS enables image data from any number of DICOM modalities to be automatically uploaded to the on-site servers and redundant client servers at the company’s data centers.

For example, Heere cites a hospital client that currently offloads digital mammography and cardiology images and is planning to add all its CT, MRI, and ultrasound studies to CoActiv’s archive and distribution

system without a PACS in place. Thus all imaging information will be centrally accessible regardless of which vendor's PACS this client ultimately chooses.

Reznik points out that in the current climate of “a PACS for every department,” the DICOM archive is key to accommodating a variety of systems and helping them share data. “We believe that workflow should be handled at the departmental level while infrastructure is handled at what we’ll call the enterprise level. ... Fragmented storage leads to fragmented patient care, so just having each department do something on its own is not the answer. You want to make sure that there’s a common infrastructure that will enable the hospital to have a single point of integration, a common portal, to the electronic medical record.”

What to Expect

While it’s fairly clear that there’s no longer any contest about IT’s expanding authority over PACS—at least in the largest institutions—for many end users, some version of a commodity PACS is going to be their stepping stone into the wider workflow. Specialty users will likely find the (relative) simplicity of a plug-and-play, grow-it-yourself configuration highly attractive. Established installations, whether single vendor or multivendor, controlled by radiology or IT, will increasingly be pressed to work smoothly with these types of “external” systems, acting as the sole portal that manages all imaging and imaging-related information across the enterprise.

According to Heere, the future of PACS “is going to be the ability to read anytime, anywhere affordably. So, anywhere you have access to a computer, you can read. ... What we’re seeing in the hospitals is the radiologists fighting with the cardiologists, the [emergency department], over who owns what but ... the hospital cares about using the same viewers, acquisition software, viewing software, archives, and exam distribution software throughout the facility in orthopedics, cardiology, radiology, wherever.”

“It’s important to recognize that the current controversy is not just about PACS; it’s about radiology IT, which is multiple systems working together,” explains Reznik. “PACS needs to be viewed as part of a larger system [and] imaging services providers need to recognize that IT can be the enabling solution for improving radiologist productivity and patient care. So it’s not just about PACS; it’s about using IT strategically to achieve the broader goals for radiology services.”

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