Finding ROI in Deconstructed PACS

Enterprise solutions reduce barriers, optimize workflow and improve patient care

When called upon, a hospital’s PACS (picture archiving and communication system) is a key component of patient care, essential to interpreting and communicating what is happening with a patient. Fast, easy access to images requires advanced systems and state-of-the-art technology working together in perfect harmony.

This harmony is within reach but presents a challenge for hospital CFOs. Constrained budgets, paired with the practice of postponing technology upgrades, have historically limited adoption of emerging technologies. But research shows compelling returns on investment for those who consider the full benefits of developing their own deconstructed PACS strategy.

Deconstructed PACS is defined as a standards-based strategy to deconstruct the core components of PACS (viewer, workflow and archive) and reassemble them with a vendor-neutral approach for enterprise viewing, enterprise workflow and enterprise archival/storage of diagnostic and non-diagnostic images. Another related industry term for this concept is PACS 3.0.

Health systems and imaging services providers who have implemented their own deconstructed PACS strategy have quickly reached their desired operational goals through gains in productivity, turning technology into strategic advantage. This white paper explores how these solutions have advanced, perceived challenges to deconstructed PACS strategies, and where institutions can realize workflow and efficiency ROIs with new systems.

A brief history of deconstructed PACS

Deconstructed PACS is the third major revolution of the PACS architecture. The first revolution was in the 1990s, during the transition of images from film to digital using thick-client, hardware-intensive approaches. The gains in productivity, efficiency and satisfaction during that transition were extreme—in some cases, reducing turnaround time from 24 hours to just a few. The second major revolution of PACS occurred in the early to mid-2000s, coinciding with the explosion of web-based solutions. Where the first revolution took PACS to academics, web-based PACS took the revolution to community-based and outpatient health care.

Today, the market has become saturated with these approaches to PACS. In 2012, HIMSS estimated that nearly 91 percent of hospitals had a radiology PACS solution in place. While these PACS solutions have clearly become the standard for interpreting and accessing radiology studies, the technology has essentially remained frozen in time. Despite demands for better functionality, usability and overall results, legacy PACS upgrades and replacements aren’t offering the overhaul radiologists expect to keep up with today’s imaging needs.

Radiologists are under significant pressure to maintain reading productivity, while also dedicating sufficient time to consult with referring physicians. With health care consolidation adding significant foundational complexity, combined with the lack of advancement in PACS, radiologists find themselves unable to efficiently read the number of studies required. Current and prior studies may not have a comprehensive view of who this patient is and his or her medical history. Advances in mobile access are limited at best.

These frustrations are leading more institutions to explore best-of-breed solutions such as enterprise diagnostic viewers, enterprise workflow solutions and vendor neutral archives for their organizations. They are deconstructing the PACS to create a solution that they can exert control over, and that offers state-of-the-art capabilities and fits their budget.

At this point, most deconstructed PACS are in place at larger hospital and private practice networks that are also early tech adopters. However, as the solution becomes mainstream, institutions will increasingly be creating their own solutions on their own terms.
The market is showing this shift, with adoption rates for enterprise solutions forecast to rise in coming years while legacy system adoptions slow. Frost & Sullivan’s US Enterprise Medical Image Viewers Market analysis showed the market anticipates growing revenue from $44.8 million in 2013 to $63.9 million in 2017, as hospitals and care systems of all sizes embrace the new technology to better serve referring physicians¹. The vendor-neutral archive (VNA) market is expected to grow from $110.5 million in 2011 to $210.0 million in 2018⁴.

**Defining the divide between legacy and deconstructed PACS**

Legacy PACS and deconstructed PACS have the same components—an archive, a viewer and a workflow/worklist solution. But the critical difference with deconstructed components is they have been developed to do one competency extremely well and also designed as enterprise-scale applications.

Legacy PACS are tied to vendor-specific solutions, which means that all components are designed to work with—and work best with—other one-size-fits-all components from that vendor. They are delivered as a packaged solution. Add-on integrations are available to add functionality, but these come at the price of third-party expenses.

In contrast, deconstructed PACS employ neutral components as a custom solution for institutional needs. These deconstructed architectures hinge on three best-of-breed components: a vendor neutral archive, an enterprise viewer and an enterprise workflow/worklist solution. These components remove two major legacy PACS issues—interface challenges and workflow inefficiency—primarily because:

- They are vendor agnostic, support modern technology and are standards-based. They work flexibly with solutions from other vendors, and integrate with existing informatics systems, including the EHR. This removes the need for proprietary interfaces.
- Organizations can consolidate image viewers and processes across sub-specialty departments, improving workflow. Many radiologists operate on so-called “swivel chair workflow,” where the radiologist has to move from viewer to viewer, from workstation to workstation, based on the type of study and which institution sent that study. Enterprise viewers can be used for all diagnostic modalities, accommodating the most common studies and leading to sizable reductions in the number of image viewers used in imaging. Server-side powered viewers are also orders of magnitude faster than legacy diagnostic workstations and clinical viewers, taking even today’s largest gigabyte-sized imaging studies in stride.

**Overcoming perceived challenges of deconstructed PACS**

Despite the operational improvements seen with deconstructed PACS, some hospitals and health systems are hesitant to embark on the strategy. There are various perceived challenges to implementing a deconstructed PACS strategy; however, by examining the long-term system and patient care benefits realized through deconstructed PACS, a clear return on investment can be seen.

Michael J. Gray, principal of Gray Consulting, said in his experience, health care organizations arrive at the decision to make their own PACS when two ideas intersect: frustration and opportunity. Frustration stems from measuring the cost to upgrade one legacy system with another. Opportunity grows when they realize they can create a custom solution, on their own, that does everything they need and want. This solution will likely have a longer life because it’s the latest generation of technology.

Other hospitals arrive at a state of deconstructed PACS readiness when they experience a fundamental environment change, because systems that used to work well no longer do, noted Paul Pierre, president and enterprise imaging architect at DISYS Consulting. Mergers and acquisitions top this list of changes, when systems can’t easily absorb and integrate new hospitals with old systems. He also shared some of the top perceived challenges he’s seen amongst provider organizations.

**Challenge #1: “Our solution isn’t broken. It doesn’t need to be fixed.”**

This argument hinges on the idea that the legacy PACS is meeting the individual needs of radiology staff and referring physicians, as well as the overall needs of the hospital. While this may be true for some organizations, the argument falls apart as operations grow more complex.

As Pierre noted, a hospital network in acquisition mode often realizes communication difficulties when its new members’ PACS are aging and from different vendors, and viewing studies are limited to the hospital where they originate.

Another area where legacy solutions have lagged behind enterprise components is mobile and remote access. It’s critical that the PACS infrastructure securely support radiologists when they are outside the hospital’s walls. As the newest generation technology, many enterprise components not only factor in mobile access, but build functionality for this purpose.
Challenge #2: “We’re not sure we have the comfort or skill level to create our own solution.”

This is a common concern among smaller hospitals and health systems. Building a customized best-of-breed solution requires more resources than smaller hospitals typically have, Gray noted, and is a primary reason that large networks have been early adopters of deconstructed PACS. It’s simpler and often effective to update the legacy PACS already in place.

However, options exist for hospitals that want to take advantage of the latest technology and implement an enterprise solution to improve mobile access or consolidate systems. In the future, systems integrators may come to market with a PACS based around the latest technology, Pierre noted, which will feature the advanced functionality of today’s technology delivered in a packaged solution.

Challenge #3: “Our team doesn’t want to learn new tools.”

New technology is often met with resistance, and training is critical to overcoming these hurdles. There are long-term benefits to consolidating and aligning different departments and provider network locations on the same system.

Resistance to adopting new tools isn’t always the case, particularly when longstanding barriers are leapfrogged through the use of innovative, deconstructed approaches. Patrick Ward, Central Illinois Radiological Associates’ (CIRA) chief information officer, noted CIRA overcame access concerns by three methods – relying on standards-based reporting, offering a workflow to physicians about how to access data within the system, and including role-based permissions so only those involved in the patient’s care could access the records. Physicians sending studies to radiologists at different locations no longer have to think about which system they’re using to prepare and mark a study for review. Radiologists reading studies from different locations can eliminate inconsistencies to create more consistent, higher quality reports for physicians.

Challenge #4: “It’s too expensive.”

Access to capital is one of the biggest challenges to replacing a PACS. While it’s usually less expensive to extend a support and maintenance contract for a legacy system, the cost of “status quo” operations will inevitably catch up, and hospital executives will find themselves being forced to make reactionary decisions. In terms of upgrades, stakeholders may feel or believe the perceived gain is not worth the direct and indirect costs, the cost of organizational change, or risk of the upgrade.

The full suite of deconstructed system components – enterprise viewer, enterprise workflow and VNA – may be more expensive than new legacy systems. However, for hospitals that examine hidden costs associated with inefficiency and third-party add-ons, the cost difference is neutralized. Gray noted that some of his clients who already had a VNA in place and have implemented a deconstructed PACS strategy saw economic returns. For example, if the cost of deconstructed PACS elements, not including the VNA, equals “X,” his clients have found legacy solutions can cost up to 140 percent of that figure. The increase in cost comes from add-ons required to achieve desired functionality. On top of this, many legacy PACS vendors will not deduct the cost of an archive from the total price, even if a VNA is already live and in place, which can be seen as an excess expense.

Another strategy that hospitals CFOs are increasingly embracing to acquire the latest imaging technology and overcome capital hurdles is a utility-based payment model, said Brad Swenson, Winthrop Resources Corporation’s senior vice president and chief product strategy and business development officer. This model works similarly to paying one’s utilities, where a monthly “operating” fee covers all expenses associated with imaging capabilities. It allows health care organizations to quickly respond to demands for new imaging technology and functionality without funneling large sums of up-front capital to the expense.

Swenson added that he’s seen cost benefits linked to upgrading hardware. For many industries, including health care, the cost to support legacy systems increases as technology ages. By taking advantage of the newest technology, hospitals can better control these support cost increases as they relate to enterprise imaging.

When measuring return on investment, look beyond the budget

A deconstructed PACS strategy is an investment that’s often met with skepticism because return on investment is not specifically or exclusively cost-related. Trying to measure a specific cost-related ROI isn’t simple, especially when you take into account elusive hidden costs. How much does it really cost for IT to develop and support custom interfaces for legacy system add-ons? What is the opportunity cost of radiologist wages paid for inefficiency? What is the long-term cost of referring physicians not knowing which image viewer to use, and when they do, not having timely access to the images and the tools they require? When your CEO says you have 90 days to figure out an enterprise imaging strategy for the new hospital your system just acquired, and you don’t have a plan, what is the cost? How do you put a value on patient care?

ROI for deconstructed PACS is linked to hard and soft benefits that ultimately affect the bottom line. These returns include enhanced efficiency and provider productivity, better access and integration, lessened IT stress and, most importantly, improved patient care. Adding together these ROIs, health care institutions can find a measurable strategic advantage in their market.

ROI #1: Radiologists and physicians can work more efficiently and productively when they have the right tools, at the right time. Salary better matches workload.

In 2013, average radiologist pay was $340,000. As one of the highest paid specialists on staff, it’s critical that productivity levels stay as close to 100 percent as possible to get the best return on salary investment.

But if the legacy PACS only allows radiologists to be 75 percent productive by reading studies and creating reports, 25 percent of their time is lost to workflow issues like logging in and out of different systems, waiting for priors and returning inadequate secondary captures for repeats. That equals almost $85,000 paid for unproductiveness per year per FTE.

Ward said CIRA’s primary goal by transitioning to a deconstructed PACS solution was to make sure their radiologists were as close to 100 percent productive by volume as possible. By solving inefficiencies with a best-of-breed system, CIRA boosted its radiologists’ productivity, improved patient care and eliminated paying for inefficiency. (See the full CIRA story at the bottom of the next page.)
ROI #2: New hospitals and partners can more easily integrate into existing networks and access systems.

Legacy PACS frustration often culminates as new hospitals are added to a distributed health system. Data can be problematic to access, and for periods of time all data, studies and reports may be restricted to the four walls of that acquired hospital.

However, with a deconstructed system, the health provider has the advantage of a foundational, enterprise system at the core. When new hospitals are acquired, the core deconstructed PACS components are simply extended to the newly acquired locations. New imaging studies from those locations are redirected to the enterprise system, established at the enterprise level, is extended to the new locations for local optimization, but also to enable radiologist interpretation from any location across the health system. Finally, because the enterprise viewer is thin-client, literally overnight radiologists and referring physicians at the new locations can be using the same viewer that is used across the health system, and linked from the enterprise EHR. The legacy PACS will only be live for the duration of archival study migration to the VNA, and once that is complete, it will be turned off. This process is repeatable; sustaining growth at the enterprise level, while also enabling the health system to fully realize the benefits of the newly acquired hospital(s).

ROI #3: Fewer systems alleviate IT department stress.

PACS management is a challenge for more than physicians and radiologists. The systems also challenge the enterprise IT department, especially when multiple PACS, workstations and viewing solutions are being used.

For example, an institution may have separate workstations for advanced visualization (3D/4D), PET/CT, echocardiography, PET/MR, brain perfusion, etc. They may have a dedicated PACS for radiology, cardiology, breast imaging and other specialties that all have their own viewing workstations and isolated image archives. Each of these PACS also provides image access to referring physicians with their own clinical viewers. For health systems that have grown by acquisition, this could be an enterprise IT burden of dozens of image viewers, workstations and multiple variant PACS. To maintain these systems, enterprise IT has to monitor and manage all the different system/viewer permutations. Add into that end user training, help desk support and interface management for multi-vendor systems, and the pressure keeps mounting.

One of the significant benefits of a best-of-breed enterprise viewer is advanced clinical capabilities. Pierre added, such as the ability to interpret specialty studies like breast imaging and PET/CT all on the same viewer as standard studies, including breast MRI. By having a single viewing platform and enterprise workflow, it becomes simpler for IT to maintain. Streamlined, consolidated environments free up hidden costs, especially those related to updates and system management. Now, for example, instead of needing 15 workflow updates for different systems, one update can be implemented. In addition to benefits of consolidating systems, this creates additional benefits by saving FTE time and effort and being more nimble as an institution.

ROI #4: A better system means better patient care.

When it comes down to it, improving patient care is the end-goal of a deconstructed PACS strategy. Enterprise systems work faster and smarter, without requiring the radiologist to get out of their chair. Radiologists can access new imaging studies and all relevant priors quicker, and communicate reports back to the referring physician sooner, netting faster results for the patient. Some enterprise viewers can also stream images directly to radiologists, whereas legacy systems have to first archive the images, then send to the local client workstation for the radiologist to be able to display the studies. With direct streaming, the radiologist can see the studies extremely fast, and request different views before the patient has

CIRA succeeds with deconstructed PACS

In 2009, Central Illinois Radiological Associates (CIRA) decided to face off against its PACS. As a group of 78 radiologists that provides subspecialty coverage to a variety of geographically distributed hospitals in its region, its team of radiologists was hampered by its workflow.

“We needed to bring the workflow together because our physicians were reading on different systems throughout the day,” said Patrick Ward, CIRA’s chief information officer. “On average, it took them 15 minutes to log in and out of a system. When you’re working on as many as 13 systems throughout a day, that’s untenable.”

Ward said PACS was the group’s problem. As a private practice group, they work on volume. And some of their physicians’ reading productivity, specifically those at remote facilities, were less than a third of their expected reading volume because of issues with the systems’ bandwidth.

The radiology group’s primary goal by transitioning to a deconstructed PACS strategy was to ensure their radiologists were as close to productive by volume as possible. This was especially true for radiologists on site at small, critical access hospitals, whose ability to efficiently access studies was often limited by network bandwidth.

Ward turned to a deconstructed strategy, which was initially met with skepticism. However, thanks to a skilled IT staff to design and manage the system, as well as relying on standards-based reporting, CIRA has seen an ROI for their system that couldn’t have been realized with a legacy PACS.

The first ROI was what they hoped – radiologist efficiency. All physicians are 100 percent FTE by volume with the new system. A second ROI was realized as hospitals within their network asked to buy into their system. CIRA had created a state-of-the-art system that previously was out of reach for small hospitals. However, by constructing a contract option according to Stark Law, CIRA was able to share its system by passing through some of the deconstructed PACS’ cost to interested partners. And the third ROI, Ward said, is what health systems are striving for with their PACS: better care through technology.

“If we consistently produce better quality results, with the volume needed to meet the needs of hospitals, we’ve improved patient safety, the delivery of care to these patients and the technology for the hospital,” Ward said. “That’s Imaging 3.0.”
been departed, reducing the patient’s radiation exposure, time on the table, and potential for repeat unnecessary imaging, Ward said.

Another benefit that’s just being realized is the ability to integrate studies directly into the patient’s record in the EHR. This benefits everyone – the radiologist, the referring physician, clinicians and the patient – because it brings radiologists into the care team. By understanding the patient’s health history, the radiologist may be alerted to areas of focus in the study beyond what has been conveyed in the order from the referring physician. Similarly, when a patient comes back for additional treatments, the physician has quick access to prior reports, pathology, labs and more to better understand health history. This all nets outcome benefits for the patient and his or her future health, which is increasingly important to meet Affordable Care Act and Meaningful Use requirements.

The ultimate ROI and the future of the market

Innovations are coming to make deconstructed PACS solutions more accessible to smaller community hospitals. Currently, some enterprise solutions can be developed as stand-alone PACS, but some forecasts include developing a new market altogether, where new vendors begin to assemble their own best-of-breed, component-based PACS solutions to offer as a package.

Supporting this shift is the strategic advantage realized by institutions that have already demanded a better way forward. Strategic advantage is the ultimate ROI, the outcome of efficiency improvements plus advanced functionality and better patient care. It is the ability to be more flexible, nimble and responsive through technology. Smart financing strategies, like a utility-based payment model, further enhance this advantage because it removes the budget barrier, to transform a conversation from one about capital to one about patient care and market position. By tapping into new technology and established financing options, health care institutions can find their own advantage in the market.

Is a deconstructed PACS strategy right for you?

1. Has your health system grown in recent years through acquisition, and as a result, are you managing multiple PACS from a variety of vendors?
2. Is your health system growing, targeting additional acquisitions as health care continues to consolidate? If asked today to incorporate a new hospital into your current PACS, are you prepared?
3. Are the imaging services of your health system competitive, or are you looking for competitive advantage?
4. Is your health care institution perceived as a technology leader, or a follower?
5. Has your health system implemented an enterprise EHR, connecting all providers and caregivers, enabling a single point of access for imaging?
6. Are your clinical viewers a point of contention with your referring physicians? Have they impacted patient care and reduced your referrals?
7. Have the capabilities of your legacy PACS become an organizational barrier to adopting new modalities, new workflows and patient care improvements?
8. Have you been required to implement inefficient workarounds and make sub-optimal business decisions because of the limitations of your legacy PACS system(s)?

For more information about financing options for enterprise PACS components, email info@winthropresources.com or call (952) 936-0226