



Carestream Health's SuperPACS™ Architecture features intelligent streaming technology that can rapidly deliver large image files to remote radiologists and clinicians, even over lower-bandwidth connections.

A Boost in Communication

Transforming disparate systems into efficient enterprise-wide PACS

By Neville Skudowitz

WHAT WE HAVE IS A FAILURE TO COMMUNICATE – AMONG RIS/PACS SYSTEMS.

Since imaging services are often delivered across multiple facilities, there is a pressing need to share patient records and imaging studies to create a more efficient diagnostic process and provide enhanced management of decentralized archives.

Currently, physician productivity is hindered by the need to learn multiple systems and use different user interfaces and tools. There is no way to balance the reading workload among multiple radiologists to improve the delivery of diagnoses and reports, and maintenance and support of these different systems is a PACS administrator's nightmare.

In the past, sharing information either required converting to a single vendor's RIS/PACS platform for all sites, or mastering and managing diverse systems. Standardizing on a single platform can work for a large hospital that wants to link its affiliated imaging centers into its existing platform. But this approach is not financially feasible for imaging providers that each have their own RIS/PACS, and in cases where information needs to be shared with competing or unaffiliated facilities.

Fortunately, new technologies and approaches are now being applied to join disparate systems into an enterprise-wide PACS. There are three critical components that must be achieved:

- ☀ One central database manager for all imaging studies regardless of where they are stored, and the ability to import DICOM and non-DICOM patient data from multiple systems.
- ☀ One global worklist that is shared among users at all facilities. It must offer continuous updates and reconcile different patient identification numbers used by each facility and
- ☀ Use of streaming technology to rapidly deliver data to users—even over lower-bandwidth connections.

ACHIEVING A CENTRALIZED DATABASE

A centralized database is essential to ensure that all prior imaging exams and other relevant information is available for

review with the current study. It is possible to query other sites for patient information, but that is cumbersome and time-consuming. It's much more productive to design a database that synchronizes exam information from all of the sites on an ongoing basis. This data includes exam metadata, study status, patient name changes and other related information.

For maximum efficiency, the exam data should be automatically synchronized on a priority basis – important information related to exam status, for example, should be updated frequently while less important data could be updated once or twice a day.

Migrating metadata into the database also performs another important function – it can eliminate the need for a very costly migration of existing imaging studies. Once the database has the exam metadata, the study becomes part of the global workflow, including automatic pre-fetching of required information from the local archive. Metadata for several years of imaging exams can often be migrated to the database in just a few days, whereas migrating pixel data often takes years. By incorporating metadata into a central database, facilities can preserve their investment in existing archives and systems and build the foundation for a global worklist.

BUILDING A GLOBAL WORKLIST

In a multi-site environment, a global worklist is needed to support productive reading from any on-site or remote location. Creating a global worklist for disparate PACS is challenging: it must be able to accurately identify the patient that goes to multiple sites and therefore has several numbers, as well as two different patients that have the same ID number.

To accomplish accurate patient identification, the PACS should be configured with either a central RIS that manages the local and global patient logic, or a third-party PIX manager or local master patient index that is configured with the RIS. The enterprise PACS will adopt an expanded patient ID number that typically includes an issuer field to identify the origin of the patient ID as well as the number itself.

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Using HL-7 or other processes, the worklist can assign a patient and site to each exam and then reconcile those factors as needed to: 1) link individual patients to multiple exams at different sites and 2) separate patients that have the same ID number. The system also needs to offer the same response to DICOM queries regardless of which patient ID is used and should display all identification numbers for a patient in the database and in the radiology reports.

LINKING PATIENT INFORMATION WITH IMAGES

Most PACS vendors don't want to support non-DICOM information because of its complexity. However delivering effective care requires that the data presented in imaging studies be evaluated in the context of other pertinent patient records. Often that necessitates importing non-DICOM information and associating it with the patient and the imaging exam.

We have created a unique process that uses XDS protocols to import non-DICOM data and store it side-by-side with DICOM data. Other methods require integration of multiple systems but our solution does not – making it both more efficient and more effective.

ACHIEVING HIGH SPEEDS OVER LOW BANDWIDTH

The final element in an efficient multi-site workflow is being able to provide rapid transmission of image and information to users at any on-site or off-site location. Modern streaming technology makes it possible to determine the fastest route between where the data is stored and each user's location.

This capability ensures rapid, responsive access even over low bandwidth lines, such as cable modem or DSL connections. Streaming technology enables remote radiologists, specialists, and other clinicians to effectively read or review large data sets.

COMPELLING BENEFITS FOR ALL PARTIES

Converting isolated PACS platforms into an efficient enterprise-wide solution can transform the practice of radiology – benefiting patients, hospitals and physicians.

Patient care is improved because prior imaging studies and other records are available for review with the current imaging exam. Hospitals gain greater productivity as manual processes are replaced with automatic ones, and a streamlined workflow leads to faster delivery of radiology reports. Operating costs are reduced through utilization of existing resources and avoidance of costly data migration. Creating a virtual enterprise-wide PACS also maximizes the productivity of IT staff and PACS administrators. Radiologists and referring physicians gain both convenience and efficiency from enhanced access to imaging exams from on-site and off-site locations.

The practice of healthcare has evolved in the last decade. Efficient, enterprise-wide systems are now a necessity to support the successful deployment of radiology services across local and regional networks with multiple imaging providers.

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