HEARTBEAT
BY INTELLIGENT IMAGING

Deconstructed PACS

Several years ago, “deconstructed PACS” was a hot topic, also called PACS as a service, PACS 2.0, PACS 3.0, de-coupled PACS, etc. During that time, many organizations made purchases based on the idea. These were often a Vendor Neutral Archive (VNA), radiologist viewer and a Zero Footprint Viewer (ZFV) for web and EMR viewing of radiology images. Dictation systems have remained constant and have for the most part, always been separate from the PACS. There are several global worklist companies out in the market that have been around for a long time. For the most part, these worklist systems have been focused on the needs and requirements of teleradiology and large radiology groups. That said they do a very good job of consolidating multiple sources of data, usually many hospitals and EMRs into a single worklist and assignment engine to get the right radiologist to read the study at the right time. With all of this technology, why have we not seen the panacea of a deconstructed PACS come to fruition?

The answer surprisingly is that as an industry, we have focused on many of the hard problems and forgotten that we still need a system to do what the PACS of yore did, and that is a departmental workflow system for the technologists. There are several functions that need to occur before image data can be submitted into the machinery of the enterprise imaging systems. These are, while seemingly mundane, extremely important: DICOM Modality Worklist, Document Scanning, quality control (QC) and image management, and order validation, all tasks that are completed by the traditional PACS. We will explore each of these in turn.

817-913-7599
info@imagingheartbeat.com
www.imagingheartbeat.com

DICOM Modality Worklist (DMWL) is essential, as it ensures that images match an order, and all demographics are correct. In my belief, a manual process is a broken process, and typing in a 16 character accession number correctly is a recipe for disaster. In short, something must provide DMWL, and it should be used in all cases.

Document Scanning is an area I struggle with. In this day and age, we should be able to remove all paper from the process. I firmly believe that the only documents to be scanned or electronically completed are documents that are required to be viewed by the radiologist and will alter the diagnosis. These should indeed be stored as a series with the images. All other documentation such as consent forms, insurance or ID cards that a facility wishes to scan should be stored in the EMR.

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QC and image manipulation refer to verifying that the images are of sufficient quality, capture the appropriate anatomy, and possibly adjusting the window/level. There is sometimes a need for splitting, merging, deleting, and moving images but the requirement has gone down over the years and most of this is done at the modality. The main point of this step is that this is the last opportunity for a technologist to review the study. As soon as the image is released, it becomes "ready to read" and will be picked up by a radiologist somewhere downstream. Given that radiologists are commonly off-site, this step gains significance. Once the image is sent, it can be viewed by multiple users and is difficult to update in the case of an issue.

The final task is order validation. With consistent use of DMWL, this step should not be necessary, but in the real-world things happen. In a distributed system where the radiologist worklist is driving reads based on HL7 orders, any study that does not match an order will not be read. It the dictation system needs to respond to an order with the report. The viewer can't launch the study if the accession number does not match an order. Therefore, the verification step is a gatekeeper step to ensure that every study has an order, or colloquially, "no pass, no play."

Again, traditional PACS performs all of these tasks, so what happens in a deconstructed model? The tasks of DICOM modality worklist, QC, document scanning, and order validation must be performed somewhere in the workflow. The question is, what is the most logical and cost-effective system to perform these functions. I would term these as technologist workflow tasks. In the current systems architecture technologist workflow tasks or departmental tasks are bundled with the licensing for diagnostic

interpretation. I have yet to find a PACS that separates the diagnostic function from the departmental function. There are a plethora of unsupported tools available for organizations to build and deploy at no cost available. However, these come with their own issues.

I would like to see industry produce a low-cost technologist workflow system that performs these tasks with a fully baked user interface and robust support model. These simple functions would greatly improve the success of organizations moving in the direction of deconstructed PACS, and can also be utilized by other service lines moving into enterprise imaging.

By KYLE HENSON
CEO & Founder
Heartbeat by Intelligent Imaging