Reconstructing PACS

PACS Components
The components of a PACS are:

- Archive(s)
- Enterprise or “Smart” Worklist(s)
- Viewer(s)
- Voice Recognition (VR) System(s)

Most Health Systems will eventually migrate to using one Archive, one Worklist, one Viewer and one VR. This gives them the ability to purchase a conventional PACS from a single vendor, but most are seriously considering a “best of breed” solution. Best-of-breed components will provide a superior solution from a functional point of view, but will take more effort to deploy.

Private Practices cannot guarantee that they will all components from a single vendor, so a smart, enterprise worklist is a requirement.

Reconstructing the PACS
Clario has broken down and reconstructed many systems over the years. Experience has shown that most “reconstructions” require:

- Feeding all order information into a single database
- Uncovering all the “silo-ed” processes and deciding on more consistent processes across the entire practice
- Designing optimal workflow
- Tracking and monitoring the right information to keep the practice efficient
- Integrating all viewers and archives

Benefits of the Reconstructed PACS
We are only beginning to understand the tremendous potential of this new unifying architecture, but once implemented, both health systems and private practices find that they benefit from:

- The ability to select best-of-breed technology for each component
- Lower cost through the use of existing systems
- Superior analytics and the ability to drive your practice efficiency with data
- Better use of subspecialty reading, load balancing, and other advanced workflow concepts
- Superior communication and collaboration between radiologists
- Easy integration of support personnel, and (in the case of large practices) operations centers

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Better integration of telerad business and all IDN locations

**Some History of the Deconstructed PACS**
The next two sections discuss the genesis of the deconstructed PACS idea. Two separations have been developing in parallel. Now that both technologies have been proven, fully deconstructed architecture is available for any practice wishing to employ best-of-breed technology.

**Deconstructing the display**
In January 2004, Dr. Lawrence Tarbox (a member of Working Group 10 who was then-employed by Siemens Corporate Research) created a white paper entitled *DICOM Workstation-Independent Access to Post-Processing Software*. This paper clearly spelled out the concept of a standardized interface into which medical imaging applications could “plug-in”.

DICOM Working Group 23 was formed to work on the “plug-in” concept; its first meeting was held on November 5th, 2004 ([http://medical.nema.org/DICOM/minutes/WG-23/2004/WG-06_API-PPSW_2004-11-05_Min.doc](http://medical.nema.org/DICOM/minutes/WG-23/2004/WG-06_API-PPSW_2004-11-05_Min.doc)). Initial drafts of the resulting standard (Supplement 118) first appear in the Fall of 2005 and discuss the many use cases following from this concept, including the display of exams by different viewers based upon image type, location, etc.

Unfortunately, as of the writing of this white paper, Supplement 118 (although approved as part of the DICOM standard) has not been adopted by any major PACS vendors. This lack of a common standard has forced worklist vendors such as Clario to become adept at supporting a host of proprietary viewer APIs. Clario has implemented over 25 image display integrations and can develop and test a custom PACS interface in less than a week (in most cases).

**Deconstructing the archive**
According to a Wikipedia article on the Vendor Neutral Archive, references to archival deconstruction go back to at least 2006 when Nadim Daher, a Medical Imaging Market Analyst for Frost and Sullivan, observed the following,

> "While the front-end clinical applications, already fairly uniform across PACS vendors, continue to evolve slowly to incorporate more features and integrate information from more systems, the back-end infrastructure of PACS is increasingly being shared across the enterprise. This growing ‘disconnect’ between the front-end clinical application and the back-end infrastructure creates room for an improved layer of middleware to manage enterprise data including, but not limited to PACS”

This concept was expanded upon by Michael Gray in a blog entry in 2007 titled “PACS-neutral Enterprise Archive- Who will build it?”

In a recent article for AuntMinnie.com, Brad Levin traced the roots of the VNA back even further...to the turn of the millennium with work done at both the University of Alabama and the University of Minnesota.
As anyone following the industry knows, VNAs have exploded. VNAs alone now account for over $100M/year in sales, and this number is growing at a double-digit rate.