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Enterprise Imaging Informatics

PACS in Radiology and Beyond

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The role of medical imaging in modern healthcare is without doubt, a vital one as almost every clinical discipline utilizes it to a certain aspect. Economic progress and the rapid proliferation of lifestyle diseases such as diabetes and hypertension due to poor diet and lack of exercise has resulted in the increasing reliance on medical imaging both for diagnostics as well as for therapeutics vis-à-vis image-guided interventional procedures, minimally invasive surgery and patient progress monitoring (e.g. response to drug treatments).

Raising Demands for Medical Imaging

According to Clearstate, a premier life sciences research consulting firm based in Singapore, the market size for the year 2008 in growth markets clearly reflects the raising demands for imaging modalities in both radiology and interventional cardiology segments in the Asia region:

- Radiology
 - India - USD 380 million ¹
 - Indonesia - USD 67 million ²

- Interventional Cardiology
 - China - USD 770 million ³
 - India - USD 249.3 million ⁴

The increasing dependence on imaging modalities for effective diagnosis coupled with digital medical imaging success stories and case studies of how an effective implementation of Picture Archival and Communication Systems (PACS) in the radiology discipline can significantly increase productivity across the entire image life cycle while reducing consumables and other operational costs, has heightened the interest and adoption of the technology among other medical imaging disciplines.

While the key adopters of PACS out of Radiology are specialties such as Endoscopy and Cardiology, other clinical disciplines like Dermatology, Ophthalmology and Pathology are also fast jumping aboard the bandwagon.

Typical Adoption Cycle for Imaging Informatics

The typical adoption 'sequence' for medical imaging Informatics within healthcare facilities follows a typical implementation pathway; it generally takes place only after Hospital Information Systems (administrative) and the Radiology informatics Systems have been thoroughly implemented. Taking Cardiology informatics for an example, a typical medical facility (except dedicated cardiology centers) adopts imaging informatics solutions in the following manner:

1. The implementation of a Hospital Information System (HIS) to enable patient registration, scheduling and billing purposes
2. Implementation of Radiology Informatics including both Radiology Information Systems (RIS) and Radiology Picture Archival and Communication Systems (PACS) to enable workflow optimization, archival and distribution of medical images (either within the department or between departments).
3. The implementation of Cardiology Informatics including Cardiovascular Information System (CVIS) and Cardiology Picture Archival and Communication Systems (PACS)

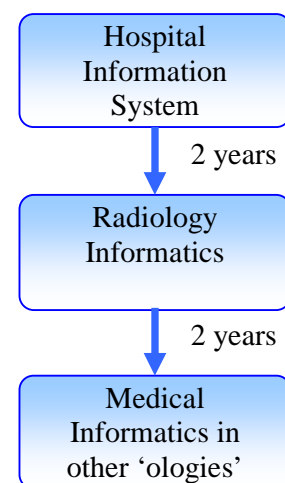


Figure 1: Typical Adoption Cycle of Imaging Informatics

The average 'time lapse' between each implementation is about two years and this period of time accounts for the following;

- Implementation period. From hardware configuration and staging to launch
- User acceptance period. Time taken for the use of system to become an integrated part of the operational workflow

Emerging Opportunities

In addition to the market size on medical imaging for the year 2008, provided by Clearstate has also collated the market size for Health Informatics in both Radiology and Interventional cardiology segments in the Asia region:

- China Radiology Informatics Systems - USD 37.5 million ⁵
- Thailand Health & Cardiovascular Informatics Systems - USD 5.7 million ⁶
- India's Cardiovascular Informatics Systems - USD 630 thousand ⁷
- India's Health and Cardiovascular Informatics Systems - USD 14 million ⁸

Taking into consideration the mounting demands for medical imaging services and typical adoption cycle of medical imaging informatics, the data provided by Clearstate clearly indicates a nascent but rapidly growing demand for adoption of medical imaging informatics out of the radiology discipline and most importantly, the need for convergence of the various medical imaging disciplines at the digital front end.

What is Enterprise Imaging Informatics?

Contrary to what the name might imply, there is no "one-size fits all" PACS solution. A Radiology PACS is very different from a Cardiology PACS or Endoscopy PACS due to the intricate nature of each imaging discipline and workflow requirements.

Even within the same clinical discipline, there exist different levels of PACS implementation; the adoption of a small scale PACS involving only one modality (e.g. ultrasound only) will be very different from a hospital wide implementation consisting of all medical imaging modalities.

Traditionally, the term “Enterprise Imaging’ in the world of medical imaging refers to a PACS implementation of a large hospital-wide level of at a ‘cluster’ (between hospitals) wide implementation, however, in pace with changes in landscape and technology, enterprise imaging has taken a new meaning with the rapid adoption of digital image acquisition and archiving out of the radiology department, ‘multi-disciplinary’ PACS at a hospital, or cluster wide implementation have now become the ‘next big thing’ and the crusade in search of the perfect Enterprise PACS is starting to attract visibility from all major imaging informatics solution providers.

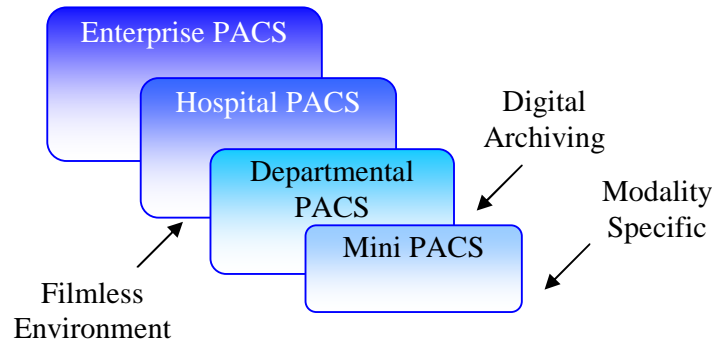


Figure 2: Levels of PACS Adoption

Why Enterprise Imaging Informatics

There are many logical reasons why an integrated PACS for all clinical disciplines is desirable. To name a few, advantages include;

1. Cost Savings

Every PACS solution incurs cost from hardware to software licenses. Consolidating the hardware (servers, storage, networks etc) will not only results in savings from reducing the number of physical equipment but also reduced electricity and air-conditioning needs. Elimination of duplicate software licenses (Operating Systems, Databases, Anti-virus, monitoring utilities) and manpower (for maintenance, support and ongoing upgrades of the systems)

2. Increased Usability

A properly designed Enterprise PACS will provide a standardized user interface. While it may sound insignificant, the availability of a unified user interface can make a huge difference in terms of reducing the learning curve and easing the change management process, effectively increasing the adoption and utilization rates to speed up returns of investments on both tangible and intangible aspects.

3. Data Integrity and 'Business Intelligence'

An Enterprise PACS deployed on a single database will eliminate the issues commonly faced by other implementations with multiple databases.

The most 'interesting implementation' I have seen till date consisted of 7 databases of different make and versions – 1 for the Radiology Information System, 1 for the Radiology PACS, 1 for the 'interface broker' for the radiology solutions, 1 for data mining purposes, 1 for the cardiovascular information system, 1 for the cardiology PACS and 1 for the 'interface broker' for the cardiology solutions.

Implementations with multiple databases can cause serious issues with data integrity and consistency as a failure in any system can cause data to be out of sync and when you have 7 databases, the probability of something going on is much higher.

A single database will also ease efforts in data mining, statistical generation and compilation of information for national registry submission. Most importantly, the ability to perform trending for diseases prevention and investigation becomes a lot easier and accurate when the underlying data is 'clean'.

Are You Prepared?

A comprehensive well-designed strategy to future-proof your facility's investment in medical imaging informatics is vital to achieve substantial productivity ROI. The efficiencies derived from an electronic continuum of care will drive the need for consolidation of the various departmental PACS as well as optimization of their capabilities.

Clinical disciplines like Cardiology, Pathology, Dermatology and Ophthalmology are fast catching up in the utilization of PACS technology in their own clinical domains and before long, Enterprise Imaging Informatics will become the norm as hospitals are actively seeking solutions to improve clinical decision making and organizational efficiency.

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