WHITE PAPER

Enterprise Imaging

Why a Combined RIS & PACS?

AGFA HealthCare

1. Introduction

Increasingly, the medical imaging environment depends upon its IT infrastructure to run its daily operations. This medical imaging IT infrastructure typically comprises a combination of distinct and unrelated applications:

- Departmental information systems (RIS, CIS)
- Picture Archiving and Communications Systems (PACS)
- Reporting applications
- Dedicated image processing and visualization workstations and servers

Each of these applications supports an important but isolated portion of the total medical imaging workflow. Over the years, standards such as DICOM and HL7 have evolved that allow these applications to exchange information and interoperate according to well-defined standards. Yet despite the growing support of standards by vendors, the complete workflow is often less than optimal: a situation that has been recognized by both medical imaging professionals and the medical imaging industry. This has led, along with other factors, to the Integrating the Healthcare Enterprise (IHE) initiative. In recent years, the growing support of IHE has contributed to better interoperability and connectivity between the different systems, but even with the best IHE and standards, support workflow and other challenges remain.

Many institutions have implemented departmental imaging solutions that create information silos that are optimized for a specific department, but that do not provide a true enterprise-wide overview of all imaging data.

Another way to overcome the challenges of the disparate applications is to resolve the root cause, by creating a single medical imaging informatics application that can perform the functions historically assigned to separate information systems (e.g. RIS), PACS, reporting and image processing and visualization services, and that can be used by many medical specialties. The Enterprise Imaging platform is such a medical imaging informatics application. This white paper explores the benefits that this type of application introduces.

2. Clinical Benefits

Standards-based, it has a single database and single patient record. These design principles offer clinical users a better overview of data and images. The single patient record helps to maintain data integrity, providing correct patient and associated clinical data to the healthcare professionals. The standards-based design allows extensive connectivity with other systems, thus providing a complete overview of available data. Using a single database application ensures that all users are looking at the same data at all times. In addition, with all users working on the same application, interaction between users is improved.

With disparate applications, users often lose time synchronizing applications or performing redundant and repetitive actions made necessary by lack of integration. Because the new Enterprise Imaging platform is a single application, these actions are no longer needed; user productivity increases, giving the users more time to spend on patient care instead of mouse clicks. It also uses a workflow-driven approach for reporting, making it possible to finish reports in the background. System performance is significantly improved by minimizing the time the user must wait when switching from studies to report. This is a significant difference from the desktop-level synchronization available in most systems today.

The combination of an improved data and image overview within a true medical imaging informatics application empowers healthcare professionals to focus more on their own tasks. The combined data model and data gathering optimize the use of the information, for smarter configurations and workflows than disparate systems can offer, e.g., in relevancy rules set-up, hanging protocol configurations, task lists and system configuration.

3. Usability Benefits

In addition to the workflow and connectivity challenges, with disparate applications the user must deal with each application's individual graphical user interface, terminology and interaction matrix. The user must master all of the differences and find the best way to work with the combined applications. This can complicate the learning curve and negatively impact the user's willingness to use the system; as a result, many features are never found or used.

A true medical imaging informatics application overcomes these usability challenges with a well-defined graphical user interface and interaction matrix that apply to all of the application's modules. The user-friendliness has been extensively tested with real users, both in-house during development testing, and during validation activities. Feedback was collected to further improve the application's ease of use.

4. Workflow benefits

Medical imaging is a multi-stakeholder and multi-medical specialty environment. Stakeholders include, but are not limited to, referring physicians, chief medical informatics officers, chief informatics officers, radiologists, cardiologists, technologists, nurses and administrative staff. Communication and collaboration are key for many of these stakeholders. Their needs are addressed by introducing workflow design and persona-based desktops. Workflow design allows information sharing to be workflow-driven (e.g., one user can create a task for another user and include comments on the

reason for it), and permits information to be used in subsequent steps of the workflow (e.g., a radiologist can change an acquisition protocol as part of the order review process; later the technologists can use this information during image acquisition).

As the role of imaging in medicine continues to expand, the number of medical specialties using it has also grown, and today includes (among others) radiology, nuclear medicine, cardiology and pathology. Each of these stakeholders, regardless of their medical specialty, needs a complete overview of all available and relevant data, and must be able to communicate and collaborate easily with peers and support staff. Because the solution works with a single database, it can present the complete overview, in a view optimized for the specific stakeholder.

The Agfa HealthCare Enterprise Imaging solution provides dedicated desktops[1] that are optimized for the task at hand, but that provide a complete overview of all available relevant data at all times (while respecting privacy and data access settings) and of the possibilities for shared and collaborative workflows. All of this is based on the solution's medical imaging informatics backbone, which offers excellent opportunities for cross specialty and cross stakeholder data sharing and workflows.

5. Cost of ownership benefits

Today's environment of disparate applications creates very complex system administration and system ownership, resulting in higher training costs and the need for service and support contracts with multiple parties. Combined with the many interfaces that must be maintained and the often-conflicting hardware and software needs, the costs are significant.

The consolidated Enterprise Imaging platform can help to reduce the cost of ownership:

- It helps to reduce overall system architecture complexity
- It helps to reduce training costs
- It helps to reduce hardware and software conflicts
- It offers "out of the box" settings, reducing set-up and configuration costs, with new functionality is also provided with default settings
- It is designed as an enterprise system; by increasing the number of users, the associated costs can be spread over a larger user group

[1] A desktop is a workstation optimized for a given persona, and as such is a combination of stakeholder and medical specialty.

6. Modularity

There is a huge difference in practices and processes between the various medical imaging departments. While this is true even for departments that are part of a single facility, it is definitely the case for departments located in different sites. In addition to the variations in practices and processes, significant differences in the IT environment can also be found at a given site. The solution's modular design addresses these differences and allows a facility to activate only those modules that are needed to meet the needs and/or demands at hand.

This modularity applies to the macro, meso and micro level. On the macro level it is possible to e.g. only activate the PACS or RIS components, or to report studies without having images available on a PACS plus Reporting system. On the meso level, a choice can be made, for example, not to use the complete RIS functionality but to activate only the protocol assignment module. An example on the micro level is the activation of Agfa HealthCare's MUSICA image processing software as part of the image display. Of course all modules can be activated at the same time; the synergies between the different modules will introduce workflow and other benefits.

The Enterprise Imaging Suite achieves this high level of modularization through its intelligent combination of software deployment, client plug-in architecture and licensing mechanism. It is always completely deployed to the site, but the functionalities used are determined by the available licenses. Once an application is introduced, it begins to collect all the information that is provided to it; this allows later functional extensions to use all or part of the collected and stored information. For example, if the solution is first deployed as a PACS, it will still collect all HL7 order and results data. If later the hospital opts to use the system as a RIS, this early data collection will support a more rapid introduction of the RIS, because much of the result, order and set-up information is already prepared. Even if the system continues to be used only as a PACS, the rich data model allows the user(s) to access and use the stored RIS information.

The modular design of Enterprise Imaging solution allows it to be easily integrated into the existing IT landscape, as it can be combined with existing applications. Thus offering the possibility of introducing either a single module, all modules or transitioning module by module over time to the new Enterprise Imaging platform.

7. Summary

Enterprise Imaging is a medical imaging informatics application that:

- Offers a modular system designed for all medical imaging stakeholders; it is independent of any one medical specialty, and has the capability to upscale or extend to other specialties.
- Provides workflow and system performance benefits.
- Provides clinical benefits by creating a complete medical imaging data overview that empowers informed clinical decision making.
- Provides usability benefits through its integrated and tested usability design.
- Helps to reduce the cost of ownership.
- Offers a modular design and introduction capabilities that reduce the need for “big-bang” replacement of the current infrastructure.

Agfa HealthCare, a member of the Agfa-Gevaert Group, is a leading global provider of diagnostic imaging and healthcare IT solutions. The company has nearly a century of healthcare experience and has been a pioneer on the healthcare IT market since the early 1990's. Today Agfa HealthCare designs, develops and delivers state-of-the-art systems for capturing, managing and processing diagnostic images and clinical/administrative information for hospitals and healthcare facilities, as well as contrast media solutions to enable effective medical imaging results.

Published by Agfa HealthCare NV
B-2640 Mortsel – Belgium
5U2HJ GB 00201508