

> How to Prepare Legacy Systems  
for RIS or PACS

To optimize your RIS or PACS, it is important to prepare any legacy equipment, technology or system to ensure that they will fit into your new electronic workflow intended for the RIS or PACS. This paper is intended to give examples of how you should approach integrating your legacy devices into your new enterprise RIS and/or environment.

Here are some things to consider as you assess how your legacy system will work with your new RIS and/or PACS:

- How does each legacy device fit into your new electronic workflow?
- Is it a modality?
- Is it an older RIS?
- Is it an imaging workstation?
- Is it a diagnostic imaging film printer?
- Is it a standalone archive or file server?
- Is it a mini-PACS system for a small area?
- Is it another legacy device that is needed to be part of your new electronic workflow?

In this document, we provide three examples of legacy technologies that may be considered. There are many others – so you should work very closely with your RIS or PACS vendor to ensure that you create a comprehensive checklist for every possible legacy device that might be in your facility as a part of your implementation plan.

You also may want to consider taking a DICOM class or workshop prior to your RIS or PACS purchase to ensure that you have the knowledge necessary for appropriate implementation planning.

## Modality Connectivity

There are many very important reasons for connecting your legacy modality. Among them are:

- 1) **Scheduled Patient Info:** To electronically access the scheduled procedure information into the modality (which patients are scheduled for which procedures at which date/time).
- 2) **Procedure Status:** To let appropriate areas of your facility electronically know about the procedures that were emergent, changed, completed or discontinued.
- 3) **Store Images:** To store the images in the PACS archive.
- 4) **Insure Images Safely Stored:** To insure that the images sent to the PACS archive are replicated before removing them from local storage.
- 5) **Persistent Presentation of Images:** To send images in a way that they are displayed or printed just like they are displayed on the modality's display device.

- 6) **Network Printing:** To occasionally print films on a shared DICOM Printer.

The above reasons can be satisfied by features that are defined within the DICOM® (Digital Imaging and Communications in Medicine) Standard and might already be implemented within that modality, if it isn't too old. If not already built in as a software feature for that modality, then special interface boxes can sometimes help a modality meet some or all of these requirements.

To determine your need, there are several things to evaluate:

- The age of the legacy modality
- Which potential capabilities are already built in and just need to be activated by the vendor
- How the modality fits into your electronic workflow schematic

You may want to start by contacting your modality vendor to determine which DICOM features are available to enable the modality to be incorporated into your workflow. Listed below are the specific feature set inquiries for the aforementioned capabilities:

- 1) **Scheduled Patient Info:** Inquire about the DICOM Modality Worklist feature
- 2) **Procedure Status:** Inquire about the DICOM Modality Performed Procedure Step feature
- 3) **Store Images:** Inquire about one or more of the DICOM Storage features
- 4) **Ensure Images Safely Stored:** Inquire about the DICOM Storage Commitment feature
- 5) **Persistent Presentation Of Images:**
  - a. Inquire about the DICOM Grayscale Softcopy Presentation State feature for sending to a workstation
  - b. Inquire about the DICOM Presentation Look Up Table feature for sending to a printer
- 6) **Network Printing:** Inquire about the DICOM Basic Grayscale or Color Print Management feature.

If these capabilities are not available for activation in the modality, it may be wise to acquire a "DICOM Box," which will provide the needed DICOM features, extending the usefulness of your modality and ensuring the images it produces can be a part of your electronic workflow.

## Print Network Connectivity

Even as you evolve into a filmless and paperless environment, there are good reasons for connecting a legacy diagnostic imaging film printer:

- You know that there will always be some need for film under some situation.
- It allows you to maintain your original investment in printing solutions.
- It prints high quality films and you would like to share it over the network.

If the printer is already a DICOM printer, then you may not have to do anything with it. However, there are some things that you should consider:

- If you are going to be putting in a CR or DR for doing digital x-rays as part of your PACS and you want to occasionally use this printer, then you will want to make sure it has a 12-bit print board installed. Printers often come standard with 8-bit print cards if they are only used for CT, MR or Ultrasound imaging. Even though most CR images are only 10-bit, printers mostly only come with either an 8- or 12-bit print interface cards.
- If you want to have images printed as they were presented on either the modality or workstation display device, then you should inquire about the DICOM Presentation Look Up Table feature to be installed on the printer. Of course, you need the modalities and workstations to support this feature as well.

If the printer is not already a DICOM printer, then you will need to buy a DICOM box to accept DICOM print requests over the network and control the printer directly.

- 1) These DICOM printer interface boxes all basically perform the same function, which is to:
  - a. Handle DICOM print requests
  - b. Put those requests into a print queue
  - c. Keep the printer printing film as fast as it can
  - d. And to send back the current status of the printer over the network to the originator of the DICOM print request.
- 2) However, they don't all handle the DICOM Presentation Look Up Table feature. So be sure to inquire about that functionality, because you will most likely need it as the PACS functionality becomes more sophisticated over time.

## Mini-pacs Connectivity

Reasons for connecting a legacy mini-PACS:

- Its performance as a limited volume PACS works well for your sized organization. It archives images, distributes those images to various workstations based on demand and/or based on some auto routing algorithm, and users feel comfortable with how it works and feels.
- It allows you to have the archived images on the same small network as the local modalities and workstations that normally process those images, allowing faster access than going to a central PACS archive, on a connected network.
- It ensures replicated images in a distributed environment to help meet some of the HIPAA security requirements for not losing electronically stored patient information.

To understand the PACS architecture that you are evaluating, ask yourself these questions:

- 1) Do you have the capability to keep your mini-PACS and make it a part of the new PACS or is it understood that it is to be scrapped?
- 2) There are two ways that your enterprise PACS can know about and receive the images that are on your mini-PACS:
  - a. The local modality sends the images to the mini-PACS, which can forward those images on to the enterprise PACS after storing them in its archive.
  - b. The local modality sends the images to the enterprise PACS, which will forward them onto the mini-PACS keeping a pointer to where their primary storage is and then archive those same images in a secondary storage for replication purposes. This approach allows the enterprise PACS to keep track of wherever the images are stored.
- 3) Does the new PACS architecture support all the SOP classes that the mini-PACS can currently store and display?

## Summary

Proactive preparation in advance of a RIS or PACS implementation can avoid disappointments or delays in having system-wide electronic workflow. Ensuring that legacy systems or technologies have the DICOM capabilities to connect to the RIS or PACS extends the ROI for legacy technologies and ensures that optimal electronic workflow occurs. DICOM® is the registered trademark of the National Electrical Manufacturers Association.

## About Merge Healthcare

Merge Healthcare is the leading provider of enterprise imaging and interoperability solutions. Merge solutions facilitate the sharing of images to create a more effective and efficient electronic healthcare experience for patients and physicians. Merge provides enterprise imaging solutions for radiology, cardiology and orthopaedics; a suite of products for clinical trials; software for financial and pre-surgical management, and applications that fuel the largest modality vendors in the world. Merge's products have been used by healthcare providers, vendors and researchers worldwide to improve patient care for more than 20 years. Additional information can be found at [www.merge.com](http://www.merge.com).

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