



KEYSTONE ENGINE STANDARDIZES CT SERIES DESCRIPTORS, YIELDING EFFECTIVE USE OF HANGING PROTOCOLS IN PACS

OVERVIEW

The hanging protocol feature in most PACS is a feature that improves radiologist productivity. Demonstrating the power of the hanging protocol feature is critical to demonstrating the productivity improvement capabilities of a PACS during the PACS selection process. The hanging protocol feature is often driven by the series descriptors in the DICOM header (e.g. 0008, 103E) coming from the modality. Series descriptors vary between different vendor modalities. It is very difficult for the PACS administrators to achieve uniform series descriptors across all modalities. As a result the PACS has a difficult time effectively applying hanging protocol rules because of the randomness of the proprietary DICOM series descriptors. The end result is radiologist dissatisfaction because the hanging protocol feature does not work as it did during the demonstration phase, and more importantly, the radiologist has to manually organize every CT series at the PACS workstation, before beginning the interpretation.

Keystone Engine from Mach 7 Technologies empowers the PACS administrator to build rules that auto-standardize the DICOM series descriptors to the preferred settings as the study is being sent on to your PACS. Once the DICOM series descriptors have been standardized, the PACS can easily apply consistent hanging protocol rules, thereby delivering improved radiologist productivity.

CASE STUDY: IMAGING CENTER UTILIZES CT SCANNERS FROM DIFFERENT VENDORS

An Imaging Center utilizes Centricity PACS and has CT scanners from GE, Siemens, Toshiba and Philips. Each CT vendor has unique series descriptors that have varying ways of describing the image sets. The CT technologists performing the procedures have limited ability to control CT series descriptors at the modality console. As the completed procedure and image sets move to PACS, the PACS tries to analyze the series descriptors to apply a pre-defined hanging protocol that corresponds to the interpreting radiologist's preference. Due to the randomness and inconsistency of the series descriptors, the PACS cannot apply consistent hanging protocols (DDP, Default Display Protocol). As a result, each radiologist must manually prepare the study so that it can be read and compared to relevant priors. This takes significant radiologist time, resulting in radiologist dissatisfaction.

Working together, the imaging center PACS administrator and Mach 7 Technologies professionals determined which series descriptors were causing the hanging protocol dysfunction. Once the issues with the series descriptors were determined, the PACS administrator created a Keystone Compare-Replace Matrix that is used by Keystone Engine. Keystone Engine is logically placed between the CTs



and the PACS. Acting as a router and a DICOM meta-data normalizer, Keystone Engine receives all CT studies, and screens the series descriptors based upon the Keystone Compare-Replace Matrix.

For example, the series descriptor from the Toshiba scanner contains the following description:

AX CHEST ABD ST ARTERIAL VENUS

Likewise, a similar procedure on the GE CT scanner contains the following description:

AX CHEST ABD VENUS ARTERIAL//

When the PACS tries to analyze the above series descriptors and apply the pre-defined hanging protocol rules, the rules fail because the PACS cannot easily be programmed to check for multiple variants of this particular series descriptions.

With Keystone Engine in place, the series descriptors above are standardized to the following:

AX CHEST ABD ARTERIAL

Technologists and PACS administrators can build one (or more) Keystone Compare-Replace Matrix(s) and import it into Keystone Engine so that the PACS consistently receives the same series descriptors. Subsequently, hanging protocol rules within the PACS can more easily be defined resulting in a consistent application of the hanging protocol rules, thereby increasing radiologist productivity.

Mach 7 Technologies has built a tool and defined a process that allows the PACS administrator to quickly auto-discover non-conforming series descriptors. Once the PACS administrator has discovered the inconsistent series descriptors, the PACS administrator can quickly determine the appropriate standardized series descriptors and enter them into the Keystone Compare-Replace Matrix.

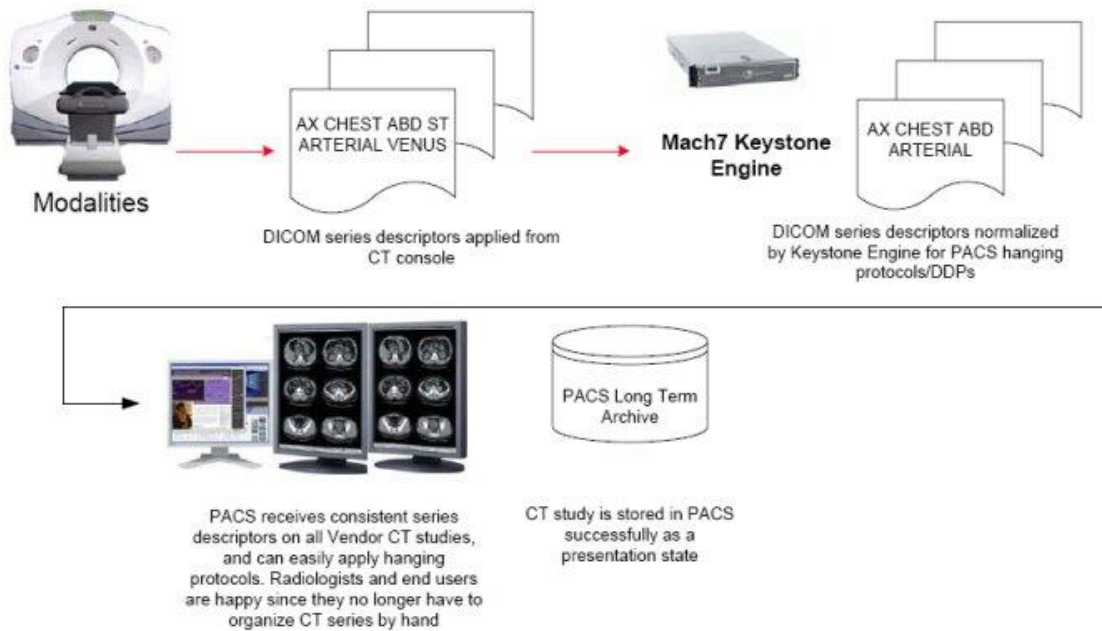
In some cases, there is a need to also auto-normalize other DICOM meta-data to ensure that the PACS hanging protocol works as expected. The Keystone Compare-Replace Matrix can also auto-standardize these DICOM meta-data elements.

It is expected that the customer PACS administrator will approach a hanging protocol improvement project with the following high level plan:

- 1 day to install / test Keystone Engine
- 2 days of analysis to determine series descriptor mismatches
- 1 day to create a Keystone Compare-Replace Matrix
- 3 days to review existing PACS hanging protocols and make modifications in anticipation of the new series descriptors
- ALPHA TEST - 2 days of PACS-Keystone Engine validation in a TEST environment
- BETA TEST - 2 days to beta test the new hanging protocols with selected radiologists
- GO LIVE - Roll out group hanging protocol standards, customize individual hanging protocols

The diagram below sums up the workflow:

Mach7 Technologies' Keystone Engine & DICOM Routing/Normalization for consistent display of hanging protocols/DDP in PACS



Visit Mach7T.com to learn more about how Keystone Engine and other components of Keystone Suite can simplify your sophisticated medical imaging workflow challenges.