Using a Query/Retrieve Client to Populate a Long-Term Archive

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Background/Problem Being Solved

In the federated institution there is a long-term vendor neutral archive (VNA) that is mandated for all digital medical images. All PACS are to send all DICOM objects to the VNA, but sometimes this doesn't happen.
To find missing DICOM objects in the VNA, an automated DICOM Query/Retrieve client application was developed to traverse the study reports in the federated EHR and compare the associated DICOM objects in the VNA with those on PACS. The missing objects are then retrieved from the PACS and stored in the VNA.

Intervention(s)

The comparison of a study's VNA DICOM objects to its PACS DICOM objects is done in several steps. First a list of Series and SOP Instance UIDs in the VNA is obtained along with the number of Series and the number of SOP Instances in each Series. Then a PACS query is issued at the Study level using the Accession Number as the query key. The PACS returns the number of Series and SOP Instances. These are then numerically compared with the VNA counts.

Barriers/Challenges

If there are missing Series or SOP Instances, additional queries are used to find and retrieve them. Missing Series are retrieved entirely. For others, Series level queries are issued to obtain the number of SOP Instances to compare it against the VNA. Missing images in the Series are then identified and retrieved.

Outcome

The automated DICOM Query/Retrieve application is being used at all the federated medical centers. The scale of the effort is large, involving upwards of 20 billion DICOM images at about 150 medical centers.

Conclusion/Statement of Impact/Lessons Learned

The automated image retrieve application uses the classic Study Root Query/Retrieve FIND/MOVE SOP Classes. The DICOM Committee has recognized that these are not very efficient for data migration applications and recently added the Inventory SOP Classes which will greatly help in the future.

Synopsis

An optimized algorithm uses classic DICOM Query/Retrieve to acquire images missing on VPN from PACS. The application is used at 150 medical centers to support an image archive containing over 20 billion DICOM image objects.

Keywords

Enterprise Imaging; Storage