JAAT

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Overview

The XNAT imaging informatics platform is increasingly used in clinical translational research. A common requirement in this type of research is the need to transfer a large number of clinical studies from a DICOM-based PACS into XNAT. In the transmission process, researchers often need to blind the DICOM or anonymize it for public use. These tasks are typically time consuming and error-prone.   This same sort of workflow is also common in transferring data from one XNAT repository to another. The Joint Anonymization and Archive Transmission (JAAT) tool greatly simplifies and automates this process for XNAT users by integrating a suite of free DICOM tools: XNAT-DICOM Gateway, CTP, and DCMTK.

JAAT enables researchers using XNAT to request bulk moves of DICOM data between repositories in an efficient, customized, and HIPAA compliant way. The tool is used in three basic ways:

1. PACS to XNAT Transfer: Transmission of data from a PACS to an XNAT instance.
2. XNAT to XNAT Transfer: Export of fully DS-142 anonymized data from a private XNAT repository, to a public repository, like XNAT Central (central.xnat.org).
3. Internal Data Migration: Copyng an existing projectto a new project within the same XNAT instance, while anonymizing or fully blinding the DICOM for a specific audience's consumption.

The proper transmission of DICOM data can include many technical challenges. For instance, typical PACS retrieval tools allow researchers to download only one imaging session at a time. Anonymization of DICOM is another significant challenge that involves: remapping/blinding of subject ids, anonymization of fields buried within DICOM sequences, and date incrementing based on subject id. In addition, HIPAA requires DICOM anonymization for public release to adhere to DICOM Supplement 142 (DS-142) as well as secure transmission of DICOM containing PHI over the Internet. Many research groups may not have enough resources to easily anonymize and transmit DICOM data properly. A common practice of preparing and mailing a hard drive may be slow by current standards and has an increased risk of PHI exposure.

JAAT aims to streamline DICOM transfer for such groups by combining several key technologies. As input, JAAT accepts DICOM-XNAT metadata mapping in simple comma-separated format. JAAT then queries the source PACS using DCMTK and applies anonymization and remapping with CTP. Anonymized studies can then be forwarded via CTP to the target XNAT or any other DICOM device via DICOM transmission protocol or secure socket connection. For XNAT-to-XNAT transmission, XNAT Gateway provides a PACS interface for the XNAT data source.

JAAT Poster for RSNA, 2013

JAAT-Poster-for-2013-RSNA.pdf

Prerequisites
To run JAAT, you will need the following tools:

XNAT

DCMTK - DCMTK is a collection of libraries and applications implementing large parts the DICOM standard. It includes software for examining, constructing and converting DICOM image files, handling offline media, sending and receiving images over a network connection, as well as demonstrative image storage and worklist servers.

CTP - The RSNA Clinical Trials Processor (CTP) is free software developed under the RSNA MIRC project that enables researchers to exchange, index and retrieve images and documents for imaging clinical trials. CTP provides a secure end-to-end solution for efficiently moving images for clinical trials research between institutions and to centralized archives. CTP is designed to support industry-standard transport protocols, so it is easy to configure CTP to work with all commercial PACS systems.

For XNAT to XNAT Transfer and Internal Data Migration, you will also need:

XNAT Gateway - XNAT Gateway is a software utility intended to be used at the scanning station, using the DICOM interface to query a remote XNAT location, and retrieve remotely stored DICOM data.

Usage

One of the main objectives of the JAAT is to simplify the transfer of DICOM for the researcher, shifting configuration and anonymization configuration responsibilities to IT. Ideally, the researcher should only have to provide two things in order to request sessions be transferred via JAAT:

1. The level of anonymization required, which will then be modified by the JAAT/CTP administrator within the CTP anonymization scripts.
2. A simple spreadsheet specifying sessions to be pulled from the PACS (or target XNAT), the XNAT subject and session labels (which are remapped in DICOM fields `PatientName (0010,0010)` and `PatientId (0010,0020)`), and the researcher's XNAT project.

query_type*	xnat_project	xnat_subject_label	xnat_session_label	pacs_query_information
	Your XNAT project id	The subject label you wish to appear in XNAT -- will also be inserted into the PatientName DICOM header 0010,0010	The session label you wish to appear in XNAT -- will also be inserted into the PatientID DICOM header, 0010,0020	Indicates the session or sessions you wish to download from the PACS. Type #3 is most common. 1 accession number 2 accession number/patient id 3 patient last name/patient first name/study date (yyyymmdd)/DOB (yyyymmdd)/modality (MR, PT, CT, US, CR, etc) Wildcards -- For type 3 queries, you can use an "*" as a wildcard (if you don't have DOB, for example). However, you should strive to make queries as specific as possible. If multiple sessions are found for the same query, a count will be appended to the cnda_session_label to ensure that each is unique, eg. xnatSubj001_MR_1, xnatSubj001_MR_2, etc.
				type 1 format: pacs_accession
				type 2 format: pacs_accession/pacs_patient_id
				type 3 format: pacs_patient_lastname/ pacs_patient_firstname/pacs_study_date/ pacs_patient_dob/pacs_study_modality
Examples				
1	myProject	xnatSubj001	xnatSubj001_MR	34982111
2	myProject	xnatSubj001	xnatSubj001_MR	34982111/1203947
3	myProject	xnatSubj001	xnatSubj001_MR	Doe/Jane/20110304/19800102/MR
3	myProject	xnatSubj001	xnatSubj001_MR	Doe/Jane/20110304/*/MR
* see **pacs_query_information** column to determine correct type				

This spreadsheet is provided as an xls file so that the instructions may be formatted. However, the JAAT administrator should resave the template provided as a csv before using it as input to JAAT.

jaat_input_template.xls