Xinapse Systems DICOM Tools
DICOM Conformance Statement

Software Release 4.0

Table of Contents

1 Introduction....3
2 Implementation....3
2.1 Application Data Flow....3
2.2 Functional Definition of AEs....3
2.3 Sequencing of Real World Activities....3
3 Specifications - StorageServer....3
3.1 AE Specification....3
3.2 Association Establishment Policies....3
3.2.1 General....3
3.2.2 Number of associations....4
3.2.3 Asynchronous Nature....4
3.2.4 Implementation Identifying Information....4
3.2.5 Called AE Title....4
3.2.6 Association Initiation Policy....4
3.3 Association Acceptance Policy....4
3.3.1 Real-World Activity – External system requests Storage of Images....4
3.3.2 Presentation Context Table....4
3.3.3 SOP Specific Conformance for Verification Class SOP Class....7
3.3.4 SOP Specific Conformance for All Storage Classes....7
3.3.5 Presentation Context Acceptance Criterion....7
3.3.6 Transfer Syntax Selection Policies....8
4 AE Specification - QueryRetrieve AE....8
4.1 Association Establishment Policies....8
4.1.1 General....8
4.1.2 Number of Associations....8
4.1.3 Asynchronous Nature....8
4.1.4 Implementation Identifying Information....8
4.1.5 Calling Title....8
4.1.6 Association Initiation Policy....8
4.1.7 Real-World Activity....8
4.1.8 Presentation Context Table....8
4.2 Association Acceptance Policy....9
5 Communication Profiles....9
5.1 Supported Communication Stacks....9
5.1.1 TCP/IP Stack....9
5.1.2 Physical Media....9

1 Introduction

Jim Version 4.0 (© Xinapse Systems Limited, 2006) is a suite of computer programs used for the analysis of medical images. As part of that suite, there are two separate tools (the 'DICOM tools') for requesting, receiving, and storing medical images. In conjunction with the whole Jim suite, these medical images can then be displayed and analysed. The DICOM tools conform to the DICOM 3.0 standard to allow interoperability with other DICOM compliant systems.

2 Implementation

The computer programs are designed to request, receive, and store medical images. The programs conform to the DICOM 3.0 standard, and will interoperate with other DICOM compliant systems.

2.1 Application Data Flow

The two tools are:

a) StorageServer. This application entity (AE) can receive image objects and STORE them to disk. As a storage SCP, the AE can respond to external storage requests which are unsolicited, or which result from DICOM C-Move requests. The StorageServer AE does not take on the SCU role.

b) QueryRetrieve. This application entity (AE) acts as a QueryRetrieve SCU. It can query external DICOM systems for patient/study, and series demographic information. It can also issue C-Get requests to retrieve images and either store the images to hard disk, or display the images.

2.2 Functional Definition of AEs

The StorageServer AE acts as an SCP for the Storage Service Class. It can receive images from external DICOM systems. The QueryRetrieve AE operates as an SCU for the QueryRetrieve service class. It can retrieve patient/study and series demographics from external DICOM QueryRetrieve SCPs. Retrievals are given an AE destination which is the same as the requesting AE.

2.3 Sequencing of Real World Activities

Not applicable.

3 Specifications - StorageServer

3.1 AE Specification

The StorageServer Application Entity provides standard conformance to the DICOM SOP classes as an SCP that are shown in Table 1.

Note that while StorageServer is capable of storing these images and data, Jim or any other related conversion and analysis programs may not be capable of converting, loading or displaying such images.

The StorageServer AE also operates as an SCU and an SCP for the service class Verification Service Class.

3.2 Association Establishment Policies

3.2.1 General

An association will be accepted by the StorageServer AE any time after the StorageServer SCP tool has been started. An association is accepted if the following criteria are met:

- Resources are available
- The Called AE Title matches the StorageServer AE's Title

- The application context is 1.2.840.10008.3.1.1.1
- There exists one presentation context in the association that matches one of the presentation contexts defined in the presentation context table that follows.

The maximum PDU size offered is 32768 bytes.

3.2.2 Number of associations

The number of simultaneous associations that the StorageServer AE can support is 1.

3.2.3 Asynchronous Nature

Not Applicable.

3.2.4 Implementation Identifying Information

The implementation UID provided is 1.2.826.4308531.3.0. The implementation version name is XINAPSE4.0X, where X is the build version minor release identifier (e.g. A).

3.2.5 Called AE Title

The default AE title of StorageServer is XIN_PACS. The StorageServer AE listens on port 4560. These values can be changed by the user through the configuration interface.

3.2.6 Association Initiation Policy

The StorageServer AE does not initiate any associations.

3.3 Association Acceptance Policy

The StorageServer AE will accept an association when any remote entity provides an acceptable application context and at least one supported presentation context. The StorageServer AE does not interpret the remote entity's AE Title or implementation UID. Once the StorageServer AE accepts an association, it will receive any images and store them on the hard disk in DICOM message format.

3.3.1 Real-World Activity – External system requests Storage of Images

The real world activity is the transfer of medical images from an external Storage SCU to the StorageServer AE and storage on hard disk.

Associated Real-World Activity

The real-world activity that causes the StorageServer AE to accept an association is that a remote DICOM entity needs to perform a STORE operation on an image ready for transmission, or an ECHO operation directed at the StorageServer. The real-world activities associated with the STORE message being received by the StorageServer AE is storing the image on the local hard disk in DICOM message format. The real-world activities associated with the ECHO message being received by the Storage SCP is that an ECHO response is generated and returned to the sender.

3.3.2 Presentation Context Table

The acceptable presentation contexts for the StorageServer application are listed in the following table.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Computed Radiography Storage	1.2.840.10008.5.1.4.1.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Digital X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital Mammography X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital Mammography X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.2.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital Intra Oral X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital Intra Oral X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.3.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
CT Storage	1.2.840.10008.5.1.4.1.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
US Multi Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
US Multi Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
MR Storage	1.2.840.10008.5.1.4.1.1.4	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
US Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
US Storage	1.2.840.10008.5.1.4.1.1.6.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Stand Alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Stand Alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Waveform Storage	1.2.840.10008.5.1.4.1.1.9.0	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.4	DICOM Implicit VR	1.2.840.10008.1.2	SCP	None

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
		Little Endian			
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Basic Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
High Resolution Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Stand Alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Stand Alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Gray Scale Soft Copy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Angio Storage	1.2.840.10008.5.1.4.1.1.12.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Fluoro Storage	1.2.840.10008.5.1.4.1.1.12.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Angio Biplane Image Storage	1.2.840.10008.5.1.4.1.1.12.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
NM Storage	1.2.840.10008.5.1.4.1.1.20	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
VL Image Storage	1.2.840.10008.5.1.4.1.1.77.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
VL Multi Frame Image Storage	1.2.840.10008.5.1.4.1.1.77.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
R Text Storage	1.2.840.10008.5.1.4.1.1.88.1	DICOM Implicit VR	1.2.840.10008.1.2	SCP	None

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
		Little Endian			
R Audio Storage	1.2.840.10008.5.1.4.1.1.88.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
SR Detail Storage	1.2.840.10008.5.1.4.1.1.88.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
SR Comprehensive Storage	1.2.840.10008.5.1.4.1.1.88.4	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Structure Sey Storage	1.2.840.10008.5.1.4.1.1.481.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Siemens CSA Non-Image Storage	1.3.12.2.1107.5.9.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 1. Acceptable presentation contexts for the StorageServer AE.

3.3.3 SOP Specific Conformance for Verification Class SOP Class

The StorageServer AE provides standard conformance to the Verification SOP Class as both an SCP and an SCU.

3.3.4 SOP Specific Conformance for All Storage Classes

The StorageServer AE provides SCP conformance of the Storage service class at Level 2. No attribute coercion is performed. The images will be stored on the system's local disk.

3.3.5 Presentation Context Acceptance Criterion

The StorageServer AE will only accept Presentation Contexts specified in the above table.

3.3.6 Transfer Syntax Selection Policies

The transfer syntax accepted and applied to the presentation context will be the first one that matches the list specified in the presentation context table. The list is checked in the order entered into the presentation context table.

4 AE Specification - QueryRetrieve AE

The QueryRetrieve Application Entity provides standard conformance to the following DICOM SOP classes as an SCU:

- Study Root Query/Retrieve Information Model – FIND
- Study Root Query/Retrieve Information Model - GET

The QueryRetrieve AE also operates as an SCU for the service class Verification Service Class.

4.1 Association Establishment Policies

4.1.1 General

The QueryRetrieve AE will request an association any time the user wishes to query a remote database or to retrieve a set of images. An association is requested if resources are available. The association parameters can be changed by configuring QueryRetrieve. A single association remains open for the duration of the query or retrieve request. The maximum PDU size offered is 32768 bytes.

4.1.2 Number of Associations

The number of simultaneous associations that the QueryRetrieve AE can support is one.

4.1.3 Asynchronous Nature

Not Applicable.

4.1.4 Implementation Identifying Information

The implementation UID provided is 1.2.826.4308531.4.0. The implementation version name is XINAPSE4.0X, where X is the build version minor release identifier (e.g. A).

4.1.5 Calling Title

The default AE Title of the QueryRetrieve AE is XIN_PACS. This value can be changed by the user in the QueryRetrieve configuration.

4.1.6 Association Initiation Policy

The QueryRetrieve AE attempts to initiate an association whenever the user requests to query a remote database or to retrieve a set of images.

4.1.7 Real-World Activity

Associated Real-World Activity

The real-world activities that causes the QueryRetrieve AE to request an association is when the user requests QueryRetrieve to send the query or to retrieve a set of images from a remove DICOM server to the AE. This is initiated by the user through the user interface using the computer mouse.

4.1.8 Presentation Context Table

The QueryRetrieve AE will offer a single presentation context in any one association request. The single context will request either the Query or Retrieve model. The presentation context for each of these models is listed in the following table.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.2.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 2. Presentation contexts for the QueryRetrieve AE.

SOP Specific Conformance for Study Root SOP Class

The QueryRetrieve AE provides standard conformance to either the C-FIND or C-GET Study Root SOP Class. No relational searches are requested and therefore no extended negotiation is used. The keys which form the query (C-FIND) are set by the user through the QueryRetrieve user interface. The set of keys used for the initial STUDY level query are:

- Patient Name
- Patient ID
- Patient Birth Date

After the initial query has returned a set of STUDY instances, the following keys are also used for SERIES level queries:

- Study Instance UID

The key which form the retrieve (C-GET) operation at the STUDY level is:

- Study Instance UID

and, in addition, when retrieving at the SERIES level is:

- Series Instance UID

4.2 Association Acceptance Policy

The QueryRetrieve AE does not accept associations.

5 Communication Profiles

5.1 Supported Communication Stacks

The DICOM tools support DICOM TCP/IP Network communication support as defined in Part 8 of the DICOM Standard.

5.1.1 TCP/IP Stack

The DICOM tools use the TCP/IP stack installed on the host system.

5.1.2 Physical Media

The DICOM tools make no assumptions and have no limitations pertaining to the physical media over which the TCP/IP stack is running.

6 Extensions/Specialisations/Privatisations

None.

7 Configuration

By default, the StorageServer AE and the QueryRetrieve AE have the AE Title "XIN_PACS". The default port for listening by the StorageServer AE is 4560. The default socket timeout is 60 seconds. All values can be configured by the user. See the user manual at http://www.xinapse.com for more details.

7.1 Configurable Parameters

The following items are configurable

- The AE Title of the SCP
- The port number of the SCP
- The socket timeout.

8 6. Support for Extended Character Sets

No extended character sets are supported.