

1. Conformance Statement Overview

Each iHistory *edge server* includes the ability to serve as short-term DICOM archive, complete with query/retrieve functionality and compliance as an IHE XDS Imaging Document Source. This component of the iHistory platform has a standard DICOM communication interface for image storage and retrieval. As specified in the table below, the image storage as well as Query/Retrieve features are options in addition to the standard DICOM API interface.

The most important DICOM characteristic of this device is the supported SOP Classes and the respective roles (Service Class User or Provider, SCU/SCP), which are listed below:

1.1 Supported SOP Classes

Table 1 -1: Supported SOP Classes

Networking SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Verification:	<i>Optional</i>	
Verification	YES	YES
Image Transfer	<i>Optional</i>	
Computed Radiography Image Storage	YES	YES
Digital X-Ray Image Storage - for Presentation	YES	YES
Digital X-Ray Image Storage - for Processing Storage	YES	YES
Digital Mammography X-ray Image Storage - For Presentation	YES	YES
Digital Mammography X-ray Image Storage - For Processing	YES	YES
Digital Intra-Oral X-ray Image Storage - For Presentation	YES	YES
Digital Intra-Oral X-Ray Image Storage - For Processing	YES	YES
CT Image Storage	YES	YES
US Multi-frame Image Storage (retired)	YES	YES
US Multi-frame Image Storage	YES	YES
MR Image Storage	YES	YES
Enhanced MR Image Storage	YES	YES
MR Spectroscopy Storage	YES	YES
Nuclear NM Image Storage (Retired)	YES	YES
Ultrasound Image Storage (Retired)	YES	YES
Ultrasound Image Storage	YES	YES
Secondary Capture Image Storage	YES	YES
Multi-Frame Single Bit Secondary Capture Image Storage	YES	YES
Multi-Frame GrayScale Byte Secondary Capture Image Storage	YES	YES
Multi-Frame GrayScale Word Secondary Capture Image Storage	YES	YES
Multi-Frame True Color Secondary Capture Image Storage	YES	YES
Standalone Overlay Storage	YES	YES
Standalone Curve Storage	YES	YES
Standalone Modality LUT Storage	YES	YES
Standalone VOI LUT Storage	YES	YES
GrayScale Softcopy Presentation State Storage SOP Class	YES	YES
X-Ray Angiographic Image Storage	YES	YES

X-Ray Radiofluoroscopic Image Storage	YES	YES
X-Ray Angiographic Bi-Plane Image Storage (retired)	YES	YES
Nuclear Medicine Image Storage	YES	YES
Raw Data Storage	YES	YES
VL Endoscopic Image Storage	YES	YES
VL Microscopic Image Storage	YES	YES
VL Slide-Coordinates Microscopic Image Storage	YES	YES
VL Photographic Image Storage	YES	YES
Basic Text SR	YES	YES
Enhanced SR	YES	YES
Comprehensive SR	YES	YES
Positron Emission Tomography Image Storage	YES	YES
Standalone PET Curve Storage	YES	YES
RT Image Storage	YES	YES
RT Dose Storage	YES	YES
RT Structure Set Storage	YES	YES
RT Beams Treatment Record Storage	YES	YES
RT Plan Storage	YES	YES
RT Brachy Treatment Record Storage	YES	YES
RT Treatment Summary Record Storage	YES	YES
Query/Retrieve	Optional	
Patient Root Q/R – FIND	NO	NO
Patient Root Q/R – MOVE	NO	NO
Study Root Q/R – FIND	YES	NO
Study Root Q/R – MOVE	YES	NO

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3. Introduction

3.1 Abbreviations and Acronyms:

• ASCII	American Standard Code for Information Interchange
• AE	Application Entity
• ANSI	American National Standards Institute
• DICOM	Digital Imaging and Communications in Medicine
• IE	Information Entity
• IOD	Information Object Definition
• ISO	International Standards Organization
• OSI	Open Systems Interconnection
• PDU	Protocol Data Unit
• SC	Secondary Capture
• SCP	Service Class Provider
• SCU	Service Class User
• SOP	Service-Object Pair
• TCP/IP	Transmission Control Protocol/Internet Protocol
• UID	Unique Identifier
• VR	Value Representation

3.2 References and Resources:

- “Digital Imaging and Communications in Medicine (DICOM) standard”, NEMA PS 3.1-3.16, 2001, <http://medical.nema.org>

3.3 Scope

- This DICOM Conformance statement documents the conformance of the Hx Technologies Imaging Document Source software with the Digital Imaging and Communications in Medicine (DICOM) standard. This document is essential in order to evaluate whether or not another DICOM compliant device may communicate with this software product. This statement is conformant with the recommended format as described in PS 3.2 of the DICOM Standard1.

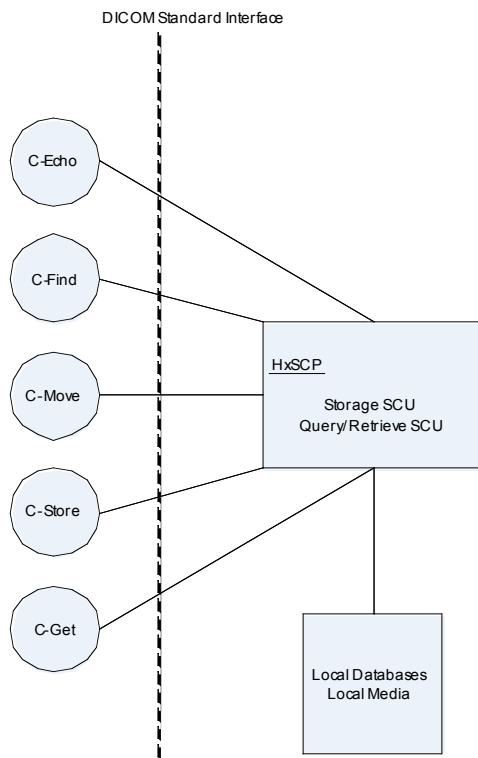
3.4 Warning to the reader:

- If another device matches this conformance statement based on the comparison with its own conformance statement, there is a chance, but no guarantee that they interoperate. DICOM only deals with communication; it does not specify what is needed for certain Applications to run on a device.

4. Networking and Processing Application

4.1 Implementation Model

APPLICATION DATA FLOW DIAGRAM



4.1.2 Mapping to Real World Activities

The Storage Association by an SCU can use an arbitrary but unique AET that results in simple storage in a local database.

The Query Association by an SCU can use an arbitrary AET that results in a simple query of the local database.

4.2 The C-FIND IOD

In order to maximize the distributed potential of Hx Technologies' Imaging Document Source to servers of all capabilities from all manufacturers the default query is the minimum set defined by the DICOM standard.

Element	Name	Level	Optional
(0010,0010)	Patient Name	Patient/Study	NO
(0010,0020)	Patient ID	Patient/Study	NO
(0010,0030)	Patient DOB	Patient/Study	NO
(0010,0040)	Patient Sex	Patient/Study	NO
(0020,000D)	Study UID	Study	NO
(0020,0010)	Study ID	Study	NO
(0008,0020)	Study Date	Study	YES
(0008,0050)	Accession Number	Study	NO
(0008,0060)	Modality	Study	YES
(0008,0080)	Institution	Study	YES
(0032,1060)	Requested Procedure	Study	YES
(0020,000E)	Series UID	Series	NO
(0008,103E)	Series Description	Series	YES
(0008,0060)	Modality	Series	NO
(0032,1060)	Requested Procedure	Series	YES
(0018,0015)	Body Part Examined	Series	YES
(0008,0021)	Series Date	Series	YES
(0008,0031)	Series Time	Series	YES
(0008,0018)	Instance UID	Image	NO
(0028,0011)	Columns	Image	NO
(0028,0010)	Rows	Image	NO
(0028,0008)	Image Frames	Image	NO

4.3 Query/Retrieve Composite C-FIND, C-MOVE & C-GET

Query and Retrieve is a Composite function that makes use of C-FIND at either Patient or Study Root Level and the corresponding C-MOVE or C-GET SOPs to retrieve a selection to a client. Hx Technologies Imaging Document Source uses Study Root query and C-MOVE or C-GET services to retrieve one or more DICOM IODs.

SOP Class	SOP name
1.2.840.10008.5.1.4.1.2.2.1	Study Root Find
1.2.840.10008.5.1.4.1.2.2.2	Study Root Move
Storage Classes	See Section 5.0

5. Processing Application and DICOM AE Specifications

5.1 Processing Application Specification

a. 5.1.1 SOP Classes

This application provides standard conformance to the following DICOM SOP classes (UID Specified):

Table 5.1.1-1 SOP Classes for Processing Application

SOP Class Name	SOP Class UID	SCU	SCP
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	YES	YES
Digital X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.1	YES	YES
Digital X-Ray Image Storage - for Processing Storage	1.2.840.10008.5.1.4.1.1.1.1.1	YES	YES
Digital Mammography X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	YES	YES
Digital Mammography X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	YES	YES
Digital Intra-Oral X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	YES	YES
Digital Intra-Oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	YES	YES
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	YES	YES
US Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	YES	YES
US Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	YES	YES
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	YES	YES
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	YES	YES
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	YES	YES
Nuclear NM Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	YES	YES
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	YES	YES
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	YES	YES
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	YES	YES
Multi-Frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	YES	YES
Multi-Frame GrayScale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	YES	YES
Multi-Frame GrayScale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	YES	YES
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	YES	YES
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	YES	YES
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	YES	YES
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	YES	YES
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	YES	YES
GrayScale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	YES	YES
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	YES	YES
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	YES	YES
X-Ray Angiographic Bi-Plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3	YES	YES
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	YES	YES
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	YES	YES
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	YES	YES
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	YES	YES
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	YES	YES
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	YES	YES
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	YES	YES
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	YES	YES
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	YES	YES

Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	YES	YES
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	YES	YES
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	YES	YES
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	YES	YES
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	YES	YES
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	YES	YES
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	YES	YES
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	YES	YES
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	YES	YES

The Hx Technologies Imaging Document Source supports the following Abstract Syntaxes as both SCP and SCU

Abstract Syntax UID	Syntax Name
1.2.840.10008.1.2	Implicit Value Representation (VR) little Endian byte order – aka the Default Transfer Syntax
1.2.840.10008.1.2.1	Explicit Value Representation (VR) little Endian byte order
1.2.840.10008.1.2.2	Explicit Value Representation (VR) big Endian byte order
1.2.840.10008.1.2.5	RLE compression See Dicom 3.5 Annex G
1.2.840.10008.1.2.4.50	JPEG Base line compression encoding The Default transfer syntax for lossy jpeg
1.2.840.10008.1.2.4.51*	JPEG Extended JPEG Coding Type 2 = 8-bit JPEG Coding Type 4 = 12-bit
1.2.840.10008.1.2.4.57*	JPEG lossless, Non-Hierarchical
1.2.840.10008.1.2.4.70*	JPEG Lossless, Non-Hierarchical, First Order Prediction The Default transfer syntax for losslessjpeg
1.2.840.10008.1.2.4.90**	Lossless (reversible) mode of JPEG 2000 Part 1 (ISO/IS 15444-1) (i.e. the use of a reversible wavelet transformation and a reversible color component transformation, if applicable, and no quantization).
1.2.840.10008.1.2.4.91**	a. the lossless (reversible) mode of JPEG 2000 Part 1 (ISO/IS 15444-1) (i.e. the use of a reversible wavelet transformation and a reversible color component transformation, if applicable, and no quantization), or b. the lossy (irreversible) mode of JPEG 2000 Part 1 (ISO/IS 15444-1) (i.e. the use of an irreversible wavelet transformation and an irreversible color component transformation, if applicable, and optionally quantization).

***Note:** The JPEG CODECS are optimized with more options if JAI is installed on a client computer as a Java extension.

****Note:** JPEG2000 Wavelet compression is only available if JAI (Java Advanced Imaging) is installed as a Java Extension – the availability is automatically detected and requires no user configuration.