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24 May, 2017

AGFA HEALTHCARE
DICOM Conformance Statement

Agfa HealthCare Enterprise Imaging 8.0.x

Document No. 001512
Revision: 13
Livelink NodeID: 50671545

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Conformance Statement Overview

This document is a DICOM Conformance Statement for the DICOM Services of the Agfa HealthCare Enterprise Imaging 8.0.x further referred to as Enterprise Imaging.

Enterprise Imaging is comprised of several components that each provide certain DICOM capabilities conforming to the DICOM 3.0 2014 standard.

The following are the application entities (AE) that implement DICOM services in Enterprise Imaging:

- o Enterprise Imaging Core Server Platform AE

   (comprised in Enterprise Imaging / Radiology Suite / Cardiology suite)

- o Enterprise Imaging VNA AE (further referred to as VNA)

- o Enterprise Imaging TRANSFER AE (further referred to as TRANSFER)

- o Enterprise Imaging XERO Viewer AE (further referred to as CWP for the server part and XERO Viewer for the display part)

- o Connectivity Manager (only required in an Enterprise Imaging VNA centric deployment)

These different optional components are not always included by default in every deployment. A brief description about Enterprise Imaging deployment is given in chapter 1.3: Enterprise Imaging - about.

Enterprise Imaging acts as a **service class provider (SCP)** for Verification, Storage, Storage Commitment, Query/Retrieve Service Classes, Modality Performed Procedure Step SOP Class and Modality Worklist.

Enterprise Imaging acts as a **service class user (SCU)** for Verification, Storage, Storage Commitment, Query/Retrieve Service Classes, Modality Performed Procedure Step SOP Class, Modality Worklist and Print.

Enterprise Imaging provides Standard Conformance to the SOP Classes listed in Table 1-1. This table lists the Network Services Supported as they appear in DICOM Part 2, Table A.1-2. The shaded items represent SOP classes that have been retired (so no longer appear in Supplement 64) but are still supported by Enterprise Imaging.

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Table 1-1: Network Services Supported

SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Verification										
Verification	1.2.840.10008.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A
Transfer										
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	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	Yes	Yes	Yes	Yes	Yes	Yes	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced US Volume Storage	1.2.840.10008.5.1.4.1.1.6.2	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***

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SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
General Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.2	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	Yes***
Arterial Pulse Waveform Storage	1.2.840.10008.5.1.4.1.1.9.5.1	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.1	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
XA / XRF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Intravascular Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	No	No	No	No	No	No	Conditional**	Conditional**	Yes***
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Ophthalmic Visual field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Colon CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.69	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	Yes***
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[1]
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Brachy Treatment Storage	1.2.840.10008.5.1.4.1.1.481.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Ion Beams Plan Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
GE Private 3D Model Storage	1.2.840.113619.4.26	Yes	Yes	Yes	Yes	No	No	No	No	No
GE Private PET Raw Data Storage	1.2.840.113619.4.30	Yes	Yes	Yes	Yes	No	No	No	No	No
Dcm4che Encapsulated Document Storage	1.2.40.0.13.1.5.1.4.1.1.104.1	No	No	Yes	Yes	No	No	No	No	No
Agfa Basic Attribute Presentation State	1.2.124.113532.3500.7	No	No	Yes	Yes	No	No	No	No	No
Siemens CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Yes	Yes	Yes	Yes	No	No	No	No	No
Philips 3D Private Presentation State Storage	1.3.46.670589.2.5.1.1	Yes	Yes	Yes	Yes	No	No	No	No	No
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Yes	Yes	Yes	Yes	No	No	No	No	No

[1] XERO Viewer will display if the bit depth is <=16, but not for 32 bit grayscale pixels

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Yes	Yes	Yes	Yes	No	No	No	No	No
Philips Private MR Examcard Data Storage	1.3.46.670589.11.0.0.12.4	Yes	Yes	Yes	Yes	No	No	No	No	No
Toshiba Aplio Ultrasound Private Storage	1.2.392.200036.9116.7.8.1.1.1	Yes	Yes	No	No	No	No	No	No	Yes
Hardcopy Grayscale Image Storage (Retired)	*1.2.840.10008.5.1.1.29*	Yes			Yes	Yes	Yes	No	No	No
Hardcopy Color Image Storage (Retired)	*1.2.840.10008.5.1.1.30*	Yes			Yes	Yes	Yes	No	No	No
Nuclear Medicine Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.5*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Ultrasound Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.6*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Ultrasound Multi-frame Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.3*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
X-Ray Angiographic Bi-plane Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.12.3*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes***
Standalone Overlay Storage (Retired)	*1.2.840.10008.5.1.4.1.1.8*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone Curve Storage (Retired)	*1.2.840.10008.5.1.4.1.1.9*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone Modality LUT Storage (Retired)	*1.2.840.10008.5.1.4.1.1.10*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone VOI LUT Storage (Retired)	*1.2.840.10008.5.1.4.1.1.11*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone PET Curve Storage (Retired)	*1.2.840.10008.5.1.4.1.1.129*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
VL Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.77.1*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes***

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SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
VL Multi-frame Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.77.2*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes***
Query/Retrieve										
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Patient/Study Only Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Workflow Management										
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	Yes	Yes	Yes	Yes	No	No	No	N/A
Modality Worklist Information Model – Find	1.2.840.10008.5.1.4.31	No	Yes	No	No-IDC Yes-Ag	No	No	Yes	No	N/A
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	Yes	Yes	Yes	No	No	No	No	N/A
Instance Availability Notification	1.2.840.10008.5.1.4.33	Yes	No	No	No	No	No			
Print Management										
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
> Basic Film Session SOP Class > Basic Film Box SOP Class > Basic Grayscale Image Box SOP Class > Printer SOP Class	1.2.840.10008.5.1.1.1 1.2.840.10008.5.1.1.2 1.2.840.10008.5.1.1.4 1.2.840.10008.5.1.1.16									
Basic Color Print Management Meta SOP Class > Basic Film Session SOP Class > Basic Film Box SOP Class > Basic Color Image Box SOP Class > Printer SOP Class	1.2.840.10008.5.1.1.18 1.2.840.10008.5.1.1.1 1.2.840.10008.5.1.1.2 1.2.840.10008.5.1.1.4.1 1.2.840.10008.5.1.1.16	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* Supported as of 8.0.1 SU1

** Supported when XERO is standalone

*** Supported by XERO Viewer only

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1 INTRODUCTION

1.1 Revision Record

DICOM Conformance Statement Enterprise Imaging 8.0.x		
Revision Number	**Date**	**Reason for Change**
1.0	July 10, 2015	Initial version
1.1	August 27, 2015	Update after review cycle Add chapter 1.3: Enterprise Imaging - about
1.2	September 10, 2015	Update after review cycle Update document title (product version) and supported SOP Classes
1.3	December 16, 2015	Update support for MPEG 4 transfer syntax (CSP 8.0.1 or higher)
1.4	January 20, 2016	Update supported SOP Classes Add chapter 6.2: WADO support CSP/CWP
1.5	February 16, 2016	Add DICOM Print information
11	November 23, 2016	- Update revision number to be in line with Livelink version - add support for deflated explicit VR Little Endian transfer syntax
12	March 17, 2017	Correct support for display of 12-lead ECG Waveform Storage SOP Class
13	May 15, 2017	Correct support for display of For-Processing SOP Classes

1.2 Purpose and Intended Audience of this Document

This document is a DICOM Conformance Statement for the DICOM Services of the Agfa HealthCare Enterprise Imaging 8.0.x, further referred to as Enterprise Imaging.

The user of this document is involved with system integration and/or software design. We assume that the reader is familiar with the terminology and concepts that are used in the DICOM 3.0 standard and the IHE Technical Framework.

Readers not familiar with DICOM 3.0 terminology should first read the appropriate parts of the DICOM standard itself, prior to reading this conformance statement.

Although the use of this conformance statement, in conjunction with the DICOM 3.0 standard, is intended to facilitate communication between Enterprise Imaging and other DICOM devices, it is not sufficient to guarantee the interoperation of the connection. Section 1.3 outlines issues that need to be considered to ensure interoperability.

1.3 Enterprise Imaging - about

Enterprise Imaging is a care-centric interoperable, collaborative workflow platform of image management and repository solutions across the continuum of care. It improves physician awareness of a patient's complete imaging record through the EHR and promotes collaboration with other care givers in a multi-disciplinary environment.

Enterprise Imaging has different entry points in the care universe, by offering different solutions, based underneath on the same Consolidated Server Platform.

- Enterprise Imaging offers departmental solutions for different departments: radiology, cardiology, dermatology, ophthalmology, and more multi-specialties. This solution can be offered as a single department solution, span immediately multiple enterprise departments or used as a regional solution to optimize the collaboration and integration in the medical imaging domain.

- Enterprise Imaging offers a Universal viewer (XERO) which can be deployed with the Enterprise Imaging departmental solutions, or which can be deployed with a 3rd party PACS system, or Agfa's IMPAX PACS systems. This offering also gives you the

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capability to limit the deployment to a Universal viewer deployment, but also be extended to a combined Universal Viewer/departmental solution or a combined Universal Viewer/VNA deployment.

- Enterprise Imaging offers a VNA solution which facilitates vendor neutral, storage agnostic archiving services, extended with workflow management and non-DICOM data, which can be deployed separately or combined with a departmental solution or Universal XERO Viewer.
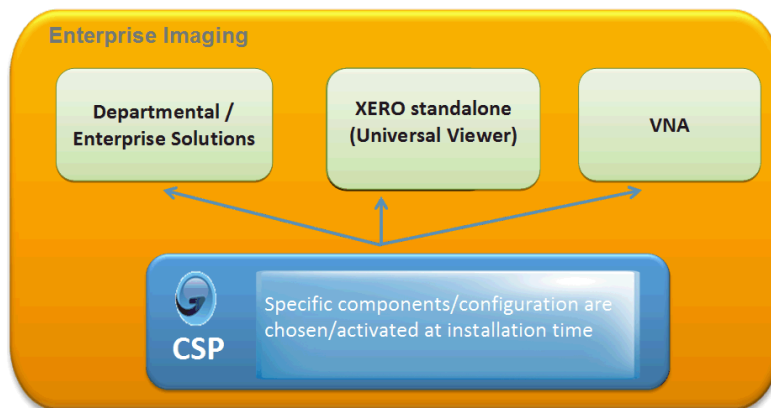
1.3.1   Departmental / Enterprise deployment

Enterprise Imaging offers departmental solutions for different departments: radiology, cardiology, dermatology, ophthalmology, and more multi-specialties. This solution can be offered as a single department solution, span immediately multiple enterprise departments or used as a regional solution to optimize the collaboration and integration in the medical imaging domain.

Enterprise Imaging supports two different deployment models mainly depending on scalability requirements
- CSP centric deployment
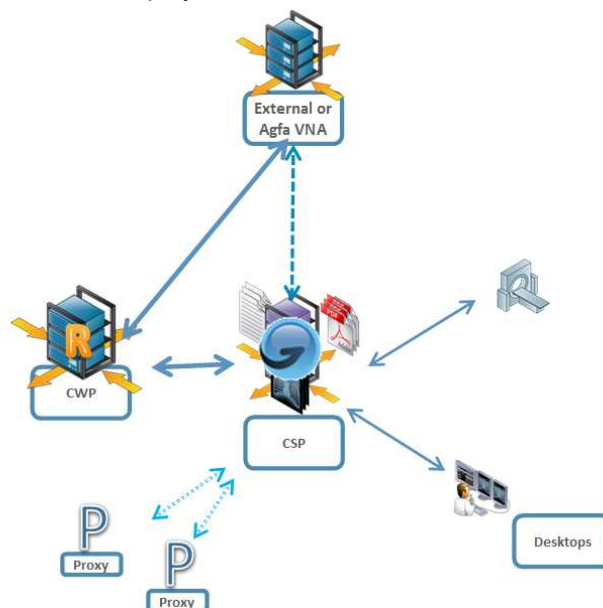
- o applicable for configurations on ALL departments, so it is not limited to Radiology, Cardiology or being deployed on a single department (versus multiple departments)

- o applicable when the total study volume production of the external PACS <u>does not</u> exceed the Core Server Platform scaling limits. In the 8.0.x release, this is defined on 1M studies/year.
  - o Supports multi-patient domain deployments
  - o This configuration can be extended with different options
    - Transfer /Capture which sends all data toward the CSP server
    - BI for volume reporting, which is based off the CSP server or BI for management reports & other BI reports
    - Teaching files
    - XERO desktops

- VNA centric deployment
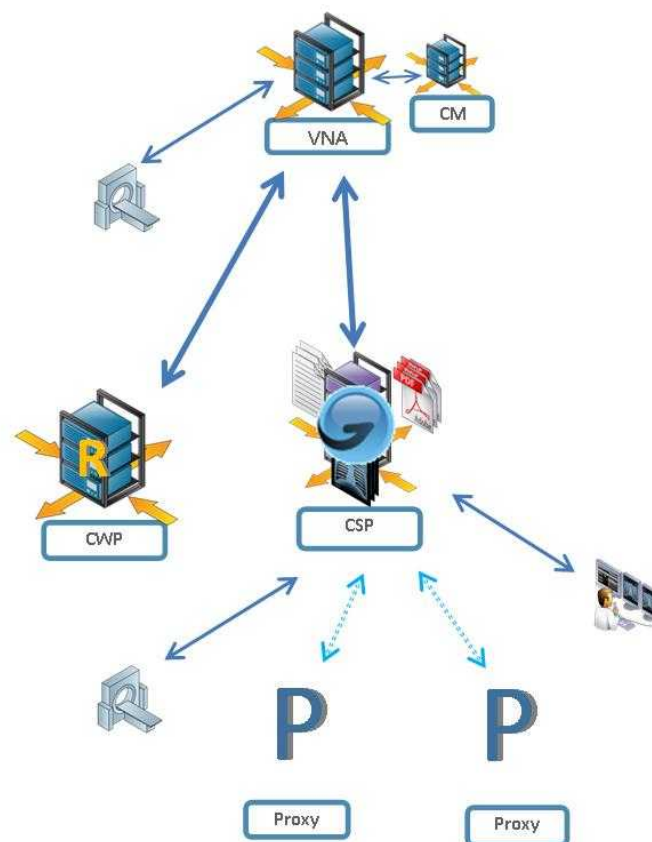
  - o applicable for configurations on ALL departments, so it is not limited to Radiology, Cardiology only or being deployed on a single department (versus multiple departments)
  - o applicable when the total study volume production of the external PACS exceeds the Core Server Platform scaling limits.
  - o This deployment does NOT support a multi-patient domain deployment, so be aware that the sizing may go up as long as it is deployed in a single patient domain (due to the connectivity manager usage in this deployment)
  - o This configuration can be extended with different options
    - BI for volume reporting, which is based off the VNA.
    - XERO desktops (see note below since CWP server is used for multiple purposes)

1.3.2 Universal Viewer (XERO)

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Enterprise Imaging offers the Universal Viewer (XERO) to allow visualization of data out of external (non-Enterprise) Imaging solutions. This is also referred to as the XERO standalone deployment in combination with 3rd party PACS systems (of other vendors), Agfa's non-Enterprise Imaging PACS systems (IMPAX ES, IMPAX EE), 3rd party VNA systems (of other vendors) or Agfa's Enterprise Imaging VNA.

This deployment contains from the 8.0.0 release on also a combined CSP/CWP packaging, where the CSP server is used to store configuration, licensing …

The CWP server can in this deployment be used for XERO viewing or to offer more extended functionality (based on Xtend) which the XERO viewer can use, also in combination with 3rd party systems. In the 8.0.0 release, the CWP server in this deployment will not offer mobile apps or proxy functionality.
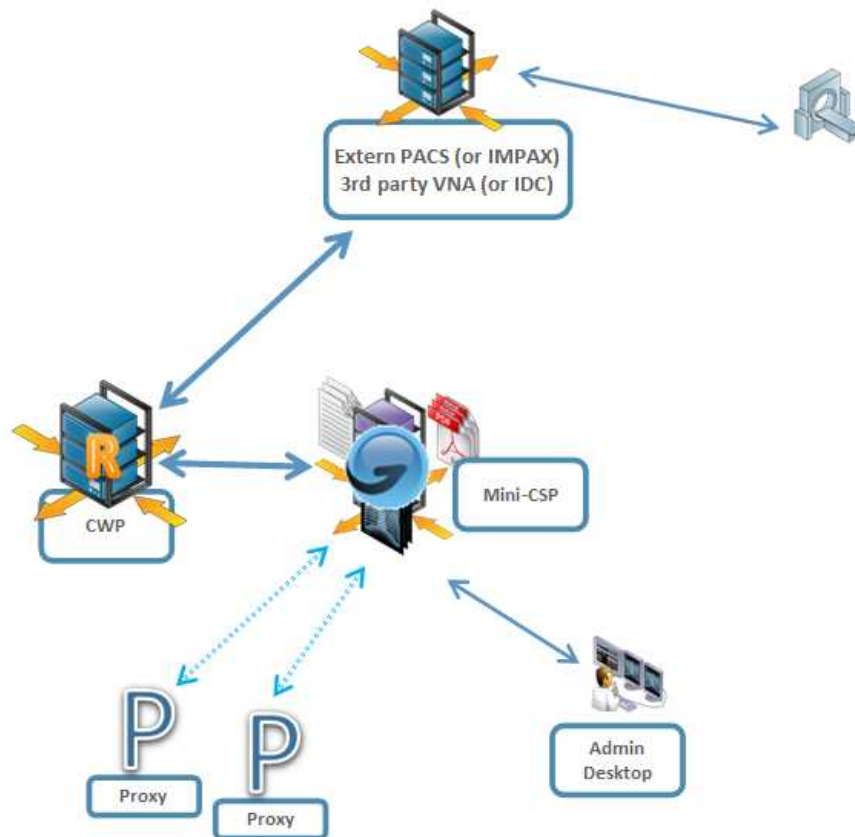
Be aware that the CWP server runs on Wildfly and is deployed on Linux. The CSP server runs on JBoss and is deployed on Linux. Since not all functionality of CSP is used on a Linux deployment, this version is identified as mini-CSP to distinguish the full use of CSP on a Window box.

It is possible to deploy a Universal Viewer (XERO) deployment immediately with a full CSP server (also deployed on Windows). This could be useful if any up-selling will be done towards other departments or a full Enterprise Imaging deployment.

1.3.3   VNA deployments

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Enterprise Imaging offers a VNA deployment which allows sharing of data from multiple systems (Enterprise Imaging departmental deployments, 3rd party PACS systems, IMPAX …).
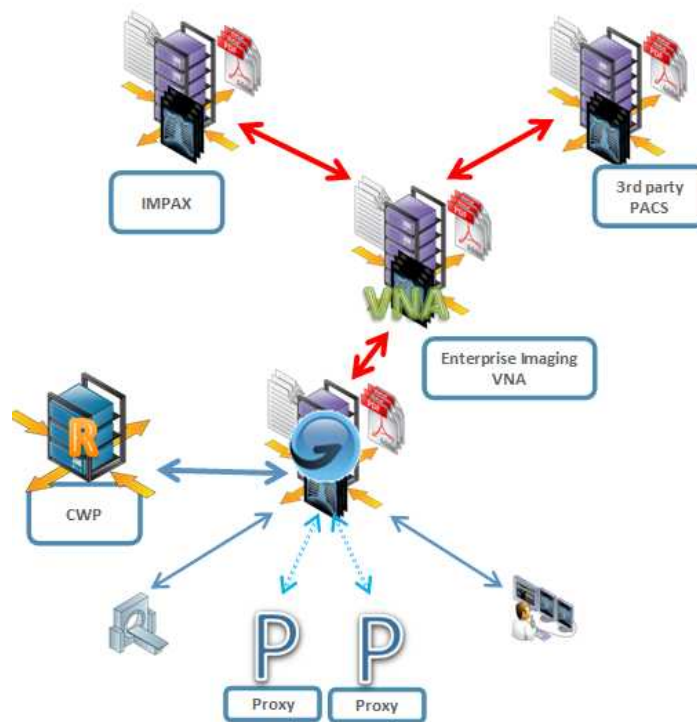
1.3.4 Optional integration - TRANSFER

Enterprise Imaging integrated with TRANSFER which sends foreign DICOM images to Enterprise Imaging. TRANSFER will ensure uniqueness of the patient ID by pre or post fixing. Enterprise Imaging is used to reconcile the incoming studies.

This deployment is applicable in the departmental deployments (both CSP/VNA centric) and in the Universal Viewer (XERO) deployment.

1.3.5 Optional integration – XERO Viewer 3D

The XERO viewer 3D is an optional deployment where the XERO viewer can be extended with more advanced visualization capabilities. This version is still available in the 8.0.0 release, but will be gradually replaced with Xtend which is natively integrated on the CWP server, so there is no need for a separate server to offer this advanced visualization capabilities.

This deployment is applicable in the departmental deployments (both CSP/VNA centric) and in the Universal Viewer (XERO) deployment.

1.3.6 Optional extensions - Teaching file

Enterprise Imaging integrates with an underneath separate teaching file system (which is only optionally packaged combined with Enterprise Imaging)

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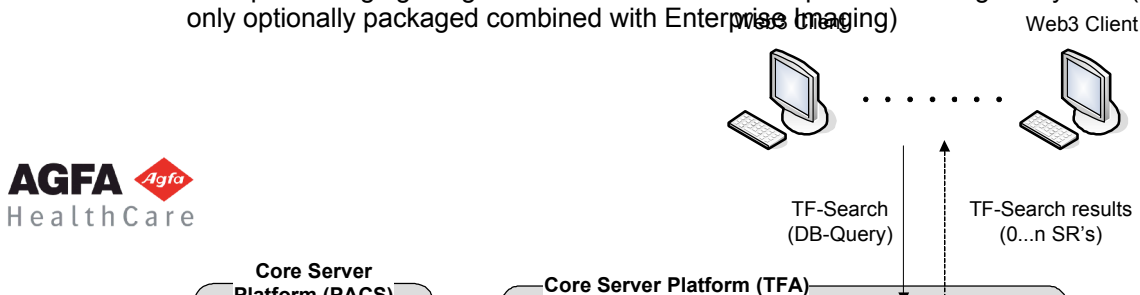
Enterprise Imaging clients store data into the separate teaching file system, using export pipelines which anonymize the data. The data can be visualized and queried from the Enterprise Imaging desktops, or can be visualized using an Enterprise Imaging Teaching file web client.

1.4   General Remarks

1.4.1   Integration and Validation Activities

The integration of any device into a system of interconnected devices goes beyond the scope of the DICOM 3.0 standard and this conformance statement when *interoperability* is desired. The responsibility for analyzing the applications requirements and developing a solution that integrates the Agfa equipment with other vendors' systems is the user's responsibility and should not be underestimated.

In some circumstances it might be necessary to perform a validation to make sure that functional interoperability between the Agfa equipment and non-Agfa devices works as expected. The user should ensure that any non-Agfa provider accepts responsibility for any validation required for their connection with the Agfa equipment.

1.4.2   Future Evolution

As the DICOM 3.0 standard evolves to meet the user's growing requirements and to incorporate new features and technologies, Agfa will follow the evolution of the standard. This evolution of the standard may require changes to devices that have implemented DICOM 3.0. The user should ensure that any non-Agfa provider, who connects with Agfa devices, also plans for future evolution of the DICOM standard. A refusal to do so may result in the loss of functionality and/or connectivity between the different products.

1.5   Acronyms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard. Abbreviations and terms are as follows:

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ADT	HL7 Admission, Discharge, and Transfer message
AE	DICOM Application Entity
AET	Application Entity Title
ACSE	Association Control Service Element
CAD	Computer Aided Detection
CD-R	Compact Disk Recordable
CM	Connectivity Manager
CSP	Core Server Platform
CSPS	Color Softcopy Presentation State
CWP	Consolidated Web Platform
DICOM	Digital Imaging and Communications in Medicine
DM	Detached Management
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
GSDF	Grayscale Standard Display Function
GSPS	Grayscale Softcopy Presentation State
GUI	Graphical User Interface
HL7	Health Level 7
IE	Information Entity
IHE	Integrating the Healthcare Enterprise
IOD	(DICOM) Information Object Definition
ISO	International Organization of Standardization
KIN	Key Image Notes
MF	Multi-frame
MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
ORM	HL7 Order Request message
ORU	HL7 Observation Results - Unsolicited message
PACS	Picture Archive and Communications System
PDU	DICOM Protocol Data Unit
RIS	Radiology Information System
SC	Secondary Capture
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
SR	Structured Report
TCP/IP	Transmission Control Protocol / Internet Protocol
UID	Unique Identifier
UTF-8	Unicode Transformation Format - 8
VR	Value Representation

1.6   Related Documents

➤ [ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) V3.0](#)

➤ IHE Radiology Technical Framework Revision 13.0, July 2014.

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2   NETWORKING

2.1   Implementation Model

2.1.1   Application Data Flow Diagram

The Application Data Flow Diagram in Figure 2.1-1 depicts the DICOM data flow to and from the individual application entities that are included in Enterprise Imaging. The tail of the arrow between a local AE and the remote real world activity indicates the party (AE or remote real world activity) that initiates the association negotiation.
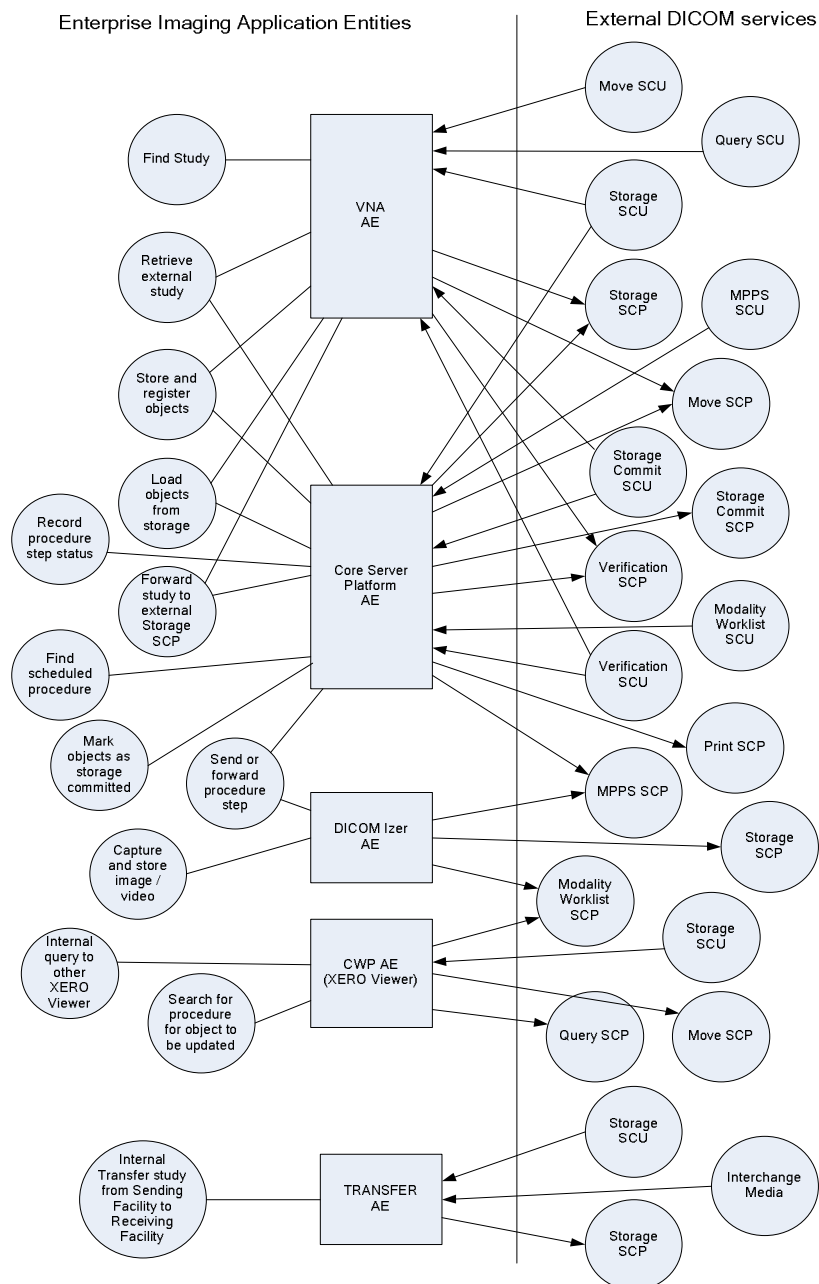
Figure 2.1-1: Functional Overview – Application Data Flow

Enterprise Imaging provides several different DICOM Application Entities:

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Core Server Platform (CSP) AE can use different AE aliases per major DICOM feature, by default it is configured as a single AE. It provides the following service classes:

- Verification-SCU and SCP
- Storage-SCP
- Storage Commitment (SCU and SCP)
- Query/Retrieve-SCP and Storage-SCU
- Retrieve-SCU
- Modality Performed Procedure Step (SCU and SCP)
- Modality Worklist SCP
- Print SCU

VNA AE can use different AE aliases per major DICOM feature, by default it is configured as a single AE. It provides the following service classes:

- Verification (SCU and SCP)
- Storage (SCU and SCP)
- Storage Commitment (SCU and SCP)
- Query/Retrieve-SCP and Storage-SCU

Connectivity Manager (CM) AE:

- Verification-SCU
- Storage-SCU

CWP AE provides the following service classes:

- Verification-SCU
- Query/Retrieve-SCU
- Modality Worklist-SCU
- Storage-SCU and SCP

TRANSFER AE provides the following service classes:

- Verification-SCP
- Storage-SCP
- Verification-SCU
- Storage-SCU
- Storage Commitment-SCU

Etiam DICOM Izer AE provides the following service classes:

- Verification-SCU
- Modality Performed Procedure Steps-SCU

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- Modality Worklist-SCU

- Storage-SCU

2.1.2   Functional Definitions of AE's

The following sections contain a functional definition for each Application Entity that is part of the Enterprise Imaging. These definitions describe the functions to be performed by the AE, and the DICOM services used to accomplish these functions (both DICOM service classes and lower level DICOM services such as Association Services).

2.1.2.1   Enterprise Imaging Verification-SCU

The following Enterprise Imaging AE's implement the DICOM Verification Service Class as an SCU:

VNA AE

CSP AE, CWP AE, DICOM Izer AE, TRANSFER & Connectivity Manager AE

2.1.2.2   Enterprise Imaging Storage-SCU

The following Enterprise Imaging AE's implement the DICOM Storage Service Class as an SCU.

VNA AE will send images to a remote Storage-SCP during a Query/Retrieve request or the forwarding rules that are configured.

CSP AE receives images and stores them to the VNA Storage SCP or to an external Archive Storage SCP, depending on the deployment model.

CSP AE will also send images to a remote storage SCP during a Query/Retrieve request.

CWP AE receives uploaded DICOM and non-DICOM format images and converts them to DICOM and sends them to the VNA Storage-SCP or to the CSP storage SCP, or an external PACS storage SCP, depending on the deployment model.

CM AE receives non-DICOM format reports and converts them to DICOM and sends them to the VNA Storage-SCP.

TRANSFER AE receives DICOM images and sends them to the CSP storage-SCP.

DICOM Izer AE receives non-DICOM format images and converts them to DICOM and sends them to the CSP Storage-SCP.

2.1.2.3   Enterprise Imaging Storage Commitment-SCU

The following Enterprise Imaging AE's implement the DICOM Storage Commitment Service Class as an SCU:

VNA AE acts as a Service Class User of Storage Commitment to request explicit responsibility for storing DICOM objects sent to a Remote Storage-SCP.

Depending on the deployment model, CSP AE uses store and remember to VNA, as such, it implements the Storage Commitment-SCU to the VNA Storage Commitment-SCP. CSP AE can also store towards external archive. As such it implements storage commitment-SCU to the external archive Storage Commitment-SCP as well.

TRANSFER AE implements the Storage Commitment-SCU to request explicit responsibility for storing DICOM objects sent to the CSP Storage Commitment-SCP.

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2.1.2.4   Enterprise Imaging Modality Performed Procedure Step-SCU

The following Enterprise Imaging AE's implement the DICOM Modality Performed Procedure Step Service Class as an SCU:

DICOM Izer AE

The DICOM Izer Modality Performed Procedure Step-SCU establishes an association with the Enterprise Imaging MPPS SCP, notifies that a study is being performed using N-CREATE and that a study has been completed or removed using N-SET, and then releases the association.

2.1.2.5   Enterprise Imaging Modality Worklist-SCU

The following Enterprise Imaging AE's implement the DICOM Modality Worklist Service Class as an SCU:

CWP, Capture

The CWP and Capture Modality Worklist-SCU use the Basic Worklist Management service to get required information to build its DICOM datasets.

It establishes an association with Enterprise Imaging Modality Worklist-SCP, performs a Find request, waits for responses, and then releases the association.

2.1.2.6   Enterprise Imaging Query/Retrieve-SCU

The following Enterprise Imaging AE's implement the DICOM Query/Retrieve Service Class as an SCU:

CWP Query/Retrieve-SCU acts as a Service Class User of C-FIND to query for DICOM objects and C-MOVE to retrieve DICOM objects from a remote Query/Retrieve SCP, or from VNA or CSP Query/Retrieve SCP depending on the deployment model.

CSP Query/Retrieve-SCU acts as a Service Class User of C-Find to query for DICOM objects and C-Move to retrieve DICOM objects from VNA or from an external archive depending on the deployment model.

2.1.2.7   Enterprise Imaging Verification-SCP

The following Enterprise Imaging AE's implement the DICOM Verification Service Class as an SCP:

VNA AE and CSP AE

2.1.2.8   Enterprise Imaging Storage Commitment-SCP

The following Enterprise Imaging AE's implement the DICOM Storage Commitment Class as an SCP:

CSP AE acts as Service Class Provider of Storage Commitment to take explicit responsibility for storing DICOM objects received until it archives to the VNA and receives confirmation that VNA has taken over this explicit responsibility.

VNA AE acts as Service Class Provider of Storage Commitment from CSP AE or other DICOM AE's to take explicit responsibility for storing DICOM objects received.

2.1.2.9   Enterprise Imaging Storage-SCP

The following Enterprise Imaging AE's implement the DICOM Storage Class as an SCP:

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VNA AE and CSP AE store a received image in its entirety in its internal data store. Enterprise Imaging stores each image with the File Meta Information attached to it. Enterprise Imaging extracts information about the images and stores this information within its internal database.

CWP Storage SCP is only active when CWP initiates a C-MOVE to a remote retrieve SCP. Storage is temporary for the purpose of display, and is not queryable or retrievable after the fact through any DICOM SCP services.

TRANSFER AE stores a received image in its entirety in its internal data store.

CWP AE Storage-SCP stores a received image in its entirety in its internal data store for viewing. CWP stores each image with the File Meta Information attached to it. CWP then forwards the received images to the VNA Storage-SCP or to the CSP Storage-SCP or to an external PACS Storage-SCP, depending on the deployment model.

2.1.2.10 Enterprise Imaging Modality Performed Procedure Step-SCP

The following Enterprise Imaging AE's implement the DICOM Modality Performance Procedure Step Class as an SCP:

CSP AE acts as a Service Class Provider of MPPS to receive MPPS.

Details: The MPPS SCP Application Entity waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, the MPPS SCP AE expects it to be a DICOM application.

The MPPS SCP AE will accept Associations with Presentation Contexts for SOP Class of Modality Performed Procedure Step SOP Class.

Once it receives a Create (N-Create) or an Update (N-Set) request, the MPPS SCP AE will store the MPPS or update an existing MPPS locally.

2.1.2.11 Enterprise Imaging Modality Worklist-SCP

The following Enterprise Imaging AE's implement the DICOM Modality Worklist Class as an SCP:

CSP AE acts as a Service Class Provider of MWL to receive MWL Query.

Details: The MWL SCP Application Entity waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, the MWL SCP AE expects it to be a DICOM application.

The MWL SCP AE will accept Associations with Presentation Contexts for SOP Class of Modality Worklist Query SOP Class.

Once it receives a Query (C-Find) request, the MWL SCP AE will search the local database with worklist items that match the query constraints and return the items in the response.

2.1.2.12 Enterprise Imaging Query/Retrieve-SCP and Enterprise Imaging Storage-SCU

The following Enterprise Imaging AE's implement the DICOM Query/Retrieve Class as an SCP and a DICOM Storage Class as an SCU:

VNA and CSP respond to queries and retrieves based on the records stored in its database.

The Query/Retrieve-SCP Application Entity waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, the Query/Retrieve-SCP AE expects it to be a DICOM application.

The Query/Retrieve-SCP AE will accept Associations with Presentation Contexts for SOP Classes of the Verification and Query/Retrieve Service Classes.

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Once it receives a Retrieve (Move) request, the Query/Retrieve-SCP AE will initiate a new association and send the requested instances to the Move Destination AE. The new association is handled by the Storage-SCU.

When a remote AE initiates an association with Enterprise Imaging and sends a query (Find) request, Enterprise Imaging will search the database for possible matches with composite SOP instances. The results of the query are returned to the remote AE using the same association.

2.1.2.13 Enterprise Imaging Print-SCU

CSP implements the DICOM Print Service Class as an SCU.

Depending on the selected Image Display Format (or Layout), the Enterprise Imaging CSP Print SCU sends one or more images and Print Management Information to a Remote Application Entity for printing.

Details: At the request of the user of the system Enterprise Imaging CSP Print AE initiates an association with a remote printer AE and sends printing requests of film box(es) (=default setting), or of a film session and one or more film box(es), with one or more image box(es)) to the printer.

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2.2   AE Specifications

This section outlines the specifications for each of the Application Entities that are part of Enterprise Imaging.

2.2.1   AE Specification: Storage-SCP, Storage Commitment (SCP and SCU), Query/Retrieve-SCP and Storage-SCU, Retrieve-SCU and Print-SCU

2.2.1.1   Default Transfer Syntaxes Supported

The Enterprise Imaging Storage-SCP provides Standard Conformance to the default transfer syntaxes listed in the following table:

Table 2-1: Default Transfer Syntaxes

Transfer Syntax	UID	SOP Class
Implicit VR Little Endian	1.2.840.10008.1.2	not Video

2.2.1.2   Extended Transfer Syntaxes Supported

The Enterprise Imaging Storage-SCP provides Standard Conformance to the extended transfer syntaxes listed in Table 2-2 for the purposes of **storage** and **retrieval**.

Table 2-2: Extended Transfer Syntaxes

Transfer Syntax	UID	SOP Class
Explicit VR Little Endian[2]	1.2.840.10008.1.2.1	not Video
Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99	not Video
JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	only Image
JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	only Image
JPEG Process 14, lossless, Non-Hierarchical	1.2.840.10008.1.2.4.57	only Image
JPEG Process 14, selection value 1, lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	only Image
RLE Lossless	1.2.840.10008.1.2.5	only Image
MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	only Video
MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102	only Video*
MPEG-4 AVC/H.264 BD compatible High Profile / Level 4.1	1.2.840.10008.1.2.4.103	only Video**

* Supported by CWP 8.0.x, VNA 8.0.x and CSP 8.0.1 or higher (CSP only for Storage)
** Supported by CWP and VNA

2.2.1.3   SOP Classes Supported

The Enterprise Imaging AE's provides Standard Conformance to the SOP Classes listed in Table 2-3. The shaded items represent SOP classes that have been retired (so no longer appear in Supplement 64) but are still supported by the Enterprise Imaging AE's.

If the **User of Service (SCU)** or the **Provider of Service (SCP)** column has the value "Option", then the functionality is either configurable or can be purchased as an option. The **Display** column indicates whether or not the CSP AE Client or XERO Viewer will display the DICOM objects.

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[2] LEE (Explicit Little Endian) is used for all group 2 elements including File Meta Information.

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Table 2-3: SOP Classes for Enterprise Imaging AE's

SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Verification										
Verification	1.2.840.10008.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A
Transfer										
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	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	Yes	Yes	Yes	Yes	Yes	Yes	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced US Volume Storage	1.2.840.10008.5.1.4.1.1.6.2	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
General Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.2	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	Yes***
Arterial Pulse Waveform Storage	1.2.840.10008.5.1.4.1.1.9.5.1	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.1	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
XA / XRF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Intravascular Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	No	No	No	No	No	No	Conditional**	Conditional**	Yes***
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes***
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Ophthalmic Visual field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Colon CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.69	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	Yes***
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes*	Yes*	Yes	Yes	No	No	Yes	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[3]
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Brachy Treatment Storage	1.2.840.10008.5.1.4.1.1.481.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
RT Ion Beams Plan Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
GE Private 3D Model Storage	1.2.840.113619.4.26	Yes	Yes	Yes	Yes	No	No	No	No	No
GE Private PET Raw Data Storage	1.2.840.113619.4.30	Yes	Yes	Yes	Yes	No	No	No	No	No
Dcm4che Encapsulated Document Storage	1.2.40.0.13.1.5.1.4.1.1.104.1	No	No	Yes	Yes	No	No	No	No	No
Agfa Basic Attribute Presentation State	1.2.124.113532.3500.7	No	No	Yes	Yes	No	No	No	No	No
Siemens CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Yes	Yes	Yes	Yes	No	No	No	No	No
Philips 3D Private Presentation State Storage	1.3.46.670589.2.5.1.1	Yes	Yes	Yes	Yes	No	No	No	No	No
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Yes	Yes	Yes	Yes	No	No	No	No	No

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[3] XERO Viewer will display if the bit depth is <=16, but not for 32 bit grayscale pixels

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Yes	Yes	Yes	Yes	No	No	No	No	No
Philips Private MR Examcard Data Storage	1.3.46.670589.11.0.0.12.4	Yes	Yes	Yes	Yes	No	No	No	No	No
Toshiba Aplio Ultrasound Private Storage	1.2.392.200036.9116.7.8.1.1.1	Yes	Yes	No	No	No	No	No	No	Yes
Hardcopy Grayscale Image Storage (Retired)	*1.2.840.10008.5.1.1.29*	Yes			Yes	Yes	Yes	No	No	No
Hardcopy Color Image Storage (Retired)	*1.2.840.10008.5.1.1.30*	Yes			Yes	Yes	Yes	No	No	No
Nuclear Medicine Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.5*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Ultrasound Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.6*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Ultrasound Multi-frame Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.3*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
X-Ray Angiographic Bi-plane Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.12.3*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes***
Standalone Overlay Storage (Retired)	*1.2.840.10008.5.1.4.1.1.8*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone Curve Storage (Retired)	*1.2.840.10008.5.1.4.1.1.9*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone Modality LUT Storage (Retired)	*1.2.840.10008.5.1.4.1.1.10*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone VOI LUT Storage (Retired)	*1.2.840.10008.5.1.4.1.1.11*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Standalone PET Curve Storage (Retired)	*1.2.840.10008.5.1.4.1.1.129*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
VL Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.77.1*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes***

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		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
VL Multi-frame Image Storage (Retired)	*1.2.840.10008.5.1.4.1.1.77.2*	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes***
Query/Retrieve										
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Patient/Study Only Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Yes	Yes	Yes	Yes	No	No	Yes	No	N/A
Workflow Management										
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	Yes	Yes	Yes	Yes	No	No	No	N/A
Modality Worklist Information Model – Find	1.2.840.10008.5.1.4.31	No	Yes	No	No-IDC Yes-Ag	No	No	Yes	No	N/A
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	Yes	Yes	Yes	No	No	No	No	N/A
Instance Availability Notification	1.2.840.10008.5.1.4.33	Yes	No	No	No	No	No			N/A
Print Management										
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
> Basic Film Session SOP Class	1.2.840.10008.5.1.1.1									
> Basic Film Box SOP	1.2.840.10008.5.1.1.2									

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SOP Class Name	SOP Class UID	CSP		VNA		TRANSFER		CWP Server		XERO viewer & Enterprise Imaging desktops
		SCU	SCP	SCU	SCP	SCU	SCP	SCU	SCP	Display
Class > Basic Grayscale Image Box SOP Class > Printer SOP Class	1.2.840.10008.5.1.1.4 1.2.840.10008.5.1.1.16									
Basic Color Print Management Meta SOP Class > Basic Film Session SOP Class > Basic Film Box SOP Class > Basic Color Image Box SOP Class > Printer SOP Class	1.2.840.10008.5.1.1.18 1.2.840.10008.5.1.1.1 1.2.840.10008.5.1.1.2 1.2.840.10008.5.1.1.4.1 1.2.840.10008.5.1.1.16	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* Supported as of 8.0.1 SU1

** Supported when XERO is standalone

*** Supported by XERO Viewer only

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2.2.1.4   Association Establishment Policies

2.2.1.4.1   General

The Storage-SCP AE can both accept and propose Association Requests. The Storage-SCP AE will accept Association Requests for the Verification and Storage Services.

The DICOM standard application context name for DICOM 3.0 is always accepted.

Table 2-4: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

The following are the limitations on PDU size for the Enterprise Imaging AE's:

Table 2-5: DICOM Application Context

CSP AE	Maximum PDU size	No Limits
CM AE	Maximum PDU size	100,000 bytes
VNA AE	Maximum PDU size	No Limits
DICOM Izer AE	Minimum PDU size	16,384 bytes
TRANSFER AE	Maximum PDU size	131,072 bytes
CWP AE	Maximum PDU size	No Limits

As already mentioned in the Conformance Statement Overview these different optional components are not always included by default in every deployment (more information about different deployments can be found in chapter 1.3).

2.2.1.4.2   Number of Associations

The maximum number of simultaneous associations accepted by the Enterprise Imaging AE's is provided in the table below.

Table 2-6: Number of Associations as an Association Acceptor for Storage-SCP

CSP AE	Maximum number of simultaneous associations	120 (Configurable)
CM AE	Maximum number of simultaneous associations	Configurable
VNA AE	Maximum number of simultaneous associations	512 (Configurable)
DICOM Izer AE	Maximum number of simultaneous associations	3
TRANSFER AE	Maximum number of simultaneous associations	3 (Configurable)
CWP AE	Maximum number of simultaneous associations	30

2.2.1.4.3   Asynchronous Nature

The CSP AE, DICOM Izer AE and TRANSFER AE allow a single outstanding operation on any association. Therefore, they do not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

The VNA AE and CWP AE support asynchronous communication. Multiple outstanding transactions are supported. It allows more than one invoked and more than one performed operation on an Association. Asynchronous mode of operation is supported.

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Table 2-7: Asynchronous Nature as an Association Initiator for the Enterprise Imaging AE's

CSP AE	Maximum number of outstanding asynchronous transactions	1 (No Async)
VNA AE	Maximum number of outstanding asynchronous transactions	1 (Configurable)
DICOM Izer AE	Maximum number of outstanding asynchronous transactions	1 (No Async)
TRANSFER AE	Maximum number of outstanding asynchronous transactions	1 (No Async)
CWP AE	Maximum number of outstanding asynchronous transactions	1 (Configurable)

2.2.1.4.4   Implementation Identifying Information

The Enterprise Imaging AEs will respond with the implementation identifying parameters listed in the following table.

Table 2-8: DICOM implementation Class and Version for the Enterprise Imaging AE's

CSP AE	Implementation Class UID	1.2.40.0.13.1.1.1
CSP AE	Implementation Version Name	dcm4che-DEV
CM - SCU	Implementation Class UID	1.2.124.113532.1.1
CM - SCU	Implementation Version Name	MITRA22JAN97
VNA AE	Implementation Class UID	1.2.40.0.13.1.1
VNA AE	Implementation Version Name	dcm4che-1.1
DICOM Izer AE	Implementation Class UID	1.2.250.1.59.3.0.3.5.3
DICOM Izer AE	Implementation Version Name	ETIAM_DCMBP_353
TRANSFER AE	Implementation Class UID	1.2.40.0.13.1.1
TRANSFER AE	Implementation Version Name	dcm4che-1.1
CWP AE	Implementation Class UID	1.2.40.0.13.1.1
CWP AE	Implementation Version Name	dcm4che-2.0

2.2.1.4.5   Called/Calling Titles

CSP AE	Configured at installation or initial configuration time. Multiple hosts within a single CSP installation can use the same AE Title.
	CSP validates the Called AE Title specified by the requesting SCU during association negotiation. By default, CSP will only accept associations destined for it. Validation of the Calling AE Title is configurable and disabled by default.
CM AE	The CM Integration Services AE titles can be configured in the CM Integration Services AE Service Tools GUI.
VNA AE	Configured at installation or initial configuration time. Multiple hosts within a single VNA installation can use the same AE Title. VNA validates the Called AE Title of the requesting SCU during association negotiation. Validation of the Calling AE Title is configurable. It is enabled by default.
CWP AE	Configured at installation or initial configuration time. Multiple hosts within a single CWP installation can use the same or different AE Titles.

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	CWP validates the Called AE Title of the requesting SCU during association negotiation. Validation of the Calling AE Title is not performed.
TRANSFER AE	TRANSFER SCP supports for two called AE titles co-existing on one instance: one for normal workflow and the other for urgent. There is no difference between these two, regarding the support for DICOM SOP class and transfer syntax. TRANSFER SCU supports for two options of calling AE title: locked AE title and passing on Sending Facility ID as calling AE title. Also, there is no difference between these two, regarding the support for DICOM SOP class and transfer syntax.
DICOM Izer AE	DICOM Izer AE initiates an association for implementing the following services as SCUs: Verification, Basic Worklist Management, MPPS and Storage.

2.2.1.5   Association Initiation Policies

2.2.1.5.1   Real World Activity – Enterprise Imaging Verification Communication-SCU

2.2.1.5.1.1   Description and Sequencing of Activity

The Enterprise Imaging Verification-SCU will issue Verification requests in response to UI mediated requests from the user to test the validity of a DICOM connection.
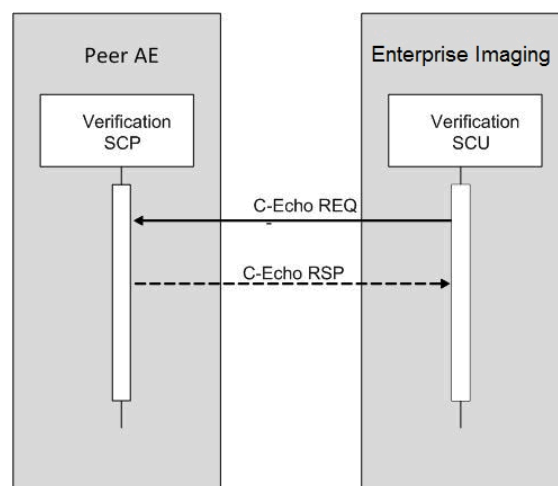
Figure 2.2-1: C-Echo Sequencing of Activity

2.2.1.5.1.2   Proposed Presentation Contexts

For the real world activity of Verification, the Enterprise Imaging Verification-SCU requests the Presentation Contexts listed in Table 2-9.

Table 2-9: Presentation Contexts Proposed by the CM AE

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Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.5.1.3 SOP Specific Conformance – Verification Communication

The Enterprise Imaging Verification-SCU provides standard conformance to the DICOM Verification Service Class as an SCU.

2.2.1.5.2 Real World Activity – Enterprise Imaging Storage Commitment Request-SCU

VNA has the ability to store studies to an external Store-SCP device and as such, it can request a storage commit to the external store-SCP.

CSP is configured to store and remember to VNA. As such, it is mandatory to also send a storage commit to VNA. TRANSFER can also be configured to send storage commit to CSP.

2.2.1.5.2.1 Description and Sequencing of Activity

Enterprise Imaging Storage Commitment Request-SCU stores images that are sent to it from an SCU. In some configurations, I Enterprise Imaging may send images to another SCP, such as a PACS, for permanent storage. The request for storage commitment may then be transmitted from Enterprise Imaging together with a list of references to one or more SOP instances. This action is invoked through the DIMSE N-ACTION primitive. The following message is supported:

- **Request Storage Commitment** - to request the safekeeping of a set of SOP instances

Each Storage Commitment Request that Enterprise Imaging sends is uniquely identified by the Transaction UID Attribute (0008,1195) value that is generated by Enterprise Imaging. After sending a Storage Commitment Request, Enterprise Imaging expects an N-EVENT-REPORT from the SCP. Enterprise Imaging will then respond with an N-EVENT-REPORT response primitive with a status code.
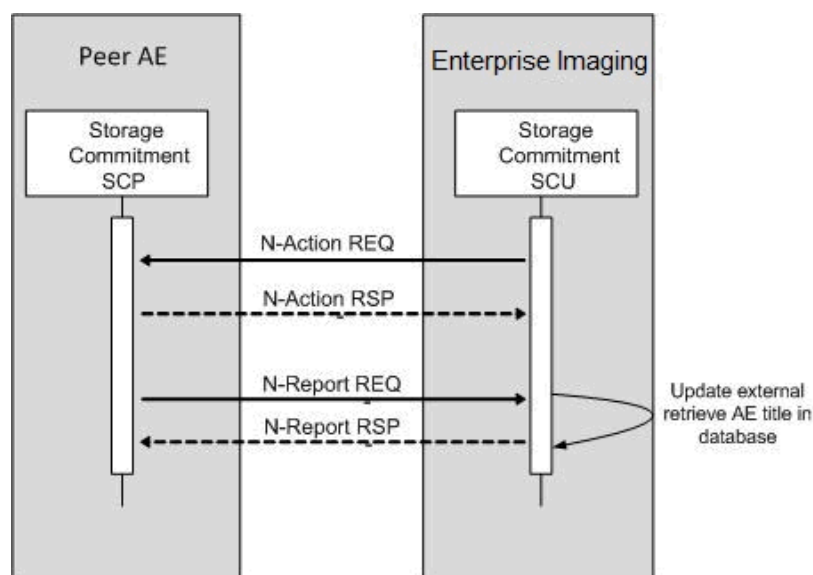
Figure 2.2-2: Send Storage Commitment Sequencing of Activity

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2.2.1.5.2.2   Proposed Presentation Contexts

Enterprise Imaging may request any of the Presentation Contexts listed in Table 2-10 for Storage Commitment.

Table 2-10: Presentation Contexts Proposed by the Enterprise Imaging Storage Commitment Request-SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.5.2.3   SOP Specific Conformance – Request Storage Commitment

The Enterprise Imaging Storage Commitment Request-SCU provides conformance to the DICOM Storage Commitment Service Class as an SCU. The Action Type and Action Information specified in Table 2-11 are supported.

Table 2-11: Storage Commitment Request – Action Information

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Enterprise Imaging Storage Commitment Request-SCU will generate an N-ACTION primitive if the local configuration setting for the remote AE is enabled for storage commitment.

Enterprise Imaging Storage Commitment Request-SCU may request storage commitment for all the SOP Class UIDs listed in Table 2-3.

Enterprise Imaging Storage Commitment Request-SCU supports the Referenced Study Component Sequence Attribute.

Enterprise Imaging Storage Commitment Request-SCU will keep the Transaction ID applicable indefinitely.

Enterprise Imaging Storage Commitment Request-SCU will respond to an N-EVENT-REPORT with an N-EVENT-REPORT response primitive using one of the status codes listed in Table 2-12.

Enterprise Imaging Storage Commitment Request-SCU can configure the destination AE Title for the Storage Commit. By default, this is the AE Title where the storage request is sent.

Table 2-12: Storage Commitment Status Codes

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0000		Successful notification

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2.2.1.5.3   Real World Activity – Enterprise Imaging Storage-SCU

2.2.1.5.3.1   Description and Sequencing of Activity

The Enterprise Imaging Storage-SCU will transmit images to a remote Storage-SCP. An association is established when the Enterprise Imaging Storage-SCU initiates a transmit request. Enterprise Imaging Storage-SCU will establish an association automatically in response to a C-MOVE request, archive to PACS notification, or configured forwarding rules.
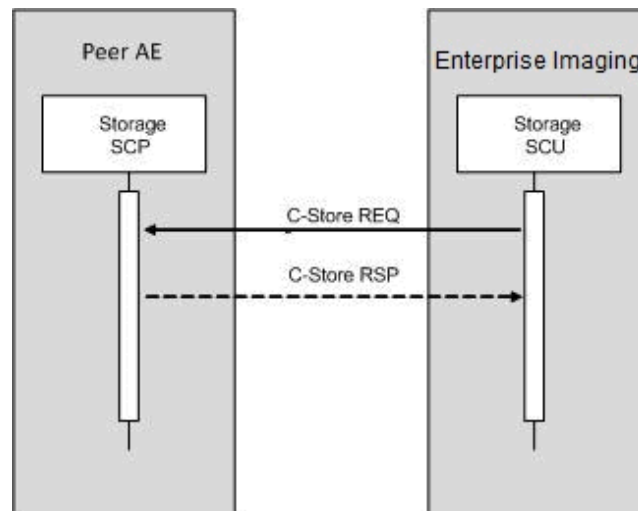
Figure 2.2-3: C-Store Sequencing of Activity

2.2.1.5.3.2   Proposed Presentation Contexts

Enterprise Imaging Storage-SCU may request any of the Presentation Contexts listed in Table 2-13 for Storage. Enterprise Imaging Storage-SCU will propose the transfer syntax used when the object was initially accepted by the server and Implicit VR Little Endian. Enterprise Imaging Storage-SCU uses the first transfer syntax in accepted presentation contexts to transfer the object.

Table 2-13: Presentation Contexts Proposed by the Enterprise Imaging Storage-SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99	SCU	None
		RLE Lossless, PackBits	1.2.840.10008.1.2.5	SCU	None
		JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCU	None
		JPEG Process 14, lossless	1.2.840.10008.1.2.4.57	SCU	None
		JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCU	None
		JPEG 2000 Part 1 lossless (reversible) mode	1.2.840.10008.1.2.4.90	SCU	None
		JPEG 2000 Part 1 lossy (irreversible) mode	1.2.840.10008.1.2.4.91	SCU	None
		MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCU	None

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Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		MPEG-4 AVC/H.264 High Profile / Level 4.1 ([4])	1.2.840.10008.1.2.4.102	SCU	None

2.2.1.5.3.3 SOP Specific Conformance – Store Objects

Enterprise Imaging Storage-SCU provides Standard conformance to the DICOM Storage Service Class as an SCU.

A successful C-Store response status will not generate any actions.

An unsuccessful C-Store response will cause the warning status B000: Sub-operations Complete – One or more Failures, in the final C-MOVE response to the C-MOVE request which triggers this C-Store sub-operation. The SOP Instance UID of the object, which storage to the Move Destination failed, will be listed in the Failed SOP Instance UID List (0008,0058) of the C_MOVE RSP Identifier and the value of Number of Failed Sub-operations (0000,1022) in the C-MOVE response will be incremented.

A warning status received in response to a C-Store operation will increment the value of Number of Warning Sub-operations (0000,1023) in the C-MOVE response

2.2.1.5.4   Real World Activity – Enterprise Imaging Query/Retrieve-SCU

2.2.1.5.4.1   Real World Activity – CWP Query Remote AE

2.2.1.5.4.1.1 Description and Sequencing of Activity
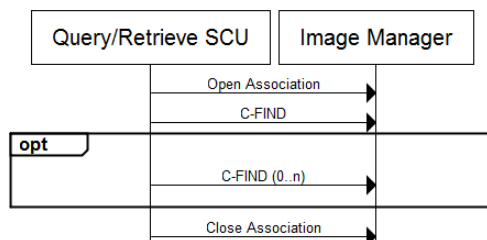
Figure 2.2-4: Query Remote AE Sequence

2.2.1.5.4.1.2 Proposed Presentation Contexts

Table 2-14: Presentation Contexts Proposed by Query/Retrieve-SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

---

[4] MPEG-4 is supported by CSP (for storage only, not display) from version 8.0.1

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Presentation Context Table					
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
Patient/Study Only Query/Retrieve Information Model –FIND (Retired)	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

2.2.1.5.4.1.3 SOP Specific Conformance

The Query/Retrieve-SCU provides standard conformance to the DICOM Query Service Class as an SCU.

CWP will use Relational-queries extended SCP behavior if available, but can be configured to use non-Relational queries as required. For displaying a study, CWP requires Object level required return keys Rows, Columns in addition to SOP class, SOP instance UID and Instance Number. It will use other keys as available. For this purpose, it will not use the Patient Root abstract syntax.

Table 2-15: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Query was successful	0000	Results are received and processed, allowing the real-world activity to proceed.

Table 2-16: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and command marked as failed. The real-world activity is halted, and an error may be reported to the user.
Association aborted	The command is marked as failed. The real-world activity is halted, and an error may be reported to the user.

Table 2-17: Keys Used for Query / Retrieve

Level	Key	Query Type[5]	Displayed	Required
Patient	Patient Name	Universal Match	Yes	No
	Patient ID	Single Value (Sequence when permitted by remote	Yes	Yes
	Patient Birth Date	Single Value	Yes	Yes
	Patient Sex	Single Value	Yes	Yes
	Issuer of Patient ID	Single Value	No	No
	Other Patient ID's Sequence	Any value match	Yes	No
	Patient Age	NA	Yes	No
	Additional Patient History	NA	Yes	No
	Number Of Patient Related Studies	None	No	No

---

[5] None keys means values requested to be returned but not with any matching value.

Level	Key	Query Type[5]	Displayed	Required
	Current Patient Location	NA	Yes	No
Study	Accession Number	Universal Match	Yes	No
	Study Instance UID	UID	No	Yes
	Study ID	Universal Match	No	No
	Referring Physician	Universal Match	Yes	No
	Study Date	Range	Yes	Yes
	Modalities In Study	Single Value (also Sequence)	Yes	Yes
	Study Description	None	Yes	No
	Confidentiality Code	None	Yes	No
	Study Time	None	Yes	No
	Study Status ID	None	Yes	No
	Number of Study Related Instances	None	Yes	No
	Number of Study Related Series	None	Yes	No
	Referring Physician Name	None	Yes	No
	Requesting Physician	None	Yes	No
	Name of Physicians Reading Study	None	Yes	No
	Admitting Diagnoses Description	None	Yes	No
	Study Comments	None	Yes	No
	Institution Name	None	Yes	No
	Institutional Department Name	None	Yes	No
	Timezone Offset from UTC	None	No	No
	Procedure Code Sequence	None	Yes	No
	(All Patient level attributes)			
Series	Series Number	None	Yes	No
	Series Instance UID	UID	No	Yes
	Modality	Single Value	Yes	Yes
	Number of Series Related Instances	None	Yes	No
	Manufacturer	None	Yes	No
	Station Name	None	Yes	No
	Performing Physician Name	None	Yes	No
	Series Date	None	Yes	No
	Series Time	None	Yes	No
	Operators Name	None	Yes	No
	Manufacturer Model Name	None	Yes	No
	Requesting Physician	None	Yes	No
	Requested Procedure ID	None	Yes	No
	Scheduled Procedure Step ID	None	Yes	No
	Performed Procedure Step Start Date	None	Yes	No
	Performed Procedure Step End Date	None	Yes	No
	(All patient/study attributes from above)			
Instance	SOP Class UID	UID	No	Yes
	SOP Instance UID	UID	No	Yes
	Instance Number	None	No	Yes
	Rows	None	No	Yes
	Columns	None	No	Yes
	Pixel Spacing	None	No	Yes

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Level	Key	Query Type[5]	Displayed	Required
	Window Center	None	Yes	No
	Window Width	None	Yes	No
	Number of Frames	None	No	Yes
	Image Orientation Patient	None	Yes	No
	Slice Thickness	None	Yes	No
	Image Type	None	Yes	No
	Number of Patient Related Series	None	No	No
	Number of Patient Related Instances	None	No	No
	All Patient,Study,Series attributes from above			

2.2.1.5.4.2   Real World Activity – CWP Retrieve SOP Instances

### 2.2.1.5.4.2.1 Description and Sequencing of Activity
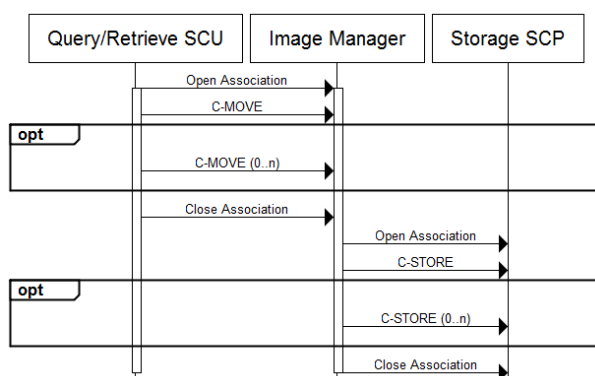
Figure 2.2-5: Retrieve SOP Instances Sequence

2.2.1.5.4.2.2 Proposed Presentation Contexts

Table 2-18: Presentation Contexts Proposed by Query/Retrieve-SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Patient/Study Only Query/Retrieve Information Model –MOVE (Retired)	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

2.2.1.5.4.2.3 SOP Specific Conformance

Table 2-19: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Query was successful	0000	Results are received and processed, allowing the real-world activity to proceed.

Table 2-20: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and command marked as failed. The real-world activity is halted, and an error may be reported to the user.
Association aborted	The command is marked as failed. The real-world activity is halted, and an error may be reported to the user.

Table 2-21: Keys Used for Retrieve

Level	Key	Query Type[6]	Required
Study	Study Instance UID	Single Value	Yes
Series	Series Instance UID	Single Value	No
Instance	SOP Instance UID	Single Value	No

2.2.1.5.4.3   Real World Activity – CSP Move Object (SCU)

2.2.1.5.4.3.1 Description and Sequencing of Activity

Enterprise Imaging Move-SCU can retrieve composite objects from a remote AE. An association is established when the user initiates a query from the graphical user interface. CSP will establish an association automatically to retrieve objects that were archived to the remote AE or to pre-fetch relevant objects from the remote AE based on configured prefetching rules.

2.2.1.5.4.3.2 Proposed Presentation Contexts

Enterprise Imaging Move-SCU will initiate any of the Presentation Contexts listed in Table 2-22 for Move. Enterprise Imaging Move-SCU will accept any number of Move Presentation Contexts per association request. Any single Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

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[6] None keys means values requested to be returned but not with any matching value.

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Table 2-22: Presentation Contexts Proposed by CSP

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient/Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.5.4.3.3 SOP Specific Conformance – Move Object

Enterprise Imaging Move-SCU provides standard conformance to the DICOM Query/Retrieve Service Class as an SCU.

Enterprise Imaging Move-SCU will try to establish an association with the move destination specified in the Move request. One or more of the Presentation Contexts listed in the Store section of this document may be negotiated in this association.]

2.2.1.5.5 Real World Activity – Enterprise Imaging Modality Worklist-SCU

2.2.1.5.5.1 Real World Activity – CWP Modality Worklist-SCU

2.2.1.5.5.1.1 Description and Sequencing of Activity

CWP will initiate a separate association for each Find request.
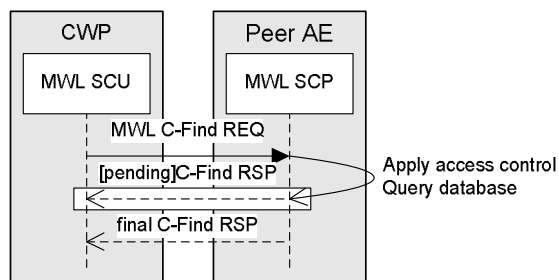
2.2.1.5.5.1.2 Proposed Presentation Contexts

CWP will propose the Presentation Contexts listed in Table 2-23 for Find.

Table 2-23: Proposed Presentation Contexts for CWP Modality Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	Requested for Modality Worklist queries.

2.2.1.5.5.1.3 SOP Specific Conformance

CWP provides standard conformance to the DICOM Modality Worklist Service Class as an SCU.

Table 2-24: Keys Used by CWP for DICOM Modality Worklist

Key	Query Type[7]	Required
Study Date	None	No
Study Time	None	No
Accession Number	Universal Match	Yes
Referring Physician Name	None	No
Patient Name	None	No
Patient Birth Date	None	No
Patient ID	Single Value or Sequence	Yes
Issuer Of Patient ID	None	No
Patient Sex	None	No
Other Patient IDs	None	No
Patient Age	None	No
Additional Patient History	None	No
Current Patient Location	None	No
Study Instance UID	UID	Yes
Requesting Physician	None	No
Requesting Service	None	No
Requested Procedure Description	None	No
Scheduled Procedure Step		
> Modality	Single Value	Yes
> Scheduled Procedure Step Start Date	Range	Yes

---

[7] None keys means values requested to be returned but not with any matching value.

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2.2.1.5.5.2   Real World Activity – DICOM Izer Modality Worklist-SCU

2.2.1.5.5.2.1 Description and Sequencing of Activity

DICOM Izer will initiate a separate association for each Find request.
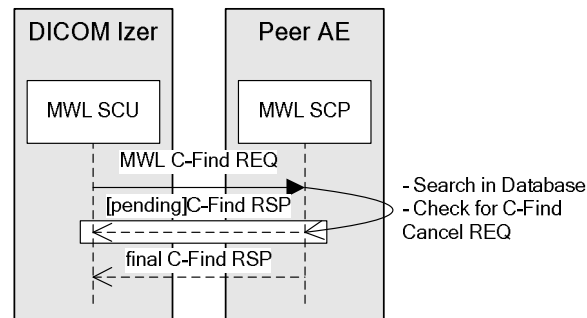
Figure 2.2-6: Sequencing of Activity – Worklist Management

2.2.1.5.5.2.2 Proposed Presentation Context

Table 2-25: Proposed Presentation Contexts for DICOM Izer Modality Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Modality Worklist Information Model	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.5.5.2.3 SOP Specific Conformance – Modality Worklist

DICOM Izer provides standard conformance to the DICOM Basic Worklist Management Service Class. DICOM Izer requests the following matching key types:

Table 2-26: Modality Worklist Matching Key Type

Key Type Matching	
SV	Single value matching
WC	Wildcard matching
RM	Range matching
No matching. Returns value when available	

Table 2-27: Modality Worklist Supported Attributes

Module	Attribute Name	Tag	Match
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	
	> Scheduled Station AE Title	(0040,0001)	SV
	> Scheduled Procedure Step Start Date	(0040,0002)	RM
	> Scheduled Procedure Step Start Time	(0040,0003)	
	> Scheduled Procedure Step End Date	(0040,0004)	
	> Scheduled Procedure Step End Time	(0040,0005)	
	> Scheduled Procedure Step Start Time	(0040,0003)	
	> Modality	(0008,0060)	SV

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Module	Attribute Name	Tag	Match
	> Scheduled Performing Physician's Name	(0040,0006)	
	> Scheduled Procedure Step Description	(0040,0070)	
	> Scheduled Station Name	(0040,0010)	
	> Scheduled Procedure Step Location	(0040,0011)	
	> Pre Medication	(0040,0012)	
	> Scheduled Procedure Step ID	(0040,0009)	
	> Scheduled Procedure Status	(0040,0020)	
	> Comments On Scheduled Procedure Step Status	(0040,0400)	
	> Requested Contrast Agent	(0032,1070	
Requested Procedure	Requested Procedure ID	(0040,1001)	
	Requesting Service	(0032,1033)	
	Requested Procedure Description	(0032,1060)	
	Study Instance UID	(0020,000D)	
	Reason For The Requested Procedure	(0020,1002)	
	Requested Procedure Priority	(0040,1003)	
	Patient Transport Arrangements	(0040,1004)	
	Names Of Intended Recipient Of Results	(0040,1010)	
	Requested Procedure Comments	(0040,1400)	
Imaging Service Request	Accession Number	(0008,0050)	SV / WC
	Requesting Physician	(0032,1032)	
	Referring Physician's Name	(0008,0090)	
	Requesting Service	(0032,1033)	
	Reason For The Imaging Service Request	(0040,2001)	
	Imaging Service Request Comments	(0040,2400)	
	Placer Order Number/Imaging Service Request	(0040,2016)	
Visit Identification	Admission ID	(0038,0010)	
	IssuerOfAdmissionID	(0038,0011)	
Visit Status	Current Patient Location	(0038,0300)	
Patient Identification	Patient's Name	(0010,0010)	SV / WC
	Patient ID	(0010,0020)	SV / WC
Patient Demographic	Patient's Birth Date	(0010,0030)	RM
	Patient's Birth Time	(0010,0032)	
	Patient's Sex	(0010,0040)	SV
	Patient's Size	(0010,1020)	
	Patient's Weight	(0010,1030)	
	Confidentiality Constraint On Patient Data Description	(0010,3001)	
	Ethnic Group	(0010,2160)	
	Patient Comments	(0010,4000)	
Patient Medical	Patient State	(0038,0500)	
	Medical Alerts	(0010,2000)	
	Contrast Allergies	(0010,2110)	
	Special Needs	(0038,0050)	
	Additional Patient history	(0010,21B0)	
	Last Patient Menstrual Date	(0010,21D0)	

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2.2.1.5.6 Enterprise Imaging Modality Performed Procedure Step (MPPS)-SCU

2.2.1.5.6.1 Description and Sequencing of Activity
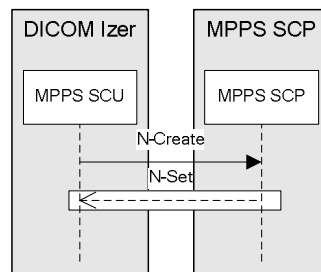
Figure 2.2-7: Sequencing of Activity – Modality Performed Procedure Step

The figure above is a typical sequence of messages between DICOM Izer and a MPPS SCP.

1. DICOM Izer opens an association with an MPPS SCP.

2. DICOM Izer sends an N-CREATE request to a MPPS SCP to create an MPPS instance with the "IN PROGRESS" status.

3. DICOM Izer closes the association with the MPPS SCP.

4. DICOM Izer opens an association with an MPPS SCP.

5. DICOM Izer sends an N-SET request to the remote AE to update the MPPS instance with the "COMPLETED" or "DISCONTINUED" status. The MPPS "COMPLETED" status is sent if the study has been completed successfully. The "DISCONTINUED" MPPS is sent if the study has been removed from DICOM Izer.

6. DICOM Izer closes the association with the MPPS SCP.

2.2.1.5.6.2 Proposed Presentation Context

Table 2-28: Proposed Presentation Contexts for DICOM Izer MPPS

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.5.6.3 SOP Specific Conformance – MPPS

DICOM Izer provides standard conformance to the DICOM MPPS SOP Class.

Table 2-29: MPPS Information Model Attributes. N-CREATE Service Request (Study Start)

Attribute Name	Tag ID	Value/ Comment
Specific Character Set	(0008,0005)	ISO_IR 100
Performed Procedure Step Relationship		
Scheduled Step Attribute Sequence	(0040,0270)	

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Attribute Name	Tag ID	Value/ Comment
>Study Instance UID	(0020,000D)	Auto
>Referenced Study Sequence	(0008,1110)	
>Accession Number	(0008,0050)	From MWL
>Requested Procedure ID	(0010,0030)	From MWL
>Requested Procedure Description	(0032,1060)	From MWL / Manual Input
>Scheduled Procedure Step ID	(0040,0009)	From MWL
> Scheduled Procedure Step Description	(0040,0007)	From MWL
>Scheduled Procedure Code Sequence	(0040,0008)	
Patient's Name	(0010,0010)	From MWL
Patient ID	(0010,0020)	From MWL
Patient's Birth Date	(0010,0030)	From MWL
Patient's Sex	(0010,0040)	From MWL
Referenced Patient Sequence	(0008,1120)	
Performed Procedure Step Information		
Performed Procedure Step ID	(0040, 0253)	NULL
Performed Station AE Title	(0040, 0241)	Izer AE Title
Performed Station Name	(0040, 0242)	NULL
Performed Location	(0040, 0243)	NULL
Performed Procedure Step Start Date	(0040,0244)	Auto
Performed Procedure Step Start Time	(0040,0245)	Auto
Performed Procedure Step Status	(0040,0252)	IN PROGRESS
Performed Procedure Step ID	(0040, 0253)	PPS_IZERID
Performed Procedure Step Description	(0040,0254)	PPS_IZERDESC
Performed Procedure Type Description	(0040,0255)	NULL
Procedure Code Sequence	(0008,1032)	
Performed Procedure Step End Date	(0040,0250)	NULL
Performed Procedure Step End Time	(0040,0251)	NULL
Image Acquisition Results		
Modality	(0008, 0060)	From WL
Study ID	(0020, 0010)	NULL
Performed Protocol Code Sequence	(0040, 0260)	
Performed Series Sequence	(0040, 0340)	NULL

Table 2-30: MPPS Information Model Attributes. N-SET Service Request (Study End)

Attribute Name	Tag ID	Value / Comment
Performed Procedure Step Information		
Performed Procedure Step End Date	(0040,0250)	Auto
Performed Procedure Step End Time	(0040,0251)	Auto
Performed Procedure Step Status	(0040,0252)	COMPLETED or DISCONTINUED
Image Acquisition Results		
Performed Series Sequence	(0040,0340)	
>Performing Physician's Name	(0008,1050)	Manual Input
>Protocol Name	(0018,1030)	Auto
>Operator's Name	(0008,1070)	Manual Input
>Series Instance UID	(0020,000E)	Auto
>Series Description	(0008,103E)	Manual Input
>Retrieve AE Title	(0008,0054)	NULL
>Referenced Image Sequence	(0008,1140)	One or more items
>>Referenced SOP Class UID	(0008,1150)	Auto
>>Referenced SOP Instance UID	(0008,1155)	Auto
>Referenced Non Image Composite SOP Instance Sequence	(0040,0220)	
>>Referenced SOP Class UID	(0008,1150)	
>>Referenced SOP Instance UID	(0008,1155)	

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2.2.1.5.7   Real World Activity – Enterprise Imaging CSP Print-SCU

2.2.1.5.7.1   Description and Sequencing of Activity

The user can export DICOM images to a specific hardcopy device from a displayed study in the image area. One image, selected images, one series or selected series will be exported.

A priori, a Dialog Box is displayed with contents/choices (Printer Orientation, FilmSize, Subject – Image or Series, Image Display Format and Number of copies). This Dialog Box repeats most of the choices as specified in the selected Print Preset. The user can override these choices in the Print Dialog Box.

The Enterprise Imaging CSP Print (SCU) AE will initiate a separate Association for each Print Session.

If the printer rejects the Association permanent (i.e. called AE not recognized or application context name not supported), then the Job Status (in the Job Manager Dialog) issues an 'Error' status. In case the printer rejects the Association transient (i.e. local limit exceeded), then the Job Status issues a 'Warning' message, the request will be retried. In the meantime the request to other destinations will be handled.

After an association is established, CSP will send one film session to the Printer. Each film session will contain one or more film boxes, which in turn contain one or more image boxes.

By default CSP is configured to request application of a Presentation LUT (P-Values) by the printer. In case the printer doesn't support P-Values, the parameter can be unchecked and a Perception LUT can be defined in the attribute Configuration Information. Then the Presentation LUT SOP Class is not negotiated anymore.

Before instructing the Printer to print, an N-GET on Printer SOP Class is issued to obtain the current printer status information. If the Printer reports a status of FAILURE, the print-job is switched to a failed state and the user informed, i.e. the Job Status (in the Job Manager Dialog) issues an 'Error' status.

In case the printer returns a status of NORMAL, CSP sends an N-ACTION on Film Box (default setting) or Film Session to instruct the Printer to print a film or a complete print job.

The film or print job is accepted by the printer when CSP receives a successful N-ACTION response.

The default PDU size negotiated by CSP is 16352 bytes.

CSP applies a pixel depth rule in order to convert the original image to 8 or 12 bit for printing (see chapter 2.2.1.5.7.3.3).

Figure 2.2-8 illustrates the sequencing of activity when CSP initiates print requests to a Print-SCP.

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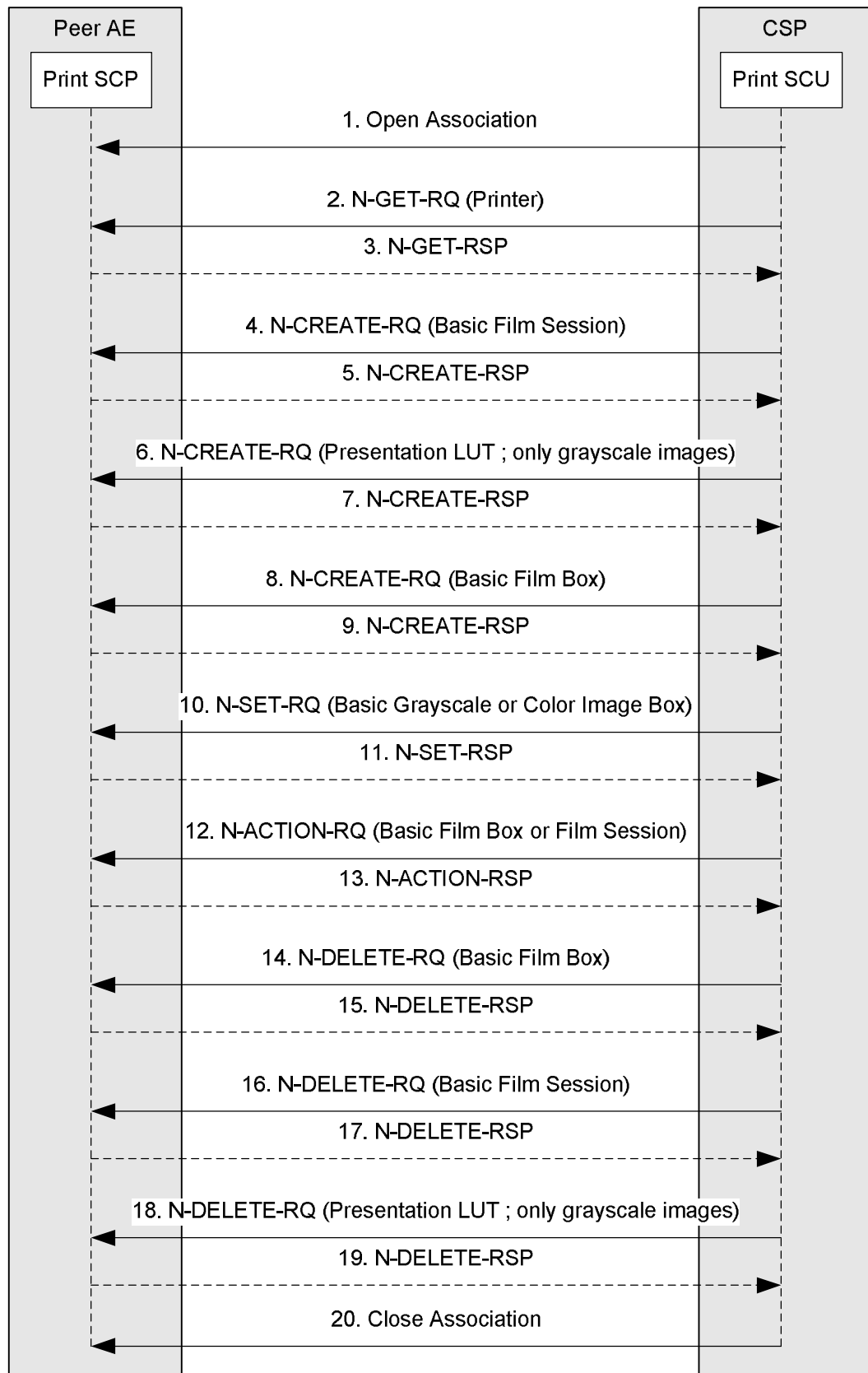
Figure 2.2-8: Print Sequencing of Activity

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2.2.1.5.7.2   Proposed Presentation Context

CSP Print SCU is capable of proposing the Presentation Contexts shown in the table below:

Table 2.2-31: Proposed Presentation Contexts for Activity Print

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Presentation LUT	1.2.840.10008.5.1.1.23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.5.7.3   SOP Specific Conformance – Basic Grayscale Print Management Meta SOP Class

The CSP Print SCU supports the following mandatory SOP classes as defined by the Basic Grayscale Print Management Meta SOP Class (1.2.840.10008.1.1.9):

Table 2.2-32: SOP Classes for Basic Grayscale Print Management Meta SOP Class

SOP Class Name	SOP Class UID	Role
Basic Film Session	1.2.840.10008.5.1.1.1	SCU
Basic Film Box	1.2.840.10008.5.1.1.2	SCU
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	SCU
Printer	1.2.840.10008.5.1.1.16	SCU

2.2.1.5.7.3.1   Basic Film Session SOP Class

The Basic Film Session IOD describes the presentation parameters which are common for all the films of a film session. The Basic Film Session SOP Instance refers to one or more Basic Film Box SOP Instances (see chapter 2.2.1.5.7.3.2).

CSP Print SCU provides support for the following DIMSE services:

➢ N-CREATE
➢ N-ACTION
➢ N-DELETE

N-CREATE is used to create a Basic Film Session SOP Instance, when an association has been established. The N-CREATE causes the Basic Film Session (root element) to be created and its attributes initialized. The values are available in an xml-file that describes the technical capabilities of the printer and configured in a Print Preset. Furthermore the user can make some final choices in an Export Dialog Box.

The following attributes are supported:

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Table 2.2-33: Supported N-CREATE Attributes for Basic Film Session

Attribute Name	Tag	Value and comments
Number of Copies	(2000,0010)	1 (configurable)
Print Priority	(2000,0020)	LOW
Medium Type	(2000,0030)	BLUE FILM, CLEAR FILM, MAMMO BLUE FILM, MAMMO CLEAR FILM, PAPER (configurable)
Film Destination	(2000,0040)	PROCESSOR

The CSP Print SCU will process the N-CREATE response. The following status codes are recognized:

Table 2.2-34: N-CREATE response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

N-ACTION will result in submitting a print job to print all the films of the film session in the order that they were received. This means that all subordinate Basic Film Boxes will be assembled into a print job for printing. Therefore the job can contain more than one film.

The CSP Print SCU will process the N-ACTION response. The following status codes are recognized:

Table 2.2-35: N-ACTION response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

N-DELETE is used to delete a Film Session. This means that the complete Film Session SOP Instance hierarchy will be deleted.

The CSP Print SCU will process the N-DELETE response. The following status codes are recognized:

Table 2.2-36: N-DELETE response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

2.2.1.5.7.3.2   Basic Film Box SOP Class

The Basic Film Box IOD is an abstraction of the presentation of one film of the film session. It also describes the presentation parameters which are common for all images on a given sheet of film.

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The Basic Film Box SOP instance refers to one or more Image Box SOP Instances (see chapters 2.2.1.5.7.3.3 and 2.2.1.5.7.4.3) and zero or one Presentation LUT SOP Instance (see chapter 2.2.1.5.7.5).

CSP Print SCU provides support for the following DIMSE services:

- ➤ N-CREATE
- ➤ N-ACTION
- ➤ N-DELETE

N-CREATE is used to create a Basic Film Box SOP Instance under the created Film Session and initialize its attributes. The values are available in an xml-file that describes the technical capabilities of the printer and configured in a Print Preset. Furthermore the user can make some final choices in an Export Dialog Box.

The creation of a Basic Film Box also causes the subordinate Image Boxes to be created for each location in the Image Display Format.

The following attributes are supported:

Table 2.2-37: Supported N-CREATE Attributes for Basic Film Box

Attribute Name	Tag	Value and comments
Image Display Format	(2010,0010)	STANDARD\C,R, ROW\R1,R2,R3, etc., COL\R1,R2,R3, etc., SLIDE and SUPERSLIDE. (configurable)
Film Orientation	(2010,0040)	PORTRAIT and LANDSCAPE (configurable)
Film Size ID	(2010,0050)	configurable
Magnification Type	(2010,0060)	REPLICATE, BILINEAR, CUBIC and NONE (configurable)
Smoothing Type	(2010,0080)	Further specifies the type of the interpolation function. Only valid for Magnification Type (2010,0060) = CUBIC. (configurable) Values supported by Agfa DICOM printers: **0** (= cubicB) **100 … 199** (cubicHighRes) **200…299** (cubicBell)
Border Density	(2010,0100)	BLACK, WHITE or i, where i represents the desired density in hundreds of OD (configurable)
Empty Image Density	(2010,0110)	BLACK, WHITE or i, where i represents the desired density in hundreds of OD (configurable)
Min Density	(2010,0120)	Minimum density of the images on the film, expressed in hundredths of OD (configurable)
Max Density	(2010,0130)	Maximum density of the images on the film, expressed in hundredths of OD (configurable).
Trim	(2010,0140)	YES, NO (configurable)
Configuration Information	(2010,0150)	Will be populated with a set of values for implementation specific print parameters, e.g. perception LUT related parameters. See DICOM Conformance Statement of the printer. Perception LUT's for Agfa Printers: **PERCEPTION_LUT={LINEAR, KANAMORI, n, OEMxxx}** Where n = 75 to 220 Note that Presentation LUT has priority when enabled. (configurable)

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Attribute Name	Tag	Value and comments
Illumination	(2010,015E)	Expressed as L_0, in candelas per square meter (cd/m_2). Needs to be configured when Presentation LUT is enabled.
Reflected Ambient Light	(2010,0160)	Expressed as L_0, in candelas per square meter (cd/m_2). Needs to be configured when Presentation LUT is enabled.
Referenced Film Session Sequence	(2010,0500)	A sequence which provides references to a Film Session SOP Class/Instance pairs. Only a single Item shall be permitted in this Sequence.
>Referenced SOP Class UID	(0008,1150)	Uniquely identifies the referenced SOP Class.
>Referenced SOP Instance UID	(0008,1155)	Uniquely identifies the referenced SOP Instance.
Referenced Presentation LUT Sequence	(2050,0500)	A sequence which provides references to a Presentation LUT related SOP Class/Instance pairs. Only a single Item shall be included in this sequence.
>Referenced SOP Class UID	(0008,1150)	Uniquely identifies the referenced SOP Class.
>Referenced SOP Instance UID	(0008,1155)	Uniquely identifies the referenced SOP Instance.

The CSP Print SCU will process the N-CREATE response. The following status codes are recognized:

Table 2.2-38: N-CREATE response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

N-ACTION will result in submitting the print job for printing the specific Film Box (or film).

The CSP Print SCU will process the N-ACTION response. The following status codes are recognized:

Table 2.2-39: N-ACTION response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

N-DELETE is used to delete a Film Box. This means that the complete Film Box SOP Instance hierarchy will be deleted.

The CSP Print SCU will process the N-DELETE response. The following status codes are recognized:

Table 2.2-40: N-DELETE response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

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2.2.1.5.7.3.3   Basic Grayscale Image Box SOP class

The Basic Image Box IOD is an abstraction of the presentation of an image and image related data in the image area of the film. The Basic Image Box IOD describes the presentation parameters and image pixel data which apply to a single image of a sheet film.

The Basic Grayscale Image Box SOP instance is created by the Printer at the time the N-CREATE of the Basic Film Box (see chapter 2.2.1.5.7.3.2) is processed, based on the value of the Basic Film Box attribute Image Display Format (2010,0010).

CSP Print SCU provides support for the following DIMSE service:

➢   N-SET

N-SET
The command is issued by CSP Print SCU to update an instance of the Grayscale Image Box SOP Class. For each image in the Basic Film Box, the attributes of the Basic Image Box are set. The values are available in an xml-file that describes the technical capabilities of the printer and configured in a Print Preset.

The following attributes are supported:

Table 2.2-41: Supported N-SET Attributes for Basic Grayscale Image Box

Attribute Name	Tag	Value and comments
Image Position	(2020,0010)	The position of the image on the film, based on Image Display Format (2010,0010).
Polarity	(2020,0020)	NORMAL and REVERSE (configurable)
Requested Image Size	(2020,0030)	Sent when True Size printing is configured. Width (x-dimension) in mm of the image to be printed. Calculated from attribute values Imager Pixel Spacing (0018,1164) & Columns (0028,0011)
Requested Decimate/Crop Behavior	(2020,0040)	CROP
Basic Grayscale Image Sequence	(2020,0110)	
> Samples Per Pixel	(0028,0002)	1
>Photometric Interpretation	(0028,0004)	MONOCHROME2
>Rows	(0028,0010)	Original number of pixels of the image height
>Columns	(0028,0011)	Original number of pixels of the image width
>Pixel Aspect Ratio	(0028,0034)	1/1
>Bits Allocated	(0028,0100)	8 (if Bits Stored = 8) 16 (if Bits Stored = 12)
>Bits Stored	(0028,0101)	8 or 12
>High Bit	(0028,0102)	7 (if BITS STORED = 8) 11 (if BITS STORED = 12)
>Pixel Representation	(0028,0103)	0
>Pixel Data	(7FE0,0010)	Data representation of pixel samples that comprise the image

In order for CSP to decide what pixel depth to convert the source image to, the following table applies:

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Grayscale Image	Printer supports pixeldepth 12	Source pixeldepth	Target pixeldepth
Grayscale	no	any	8
	yes	8-11	8
		12-16	12

The CSP Print SCU will process the N-SET response. The following status codes are recognized:

Table 2.2-42: N-SET response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

2.2.1.5.7.3.4   Printer SOP Class

The Printer IOD is an abstraction of the hard copy printer and is the basic Information Entity to monitor the status of the printer. The Printer SOP Instance is created by the Printer during start-up of the hard copy printer and has a well-known SOP Instance UID.

CSP Print SCU provides support for the following DIMSE service:

➢   N-GET

N-GET is used to retrieve an instance of the Printer SOP Class.
The CSP Print SCU issues the command to obtain information about the current printer status. If the Printer reports a status of FAILURE, the print-job is switched to a failed state and the user informed.

The attributes obtained via N-GET are listed in the Table below:

Table 2.2-43: N-GET attributes on a Printer

Attribute Name	Tag	Value
Printer Status	(2110,0010)	NORMAL, WARNING, FAILURE
Printer Status Info	(2110,0020)	Printer dependent
Printer Name	(2110,0030)	User defined name identifying the printer
Manufacturer	(0008,0070)	Manufacturer of the printer
Manufacturer Model Name	(0008,1090)	Manufacturer's model number of the printer
Device Serial Number	(0018,1000)	Manufacturer's serial number of the printer
Software Versions	(0018,1020)	Manufacturer's designation of software version of the printer
Date Last Calibration	(0018,1200)	Date when the printer was last calibrated
Last Calibration	(0018,1201)	Time when the printer was last calibrated

2.2.1.5.7.4   SOP Specific Conformance – Basic Color Print Management Meta SOP class

The CSP Print SCU supports the following mandatory SOP classes as defined by the Basic Color Print Management Meta SOP Class (1.2.840.10008.1.1.18):

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Table 2.2-44: SOP Classes for Basic Color Print Management Meta SOP Class

SOP Class Name	SOP Class UID	Role
Basic Film Session	1.2.840.10008.5.1.1.1	SCU
Basic Film Box	1.2.840.10008.5.1.1.2	SCU
Basic Color Image Box	1.2.840.10008.5.1.1.4.1	SCU
Printer	1.2.840.10008.5.1.1.16	SCU

2.2.1.5.7.4.1   Basic Film Session SOP Class

Refer to 'Basic Film Session SOP Class' for 'Basic Grayscale Print Management Meta SOP Class' (chapter 2.2.1.5.7.3.1).

2.2.1.5.7.4.2   Basic Film Box SOP Class

Refer to 'Basic Film Box SOP Class' for 'Basic Grayscale Print Management Meta SOP Class' (chapter 2.2.1.5.7.3.2).

2.2.1.5.7.4.3   Basic Color Image Box SOP Class

The Basic Image Box IOD is an abstraction of the presentation of an image and image related data in the image area of the film. The Basic Image Box IOD describes the presentation parameters and image pixel data which apply to a single image of a sheet film.

The Basic Color Image Box SOP instance is created by the Printer at the time the N-CREATE of the Basic Film Box (see chapter 2.2.1.5.7.4.2) is processed, based on the value of the Basic Film Box attribute Image Display Format (2010,0010).

CSP Print SCU provides support for the following DIMSE service:

➢   N-SET

N-SET
The command is issued by CSP Print SCU to update an instance of the Color Image Box SOP Class. For each image in the Basic Film Box, the attributes of the Basic Image Box are set. The values are available in an xml-file that describes the technical capabilities of the printer and configured in a Print Preset.

The following attributes are supported:

Table 2.2-45: Supported N-SET Attributes for Basic Color Image Box

Attribute Name	Tag	Value and comments
Image Position	(2020,0010)	The position of the image on the film, based on Image Display Format (2010,0010).
Requested Image Size	(2020,0030)	Sent when True Size printing is configured. Width (x-dimension) in mm of the image to be printed. Calculated from attribute values Imager Pixel Spacing (0018,1164) & Columns (0028,0011)
Basic Color Image Sequence	(2020,0111)	
> Samples Per Pixel	(0028,0002)	1
>Photometric Interpretation	(0028,0004)	RGB
>Planar Configuration	(0028,0006)	1 (frame interleave)
>Rows	(0028,0010)	Original number of pixels of the image in the height
>Columns	(0028,0011)	Original number of pixels of the image in the width
>Pixel Aspect Ratio	(0028,0034)	1/1
>Bits Allocated	(0028,0100)	8

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Attribute Name	Tag	Value and comments
>Bits Stored	(0028,0101)	8
>High Bit	(0028,0102)	7
>Pixel Representation	(0028,0103)	0
>Pixel Data	(7FE0,0010)	Data representation of pixel samples that comprise the image

The CSP Print SCU will process the N-SET response. The following status codes are recognized:

Table 2.2-46: N-SET response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

2.2.1.5.7.4.4   Printer SOP Class

Refer to 'Printer SOP Class' for 'Basic Grayscale Print Management Meta SOP Class' (chapter 2.2.1.5.7.3.4).

2.2.1.5.7.5 SOP Specific Conformance – Presentation LUT SOP Class

The Presentation LUT Information Object is an abstraction of a Presentation LUT.

The Basic Film Box Information Object references the Presentation LUT (see chapter 2.2.1.5.7.3.2).

If the Configuration Information Attribute (2010,0150) of the Basic Film Box IOD contains information similar to the Presentation LUT, then the Presentation LUT Attributes shall take precedence.

The output of the Presentation LUT is Presentation Values (P-Values). P-Values are approximately related to human perceptual response. They are intended to facilitate common input for both hardcopy and softcopy display devices.

The Presentation LUT is not intended to alter the appearance of the pixel values, as specified by the Photometric Interpretation (0028,0004) and Polarity (2020,0020).

The Printer shall use the Grayscale Standard Display Function as specified in PS 3.14 to convert the output of the Presentation LUT to density for printing.
The CSP Print SCU specifies values for Illumination (2010,015E) and/or Reflected Ambient Light (2010,0160). The Printer applies the GSDF curve together with the density range to be printed, Min Density to Max Density, as is specified at Film Box level.

CSP Print SCU provides support for the following DIMSE service:

➢ N-CREATE

➢ N-DELETE

N-CREATE is issued by CSP Print SCU to create a Presentation LUT SOP Instance.

The following attributes are supported:

Table 2.2-47: Supported N-CREATE Attribute for Presentation LUT

Attribute Name	Tag	Value and comments
Presentation LUT Shape	(2050,0020)	IDENTITY

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The CSP Print SCU will process the N-SET response. The following status codes are recognized:

Table 2.2-48: N-CREATE response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

N-DELETE is used to delete the Presentation LUT SOP Instance.

The CSP Print SCU will process the N-DELETE response. The following status codes are recognized:

Table 2.2-49: N-DELETE response Status Codes

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	The SCP has completed the operation successfully.
*	*	Any other status code	The Association is aborted using A-ABORT and the sent job is marked as failed. The status code is logged.

2.2.1.6 Association Acceptance Policies

The Enterprise Imaging AE's accept associations for the following real world activities:

- ➢ Verification Communication
- ➢ Request Storage Commitment
- ➢ Store Objects
- ➢ Find Object
- ➢ Move Object
- ➢ Modality Performed Procedure Step
- ➢ Modality Worklist

Association requests from unknown Application Entities will be rejected by the Enterprise Imaging AE's.

2.2.1.6.1 Real World Activity – Verification Communication-SCP

2.2.1.6.1.1 Description and Sequencing of Activity

The Enterprise Imaging Verification-SCP will respond to Verification requests to provide an SCU with the ability to determine if the Enterprise Imaging Verification-SCP is receiving DICOM requests.

2.2.1.6.1.2 Accepted Presentation Contexts

The Enterprise Imaging Verification-SCP will accept any of the Presentation Contexts listed in Table 2-50 for Verification.

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Table 2-50: Presentation Contexts Proposed by the Enterprise Imaging Verification-SCP

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

2.2.1.6.1.3   SOP Specific Conformance - Verification Communication

The Enterprise Imaging Verification-SCP provides standard conformance to the DICOM Verification Service Class as an SCU. The Enterprise Imaging Verification-SCP returns one of the following status codes.

Table 2-51: Verification Response Status

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	Operation performed properly.

2.2.1.6.1.4   Presentation Context Acceptance Criterion – Verification Communication

The Enterprise Imaging Verification-SCP will always accept a Presentation Context for the Verification SOP Class with the default DICOM transfer syntax listed in Table 2-50.

2.2.1.6.1.5   Transfer Syntax Selection Policies - Verification Communication

Since no DICOM data object is associated with a Verification command, only the default DICOM transfer syntax is required/supported.

2.2.1.6.2   Real World Activity – Enterprise Imaging Storage Commitment-SCP

2.2.1.6.2.1   Description and Sequencing of Activity

Enterprise Imaging stores images that are sent to it from a Storage SCU. The request for storage commitment may then be transmitted to the Enterprise Imaging Storage Commitment-SCP together with a list of references to one or more SOP instances. Enterprise Imaging Storage Commitment-SCP will receive and respond to DIMSE N-ACTION. The following message is supported:

- **Request Storage Commitment** - to request the safekeeping of a set of SOP instances

When Enterprise Imaging Storage Commitment-SCP is ready to commit successful recipient of the requested objects, an Association Request is sent to the peer AE that sent the Storage Commitment Push Model request. Upon successful negotiation of the required Presentation Context the outstanding N-EVENT-REPORT is sent.

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Figure 2.2-9 illustrates the sequencing of activities when Enterprise Imaging Storage Commitment-SCP receives a storage commitment request (N-Action) and send a storage commitment response (N-Event).
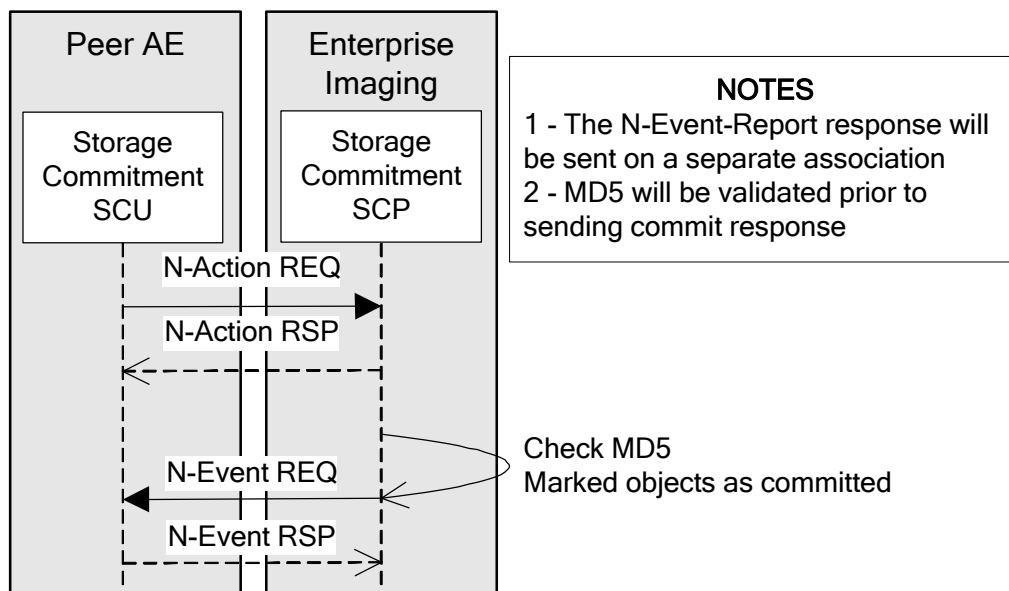
Figure 2.2-9: Storage Commitment Request Sequencing of Activity

2.2.1.6.2.2 Accepted Presentation Contexts

Enterprise Imaging Storage Commitment-SCP will accept any of the Presentation Contexts listed in Table 2-52 for Storage Commitment.

Table 2-52: Presentation Contexts Accepted for Storage Commitment Request Sent by Remote AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

2.2.1.6.2.3 SOP Specific Conformance

Enterprise Imaging Storage Commitment-SCP provides standard conformance to the DICOM **Storage Commitment** Service Class as an SCP. Enterprise Imaging Storage Commitment-SCP supports the elements listed in Table 2-53 for this SOP class.

The associated Activity with the Storage Commitment Push Model service is the communication by the Storage Commitment AE to peer AEs that it has committed to permanently store Composite SOP Instances that have been sent to it.

It thus allows peer AEs to determine whether the Storage-SCP AE has taken responsibility for the archiving of specific SOP Instances so that they can be flushed from the peer AE system.

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The Storage Commitment SCP AE will initiate a new Association to a peer AE that sent a Storage Commitment Push Model request if the original Association over which this was sent is no longer open.

Table 2-53: Storage Commitment Request – Action Information

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Enterprise Imaging Storage Commitment-SCP will store SOP Instances indefinitely unless the instances are manually deleted by a user with appropriate system permissions. The capacity is limited only by the availability of archive storage and volatility is dependent on the archive medium used. Enterprise Imaging Storage Commitment-SCP will stop accepting new objects for storage to ensure the availability of objects for which a successful storage commitment response has been sent.

2.2.1.6.2.4 Storage Commitment Result

If Enterprise Imaging Storage Commitment-SCP determines that it has successfully completed storage commitment, Enterprise Imaging Storage Commitment-SCP issues an N-EVENT-REPORT to the SCU including references to the successfully stored SOP Instances contained in the N-ACTION.

In the event that Enterprise Imaging Storage Commitment-SCP cannot commit to storing SOP Instances, Enterprise Imaging Storage Commitment-SCP issues an N-EVENT-REPORT to the SCU including references to the failed SOP Instances contained in the N-ACTION.

The N-EVENT-REPORT contains the Transaction UID value contained in the initiating N-ACTION. The N-EVENT-REPORT is sent on a separate association from the N-ACTION operation.

Enterprise Imaging Storage Commitment-SCP supports the Event Information as specified in Table 2-54. VNA supports the optional Retrieve AE Title (0008,0054) Attributes in the N-EVENT-REPORT.

Table 2-54: Storage Commitment Result – Event Information

Action Type Name	Event Type ID	Attribute Name	Tag
Storage Commitment Request Successful	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		>Retrieve AE Title	(0008,0054)
Storage Commitment Request Complete-Failures Exist	2	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		>Retrieve AE Title	(0008,0054)
		Failed SOP Sequence	(0008,1198)
		>Referenced SOP Class UID	(0008,1150)

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Action Type Name	Event Type ID	Attribute Name	Tag
		>Referenced SOP Instance UID	(0008,1155)
		>Failure Reason	(0008,1197)

2.2.1.6.2.5   Operations – Storage Commitment

Enterprise Imaging Storage Commitment-SCP will never delete SOP Instances for which Storage Commitment was requested – except deletion is forced manually by authorized user.

SOP Instances can be retrieved from Enterprise Imaging Storage Commitment-SCP using C-FIND and C-MOVE.

2.2.1.6.2.6   Presentation Context Acceptance Criterion

Enterprise Imaging Storage Commitment-SCP will accept any number of Storage Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.2.1.6.2.7   Transfer Syntax Selection Policies

Explicit VR Little Endian is preferred over Implicit VR Little Endian.

2.2.1.6.3   Real World Activity – Enterprise Imaging Storage-SCP

2.2.1.6.3.1   Description and Sequencing of Activity

Enterprise Imaging will store images that are sent to it from a Storage SCU. All images received by Enterprise Imaging Storage-SCP, other than images sent to the TRANSFER Storage SCP, can be retrieved at a later time from Enterprise Imaging; however, the rate of return of the images will vary depending on the state of the images. The images can be in one of three states, as listed in Table 2-55.

Table 2-55: Image States for Image or other Composite DICOM Object Sent by Remote AE (SCP)

Image State	Description
Online	The image is immediately available.
Nearline	The image is automatically available. However, there may be a small delay in retrieval time.
Offline	The image requires manual assistance to become online. The retrieval request will return a failure code.

Figure 2.2-10 illustrates the sequencing of activity when new DICOM objects are stored to Enterprise Imaging. Enterprise Imaging may be configured to apply lossless compression to received DICOM image objects. If this configuration option has been set, only images that arrived uncompressed are affected.

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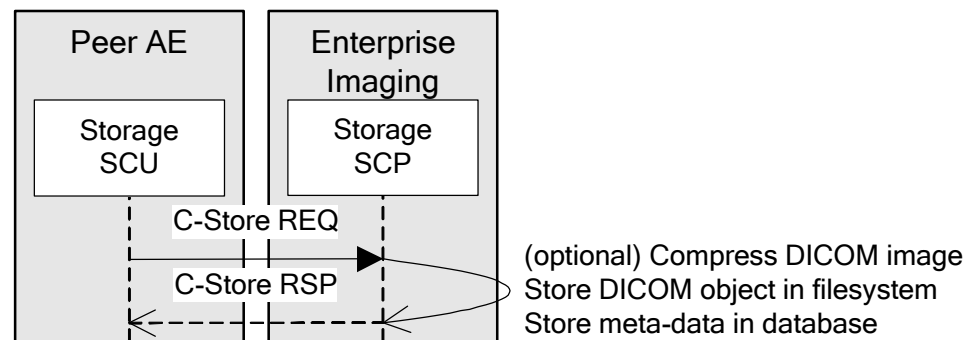
Figure 2.2-10: C-Store Sequencing of Activity

2.2.1.6.3.2   Accepted Presentation Contexts

Enterprise Imaging Storage-SCP will accept any of the Presentation Contexts listed in Table 2-56 for Storage.

Table 2-56: Presentation Contexts Accepted by Storage-SCP for Image DICOM Object Sent by Remote AE (SCP)

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	-
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	-
		RLE Lossless, PackBits	1.2.840.10008.1.2.5	SCP	-
		JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCP	-
		JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCP	-
		JPEG Process 14, lossless	1.2.840.10008.1.2.4.57	SCP	-
		JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCP	-
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	-
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91	SCP	-

Table 2-57: Presentation Contexts Accepted by Storage-SCP for Video DICOM Object Sent by Remote AE (SCP)

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCP	-
		MPEG-4 AVC/H.264 High Profile / Level 4.1 *	1.2.840.10008.1.2.4.102	SCP	
		MPEG-4 AVC/H.264 BD compatible High Profile / Level 4.1 **	1.2.840.10008.1.2.4.103	SCP	

* Supported by VNA 8.0.x, CWP 8.0.x, XERO 8.0.x and CSP 8.0.1 (or higher)
** Supported by VNA and CWP

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Table 2-58: Presentation Contexts Accepted by Storage-SCP for SR DICOM Object Sent by Remote AE (SCP)

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	-
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	-
		Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99	SCP	-

Table 2-59: Presentation Contexts Accepted by Storage-SCP for Other Composite DICOM Object Sent by Remote AE (SCP)

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	-
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	-

2.2.1.6.3.3 SOP Specific Conformance – Image or other Composite DICOM Object Sent by Remote AE (SCP)

Enterprise Imaging Storage-SCP conforms to the DICOM Storage Service Class as a Level 2 (Full) SCP. No elements are discarded or coerced by Enterprise Imaging. All Type 1, Type 2 and Type 3 attributes will be retained. Private attributes will be stored and included when the object is sent out again. Enterprise Imaging can decompress lossy compressed images and send them in uncompressed format. The Attribute Lossy Image Compression (0028,2110) remains "01".

VNA Storage-SCP Only:

Upon receiving an object from a Storage SCU, VNA can be configured to extract other linked patient IDs associated to the same patient by one of the following mechanisms:

- Query an external Patient Identity Cross-referencing Manager using HL7 QBP^Q23 message using the Patient ID (0010,0020) and Issuer of Patient ID (0010,0021)

- Extract from the DICOM header. The other linked patient IDs can be stored in any DICOM attributes, public or private. For example, Other Patient IDs (0010,1000), Other Patient ID Sequence (0010,1002), etc.

Note that other linked patient IDs can also be conveyed to VNA outside of DICOM, for example, via HL7 ADT messages.

All patient IDs, including the primary patient ID (0010,0020) and all linked patient IDs, if present, must be uniquely qualified to a specific patient ID domain. For example, each patient ID is qualified by a corresponding Issuer of Patient ID attribute (0010,0021).

If the received object is a DICOM SR with document title equal to (11528-7, LN, "Radiology Report"), then Enterprise Imaging will automatically update the study_status_id to READ.

CSP and VNA Storage-SCP:

Upon successful storage of objects contained within a study, the study can be automatically transferred to a remote AE or returned in response to a retrieval request. Enterprise Imaging Storage-SCP can be configured to automatically archive or delete objects contained within a study. Studies may be manually transferred, archived or deleted through the graphical user interface.

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In addition, Enterprise Imaging Storage-SCP can be configured to silently ignore the duplicate object by returning success (i.e. return status of 0000H).

Enterprise Imaging Storage-SCP calculates a hash code for each object received using the industry standard MD5 hashing algorithm. If Enterprise Imaging receives the same object (i.e. same SOP Instance UID) at a later time but the MD5 hash is different from the previous instance, Enterprise Imaging can be configured to overwrite the former received object.

TRANSFER SCP:

TRANSFER SCP is able to compress raw image data into <u>JPEG Process 14, selection value 1, lossless</u> (1.2.840.10008.1.2.4.70).

In addition, TRANSFER SCU silently ignores a duplicate object by returning success (i.e. return status of 0000H).

Enterprise Imaging Storage-SCP will return the C-STORE status codes shown in Table 2-60.

Table 2-60: Verification Response Status for Image or other Composite DICOM Object Sent by Enterprise Imaging Storage-SCP

Service Status	Further Meaning	Error Code	Reason
Refused	Out of resources	A700	Indicates that there was not enough storage space to store the image. Recovery from this condition is left to the administrative functions.
Error	Data set does not match SOP Class	A900	Indicates that the Data Set does not encode an instance of the SOP Class specified.
	Processing Failure	110	The operation was not successful.
	Coercion of Data Elements	B000	Values of attributes were modified by the SCP to ensure consistency with former received objects belonging to the same Patient/Study/Series entity.
Success	Success	0000	Operation performed properly.

2.2.1.6.3.4   Presentation Context Acceptance Criterion

Enterprise Imaging Storage-SCP will accept any number of Storage Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.2.1.6.3.5   Transfer Syntax Selection Policies

Enterprise Imaging Storage-SCP supports all transfer syntaxes listed in Table 2-56, Table 2-57, Table 2-58 and Table 2-59. By default, Enterprise Imaging will choose a transfer syntax other than Implicit VR Little Endian if more than one is requested in a single Presentation Context. Enterprise Imaging will prefer a compressed Transfer Syntax over an uncompressed Transfer Syntax. Lossless Compression is preferred over Lossy Compression and Explicit VR Little Endian is preferred over Implicit VR Little Endian.

2.2.1.6.4   Real World Activity – Modality Performed Procedure Step-SCP

2.2.1.6.4.1   Description and Sequencing of Activity

Enterprise Imaging MPPS-SCP acts as an SCP to DIMSE N-CREATE or N-SET Modality Performed Procedure Steps. Attributes values for the performed procedure step are stored within the CSP's data repository. If configured, Enterprise Imaging MPPS-SCP can act as an MPPS SCU forwarding the received Modality Performed Procedure Steps SOP Instance to another MPPS SCP.

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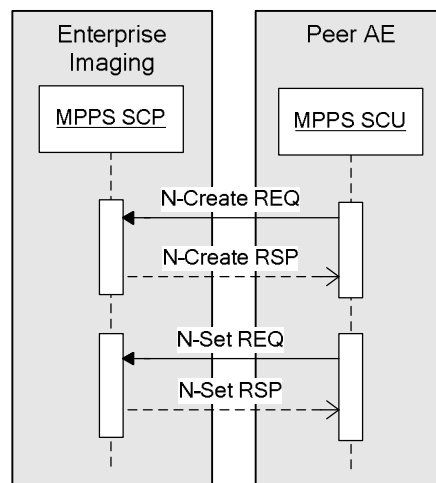
Figure 2.2-11: MPPS SCP N-Create and N-Set Sequence of Activity

2.2.1.6.4.2   Accepted Presentation Contexts

Table 2-61: Presentation Contexts Accepted by Modality Performed Procedure Step SCP

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

2.2.1.6.4.3   SOP Specific Conformance

When Enterprise Imaging MPPS-SCP receives an N-CREATE or N-SET MPPS from a MPPS SCU, if there are any configured forward destinations, Enterprise Imaging MPPS-SCP will forward the MPPS.

Enterprise Imaging MPPS-SCP supports the following N-CREATE Modality Performed Procedure Step attributes:

Table 2-62: Modality Performed Procedure Step SOP Class N-CREATE Attributes

Module	Attribute Name	Tag	Remarks
SOP Common	Specific Character Set	(0008,0005)	
Performed Procedure Step	Patient's Name	(0010,0010)	
Relationship	Patient ID	(0010,0020)	
	Patient Birth Date	(0010,0030)	
	Patient's Sex	(0010,0040)	
	Scheduled Step Attribute Sequence	(0040,0270)	See Note 1
	>Accession Number	(0008,0050)	
	>Referenced Study Sequence	(0008,1110)	
	>>Referenced SOP Instance UID	(0008,1155)	
	>Referenced Patient Sequence	(0008,1120)	
	>>Referenced SOP Instance UID	(0008,1155)	
	>Performing Physician's Name	(0008,1050)	
	>Study Instance UID	(0020,000D)	See Note 1
	>Requested Procedure Description	(0032,1060)	

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Module	Attribute Name	Tag	Remarks
	>Scheduled Procedure Step Description	(0040,0007)	
	>Scheduled Action Item Code Seq.	(0040,0008)	
	>>Code Value	(0008,0100)	
	>>Coding Scheme Designator	(0008,0102)	
	>>Code Meaning	(0008,0104)	
	>Scheduled Procedure Step ID	(0040,0009)	
	>Requested Procedure ID	(0040,1001)	
Performed Procedure Step	Procedure Code Sequence	(0008,1032)	
Information	>Code Value	(0008,0100)	
	>Coding Scheme Designator	(0008,0102)	
	>Code Meaning	(0008,0104)	
	Performed Station AE Title	(0040,0241)	See Note 1
	Performed Station Name	(0040,0242)	
	Performed Location	(0040,0243)	
	Performed Procedure Step Start Date	(0040,0244)	See Note 1
	Performed Procedure Step Start Time	(0040,0245)	See Note 1
	Performed Procedure Step End Date	(0040,0250)	
	Performed Procedure Step End Time	(0040,0251)	
	Performed Procedure Step Status	(0040,0252)	See Note 1 Must have status 'In Progress'. Any other status will result in an error.
	Performed Procedure Step ID	(0040,0253)	See Note 1
	Performed Procedure Step Description	(0040,0254)	
	Performed Procedure Type Description	(0040,0255)	
Image Acquisition Results	Modality	(0008,0060)	See Note 1
	Study ID	(0020,0010)	
	Performed Protocol Code Sequence	(0040,0260)	
	>Code Value	(0008,0100)	
	>Coding Scheme Designator	(0008,0102)	
	>Code Meaning	(0008,0104)	
	Performed Series Sequence	(0040,0340)	
	>Retrieve AE Title	(0008,0054)	
	>Series Description	(0008,103E)	
	>Performing Physician's Name	(0008,1050)	
	>Operator's Name	(0008,1070)	
	>Referenced Image Sequence	(0008,1140)	
	>>Referenced SOP Class UID	(0008,1150)	
	>>Referenced SOP Instance UID	(0008,1155)	
	>Protocol Name	(0018,1030)	
	>Series Instance UID	(0020,000E)	
	> Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	
	>>Referenced SOP Class UID	(0008,1150)	
	>>Referenced SOP Instance UID	(0008,1155)	

Note 1: These attributes must be present and not empty.

Enterprise Imaging MPPS-SCP returns one of the following status codes in the N-CREATE-RSP:

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Table 2-63: Modality Performed Procedure Step SCP Response Status

Service Status	Error Code	Reason
Success	0000	Operation performed properly
Invalid attribute value	0106	If the Performed Procedure Step Status has a value other than In Progress.
Processing failure	0110	Sent when an SCU attempts to create a MPPS which SOP Instance UID has already existed, or when Enterprise Imaging failed to create the MPPS record in the system.
Missing attribute value	0121	One or more Type 1 attributes are either not available or are empty.

All attributes in the following table may be updated by the MPPS SCU using the N-SET Service.

Table 2-64: Modality Performed Procedure Step SOP Class N-SET Attributes

Module	Attribute Name	Tag	Remarks
Performed Procedure Step Information	Procedure Code Sequence	(0008,1032)	
	>Code Value	(0008,0100)	
	>Coding Scheme Designator	(0008,0102)	
	>Code Meaning	(0008,0104)	
	Performed Procedure Step End Date	(0040,0250)	See Note 2
	Performed Procedure Step End Time	(0040,0251)	See Note 2
	Performed Procedure Step Status	(0040,0252)	
	Performed Procedure Step Description	(0040,0254)	
	Performed Procedure Type Description	(0040,0255)	
Image Acquisition Results	Performed Protocol Code Sequence	(0040,0260)	
	>Code Value	(0008,0100)	
	>Coding Scheme Designator	(0008,0102)	
	>Code Meaning	(0008,0104)	
	Performed Series Sequence	(0040,0340)	See Note 2
	>Retrieve AE Title	(0008,0054)	
	>Series Description	(0008,103E)	
	>Performing Physician's Name	(0008,1050)	
	>Operator's Name	(0008,1070)	
	>Referenced Image Sequence	(0008,1140)	
	>>Referenced SOP Class UID	(0008,1150)	
	>>Referenced SOP Instance UID	(0008,1155)	
	>Protocol Name	(0018,1030)	
	>Series Instance UID	(0020,000E)	
	> Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	
	>>Referenced SOP Class UID	(0008,1150)	
	>>Referenced SOP Instance UID	(0008,1155)	

Note 2: These attributes must be present and not empty.

Enterprise Imaging MPPS-SCP returns one of the following status codes in the N-SET-RSP:

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Table 2-65: Modality Performed Procedure Step SCP Response Status

Service Status	Error Code	Reason
Success	0000	Operation performed properly
Invalid attribute value	0106	If the Performed Procedure Step Status is neither In Progress, Completed nor Discontinued.
Processing failure	0110	Sent when an SCU attempts to update a performed procedure step which is COMPLETED or DISCONTINUED, or when it attempts to update an attribute that cannot be updated.
Missing attribute values	0121	One or more Type 1 attributes are either not present or are empty.

If configured to forward the received MPPS SOP Instance, Enterprise Imaging MPPS-SCP will propose the following presentation context to the configured MPPS SCP. Upon successful association negotiation, Enterprise Imaging MPPS-SCP will forward the received MPPS SOP Instance as is to the configured MPPS SCP.

Table 2-66: Presentation Contexts Proposed by Modality Performed Procedure Step SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.6.5   Real World Activity – Modality Worklist-SCP

2.2.1.6.5.1   Description and Sequencing of Activity

Enterprise Imaging Modality Workflow-SCP will respond to query requests that are sent to it by a Modality Worklist Find SCU. Modality Workflow-SCP creates the modality worklist items based on the scheduled order messages (HL7 ORM) sent from the RIS.

Figure 2.2-12 illustrates the sequencing of activity when Enterprise Imaging receives a Modality Worklist query from a peer AE.
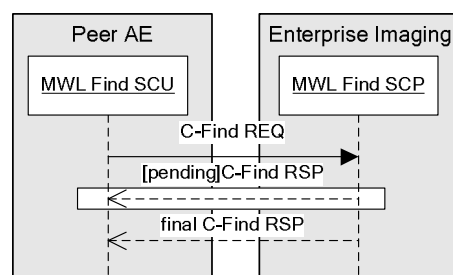
Figure 2.2-12 MWL Query Sequencing of Activity

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2.2.1.6.5.2 Accepted Presentation Contexts

Table 2-67: Presentation Contexts Accepted by Modality Worklist SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist IM - Find	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

2.2.1.6.5.3 SOP Specific Conformance

Modality Workflow-SCP provides standard conformance to the DICOM Basic Worklist Management Service Class.

Modality Workflow-SCP supports all required matching key types:

Table 2-68: Matching Key Types

Matching Key Types	
SV	single valued match
WC	wild card match
UI	List of UID matching
SQ	sequence match
DR	date range match

Modality Workflow-SCP supports all required return keys as long as the data is available from the RIS. Modality Workflow-SCP only returns Modality Worklist Items that have Scheduled Procedure Step Status (0040,0020) as SCHEDULED.

Modality Workflow-SCP supports case-insensitive matching for Patient Name (0010,0010). Modality Workflow-SCP does not support fuzzy semantic matching of patient names.

If the received request specifies an unsupported Specific Character Set (0008,0005) element, Modality Workflow-SCP will try to find any matching records using the constraints specified in the request as is without any modification.

Modality Workflow-SCP supports the following elements for this SOP class:

Table 2-69: Modality Worklist Information Model Attributes

Module	Attribute Name	Tag	Match	Return
SOP Common	Specific Character Set	(0008,0005)		1C
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	SQ	1
	>Modality	(0008,0060)	SV	1
	>Requested Contrast Agent	(0032,1070)		2C
	>Scheduled Station AE Title	(0040,0001)	SV	1
	>Scheduled Procedure Step Start Date	(0040,0002)	DR	1
	>Scheduled Procedure Step Start Time	(0040,0003)	DR	1
	>Scheduled Performing Physician	(0040,0006)		2
	>Scheduled Procedure Step Desc	(0040,0007)		1C
	>Scheduled Protocol Code Sequence	(0040,0008)		1C
	>>Code Value	(0008,0100)		1C
	>>Code Schema Designator	(0008,0102)		1C
	>Scheduled Procedure Step ID	(0040,0009)		1

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Module	Attribute Name	Tag	Match	Return
	>Scheduled Station Name	(0040,0010)		2
	>Scheduled Procedure Step Location	(0040,0011)		2
	>Pre-Medication	(0040,0012)		2C
Requested Procedure	Referenced Study Sequence	(0008,1110)		2
	>Referenced SOP Class UID	(0008,1150)		1C
	>Referenced SOP Instance UID	(0008,1155)		1C
	Study Instance UID	(0020,000D)		1
	Requested Procedure Description	(0032,1060)		1C
	Requested Procedure Code Sequence	(0032,1064)		1C
	>Code Value	(0008,0100)		1C
	>Coding Scheme Designator	(0008,0102)		1C
	Requested Procedure ID	(0040,1001)	SV	1
	Requested Procedure Priority	(0040,1003)		2
	Patient Transport Arrangements	(0040,1004)		2
Imaging Service Request	Accession Number	(0008,0050)	SV	2
	Referring Physician Name	(0008,0090)		2
	Requesting Physician	(0032,1032)		2
Visit Identification	Admission ID	(0038,0010)		2
Visit Status	Current Patient Location	(0038,0300)		2
Visit Relationship	Referenced Patient Sequence	(0008,1120)		2
	>Referenced SOP Class UID	(0008,1150)		2
	>Referenced SOP Instance UID	(0008,1155)		2
Patient Identification	Patient Name	(0010,0010)	WC	1
	Patient ID	(0010,0020)	SV	1
Patient Demographic	Patient Birth Date	(0010,0030)		2
	Patient Birth Time	(0010,0032)		2
	Patient Sex	(0010,0040)		2
	Patient Weight	(0010,1030)		2
	Confidentiality Constraint	(0040,3001)		2
Patient Medical	Medical Alerts	(0010,2000)		2
	Contrast Allergies	(0010,2110)		2
	Pregnancy Status	(0010,21C0)		2
	Special Needs	(0038,0050)		2
	Patient State	(0038,0500)		2

Modality Workflow-SCP returns one of the following status codes in the Modality Worklist C-FIND response:

Table 2-70: Modality Worklist SCP Response Status

Service Status	Error Code	Reason
Success	0000	Operation performed properly
Fail	A900	Sent when an SCU attempts to request an Identifier that doesn't match SOP Class attributes.
	Cxxx	Sent when the SCP is Unable to Process the SCU request.
Cancel	FE00	It is terminated due to Cancel request.
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional keys were supported in the same manner as Required keys.

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Service Status	Error Code	Reason
	FF01	Matches are continuing – Warning that one or more Optional keys were not supported for existence for this identifier.

2.2.1.6.5.4 Presentation Context Acceptance Criterion – Modality Worklist (SCP)

Modality Workflow-SCP will accept any number of Modality Worklist Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.2.1.6.5.5 Transfer Syntax Selection Policies – Modality Worklist (SCP)

Modality Workflow-SCP prefers Explicit VR Little Endian if proposed, otherwise it will choose Implicit VR Little Endian.

2.2.1.6.6 Real World Activity – Enterprise Imaging Query/Retrieve-SCP

2.2.1.6.6.1 Description and Sequencing of Activity – Find Object (SCP)

Enterprise Imaging Query/Retrieve-SCP will respond to query requests that are sent to it by a Query/Retrieve SCU. The latency for retrieval of SOP Instances is dependent on the object state, as specified in Table 2-71.

Figure 2.2-13 illustrates the sequencing of activity when Enterprise Imaging Query/Retrieve-SCP receives a DICOM query from a peer AE.
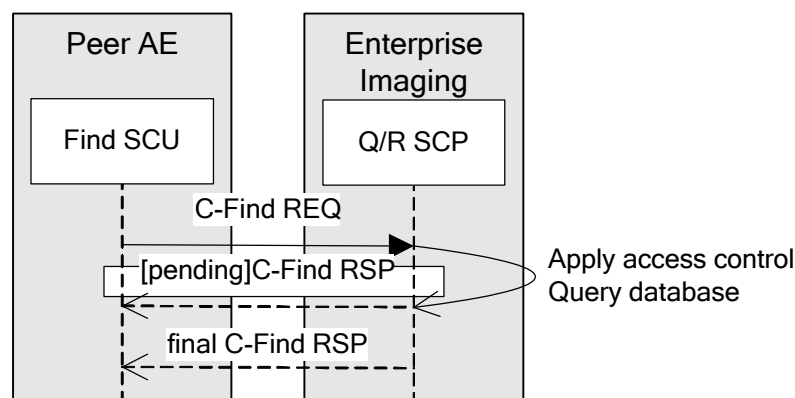
Figure 2.2-13: Query Sequencing of Activity

Table 2-71: Image States for Find Object (SCP)

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Image State	Description
Online	The image is immediately available.
Nearline	The image is automatically available. However, there may be a small delay in retrieval time.
Offline	The image requires manual assistance to become online. The retrieval request will return a failure code.

VNA Query/Retrieve-SCP can be configured to return a longitudinal record for the patient upon receiving a query request by a Query/Retrieve-SCU.

2.2.1.6.6.2   Accepted Presentation Contexts – Find Object (SCP)

Enterprise Imaging Query/Retrieve-SCP will accept any of the Presentation Contexts listed in Table 2-72 for Find.

Table 2-72: Presentation Contexts Accepted by VNA for Find Object (SCP)

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See Note 1 See Note 2
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See Note 1
Patient/Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See Note 1 See Note 2

Note 1: C-Find Extended Negotiation will be supported. Enterprise Imaging Query/Retrieve-SCP will respond with the information in Table 2-73.

Note 2: Patient Root Query/Retrieve only available from VNA Q/R-SCP

Table 2-73: FIND Extended Negotiation

Field Name	Value	Description of Field
Relational-queries	1	Relational queries supported.

2.2.1.6.6.3   SOP Specific Conformance – Find Object (SCP)

Enterprise Imaging Query/Retrieve-SCP provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP.

Enterprise Imaging Query/Retrieve-SCP supports the Relational-queries extended SCP behavior. VNA supports all mandatory Unique and Required Matching Keys. Matching for all PN VR attributes, but also for Study Description (0008,1030), Institution Name (0008,0080) and Institutional Department Name (0008,1040) is case-insensitive. Supported Return Keys are configurable. There is a trade-off between the extent of supported Return Keys and the size of the database.

VNA Query/Retrieve-SCP Only:

VNA supports matching multiple Patient IDs in the same query using the Other Patient ID Sequence (0010,1002). If Other Patient ID Sequence is specified, then all items within the sequence as well as the root level Patient ID and Issuer of Patient ID must be specified and cannot have wildcard.

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Enterprise Imaging Query/Retrieve-SCP provides support for the Instance Availability (0008,0056) Data Element on Study, Series and Instance Level, but not on Patient Level.

Table 2-74: Patient Level Attributes for Find Object (SCP)

Description	Tag	Support
Patient Name	(0010,0010)	Wild Card Matching / Returned
Patient ID	(0010,0020)	Wild Card Matching / Returned
Issuer of Patient ID	(0010,0021)	Single Value Matching / Returned
Patient Birth Date	(0010,1005)	Range Matching / Returned
Patient Sex	(0010,0040)	Wild Card Matching / Returned
Other Patient ID Sequence	(0010,1002)	Sequence Matching / Returned
> Patient ID	(0010,0020)	Single Value Matching / Returned
> Issuer of Patient ID	(0010,0021)	Single Value Matching / Returned
All additional configured Patient Level Return Keys		Returned Only

Table 2-75: Study Level Attributes for Find Object (SCP)

Description	Tag	Support
Study Instance UID	(0020,000D)	List of UID Matching / Returned
Study ID	(0020,0010)	Wild Card Matching / Returned
Study Date	(0008,0020)	Range Matching[8] / Returned
Study Time	(0008,0010)	Range Matching[8] / Returned
Accession Number	(0008,0050)	Wild Card Matching / Returned
Modalities in Study	(0008,0061)	Single Value Matching / Returned
Referring Physician's Name	(0008,0090)	Wild Card Matching / Returned
Study Description	(0008,1030)	Wild Card Matching / Returned
Study Status ID	(0032,000A)	Single Value Matching / Returned
Number of Study Related Series	(0020,1000)	Returned Only
Number of Study Related Instances	(0020,1208)	Returned Only
All additional configured Study Level Return Keys		Returned Only

Table 2-76: Series Level Attributes for Find Object (SCP)

Description	Tag	Support
Series Instance UID	(0020,000E)	List of UID Matching / Returned
Series Number	(0020,0011)	Wild Card Matching / Returned

[8]Matching keys for Date and Time are combined. For example, a Study Date of "20060705-20060707" and a Study Time of "1000-1800" will match the time period of July 5, 10am until July 7, 6pm, rather than the three time periods of 10am until 6pm on each of July 5, July 6 and July 7.

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Description	Tag	Support
Modality	(0008,0060)	Wild Card Matching / Returned
Institution Name	(0008,0080)	Wild Card Matching / Returned
Institutional Department Name	(0008,1040)	Wild Card Matching / Returned
Body Part Examined	(0018,0015)	Wild Card Matching / Returned
Laterality	(0020,0060)	Wild Card Matching / Returned
Request Attribute Sequence	(0040,0275)	
>Requested Procedure ID	(0040,1001)	Wild Card Matching / Returned
>Reason for the Requested Procedure	(0040,1002)	Returned Only
>Reason for Requested Procedure Code Sequence	(0040,100A)	
>>Code Value	(0008,0100)	Returned Only
>>Coding Scheme Designator	(0008,0102)	Returned Only
>>Coding Scheme Version	(0008,0103)	Returned Only
>>Code Meaning	(0008,0104)	Returned Only
>Scheduled Procedure Step ID	(0040,0009)	Wild Card Matching / Returned
>Scheduled Procedure Step Description	(0040,0007)	Returned Only
>Scheduled Protocol Code Sequence	(0040,0008)	
>>Code Value	(0008,0100)	Returned Only
>>Coding Scheme Designator	(0008,0102)	Returned Only
>>Coding Scheme Version	(0008,0103)	Returned Only
>>Code Meaning	(0008,0104)	Returned Only
Performed Procedure Step Start Date	(0040,0244)	Range Matching[8] / Returned
Performed Procedure Step Start Time	(0040,0245)	Range Matching[8] / Returned
Number of Series Related Instances	(0020,1209)	Returned Only
All additional configured Series Level Return Keys		Returned Only

Table 2-77: Instance Level Attributes for Find Object (SCP)

Description	Tag	Support
Instance Number	(0020,0013)	Wild Card Matching / Returned
SOP Instance UID	(0008,0018)	List of UID Matching / Returned
SOP Class UID	(0008,0016)	List of UID Matching / Returned
Content Date	(0008,0023)	Range Matching[8] / Returned
Content Time	(0008,0033)	Range Matching[8] / Returned
Concept Name Code Sequence	(0040,A043)	
>>Code Value	(0008,0100)	Single Value Matching / Returned
>>Coding Scheme Designator	(0008,0102)	Single Value Matching / Returned
>>Coding Scheme Version	(0008,0103)	Returned Only
>>Code Meaning	(0008,0104)	Returned Only

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Description	Tag	Support
Completion Flag	(0040,A491)	Single Value Matching / Returned
Verification Flag	(0040,A493)	Single Value Matching / Returned
All additional configured Instance Level Return Keys		Returned Only

VNA Query/Retrieve-SCP Only:

> For VNA to return the longitudinal record for the patient, the query must be constrained with at least Patient ID (0010,0020) and Issuer of Patient ID (0010,0021). Other query constraints can also be specified.

> Since the longitudinal record may consist of records from different originating sources, especially from different patient ID domains, VNA may return query responses that consist of Patient ID (0010,0020) and Issuer of Patient ID (0010,0021) other than the pair specified in the query. It is the responsibility of the Query/Retrieve SCU to handle the responses appropriately.

Enterprise Imaging Query/Retrieve-SCP returns one of the following status codes to a C-FIND request.

Table 2-78: C-FIND Status Codes for Find Object (SCP)

Service Status	Further Meaning	Protocol Codes	Description
Failed	Identifier does not match SOP Class	A900	The specified identifier contains a request that does not match the specified SOP Class.
	Unable to process	C000	For some reason (such as the database being off-line) this request cannot be processed at this time.
Cancel	Matching terminated due to Cancel Request	FE00	The original requester canceled this operation.
Pending	Pending	FF00	All Optional Keys are supported in the same manner as Required Keys.
Success	Success	0000	Operation performed properly.

2.2.1.6.6.4   Presentation Context Acceptance Criterion – Find Object (SCP)

Enterprise Imaging Query/Retrieve-SCP will accept any number of Find Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.2.1.6.6.5   Transfer Syntax Selection Policies – Find Object (SCP)

Explicit VR Little Endian is preferred over Implicit VR Little Endian.

2.2.1.6.7   Real World Activity – Enterprise Imaging Move-SCP

2.2.1.6.7.1   Description and Sequencing of Activity

Enterprise Imaging will transmit images that have been sent to it previously, driven by user requests. An association is established when the user initiates a transmit request. Enterprise Imaging Move-SCP will establish an association automatically in response to a C-MOVE request.

Figure 2.2-14 illustrates the sequencing of activity when Enterprise Imaging Move-SCP received a C-Move request from a Move-SCU. Pending C-Move responses are, by default,

sent on a periodic basis to keep the inbound DICOM association alive. The pending response interval is configurable.
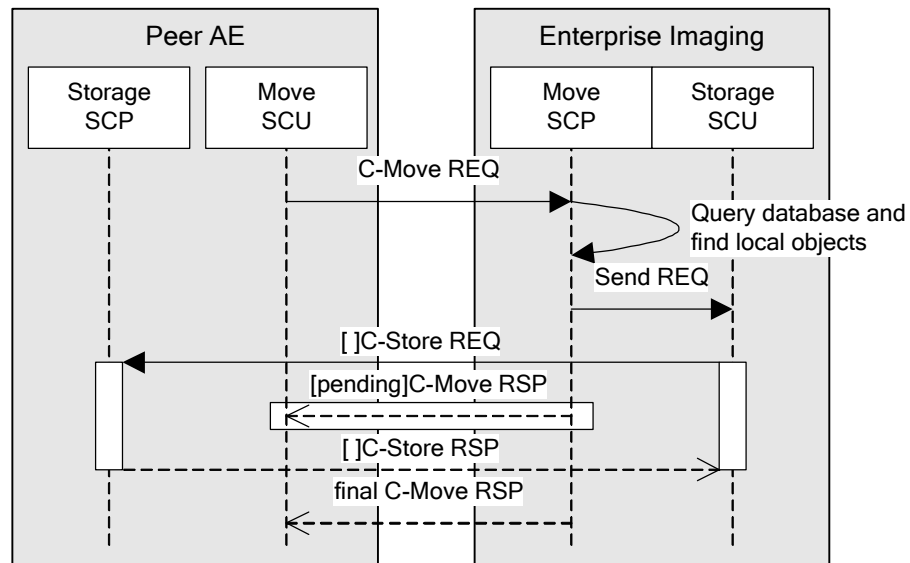
Figure 2.2-14: Retrieve Sequencing of Activity

2.2.1.6.7.2   Accepted Presentation Contexts – Move Object (SCP)

Enterprise Imaging Move-SCP will accept any of the Presentation Contexts listed in Table 2-79 for Move.

Table 2-79: Presentation Contexts Accepted by VNA for Move Object (SCP)

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See Note 1 See Note 2
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See Note 1
Patient/Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See Note 1 See Note 2

Note 1: C-Move Extended Negotiation will be supported Enterprise Imaging Move-SCP will respond with the information in Table 2-80: MOVE Extended Negotiation.

Note 2: Patient level move supported by VNA Enterprise Imaging Move-SCP

Table 2-80: MOVE Extended Negotiation

Field Name	**Value**	**Description of Field**
Relational-retrieve	1	Relational retrieve supported.

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2.2.1.6.7.3 SOP Specific Conformance – Move Object (SCP)

Enterprise Imaging Move-SCP will try to establish an association with the move destination specified in the Move request. One or more of the Presentation Contexts listed in the Store section of this document may be negotiated in this association.

Enterprise Imaging Move-SCP returns one of the following status codes to a C-MOVE request.

Table 2-81: C-MOVE Status Codes for Move Object (SCP)

Service Status	Further Meaning	Protocol Codes	Description
Refused	Out of Resources	A702	Unable to perform storage of images to move destination.
	Move destination unknown	A801	The destination of this move request is unknown.
Failed	Identifier does not match SOP Class	A900	The specified identifier contains a request that does not match the specified SOP Class.
	Unable to process	C000	For some reason (such as the database being off-line) this request cannot be processed at this time.
Cancel	Storage terminated due to Cancel Request	FE00	The original requester canceled this operation.
Warning	Warning	B000	Storage complete with one or more failures.
Pending	Pending	FF00	The storage operation is continuing.
Success	Success	0000	Operation performed properly.

VNA Enterprise Imaging Move-SCP only:

When VNA returns an object to the move destination, it will include all known linked patient IDs other than the primary patient ID in the Other Patient IDs Sequence (0010,1002). Each item in the sequence specifies one linked patient identifier. Each item includes the Patient ID (0010,0020) and Issuer of Patient ID (0010,0021).

Furthermore, VNA will always attempt to localize the primary Patient ID (0010,0020) and primary Issuer of Patient ID (0010,0021) based on a predefined list of local issuers for the move destination. One or more local issuers can be defined for each move destination. If the primary Issuer of Patient ID does not match the predefined list of local issuers for the move destination but one or more of the other linked patient IDs does, then VNA will substitute the primary Patient ID and Issuer of Patient ID with the first match. Moreover, the original primary Patient ID and primary Issuer of Patient ID will be added as an item to the Original Attribute Sequence (0400,0561).

The following table shows the key attributes related to patient identification in an object returned by VNA.

Attribute Name	Attribute Tag	Description
Patient ID	(0010,0020)	Localized Patient ID (as per section 3.2)
Issuer of Patient ID	(0010,0021)	Localized Patient Domain (as per section 3.2)
Other Patient IDs Sequence	(0010,1002)	This sequence includes <u>all</u> known linked patient identities
>Patient ID	(0010,0020)	Each item in the sequence conveys corresponding patient id and patient domain pairs
>Issuer of Patient ID	(0010,0021)	
Original Attribute Sequence	(0400,0561)	This sequence includes the original primary patient identity that was localized

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>Modified Attribute Sequence	(0400,0550)	Single item in the sequence conveys original patient id and patient domain pair
>>Patient ID	(0010,0020)	
>>Issuer of Patient ID	(0010,0021)	

2.2.1.6.7.4   Presentation Context Acceptance Criterion – Move Object (SCP)

Enterprise Imaging Move-SCP will accept any number of Move Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.2.1.6.7.5   Transfer Syntax Selection Policies – Move Object (SCP)

By default, Enterprise Imaging Move-SCP sends the IOD using the transfer syntax that was used when the image was originally stored. It will convert the IOD to a transfer syntax with native (uncompressed) pixel data (=Explicit or Implicit VR Little Endian) if the original transfer syntax is not supported by the destination.

Enterprise Imaging Move-SCP can be configured on a per-destination basis to convert the IOD from the original transfer syntax to Explicit or Implicit VR Little Endian.

2.3   Network Interfaces

Enterprise Imaging provides DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 of the DICOM Standard. Enterprise Imaging inherits its TCP/IP stack from the computer system upon which it executes.

2.3.1   Physical Medium Support

Enterprise Imaging is indifferent to the physical medium over which TCP/IP executes; it inherits the medium from the computer system upon which it is being executed.

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2.4 Configuration

Any configuration of Enterprise Imaging that affects DICOM conformance is described in this section.

2.4.1 Core Server Platform Configuration

Any CSP Configuration that affects DICOM conformance is described in this section.

2.4.1.1 CSP AE Title/Presentation Address Mapping

The translation from Application Entity Title to Presentation Address is stored in the database. Along with this mapping, the database stores those AE titles that are allowed to communicate with CSP.

2.4.1.1.1 CSP Local AE Titles

The local AE Titles and TCP ports are configurable through web interface.

2.4.1.1.2 CSP Remote AE Title

Remote AE Titles, TCP/IP Addresses and ports can be configured through web interface.

In the default configuration, Association Requests with any Calling AE TITLE will be accepted.

2.4.1.2 CSP Parameters

The following table shows the CSP configuration parameters relevant to DICOM communication. Refer to the CSP Documentation for details on general configuration capabilities.

Parameter	Configurable	Default Value
General Parameters		
PDU Size	Yes	16352 bytes
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	Yes	10 s
General DIMSE level time-out values	Yes	600 s
Time-out waiting for response to TCP/IP connect request. (Low-level timeout)	No	None
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	None
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	No	None
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	None
AE Specific Parameters (all AEs)		
Size constraint in maximum object size	No	None
Maximum PDU size the AE can receive (see note 1)	Yes	16352 bytes
Maximum PDU size the AE can send	No	1048576 bytes
AE specific DIMSE level time-out values	No	None
Number of simultaneous Associations by Service and/or SOP Class	No	Unlimited
SOP Class support	No	All supported SOP Classes always proposed and accepted

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Parameter	Configurable	Default Value
Transfer Syntax support	No	All supported Transfer Syntaxes always proposed and accepted
Other parameters that are configurable	No	None
General Parameters		
Listening Port (see note [9])	Yes	104 (Non-Secure) 2762 (Secure)
Maximum number of simultaneous Associations	Yes	10
Time-out waiting for A-ASSOCIATE RQ on open TCP/IP connection (ARTIM timeout)	Yes	5s
Time-out waiting on an open association for the next message (DIMSE timeout)	Yes	600 s
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	Yes	10 s
Time-out waiting on an open association for the next message after sending A-RELEASE RSP or A-ABORT RQ (Closing timeout)	Yes	50 ms
Maximum PDU size the AE can receive	Yes	16352 bytes
Maximum PDU size the AE can send	No	1048576 bytes
Pack Command and Data PDVs in one PDU	Yes	false
Support for the Basic TLS Secure Transport Connection Profile	Yes	Off
Accepted TLS Ciphers	Yes	-
Storage Server AE		
Accepted Called AE Titles	Yes	
Accepted Calling AE Titles	Yes	any
List of DICOM AE Titles that identify the location from which composite object instance(s) received by this Storage Server may be retrieved on the network	Yes	
Storage Directory Path Prefix	Yes	
Time-out waiting for the A-ASSOCIATE-AC PDU after transmission of the A-ASSOCIATE-RQ to open an association to the Storage Commitment SCU	Yes	10 s
Query/Retrieve Server AE		
Accepted Called AE Titles	Yes	
Accepted Calling AE Titles	Yes	any
Send optional C-MOVE RSPs with Pending Status to the C-MOVE SCU during the retrieve process	Yes	true
Time-out waiting for the A-ASSOCIATE-AC PDU after transmission of the A-ASSOCIATE-RQ to open an association to the Move Destination AE	Yes	10 s

2.4.2 Connectivity Manager (CM) AE Configuration

This sub-section describes any configuration of the CM AE that affects DICOM conformance.

---

[9] A C-Store SCP can choose to send objects to the CSP via port 105, 106 or 107 instead of port 104. The various ports have the following characteristics that differ from the normal flow on port 104:

- 105 –does not mark the study as unverified. Useful for testing or otherwise where automatic verification is impossible or unwanted. Reading tasks will still be created.
- 106 – study is marked as unverified and workflow tasks are created. Useful when simply accepting previously read studies from another system for archiving.
- 107 – similar to 106, but performs automatic reconciliation of study with HIS/RIS order details. Useful for migration of studies from a legacy PACS system.

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2.4.2.1　CM AE Title/ Presentation Mapping

The CM AE titles can be configured via the Service Tools. The Service Tools provide a Web-based GUI for configuration.

2.4.2.2　CM AE Configuration Parameters

The following table lists all of the DICOM parameters that can be configured via the Service Tools of the CM AE. These parameters can be configured for each real world device that the CM AE communicates with.

Table 2-82: Configuration Parameter Table

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
Default character encoding	Yes	Latin 1 (ISO-8859-1)
Device name (remote AE title)	Yes	n/a

2.4.3　VNA Configuration

Any VNA Configuration that affects DICOM conformance is described in this section.

2.4.3.1　VNA AE Title/Presentation Address Mapping

The translation from Application Entity Title to Presentation Address is stored in the database. Along with this mapping, the database stores those AE titles that are allowed to communicate with VNA.

2.4.3.1.1　VNA Local AE Titles

The local AE Titles and TCP ports are configurable through web interface and command line tools.

2.4.3.1.2　VNA Remote AE Title

Remote AE Titles, TCP/IP Addresses and ports can be configured through web interface.

In the default configuration, Association Requests with configured Calling AE TITLE will be accepted. Association Requests from unknown Calling AE TITLE will be rejected.

2.4.3.2　VNA Parameters

The following table shows the VNA configuration parameters relevant to DICOM communication. Refer to the VNA Documentation for details on general configuration capabilities.

Table 2-83: Parameters

Parameter	Configurable	Default Value
General Parameters		
PDU Size	Yes	16352 bytes

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Parameter	Configurable	Default Value
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	Yes	10 s
General DIMSE level time-out values	Yes	600 s
Time-out waiting for response to TCP/IP connect() request. (Low-level timeout)	No	None
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	None
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	No	None
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	None
AE Specific Parameters (all AEs)		
Size constraint in maximum object size	No	None
Maximum PDU size the AE can receive (see note 1)	Yes	16352 bytes
Maximum PDU size the AE can send	No	1048576 bytes
AE specific DIMSE level time-out values	No	None
Number of simultaneous Associations by Service and/or SOP Class	No	Unlimited
SOP Class support	No	All supported SOP Classes always proposed and accepted
Transfer Syntax support	No	All supported Transfer Syntaxes always proposed and accepted
Other parameters that are configurable	No	None
General Parameters		
Listening Port	Yes	11112
Maximum number of simultaneous Associations	Yes	128
Time-out waiting for A-ASSOCIATE RQ on open TCP/IP connection (ARTIM timeout)	Yes	5s
Time-out waiting on an open association for the next message (DIMSE timeout)	Yes	600 s
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	Yes	10 s
Time-out waiting on an open association for the next message after sending A-RELEASE RSP or A-ABORT RQ (Closing timeout)	Yes	50 ms
Maximum PDU size the AE can receive	Yes	16352 bytes
Maximum PDU size the AE can send	No	1048576 bytes
Pack Command and Data PDVs in one PDU	Yes	false
Support for the Basic TLS Secure Transport Connection Profile	Yes	Off
Accepted TLS Ciphers	Yes	-
Storage Server AE		
Accepted Called AE Titles	Yes	
Accepted Calling AE Titles	Yes	Configured

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Parameter	Configurable	Default Value
List of DICOM AE Titles that identify the location from which composite object instance(s) received by this Storage Server may be retrieved on the network	Yes	
Storage Directory Path Prefix	Yes	
Time-out waiting for the A-ASSOCIATE-AC PDU after transmission of the A-ASSOCIATE-RQ to open an association to the Storage Commitment SCU	Yes	10 s
Query/Retrieve Server AE		
Accepted Called AE Titles	Yes	
Accepted Calling AE Titles	Yes	Configured
Send optional C-MOVE RSPs with Pending Status to the C-MOVE SCU during the retrieve process	Yes	true
Time-out waiting for the A-ASSOCIATE-AC PDU after transmission of the A-ASSOCIATE-RQ to open an association to the Move Destination AE	Yes	10 s

2.4.4   DICOM Izer AE Configuration

This sub-section describes any configuration of the DICOM Izer AE that affects DICOM conformance.

2.4.4.1   DICOM Izer AE Title/ Presentation Mapping

DICOM Izer AE Titles, host names and port numbers for remote applications are configured through the Connectivity tab in the control panel (Settings window) in DICOM Izer interface.

2.4.4.2   DICOM Izer Configuration Parameters

DICOM Izer configurable parameters can be defined on the Connectivity and Workstation tabs of the control panel (Settings window). They are the following:

➢ AE Title: Default is IZER_SystemID, with SystemID, a random number consisting of 4 digits.

➢ The UID root of the institution or distributor.

➢ Debug and Verbose modes: to get detailed or undetailed information on connections.

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3   MEDIA INTERCHANGE

3.1   CSP

3.1.1   Implementation Model

3.1.1.1   Application Data Flow
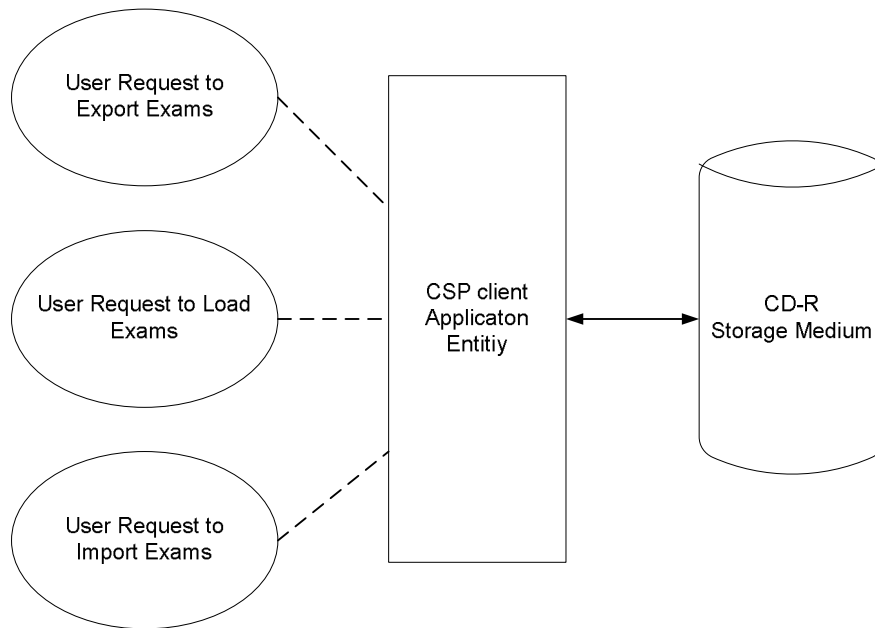
Figure 3-1: Application Data Flow Diagram for Interchange Media

The following data flows are depicted in the diagram:

➢ The CSP Client Application Entity exports exams to CD-R storage medium. It is associated with the local real-world activity "Save to Media". A DICOM viewer is exported along with the exams. "Save to Media" is performed upon user request for selected patients, studies, series and instances (images, presentation states and other non-image objects).

➢ The CSP Client Application Entity loads exams from the CD-R storage medium. It is associated with the local real-world activity "Open" Exams. It is performed upon user request to search the content of the CD-R storage medium and then open the selected studies to display corresponding patients, studies, series or instances (images, presentation states and other non-image objects).

➢ The CSP Client Application Entity imports exams from the CD-R storage medium to its Storage-SCP AE. It is associated with the real-world activity "Import" Exams. It is performed upon user request to import selected studies with all containing patients, series or instances (images, presentation states and other non-image objects).

3.1.1.2   Functional Definitions of AE's

3.1.1.2.1   Functional Definition of CSP Client Application Entity

Activation of the "Save to Media" with the selected method "Burn CD/DVD" will create an export job. Each export job has references to one or more studies selected by the user. The contents referenced in each export job will be written to a single CD-R media. The disk

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space check is performed before burning and the job will be blocked if the total size of the selection is larger than the capacity of a single CD-R media.

Selecting a CD/DVD as the search location will read the DICOMDIR (if available) or search for DICOM files on the media and present all the studies available on the CD/DVD to the user. The user can then select one or more studies to be displayed at the CSP Client Application Entity.

Activation of the "Import" icon or menu entry will import the selected patients and studies to the internal PACS AE. Import is performed by transmitting the instances of the selected studies to the internal PACS AE.

3.1.1.3 Sequencing of Real-World Activities

3.1.1.3.1 Save to media

One or more studies must be selected before the "Save to Media" action can be invoked. An export job is created. The job contains references to which studies are selected. The CSP Client AE retrieves all the instances for the referenced studies, transcodes them into DICOM files with Transfer Syntax Explicit VR Little Endian. A HTML representation of the studies including the images as jpg files is created. The CSP Client AE then writes all the contents and a DICOM viewer is then stored to a CD-R storage medium if a blank media is available and inserted in the CD-R writer device, or the write process will wait until a blank media is available.

3.1.1.3.2 Importing from media

When the CSP Client AE imports one or more studies from a CD-R media, the instances are loaded from the DICOM file folders. The transmission from CSP Client Application to internal PACS AE is done via C-Store service as a Service Class User.

3.1.1.4 File Meta Information for Implementation Class and Version

Table 3-1: File Meta Information for Implementation Class and Version

File Meta Information Version	0x00 0x01
Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-null

3.1.2 AE Specification

3.1.2.1 CSP Client AE

CSP Client AE provides standard conformance to DICOM Interchange Option of the Media Storage Device Class.

Table 3-2: AE Related Application Profiles, Real World Activities and Role

Application Profiles Supported	Real World Activity	Role	SC Option
STD-GEN-CD	Export Exams	FSC	Interchange
STD-GEN-CD	Load Exams	FSR	Interchange
STD-GEN-CD	Import Exams	FSR	Interchange

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3.1.2.1.1   File Meta Information for the CSP Client AE

3.1.2.1.2   Real World Activities

3.1.2.1.2.1   Activity – Export Exams

The CSP Client AE acts as a File-Set Creator when export patient exams to an interchange media. It creates the DICOM Directory structure with references to the exam objects. If the content of the current selection exceeds the capacity of a single CD-R medium an error dialog will be shown notifying the user that export to this medium is not possible.

The user will be prompted to insert an empty CD-R for each export job. The contents of the export job will be written together with a corresponding DICOMDIR and a DICOM viewer to a single-session CDR. Writing in multi-session mode is not supported. The user can cancel an export job in the job queue.

3.1.2.1.2.1.1 Application Profile Specific Conformance

The CSP Client AE supports the STD-GEN-CD Application Profile. It supports all SOP classes defined in Table 1-1. All exported instances have transfer syntax set to Explicit VR Little Endian (transfer syntax UID 1.2.840.10008.1.2.1). If an instance stored in the CSP AE associated with the CSP Client AE does not have transfer syntax of Explicit VR Little Endian, then the CSP Client AE will convert the object into Explicit VR Little Endian.

The following attributes are defined as Type 1 for the DICOM directory record but are defined as Type 2 in the corresponding Information Object Definition:

> (0008,0020) Study Date
> (0008,0030) Study Time
> (0020,0010) Study ID
> (0020,0011) Series Number
> (0020,0013) Instance Number

If the values of these attributes are empty in the CSP AE database, then the CSP AE will not automatically generate a value for them. In other words, if one or more of these type 1 attributes are still empty after the updates from the database, the study will be exported as is and the media will not be DICOM Part 10 compliant in this case.

3.1.2.1.2.2   Activity – Load Exams

The CSP Client AE also acts as a File-Set Reader when reading exams from an interchange media. It retrieves the references to the exam objects based on the DICOM Directory structure (if available) or search for DICOM files on the media and then presents a list of all the available exams to the user. Then the user can select a study and display the objects using the location references retrieved from the DICOM Directory structure.

3.1.2.1.2.2.1 Application Profile Specific Conformance

The CSP Client AE supports the STD-GEN-CD Application Profile. It supports all SOP classes defined in Table 1-1 with transfer syntax set to Explicit VR Little Endian (transfer syntax UID 1.2.840.10008.1.2.1)

3.1.2.1.2.3   Activity – Import Exams

The CSP Client AE also acts as a File-Set Reader when it imports exams from an interchange media to its associated CSP AE. It retrieves the references to the exam objects

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based on the DICOM Directory structure. Then using the location references retrieved, it transmits the objects to its associated CSP AE via DICOM C-Store.

3.1.2.1.2.3.1 Application Profile Specific Conformance

The CSP Client AE supports the STD-GEN-CD Application Profile. It supports all SOP classes defined in Table 1-1 with transfer syntax set to Explicit VR Little Endian (transfer syntax UID 1.2.840.10008.1.2.1).

3.1.3 Augmented and Private Profiles

3.1.3.1 Augmented Profiles

None

3.1.3.2 Private Profiles

None

3.1.4 Media Configuration

None

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3.2 TRANSFER

TRANSFER reads DICOM Interchange media and the related capabilities are described in the following sections.

3.2.1 Implementation Model

3.2.1.1 Application Data Flow Diagram

TRANSFER reads the DICOM data from storage medium, and then transmits data to Enterprise Enterprise Imaging Storage-SCP.

Figure 3.2-1 depicts the TRANSFER media workflow.
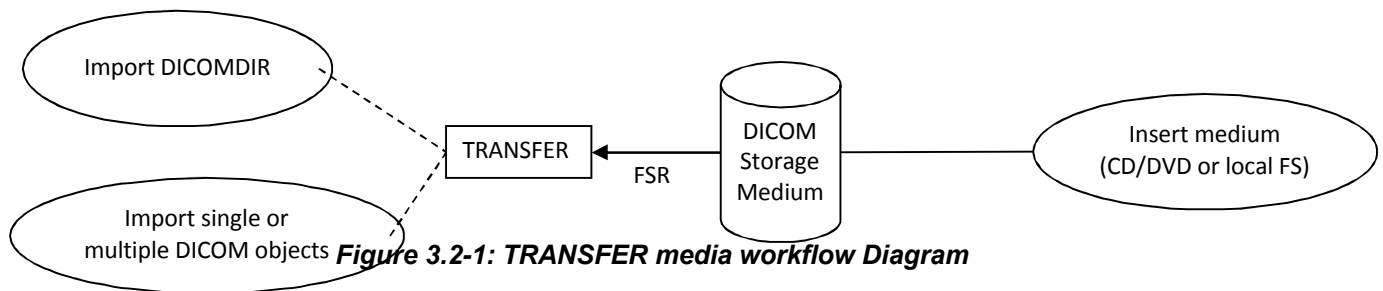
Figure 3.2-1: TRANSFER media workflow Diagram

3.2.1.2 Functional Definition of AEs

TRANSFER User Interface reads the DICOMDIR or DICOM objects on the storage medium and then imports them over to Enterprise Imaging. The supported list of SOP classes can be found in the **TRANSFER AE** part of the Table 2-3: SOP Class(es) for SCP above.

3.2.1.3 Sequencing of Real World Activities

TRANSFER enables the user to browser the DICOM Storage Medium to find the study(ies) to import, then copy particular Study data into its local cache prior to transmitting them over to Enterprise Imaging.

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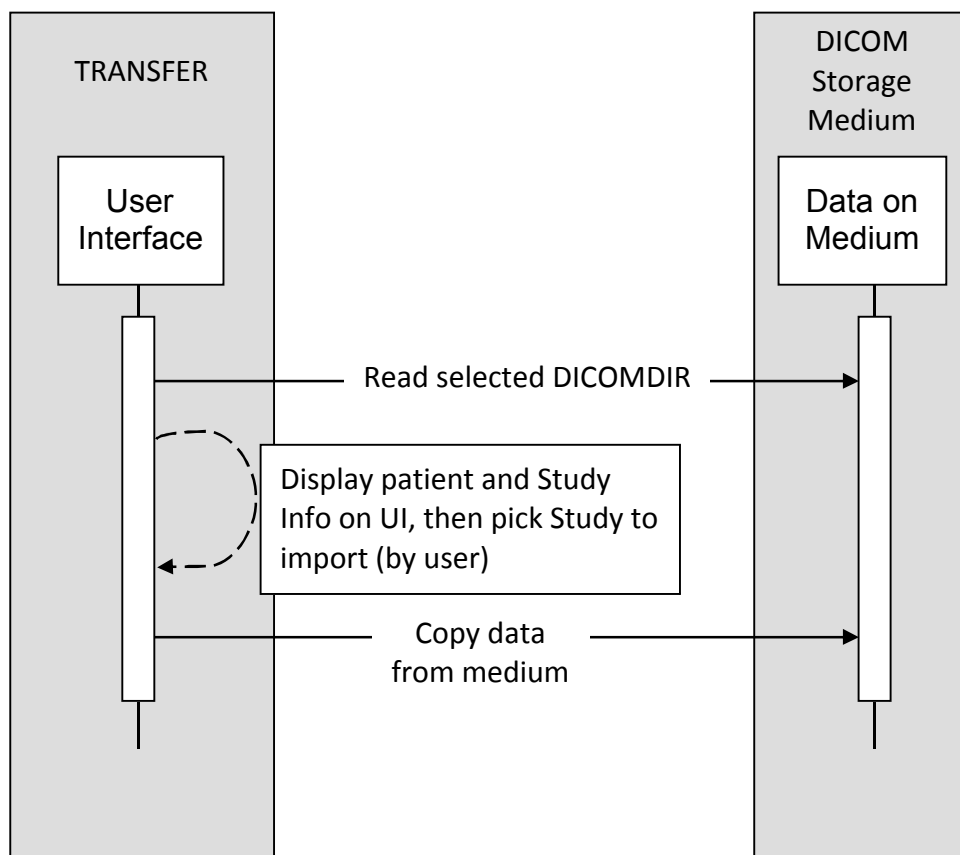
Figure 3.2-2: DICOM Import Sequence Diagram

3.2.1.4 File Meta Information for Implementation Class and Version

Not applicable

3.2.2 AE Specifications

None

3.2.3 Augmented and Private Application Profiles

None

3.2.4 Media Configuration

None

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3.3   CWP

3.3.1   Implementation Model

3.3.1.1   Application Data Flow Diagram
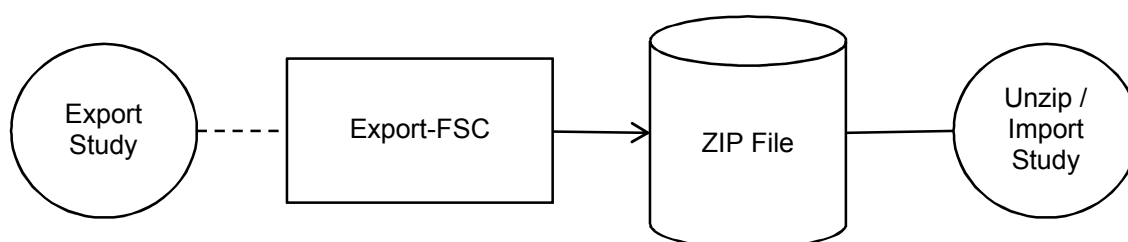
Figure 3.3-1: Application Data Flow Diagram

CWP supports export of a study to a ZIP archive following the data model in DICOM part 10, on behalf of a user request. The resulting archive may be extracted by the user, and then imported by a device that is compliant with DICOM part 10.

3.3.1.2   Functional Definition of AEs

3.3.1.2.1   Export-FSC

Export-FSC is activated through the user interface to export a given study. It organizes the SOP Instances according to DICOM part 10, including the creation of a DICOMDIR entry. These files are then provided as a single ZIP file. The user has the option to encrypt the ZIP file with a given password.

3.3.1.3   Sequencing of Real World Activities

Not applicable

3.3.1.4   File Meta Information for Implementation Class and Version

Attribute Name	Tag	Type	Value
File Meta Information Version	(0002,0001)	1	00\01
Implementation Class UID	(0002,0012)	1	*Not set or modified*
Implementation Version Name	(0002,00013)	3	*Not set or modified*

The Implementation Class UID and Implementation Version Name attributes are not set or modified by the Export-FSC. If they contain a value, then it will originate from the image manager from which CWP retrieved the SOP instance.

3.3.2   AE Specifications

3.3.2.1   Export-FSC Specification

Export-FSC provides standard conformance to the Media Storage Service Class.

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Table 3.3-1: Application Profiles, Real World Activities and Roles for Export-FSC

Supported Application Profile	Real-World Activity	Roles	SC Option
STD-GEN-ZIP-MAIL	Export Study	FSC	
STD-GEN-SEC-ZIP-MAIL	Export Study	FSC	

Export-FSC does not provide a native E-Mail service, but relies on the end-user to attach the ZIP File provided in an E-Mail to the intended destination.

3.3.2.1.1 File Meta Information for the Export-FSC

No file meta information is set or modified by the Export-FSC.

3.3.2.1.2 Real World Activities

3.3.2.1.2.1 Real World Activity – Export Study

The Export-FSC is activated through the CWP user interface. Once a study is in view, the end-user may have the option, depending on their permissions and configuration, to export the study to a ZIP. Upon selecting this option, the user is then presented with the further option of encrypting the ZIP with a user-supplied password. Once acknowledged, CWP will activate the Export-FSC to construct the ZIP file containing all of the SOP instances of the study, including the generation of a DICOMDIR. The ZIP file is then presented to the user for download, and the user may email the ZIP to its destination or unzip and import directly into another device.

3.3.2.1.2.1.1 Media Storage Application Profile

The Export-FSC uses the STD-GEN-ZIP-MAIL and STD-GEN-SEC-ZIP-MAIL profiles.

3.3.2.1.2.1.1.1 Options

Not applicable

3.3.3 Augmented and Private Application Profiles

3.3.3.1 Augmented Application Profiles

3.3.3.1.1 Augmented Application Profile – STD-GEN-ZIP-MAIL

3.3.3.1.1.1 SOP Class Augmentations

None

3.3.3.1.1.2 Directory Augmentations

None

3.3.3.1.1.3 Other Augmentations

The ZIP file may be encrypted at the user's discretion, with a user-supplied password.

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3.3.3.1.2   Augmented Application Profile STD-GEN-SEC-ZIP-MAIL

3.3.3.1.2.1   SOP Class Augmentations

None

3.3.3.1.2.2   Directory Augmentations

None

3.3.3.1.2.3   Other Augmentations

The ZIP file may be encrypted at the user's discretion, with a user-supplied password.

3.3.3.2   Private Application Profiles

Not applicable

3.3.4   Media Configuration

Not applicable

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4 SUPPORT FOR EXTENDED CHARACTER SETS

4.1 CSP Support for Extended Character Sets

CSP supports the following character sets:

Table 4-1: Enterprise Imaging Extended Character Sets

Defined Term	Character Set
• ISO-IR 6 (default)	Basic G0 Set
• ISO-IR 100	Latin Alphabet No. 1
• ISO-IR 101	Latin Alphabet No. 2

4.2 VNA Support for Extended Character Sets

Support extends to correctly decoding and displaying the correct symbol in the supported character sets for all names and strings received over the network, and in the local database.

No specific support for sorting of strings other than in the default character set is provided in the browsers.

VNA supports the following extended character set:

Table 4-2: Extended Character Sets

Character Set Description	Defined Term
Basic G0 Set	ISO-IR 6 (default)
JIS X 0201: Katakana	ISO 2022 IR 13
JIS X 0208: Kanji	ISO 2022 IR 87
ISO 8859-1 Latin Alphabet No. 1	ISO-IR 100
Greek	ISO-IR 126
Arabic	ISO-IR 127
Cyrillic	ISO-IR 144
KS X 1001: Hangul and Hanja	ISO 2022 IR 149
UTF-8	ISO-IR 192
Simplified Chinese	GB18030

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5 SECURITY

5.1 Security Profiles

Enterprise Imaging supports secure DICOM communication in conformance with the Basic TLS Secure Transport Connection Profile. At default configuration, the TLS option is deactivated.

5.2 Association Level Security

Enterprise Imaging provides association level security by restricting acceptance to association requests only from DICOM AEs configured in Enterprise Imaging.

Association requests from unknown DICOM AEs will be rejected.

5.3 Application Level Security

Enterprise Imaging Administration Tools require a valid user name and password pair to login.

CSP and CWP User Interfaces require user authentication in order to access user interface functionality.

Activities are logged according to the IHE Audit Trail and Node Authentication (ATNA) Profile.

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6   SUPPORT OF WEB ACCESS TO DICOM PERSISTENT OBJECTS (WADO)

6.1   VNA

VNA supports receiving web access to DICOM persistent objects requests according to DICOM Part 18. It supports the following mandatory parameters:

Table 6-1: Supported Parameters for WADO

Parameter Name	Description
requestType	Must be set to WADO
studyUID	The requested Study Instance UID of the object to be retrieved
seriesUID	The requested Series Instance UID of the object to be retrieved
objectUID	The requested SOP Instance UID of the object to be retrieved
contentType	mimeType of the returned object. VNA supports the value of **application/dicom** for full-fidelity DICOM object.

VNA ignores the Accept field in the HTTP request. It responds according to the contentType value set in the Request-URI. The supported value is listed in Table 6-1. VNA will return the DICOM object in its native transfer syntax.

The URL to access the WADO service on VNA is structured as follows:

http://<host>:8080/wado?requestType=WADO

6.2   CSP / CWP

CSP / CWP support receiving web access to DICOM persistent objects requests according to DICOM Part 18. It supports the following parameters:

Table 6-2: Supported Parameters for WADO

Parameter Name	Description
requestType	Must be set to WADO for standard WADO access. Other values are XERO, STUDY, SERIES, IMAGE, PATIENT, and CFIND for other types of related queries. Only WADO related parameters are documented here.
studyUID	The requested Study Instance UID of the object to be retrieved
seriesUID	The requested Series Instance UID of the object to be retrieved
objectUID	The requested SOP Instance UID of the object to be retrieved
contentType	mimeType of the returned object. XERO Viewer supports the value of **application/dicom** for full-fidelity DICOM object, image/jpeg, image/png, image/gif, text/xml, text/plain, application/xml, audio/basic (among other audio types), video/mpeg2. JPEG lossless has been added as image/jpll JPEG-LS has been added as image/jpls 12 bit JPEG as image/jp12
rows, columns	The size of the desired image. Only applicable to image retrieves.
transferSyntax	A backslash separated list of transfer syntaxes to use, if any match the existing transfer syntax, that one will be used, otherwise the first one in the list.
region	A 4 value, comma separated list containing the area of the image to return. Only applicable to image retrieves.
seriesPresentationUID, presentationUID	The UID of the presentation state to apply to the image

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Parameter Name	Description
frameNumber	The frame number of the image to return. Only applies to image retrieval on multiframes.

CSP / CWP ignore the Accept field in the HTTP(S) request. It responds according to the contentType value set in the Request-URI. The supported values are listed in Table 6-2. CSP / CWP will return the DICOM object in the uncompressed transfer syntax LEI by default (not the standard LEE) or will choose the native transfer syntax if listed, or the first one from the transferSyntax if the native syntax isn't listed (multiple values separated by \ according to the DICOM standard).

The URL to access the WADO service on XERO Viewer is structured as follows:

http://<host>/wado/?requestType=WADO

This URL is access-controlled use form based authentication.

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7 ANNEXES

7.1 IOD Contents

7.1.1 Created SOP Instance

CSP creates GSPS as PR modality and Key image notes as KO modality.

CM creates DICOM SR as SR modality or DICOM Encapsulated PDF as DOC modality.

CWP creates DOC (RAW Data), AU, SR or ECG (Encapsulated PDF) and XC as XC modality.

The following tables use a number of abbreviations. The abbreviations used in the "Presence of Module" and "Presence of Value" columns are:

ALWAYS	Always Present with a value
ANAP	Attribute Not Always Present
EMPTY	Attribute is sent without a value
VNAP	Value Not Always Present (attribute sent zero length if no value is present)

The abbreviations used for the source of the data values in the tables are:

AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter
MPPS	The attribute value source is Modality Performed Procedure Step
MWL	The attribute value source is Modality Worklist
USER	The attribute value source is from user input

7.1.2 CSP

7.1.2.1 GSPS IOD

Table 7-1: IOD of GSPS SOP Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 7-3	ALWAYS
Study	General Study	Table 7-4	ALWAYS
	Patient Study	Table 7-5	ALWAYS
Series	General Series	Table 7-6	ALWAYS
	Presentation Series	Table 7-9	ALWAYS
Equipment	General Equipment	Table 7-7	ALWAYS
Presentation State	Presentation State Identification	Table 7-10	ALWAYS
	Displayed Area	Table 7-11	ALWAYS
	Graphic Annotation	Table 7-12	Required if Graphic Annotations are to be applied to referenced image(s)
	Spatial Transformation	Table 7-13	Required if rotation or flipping are to be applied to referenced image(s)
	Graphic Layer	Table 7-14	Required if Graphic Annotations or Overlays or Curves are to be applied to referenced image(s)
	Softcopy VOI LUT	Table 7-15	Required if a VOI LUT is to be applied to referenced image(s)
	Softcopy Presentation LUT	Table 7-16	ALWAYS
	SOP Common	Table 7-8	ALWAYS

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7.1.2.2   Key Image Note IOD

Table 7-2: IOD of KO SOP Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 7-3	ALWAYS
Study	General Study	Table 7-4	ALWAYS
	Patient Study	Table 7-5	ALWAYS
Series	General Series	Table 7-6	ALWAYS
Equipment	General Equipment	Table 7-7	ALWAYS
Document	Key Object Document	Table 7-17	ALWAYS
	Document Content	Table 7-18	ALWAYS
	SOP Common	Table 7-8	ALWAYS

7.1.2.3   Common Modules

Table 7-3: Patient Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Obtained directly from referenced image	ALWAYS	AUTO
Patient ID	(0010,0020)	LO	Obtained directly from referenced image	ALWAYS	AUTO
Issuer of Patient ID	(0010,0021)	LO	Obtained directly from referenced image	VNAP	AUTO
Patient's Birth Date	(0010,0030)	DA	Obtained directly from referenced image	VNAP	AUTO
Patient's Sex	(0010,0040)	CS	Obtained directly from referenced image	VNAP	AUTO
Other Patient IDs	(0010,1000)	LO	Obtained directly from referenced image	VNAP	AUTO
Other Patient Names	(0010,1001)	PN	Obtained directly from referenced image	ANAP	AUTO
Ethnic Group	(0010,2160)	SH	Obtained directly from referenced image	VNAP	AUTO
Patient Comments	(0010,4000)	LT	Obtained directly from referenced image	VNAP	AUTO

Table 7-4: General Study Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	Obtained directly from referenced image	ALWAYS	AUTO
Study Date	(0008,0020)	DA	Obtained directly from referenced image	ALWAYS	AUTO
Study Time	(0008,0030)	TM	Obtained directly from referenced image	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	Obtained directly from referenced image	VNAP	AUTO
Study ID	(0020,0010)	SH	Obtained directly from referenced image	VNAP	AUTO
Accession Number	(0008,0050)	SH	Obtained directly from referenced image	VNAP	AUTO
Study Description	(0008,1030)	LO	Obtained directly from referenced image	ANAP	AUTO

Table 7-5: Patient Study Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Age	(0010,1010)	AS	Obtained directly from referenced image	ANAP	AUTO
Patient's Size	(0010,1020)	DS	Obtained directly from referenced image	ANAP	AUTO
Patient's Weight	(0010,1030)	DS	Obtained directly from referenced image	ANAP	AUTO

Table 7-6: General Series Module of Created SOP Instances

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Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	PR for Presentation States KO for key images notes	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by application	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by application	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ANAP	AUTO
Series Time	(0008,0031)	TM	<hhmmss>	ANAP	AUTO
Series Description	(0008,103E)	LO	PR: EMPTY KO: Attribute not present	ANAP	PS: USER
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	Obtained directly from referenced image	ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	Obtained directly from referenced image	ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Obtained directly from referenced image	ANAP	AUTO
Body Part Examined	(0018,0015)	CS	Obtained directly from referenced image	ANAP	AUTO

Table 7-7: General Equipment Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	KO: empty PR: AGFA	VNAP	AUTO

Table 7-8: SOP Common Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	Presentation State = 1.2.840.10008.5.1.4.1.1.11.1 Key Image Notes = 1.2.840.10008.5.1.4.1.1.88.59	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Created by application	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	Supported Character Sets listed in Chapter 4	ALWAYS	CONFIG
Instance Creation Date	(0008,0012)	DA	KO: <yyyymmdd>	ANAP	AUTO
Instance Creation Time	(0008,0013)	TM	KO: <hhmmss>	ANAP	AUTO
Instance Number	(0020,0013)	IS	Created by application	ALWAYS	AUTO

7.1.2.4   GSPS Modules

Table 7-9: Presentation Series Module of Created GSPS SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	PR	ALWAYS	AUTO
Softcopy VOI LUT Sequence	(0028,3110)	SQ	One or more items	VNAP	AUTO
>Referenced Image Sequence	(0008,1140)	SQ	Obtained directly from referenced image	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	From referenced image	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	From referenced image	ALWAYS	AUTO
>>Referenced Frame Number	(0008,1160)	IS	If referenced image is a multiframe image	ANAP	AUTO

Table 7-10: Presentation State Identification Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Presentation Creation Date	(0070,0082)	DA	<yyyymmdd>	ALWAYS	AUTO
Presentation Creation Time	(0070,0083)	TM	<hhmmss>	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	Generated by application	ALWAYS	AUTO
Presentation Label	(0070,0080)	CS	From user input	ALWAYS	USER
Presentation Description	(0070,0081)	LO	From user input	VNAP	USER
Presentation Creator's Name	(0070,0084)	PN	Generated by device according to currently active user	ALWAYS	AUTO
Referenced Series Sequence	(0008,1115)	SQ	One or more items	ALWAYS	AUTO
>Series Instance UID	(0020,000E)	UI	From referenced image	ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ	From referenced image	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	From referenced image	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	From referenced image	ALWAYS	AUTO
>>Referenced Frame Number	(0008,1160)	IS	If referenced image is a multiframe image	ANAP	AUTO
Shutter Presentation Value	(0018,1622)	US	Generated by device if shutter present	ANAP	AUTO

Table 7-11: Displayed Area Module of Created GSPS SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Displayed Area Selection Sequence	(0070,005A)	SQ	One or more items	ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ	One or more items	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	Obtained directly from referenced image	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	Obtained directly from referenced image	ALWAYS	AUTO
>>Referenced Frame Number	(0008,1160)	IS	If referenced image is a multiframe image	VNAP	AUTO

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Attribute Name	Tag	VR	Value	Presence of Value	Source
>Displayed Area Top Left Hand Corner	(0070,0052)	SL	From current display setting	ALWAYS	AUTO
>Displayed Area Bottom Right Hand Corner	(0070,0053)	SL	From current display setting	ALWAYS	AUTO
>Presentation Size Mode	(0070,0100)	CS	From current display setting	ALWAYS	AUTO
>Presentation Pixel Spacing	(0070,0101)	DS	From current display setting	ANAP	AUTO
>Presentation Pixel Aspect Ratio	(0070,0102)	IS	From current display setting	ANAP	AUTO
>Presentation Pixel Magnification Ratio	(0070,0103)	FL	From current display setting	ANAP	AUTO

Table 7-12: Graphic Annotation Module of Created GSPS SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Graphic Annotation Sequence	(0070,0001)	SQ	One or more items	ANAP	AUTO
>Referenced Image Sequence	(0008,1140)	SQ	One or more items	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	From referenced image	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	From referenced image	ALWAYS	AUTO
>>Referenced Frame Number	(0008,1160)	IS	If referenced image is a multiframe image	ANAP	AUTO
>Graphic Layer	(0070,0002)	CS	ROI	ALWAYS	AUTO
>Text Object Sequence	(0070,0008)	SQ	One or more Items	ANAP	AUTO
>>Anchor Point Annotation Units	(0070,0004)	CS	PIXEL	ALWAYS	AUTO
>>Unformatted Text Value	(0070,0006)	ST	From user Input or automatic generated from graphic object properties	ALWAYS	AUTO or USER
>>Bounding Box Text Horizontal Justification	(0070,0012)	CS	Input from the user	ALWAYS	USER
>>Anchor Point	(0070,0014)	FL	Input from the user	ALWAYS	USER
>>Anchor Point Visibility	(0070,0015)	CS	Input from the user	ALWAYS	USER
>Graphic Object Sequence	(0070,0009)	SQ	One or more Items	ANAP	AUTO
>>Graphic Annotation Units	(0070,0005)	CS	PIXEL	ALWAYS	AUTO
>>Graphic Dimensions	(0070,0020)	US	2	ALWAYS	AUTO
>>Number of Graphic Points	(0070,0021)	US	Input from the user	ALWAYS	USER
>> Graphic Data	(0070,0022)	FL	Input from the user	ALWAYS	USER

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Attribute Name	Tag	VR	Value	Presence of Value	Source
>>Graphic Type	(0070,0023)	CS	CIRCLE, POLYLINE or INTERPOLATED	ALWAYS	USER
>>Graphic Filled	(0070,0024)	CS	Y or N	ALWAYS	USER

Table 7-13: Spatial Transformation Module of Created GSPS SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Rotation	(0070,0042)	US	From current display setting	ALWAYS	AUTO
Image Horizontal Flip	(0070,0041)	CS	From current display setting	ALWAYS	AUTO

Table 7-14: Graphic Layer Module of Created GSPS SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Graphic Layer Sequence	(0070,0060)	SQ	One or more items	ANAP	AUTO
>Graphic Layer	(0070,0002)	CS	ROI	ALWAYS	AUTO
>Graphic Layer Order	(0070,0062)	IS	From current display setting	ALWAYS	AUTO
>Graphic Layer Recommended Display Grayscale Value	(0070,0066)	US	<xxxxx> From 0000H(black) to FFFFH(white)	ANAP	AUTO
>Graphic Layer Recommended Display CIELab Value	(0070,0401)	US	<xxxxx\xxxxx\xxxxx> From 0000H(black) to FFFFH(white)	ANAP	AUTO

Table 7-15: Softcopy VOI LUT Module of Created GSPS SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Softcopy VOI LUT Sequence	(0028,3110)	SQ	One or more items	ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ	One or more items	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	From referenced image	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	From referenced image	ALWAYS	AUTO
>>Referenced Frame Number	(0008,1160)	IS	If referenced image is a multiframe image	ANAP	AUTO
>Window Center	(0028,1050)	DS	From current display setting	ALWAYS	AUTO
>Window Width	(0028,1051)	DS	From current display setting	ALWAYS	AUTO
> WindowCenter WidthExplanation	(0028,1055)	LO	From current display settings	ALWAYS	AUTO
VOI LUT Sequence	(0028,3010)	SQ	One or more Items	ANAP	AUTO
>LUT Descriptor	(0028,3002)	US/SS	From current display settings	ANAP	AUTO
>LUT Data	(0028,3006)	OW	From current display settings	ANAP	AUTO

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Table 7-16: Softcopy Presentation LUT Module of Created GSPS SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Presentation LUT Shape	(2050,0020)	CS	INVERSE, IDENTITY	ALWAYS	AUTO

7.1.2.5   Flags and Sessions Modules

Table 7-17: Key Object Document Module Key Image Note SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by application	ALWAYS	AUTO
Content Date	(0008,0023)	DA	<yyyymmdd>	ANAP	AUTO
Content Time	(0008,0033)	TM	<hhmmss>	ANAP	AUTO
Current Requested Procedure Evidence Sequence	(0040,A375)	SQ	One or more items	ALWAYS	AUTO
>Study Instance UID	(0020,000D)	UI	Obtained from referenced image/s	ALWAYS	AUTO
>Referenced Series Sequence	(0008,1115)	SQ	One or more items	ALWAYS	AUTO
>>Series Instance UID	(0020,000E)	UI	Obtained from referenced image/s	ALWAYS	AUTO
>>Referenced SOP Sequence	(0008,1199)	SQ	One or more items	ALWAYS	AUTO
>>>Referenced SOP Class UID	(0008,1150)	UI	Obtained from referenced image/s	ALWAYS	AUTO
>>>Referenced SOP Instance UID	(0008,1155)	UI	Obtained from referenced image/s	ALWAYS	AUTO

Table 7-18 : Key Object Document Content Module of Created Sessions and Flags SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	CS	Generated by Application	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	Generated by application	ALWAYS	AUTO
Content Date	(0008,0023)	DA	<yyyymmdd>	ANAP	AUTO
Content Time	(0008,0033)	TM	<hhmmss>	ANAP	AUTO
Concept Name Code Sequence	(0040,A043)	SQ	One or more Items	ALWAYS	AUTO
> Code Value	(0008,0100)	SH	Generated by Application	ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	Generated by Application	ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO	For Sessions : Key Object Description	ANAP	AUTO
Content Sequence	(0040,A730)	SQ	Some Items	ALWAYS	AUTO
>Relationship Type	(0040,A010)	CS	CONTAINS	ALWAYS	AUTO
>Value Type	(0040,A040)	CS	TEXT or IMAGE	ALWAYS	AUTO
>Referenced SOP Sequence	(0008,1199)	SQ	Two or more items	ALWAYS	AUTO

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Attribute Name	Tag	VR	Value	Presence of Value	Source
>Referenced SOP Class UID	(0008,1150)	UI	Obtained from referenced image/s	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Obtained from referenced image/s	ALWAYS	AUTO

7.1.3   CM

7.1.3.1   Encapsulated Portable Document Format Objects

Table 7-19 defines the IOD of the encapsulated portable document format objects for diagnostic report content.

Table 7-19: IOD of Encapsulated Portable Document Format Objects

IE	Module	Reference	Presence of Module
Patient	Patient	Table 7-3	ALWAYS
Study	General Study	Table 7-4	ALWAYS
	Patient Study	Table 7-5	ALWAYS
Series	General Series	Table 7-6	ALWAYS
Equipment	General Equipment	Table 7-7	ALWAYS
Encapsulated Document	SOP Common	Table 7-8	ALWAYS
	Encapsulated Document	Table 7-22	ALWAYS

7.1.3.2   Basic Text Structured Report

Table 7-20 defines the IOD of the basic text structured report objects for diagnostic report content.

Table 7-20: IOD of Plain Text Structured Reports

IE	Module	Reference	Presence of Module
Patient	Patient	Table 7-3	ALWAYS
Study	General Study	Table 7-4	ALWAYS
	Patient Study	Table 7-5	ALWAYS
Series	General Series	Table 7-6	ALWAYS
Equipment	General Equipment	Table 7-7	ALWAYS
Document	SOP Common	Table 7-8	ALWAYS
	SR Document General	Table 7-21	ALWAYS
	SR Document Content	Table 7-23	ALWAYS

Table 7-21: SR Document General of Created SOP Instances

Attribute	DICOM Tag	VR	Value	Presence of Value	Source
Referring Physician Sequence	(0008,0096)	SQ		ALWAYS	AUTO
>Institution Name	(0008,0080)	LO	Original order request.	ALWAYS	MWL
>Person ID Sequence	(0040,1101)	SQ		ALWAYS	MWL
>>Code Value	(0008,0100)	SH	Original order request.	ALWAYS	MWL

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Attribute	DICOM Tag	VR	Value	Presence of Value	Source
>>Coding Scheme Designator	(0008,0102)	SH	Issuer of person ID from original request.	ALWAYS	MWL
>>Code Meaning	(0008,0104)	LO	Referring Physician ID	ALWAYS	MWL
Referenced Study Component Sequence	(0008,1111)	SQ		ALWAYS	MWL
>Referenced SOP Class UID	(0008,1150)	UI	SOP class of object. For Plain Text SR: 1.2.840.10008.5.1.4.1.1.88.11 For Encapsulated PDF: 1.2.840.10008.5.1.4.1.1.104.1	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance of the object.	ALWAYS	AUTO

Table 7-22: Encapsulated Document Module of Created SOP Instances

Attribute	DICOM Tag	VR	Value	Presence of Value	Source
Referring Physician Sequence	(0008,0096)	SQ		ALWAYS	AUTO
>Institution Name	(0008,0080)	LO	Original order request.	ALWAYS	MWL
>Person ID Sequence	(0040,1101)	SQ		ALWAYS	MWL
>>Code Value	(0008,0100)	SH	Original order request.	ALWAYS	MWL
>>Coding Scheme Designator	(0008,0102)	SH	Issuer of person ID from original request.	ALWAYS	MWL
>>Code Meaning	(0008,0104)	LO	Referring Physician ID	ALWAYS	MWL
Referenced Study Component Sequence	(0008,1111)	SQ		ALWAYS	MWL
>Referenced SOP Class UID	(0008,1150)	UI	SOP class of object. For Plain Text SR: 1.2.840.10008.5.1.4.1.1.88.11 For Encapsulated PDF: 1.2.840.10008.5.1.4.1.1.104.1	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance of the object.	ALWAYS	AUTO
Acquisition Date Time	(0008,002A)	DT	Date time of report content creation as found in HL7 message. If not present, date and time of DICOM object creation will be used.	ALWAYS	AUTO
Conversion Type	(0008,002A)	CS	WSD	ALWAYS	AUTO
Manufacturer	(0008,0070)	LO	AGFA	ALWAYS	AUTO
Secondary Capture Device ID	(0018,1010)	LO	UID of device associated with HL7 RIS feed.	ALWAYS	AUTO
Secondary Capture Device Manufacturer	(0018,1016)	LO	Agfa Healthcare	ALWAYS	AUTO
Secondary Capture Device Manufacturer Model Name	(0018,1018)	LO	Device name associated with HL7 RIS feed.	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	NO	ALWAYS	AUTO
Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>Code Value	(0008,0100)	SH	18748-4	ALWAYS	AUTO

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Attribute	DICOM Tag	VR	Value	Presence of Value	Source
>Coding Scheme Designator	(0008,0102)	SH	LN	ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO	Diagnostic Imaging Report	ALWAYS	AUTO
Document Title	(0042,0010)	ST	- Diagnostic Report"	ALWAYS	AUTO
Encapsulated Document	(0042,0011)	OB	PDF content	ALWAYS	USER
MIME Type of Encapsulated Document	(0042,0012)	LO	application/pdf	ALWAYS	AUTO

Table 7-23: SR Document Content Module of Created SOP Instances

Attribute	DICOM Tag	VR	Value	Presence of Value	Source
Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>Code Value	(0008,0100)	SH	18748-4	ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	LN	ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO	Diagnostic Imaging Report	ALWAYS	AUTO
Continuity of Content	(0040,A050)	CS	CONTINUOUS	ALWAYS	AUTO
Verifying Observer Sequence	(0040,A073)	SQ		ALWAYS	AUTO
>Verifying Organization	(0040,A027)	LO	Modality Worklist	ALWAYS	AUTO
>Verification Date Time	(0040,A030)	DT	Modality Worklist	ALWAYS	AUTO
>Verifying Observer Name	(0040,A075)	PN	Modality Worklist	ALWAYS	AUTO
Predecessor Documents Sequence	(0040,A360)	SQ		ANAP	AUTO
>Referenced Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
>>Referenced SOP Sequence	(0008,1199)	SQ		ALWAYS	AUTO
>>>Referenced SOP Class UID	(0008,1150)	UI	SOP Class of document that qualifies as a predecessor. If the predecessor is a Plain Text SR, the value will be: 1.2.840.10008.5.1.4.1.1.88.11	ALWAYS	AUTO
>>>Referenced SOP Instance UID	(0008,1155)	UI	SOP instance of predecessor document.	ALWAYS	AUTO
>>Series Instance UID	(0020,000E)	UI	Series instance of the series that contains the predecessor document.	ALWAYS	AUTO
>Study Instance UID	(0020,000D)	UI	Study instances of the study that contains the predecessor document.	ALWAYS	AUTO
Referenced Request Sequence	(0040,A370)	SQ		ALWAYS	AUTO
>Accession Number	(0008,0050)	SH	Modality Worklist	ALWAYS	MWL
>Referenced Study Sequence	(0008,1110)	SQ		ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.1.4.1.1.88.11	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance of the object.	ALWAYS	AUTO
>Study Instance UID	(0020,000D)	UI	Modality Worklist	ALWAYS	MWL
>Requested Procedure Description	(0032,1060)	LO	Modality Worklist	ALWAYS	MWL
>Requested Procedure Code Sequence	(0032,1064)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	Modality Worklist	ALWAYS	MWL
>>Coding Scheme Designator	(0008,0102)	SH	Modality Worklist	ALWAYS	AUTO
>Requested Procedure ID	(0040,1001)	SH	Modality Worklist	ALWAYS	MWL
>Placer Ordering Number Imaging Service Request	(0040,2016)	SH	Modality Worklist	ALWAYS	MWL

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Attribute	DICOM Tag	VR	Value	Presence of Value	Source
>Filler Ordering Number Imaging Service Request	(0040,2017)	SH	Modality Worklist	ALWAYS	MWL
Performed Procedure Code Sequence	(0004,A372)	SQ		ALWAYS	AUTO
Completion Flag	(0040,A491)	CS	COMPLETE	ALWAYS	AUTO
Verification Flag	(0040,A493)	CS	VERIFIED	ALWAYS	AUTO
Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO
Item #1					
>Relationship Type	(0040,A010)	CS	HAS CONCEPT MOD	ALWAYS	AUTO
>Value Type	(0040,A040)	CS	CODE	ALWAYS	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121049	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Language of Content Item and Descendants	ALWAYS	AUTO
>Concept Code Sequence	(0040,A168)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	eng	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	RFC3066	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	English	ALWAYS	AUTO
Item #2					
>Relationship Type	(0040,A010)	CS	HAS OBS CONTEXT	ALWAYS	AUTO
>Value Type	(0040,A040)	CS	CODE	ALWAYS	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121005	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Observer Type	ALWAYS	AUTO
>Concept Code Sequence	(0040,A168)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121006	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Person	ALWAYS	AUTO
Item #3					
>Relationship Type	(0040,A010)	CS	HAS OBS CONTEXT	ALWAYS	AUTO
>Value Type	(0040,A040)	CS	CODE	ALWAYS	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121097	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Person Observer's Role in this Procedure	ALWAYS	AUTO
>Concept Code Sequence	(0040,A168)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121097	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Recording	ALWAYS	AUTO
Item #4					
>Relationship Type	(0040,A010)	CS	CONTAINS	ALWAYS	AUTO
>Value Type	(0040,A040)	CS	CONTAINER	ALWAYS	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121064	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Current Procedure Description	ALWAYS	AUTO

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Attribute	DICOM Tag	VR	Value	Presence of Value	Source
>Continuity of Content	(0040,A050)	CS	CONTINUOUS	ALWAYS	AUTO
>Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO
>>Relationship Type	(0040,A010)	CS	CONTAINS	ALWAYS	AUTO
>>Value Type	(0040,A040)	CS	TEXT	ALWAYS	AUTO
>>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>>Code Value	(0008,0100)	SH	121065	ALWAYS	AUTO
>>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>>Code Meaning	(0008,0104)	LO	Procedure Description	ALWAYS	AUTO
>>Text Value	(0040,A160)	UT	Procedure Description from original order.	ALWAYS	MWL
Item #5					
>Relationship Type	(0040,A010)	CS	CONTAINS	ALWAYS	AUTO
>Value Type	(0040,A040)	CS	CONTAINER	ALWAYS	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121070	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Findings	ALWAYS	AUTO
>Continuity of Content	(0040,A050)	CS	CONTINUOUS	ALWAYS	AUTO
>Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO
>>Relationship Type	(0040,A010)	CS	CONTAINS	ALWAYS	AUTO
>>Value Type	(0040,A040)	CS	TEXT	ALWAYS	AUTO
>>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>>Code Value	(0008,0100)	SH	121071	ALWAYS	AUTO
>>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>>Code Meaning	(0008,0104)	LO	Finding	ALWAYS	AUTO
>>Text Value	(0040,A160)	UT	Report findings from report message.	ALWAYS	MWL
Item #6					
>Relationship Type	(0040,A010)	CS	CONTAINS	ALWAYS	AUTO
>Value Type	(0040,A040)	CS	CONTAINER	ALWAYS	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121072	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Impressions	ALWAYS	AUTO
>Continuity of Content	(0040,A050)	CS	CONTINUOUS	ALWAYS	AUTO
>Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO
>>Relationship Type	(0040,A010)	CS	CONTAINS	ALWAYS	AUTO
>>Value Type	(0040,A040)	CS	TEXT	ALWAYS	AUTO
>>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>>Code Value	(0008,0100)	SH	121073	ALWAYS	AUTO
>>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>>Code Meaning	(0008,0104)	LO	Impression	ALWAYS	AUTO
>>Text Value	(0040,A160)	UT	Report from report message.	ALWAYS	MWL

7.1.4   CWP

The abbreviations used for the 'Usage'-column in the tables are:

- Always – included with the full set of values.

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- Never – not included
- Auto – included with pre-defined, automatically filled values.

7.1.4.1 XC – VL Photographic Image IOD

Table 7-24: IOD of XC – VL Photographic Image SOP Instances

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	Always
	Clinical Trial Subject	C.7.1.3	Never
Study	General Study	C.7.2.1	Always
	Patient Study	C.7.2.2	Never
	Clinical Trial Study	C.7.2.3	Never
Equipment	General Equipment	C.7.5.1	Auto
Image	General Image	C.7.6.1	Auto
	Image Pixel	C.7.6.3	Always
	Acquisition Context	C.7.6.14	Auto
	Device	C.7.6.12	Never
	Specimen	C.7.6.22	Never
	VL Image	C.8.12.1	Auto
	Overlay Plane	C.9.2	Never
	ICC Profile	C.11.15	Never
	SOP Common	C.12.1	Auto

7.1.4.2 XC – Video Photographic Image IOD

Table 7-25: IOD of XC - Video Photographic Image SOP Instances

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	Always
	Clinical Trial Subject	C.7.1.3	Never
Study	General Study	C.7.2.1	Always
	Patient Study	C.7.2.2	Never
	Clinical Trial Study	C.7.2.3	Never
Equipment	General Equipment	C.7.5.1	Auto
Image	General Image	C.7.6.1	Auto
	Cine	C.7.6.5	Always
	Multi-frame	C.7.6.6	Always
	Image Pixel	C.7.6.3	Always
	Acquisition Context	C.7.6.14	Auto
	Specimen	C.7.6.22	Never
	VL Image	C.8.12.1	Auto
	Device	C.7.6.12	Never
	ICC Profile	C.11.15	Never
	SOP Common	C.12.1	Auto

7.1.4.3 SR or ECG – Encapsulated PDF

Table 7-26: IOD of SR or ECG – Encapsulated PDF SOP Instances

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IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	Always
	Clinical Trial Subject	C.7.1.3	Never
Study	General Study	C.7.2.1	Always
	Patient Study	C.7.2.2	Never
	Clinical Trial Study	C.7.2.3	Never
Series	Encapsulated Document Series	C.24.1	Always
Equipment	General Equipment	C.7.5.1	Auto
Encapsulated Document	Encapsulated Document	C.24.2	Always
	SOP Common	C.12.1	Auto

7.1.4.4   AU – General Audio Waveform

Table 7-27: IOD of General Audio Waveform SOP Instances

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	Always
	Clinical Trial Subject	C.7.1.3	Never
Study	General Study	C.7.2.1	Always
	Patient Study	C.7.2.2	Never
	Clinical Trial Study	C.7.2.3	Never
Series	General Series	C.7.3.1	Always
	Clinical Trial Series	C.7.3.2	Never
Equipment	General Equipment	C.7.5.1	Auto
Waveform	Waveform Identification	C.10.8	Auto
	Waveform	C.10.9	Always
	Acquisition Context	C.7.6.14	Auto
	Waveform Annotation	C.10.10	Never
	SOP Common	C.12.1	Auto

7.1.4.5   DOC – RAW Data (Encapsulated)

This SOP Class is used for storing RAW Data. The specification species that private tags are required to store the data. In this case, the data is simply stored as an encapsulated any document type (except PDF/CDA, stored by itself) rather than creating new tags. The Modality is always DOC.

This type can be retrieved from the data services, and will default to the content type in the document itself.

Table 7-28: IOD of DOC – RAW Data (Encapsulated) SOP Instances

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	Always
	Clinical Trial Subject	C.7.1.3	Never
Study	General Study	C.7.2.1	Always

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IE	Module	Reference	Usage
	Patient Study	C.7.2.2	Never
	Clinical Trial Study	C.7.2.3	Never
Series	Encapsulated Document Series	C.24.1	Always
Equipment	General Equipment	C.7.5.1	Auto
Encapsulated Document	Encapsulated Document	C.24.2	Always
	SOP Common	C.12.1	Auto

7.2 Usage of Attributes from Received IOD's

7.2.1 CSP

No SOP Class specific fields for images are required.

7.2.2 CWP

No SOP Class specific fields for images are required, although for best display, the following fields are recommended (this is not an exhaustive list of attributes used, but includes the ones which significantly affect display)

- Modality – used to select tools and options available

- View Code Sequence – for MG used to display/regroup by view type

- Instance Number – used for multiframes to split/group multiframes belonging to the same multiframe sequence but split into two or more objects for size reasons

- Echo Number – used to split MR series by echo

- Number of Frames – required to organize and figure out how many images are to be displayed in the client

- Window Center/Width – used to specify the initial window level

- LUTs – applied against the image to display the image with the correct appearance

- Pixel Spacing (or the related ERMF attributes), used to display true size and for measurements

- Slice Thickness – used to hide thin slice data

- Image Type – used to hide 'For Processing' images

- Echo Time – for MR is required if the series is to be split by echo time values.

- Pixel Padding – for MG if the mask is to be shown in black around the breast.

7.3 Attribute Mapping

Not applicable.

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7.4   Coerced/Modified fields

7.4.1   CSP

Attribute coercion is configurable for IOD's received by the Storage Server. Attributes can either be mapped or may be filled with "fixed values" depending on the existence or the content(s) of one or more other Attributes.

Patient Information, Patient Demographics and Study Information will be updated automatically by information received from HIS/RIS based upon corresponding patient and order information.

The coerced/modified Attribute values are provided when a remote Query/Retrieve SCU queries information or when SOP Instances are sent to a remote Storage SCP. Attribute Coercion will be indicated in the appropriate Service Response Status.

7.4.2   CWP

No attributes are coerced/modified, except that all patient, study and series level attributes in C-Move stored objects are co-erced to the values found at the time of display from a C-Find. Thus, updates to patient information will be done via the C-Find request.

7.5   Data Dictionary of Private Attributes

No private attributes are defined for the purposes of external interaction with DICOM devices. Some attributes are defined/used internally.

7.6   Coded Terminology and Templates

7.6.1   CSP

The value for Code Meaning will be displayed for all code sequences. No local lexicon is provided to look up alternative code meanings.

7.6.2   CWP

The value for Code Meaning will be displayed for all code sequences. A local lexicon is used based on the code value, and if present will replace the code meaning. A standard set of lexicons is provided for the supported languages.

7.7   Grayscale Image Consistency

The high resolution display monitor attached to the product can be calibrated according to the Grayscale Standard Display Function (GSDF).

All attached XERO Viewer client systems are sent data for calibrated GSDF monitors. There are options for specifying monitor calibration for a limited set of devices, including the Apple iPad 3, for a limited set of standard lighting conditions; otherwise the images are sent assuming a calibrated NEMA monitor. A calibration pattern is provided.

7.8   Standard Extended/Specialized/Private SOP Classes

Enterprise Imaging supports the following private SOP classes:

- Mitra linked database query (1.2.124.113532.5.1.1.1.3)
- Dcm4che StudyRoot FIND (1.2.40.0.13.1.5.1.4.1.2.2.1)
- Dcm4che Blocked StudyRoot FIND (1.2.40.0.13.1.5.1.4.1.2.2.1.1)

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7.9   Private Transfer Syntaxes

None.