# COMMVAULT®

# Commvault Clinical Image Archiving

*DICOM Conformance Statement*

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# ▶ Introduction

## Purpose and Intended Audience of this Document

This document specifies the conformance of Commvault Systems Clinical Image Archiving solution for version 11.0 to the DICOM 3.0 standard. Clinical Image Archiving is an open system architecture using a Windows platform to provide transport, storage, tracking, and retrieving of digital medical images across an entire storage system network that is both collaborative and extensible. This document covers conformance for the following:

- **Verification Service Class** (DICOM 3.4A) - verifies application level communication between peer DICOM AEs.
- **Storage Service Class** (DICOM 3.4B) - providing long-term storage and retrieval of all DICOM V3.0 objects, designed for performance, scalability, and reliability.
- **Query and Retrieve Service Class** (DICOM 3.4C) – The DICOM Server receives DICOM Query and Retrieve request from DICOM devices. The request can look at the local DICOM Server database(s) and/or other DICOM device(s) for matches to the Query or Retrieve request and return an integrated response to the requesting DICOM device.
- **Procedure Step Service Class** (DICOM 3.4F) – handles processing of procedure step
- **Storage Commitment Service Class** (DICOM 3.4J) – The DICOM Server receives DICOM Storage Commitment request from DICOM devices. The DICOM Server returns responses indicating all objects that were found and not found.
- **Prefetcher** - an application that moves DICOM objects on the network in a predictive manner to facilitate access by real world entities.

## Related Documents

- NEMA 2015  The DICOM Standard: Parts 1 - 14.

## 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:

- ACR American College of Radiology
- AE:  DICOM Application Entity
- AET:  Application Entity Title
- ANSI American National Standards Institute
- ASCII American Standard Code for Information Interchange
- CDS Clinical Decision Support
- CEN TC251 Comité Européen de Normalisation -Technical Committee 251 - Medical Informatics
- Chest CAD Computer-Aided Detection and/or Computer-Aided Diagnosis for chest radiography
- Combined Print Image: a pixel matrix created by superimposing an image and an overlay
- DICOM: Digital Imaging and Communications in Medicine
- DICOM Application Model: an Entity-Relationship diagram used to model the relationships between Real-World Objects

- DICOM Information Model: an Entity-Relationship diagram that is used to model the relationships between the Information Object Definitions representing classes of Real-World Objects defined by the DICOM Application Model.
- DIMSE:  DICOM Message Service Element
- DIMSE-C DICOM Message Service Element-Composite
- DIMSE-N DICOM Message Service Element-Normalized
- GSDF:  Grayscale Standard Display Function
- HIS/RIS:  Hospital Information System / Radiology Information System.
- HL7 Health Level 7
- IE Information Entity
- IHE:  Integrating the Healthcare Enterprise
- IHE-TF:  Integrating the Healthcare Enterprise Technical Framework
- IAN:  Instance Availability Notification
- IOD:  Information Object Definition ISO:  International Standard Organization PDU:  DICOM Protocol Data Unit
- OSI Open Systems Interconnection
- JPIP JPEG 2000 Interactive Protocol
- LUT:  Look-up Table
- MAR Medication Administration Record
- MPPS:  Modality Performed Procedure Step
- MWL:  Modality Worklist
- P-LUT: Presentation Look-up Table
- Q/R:  Query Retrieve
- Presentation Context: A Presentation Context may be considered as a negotiated "sub-channel" with a DICOM Association through which the Application Entities have agreed to exchange information.  A proposed presentation context consists of:  A presentation context ID (an odd integer < = 255 unique within the association), a SOP_Class or Meta_SOP_Class, and a list of proposed Transfer_Syntaxes.  This is considered by the requesting Application_Entity which either rejects it completely or accepts, in which case the list of proposed transfer syntaxes is replaced by a single accepted transfer syntax which is then used for all communications using that presentation context.  Such subsequent communications only quote the presentation context ID, and so applications must retain copy of the agreed information in order to determine the SOP class and transfer syntax used.
- Real-World Activity: that which exists in the real world - represented by computer information metaphors called SOP Classes.
- Real-World Object: that which exists in the real world - represented through a computer information metaphor called a SOP Instance.
- Service Class Provider: the role played by a DICOM Application Entity (DIMSE-Service-User) that performs operations and invokes notifications on a specific Association.
- Service Class User: the role played by a DICOM Application Entity (DIMSE-Service-User) that invokes operations and performs notifications on a specific Association.
- Service Class: a collection of SOP Classes and/or Meta SOP Classes that are related in that they are described together to accomplish a single application.
- SCN:  Study Content Notification
- SOP:  DICOM Service-Object Pair
- TCP/IP:  Transmission Control Protocol/Internet Protocol

- TLS:  Transport Layer Security
- UID: Unique Identifier
- VR:  Value Representation

# ▶ Implementation Model

## DICOM Server

Clinical Image Archiving allows for the storage and retrieval of DICOM objects. Additionally, it allows for the querying of information about the DICOM objects that have been stored to it. Administration is accomplished using a remote administrative application.

### Application Data Flow Diagram
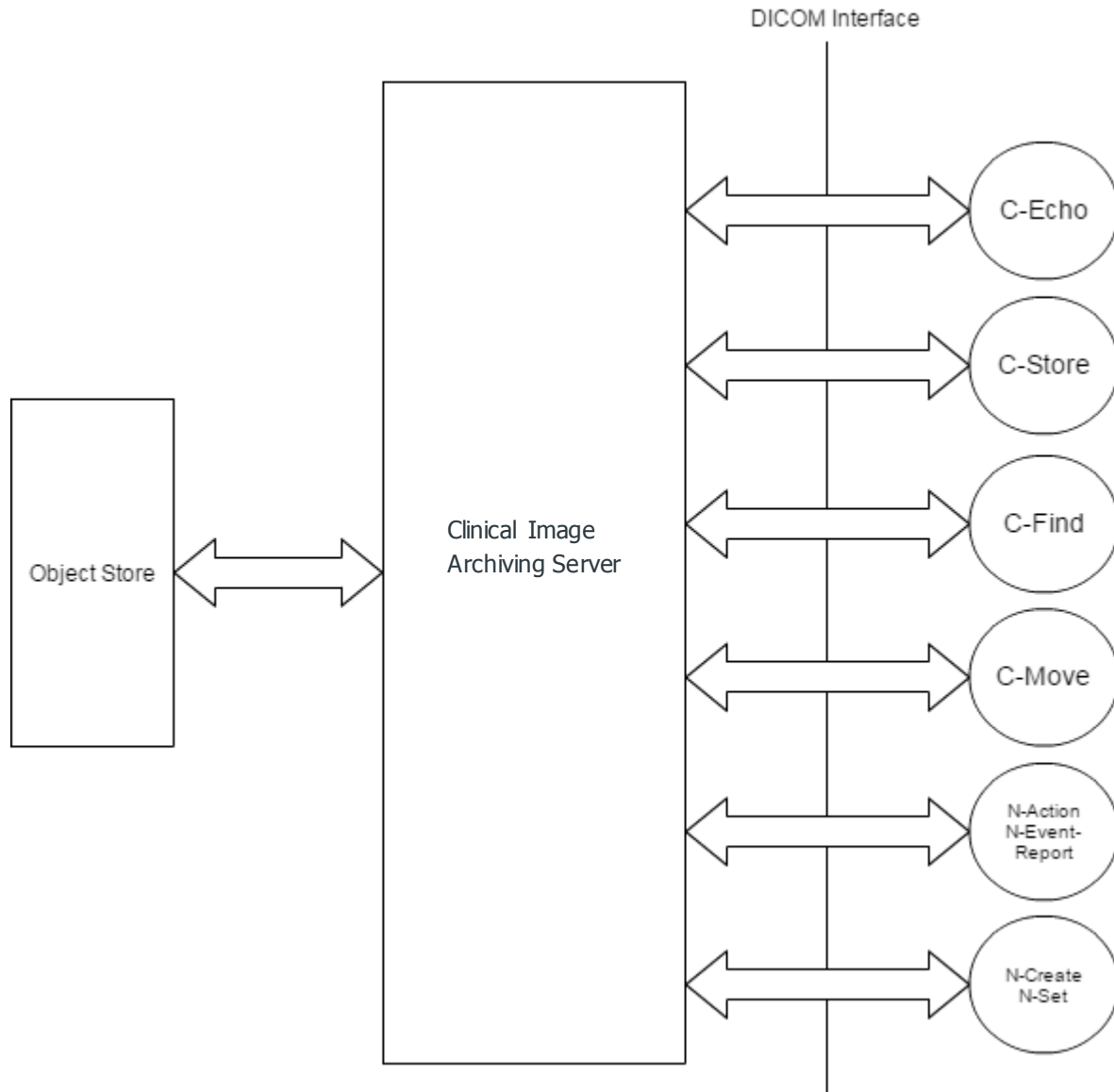
## Functional Definition

The DICOM Server waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, the archive expects it to be a DICOM application. The archive will accept associations with Presentation Contexts for the following Service Classes:

- Verification Service Class
- Storage Service Class
- Storage Commitment Service Class
- Query/Retrieve Service Class

The archive will receive objects/requests. When it receives an object, it stores that object and build its metadata on ObjectStore. When a request is received it is processed accordingly. If the request is a retrieve request, the archive will locate the object in ObjectStore, retrieve the object from the file system in which it is stored, establish an association with the application to receive the object, and send the object across that association. If the request is a query, the archive will simply perform the query on ObjectStore and return the results.

# Performed Procedure Step Manager

The PPS Manager is a system that re-distributes the Modality Performed Procedure Step information from the Acquisition Modality or Evidence Creator to the Department System Scheduler/Order Filler, Image Manager and Report Manager.

## Application Data Flow Diagram
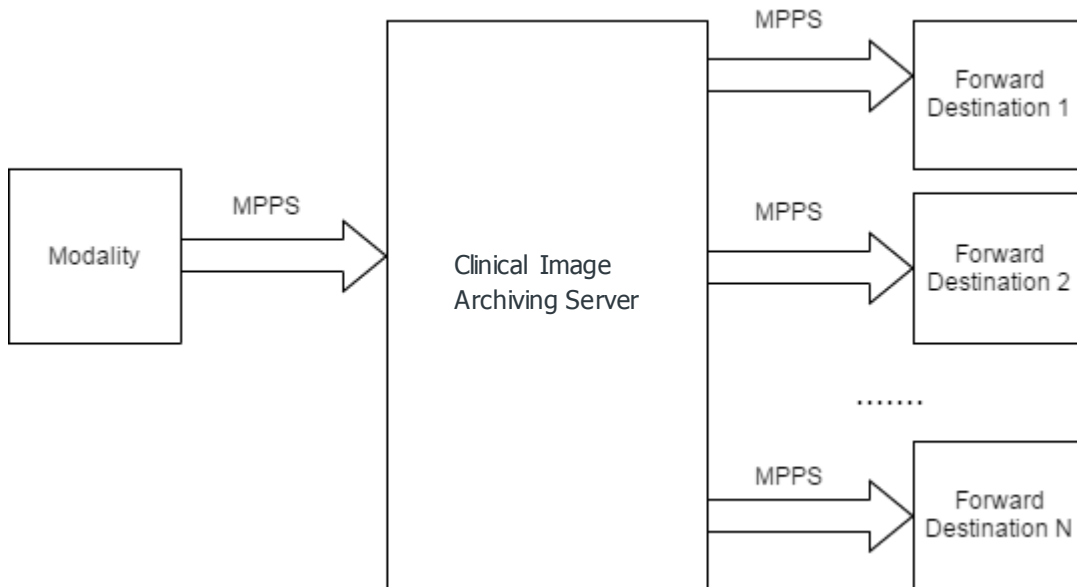
## Functional Definition

The PPS Manager provides a Modality Performed Procedure Step SCP that accepts N-Create and N-Set primitive requests to provide attribute values for a specific Modality Performed Procedure Step SOP Instance.

Based on configuration, the PPS Manager issues N-Create and N-Set request primitive to multiple forward destinations to forward those attribute values.

# Prefetcher

The Prefetcher moves images on the network in a predictive manner to facilitate access by real world entities. Administration is accomplished using a remote administrative application

## Application Data Flow Diagram
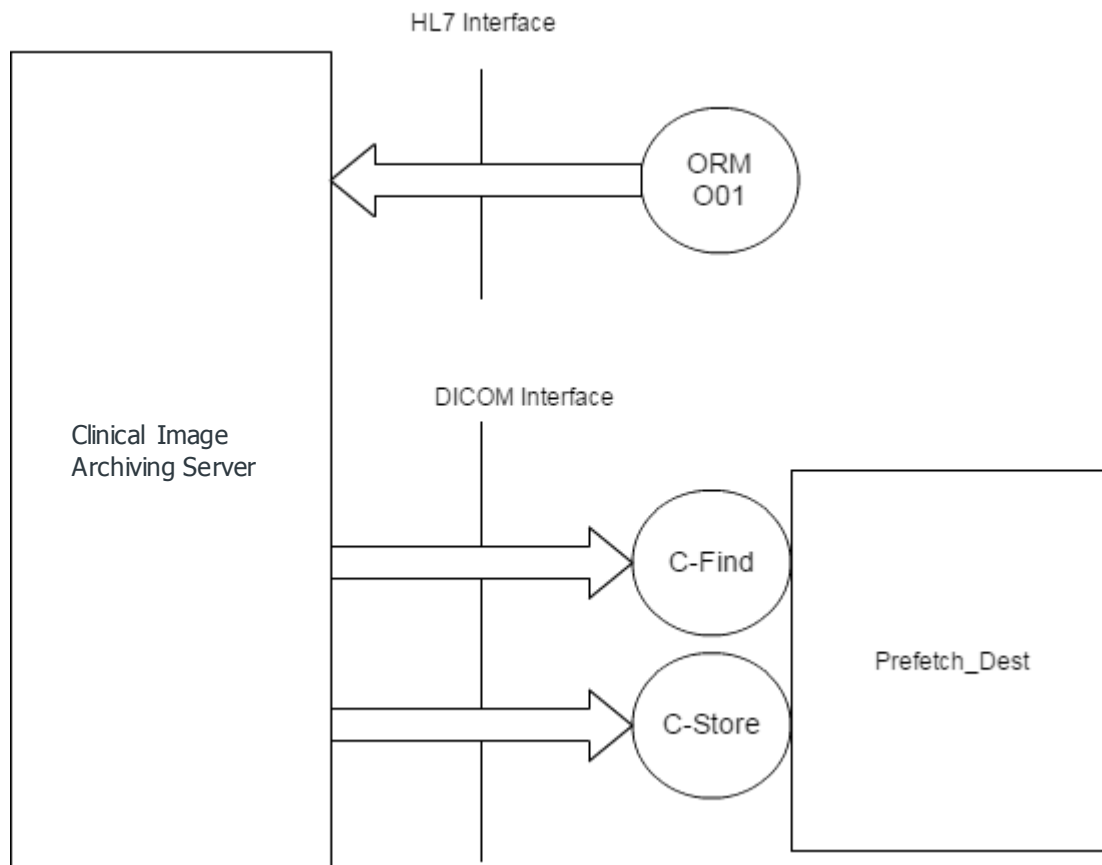


## Functional Definition

The Prefetcher provides no services to clients in the typical client server sense. It is purely a 'listener' to the environment, and performs moves as a result of what it hears.

- **HL7 ORM O01** - receive as prefetching trigger.
- **C-FIND SCU** - query the prefetch destination for those studies that already exist. AE title has to be "Prefetch_Dest".
- **C-STORE SCU** – store those related studies that not yet pushed to the configured destination. AE title has to be "Prefetch_Dest".

### Sequencing of Real World Activities

The Prefetcher 'listens' for events in the environment that trigger prefetching rules. These rules can query DICOM network devices, as well as initiate move requests for DICOM objects to and from remote DICOM devices.

The Prefetcher receives events and executes custom rules for those events. Those rules can perform matching against database in an effort to find prior studies that the rule deems important. Those prior studies are scheduled to be moved at some point in the future. When it is time for a set of priors to be moved, the Prefetcher will make a C-Store to the prefech destination. All moves will begin as study level operations.

# ▶ AE Specifications

## DICOM Server Specification

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU and/or SCP (as indicated in the table):

| SOP Class Name | SOP Class UID | SCU/SCP |
|---|---|---|
| **Verification** | | |
| **Verification** | 1.2.840.10008.1.1 | N / Y |
| **Storage** | | |
| **12-lead ECG Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.1.1 | Y / Y |
| **Ambulatory ECG Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.1.3 | Y / Y |
| **Arterial Pulse Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.5.1 | Y / Y |
| **Autorefraction Measurements Storage** | 1.2.840.10008.5.1.4.1.1.78.2 | Y / Y |
| **Basic Attribute Presentation State** | 1.2.124.113532.3500.7 | Y / Y |
| **Basic Film Session SOP Class** | 1.2.840.10008.5.1.1.1 | Y / Y |
| **Basic Film Box SOP Class** | 1.2.840.10008.5.1.1.2 | Y / Y |
| **Basic Grayscale Image Box SOP Class** | 1.2.840.10008.5.1.1.4 | Y / Y |
| **Basic Grayscale Print Management** | 1.2.840.10008.5.1.1.9 | Y / Y |

| Meta SOP Class | | |
|---|---|---|
| **Basic Structured Display Storage** | 1.2.840.10008.5.1.4.1.1.131 | Y / Y |
| **Basic Text SR Storage** | 1.2.840.10008.5.1.4.1.1.88.11 | Y / Y |
| **Basic Text SR Storage** | 1.2.840.10008.5.1.4.1.1.88.1 | Y / Y |
| **Basic Voice Audio Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.4.1 | Y / Y |
| **Blending Softcopy Presentation State Storage** | 1.2.840.10008.5.1.4.1.1.11.4 | Y / Y |
| **Breast Tomosynthesis Image Storage** | 1.2.840.10008.5.1.4.1.1.13.1.3 | Y / Y |
| **Cardiac Electrophysiology Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.3.1 | Y / Y |
| **Chest CAD SR Storage** | 1.2.840.10008.5.1.4.1.1.88.65 | Y / Y |
| **Color Softcopy Presentation State Storage** | 1.2.840.10008.5.1.4.1.1.11.2 | Y / Y |
| **Color Palette Storage** | 1.2.840.10008.5.1.4.39.1 | Y / Y |
| **Colon CAD SR Storage** | 1.2.840.10008.5.1.4.1.1.88.69 | Y / Y |
| **Comprehensive SR Storage** | 1.2.840.10008.5.1.4.1.1.88.33 | Y / Y |
| **Computed Radiography Image Storage** | 1.2.840.10008.5.1.4.1.1.1 | Y / Y |
| **CT Image Storage** | 1.2.840.10008.5.1.4.1.1.2 | Y / Y |
| **CT Image Storage (DICOS)** | 1.2.840.10008.5.1.4.1.1.501.1 | Y / Y |
| **Deformable Spatial Registration Storage** | 1.2.840.10008.5.1.4.1.1.66.3 | Y / Y |
| **Detail SR Storage - Trial (Retired)** | 1.2.840.10008.5.1.4.1.1.88.3 | Y / Y |
| **Digital Intra-oral X-Ray Image Storage(Presentation)** | 1.2.840.10008.5.1.4.1.1.1.3 | Y / Y |
| **Digital Intra-oral X-Ray Image Storage (Processing)** | 1.2.840.10008.5.1.4.1.1.1.3.1 | Y / Y |
| **Digital Mammography Image Storage (Presentation)** | 1.2.840.10008.5.1.4.1.1.1.2 | Y / Y |
| **Digital Mammography Image Storage (Processing)** | 1.2.840.10008.5.1.4.1.1.1.2.1 | Y / Y |
| **Digital XRay Image Storage For Presentation (DICOS)** | 1.2.840.10008.5.1.4.1.1.501.2.1 | Y / Y |
| **Digital XRay Image Storage For Processing (DICOS)** | 1.2.840.10008.5.1.4.1.1.501.2.2 | Y / Y |

| | | |
|---|---|---|
| **Digital X-Ray Image Storage (Presentation)** | 1.2.840.10008.5.1.4.1.1.1.1 | Y / Y |
| **Digital X-Ray Image Storage (Processing)** | 1.2.840.10008.5.1.4.1.1.1.1.1 | Y / Y |
| **Eddy Current Image Storage (DICONDE)** | 1.2.840.10008.5.1.4.1.1.601.1 | Y / Y |
| **Eddy Current Multiframe Image Storage (DICONDE)** | 1.2.840.10008.5.1.4.1.1.601.2 | Y / Y |
| **Encapsulated PDF Storage SOP Class** | 1.2.840.10008.5.1.4.1.1.104.1 | Y / Y |
| **Enhanced CT Image Storage** | 1.2.840.10008.5.1.4.1.1.2.1 | Y / Y |
| **Enhanced MR Color Image Storage** | 1.2.840.10008.5.1.4.1.1.4.3 | Y / Y |
| **Enhanced MR Image Storage** | 1.2.840.10008.5.1.4.1.1.4.1 | Y / Y |
| **Enhanced PET Image Storage** | 1.2.840.10008.5.1.4.1.1.130 | Y / Y |
| **Enhanced SR Storage** | 1.2.840.10008.5.1.4.1.1.88.22 | Y / Y |
| **Enhanced US Volume Storage** | 1.2.840.10008.5.1.4.1.1.6.2 | Y / Y |
| **Enhanced XA Image Storage** | 1.2.840.10008.5.1.4.1.1.12.1.1 | Y / Y |
| **Enhanced XRF Image Storage** | 1.2.840.10008.5.1.4.1.1.12.2.1 | Y / Y |
| **General Audio Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.4.2 | Y / Y |
| **General ECG Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.1.2 | Y / Y |
| **Generic Implant Template Storage** | 1.2.840.10008.5.1.4.43.1 | Y / Y |
| **Grayscale Softcopy Presentation State Storage** | 1.2.840.10008.5.1.4.1.1.11.1 | Y / Y |
| **Hanging Protocol Storage** | 1.2.840.10008.5.1.4.38.1 | Y / Y |
| **Hardcopy Color Image Storage** | 1.2.840.10008.5.1.1.30 | Y / Y |
| **Hardcopy Grayscale Image Storage** | 1.2.840.10008.5.1.1.29 | Y / Y |
| **Hemodynamic Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.2.1 | Y / Y |
| **Implantation Plan SR Document Storage** | 1.2.840.10008.5.1.4.1.1.88.70 | Y / Y |
| **Implant Assembly Template Storage** | 1.2.840.10008.5.1.4.44.1 | Y / Y |
| **Implant Template Group Storage** | 1.2.840.10008.5.1.4.45.1 | Y / Y |
| **Intraocular Lens Calculations Storage** | 1.2.840.10008.5.1.4.1.1.78.8 | Y / Y |
| **Intravascular Optical Coherence Tomography Image Storage - For Presentation** | 1.2.840.10008.5.1.4.1.1.14.1 | Y / Y |

| | | |
|---|---|---|
| **Intravascular Optical Coherence Tomography Image Storage - For Processing** | 1.2.840.10008.5.1.4.1.1.14.2 | Y / Y |
| **Keratometry Measurements Storage** | 1.2.840.10008.5.1.4.1.1.78.3 | Y / Y |
| **Key Object Selection Document** | 1.2.840.10008.5.1.4.1.1.88.59 | Y / Y |
| **Lensometry Measurements Storage** | 1.2.840.10008.5.1.4.1.1.78.1 | Y / Y |
| **Mammography CAD SR** | 1.2.840.10008.5.1.4.1.1.88.50 | Y / Y |
| **MR Image Storage** | 1.2.840.10008.5.1.4.1.1.4 | Y / Y |
| **MR Spectroscopy Storage** | 1.2.840.10008.5.1.4.1.1.4.2 | Y / Y |
| **Multi-frame Grayscale Byte Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.2 | Y / Y |
| **Multi-frame Grayscale Word Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.3 | Y / Y |
| **Multi-frame True Color Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.4 | Y / Y |
| **Multi-frame Single Bit Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.1 | Y / Y |
| **Nuclear Medicine Image Storage** | 1.2.840.10008.5.1.4.1.1.20 | Y / Y |
| **Nuclear Medicine Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.5 | Y / Y |
| **Ophthalmic Photography 16 Bit Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.5.2 | Y / Y |
| **Ophthalmic Photography 8 Bit Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.5.1 | Y / Y |
| **Ophthalmic Tomography Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.5.4 | Y / Y |
| **Ophthalmic Photography 16 Bit Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1 | Y / Y |
| **Ophthalmic Axial Measurements Storage** | 1.2.840.10008.5.1.4.1.1.78.7 | Y / Y |
| **Ophthalmic Visual Field Static Perimetry Measurements Storage** | 1.2.840.10008.5.1.4.1.1.80.1 | Y / Y |
| **Positron Emission Tomography Image Storage** | 1.2.840.10008.5.1.4.1.1.128 | Y / Y |
| **Printer SOP Class** | 1.2.840.10008.5.1.1.16 | Y / Y |

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|---|---|---|
| **Presentation LUT SOP Class** | 1.2.840.10008.5.1.1.23 | Y / Y |
| **Pseudo-Color Softcopy Presentation State Storage** | 1.2.840.10008.5.1.4.1.1.11.3 | Y / Y |
| **Procedure Log Storage** | 1.2.840.10008.5.1.4.1.1.88.40 | Y / Y |
| **Raw Data Storage** | 1.2.840.10008.5.1.4.1.1.66 | Y / Y |
| **Respiratory Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.6.1 | Y / Y |
| **RT Beams Treatment Record Storage** | 1.2.840.10008.5.1.4.1.1.481.4 | Y / Y |
| **RT Brachy Treatment Record Storage** | 1.2.840.10008.5.1.4.1.1.481.6 | Y / Y |
| **RT Dose Storage** | 1.2.840.10008.5.1.4.1.1.481.2 | Y / Y |
| **RT Image Storage** | 1.2.840.10008.5.1.4.1.1.481.1 | Y / Y |
| **RT Plan Storage** | 1.2.840.10008.5.1.4.1.1.481.5 | Y / Y |
| **RT Structure Set Storage** | 1.2.840.10008.5.1.4.1.1.481.3 | Y / Y |
| **RT Treatment Summary Record Storage** | 1.2.840.10008.5.1.4.1.1.481.7 | Y / Y |
| **RT Ion Plan Storage** | 1.2.840.10008.5.1.4.1.1.481.8 | Y / Y |
| **RT Ion Beams Treatment Record Storage** | 1.2.840.10008.5.1.4.1.1.481.9 | Y / Y |
| **RT Beams Delivery Instruction Storage (Draft)** | 1.2.840.10008.5.1.4.34.1 | Y / Y |
| **RT Beams Delivery Instruction Storage** | 1.2.840.10008.5.1.4.34.7 | Y / Y |
| **Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7 | Y / Y |
| **Segmentation Storage** | 1.2.840.10008.5.1.4.1.1.66.4 | Y / Y |
| **Stand-alone Curve Storage** | 1.2.840.10008.5.1.4.1.1.9 | Y / Y |
| **Stand-alone Modality LUT Storage** | 1.2.840.10008.5.1.4.1.1.10 | Y / Y |
| **Stand-alone Overlay Storage** | 1.2.840.10008.5.1.4.1.1.8 | Y / Y |
| **Stand-alone PET Curve Storage** | 1.2.840.10008.5.1.4.1.1.129 | Y / Y |
| **Stand-alone VOI LUT Storage** | 1.2.840.10008.5.1.4.1.1.11 | Y / Y |
| **Stored Print Storage** | 1.2.840.10008.5.1.1.27 | Y / Y |
| **Stereometric Relationship Storage** | 1.2.840.10008.5.1.4.1.1.77.1.5.3 | Y / Y |
| **Spatial Registration Storage** | 1.2.840.10008.5.1.4.1.1.66.1 | Y / Y |
| **Spatial Fiducials Storage** | 1.2.840.10008.5.1.4.1.1.66.2 | Y / Y |
| **Spectacle Prescription Report Storage** | 1.2.840.10008.5.1.4.1.1.78.6 | Y / Y |

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|---|---|---|
| **SR Audio Storage (Draft)** | 1.2.840.10008.5.1.4.1.1.88.2 | Y / Y |
| **SR Comprehensive Storage (Draft)** | 1.2.840.10008.5.1.4.1.1.88.4 | Y / Y |
| **Subjective Refraction Measurements Storage** | 1.2.840.10008.5.1.4.1.1.78.4 | Y / Y |
| **Surface Segmentation Storage** | 1.2.840.10008.5.1.4.1.1.66.5 | Y / Y |
| **Threat Detection Report Storage (DICOS)** | 1.2.840.10008.5.1.4.1.1.501.3 | Y / Y |
| **Ultrasound Image Storage** | 1.2.840.10008.5.1.4.1.1.6.1 | Y / Y |
| **Ultrasound Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.6 | Y / Y |
| **Ultrasound Multi-frame Image Storage** | 1.2.840.10008.5.1.4.1.1.3.1 | Y / Y |
| **Ultrasound Multi-frame Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.3 | Y / Y |
| **Visual Acuity Measurements Storage** | 1.2.840.10008.5.1.4.1.1.78.5 | Y / Y |
| **VL Endoscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.1 | Y / Y |
| **VL Microscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.2 | Y / Y |
| **VL Photographic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.4 | Y / Y |
| **VL Slide-Coordinates Microscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.3 | Y / Y |
| **VL Whole Slide Microscopy Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.6 | Y / Y |
| **VL Multi Frame Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.77.2 | Y / Y |
| **Video Endoscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.1.1 | Y / Y |
| **Video Microscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.2.1 | Y / Y |
| **Video Photographic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.4.1 | Y / Y |
| **Waveform Storage (Draft)** | 1.2.840.10008.5.1.4.1.1.9.1 | Y / Y |
| **XA/XRF Grayscale Softcopy Presentation State Storage** | 1.2.840.10008.5.1.4.1.1.11.5 | Y / Y |
| **X-Ray Angiographic Bi-Plane Image Storage (retired)** | 1.2.840.10008.5.1.4.1.1.12.3 | Y / Y |
| **X-Ray Angiographic Image Storage** | 1.2.840.10008.5.1.4.1.1.12.1 | Y / Y |
| **X-Ray Radiation Dose SR** | 1.2.840.10008.5.1.4.1.1.88.67 | Y / Y |

| | | |
|---|---|---|
| **X-Ray Radiofluoroscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.12.2 | Y / Y |
| **X-Ray 3D Angiographic Image Storage** | 1.2.840.10008.5.1.4.1.1.13.1.1 | Y / Y |
| **X-Ray 3D Craniofacial Image Storage** | 1.2.840.10008.5.1.4.1.1.13.1.2 | Y / Y |
| **Query/Retrieve** | | |
| **Patient Root Query/Retrieve Information Model - FIND** | 1.2.840.10008.5.1.4.1.2.1.1 | Y / Y |
| **Patient Root Query/Retrieve Information Model - MOVE** | 1.2.840.10008.5.1.4.1.2.1.2 | Y / Y |
| **Patient Root Query/Retrieve Information Model - GET** | 1.2.840.10008.5.1.4.1.2.1.3 | Y / Y |
| **Study Root Query/Retrieve Information Model - FIND** | 1.2.840.10008.5.1.4.1.2.2.1 | Y / Y |
| **Study Root Query/Retrieve Information Model - MOVE** | 1.2.840.10008.5.1.4.1.2.2.2 | Y / Y |
| **Study Root Query/Retrieve Information Model - GET** | 1.2.840.10008.5.1.4.1.2.2.3 | Y / Y |
| **Patient/Study Only Query/Retrieve Information Model - FIND** | 1.2.840.10008.5.1.4.1.2.3.1 | Y / Y |
| **Patient/Study Only Query/Retrieve Information Model - MOVE** | 1.2.840.10008.5.1.4.1.2.3.2 | Y / Y |
| **Patient/Study Only Query/Retrieve Information Model - GET** | 1.2.840.10008.5.1.4.1.2.3.3 | Y / Y |
| **Storage Commitment** | | |
| **Storage Commitment Push Model** | 1.2.840.10008.1.20.1 | Y / Y |
| **Study Management** | | |
| **Modality Performed Procedure Step** | 1.2.840.10008.3.1.2.3.3 | Y / Y |
| **Modality Worklist** | | |
| **Modality Worklist Information Model - FIND** | 1.2.840.10008.5.1.4.31 | Y / N |
| **Private** | | |
| **GE Private 3D Model Storage** | 1.2.840.113619.4.26 | Y / Y |
| **GE Private Nuclear Medicin Storage** | 1.2.840.113619.4.27 | Y / Y |
| **GE Advance (PET) Raw Data Storage** | 1.2.840.113619.4.30 | Y / Y |

| | | |
|---|---|---|
| **Siemens CSA Non-Image Storage** | 1.3.12.2.1107.5.9.1 | Y / Y |
| **Philips  Private Gyroscan MR Spectrum Storage** | 1.3.46.670589.11.0.0.12.1 | Y / Y |
| **Philips  Private Gyroscan MR Series Data Storage** | 1.3.46.670589.11.0.0.12.2 | Y / Y |
| **Philips  Private CX Image Storage** | 1.3.46.670589.2.4.1.1 | Y / Y |
| **Philips  Private 3D Volume Storage (Retired)** | 1.3.46.670589.5.0.1 | Y / Y |
| **Philips  Private 3D Volume Storage** | 1.3.46.670589.5.0.1.1 | Y / Y |
| **Philips  Private MR Synthetic Image Storage** | 1.3.46.670589.5.0.10 | Y / Y |
| **Philips  Private MR Cardio Analysis Storage (Retired)** | 1.3.46.670589.5.0.11 | Y / Y |
| **Philips  Private MR Cardio Analysis Storage** | 1.3.46.670589.5.0.11.1 | Y / Y |
| **Philips  Private CX Synthetic Image Storage** | 1.3.46.670589.5.0.12 | Y / Y |
| **Philips  Private Perfusion Storage** | 1.3.46.670589.5.0.13 | Y / Y |
| **Philips  Private Perfusion Analysis Storage** | 1.3.46.670589.5.0.14 | Y / Y |
| **Philips  Private 3D Volume Object Storage (Retired)** | 1.3.46.670589.5.0.2 | Y / Y |
| **Philips  Private 3D Volume Object Storage** | 1.3.46.670589.5.0.2.1 | Y / Y |
| **Philips  Private Surface Storage (Retired)** | 1.3.46.670589.5.0.3 | Y / Y |
| **Philips  Private Surface Storage** | 1.3.46.670589.5.0.3.1 | Y / Y |
| **Philips  Private Composite Object Storage** | 1.3.46.670589.5.0.4 | Y / Y |
| **Philips  Private MR Cardio Profile Storage** | 1.3.46.670589.5.0.7 | Y / Y |
| **Philips  Private MR Cardio Storage (Retired)** | 1.3.46.670589.5.0.8 | Y / Y |
| **Philips  Private MR Cardio Storage** | 1.3.46.670589.5.0.8.1 | Y / Y |
| **Philips  Private CT Synthetic Image** | 1.3.46.670589.5.0.9 | Y / Y |

| | | |
|---|---|---|
| Storage | | |
| Philips Private Specialized XA Image Storage | 1.3.46.670589.2.3.1.1 | Y / Y |
| Philips iE33 Private 3D Object Storage | 1.3.46.670589.2.5.1.1 | Y / Y |
| LTArchive RT Treatment Record Storage | 1.2.246.352.70.1.10 | Y / Y |
| Toshiba Aplio Ultrasound Private SOP | 1.2.392.200036.9116.7.8.1.1.1 | Y / Y |
| Dcm4che Encapsulated Document Storage | 1.2.40.0.13.1.5.1.4.1.1.104.1 | Y / Y |

## Association Establishment Policies

### General

The DICOM Server will attempt to establish an association any time a C-MOVE request is received from a remote application entity in order to store the requested data in the move. The archive will only attempt to establish associations in response to valid C-MOVE requests for images that are known to its database, or for response to valid Storage Commitment requests. The archive will attempt to establish an association even if the destination is unknown by pairing the requested destination with the IP address of the C-MOVE requestor using the DICOM well-known port (104).

The DICOM Component supports SCU/SCP Role Negotiation.

The DICOM Server initiates an association:

- In response to a C-Store request – an association is established to propagate the original C-Store to one or more additional DICOM device(s).
- In response to a C-Find request – an association is established to propagate the original C-Find to one or more additional DICOM device(s).
- In response to a C-Move request – an association is established to Store the images requested in the C-Move to one or more additional DICOM device(s).
- In response to a C-Move request – an association is established to propagate the original C-Move to one or more additional DICOM device(s).
- In response to a Storage Commitment request – an association is established to send a Storage Commitment report to the requesting DICOM device.

### Number of Associations

The DICOM Server will attempt only one storage association establishment to service CMOVE requests or Storage Commitment requests. The DICOM Server will accept any number of simultaneous associations, the number of which can be configured. The maximum limit on the number of simultaneous associations is dependent on the number of open file descriptors allowed by the underlying operating system.

### Asynchronous Nature

The DICOM Server will allow any number of asynchronous operations, whether invoked and performed. This number of asynchronous operations is configurable. When establishing storage associations to service C-MOVE

requests the archive will attempt to negotiate the configured asynchronous operations window in order to optimize object moves.

### *Implementation Identifying Information*

DICOM Component Implementation Class UID 1.2.40.0.13.1.1

Implementation Version Name dcm4che-3.3.6

## Association Initiation by Real-World Activity

The DICOM Server will attempt to initiate one C-Store association for each C-MOVE request that is received.

The DICOM Server will attempt to initiate one N-Event-Report association for each Storage Commitment request that is received.

### *Proposed Presentation Contexts*

The DICOM Server will propose a collection of presentation contexts, which will be obtained by applying the algorithm presented in the next section to the following Presentation Context Table. The Role is SCU and there is no extended negotiation.

## Supported Actions

| Name | UID |
|---|---|
| **12-lead ECG Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.1.1 |
| **Ambulatory ECG Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.1.3 |
| **Basic Study Content Notification** | 1.2.840.10008.1.9 |
| **Basic Text SR Storage** | 1.2.840.10008.5.1.4.1.1.88.11 |
| **Basic Voice Audio Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.4.1 |
| **Cardiac Electrophysiology Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.3.1 |
| **Comprehensive SR Storage** | 1.2.840.10008.5.1.4.1.1.88.33 |
| **Computed Radiography Image Storage** | 1.2.840.10008.5.1.4.1.1.1 |
| **CT Image Storage** | 1.2.840.10008.5.1.4.1.1.2 |
| **Enhanced CT Image Storage** | 1.2.840.10008.5.1.4.1.1.2.1 |
| **Digital X-Ray Image Storage (Presentation)** | 1.2.840.10008.5.1.4.1.1.1.1 |
| **Digital X-Ray Image Storage (Processing)** | 1.2.840.10008.5.1.4.1.1.1.1.1 |
| **Digital Mammography Image Storage (Presentation)** | 1.2.840.10008.5.1.4.1.1.1.2 |
| **Digital Mammography Image Storage (Processing)** | 1.2.840.10008.5.1.4.1.1.1.2.1 |
| **Digital Intra-oral X-Ray Image Storage (Presentation)** | 1.2.840.10008.5.1.4.1.1.1.3 |
| **Digital Intra-oral X-Ray Image Storage (Processing)** | 1.2.840.10008.5.1.4.1.1.1.3.1 |

| | |
|---|---|
| **Encapsulated PDF Storage SOP Class** | 1.2.840.10008.5.1.4.1.1.104.1 |
| **Enhanced SR Storage** | 1.2.840.10008.5.1.4.1.1.88.22 |
| **General ECG Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.1.2 |
| **Grayscale Softcopy Presentation State Storage** | 1.2.840.10008.5.1.4.1.1.11.1 |
| **Hardcopy Color Image Storage** | 1.2.840.10008.5.1.1.30 |
| **Hardcopy Grayscale Image Storage** | 1.2.840.10008.5.1.1.29 |
| **Hemodynamic Waveform Storage** | 1.2.840.10008.5.1.4.1.1.9.2.1 |
| **Key Object Selection Document** | 1.2.840.10008.5.1.4.1.1.88.59 |
| **Mammography CAD SR** | 1.2.840.10008.5.1.4.1.1.88.50 |
| **Multi-frame Single Bit Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.1 |
| **Multi-frame Grayscale Byte Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.2 |
| **Multi-frame Grayscale Word Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.3 |
| **Multi-frame True Color Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7.4 |
| **MR Image Storage** | 1.2.840.100008.5.1.4.1.1.4 |
| **Enhanced MR Image Storage** | 1.2.840.100008.5.1.4.1.1.4.1 |
| **Nuclear Medicine Image Storage** | 1.2.840.10008.5.1.4.1.1.20 |
| **Nuclear Medicine Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.5 |
| **Positron Emission Tomography Image Storage** | 1.2.840.10008.5.1.4.1.1.128 |
| **RT Beams Treatment Record Storage** | 1.2.840.10008.5.1.4.1.1.481.4 |
| **RT Brachy Treatment Record Storage** | 1.2.840.10008.5.1.4.1.1.481.6 |
| **RT Dose Storage** | 1.2.840.10008.5.1.4.1.1.481.2 |
| **RT Image Storage** | 1.2.840.10008.5.1.4.1.1.481.1 |
| **RT Plan Storage** | 1.2.840.10008.5.1.4.1.1.481.5 |
| **RT Structure Set Storage** | 1.2.840.10008.5.1.4.1.1.481.3 |
| **RT Treatment Summary Record Storage** | 1.2.840.10008.5.1.4.1.1.481.7 |
| **Secondary Capture Image Storage** | 1.2.840.10008.5.1.4.1.1.7 |
| **Stand-alone Curve Storage** | 1.2.840.10008.5.1.4.1.1.9 |
| **Stand-alone Modality LUT Storage** | 1.2.840.10008.5.1.4.1.1.10 |

| | |
|---|---|
| **Stand-alone Overlay Storage** | 1.2.840.10008.5.1.4.1.1.8 |
| **Stand-alone VOI LUT Storage** | 1.2.840.10008.5.1.4.1.1.11 |
| **Standalone PET Curve Storage** | 1.2.840.10008.5.1.4.1.1.129 |
| **Stored Print Storage** | 1.2.840.10008.5.1.1.27 |
| **Ultrasound Image Storage** | 1.2.840.10008.5.1.4.1.1.6.1 |
| **Ultrasound Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.6 |
| **Ultrasound Multi-frame Image Storage** | 1.2.840.10008.5.1.4.1.1.3.1 |
| **Ultrasound Multi-frame Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.3 |
| **VL Endoscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.1 |
| **VL Microscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.2 |
| **VL Slide-Coordinates Microscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.3 |
| **VL Photographic Image Storage** | 1.2.840.10008.5.1.4.1.1.77.1.4 |
| **X-Ray Angiographic Bi-Plane Image Storage (Retired)** | 1.2.840.10008.5.1.4.1.1.12.3 |
| **X-Ray Angiographic Image Storage** | 1.2.840.10008.5.1.4.1.1.12.1 |
| **X-Ray Radiofluoroscopic Image Storage** | 1.2.840.10008.5.1.4.1.1.12.2 |

*Transfer Syntax for Send to a Remote System*

| Name | UID |
|---|---|
| **Little Endian Explicit VR** | 1.2.840.10008.1.2.1 |
| **Little Endian Implicit VR** | 1.2.840.10008.1.2 |
| **Big Endian Explicit VR** | 1.2.840.10008.1.2.2 |
| **Deflated Little Endian Explicit VR** | 1.2.840.10008.1.2.1.99 |
| **Lossless JPEG Image Compression (baseline)** | 1.2.840.10008.1.2.4.70 |
| **Lossy JPEG Image Compression (8-bit coding Process 1)** | 1.2.840.10008.1.2.4.50 |
| **Lossy JPEG Image Compression (12-bit coding Process 4)** | 1.2.840.10008.1.2.4.51 |
| **JPEG 2000 Image Compression (Lossless Only)** | 1.2.840.10008.1.2.4.90 |
| **JPEG 2000 Image Compression** | 1.2.840.10008.1.2.4.91 |
| **Lossless RLE Image Compression** | 1.2.840.10008.1.2.5 |

### *Associated Real-World Activity*

The associated real-world activity is the response to a Storage Commitment request from a remote application entity.

### *Proposed Presentation Contexts*

The following presentation contexts will be proposed for each association.  The role is SCP and there is no extended negotiation.

| Abstract Syntax Name | Abstract Syntax UID | Transfer Syntax Name | Transfer Syntax UID |
|---|---|---|---|
| **Storage Commitment Push Model** | 1.2.840.10008.1.20.1 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 |
| **Storage Commitment Push Model** | 1.2.840.10008.1.20.1 | Little Endian Implicit VR | 1.2.840.10008.1.2 |
| **Storage Commitment Push Model** | 1.2.840.10008.1.20.1 | Big Endian Explicit VR | 1.2.840.10008.1.2.2 |
| **Storage Commitment Push Model** | 1.2.840.10008.1.20.1 | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 |

### *Retrieve a Modality Worklist from a Remote System*

### *Associated Real-World Activity*

The Modality Worklist Reconciliation component of the Enterprise Archive will establish an association to a Modality Worklist SCP each time a new study is stored to the Archive. The Modality Worklist Reconciliation component will query the Modality Worklist SCP for demographic and other data relating to that study.

### *Proposed Presentation Contexts*

The following presentation contexts will be proposed for each association:

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| **Name** | **UID** | **Name** | **UID** | | |
| Modality Worklist Information Model - FIND | 1.2.840.10008.5.1.4.31 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCU | None |

# Association Acceptance Policy

When the DICOM Server accepts an association, it will allow the storage of objects, the retrieval of objects previously stored, the query for information about stored objects, the verification of the archive, and the storage commitment of stored object.

# Respond to a Verification Request from a Remote System

### Associated Real-World Activity

When the DICOM Server receives a verification request (C-ECHO) it will respond with a status of success if possible.

### Presentation Context Table

The DICOM Server will accept the following Transfer Syntaxes for each presentation context in an association it receives. The role is SCP and there is no extended negotiation.

| Abstract Syntax | | Transfer Syntax | |
|---|---|---|---|
| Name | UID | Name | UID |
| Verification | 1.2.840.10008.1.1 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 |

### SOP Specific Conformance for Verification SOP Class

The DICOM Server conforms to the SOP of the Verification Service Class fully. Extended negotiation is not supported for the Verification Service Class.

If the DICOM Server returns anything other than success then the C-ECHO operation failed.

### Presentation Context Acceptance Criterion

There is no prioritization used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted, in case the product is configured for them.

### Transfer Syntax Selection Policies

The Enterprise DICOM Archive Manager selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the archive's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list will be selected.

## Receive Objects from a Remote System

### Associated Real-World Activity

When the Enterprise DICOM Archive Manager receives a storage request (C-STORE) for an object, that object is stored to media on the underlying platform in DICOM Part 10 format and registers the object in the underlying database. If it is unable to store the object a failure response will be returned and the object will be stored in an exceptions area on the underlying platform if possible.

The data set of the C-STORE command is stored with no loss of information.

### Presentation Context Table

The DICOM Server will accept the following Transfer Syntaxes for each presentation context in an association it receives. The role is SCP, and there is no extended negotiation. The transfer syntax is in the next table.

| Abstract Syntax | |
|---|---|
| **Name** | **UID** |
| 12-lead ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.1 |
| Ambulatory ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.3 |
| Basic Study Content Notification | 1.2.840.10008.1.9 |
| Basic Text SR Storage | 1.2.840.10008.5.1.4.1.1.88.11 |
| Basic Voice Audio Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.4.1 |
| Cardiac Electrophysiology Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.3.1 |
| Comprehensive SR Storage | 1.2.840.10008.5.1.4.1.1.88.33 |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 |
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 |

| Abstract Syntax | |
|---|---|
| **Name** | **UID** |
| Enhanced CT Image Storage | 1.2.840.10008.5.1.4.1.1.2.1 |
| Digital X-Ray Image Storage (Presentation) | 1.2.840.10008.5.1.4.1.1.1.1 |
| Digital X-Ray Image Storage (Processing) | 1.2.840.10008.5.1.4.1.1.1.1.1 |
| Digital Mammography Image Storage (Presentation) | 1.2.840.10008.5.1.4.1.1.1.2 |
| Digital Mammography Image Storage (Processing) | 1.2.840.10008.5.1.4.1.1.1.2.1 |
| Digital Intra-oral X-Ray Image Storage (Presentation) | 1.2.840.10008.5.1.4.1.1.1.3 |
| Digital Intra-oral X-Ray Image Storage (Processing) | 1.2.840.10008.5.1.4.1.1.1.3.1 |
| Encapsulated PDF Storage SOP Class | 1.2.840.10008.5.1.4.1.1.104.1 |

| | |
|---|---|
| Enhanced SR Storage | 1.2.840.10008.5.1.4.1.1.88.22 |
| General ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.2 |
| Grayscale Softcopy Presentation State Storage | 1.2.840.10008.5.1.4.1.1.11.1 |
| Hardcopy Color Image Storage | 1.2.840.10008.5.1.1.30 |
| Hardcopy Grayscale Image Storage | 1.2.840.10008.5.1.1.29 |
| Hemodynamic Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.2.1 |
| Key Object Selection Document | 1.2.840.10008.5.1.4.1.1.88.59 |
| Mammography CAD SR | 1.2.840.10008.5.1.4.1.1.88.50 |
| Multi-frame Single Bit Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.1 |
| Multi-frame Grayscale Byte Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 |
| Multi-frame Grayscale Word Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.3 |
| Multi-frame True Color Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.4 |

| Abstract Syntax | |
|---|---|
| Name | UID |
| MR Image Storage | 1.2.840.100008.5.1.4.1.1.4 |
| Enhanced MR Image Storage | 1.2.840.100008.5.1.4.1.1.4.1 |
| Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.20 |
| Nuclear Medicine Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.5 |
| Positron Emission Tomography Image Storage | 1.2.840.10008.5.1.4.1.1.128 |

| | |
|---|---|
| RT Beams Treatment Record Storage | 1.2.840.10008.5.1.4.1.1.481.4 |
| RT Brachy Treatment Record Storage | 1.2.840.10008.5.1.4.1.1.481.6 |
| RT Dose Storage | 1.2.840.10008.5.1.4.1.1.481.2 |
| RT Image Storage | 1.2.840.10008.5.1.4.1.1.481.1 |
| RT Plan Storage | 1.2.840.10008.5.1.4.1.1.481.5 |
| RT Structure Set Storage | 1.2.840.10008.5.1.4.1.1.481.3 |
| RT Treatment Summary Record Storage | 1.2.840.10008.5.1.4.1.1.481.7 |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 |
| Stand-alone Curve Storage | 1.2.840.10008.5.1.4.1.1.9 |
| Stand-alone Modality LUT Storage | 1.2.840.10008.5.1.4.1.1.10 |
| Stand-alone Overlay Storage | 1.2.840.10008.5.1.4.1.1.8 |
| Stand-alone VOI LUT Storage | 1.2.840.10008.5.1.4.1.1.11 |
| Standalone PET Curve Storage | 1.2.840.10008.5.1.4.1.1.129 |
| Stored Print Storage | 1.2.840.10008.5.1.1.27 |
| Ultrasound Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 |
| Ultrasound Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.6 |
| Ultrasound Multi-frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 |
| Ultrasound Multi-frame Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.3 |

| | |
|---|---|
| VL Endoscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.1 |
| VL Microscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.2 |
| VL Slide-Coordinates Microscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.3 |
| VL Photographic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.4 |
| X-Ray Angiographic Bi-Plane Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.12.3 |

| | |
|---|---|
| X-Ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 |
| X-Ray Radiofluoroscopic Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 |

## Transfer Syntax for Send to a Remote System

| Name | UID |
|---|---|
| Little Endian Explicit VR | 1.2.840.10008.1.2.1 |
| Little Endian Implicit VR | 1.2.840.10008.1.2 |
| Big Endian Explicit VR | 1.2.840.10008.1.2.2 |
| Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 |
| Lossless JPEG Image Compression (baseline) | 1.2.840.10008.1.2.4.70 |
| Lossy JPEG Image Compression (8-bit, coding Process 1) | 1.2.840.10008.1.2.4.50 |
| Lossy JPEG Image Compression (12-bit, coding Process 4) | 1.2.840.10008.1.2.4.51 |
| JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 |
| JPEG 2000 Image Compression | 1.2.840.10008.1.2.4.91 |
| Lossless RLE Image Compression | 1.2.840.10008.1.2.5 |

### SOP Specific Conformance for all Storage SOP Classes

The DICOM Server DICOM component conforms to the SOPs of the Storage Service Class at Level 2 (full). No elements are discarded or coerced.

Extended negotiation is not supported for Storage Service Classes.

If the DICOM Server returns one of the following status codes, then the C-STORE operation was unsuccessful. If possible the offending object will be stored in the exceptions area on the underlying platform. All status codes are in hexadecimal.

- **0110** (Processing Failure) - Indicates that an unknown error occurred during the storage of the received object.

- **A900** (SOP Class UID Mismatch) - Indicates that the SOP Class UID of the object received did not match the presentation context over which the object arrived. The Error Comment field of the status will be populated with a description of the error encountered.
- **C000** (Data Set Read Error) - Indicates that the archive encountered an error while reading the object's data set. This may be returned if the data set is corrupted. The Error Comment field of the status will be populated with a description of the error encountered.
- **C001** (SOP Instance UID Mismatch) - Indicates that the SOP Instance UID of the object received did not match the SOP Instance UID sent in the C-STORE command. The Error Comment field of the status will be populated with a description of the error encountered.
- **C002** (Cannot Understand) - Indicates that an unknown error was thrown from within the archive. The Error Comment field of the status will be populated with a description of the error encountered.

If the DICOM Server returns the following status code it indicates that the C-STORE operation was a success but there were warnings. All status codes are in hexadecimal.

- **B007** (Data Set Does Not Match SOP Class) - Indicates that the object received did not fully match the SOP Class of the object, but the mismatch was not significant enough to warrant an exception.

### *Presentation Context Acceptance Criterion*

There is no prioritization used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted, in case the product is configured for them.

### *Transfer Syntax Selection Policies*

The DICOM Server DICOM component selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the archive's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list will be selected.

## Response to a Query Request from a Remote System

### *Associated Real-World Activity*

When the DICOM Server receives a query request (C-FIND) it will resolve the request against the underlying database and return all found information to the query initiator. The archive supports query transactions for all stored DICOM composite objects.

### *Presentation Context Table*

The Enterprise DICOM Archive Manager will accept the following Transfer Syntaxes for each presentation context in an association it receives

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Patient Root Query/Retrieve Information Model - FIND | 1.2.840.10008.5.1.4.1.2.1.1 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | Relational |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |

| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |
| Study Root Query/Retrieve Information Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | Relational |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |
| Patient/Study Only Query/ Retrieve Information Model - FIND | 1.2.840.10008.5.1.4.1.2.3.1 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | Relational |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |

**SOP Specific Conformance for all Find SOP Classes**

The DICOM Server conforms to the SOPs of the Query/Retrieve Service Class at both the hierarchical and relational level.

**Table 11: SOP Extended Negotiation**

| Item bytes | Field Name | Description of Field |
|---|---|---|
| 1 | Relational-queries/retrieval | This byte field defines relational-query/retrieval support for the Association-acceptor. It shall be encoded as an unsigned binary integer and shall use one of the following values<br>0 - relational-queries/retrieval not supported  1 - relational-queries/retrieval supported |

**Query Modes**

The DICOM Server supports both the Hierarchical and Relational search modes.

### Information Models

The DICOM Server supports the Patient Root, Study Root, and Patient-Study Only information models.

### Patient Root Image C-FIND Supported Attributes

| Attribute Name | Tag | Query Keys Matching SCP | Query Keys Return SCP |
|---|---|---|---|
| Patient Level | | | |
| Patient Name | (0010, 0010) | Supported | Supported |
| Patient ID | (0010, 0020) | Supported (U) | Supported |
| Patient's Birth Date | (0010, 0030) | Supported | Supported |
| Patient's Birth Time | (0010, 0032) | Supported | Supported |
| Patient's Sex | (0010, 0040) | Supported | Supported |
| Ethnic Group | (0010, 2160) | Supported | Supported |
| Patient Comments | (0010, 4000) | Supported | Supported |
| Number of Patient Related Studies | (0020, 1200) | Supported | Supported |
| Number of Patient Related Series | (0020, 1202) | Supported | Supported |
| Number of Patient Related Instances | (0020, 1204) | Supported | Supported |
| Study Level | | | |
| Study Date | (0008, 0020) | Supported | Supported |
| Study Time | (0008, 0030) | Supported | Supported |

| | | | |
|---|---|---|---|
| Accession Number | (0008, 0050) | Supported | Supported |
| Study ID | (0020, 0010) | Supported | Supported |
| Study Instance UID | (0020, 000D) | Supported (U) | Supported |
| Modalities in Study | (0008, 0061) | Supported | Supported |
| Referring Physician's Name | (0008, 0090) | Supported | Supported |
| Study Description | (0008, 1030) | Supported | Supported |
| Number Of Study Related Series | (0020, 1206) | Supported | Supported |
| Number Of Study Related Instances | (0020, 1208) | Supported | Supported |

## Series Level

| | | | |
|---|---|---|---|
| Modality | (0008, 0060) | Supported | Supported |
| Series Number | (0020, 0011) | Supported | Supported |
| Series Instance UID | (0020, 000E) | Supported (U) | Supported |
| Number of Series Related Instances | (0020, 1209) | Supported | Supported |
| Series Description | (0008, 103E) | Supported | Supported |

## Composite Object Instance Level

| | | | |
|---|---|---|---|
| Instance Number | (0020, 0013) | Supported | Supported |

| | | | |
|---|---|---|---|
| SOP Instance UID | (0008, 0018) | Supported (U) | Supported |
| SOP Class UID | (0008, 0016) | Supported | Supported |
| Image Specific Level | | | |
| Rows | (0020, 0010) | Supported | Supported |
| Columns | (0020, 0011) | Supported | Supported |
| Bits Allocated | (0028, 0100) | Supported | Supported |

**Table 13: Study Root Image C-FIND Supported Attributes**

| Attribute Name | Tag | Query Keys Matching SCP | Query Keys Return SCP |
|---|---|---|---|
| Study Level | | | |
| Study Date | (0008, 0020) | Supported | Supported |
| Study Time | (0008, 0030) | Supported | Supported |
| Accession Number | (0008, 0050) | Supported | Supported |
| Study ID | (0020, 0010) | Supported | Supported |
| Study Instance UID | (0020, 000D) | Supported (U) | Supported |
| Modalities in Study | (0008, 0061) | Supported | Supported |

| | | | |
|---|---|---|---|
| Referring Physician's Name | (0008, 0090) | Supported | Supported |
| Study Description | (0008, 1030) | Supported | Supported |
| Number Of Study Related Series | (0020, 1206) | Supported | Supported |
| Number Of Study Related Instances | (0020, 1208) | Supported | Supported |
| Series Level | | | |
| Modality | (0008, 0060) | Supported | Supported |
| Series Number | (0020, 0011) | Supported | Supported |
| Series Instance UID | (0020, 000E) | Supported (U) | Supported |
| Number of Series Related Instances | (0020, 1209) | Supported | Supported |
| Series Description | (0008, 103E) | Supported | Supported |
| Composite Object Instance Level | | | |
| Instance Number | (0020, 0013) | Supported | Supported |
| SOP Instance UID | (0008, 0018) | Supported (U) | Supported |
| SOP Class UID | (0008, 0016) | Supported | Supported |

| Image Specific Level | | | |
|---|---|---|---|
| Rows | (0020, 0010) | Supported | Supported |
| Columns | (0020, 0011) | Supported | Supported |
| Bits Allocated | (0028, 0100) | Supported | Supported |

**Grayscale Soft Copy Presentation State C-FIND Supported Attributes**

| Attribute Name | Tag | Query Keys Matching SCP | Query Keys Return SCP |
|---|---|---|---|
| GSPS Instance Specific Level | | | |
| Presentation Creation Date | (0070, 0082) | Supported | Supported |
| Presentation Creation Time | (0070, 0083) | Supported | Supported |

**Basic Text SR and Enhanced SR C-FIND Supported Attributes**

| Attribute Name | Tag | Query Keys Matching SCP | Query Keys Return SCP |
|---|---|---|---|
| SR Instance Specific Level | | | |
| Content Date | (0008, 0023) | Supported | Supported |
| Content Time | (0008, 0033) | Supported | Supported |
| Observation Date Time | (0040, A032) | Supported | Supported |

## C-FIND Status Codes

If the Enterprise DICOM Archive Manager returns one of the following status codes for C-FIND then the operation was unsuccessful. All status codes are in hexadecimal.

- **0110** (Processing Failure) - Indicates that an unknown error occurred during the query.
- **C000** (Data Set Read Error) - Indicates that there was an error reading the query parameters data set. This may be returned if the data set is corrupted. The Error Comment field of the status will be populated with a description of the error encountered.
- **C001** (Unable To Process) - Indicates that the archive was unable to fully process the query. The Error Comment field of the status will be populated with a description of the error encountered.
- **A900** (Identifier Does Not Match SOP Class) - Indicates that the query parameter data set did not conform to the requirements of the presentation context it was received across.
- **FE00** (Matching Terminated Due To Cancel Request) - Indicates that the query operation was terminated by the remote application entity prior to completion.
- **A700** (Out Of Resources) - Indicates that the archive ran out of resources to process the query request.

### Query Implementation Specifics

The SCUs are recommended to append wildcard "*" at the end of each component of any structured name to facilitate matching.

### Presentation Context Acceptance Criterion

There is no prioritization used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted, in case the product is configured for them.

### Transfer Syntax Selection Policies

The DICOM Server selects transfer syntaxes in Acceptor first modes: the first transfer syntax in the archive's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list will be selected.

## Respond to a Retrieve Request from a Remote System

### Associated Real-World Activity

When the DICOM Server receives a request for retrieval (C-MOVE or C-GET), the request will be resolved against the underlying database. If any objects are found, it will attempt to establish an association over which to store the found objects (C-MOVE only). If the association is established, it will retrieve the found objects from the underlying platform and store them over the association, returning pending responses to the retrieval request initiator.

### Presentation Context Table

The DICOM Server will accept the following Transfer Syntaxes for each presentation context in an association it receives:

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| **Name** | **UID** | **Name** | **UID** | | |
| Patient Root Query/Retrieve Information Model - MOVE | 1.2.840.10008.5.1.4.1.2.1.2 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | Relational |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |
| Patient Root Query/Retrieve Information Model - GET | 1.2.840.10008.5.1.4.1.2.1.3 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | Relational |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |

| | | | | | |
|---|---|---|---|---|---|
| Study Root *Query/Retrieve* Information Model - MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | Relational |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |
| Study Root *Query/Retrieve* Information Model - GET | 1.2.840.10008.5.1.4.1.2.2.3 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | Relational |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |
| | | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | | |
| Patient/Study Only Query/ Retrieve Information Model - | 1.2.840.10008.5.1.4.1.2.3.2 | Little Endian Implicit VR | 1.2.840.10008.1.2 | SCP | Relational |

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| MOVE | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |
| | | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | | |
| Patient/Study Only Query/ Retrieve Information Model - GET | 1.2.840.10008.5.1.4.1.2.3.3 | Little Endian Implicit VR | 1.2.840.10008.1.2 | SCP | Relational |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | | | | |

*SOP Specific Conformance for All Query/Retrieve SOP Classes*

## C-MOVE or C-GET Status Codes

If the DICOM Server returns one of the following status codes for C-MOVE or C-GET then the operation was unsuccessful. All status codes are in hexadecimal.

- **0110** (Processing Failure) - Indicates that an unknown error occurred during the query.
- **C000** (Data Set Read Error) - Indicates that there was an error reading the move/get parameters data set. This may be returned if the data set is corrupted. The Error Comment field of the status will be populated with a description of the error encountered.
- **C001** (Unable To Process) - Indicates that the archive was unable to fully process the move/get. The Error Comment field of the status will be populated with a description of the error encountered.
- **A900** (Identifier Does Not Match SOP Class) - Indicates that the move/get parameter data set did not conform to the requirements of the presentation context it was received across.
- **FE00** (Sub-Operations Terminated Due To Cancel Request) - Indicates that the move/get request was terminated by the remote application entity prior to completion.
- **A701** (Unable To Calculate Number Of Matches) - Indicates that the archive was unable to calculate the number of matching objects for this move/get request. May be due to lack of resources.
- **A702** (Unable To Perform Sub-Operations) - Indicates that the archive was unable to perform the storage sub-operations. May be due to lack of resources.

- **A801** (Move Destination Unknown) - Indicates that the archive was unable to connect to the move destination (C-MOVE only).

### Presentation Context Acceptance Criterion

There is no prioritization used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted, in case the product is configured for them.

### Transfer Syntax Selection Policies

The DICOM Server selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the archive's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list will be selected.

## Accepting a Storage Commitment Request from a Remote System

### Associated Real-World Activity

When the DICOM Server receives a storage commitment request (N-ACTION) it will immediately respond with a status of success. It will then attempt to locate all objects in the Archive Manager and Advanced Visualization for which storage commitment was requested. Once it has located the objects, it will establish an association back to the requesting entity and will send a storage commitment response (N-EVENT-REPORT), detailing all objects that were/were not found. Upon completion of the N-EVENT-REPORT, it will close the association.

### Proposed Presentation Contexts

The Enterprise DICOM Archive Manager will accept the following Transfer Syntaxes for each presentation context in an association it receives:

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | None |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |

### SOP Specific Conformance for Storage Commitment Push SOP Class

The DICOM Server conforms to the SOP of the Storage Commitment Push Service Class fully.

Extended negotiation is not supported for the Storage Commitment Push Service Class.

If the DICOM Server returns one of the following status codes for N-ACTION, then the request for storage commitment was unsuccessful.

- **0119** (Class-instance conflict) - Indicates that the SOP Instance UID sent in the N-ACTION-RQ was not the Storage Commitment Push Model SOP Instance UID (1.2.840.10008.1.20.1.1).
- **0110** (Processing Failure) - Indicates that an unknown error occurred during the storage commitment.

### *Presentation Context Acceptance Criterion*

There is no prioritization used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted, in case the product is configured for them.

### *Transfer Syntax Selection Policies*

The DICOM Server selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the archive's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list will be selected.

## Receiving MPPS Messages

### *Associated Real-World Activity*

When the Archive Manager receives an N-Create or N-Set operation, it will process it accordingly and respond with a status of Success (0000h) to the MPPS SCU. The received message will then be forwarded reliably to the remote configured MPPS SCP. For this operation the Archive Manager is serving the role of the MPPS SCU.

### *Presentation Context Table*

The Archive Manager will accept the following Transfer Syntaxes for each presentation context in an association it receives:

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCP | None |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |

### *SOP Specific Conformance Statement for MPPS*

The Archive Manager provides standard conformance to the DICOM Modality Performed Procedure Step SOP Class as an SCP.

### *Presentation Context Acceptance Criterion*

There is no prioritization used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted, in case the product is configured for them.

*Transfer Syntax Selection Policies*

The Archive Manager selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the archive's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list will be selected.

# Prefetcher Specification

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU (as indicated in the table):

| SOP Class Name | SOP Class UID | SCU/SCP |
|---|---|---|
| Query/Retrieve | | |
| Study Root Query/Retrieve Information Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Y / N |
| Storage Service Class<br>Storage Service Class<br>Storage Service Class - STORE | *<br><br>1.2.840.10008.4.2 | Y / N |

## Association Establishment Policies

### General

The Prefetcher is capable of querying and making store requests to other DICOM server according to user configurable rules. This feature is known as "prefetching." When performing prefetching functions, the Prefetcher will attempt to establish associations with remote application entities in order to query for and request the move of objects.

### Number of Associations

The Prefetcher will establish any number of simultaneous associations performing DICOM Queries, depending only on the environmental triggering events and the rule implementations.

The Prefetcher will establish any number of associations performing DICOM Moves.

### Asynchronous Nature

The Prefetcher will accept HL7 ORM O01 message and initiate C-Store requests according to Scheduled Procedure Step Start Date.

### Implementation identifying Information

The Pre-fetcher will provide a single Implementation Class UID and Implementation Version Name as follows:

| Pre-fetcher Implementation Class UID (C-Store SCU) | 1.2.40.0.13.1.1 |
|---|---|
| Implementation Version Name | dcm4che-3.3.6 |

# Association Initiation by Real-World Activity

The Prefetcher will initiate an association to a remote entity when triggered by receipt of an event, which causes a configured prefetching rule to look for priors. Additionally, the Prefetcher will initiate an association to a remote device at the scheduled delivery time of priors.

## Query a Remote DICOM Device

### Associated Real-World Activity

A triggering event (receipt of an HL7) invokes a prefetch rule. The pre-fetcher will initiate an association to the configured destination to search for data which that may be relevant older procedures performed. The search queries for data based on the following:

- A matching patient.
- A matching modality.

### Proposed Presentation Contexts

The Prefetcher will propose the following Transfer Syntaxes for each presentation context in an association it initiates:

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Study Root Query/Retrieve Information Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Little Endian Explicit VR | 1.2.840.10008.1.2.1 | SCU | None |
| | | Little Endian Implicit VR | 1.2.840.10008.1.2 | | |
| | | Big Endian Explicit VR | 1.2.840.10008.1.2.2 | | |
| | | Deflated Little Endian Explicit VR | 1.2.840.10008.1.2.1.99 | | |

# SOP Specific Conformance Statement for Query SOP Class

## Query Attributes

The query attributes can vary depending on the configured rules, which can add arbitrary tags to the query using an internal API. However, the following attributes are included in the queries by default:

### Patient Level Query

| Attribute Tag | Element Name |
|---|---|
| (0010, 0020) | Patient ID |

| Attribute Tag | Element Name |
|---|---|
| (0008, 0061) | Modalities In Study |
| (0020, 1208) | Number Of Study Related Instances |
| (0020, 000D) | Study Instance UID |

# Request C-Store Association to a Remote System

### Associated Real-World Activity

A prefetch order previously scheduled is due for delivery. The Prefetcher will make C-Store requests to the destination entity.

### Proposed Presentation Contexts

The Prefetcher will propose the following Transfer Syntaxes for each presentation context in an association it initiates:

## Association Acceptance Policy

The Prefetcher accepts only the HL7 message. All remaining DICOM activity performed by the Prefetcher is in a SCU role. Acceptance of the HL7 message is used to support triggering of Prefetch rules.

# Communication Profiles

## Supported Communication Stacks (Parts 8, 9)

The Clinical Image Archiving solution provides DICOM V3.0 TCP/IP Network Support as defined in PS3.8.

## TCP/IP Stack

The Clinical Image Archiving solution inherits its TCP/IP stack from the Java virtual machine, and, by default, the underlying platform on which the virtual machine is executing.

## API

The API used to enable the TCP/IP stack for the Clinical Image Archiving solution is the Java Socket API found in the java.net package of the Java Development Kit.

## Physical Media Support

The Clinical Image Archiving solution is indifferent to the physical medium over which TCP/IP executes. This is inherited from the particular platform that the Java virtual machine is executing.

## Web Access to DICOM Persistent Objects (WADO)

The System provides a service enabling the Web Client System to retrieve DICOM Persistent Objects managed by a Web Enabled DICOM Server, through HTTP/HTTPs protocol. All required request parameters are supported. Optional request parameters that are supported are listed below.

### WADO-URI

URI based using HTTP Get

### WADO MIME types supported

application/dicom

image/jpeg (rows, columns, frameNumber, region, windowWidth, windowCenter)

### QIDO-RS

RESTful Services (RS) using HTTP Get

# Extensions/Specializations/Privatizations

### Standard Extended/Specialized/Private SOPs

The Clinical Image Archiving solution supports Standard Extended, Specialized, and Private Storage SOPs as long as they conform to the Storage Service Class specification (PS3.4, Annex B).

The Clinical Image Archiving solution supports Standard Extended, Specialized, and Private Query/Retrieve SOPs as long as they conform to the Query/Retrieve Service Class specification (PS3.4, Annex C).

### Private Transfer Syntaxes

Private transfer syntaxes are not supported by the Clinical Image Archiving solution at installation.

# Support of Extended Character Sets

The Clinical Image Archiving solution supports all 8-bit character sets supported by DICOM V3.0. Multi-byte character sets are not supported.

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