IBM iConnect® Enterprise Archive

14.2

DICOM Conformance Statement

IBM Watson Health

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Contents

Chapter 1. Overview

This document specifies the conformance of iConnect Enterprise Archive (iCEA) Release 14.2 to the DICOM 3.0 standard. This document covers conformance for the following:

- Enterprise DICOM Archive Manager – an enterprise class archive providing long-term storage and retrieval of all DICOM V3.0 objects. It has been designed for performance, scalability, and reliability.
- Worklist Manager – a worklist management and persistence engine. It is designed to support multiple worklist types. It responds to various inputs to create, schedule, and update information pertaining to work items.
- Prefetcher – an application that moves DICOM objects on the network in a predictive manner to facilitate access by real world entities.
- Technologist Workflow (TWF) – an application that allows for patient demographic reconciliation with images received from a modality that does not have worklist support.
- WADO-URI – provides an HTTP interface to allow for the retrieval of DICOM SOP instances.
- WADO-WS – provides a web service interface to allow for the retrieval of DICOM SOP instances.
- WADO-RS – provides a RESTful interface to allow for the retrieval of DICOM SOP instances.
- STOW-RS – provides a RESTful interface for storage of the storage of DICOM SOP instances.
- QIDO-RS – allows the client to search for studies, series or SOP instances stored using a RESTful interface.

iCEA 14.2 has participated in an industry-wide testing program sponsored by Integrating the Healthcare Enterprise (IHE). The IHE Integration Statement for iCEA 14.2, together with the IHE Technical Framework, may facilitate the process of validation testing.

1.1. Related Documents

NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://dicom.nema.org/.

Chapter 2. Implementation Model

This section describes the implementation models for the Enterprise Archive Manager, Worklist Manager, Prefetcher, Technologist workflow, and the WADO Service.

2.1. Enterprise Archive Manager

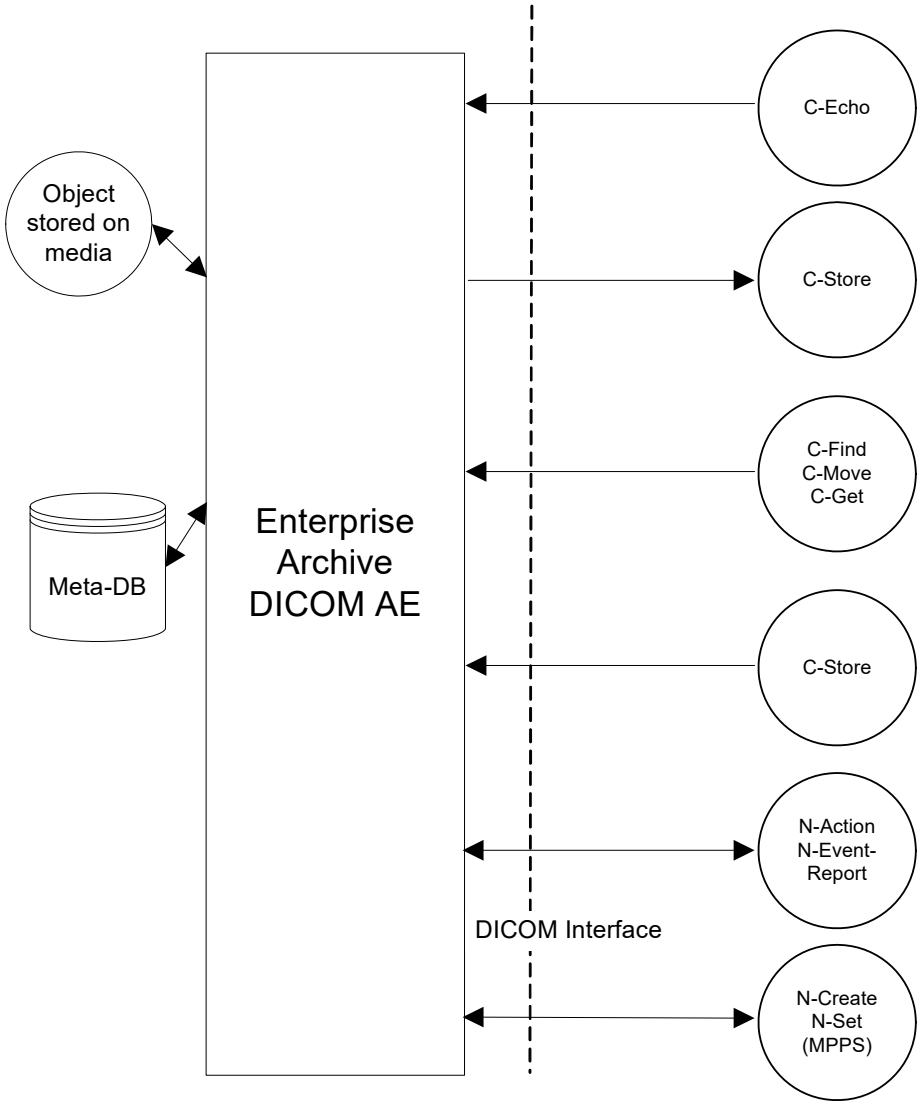
The Enterprise Archive Manager allows for the storage and retrieval of DICOM objects. Additionally, it allows for the querying of information about the DICOM objects that have been stored to it.

Administration is accomplished using a remote administrative application.

2.1.1. Application Data Flow Diagram

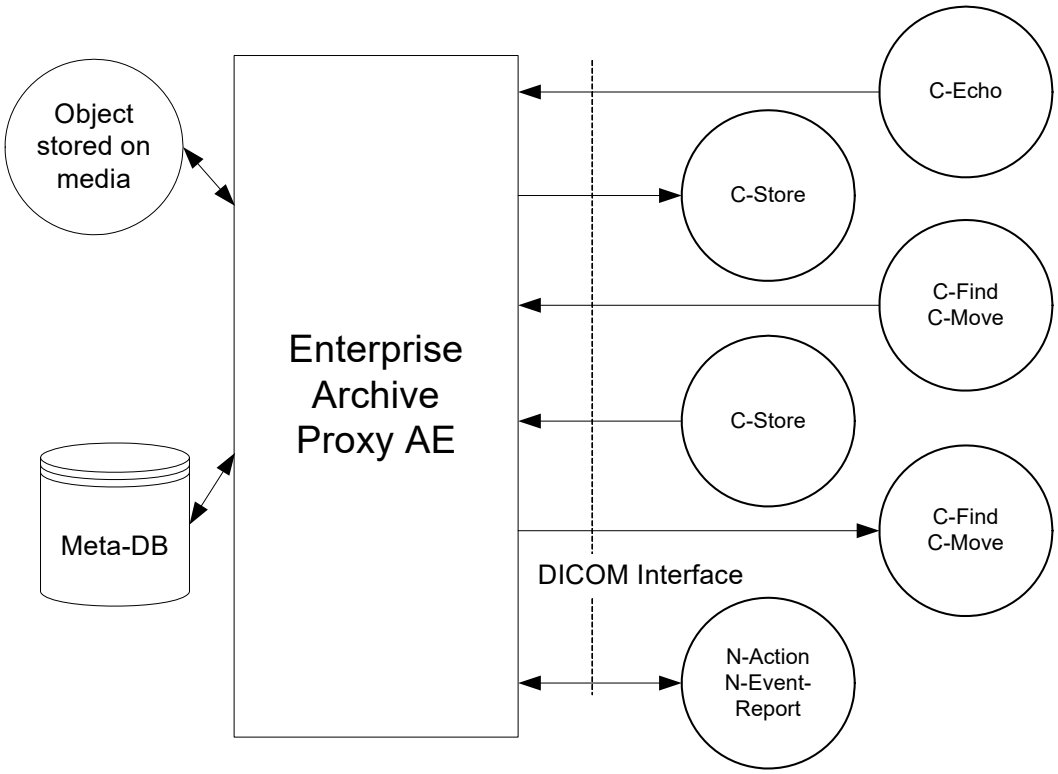
2.1.1.1. Enterprise Archive DICOM Component AE

Figure 2.1: Enterprise Archive DICOM AE Implementation Model



2.1.1.2. Enterprise Archive Proxy Component AE

Figure 2.2: Enterprise Archive Proxy AE Implementation Model



2.1.2. Functional Definition of AEs

2.1.2.1. DICOM AE

The Enterprise Archive Manager 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 accepts associations with Presentation Contexts for the following SOP Classes:

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

The archive receives objects/requests. When the archive receives an object, it stores that object in Part 10 format as a file on a file system and registers that object in the database.

When a request is received, it is processed accordingly. If the request is a retrieve request, the archive locates the object in the database, retrieves the object from the file system in which it is stored, establishes an association with the application to receive the object, and sends the object across that association. If the request is a query, the archive performs the query on the database and returns the results.

The Enterprise Archive Manager initiates associations based on various internal processes. These associations include the routing of objects, the forwarding of MPPS messages, Modality Worklist queries, Basic Study Content notifications, and confirming the storage of objects on a remote system. For these operations, the following SOP Classes are proposed:

- Storage Service Class
- Storage Commitment Service Class
- Modality Worklist Service Class
- Modality Performed Procedure Service Class
- Basic Study Content Notification Service Class

2.1.2.2. Proxy AE

If the Enterprise Archive Manager is configured with the Proxy component, it waits for a remote application to connect at the presentation address configured for its “Proxy” Application Entity Title. When another application connects, the Enterprise Archive Manager expects it to be a DICOM application. The Enterprise Archive Manager accepts associations with Presentation Contexts for SOP Classes of the Storage Service Class, Storage Commitment Service Class, the Query/Retrieve Service Class, and/or the Verification Service Class. When a request is received, it is processed. When it receives an object, it stores that object in Part 10 format on some media and registers that object in the database.

If the request is a storage commitment request, it responds with a status of success. After that, the Proxy locates the specified objects in the Archive Manager and Advanced Visualization and then sends a storage commitment response.

If the request is a retrieve request, the Proxy locates the object in the database or in another configured DICOM archive on the network, retrieves the object from the media that it stored it on or from the external archive where it was found, establishes an association with the application to receive the object, and sends the object across that association. If the request is a query, the Proxy performs the query on the database and on the other configured archives on the network and returns the results.

2.2. Worklist Manager

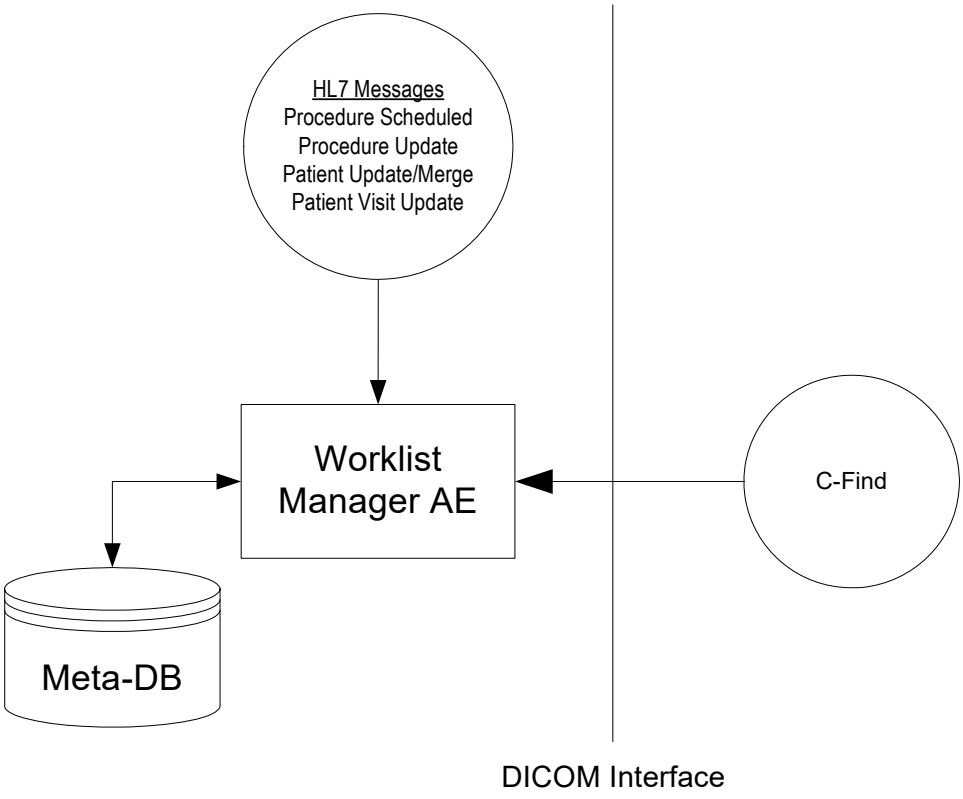
The Worklist Manager accepts hospital and radiological information system (HIS and RIS) messages that are in HL7 format. The system converts those messages into the DICOM data model and uses the information to populate and update a DICOM modality worklist that is maintained in a relational database. The system then allows DICOM modality worklist queries against the worklist data.

This document is only concerned with the DICOM aspects of the Worklist Manager.

Administration of the system is accomplished using a remote administrative application.

2.2.1. Application Data Flow Diagram

Figure 2.3: Worklist Manager AE Implementation Model



2.2.2. Functional Definition of AEs

The Worklist Manager provides a DICOM Modality Worklist SCP that accepts requests for workitems from properly configured DICOM Modality Worklist SCUs. Typically, an SCU is either a modality, or if the modality does not support DICOM's modality worklist, a DICOM Interface (a.k.a “Black”) Box associated with the modality and acting on the modality's behalf.

The modality then presents the query's resulting workitems to the modality operator who then chooses and performs an item of work. The resulting images are then typically stored in an image archive.

2.2.3. Sequencing of Real-World Activities

The Worklist Manager must have a feed of HL7 messages from the HIS/RIS in order to function properly. This information is used to populate and update the worklist information residing in the database. The types of HL7 messages used by the system include:

- Procedure Scheduled
- Procedure Update
- Patient Update/Merge
- Patient Visit Update

The HL7 Interface is used to capture HL7 messages and forward them to the Worklist Manager for processing.

To maintain a modality worklist, the Worklist Manager must receive at least Procedure Scheduled messages.

Procedure Update messages allow the system to update/cancel workitems.

Patient Update/Merge and Patient Visit Update messages allow the system to update workitem demographics. While critical for workflow and data consistency/accuracy, these updates are not required for the system to be functional.

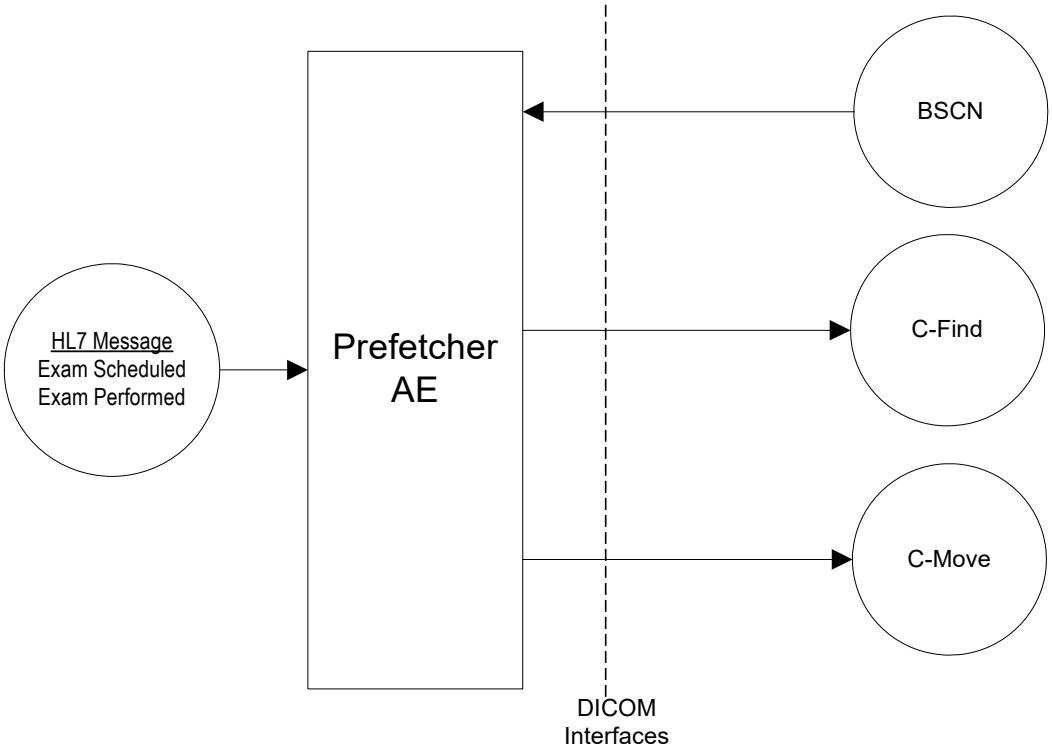
2.3. Prefetcher

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.

2.3.1. Application Data Flow Diagram

Figure 2.4: Prefetcher AE Implementation Model



2.3.2. Functional Definition of AEs

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.

The Prefetcher accepts the following associations with Presentation Contexts for the following SOP Classes:

- BSCN SCP - receive BSCN as prefetching trigger
- C-FIND SCU - query archive for priors
- C-MOVE SCU - make move requests to the archive

2.3.3. 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, such as HL7 or BSCN, and executes custom rules for those events. Those rules can perform C-FIND operations against an archive in an effort to find prior studies that the rule deems important. Those prior studies are scheduled to be moved in the future.

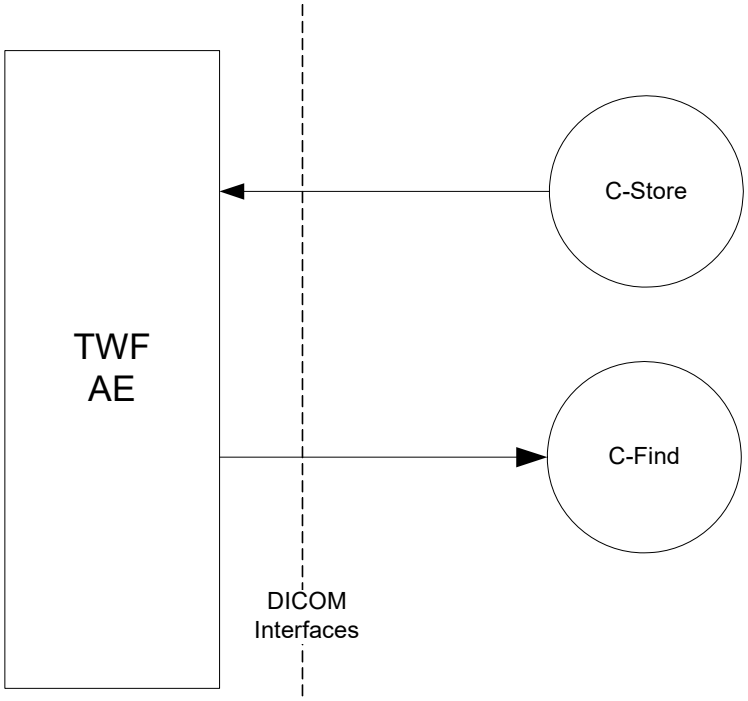
When it is time for a set of priors to be moved, the Prefetcher makes a C-MOVE request to the archive hosting the objects in question. All moves begin as study level operations. If a failure occurs and a listing of failed SOP instance UIDs is provided in the result of the study level move, then the Prefetcher performs a C-FIND to obtain a complete listing of objects in the study in question. The failed objects may be moved again, at the object level, in the future.

2.4. Technologist Workflow

Technologist Workflow (TWF) provides a user interface to the technologist to reconcile patient demographic data for images received from modalities that do not support worklist functionality. The TWF functions as a plug-in that supports both automatic and manual reconciliation of studies.

2.4.1. Application Data Flow Diagram

Figure 2.5: Technologist Workflow AE Implementation Model



2.4.2. Functional Definition of AEs

The TWF receives studies from modalities and stores the reconciled studies back to the archive. The TWF also supports MWL queries to retrieve patient demographic data.

The TWF accepts associations for the following Sop Classes:

- C-STORE SCP - Receives studies from modalities lacking worklist functionality.
- MWL C-FIND SCU - Queries the Modality Worklist for patient demographic data.

2.4.3. Sequence of Real World Activities

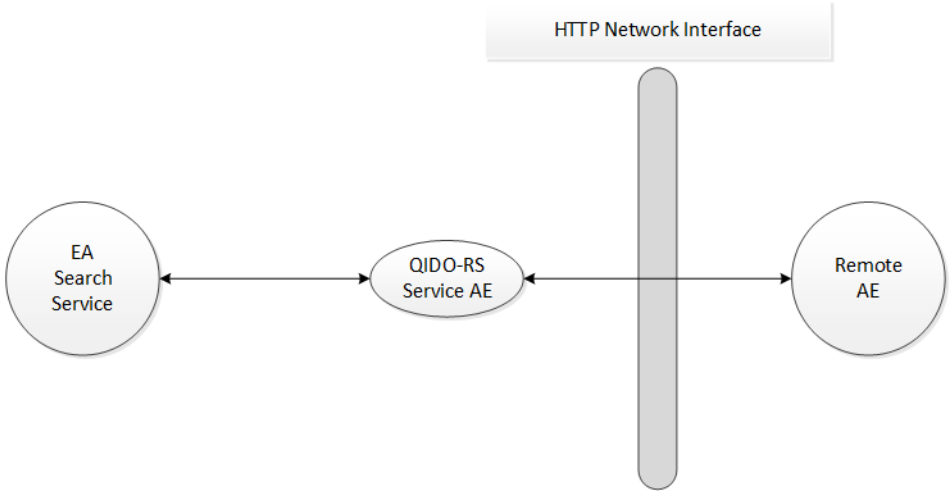
A study is acquired at a modality that does not have worklist functionality. The technologist enters the patient demographic data that is available and sends the study to the TWF using its unique AE-title. The TWF attempts to auto-reconcile the study by performing a MWL C-FIND query against the Worklist Manager for some pre-defined attributes. If a match is found in the Worklist, the demographic data is merged into the study. The technologist can review this information before the updated study is moved to the archive for storage. This move is handled internally and does not require an association for a C-Store to be created. If a match in the worklist is not found, the technologist can manually enter the patient information.

2.5. QIDO-RS Service

The QIDO-RS Provider Application receives QIDO requests from a remote AE. These requests are HTTP/1.1 GET requests. It is associated with the local real-world activity “Query Remote Device.” It uses the request to select matching studies, series, or instances. It then returns a set of matching studies, series, or instances or a response code indicating warning or failure back to the requesting device.

2.5.1. Application Flow Diagram

Figure 2.6: Application Data Flow



2.5.2. Functional Definition of QIDO-RS Service Application

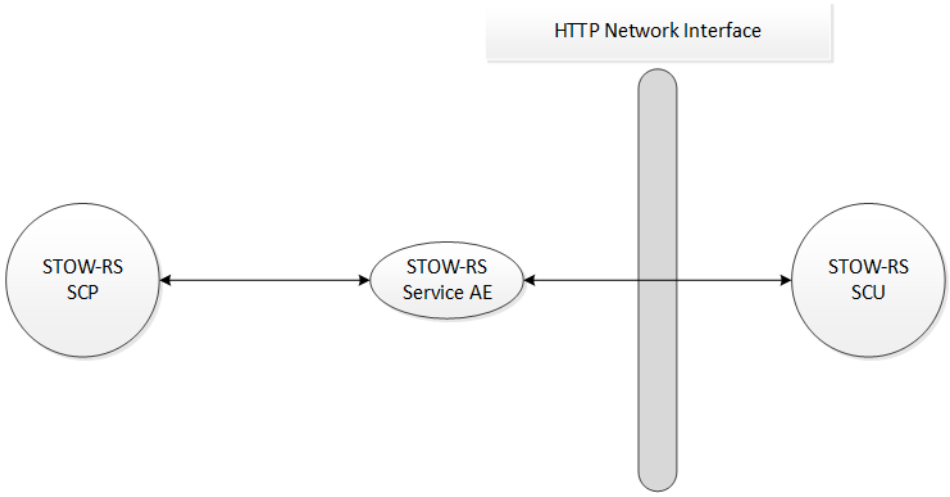
The reception of a QIDO-RS POST request activates the QIDO-RS Service. The storage request is based on the accept headers in the QIDO-RS POST request. The response includes an HTTP/1.1 status line, including a status code and its associated textual phrase, followed by an XML message indicating success, warning, or failure of the search by the QIDO-RS service.

2.6. STOW-RS Service

The STOW-RS Service Application receives STOW-RS requests from a remote AE. These requests may be either over the URI or WS interfaces. It is associated with the local real-world activity Retrieve Images. It converts these requests into internal lookup functions to find the matching SOP Instances. It then obtains these matching SOP Instances and composes a response back to the requesting remote AE.

2.6.1. Application Flow Diagram

Figure 2.7: Application Data Flow



2.6.2. Functional Definition of STOW-RS Service Application

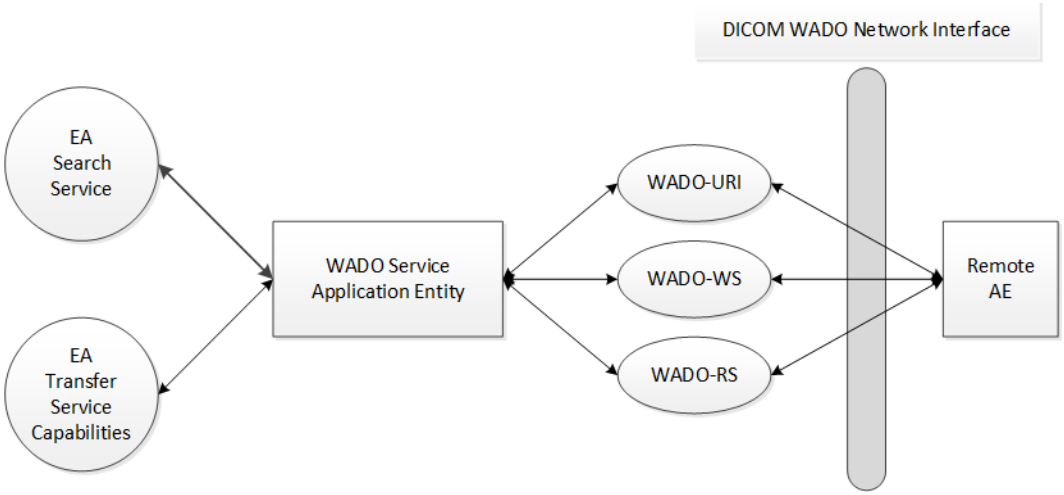
The reception of a STOW-RS POST request activates the STOW-RS Service. The storage request is based on the accept headers in the STOW-RS POST request. The response includes an HTTP/1.1 status line, including a status-code and its associated textual phrase, followed by an XML message indicating success, warning, or failure for each instance stored by the STOW-RS service.

2.7. WADO-URI/WS/RS Services

The WADO Service Application receives WADO requests from a remote AE. These requests may be either over the URI, RS, or WS interfaces. It is associated with the local real-world activity Retrieve Images. It converts these requests into internal lookup functions to find the matching SOP Instances. It then obtains matching SOP Instances and composes a response back to the requesting remote AE.

2.7.1. Application Flow Diagram

Figure 2.8: Application Data Flow



2.7.2. Functional Definition of WADO Service Application

The reception of a WADO request activates the AE. An internal request is sent to the search capabilities of the Enterprise Archive WADO Service. This request is based on the request parameters or the URL resource end point from the WADO request. The response is a list of all SOP instances stored on the Enterprise Archive that match the request parameters. If there are no matching instances, the AE indicates this in the WADO response. For all matching instances, the AE uses the internal image transfer request to obtain a copy of each instance. If the request was for retrieval of instances, these instances are returned. If the request was for retrieval of rendered instances, then the AE renders each instance and returns the rendered results.

Chapter 3. AE Specifications

This section describes the Application Entity specifications for the iConnect Enterprise Archive components.

3.1. Enterprise Archive DICOM Component 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):

NOTE: New SOP Classes may be supported through simple configuration changes of the product.

SOP Class Name	SOP Class UID	SCU/SCP
Verification		
Verification	1.2.840.10008.1.1	Y / 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
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Y / Y
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Y / Y
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Y / Y
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Y / Y
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	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
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	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
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 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
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	Y / Y
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Y / Y

SOP Class Name	SOP Class UID	SCU/SCP
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Y / Y
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	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
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Y / Y
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Y / Y
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	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
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Y / Y
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	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 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
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	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
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	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

SOP Class Name	SOP Class UID	SCU/SCP
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Y / Y
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Y / Y
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Y / Y
Stored Print Storage	1.2.840.10008.5.1.1.27	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
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 Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Y / Y
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	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 Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Y / Y
Query/Retrieve		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	N / Y
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	N / Y
Patient Root Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.1.3	N / Y
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	N / Y
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	N / Y
Study Root Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.2.3	N / Y
Patient/Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	N / Y
Patient/Study Only Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	N / Y
Patient/Study Only Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.3.3	N / Y
Storage Commitment		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Y / Y

SOP Class Name	SOP Class UID	SCU/SCP
Study Management		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Y / Y
BSCN		
Basic Study Content Notification	1.2.840.10008.1.9	Y / N
Modality Worklist		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Y / N

3.1.1. Association Establishment Policies

3.1.1.1. General

The DICOM Component of the Enterprise Archive Manager attempts 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 only attempts to establish associations in response to valid C-MOVE requests for images that are known to its database, or for responses to valid Storage Commitment requests.

The archive may also attempt to establish an association to initiate a Storage Commitment request (to confirm objects are stored on a remote system).

The archive attempts 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 Component supports configurable Maximum PDU sizes, both sent and received (the default is 50KB, both sent and received).

3.1.1.2. Number of Associations

The Enterprise Archive Manager attempts only one storage association establishment to service C-MOVE requests or Storage Commitment requests.

The Enterprise Archive Manager establishes a configurable number of connections for operations involving the Router functionality, forwarding MPPS messages, sending BSCN messages, and confirming storage of objects on a remote system (using Storage Commit).

The Enterprise Archive Manager accepts any number of simultaneous associations, the number of which can be configured. The maximum limit on the number of simultaneous associations depends on the number of open file descriptors allowed by the underlying operating system.

3.1.1.3. Asynchronous Nature

The Enterprise Archive Manager allows 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 attempts to negotiate the configured asynchronous operations window to optimize object moves.

3.1.1.4. Implementation Identifying Information

The Enterprise Archive Manager DICOM Component provides a single Implementation Class UID and Implementation Version Name as follows:

DICOM Component Implementation Class UID	1.2.826.0.1.3680043.2.133.1.1
Implementation Version Name	11.3.0

3.1.2. Association Initiation by Real-World Activity

The Enterprise Archive Manager attempts to initiate one storage association for each C-MOVE request or Storage Commitment request that is received.

If the Router component is enabled, it can be configured to use one or multiple associations. For ease of implementation, most destinations are configured to use one association.

Similar to the Router component, the Storage Commitment component can also be configured to use multiple associations.

3.1.2.1. Storage Association

- Completing a Move Request to a Remote System
- Unsolicited Storage of DICOM Objects to a Remote System

Associated Real-World Activity

The associated real-world activity is the receipt of a C-MOVE request from a remote application entity.

Other components that may be installed in the archive can cause associations to be established for various reasons.

3.1.2.2. Router Plug-In

The Router plug-in, if installed, establishes a pooled association to the configured C-Store SCP(s) when an object is stored to the archive. If an established association exists in the association pool, the association is reused instead of establishing a new association. The Router plug-in then performs a C-Store on the pooled association(s) to the configured SCP(s) for each object stored to the archive.

Proposed Presentation Contexts

The Enterprise Archive Manager proposes a collection of presentation contexts, which are obtained by applying the algorithm presented in TABLE 3.1.

Table 3.1: Presentation Context Table

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	See TABLE 3.2.	SCU	None
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	See TABLE 3.2.	SCU	None
Basic Study Content Notification	1.2.840.10008.1.9	See TABLE 3.2.	SCU	None
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	See TABLE 3.2.	SCU	None
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	See TABLE 3.2.	SCU	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See TABLE 3.2.	SCU	None
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	See TABLE 3.2.	SCU	None
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	See TABLE 3.2.	SCU	None
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	See TABLE 3.2.	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See TABLE 3.2.	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See TABLE 3.2.	SCU	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See TABLE 3.2.	SCU	None
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	See TABLE 3.2.	SCU	None
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	See TABLE 3.2.	SCU	None
Digital Mammography Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	See TABLE 3.2.	SCU	None
Digital Mammography Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	See TABLE 3.2.	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	See TABLE 3.2.	SCU	None
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	See TABLE 3.2.	SCU	None
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	See TABLE 3.2.	SCU	None
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	See TABLE 3.2.	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	See TABLE 3.2.	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See TABLE 3.2.	SCU	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See TABLE 3.2.	SCU	None
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	See TABLE 3.2.	SCU	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	See TABLE 3.2.	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See TABLE 3.2.	SCU	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	See TABLE 3.2.	SCU	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See TABLE 3.2.	SCU	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See TABLE 3.2.	SCU	None
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See TABLE 3.2.	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See TABLE 3.2.	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See TABLE 3.2.	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See TABLE 3.2.	SCU	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See TABLE 3.2.	SCU	None
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	See TABLE 3.2.	SCU	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	See TABLE 3.2.	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See TABLE 3.2.	SCU	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	See TABLE 3.2.	SCU	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See TABLE 3.2.	SCU	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	See TABLE 3.2.	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	See TABLE 3.2.	SCU	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See TABLE 3.2.	SCU	None
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	See TABLE 3.2.	SCU	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See TABLE 3.2.	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See TABLE 3.2.	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See TABLE 3.2.	SCU	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See TABLE 3.2.	SCU	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	See TABLE 3.2.	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See TABLE 3.2.	SCU	None
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	See TABLE 3.2.	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	See TABLE 3.2.	SCU	None
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	See TABLE 3.2.	SCU	None
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	See TABLE 3.2.	SCU	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	See TABLE 3.2.	SCU	None
Stored Print Storage	1.2.840.10008.5.1.1.27	See TABLE 3.2.	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See TABLE 3.2.	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	See TABLE 3.2.	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See TABLE 3.2.	SCU	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	See TABLE 3.2.	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See TABLE 3.2.	SCU	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See TABLE 3.2.	SCU	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See TABLE 3.2.	SCU	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See TABLE 3.2.	SCU	None
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	See TABLE 3.2.	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See TABLE 3.2.	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See TABLE 3.2.	SCU	None

Table 3.2: Transfer Syntax for Send to a Remote System

Name	UID
Little Endian Explicit VR	1.2.840.10008.1.2.1

Name	UID
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 Lossless, Nonhierarchical (Processes 14)	1.2.840.10008.1.2.4.57
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
MPEG2 Main Profile Main Level	1.2.840.10008.1.2.4.100
MPEG2 Main Profile High Level	1.2.840.10008.1.2.4.101
MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102
MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	1.2.840.10008.1.2.4.103
Lossless RLE Image Compression	1.2.840.10008.1.2.5

Algorithm for Computing the Proposed Presentation Contexts for Outgoing Storage Associations

When the association is establishment, the set of DICOM objects to be sent out has been determined. Since both the transfer syntax in which each DICOM object has been stored and the SOP Class UID of each DICOM object are stored in the archives database, both of these tags are already known. The intention of the algorithm is to send out each object in the transfer syntax it has been initially stored in or a similar one. If the object has been initially received in a supported encapsulated transfer syntax, the algorithm ensures that for the specific abstract syntax, a presentation context with that particular transfer syntax has been proposed. The encapsulated transfer syntax is preserved for efficiency to save the processing time of the compression conversion. In the case of objects stored in a native transfer syntax, preserving the transfer syntax is not important and any native transfer syntax should be acceptable.

The archive performs an analysis of the different encapsulated transfer syntaxes for each abstract syntax The archive proposes one presentation context for each encapsulated transfer syntax class recorded, plus a context with the list of all the other supported transfer syntaxes. Proposing these contexts creates the possibility for each desired presentation context to be accepted. As an example, assume that the retrieve set of a C-Move request contains Ultrasound Multi-Frame objects stored in both the Lossless JPEG transfer syntax and the Lossy JPEG transfer syntax coding Process 1. Three presentation contexts are proposed for the Ultrasound Multi-Frame abstract syntax: one with the Lossless JPEG transfer syntax, one with the Lossy JPEG transfer syntax coding Process 1, and one containing a list of all the other supported native transfer syntaxes.

When the association negotiation is complete, some presentation contexts are accepted and some are not. For datasets that had DICOM objects stored in different transfer syntaxes for the same abstract class, a heuristic needs to be applied to select the appropriate presentation context. The configurable TransferSyntaxPriorityList property controls the choosing of the appropriate presentation context. For each transfer syntax UID, a list of transfer syntaxes is provided. The User Service is created on the first available (accepted) presentation context obtained from parsing the

priority list (i.e. the list of transfer syntaxes is parsed and the first presentation context that matches in the accepted transfer syntax is used). The first entry in the list should be the same as the transfer syntax used as key, at least in the case of encapsulated transfer syntaxes.

Algorithm for Computing the Proposed Presentation Contexts for Outgoing Router Plug-in Storage Associations

When the pooled association is establishment, the Router has no knowledge of all the objects to be stored on the association. Therefore, the Router must propose presentation contexts for all storage SOP Classes supported by the Archive with a list of native transfer syntaxes in the order specified by the Archive DICOM Component. The Router always proposes the default storage transfer syntax configured for the Archive even if it is encapsulated transfer syntax.

When the Router encounters an object stored in encapsulated transfer syntax, the Router designates the object's SOP Class as special. As well, the Router proposes presentation contexts for each special designated SOP Class, and each encapsulated transfer syntax supported by the Archive.

3.1.2.3. Completing Storage Commitment Request from a Remote System

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 are proposed for each association:

Table 3.3: Presentation Context Table

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		

3.1.2.4. Forwarding MPPS Messages

Associated Real-World Activity

The Router plug-in schedules and forwards messages to the DSS/Order Filler or any other MPPS SCP The Router plug-in provides reliable delivery of PPS messages if the DSS/Order Filler or any MPPS SCP is unable to accept a message.

Proposed Presentation Contexts

The Router plug-in proposes the following Transfer Syntaxes for each presentation context in an association it initiates:

Table 3.4: 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	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		

3.1.2.5. Retrieve a Modality Worklist from a Remote System

Associated Real-World Activity

The Modality Worklist Reconciliation component of the Enterprise Archive, if installed and configured, causes an association to be established to a Modality Worklist SCP when a new study is stored to the Archive. The Modality Worklist Reconciliation component queries the Modality Worklist SCP for demographic and other data relating to that study.

Proposed Presentation Contexts

The following presentation contexts are proposed for each association:

Table 3.5: Presentation Context Table

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

3.1.2.6. Send Basic Study Content Notification to a Remote System

Associated Real-World Activity

The BSCN component of the Enterprise Archive, if installed and configured, causes a BSCN dataset to be stored to a configurable number of destination Application Entities. When the Archive receives an object, a timing interval that is set to a configurable value is associated with the study to which that

object belongs. If that study is already associated with a timing interval, that timing interval is reset. When a timing interval expires, a BSCN object is generated for the associated study and stored to each of the configured destination Application Entities.

In addition to its default behavior, the BSCN component is also configurable to immediately generate and send a BSCN object whenever the first image of a new study arrives at the Archive.

Proposed Presentation Contexts

The following presentation contexts are proposed for each association:

Table 3.6: Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Study Content Notification	1.2.840.10008.1.9	Little Endian Explicit VR	1.2.840.10008.1.2.1	SCU	None

3.1.2.7. Confirming Storage of Objects on a Remote System

Associated Real-World Activity

The Storage Commitment Client component of Enterprise Archive, if configured, causes a Storage Commitment Request to be sent to a configurable number of destination Application Entities. When the archive successfully routes a study, it initiates the Storage Commitment Request after a configurable timing interval.

Proposed Presentation Contexts

The following presentation contexts are proposed for each association:

Table 3.7: Presentation Context Table

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	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		

3.1.3. Association Acceptance Policy

When the Enterprise Archive Manager accepts an association, it allows 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.

The Enterprise Archive Manager is configurable to allow security restrictions ranging from no restrictions (promiscuous) to limiting a particular remote application entity to specified SOP Classes and specified SCU/SCP roles. If security is enabled, association attempts by unknown entities are rejected; proposed presentation contexts from known remote application entities may also be rejected based on their allowed security permissions.

3.1.3.1. Respond to a Verification Request from a Remote System

Associated Real-World Activity

When the Enterprise Archive Manager receives a verification request (C-ECHO), it responds with a status of success if possible.

Presentation Context Table

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

Table 3.8: Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	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 Verification SOP Class

The Enterprise Archive Manager fully conforms to the SOP of the Verification Service Class.

Extended negotiation is not supported for the Verification Service Class.

If the Enterprise Archive Manager returns anything other than success, then the C-ECHO operation failed.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if 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 is selected.

3.1.3.2. 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 is returned and the object is 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 Enterprise Archive Manager accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.9: Presentation Context Table

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	See TABLE 3.10.	SCP	None
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	See TABLE 3.10.	SCP	None
Basic Study Content Notification	1.2.840.10008.1.9	See TABLE 3.10.	SCP	None
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	See TABLE 3.10.	SCP	None
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	See TABLE 3.10.	SCP	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See TABLE 3.10.	SCP	None
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	See TABLE 3.10.	SCP	None
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	See TABLE 3.10.	SCP	None
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	See TABLE 3.10.	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See TABLE 3.10.	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See TABLE 3.10.	SCP	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See TABLE 3.10.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	**UID**			
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	See TABLE 3.10.	SCP	None
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	See TABLE 3.10.	SCP	None
Digital Mammography Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	See TABLE 3.10.	SCP	None
Digital Mammography Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	See TABLE 3.10.	SCP	None
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	See TABLE 3.10.	SCP	None
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	See TABLE 3.10.	SCP	None
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	See TABLE 3.10.	SCP	None
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	See TABLE 3.10.	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	See TABLE 3.10.	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See TABLE 3.10.	SCP	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See TABLE 3.10.	SCP	None
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	See TABLE 3.10.	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	See TABLE 3.10.	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See TABLE 3.10.	SCP	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	See TABLE 3.10.	SCP	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See TABLE 3.10.	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See TABLE 3.10.	SCP	None
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See TABLE 3.10.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	**UID**			
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See TABLE 3.10.	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See TABLE 3.10.	SCP	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See TABLE 3.10.	SCP	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See TABLE 3.10.	SCP	None
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	See TABLE 3.10.	SCP	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	See TABLE 3.10.	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See TABLE 3.10.	SCP	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	See TABLE 3.10.	SCP	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See TABLE 3.10.	SCP	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	See TABLE 3.10.	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	See TABLE 3.10.	SCP	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See TABLE 3.10.	SCP	None
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	See TABLE 3.10.	SCP	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See TABLE 3.10.	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See TABLE 3.10.	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See TABLE 3.10.	SCP	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See TABLE 3.10.	SCP	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	See TABLE 3.10.	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See TABLE 3.10.	SCP	None
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	See TABLE 3.10.	SCP	None
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	See TABLE 3.10.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	See TABLE 3.10.	SCP	None
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	See TABLE 3.10.	SCP	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	See TABLE 3.10.	SCP	None
Stored Print Storage	1.2.840.10008.5.1.1.27	See TABLE 3.10.	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See TABLE 3.10.	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	See TABLE 3.10.	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See TABLE 3.10.	SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	See TABLE 3.10.	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See TABLE 3.10.	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See TABLE 3.10.	SCP	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See TABLE 3.10.	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See TABLE 3.10.	SCP	None
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	See TABLE 3.10.	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See TABLE 3.10.	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See TABLE 3.10.	SCP	None

Table 3.10: Transfer Syntax for Receive from 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

Name	UID
JPEG Lossless, Nonhierarchical (Processes 14)	1.2.840.10008.1.2.4.57
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
MPEG2 Main Profile Main Level	1.2.840.10008.1.2.4.100
MPEG2 Main Profile High Level	1.2.840.10008.1.2.4.101
MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102
MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	1.2.840.10008.1.2.4.103
Lossless RLE Image Compression	1.2.840.10008.1.2.5

SOP Specific Conformance for all Storage SOP Classes

The Enterprise Archive Manager DICOM component conforms to the SOPs of the Storage Service Class at Level 2 (full). No elements are discarded or coerced, unless explicitly configured to do so. Discarding offending DICOM elements (invalid tags) or coercing some data elements to address customer needs is possible; however, it can be done only with the direct involvement of Support, and it implies custom implementations of coercion strategies.

In the event of a successful C-STORE operation, the object is fully stored to the underlying platform's media in Part 10 format and is accessible either as a file or through the archive. If the DICOM object has been received in the archive using a supported native transfer syntax, the transfer syntax used for the Part 10 format is always JPEG 2000 Image Compression(Lossless Only). However, if the DICOM object has been received using an encapsulated transfer syntax, Lossless JPEG or Lossy JPEG Image Compression coding Process 1 or coding Process 4, then the Part 10 object is stored using the same transfer syntax.

The archive performs minimal object validation to ensure database integrity. Additional validation may be configured to prevent the object from being stored in the archive.

Extended negotiation is not supported for Storage Service Classes.

If the Enterprise Archive Manager returns one of the following status codes, then the C-STORE operation was unsuccessful. If possible, the offending object is 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 is 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 error may be returned if the data set is corrupted. The Error Comment field of the status is 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 is 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 is populated with a description of the error encountered.

If the Enterprise Archive Manager 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.

Implementation specifics for Person Names

The values of data elements with a VR of PN (Person Name) are stored in a canonical format. Only the StandardName is stored and all Name Components are stored regardless of their value, separated by the caret character ('^'). This normalizes the names, always appending the trailing caret characters. For example, the following names are equivalent: LN^FN, LN^FN^, LN^FN^^, LN^FN^^^ and will all be stored in the database layer as LN^FN^^^. The stored person name is also uppercased.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Enterprise Archive Manager 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 is selected.

3.1.3.3. Response to a Query Request from a Remote System

Associated Real-World Activity

When the Enterprise Archive Manager receives a query request (C-FIND), it resolves the request against the underlying database and returns 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 accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.11: Presentation Context Table

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		

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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 Enterprise Archive Manager conforms to the SOPs of the Query/Retrieve Service Class at both the hierarchical and relational level.

Table 3.12: 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 is encoded as an unsigned binary integer and uses one of the following values: • 0 - relational-queries/retrieval not supported • 1 - relational-queries/retrieval supported

Query Modes

The Enterprise Archive Manager supports both the Hierarchical and Relational search modes.

Information Models

The Enterprise Archive Manager supports the Patient Root, Study Root, and Patient-Study Only information models.

Table 3.13: 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

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Patient ID	(0010, 0020)	Supported (U)	Supported
Referenced Patient Sequence	(0008, 1120)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Patient's Birth Date	(0010, 0030)	Supported	Supported
Patient's Birth Time	(0010, 0032)	Supported	Supported
Patient's Sex	(0010, 0040)	Supported	Supported
Other Patient IDs	(0010, 1000)	Supported	Supported
Other Patient Names	(0010, 1001)	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
Procedure Code Sequence	(0008, 1032)	Supported	Supported
Code Value	(0008, 0100)	Supported	Supported
Coding Scheme Designator	(0008, 0102)	Supported	Supported
Coding Scheme Version	(0008, 0103)	Supported	Supported
Code Meaning	(0008, 0104)	Supported	Supported
Name of Physician(s) Reading Study	(0008, 1060)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Admitting Diagnoses Description	(0008, 1080)	Supported	Supported
Referred Study Sequence	(0008, 1110)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Patient's Age	(0010, 1010)	Supported	Supported
Patient's Size	(0010, 1020)	Supported	Supported
Patient's Weight	(0010, 1030)	Supported	Supported
Occupation	(0010, 2180)	Supported	Supported
Additional Patient History	(0010, 21B0)	Supported	Supported
Other Study Numbers	(0020, 1070)	Supported	Supported
Number of Study Related Series	(0020, 1206)	Supported	Supported
Number of Study Related Instances	(0020, 1208)	Supported	Supported
Interpretation Author	(4008, 010C)	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
Performed Procedure Step ID	(0040, 0253)	Supported	Supported
Reference Study Component Sequence	(0008, 1111)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Request Attribute Sequence	(0040, 0275)	Supported	Supported
Requested Procedure ID	(0040, 1001)	Supported	Supported
Scheduled Procedure Step ID	(0040, 0009)	Supported	Supported
Performed Procedure Step Start Date	(0040, 0244)	Supported	Supported
Performed Procedure Step Start Time	(0040, 0245)	Supported	Supported
Body Part Examined	(0018, 0015)	Supported	Supported
Station Name	(0008, 1010)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Institution Name	(0008, 0080)	Supported	Supported
Performing Physician's Name	(0008, 1050)	Supported	Supported
Manufacturer	(0008, 0070)	Supported	Supported
Manufacturer's Model Name	(0008, 1090)	Supported	Supported
Series Description	(0008, 103E)	Supported	Supported
Series Date	(0008, 0021)	Supported	Supported
Series Time	(0008, 0031)	Supported	Supported
Protocol Name	(0018, 1030)	Supported	Supported
Composite Object Instance Level			
Instance Number	(0020, 0013)	Supported	Supported
Overlay Number	(0020, 0022)	Supported	Supported
Curve Number	(0020, 0024)	Supported	Supported
LUT Number	(0020, 0026)	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
Number of Frames	(0028, 0008)	Supported	Supported

Table 3.14: 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
Patient Name	(0010, 0010)	Supported	Supported
Patient ID	(0010, 0020)	Supported (U)	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
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
Procedure Code Sequence	(0008, 1032)	Supported	Supported
Code Value	(0008, 0100)	Supported	Supported
Coding Scheme Designator	(0008, 0102)	Supported	Supported
Coding Scheme Version	(0008, 0103)	Supported	Supported
Code Meaning	(0008, 0104)	Supported	Supported
Name of Physician(s) Reading Study	(0008, 1060)	Supported	Supported
Admitting Diagnoses Description	(0008, 1080)	Supported	Supported
Referred Study Sequence	(0008, 1110)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Referenced Patient Sequence	(0008, 1120)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Patient's Birth Date	(0010, 0030)	Supported	Supported
Patient's Birth Time	(0010, 0032)	Supported	Supported
Patient's Sex	(0010, 0040)	Supported	Supported
Other Patient IDs	(0010, 1000)	Supported	Supported
Other Patient Names	(0010, 1001)	Supported	Supported
Patient's Age	(0010, 1010)	Supported	Supported
Patient's Size	(0010, 1020)	Supported	Supported
Patient's Weight	(0010, 1030)	Supported	Supported
Ethnic Group	(0010, 2160)	Supported	Supported
Occupation	(0010, 2180)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Additional Patient History	(0010, 21B0)	Supported	Supported
Patient Comments	(0010, 4000)	Supported	Supported
Other Study Numbers	(0020, 1070)	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
Number of Study Related Series	(0020, 1206)	Supported	Supported
Number of Study Related Instances	(0020, 1208)	Supported	Supported
Interpretation Author	(4008, 010C)	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
Performed Procedure Step ID	(0040, 0253)	Supported	Supported
Reference Study Component Sequence	(0008, 1111)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Request Attribute Sequence	(0040, 0275)	Supported	Supported
Requested Procedure ID	(0040, 1001)	Supported	Supported
Scheduled Procedure Step ID	(0040, 0009)	Supported	Supported
Performed Procedure Step Start Date	(0040, 0244)	Supported	Supported
Performed Procedure Step Start Time	(0040, 0245)	Supported	Supported
Body Part Examined	(0018, 0015)	Supported	Supported
Station Name	(0008, 1010)	Supported	Supported
Institution Name	(0008, 0080)	Supported	Supported
Performing Physician's Name	(0008, 1050)	Supported	Supported
Manufacturer	(0008, 0070)	Supported	Supported
Manufacturer's Model Name	(0008, 1090)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Series Description	(0008, 103E)	Supported	Supported
Series Date	(0008, 0021)	Supported	Supported
Series Time	(0008, 0031)	Supported	Supported
Protocol Name	(0018, 1030)	Supported	Supported
Composite Object Instance Level			
Instance Number	(0020, 0013)	Supported	Supported
Overlay Number	(0020, 0022)	Supported	Supported
Curve Number	(0020, 0024)	Supported	Supported
LUT Number	(0020, 0026)	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
Number of Frames	(0028, 0008)	Supported	Supported

Patient/Study Only Image C-FIND Supported Attributes

Attributes for the Patient and Study Levels of the Patient/Study Only Query/Retrieve Information Model are the same as the corresponding attributes for the Patient and Study Levels of the Patient Root Query/Retrieve Information Model. For information about these attributes, see TABLE 3.15.

Table 3.15: 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 Label	(0070, 0080)	Supported	Supported
Presentation Description	(0070, 0081)	Supported	Supported
Presentation Creation Date	(0070, 0082)	Supported	Supported
Presentation Creation Time	(0070, 0083)	Supported	Supported
Presentation Creator's Name	(0070, 0084)	Supported	Supported
Referenced Series Sequence	(0008, 1115)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
>Series Instance UID	(0020, 000E)	Supported	Supported
>Referenced Image Sequence	(0008, 1140)	Supported	Supported
>>Referenced SOP Class UID	(0008, 1150)	Supported	Supported
>>Referenced SOP Instance UID	(0008, 1155)	Supported	Supported

Table 3.16: 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			
Completion Flag	(0040, A491)	Supported	Supported
Verification Flag	(0040, A493)	Supported	Supported
Content Date	(0008, 0023)	Supported	Supported
Content Time	(0008, 0033)	Supported	Supported
Observation Date Time	(0040, A032)	Supported	Supported
Verifying Observer Sequence	(0040, A073)	Supported	Supported
>Verifying Organization	(0040, A027)	Supported	Supported
>Verification DateTime	(0040, A030)	Supported	Supported
>Verifying Observer Name	(0040, A075)	Supported	Supported
>Verifying Observer Identification Code Sequence	(0040, A088)	Supported	Supported
Referenced Request Sequence	(0040, A370)	Supported	Supported
>Study Instance UID	(0020, 000D)	Supported	Supported
>Accession Number	(0008, 0050)	Supported	Supported
>Requested Procedure ID	(0040, 1000)	Supported	Supported
>Requested Procedure Code Sequence	(0032, 1064)	Supported	Supported
>>Code Value	(0008, 0100)	Supported	Supported
>>Code Scheme Designator	(0008, 0102)	Supported	Supported
>>Code Scheme Version	(0008, 0103)	Supported	Supported
>>Code Meaning	(0008, 0104)	Supported	Supported
Concept Name Code Sequence	(0040, A043)	Supported	Supported
>Code Value	(0008, 0100)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
>Coding Scheme Designator	(0008, 0102)	Supported	Supported
>Coding Scheme Version	(0008, 0103)	Supported	Supported
>Code Meaning	(0008, 0104)	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 error may be returned if the data set is corrupted. The Error Comment field of the status is 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 is 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 before completion.
- A700 (Out Of Resources) - Indicates that the archive ran out of resources to process the query request.

Query Implementation Specifics

It is recommended that SCUs be appended with wildcard “*” at the end of each component of any structured name to facilitate matching.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Enterprise Archive Manager 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 is selected.

3.1.3.4. Respond to a Retrieve Request from a Remote System

Associated Real-World Activity

When the Enterprise Archive Manager receives a request for retrieval (C-MOVE or C-GET), the request is resolved against the underlying database. If any objects are found, the Enterprise Archive Manager attempts to establish an association over which to store the found objects (C-MOVE only). If the association is established, the Enterprise Archive Manager retrieves the found objects from the underlying platform and stores them over the association, returning pending responses to the retrieval request initiator.

Presentation Context Table

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

Table 3.17: Presentation Context Table

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		

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
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		

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Patient/ Study Only Query/ Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	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/ Study Only Query/ Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.3.3	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		

SOP Specific Conformance for All Query/Retrieve SOP Classes

C-MOVE or C-GET Status Codes

If the Enterprise Archive Manager 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 is 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 is 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. This error may be due to a lack of resources.
- A702 (Unable To Perform Sub-Operations) - Indicates that the archive was unable to perform the storage sub-operations. This error may be due to a 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

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Enterprise 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 is selected.

3.1.3.5. Accepting a Storage Commitment Request from a Remote System

Associated Real-World Activity

When the Enterprise Archive Manager receives a storage commitment request (N-ACTION), it immediately responds with a status of success. The Enterprise Archive Manager then attempts to locate all objects in the Archive Manager and Advanced Visualization for which storage commitment was requested. When it has located the objects, the Enterprise Archive Manager establishes an association back to the requesting entity and sends a storage commitment response (N-EVENT-REPORT), detailing all objects that were/were not found. Upon completion of the N-EVENT-REPORT, the Enterprise Archive Manager closes the association.

Proposed Presentation Contexts

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

Table 3.18: Presentation Context Table

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 Enterprise Archive Manager fully conforms to the SOP of the Storage Commitment Push Service Class.

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

If the Enterprise Archive Manager 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

No prioritization is 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 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.

3.1.3.6. 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:

Table 3.19: 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	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

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if 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 is selected.

3.2. Enterprise Archive Proxy Component Specification

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU and/or SCP. The Application Entity can support all Storage SOP Classes as SCU and SCP after dynamic reconfiguration of the archive properties file.

SOP Class Name	SOP Class UID	SCU/SCP
Verification		
Verification	1.2.840.10008.1.1	N / Y
Storage		
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
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Y / Y

SOP Class Name	SOP Class UID	SCU/SCP
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
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Y / Y
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	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 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
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	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 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 Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Y / Y
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Y / Y
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Y / Y
* 12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Y / Y
* General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Y / Y
* Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Y / Y
* Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Y / Y
* Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Y / Y
* Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	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 VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Y / Y
* Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Y / Y
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Y / Y
Stored Print Storage	1.2.840.10008.5.1.1.27	Y / Y

SOP Class Name	SOP Class UID	SCU/SCP
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
X-Ray Angiographic Bi-Plane Image Storage	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 Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Y / Y
Digital X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.1	Y / Y
Digital X-Ray Image Storage - for Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Y / Y
Digital Mammography Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.2	Y / Y
Digital Mammography Image Storage - for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Y / Y
Digital Intra-oral X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.3	Y / Y
Digital Intra-oral X-Ray Image Storage - for Processing	1.2.840.10008.5.1.4.1.1.1.3.1	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 Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Y / Y
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Y / Y
* Basic text SR	1.2.840.10008.5.1.4.1.1.88.11	Y / Y
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	Y / Y
* Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Y / Y
* Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Y / Y
* Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	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
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
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

SOP Class Name	SOP Class UID	SCU/SCP
Storage Commitment		
Storage Commitment Push Model	1.2.840.10008.1.20.1	N / Y

* These SOP Classes have been implemented in the Proxy; however, they are not supported as standard features. If the user wishes to use these features, the appropriate properties must be added.

3.2.1. Association Establishment Policies

3.2.1.1. General

The Proxy attempts to establish an association anytime a C-FIND request is received from a remote application entity. The Proxy attempts to establish associations with other archives on the network to find objects until all configured archives have been queried. The Proxy attempts to establish associations in response to valid Storage Commitment requests.

When a C-MOVE request is received from a remote application entity, the Proxy attempts to establish one or more associations. If the object is known in the local database, the Proxy attempts to establish an association to store the object requested in the move. If the object is not known in the local database and a move-thru has been configured, the Proxy attempts to establish an association with the remote DICOM archive where the object is known in order to move the requested object to the Archive's local database. Then the Proxy attempts to establish an association to store the object requested in the move. If the object is not known in the local database and a third-party-move has been configured, the Proxy attempts to establish an association with the remote DICOM archive where the object is known in order to request a move of the object directly to the original application entity requesting the object.

The Proxy attempts to establish an association to store objects even if the destination is unknown by pairing the requested destination with the IP address of the C-MOVE requestor and the DICOM well-known port (104).

The Proxy supports SCU/SCP Role Negotiation.

The Proxy has configurable Maximum PDU sizes; both sent and received (the default is 50KB, both sent and received).

3.2.1.2. Number of Associations

The Proxy attempts only one storage association establishment to service C-MOVE requests where move-thru is configured or Storage Commitment requests.

The Proxy accepts any number of simultaneous associations, the number of which can be configured. The maximum limit on the number of simultaneous associations depends on the number of open file descriptors allowed by the underlying operating system.

3.2.1.3. Asynchronous Nature

The Proxy allows 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 Proxy attempts to negotiate the configured asynchronous operations window to optimize object moves.

3.2.1.4. Implementation Identifying Information

The Enterprise Archive Manager Proxy Component provides a single Implementation Class UID and Implementation Version Name as follows:

Proxy Component Implementation Class UID	1.2.826.0.1.3680043.2.133.1.1
Implementation Version Name	11.3.0

3.2.2. Association Initiation by Real-World Activity

The Proxy attempts to initiate one storage association for each C-MOVE request where move-thru is configured or Storage Commitment request that is received.

3.2.2.1. Storage Association

- Completing a Move Request to a Remote System

Associated Real-World Activity

The associated real-world activity is the receipt of a C-MOVE request from a remote application entity where move-thru is configured.

Proposed Presentation Contexts

The Proxy proposes a collection of presentation contexts, which are obtained by applying the algorithm presented in the next section to the following Presentation Context Table:

Table 3.20: Presentation Context Table

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	See TABLE 3.21.	SCU	None
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	See TABLE 3.21.	SCU	None
Basic Study Content Notification	1.2.840.10008.1.9	See TABLE 3.21.	SCU	None
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	See TABLE 3.21.	SCU	None
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	See TABLE 3.21.	SCU	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See TABLE 3.21.	SCU	None
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	See TABLE 3.21.	SCU	None
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	See TABLE 3.21.	SCU	None
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	See TABLE 3.21.	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	**UID**			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See **Table 3.21**.	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See **Table 3.21**.	SCU	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See **Table 3.21**.	SCU	None
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	See **Table 3.21**.	SCU	None
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	See **Table 3.21**.	SCU	None
Digital Mammography Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	See **Table 3.21**.	SCU	None
Digital Mammography Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	See **Table 3.21**.	SCU	None
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	See **Table 3.21**.	SCU	None
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	See **Table 3.21**.	SCU	None
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	See **Table 3.21**.	SCU	None
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	See **Table 3.21**.	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	See **Table 3.21**.	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See **Table 3.21**.	SCU	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See **Table 3.21**.	SCU	None
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	See **Table 3.21**.	SCU	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	See **Table 3.21**.	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See **Table 3.21**.	SCU	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	See **Table 3.21**.	SCU	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See **Table 3.21**.	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See TABLE 3.21.	SCU	None
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See TABLE 3.21.	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See TABLE 3.21.	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See TABLE 3.21	SCU	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See TABLE 3.21.	SCU	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See TABLE 3.21.	SCU	None
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	See TABLE 3.21.	SCU	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	See TABLE 3.21.	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See TABLE 3.21.	SCU	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	See TABLE 3.21.	SCU	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See TABLE 3.21.	SCU	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	See TABLE 3.21.	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	See TABLE 3.21.	SCU	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See TABLE 3.21.	SCU	None
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	See TABLE 3.21.	SCU	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See TABLE 3.21.	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See TABLE 3.21.	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See TABLE 3.21.	SCU	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See TABLE 3.21.	SCU	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	See TABLE 3.21.	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See TABLE 3.21.	SCU	None
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	See TABLE 3.21.	SCU	None
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	See TABLE 3.21.	SCU	None
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	See TABLE 3.21.	SCU	None
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	See TABLE 3.21.	SCU	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	See TABLE 3.21.	SCU	None
Stored Print Storage	1.2.840.10008.5.1.1.27	See TABLE 3.21.	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See TABLE 3.21.	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	See TABLE 3.21.	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See TABLE 3.21.	SCU	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	See TABLE 3.21.	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See TABLE 3.21.	SCU	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See TABLE 3.21.	SCU	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See TABLE 3.21.	SCU	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See TABLE 3.21.	SCU	None
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	See TABLE 3.21.	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See TABLE 3.21.	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See TABLE 3.21.	SCU	None

Table 3.21: 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

Name	UID
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 Lossless, Nonhierarchical (Processes 14)	1.2.840.10008.1.2.4.57
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
MPEG2 Main Profile Main Level	1.2.840.10008.1.2.4.100
MPEG2 Main Profile High Level	1.2.840.10008.1.2.4.101
MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102
MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	1.2.840.10008.1.2.4.103
Lossless RLE Image Compression	1.2.840.10008.1.2.5

Algorithm for Computing the Proposed Presentation Contexts for Outgoing Storage Associations

When the association is established, the set of DICOM objects to be sent has been determined. Since both the transfer syntax in which each DICOM object has been stored and the SOP Class UID of each DICOM object are stored in the archives database, both of these tags are already known. The intention of the algorithm is to send each object in the transfer syntax it has been initially stored in or a similar one. If the object has been initially received in a supported encapsulated transfer syntax, the algorithm ensures that for the specific abstract syntax, a presentation context with that particular transfer syntax has been proposed. The encapsulated transfer syntax is preserved for efficiency to save the processing time of the compression conversion. For objects stored in a native transfer syntax, preserving the transfer syntax is not important and any native transfer syntax should be acceptable.

The archive performs an analysis of the different encapsulated transfer syntaxes for each abstract syntax and proposes one presentation context for each encapsulated transfer syntax class recorded, plus a context with the list of all the other supported transfer syntaxes. This creates the possibility for each desired presentation context to be accepted. For example, assume that the retrieve set of a C-Move request contains Ultrasound Multi-Frame objects stored in both the Lossless JPEG transfer syntax and the Lossy JPEG transfer syntax coding Process 1. Three presentation contexts are proposed for the Ultrasound Multi-Frame abstract syntax: one with the Lossless JPEG transfer syntax, one with the Lossy JPEG transfer syntax coding Process 1, and one containing a list of all the other supported native transfer syntaxes.

When the association negotiation is complete, some presentation contexts are accepted and some are not. For datasets that had DICOM objects stored in different transfer syntaxes for the same abstract class, a heuristic needs to be applied to select the appropriate presentation context. The configurable TransferSyntaxPriorityList property controls the choosing of the appropriate presentation context. For each transfer syntax UID, a list of transfer syntax lists is provided. The User Service is created on the first available (accepted) presentation context obtained from parsing the priority list (i.e. the list of transfer syntaxes is parsed and the first presentation context that matches in the accepted transfer syntax is used). The first entry in the list should be the same as the transfer syntax used as key, at least in the case of encapsulated transfer syntaxes.

3.2.2.2. Query a Remote DICOM Device

Associated Real-World Activity

The associated real-world activity is the receipt of a C-FIND request from a remote application entity and there are configured external archives.

Proposed Presentation Contexts

The Proxy proposes the following Transfer Syntaxes for each presentation context in an association it initiates to an external archive:

Table 3.22: Presentation Context Table

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	SCU	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	SCU	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		

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
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	SCU	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		

*If all external archives support relational, then the Proxy supports relational.

SOP Specific Conformance Statement for All SOP Classes

The Proxy provides standard conformance to the DICOM Query/Retrieve - FIND SOP Classes as an SCU.

3.2.2.3. Request a Move Association to Remote DICOM Device

Associated Real-World Activity

The associated real-world activity is the receipt of a C-MOVE request from a remote application entity and there are configured external archives.

Proposed Presentation Contexts

The Proxy proposes the following Transfer Syntaxes for each presentation context in an association it initiates:

Table 3.23: Presentation Context Table

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	SCU	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	SCU	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		

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient/ Study Only Query/ Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Little Endian Explicit VR	1.2.840.10008.1.2.1	SCU	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		

*If all external archives support relational, then the Proxy supports relational.

SOP Specific Conformance Statement for all SOP Classes

The Proxy provides standard conformance to the DICOM Query/Retrieve - MOVE SOP Classes as an SCU.

3.2.2.4. Completing Storage Commitment Request from a Remote System

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 are proposed for each association:

Table 3.24: Presentation Context Table

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		

3.2.3. Association Acceptance Policy

When the Proxy accepts an association, it allows the retrieval of objects that were previously stored, the query for information about stored objects, the verification of the Proxy, and the storage commitment of stored objects.

The Proxy is configurable to allow security restrictions ranging from no restrictions (promiscuous) to limiting a particular remote application entity to specified SOP Classes and specified SCU/SCP roles. If security is enabled, association attempts by unknown entities are rejected outright and proposed presentation contexts from known remote application entities may be rejected based on their allowed security permissions.

3.2.3.1. Respond to a Verification Request from a Remote System

Associated Real-World Activity

When the Proxy receives a verification request (C-ECHO), it responds with a status of success if possible.

Presentation Context Table

The Proxy accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.25: Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	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 Verification SOP Class

The Proxy fully conforms to the SOP of the Verification Service Class.

Extended negotiation is not supported for the Verification Service Class.

If the Proxy returns anything other than success, then the C-ECHO operation failed.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Proxy selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the Proxy's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.2.3.2. Receive Objects from a Remote System

Associated Real-World Activity

When the Proxy receives a storage request (C-STORE) for an object, that object is stored to media on the underlying platform in Part 10 format and the object is registered in the underlying database. If it is unable to store the object, a failure response is returned and the object is 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 Proxy accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.26: Presentation Context Table

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	See TABLE 3.27.	SCP	None
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	See TABLE 3.27.	SCP	None
Basic Study Content Notification	1.2.840.10008.1.9	See TABLE 3.27.	SCP	None
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	See TABLE 3.27.	SCP	None
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	See TABLE 3.27.	SCP	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See TABLE 3.27.	SCP	None
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	See TABLE 3.27.	SCP	None
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	See TABLE 3.27.	SCP	None
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	See TABLE 3.27.	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See TABLE 3.27.	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See TABLE 3.27.	SCP	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See TABLE 3.27.	SCP	None
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	See TABLE 3.27.	SCP	None
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	See TABLE 3.27.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	**UID**			
Digital Mammography Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	See TABLE 3.27.	SCP	None
Digital Mammography Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	See TABLE 3.27.	SCP	None
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	See TABLE 3.27.	SCP	None
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	See TABLE 3.27.	SCP	None
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	See TABLE 3.27.	SCP	None
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	See TABLE 3.27.	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	See TABLE 3.27.	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See TABLE 3.27.	SCP	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See TABLE 3.27.	SCP	None
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	See TABLE 3.27.	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	See TABLE 3.27.	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See TABLE 3.27.	SCP	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	See TABLE 3.27.	SCP	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See TABLE 3.27.	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See TABLE 3.27.	SCP	None
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See TABLE 3.27.	SCP	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See TABLE 3.27.	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See TABLE 3.27.	SCP	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See TABLE 3.27.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See TABLE 3.27.	SCP	None
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	See TABLE 3.27.	SCP	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	See TABLE 3.27.	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See TABLE 3.27.	SCP	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	See TABLE 3.27.	SCP	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See TABLE 3.27.	SCP	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	See TABLE 3.27	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	See TABLE 3.27.	SCP	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See TABLE 3.27.	SCP	None
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	See TABLE 3.27.	SCP	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See TABLE 3.27.	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See TABLE 3.27.	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See TABLE 3.27.	SCP	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See TABLE 3.27.	SCP	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	See TABLE 3.27.	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See TABLE 3.27.	SCP	None
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	See TABLE 3.27.	SCP	None
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	See TABLE 3.27.	SCP	None
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	See TABLE 3.27.	SCP	None
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	See TABLE 3.27.	SCP	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	See TABLE 3.27.	SCP	None
Stored Print Storage	1.2.840.10008.5.1.1.27	See TABLE 3.27.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See TABLE 3.27.	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	See TABLE 3.27.	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See TABLE 3.27.	SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	See TABLE 3.27	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See TABLE 3.27.	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See TABLE 3.27.	SCP	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See TABLE 3.27.	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See TABLE 3.27.	SCP	None
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	See TABLE 3.27.	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See TABLE 3.27.	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See TABLE 3.27.	SCP	None

Table 3.27: Transfer Syntax for Receive from 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 Lossless, Nonhierarchical (Processes 14)	1.2.840.10008.1.2.4.57
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
MPEG2 Main Profile Main Level	1.2.840.10008.1.2.4.100

Name	UID
MPEG2 Main Profile High Level	1.2.840.10008.1.2.4.101
MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102
MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	1.2.840.10008.1.2.4.103
Lossless RLE Image Compression	1.2.840.10008.1.2.5

SOP Specific Conformance for all Storage SOP Classes

The Proxy conforms to the SOPs of the Storage Service Class at Level 2 (full). No elements are discarded or coerced. In the event of a successful C-STORE operation, the object is fully stored to the underlying platform's media in Part 10 format and is accessible either as a file or through the Proxy.

Minimal object validation is performed by the Proxy to ensure database integrity. Additional validation may be configured to prevent the object from being stored in the Proxy. This capability should only be configured by Support based on customer request or Support's recommendation.

Extended negotiation is not supported for Storage Service Classes.

If the Proxy returns one of the following status codes, the C-STORE operation was unsuccessful. If possible, the offending object is 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 is populated with a description of the error encountered.
- C000 (Data Set Read Error) - Indicates that the Proxy encountered an error while reading the object's data set. This error may be returned if the data set is corrupted. The Error Comment field of the status is 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 is populated with a description of the error encountered.
- C002 (Cannot Understand) - Indicates that an unknown error was thrown from within the Proxy. The Error Comment field of the status is populated with a description of the error encountered.

If the Proxy 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.

Implementation Specifics for Person Names

The values of data elements with a VR of PN (Person Name) will be stored in a canonical format. Only the StandardName will be stored, and all Name Components will be stored regardless of their value, separated by the caret character ('^'). This normalizes the names, always appending the trailing caret characters. As an example, the following names are equivalent: LN^FN, LN^FN^, LN^FN^^, LN^FN^^^ and will all be stored in the database layer as LN^FN^^^. The stored person name will also be uppercased.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Proxy selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the Proxy's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.2.3.3. Response to a Query Request from a Remote System

Associated Real-World Activity

When the Proxy receives a query request (C-FIND), it resolves the request against the underlying database and, if configured, other archives on the network and returns all found information to the query initiator. The Proxy supports query transactions for all stored DICOM composite objects.

Presentation Context Table

The Proxy accepts the following Transfer Syntaxes for any presentation context proposed to it during an association establishment:

Table 3.28: Presentation Context Table

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		

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	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		

*If all external archive support relational, then the Proxy will support relational.

SOP Specific Conformance for all Query/Retrieve SOP Classes

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

Table 3.29: 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: • 0 - relational-queries/retrieval not supported • 1 - relational-queries/retrieval supported

Query Modes

The Enterprise Archive Manager supports both the Hierarchical and Relational search modes.

Information Models

The Enterprise Archive Manager supports the Patient Root, Study Root, and Patient-Study Only information models.

Table 3.30: 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
Referenced Patient Sequence	(0008, 1120)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Patient's Birth Date	(0010, 0030)	Supported	Supported
Patient's Birth Time	(0010, 0032)	Supported	Supported
Patient's Sex	(0010, 0040)	Supported	Supported
Other Patient IDs	(0010, 1000)	Supported	Supported
Other Patient Names	(0010, 1001)	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

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
Procedure Code Sequence	(0008, 1032)	Supported	Supported
Code Value	(0008, 0100)	Supported	Supported
Coding Scheme Designator	(0008, 0102)	Supported	Supported
Coding Scheme Version	(0008, 0103)	Supported	Supported
Code Meaning	(0008, 0104)	Supported	Supported
Name of Physician(s) Reading Study	(0008, 1060)	Supported	Supported
Admitting Diagnoses Description	(0008, 1080)	Supported	Supported
Referred Study Sequence	(0008, 1110)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Patient's Age	(0010, 1010)	Supported	Supported
Patient's Size	(0010, 1020)	Supported	Supported
Patient's Weight	(0010, 1030)	Supported	Supported
Occupation	(0010, 2180)	Supported	Supported
Additional Patient History	(0010, 21B0)	Supported	Supported
Other Study Numbers	(0020, 1070)	Supported	Supported
Number of Study Related Series	(0020, 1206)	Supported	Supported
Number of Study Related Instances	(0020, 1208)	Supported	Supported
Interpretation Author	(4008, 010C)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
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
Performed Procedure Step ID	(0040, 0253)	Supported	Supported
Reference Study Component Sequence	(0008, 1111)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Request Attribute Sequence	(0040, 0275)	Supported	Supported
Requested Procedure ID	(0040, 1001)	Supported	Supported
Scheduled Procedure Step ID	(0040, 0009)	Supported	Supported
Performed Procedure Step Start Date	(0040, 0244)	Supported	Supported
Performed Procedure Step Start Time	(0040, 0245)	Supported	Supported
Body Part Examined	(0018, 0015)	Supported	Supported
Station Name	(0008, 1010)	Supported	Supported
Institution Name	(0008, 0080)	Supported	Supported
Performing Physician's Name	(0008, 1050)	Supported	Supported
Manufacturer	(0008, 0070)	Supported	Supported
Manufacturer's Model Name	(0008, 1090)	Supported	Supported
Series Description	(0008, 103E)	Supported	Supported
Series Date	(0008, 0021)	Supported	Supported
Series Time	(0008, 0031)	Supported	Supported
Protocol Name	(0018, 1030)	Supported	Supported
Composite Object Instance Level			
Instance Number	(0020, 0013)	Supported	Supported
Overlay Number	(0020, 0022)	Supported	Supported
Curve Number	(0020, 0024)	Supported	Supported
LUT Number	(0020, 0026)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
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
Number of Frames	(0028, 0008)	Supported	Supported

(U) = Unique

Table 3.31: Study Root Image C-FIND Supported Attributes

Table 3.32: Attribute Name Tag Query

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
Patient Name	(0010, 0010)	Supported	Supported
Patient ID	(0010, 0020)	Supported (U)	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
Procedure Code Sequence	(0008, 1032)	Supported	Supported
Code Value	(0008, 0100)	Supported	Supported
Coding Scheme Designator	(0008, 0102)	Supported	Supported
Coding Scheme Version	(0008, 0103)	Supported	Supported
Code Meaning	(0008, 0104)	Supported	Supported
Name of Physician(s) Reading Study	(0008, 1060)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Admitting Diagnoses Description	(0008, 1080)	Supported	Supported
Referred Study Sequence	(0008, 1110)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Referenced Patient Sequence	(0008, 1120)	Supported	Supported
Patient's Birth Date	(0010, 0030)	Supported	Supported
Patient's Birth Time	(0010, 0032)	Supported	Supported
Patient's Sex	(0010, 0040)	Supported	Supported
Other Patient IDs	(0010, 1000)	Supported	Supported
Other Patient Names	(0010, 1001)	Supported	Supported
Patient's Age	(0010, 1010)	Supported	Supported
Patient's Size	(0010, 1020)	Supported	Supported
Patient's Weight	(0010, 1030)	Supported	Supported
Ethnic Group	(0010, 2160)	Supported	Supported
Occupation	(0010, 2180)	Supported	Supported
Additional Patient History	(0010, 21B0)	Supported	Supported
Patient Comments	(0010, 4000)	Supported	Supported
Other Study Numbers	(0020, 1070)	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
Number of Study Related Series	(0020, 1206)	Supported	Supported
Number of Study Related Instances	(0020, 1208)	Supported	Supported
Interpretation Author	(4008, 010C)	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

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Performed Procedure Step ID	(0040, 0253)	Supported	Supported
Reference Study Component Sequence	(0008, 1111)	Supported	Supported
Referenced SOP Class UID	(0008, 1150)	Supported	Supported
Referenced SOP Instance UID	(0008, 1155)	Supported	Supported
Request Attribute Sequence	(0040, 0275)	Supported	Supported
Requested Procedure ID	(0040, 1001)	Supported	Supported
Scheduled Procedure Step ID	(0040, 0009)	Supported	Supported
Performed Procedure Step Start Date	(0040, 0244)	Supported	Supported
Performed Procedure Step Start Time	(0040, 0245)	Supported	Supported
Body Part Examined	(0018, 0015)	Supported	Supported
Station Name	(0008, 1010)	Supported	Supported
Institution Name	(0008, 0080)	Supported	Supported
Performing Physician's Name	(0008, 1050)	Supported	Supported
Manufacturer	(0008, 0070)	Supported	Supported
Manufacturer's Model Name	(0008, 1090)	Supported	Supported
Series Description	(0008, 103E)	Supported	Supported
Series Date	(0008, 0021)	Supported	Supported
Series Time	(0008, 0031)	Supported	Supported
Protocol Name	(0018, 1030)	Supported	Supported
Composite Object Instance Level			
Instance Number	(0020, 0013)	Supported	Supported
Overlay Number	(0020, 0022)	Supported	Supported
Curve Number	(0020, 0024)	Supported	Supported
LUT Number	(0020, 0026)	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

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Bits Allocated	(0028, 0100)	Supported	Supported
Number of Frames	(0028, 0008)	Supported	Supported

Patient/Study Only Image C-FIND Supported Attributes

Attributes for the Patient and Study Levels of the Patient/Study Only Query/Retrieve Information Model are the same as the corresponding attributes for the Patient and Study Levels of the Patient Root Query/Retrieve Information Model. For information about these attributes, see TABLE 3.30.

Table 3.33: 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 Label	(0070, 0080)	Supported	Supported
Presentation Description	(0070, 0081)	Supported	Supported
Presentation Creation Date	(0070, 0082)	Supported	Supported
Presentation Creation Time	(0070, 0083)	Supported	Supported
Presentation Creator's Name	(0070, 0084)	Supported	Supported
Referenced Series Sequence	(0008, 1115)	Supported	Supported
>Series Instance UID	(0020, 000E)	Supported	Supported
>Referenced Image Sequence	(0008, 1140)	Supported	Supported
>>Referenced SOP Class UID	(0008, 1150)	Supported	Supported
>>Referenced SOP Instance UID	(0008, 1155)	Supported	Supported

Table 3.34: 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			
Completion Flag	(0040, A491)	Supported	Supported
Verification Flag	(0040, A493)	Supported	Supported
Content Date	(0008, 0023)	Supported	Supported
Content Time	(0008, 0033)	Supported	Supported
Observation Date Time	(0040, A032)	Supported	Supported
Verifying Observer Sequence	(0040, A073)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
>Verifying Organization	(0040, A027)	Supported	Supported
>Verification DateTime	(0040, A030)	Supported	Supported
>Verifying Observer Name	(0040, A075)	Supported	Supported
>Verifying Observer Identification Code Sequence	(0040, A088)	Supported	Supported
Referenced Request Sequence	(0040, A370)	Supported	Supported
>Study Instance UID	(0020, 000D)	Supported	Supported
>Accession Number	(0008, 0050)	Supported	Supported
>Requested Procedure ID	(0040, 1000)	Supported	Supported
>Requested Procedure Code Sequence	(0032, 1064)	Supported	Supported
>>Code Value	(0008, 0100)	Supported	Supported
>>Code Scheme Designator	(0008, 0102)	Supported	Supported
>>Code Scheme Version	(0008, 0103)	Supported	Supported
>>Code Meaning	(0008, 0104)	Supported	Supported
Concept Name Code Sequence	(0040, A043)	Supported	Supported
>Code Value	(0008, 0100)	Supported	Supported
>Coding Scheme Designator	(0008, 0102)	Supported	Supported
>Coding Scheme Version	(0008, 0103)	Supported	Supported
>Code Meaning	(0008, 0104)	Supported	Supported

C-FIND Status Codes

If the Proxy returns one of the following status codes for C-FIND, 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 error may be returned if the data set is corrupted. The Error Comment field of the status is populated with a description of the error encountered.
- C001 (Unable To Process) - Indicates that the Proxy was unable to fully process the query. The Error Comment field of the status is 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 before completion.
- A700 (Out Of Resources) - Indicates that the Proxy ran out of resources to process the query request.

If the Proxy returns one of the following status codes for C-MOVE, 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 parameters data set. This error may be returned if the data set is corrupted. The Error Comment field of the status is populated with a description of the error encountered.
- C001 (Unable To Process) - Indicates that the Proxy was unable to fully process the move. The Error Comment field of the status is populated with a description of the error encountered.
- A900 (Identifier Does Not Match SOP Class) - Indicates that the move 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 request was terminated by the remote application entity prior to completion.
- A701 (Unable To Calculate Number Of Matches) - Indicates that the Proxy was unable to calculate the number of matching objects for this move request. This error may be due to a lack of resources.
- A702 (Unable To Perform Sub-Operations) - Indicates that the Proxy was unable to perform the storage sub-operations. This error may be due to a lack of resources.
- A801 (Move Destination Unknown) - Indicates that the Proxy was unable to connect to the move destination (C-MOVE only).

Query implementation specifics

It is recommended that the SCUs append a wildcard “*” at the end of each component of any structured name to facilitate matching.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Proxy selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the Proxy's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.2.3.4. Respond to a Retrieve Request from a Remote System

Associated Real-World Activity

When the Proxy receives a request for retrieval (C-MOVE), it first resolves the request against the underlying database and then the other archives on the network. If any objects are found, it attempts to establish an association over which to store the found objects (C-MOVE and move-thru only). If the association is established, it retrieves the found objects from the underlying platform or archive and stores them over the association, returning pending responses to the retrieval request initiator.

Presentation Context Table

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

Table 3.35: Presentation Context Table

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		
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		
Patient/Study Only Query/ Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Little Endian Implicit VR	1.2.840.10008.1.2	SCP	Relational
		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 Query/Retrieve SOP Classes

C-MOVE Status Codes

If the Enterprise Archive Manager returns one of the following status codes for C-MOVE, 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 error may be returned if the data set is corrupted. The Error Comment field of the status is 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 is 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 before 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. This error may be due to a lack of resources.
- A702 (Unable To Perform Sub-Operations) - Indicates that the archive was unable to perform the storage sub-operations. This error may be due to a lack of resources.
- A801 (Move Destination Unknown) - Indicates that the archive was unable to connect to the move destination.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Proxy selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the Proxy's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.2.3.5. Accepting a Storage Commitment Request from a Remote System

Associated Real-World Activity

When the Proxy receives a storage commitment request (N-ACTION), it immediately responds with a status of success. It then attempts to locate all objects in the Archive Manager and Advanced Visualization for which storage commitment was requested. When the Proxy has located the objects, it establishes an association back to the requesting entity and sends a storage commitment response (N-EVENT-REPORT), detailing all objects that were/were not found. Upon completion of the N-EVENT-REPORT, it closes the association.

Proposed Presentation Contexts

The Proxy accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.36: Presentation Context Table

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 Proxy fully conforms to the SOP of the Storage Commitment Push Service Class.

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

If the Proxy returns one of the following status codes for N-ACTION, 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

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Proxy 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 is selected.

3.3. Worklist Manager 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

SOP Class Name	SOP Class UID	SCU/SCP
Modality Worklist		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	N / Y

3.3.1. Association Establishment Policies

3.3.1.1. General

The Worklist Manager never initiates DICOM associations. The Worklist Manager has configurable Maximum PDU sizes, both sent and received (the default is 50kb, both sent and received).

3.3.1.2. Number of Associations

The Worklist Manager accepts any number of simultaneous associations up to a configurable limit. The default limit (which may be increased or decreased) is 200 simultaneous connections. The maximum limit on the number of simultaneous associations depends on the number of open file descriptors by the underlying operating system.

3.3.1.3. Asynchronous Nature

The Worklist Manager allows any number of asynchronous operations, whether invoked or performed. The number of asynchronous operations is configurable.

3.3.1.4. Implementation Identifying Information

The Worklist Manager provides a single Implementation Class UID and Implementation Version Name as follows:

Worklist Manager Implementation Class UID	1.2.826.0.1.3680043.2.133.1.3
Implementation Version Name	11.3.0

3.3.2. Association Initiation by Real-World Activity

The Worklist Manager does not initiate associations.

3.3.3. Association Acceptance Policy

The Worklist Manager is configurable to allow security restrictions ranging from no restrictions (promiscuous mode) to limiting successful association negotiation to a known set of remote AEs for a configurable set of SOP Classes.

If security is enabled, association attempts by unknown application entities are rejected. Proposed presentation contexts from known remote application entities may be rejected based on their allowed security permissions (allowable service classes for the AE).

3.3.3.1. Respond to a Verification Request from a Remote System

Associated Real-World Activity

When the Worklist Manager receives a verification request (C-ECHO), it responds with a status of success if possible.

Presentation Context Table

The Worklist Manager accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.37: Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	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		

SOP Specific Conformance - Verification

The Worklist Manager fully conforms to the SOP of the Verification Service class.

Extended negotiation is not supported for the Verification Service Class.

If the Worklist Manager returns anything other than success, then the C-ECHO request failed.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Worklist Manager selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the Worklist Manager's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.3.3.2. Respond to a Modality Worklist (MWL) Query Request from a Remote System

Associated Real-World Activity

This activity is initiated by an SCU, typically an imaging modality, which queries the Worklist Manager for information related to Scheduled Procedure Steps and entities related to the Scheduled Procedure Steps. Part of this information is used by the imaging modality itself, but much of the information is intended to be presented to the modality operator.

Presentation Context Table

The Worklist Manager accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.38: Presentation Context Table

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	SCP	None
		Little Endian Implicit VR	1.2.840.10008.1.2		
		Big Endian Explicit VR	1.2.840.10008.1.2.2		

SOP Specific Conformance

Worklist Manager provides standard conformance to the DICOM Modality Worklist SOP Class as an SCP.

The Worklist Manager supports all required matching key types and all allowable optional matching key attributes.

Subject to availability from the HIS/RIS, the Worklist Manager supports virtually all required and optional return key attributes.

Worklist Manager supports the following elements for this SOP Class:

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
SOP Common Module			
SOP Class UID	(0008,0016)	Supported	Supported
SOP Instance UID	(0008,0018)	Supported (U)	Supported
Specific Character Set	(0008,0005)	Supported	Supported
Instance Creation Date	(0008,0012)	Supported	Supported
Instance Creation Time	(0008,0013)	Supported	Supported
Instance Creator UID	(0008,0014)	Supported	Supported
Instance Number	(0020,0013)	Supported	Supported
Patient Relationship Module			
Referenced Visit Sequence	(0008,1125)	Supported	Supported
> Referenced SOP Class UID	(0008,1150)	Supported	Supported
> Referenced SOP Instance UID	(0008,1155)	Supported	Supported
Referenced Patient Alias Sequence	(0038,0004)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
> Referenced SOP Class UID	(0008,1150)	Supported	Supported
> Referenced SOP Instance UID	(0008,1155)	Supported	Supported
Patient Identification Module			
Patient Name	(0010,0010)	Supported	Supported
Patient ID	(0010,0020)	Supported	Supported
Issuer of Patient ID	(0010,0021)	Supported	Supported
Other Patient IDs	(0010,1000)	Supported	Supported
Other Patient Names	(0010,1001)	Supported	Supported
Patient's Birth Name	(0010,1005)	Supported	Supported
Patient's Mother's Birth Name	(0010,1060)	Supported	Supported
Medical Record Locator	(0010,1090)	Supported	Supported
Patient Demographic Module			
Patient's Age	(0010,1010)	Supported	Supported
Occupation	(0010,2180)	Supported	Supported
Patient Data Confidentiality Constraint Description	(0040,3001)	Supported	Supported
Patient's Birth Date	(0010,0030)	Supported	Supported
Patient's Birth Time	(0010,0032)	Supported	Supported
Patient's Sex	(0010,0040)	Supported	Supported
Patient's Insurance Plan Code Sequence	(0010,0050)	Supported	Supported
> Code Value	(0008,0100)	Supported	Supported
> Coding Scheme Designator	(0008,0102)	Supported	Supported
> Coding Scheme Version	(0008,0103)	Supported	Supported
> Code Meaning	(0008,0104)	Supported	Supported
Patient's Size	(0010,1020)	Supported	Supported
Patient's Weight	(0010,1030)	Supported	Supported
Patient's Address	(0010,1040)	Supported	Supported
Military Rank	(0010,1080)	Supported	Supported
Branch of Service	(0010,1081)	Supported	Supported
County of Residence	(0010,2150)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Region of Residence	(0010,2152)	Supported	Supported
Patient's Telephone Numbers	(0010,2154)	Supported	Supported
Ethnic Group	(0010,2160)	Supported	Supported
Patient's Religious Preference	(0010,21F0)	Supported	Supported
Patient Comments	(0010,4000)	Supported	Supported
Patient Medical Module			
Medical Alerts	(0010,2000)	Supported	Supported
Contrast Allergies	(0010,2110)	Supported	Supported
Smoking Status	(0010,21A0)	Supported	Supported
Additional Patient History	(0010,21B0)	Supported	Supported
Pregnancy Status	(0010,21C0)	Supported	Supported
Last Menstrual Date	(0010,21D0)	Supported	Supported
Special Needs	(0038,0050)	Supported	Supported
Patient State	(0038,0500)	Supported	Supported
Visit Relationship Module			
Referenced Patient Sequence	(0008,1120)	Supported	Supported
> Referenced SOP Class UID	(0008,1150)	Supported	Supported
> Referenced SOP Instance UID	(0008,1155)	Supported	Supported
Visit Identification Module			
Institution Name	(0008,0080)	Supported	Supported
Institution Address	(0008,0081)	Supported	Supported
Institution Code Sequence	(0008,0082)	Supported	Supported
> Code Value	(0008,0100)	Supported	Supported
> Coding Scheme Designator	(0008,0102)	Supported	Supported
> Coding Scheme Version	(0008,0103)	Supported	Supported
> Code Meaning	(0008,0104)	Supported	Supported
Admission ID	(0038,0010)	Supported	Supported
Issuer of Admission ID	(0038,0011)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Visit Status Module			
Visit Status ID	(0038,0008)	Supported	Supported
Current Patient Location	(0038,0300)	Supported	Supported
Patient's Institutional Residence	(0038,0400)	Supported	Supported
Visit Comments	(0038,4000)	Supported	Supported
Visit Admission Module			
Referring Physician's Name	(0008,0090)	Supported	Supported
Referring Physician's Address	(0008,0092)	Supported	Supported
Referring Physician's Phone Numbers	(0008,0094)	Supported	Supported
Admitting Diagnosis Description	(0008,1080)	Supported	Supported
Admitting Diagnosis Code Sequence	(0008,1084)	Supported	Supported
> Code Value	(0008,0100)	Supported	Supported
> Coding Scheme Designator	(0008,0102)	Supported	Supported
> Coding Scheme Version	(0008,0103)	Supported	Supported
> Code Meaning	(0008,0104)	Supported	Supported
Route of Admissions	(0038,0016)	Supported	Supported
Admitting Date	(0038,0020)	Supported	Supported
Admitting Time	(0038,0021)	Supported	Supported
Scheduled Procedure Step Module			
Scheduled Procedure Step Sequence	(0040,0100)	Supported	Supported
> Scheduled Station AE Title	(0040,0001)	Supported	Supported
> Scheduled Station Name	(0040,0010)	Supported	Supported
> Scheduled Procedure Step Location	(0040,0011)	Supported	Supported
> Scheduled Procedure Step Start Date	(0040,0002)	Supported	Supported
> Scheduled Procedure Step Start Time	(0040,0003)	Supported	Supported
> Scheduled Procedure Step End Date	(0040,0004)	Supported	Supported
> Scheduled Procedure Step End Time	(0040,0005)	Supported	Supported
> Scheduled Performing Physician's Name	(0040,0006)	Supported	Supported
> Scheduled Procedure Step Description	(0040,0007)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
> Scheduled Protocol Sequence	(0040,0008)	Supported	Supported
>> Code Value	(0008,0100)	Supported	Supported
>> Coding Scheme Designator	(0008,0102)	Supported	Supported
>> Coding Scheme Version	(0008,0103)	Supported	Supported
>> Code Meaning	(0008,0104)	Supported	Supported
>> Protocol Context Sequence	(0040, 0440)	Not Supported	Not Supported
> Scheduled Procedure Step ID	(0040,0009)	Supported	Supported
> Scheduled Procedure Step Status	(0040,0020)	Supported	Supported
> Comments on the Scheduled Procedure Step	(0040,0400)	Supported	Supported
> Modality	(0008,0060)	Supported	Supported
> Requested Contrast Agent	(0032,1070)	Supported	Supported
> Pre-medication	(0040,0012)	Supported	Supported
Requested Procedure Step Module			
Requested Procedure ID	(0040,1001)	Supported	Supported
Reason for the Requested Procedure	(0040,1002)	Supported	Supported
Requested Procedure Comments	(0040,1400)	Supported	Supported
Requested Procedure Code Sequence	(0032,1064)	Supported	Supported
> Code Value	(0008,0100)	Supported	Supported
> Coding Scheme Designator	(0008,0102)	Supported	Supported
> Coding Scheme Version	(0008,0103)	Supported	Supported
> Code Meaning	(0008,0104)	Supported	Supported
Study Instance UID	(0020,000D)	Supported	Supported
Referenced Study Sequence	(0008,1110)	Supported	Supported
> Referenced SOP Class UID	(0008,1150)	Supported	Supported
> Referenced SOP Instance UID	(0008,1155)	Supported	Supported
Requested Procedure Description	(0032,1060)	Supported	Supported
Requested Procedure Priority	(0040,1003)	Supported	Supported
Patient Transport Arrangements	(0040,1004)	Supported	Supported
Requested Procedure Location	(0040,1005)	Supported	Supported

Attribute Name	Tag	Query Keys Matching SCP	Query Keys Return SCP
Confidentiality Code	(0040,1008)	Supported	Supported
Reporting Priority	(0040,1009)	Supported	Supported
Names of Intended Recipients of Results	(0040,1010)	Supported	Supported
Imaging Service Request Module			
Reason for the Imaging Service Request	(0040,2001)	Supported	Supported
Imaging Service Request Comments	(0040,2400)	Supported	Supported
Requesting Physician	(0032,1032)	Supported	Supported
Referring Physician's Name	(0008,0090)	Supported	Supported
Requesting Service	(0032,1033)	Supported	Supported
Accession Number	(0008,0050)	Supported	Supported
Issuing Date of Imaging Service Request	(0040,2004)	Supported	Supported
Issuing Time of Imaging Service Request	(0040,2005)	Supported	Supported
Placer Order Number / Imaging Service Request	(0040,2016)	Supported	Supported
Filler Order Number / Imaging Service Request	(0040,2017)	Supported	Supported
Order Entered By...	(0040,2008)	Supported	Supported
Order Enterer's Location	(0040,2009)	Supported	Supported
Order Callback Number	(0040,2010)	Supported	Supported

(U) = Unique

C-FIND Status Codes - Modality Worklist Query

The Worklist Manager returns the C-FIND Response Status Code applicable to the associated request through the C-FIND response primitive.

If the Worklist Manager returns one of the following status codes for C-FIND, 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 error may be returned if the data set is corrupted. The Error Comment field of the status is 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 is 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.

DICOM PS 3.4-2003 Table K.4-1 defines the status values specific to this SOP Class and DIMSE Service.

Query implementation specifics - Modality Worklist Query

When the Worklist Manager receives a Modality Worklist Query request, it resolves the request against the underlying database and returns all matching items (general purpose scheduled procedure steps) and requested return keys to the query initiator.

Person Names are stored in the database in uppercase. All VR PN attributes found in query datasets are converted to uppercase before a database query is made.

Because of this, the system supports case-insensitive matching for PN VR attributes.

Per the recommendation by IHE, it is recommended that the SCUs append a wildcard “*” at the end of each component of any structured name to facilitate matching.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The Worklist Manager selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the Worklist Manager's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.4. Prefetcher 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
BSCN		
Basic Study Content Notification	1.2.840.10008.1.9	N / Y
Query/Retrieve		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Y / N
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Y / N

3.4.1. Association Establishment Policies

3.4.1.1. General

The Prefetcher is capable of querying and making move requests to other DICOM archives according to user configurable rules. This feature is known as “prefetching.” When performing prefetching functions, the Prefetcher attempts to establish associations with remote application entities to query for and request the move of objects.

The Prefetcher has configurable Maximum PDU sizes, both sent and received (the default is 50KB, both sent and received).

3.4.1.2. Number of Associations

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

The Prefetcher establishes any number of associations performing DICOM Moves, up to a configurable limit. This limit is configurable from the Prefetcher administration utilities and is specific to the AE of the Move SCP. Distinct Move SCPs can have distinct limits.

3.4.1.3. Asynchronous Nature

The Prefetcher accepts only one operation per association as a BSCN SCU.

In all SOP Classes where the Prefetcher acts as an SCP, the Prefetcher invokes only one operation per association.

3.4.1.4. Implementation identifying Information

The Prefetcher provides a single Implementation Class UID and Implementation Version Name as follows:

Pre-fetcher Implementation Class UID (BSCN SCP, Query SCU)	1.2.826.0.1.3680043.2.133.1.4.2
Pre-fetcher Implementation Class UID (Move SCU)	1.2.826.0.1.3680043.2.133.1.4.1
Implementation Version Name	11.3.0

3.4.2. Association Initiation by Real-World Activity

The Prefetcher initiates 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 initiates an association to a remote device at the scheduled delivery time of priors.

3.4.2.1. Query a Remote DICOM Device

Associated Real-World Activity

A triggering event (receipt of an HL7 or BSCN message) invokes a prefetch rule. The Prefetcher initiates an association to the configured destination to search for data that may be relevant to older procedures performed.

The search queries for data based on the following:

- A matching patient.
- Prior images of a patient.
- Objects within a study.

Proposed Presentation Contexts

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

Table 3.39: Presentation Context Table

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:

Table 3.40: Patient Level Query

Attribute Tag	Element Name
(0010, 0010)	Patient Name
(0010, 0020)	Patient ID
(0010, 0021)	Issuer of Patient ID
(0010, 0030)	Patient Birth Date
(0010, 0040)	Patient Sex

Table 3.41: Study Level Query

Attribute Tag	Element Name
(0008, 0020)	Study Date
(0008, 0030)	Study Time
(0008, 0050)	Accession Number

Attribute Tag	Element Name
(0008, 0061)	Modalities In Study
(0020, 000D)	Study Instance UID
(0020, 0010)	Study ID

3.4.2.2. Request a Move Association to a Remote System

Associated Real-World Activity

A prefetch order previously scheduled is due for delivery. The Prefetcher makes C-MOVE requests to the source entity of the prior exam determined to be needed by the rule.

Proposed Presentation Contexts

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

Table 3.42: Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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	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 Move SOP Class

Query Attributes

The move request attributes can vary depending on the configured patient resolution strategy. Not all patient level attributes may be present as a result of said strategy. The following is a super set of possible attributes:

Table 3.43: Study Level Move

Attribute Tag	Element Name
(0010, 0010)	Patient Name
(0010, 0020)	Patient ID
(0010, 0021)	Issuer of Patient ID
(0010, 0030)	Patient Birth Date
(0010, 0032)	Patient Birth Time
(0010, 0040)	Patient Sex
(0020, 000D)	Study Instance UID

Table 3.44: Image Level Move

Attribute Tag	Element Name
(0008, 0018)	SOP Instance UID
(0010, 0010)	Patient Name
(0010, 0020)	Patient ID
(0010, 0021)	Issuer of Patient ID
(0010, 0030)	Patient Birth Date
(0010, 0032)	Patient Birth Time
(0010, 0040)	Patient Sex
(0020, 000D)	Study Instance UID
(0020, 000E)	Series Instance UID

3.4.3. Association Acceptance Policy

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

3.4.3.1. Receive a BSCN message from a Remote System

Associated Real-World Activity

The Prefetcher supports only BSCN storage. Any other association types are rejected. The associated data set of a BSCN is used internally to trigger prefetching. The data set is not persisted or retransmitted.

Presentation Context Tables

The following presentation contexts are supported by the Prefetcher during association establishment:

Table 3.45: Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Study Content Notification	1.2.840.10008.1.9	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 all Storage SOP Classes

The Prefetcher does not store images and therefore does not verify their storage. As a result, the response BSCN Status Code is always: 0x003 Success.

As a result of a BSCN, the Prefetcher triggers internal prefetching rules that have expressed interest in these types of events. The result of rule execution is determined by the rule implementation. Typically, a rule queries a storage AE for related images and schedules the transfer (C-MOVE) of those images to another AE.

Presentation Context Acceptance Criterion

No prioritization is 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 Prefetcher always selects a transfer syntax using an acceptor first policy.

In an acceptor first policy, the first transfer syntax in the Prefetcher's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.5. Technologist Workflow (TWF) Specification

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCP:

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	N / Y
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	N / Y
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	N / Y
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	N / Y
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	N / Y
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	N / Y
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	N / Y
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	N / Y
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	N / Y
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	N / Y
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	N / Y
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	N / Y
Digital Mammography Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	N / Y
Digital Mammography Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	N / Y
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	N / Y
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	N / Y
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	N / Y
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	N / Y
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	N / Y
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	N / Y
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	N / Y
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	N / Y
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	N / Y
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	N / Y

SOP Class Name	SOP Class UID	SCU/SCP
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	N / Y
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	N / Y
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	N / Y
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	N / Y
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	N / Y
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	N / Y
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	N / Y
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	N / Y
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	N / Y
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	N / Y
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	N / Y
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	N / Y
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	N / Y
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	N / Y
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	N / Y
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	N / Y
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	N / Y
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	N / Y
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	N / Y
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	N / Y
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	N / Y
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	N / Y
Stored Print Storage	1.2.840.10008.5.1.1.27	N / Y
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	N / Y
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	N / Y
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	N / Y
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	N / Y
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	N / Y
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	N / Y
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	N / Y

SOP Class Name	SOP Class UID	SCU/SCP
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	N / Y
X-Ray Angiographic Bi-Plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3	N / Y
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	N / Y
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	N / Y
Modality Worklist		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Y / N

3.5.1. Association Establishment Policies

3.5.1.1. General

The TWF creates an association with the MWL C-FIND SCP when prompted by the user. The TWF has configurable Maximum PDU sizes for both sent and received (the default is 1024kb, both sent and received).

3.5.1.2. Number of Associations

Outgoing associations for the C-FIND requests are pooled. The size of the pool is configurable. The default pool size is for five simultaneous associations.

3.5.1.3. Asynchronous Nature

The TWF allows any number of asynchronous operations, whether invoked and performed. The number of asynchronous operations is configurable.

3.5.1.4. Implementation Identifying Information

The TWF provides a single Implementation Class UID and Implementation Version Name as follows:

DICOM Component Implementation Class UID	1.2.826.0.1.3680043.2.133.1.1
Implementation Version Name	11.3.0

3.5.2. Association Initiation by Real-World Activity

The TWF attempts to initiate one association for each C-FIND request from the user. The association is initiated when a user chooses to query the MWL for the patient demographic information to be used in the reconciliation. The query can be done for a configurable set of attributes.

3.5.2.1. Query Modality Worklist

Associated Real-World Activity

The user selects a study within the TWF to be reconciled. The MWL is queried by TWF for a set of defined attributes. The results are returned and the user can choose the best match to reconcile the patient demographic data.

Proposed Presentation Contexts

Table 3.46: Presentation Context Table

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

Information Model

TWF attempts to query the MWL for the following default attributes. The attributes used for identification by the TWF are configurable:

Attribute Name	Tag	Query Keys Matching SCU
Patient ID	(0010, 0020)	Supported
Scheduled Procedure Step Sequence	(0040, 0100)	Supported
Modality	(0008, 0060)	Supported
Accession Number	(0008, 0050)	Supported

3.5.3. Association Acceptance Policy

When the TWF accepts an association, it allows the storage of objects and verification of the TWF interface.

The TWF accepts any number of simultaneous associations, the number of which can be configured. The maximum limit on the number of simultaneous associations depends on the number of open file descriptors allowed by the underlying operating system.

The TWF is configurable to allow security restrictions ranging from no restrictions (promiscuous) to limiting a particular remote application entity to specified SOP Classes and specified SCU/SCP roles. If security is enabled, association attempts by unknown entities are rejected outright and proposed presentation contexts from known remote application entities may be rejected based on their allowed security permissions.

3.5.3.1. Store DICOM Objects

Associated Real-World Activity

This activity is initiated by a modality lacking worklist functionality to populate the patient demographic information in the acquired images. The technologist pushes the images to the unique AE-title of the TWF interface for reconciliation.

Presentation Contexts

Table 3.47: Presentation Context Table

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	See TABLE 3.48.	SCP	None
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	See TABLE 3.48.	SCP	None
Basic Study Content Notification	1.2.840.10008.1.9	See TABLE 3.48.	SCP	None
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	See TABLE 3.48.	SCP	None
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	See TABLE 3.48.	SCP	None
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	See TABLE 3.48.	SCP	None
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	See TABLE 3.48.	SCP	None
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	See TABLE 3.48.	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See TABLE 3.48.	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See TABLE 3.48.	SCP	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See TABLE 3.48.	SCP	None
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	See TABLE 3.48.	SCP	None
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	See TABLE 3.48.	SCP	None
Digital Mammography Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	See TABLE 3.48.	SCP	None
Digital Mammography Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	See TABLE 3.48.	SCP	None
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	See TABLE 3.48.	SCP	None
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	See TABLE 3.48.	SCP	None
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	See TABLE 3.48.	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	See TABLE 3.48.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	**UID**			
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See TABLE 3.48.	SCP	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See TABLE 3.48.	SCP	None
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	See TABLE 3.48.	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	See TABLE 3.48.	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See TABLE 3.48.	SCP	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	See TABLE 3.48.	SCP	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See TABLE 3.48.	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See TABLE 3.48.	SCP	None
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See TABLE 3.48	SCP	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See TABLE 3.48.	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See TABLE 3.48.	SCP	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See TABLE 3.48.	SCP	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See TABLE 3.48.	SCP	None
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	See TABLE 3.48.	SCP	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	See TABLE 3.48.	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See TABLE 3.48.	SCP	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	See TABLE 3.48.	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	See TABLE 3.48.	SCP	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See TABLE 3.48.	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	**UID**			
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	See TABLE 3.48.	SCP	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See TABLE 3.48.	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See TABLE 3.48.	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See TABLE 3.48.	SCP	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See TABLE 3.48.	SCP	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	See TABLE 3.48.	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See TABLE 3.48.	SCP	None
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	See TABLE 3.48.	SCP	None
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	See TABLE 3.48	SCP	None
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	See TABLE 3.48	SCP	None
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	See TABLE 3.48.	SCP	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	See TABLE 3.48.	SCP	None
Stored Print Storage	1.2.840.10008.5.1.1.27	See TABLE 3.48.	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See TABLE 3.48.	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	See TABLE 3.48.	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See TABLE 3.48.	SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	See TABLE 3.48.	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See TABLE 3.48.	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See TABLE 3.48.	SCP	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See TABLE 3.48.	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See TABLE 3.48.	SCP	None
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	See TABLE 3.48	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See TABLE 3.48	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See TABLE 3.48	SCP	None

Table 3.48: Transfer Syntax for Receive from 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 Lossless, Nonhierarchical (Processes 14)	1.2.840.10008.1.2.4.57
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
MPEG2 Main Profile Main Level	1.2.840.10008.1.2.4.100
MPEG2 Main Profile High Level	1.2.840.10008.1.2.4.101
MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102
MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	1.2.840.10008.1.2.4.103

3.5.3.2. Respond to a Verification Request from a Remote System

Associated Real-World Activity

When the TWF receives a verification request (C-ECHO), it responds with a status of success if possible.

Presentation Context Table

The TWF accepts the following Transfer Syntaxes for each presentation context in an association it receives:

Table 3.49: Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	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 Verification SOP Class

The TWF fully conforms to the SOP of the Verification Service Class.

Extended negotiation is not supported for the Verification Service Class.

If the TWF returns anything other than success, the C-ECHO operation has failed.

Presentation Context Acceptance Criterion

No prioritization is used for the acceptance of presentation contexts. Any combination of supported transfer syntax and abstract syntax is accepted if the product is configured for them.

Transfer Syntax Selection Policies

The TWF selects transfer syntaxes in Acceptor first mode: the first transfer syntax in the TWF's list of allowable transfer syntaxes that also exists in the proposed transfer syntax list is selected.

3.6. QIDO-RS Specification

This AE complies with Chapter 6.7 in P.S. 3.18, specifications for QIDO-RS.

3.6.1. QIDO-RS Search Studies

The following tables provide an overview of the network services supported by the Enterprise Archive QIDO-RS Service. The Unique Key for that query level, in which Universal Matching or Single Value matching is issued, depends on the query level (See Section C.2.2.1.1. “Unique Keys”)

Table 3.50: QIDO-RS Search for Studies Specification

Parameter	Restrictions
Media Types Supported (Accept header)	Restricted to “multipart/related; type=application/dicom+xml”
Matching Attributes	See TABLE 3.2.
Return Attributes	See TABLE 3.2.
Limit and Offset Support	No
Person Name Matching	Literal, case insensitive. (see Section K.4.2.2 DICOM Standard P.S-3.2 - “Extended Negotiation”.)

Table 3.51: QIDO-RS Search for Studies Attribute Matching

Keyword	Tag	Types of Matching
Study Level		
StudyDate	00080020	S,*,U,R
StudyTime	00080030	S,*,U,R
AccessionNumber	00080050	S,*,U,R
ModalitiesInStudy	00080061	S,*,U,R
ReferringPhysiciansName	00080090	S,*,U,R
StudyDescription	00081030	S,*,U,R
PhysicianOfRecord	00081048	S,*,U,R
PatientsName	00100010	S,*,U,R
PatientID	00100020	S,*,U,R
PatientBirthDate	00100030	S,*,U,R
PatientSex	00100040	S,*,U,R
StudyInstanceUID	0020000D	S,*,U,R
StudyID	00200010	S,*,U,R
NumberOfStudyRelatedSeries	00201206	S,*,U,R
NumberOfStudyRelatedInstances	00201208	S,*,U,R

Keyword	Tag	Types of Matching
RetrieveURL	0081190	S,*,U,R
Common to all query levels		
InstanceAvailability	00080056	S,*,U,R
SpecificCharacterSet	00080005	S,*,U,R
RetrieveURL	00081190	S,*,U,R

3.6.2. QIDO-RS Search for Series

Table 3.52: QIDO-RS Search for Series Specification

Parameter	Restrictions
Media Types Supported (Accept header)	Restricted to “multipart/related; type=application/dicom+xml” or “application/json”
Matching Attributes	See TABLE 3.4.
Return Attributes	See TABLE 3.4.
Limit and Offset Support	No
Person Name Matching	Literal, case insensitive. (see section “Extended Negotiation” below)

The following table provides an overview of the network services supported by the Enterprise Archive QIDO-RS Service.

Table 3.53: QIDO-RS Series Attribute Matching

Keyword	Tag	Types of Matching
Series Level		
Modality	00080060	S,*,U,R
SeriesDescription	0008103E	S,*,U,R
SeriesInstanceUID	0020000E	S,*,U,R
SeriesNumber	00200011	S,*,U,R
NumberOfSeriesRelatedInstances	00201209	S,*,U,R
PerformedProcedureStepStartDate	00400244	S,*,U,R
PerformedProcedureStepStartTime	00400245	S,*,U,R
RequestAttributeSequence	00400275	S,*,U,R
>ScheduledProcedureStepID	00400009	S,*,U,R

Keyword	Tag	Types of Matching
>RequestedProcedureID	00401001	S,*,U,R
Common to all query levels		
InstanceAvailability	00080056	S,*,U,R
SpecificCharacterSet	00080005	S,*,U,R
RetrieveURL	00081190	S,*,U,R

3.6.3. QIDO-RS Search for Instances

Table 3.54: QIDO-RS Search for Instances Specification

Parameter	Restrictions
Media Types Supported (Accept header)	Restricted to “multipart/related; type=application/dicom+xml” or “application/json”
Matching Attributes	See TABLE 3.6.
Return Attributes	See TABLE 3.6.
Limit and Offset Support	No
Person Name Matching	Literal, case insensitive. (see section “Extended Negotiation” below)

Table 3.55: QIDO-RS Search for Instances Attribute Matching

Keyword	Tag	Types of Matching
Series Level		
Modality	00080060	S,*,U,R
SeriesDescription	0008103E	S,*,U,R
SeriesInstanceUID	0020000E	S,*,U,R
SeriesNumber	00200011	S,*,U,R
NumberOfSeriesRelatedInstances	00201209	S,*,U,R
PerformedProcedureStepStartDate	00400244	S,*,U,R
PerformedProcedureStepStartTime	00400245	S,*,U,R
RequestAttributeSequence	00400275	S,*,U,R
>ScheduledProcedureStepID	00400009	S,*,U,R
>RequestedProcedureID	00401001	S,*,U,R

Keyword	Tag	Types of Matching
Composite Instance Level		
SOPClassUID	00080016	S,*,U,R
SOPInstanceUID	00080018	S,*,U,R
InstanceNumber	00200013	S,*,U,R
Rows	00280010	S,*,U,R
Columns	00280011	S,*,U,R
BitsAllocated	00280100	S,*,U,R
NumberofFrames	00280008	S,*,U,R
Common to all query levels		
InstanceAvailability	00080056	S,*,U,R
SpecificCharacterSet	00080005	S,*,U,R
RetrieveURL	00081190	S,*,U,R

3.6.4. QIDO-RS Types of Matching Values

The following values are used for Types of Matching for all three QIDO-RS services.

Value	Definition
S	Identifier attribute that uses Single Value Matching.
L	UID List Matching.
U	Universal Matching. If only Universal Matching is supported for an attribute, then that attribute can only be passed as an “includefield” query key.
*	Wildcard matching.
R	Range Matching.
SEQUENCE	Sequence Matching.
NONE	No matching is supported, but the values for this Element requested will be returned with all requests.
UNIQUE	Unique Key for that query level, where Universal Matching or Single Value Matching is issued depending on the query level (see SectionC.2.2.1.1 “Unique Keys in DICOM Standard P.S-3.4).

3.6.5. Connection Policies

3.6.5.1. General

All standard RS connection policies apply. There are no extensions for RS options.

3.6.5.2. Number of Connections

The Enterprise Archive QIDO-RS Service is configurable to limit the number of simultaneous HTTP requests. The connection pool is shared among all services operating on the hosting server. A maximum number of simultaneous connections depends on the hardware and network where the application is installed.

3.6.5.3. Asynchronous Nature

The Enterprise Archive QIDO-RS RS Service does not support asynchronous response.

3.6.5.4. Response Status

The QIDO-RS response message header contains status codes indicating success, warning, or failure as shown in the following table. No additional status codes are used.

Table 3.56: Standard Response Codes

Service Status	HTTP/1.1 Status Code	QIDO-RS Description
Failure	400 - Bad Request	QIDO?RS Provider was unable to fulfill the request because the query component cannot be understood.
	401 - Unauthorized	QIDO?RS Provider refused to fulfill the request because the client is not authorized.
	403 - Forbidden	QIDO-RS Provider understood the request, but is refusing to fulfill it (e.g., no single patient specified, an authorized user with insufficient privileges, etc.).
	413 - Request entity too large	Query was too broad and a narrower query or paging should be requested. This code is returned for queries that do not specify a PatientID.
	503 - Busy	Service is unavailable.
Success	200 - OK	Query completed and any matching results are returned in the message body.

3.6.6. Extended Negotiation

QIDO-RS does not support the “fuzzymatching” query key.

QIDO-RS performs case insensitive matching for PN VR attributes but does not perform other forms of fuzzy matching. This applies to the following attributes:

- Referring Physician's Name (0008, 0090)
- Physician(s) of Record (0008, 1048)
- Patient's Name (0010, 0010)

3.7. STOW-RS Specification

This AE complies with Chapter 6.6 in P.S. 3.18, specifications for STOW-RS storage.

3.7.1. STOW-RS Store Instance

Table 3.57: STOW-RS Store Instance Specification

Parameter	Restrictions
Media Types Supported (Accept header)	Restricted to application/dicom or application/dicom+xml
Transfer Syntaxes Supported	Any transfer syntax supported by the hosting Enterprise Archive.
SOP Class Restrictions	Any SOP Class supported by the hosting Enterprise Archive.
Size restriction	Any size supported by the hosting Enterprise Archive

3.7.2. Connection Policies

All standard RS connection policies apply. There are no extensions for RS options.

3.7.2.1. Number of Connections

The Enterprise Archive STOW-RS Service is configurable to limit the number of simultaneous HTTP requests. The connection pool is shared among all services operating on the hosting server. A maximum number of simultaneous connections are dependent on the hardware and network where the application is installed.

3.7.2.2. Asynchronous Nature

The Enterprise Archive STOW-RS Service does not support asynchronous response.

The STOW-RS response message header contains status codes indicating success, warning, or failure. No additional status codes are used.

3.7.2.3. Response Status

Service Status	HTTP/1.1 Status Code	QIDO-RS Description
Failure	400 - Bad Request	STOW-RS Service was unable to store any instances due to bad syntax.
	401 - Unauthorized	STOW-RS Service refused to create or append any instances because the client is not authenticated.
	403 - Forbidden	STOW-RS Service understood the request, but is refusing to fulfill it (e.g., an authenticated user with insufficient privileges).
	409 - Conflict	STOW-RS Service request was formed correctly but the service was unable to store any instances due to a conflict in the request (e.g., unsupported SOP Class or Study Instance UID mismatch). This status code may also be used to indicate that a STOW-RS Service was unable to store any instances for a mixture of reasons. Additional information regarding the instance errors can be found in the XML response message.
	503 - Busy	STOW-RS Service was unable to store any instances because it was out of resources.
Warning	202 - Accepted	STOW-RS Service stored some of the instances but warnings or failures exist for others. Additional information regarding this error can be found in the XML response message body.
Success	200 - OK	STOW-RS Service successfully stored all the instances.

The Enterprise Archive STOW-RS response message body (PS3.18 XML Store Instances Response Module) contains the DICOM status codes for individual SOP Instances indicating success, warning, or failure as defined below. No additional status codes are used.

For the following semantics the associated value are used for the Warning Reason (0008, 1196):

- **B000-Coercion of Data Elements**

  The STOW-RS Service modified one or more data elements during storage of the instance.

- **B006-Elements Discarded**

  The STOW-RS Service discarded some data elements during storage of the instance.

- **B007-Data Set does not match SOP Class**

  The STOW-RS Service stored the instance despite the Data Set not matching the constraints of the SOP Class.

  Additional codes may be used for the Warning Reason (0008, 1196) to address the semantics of other issues. If multiple codes apply, the single most appropriate code is used.

  For the following semantics, the associated value are used for the Failure Reason (0008, 1197):

- **A700-Refused out of Resources**

  The STOW-RS Service did not store the instance because it was out of memory.

- **A710-Refused out of Resources**

  The STOW-RS Service did not store the instance because it was out of storage space.

- **A900-Error: Data Set does not match SOP Class**

  The STOW-RS Service did not store the instance because the SOP Class of an element in the Referenced SOP Instance Sequence did not correspond to the SOP Class registered for this SOP Instance at the STOW-RS Service.

- **C000-Error: Cannot understand**

  The STOW-RS Service did not store the instance because it cannot understand certain data elements.

- **C122-Referenced Transfer Syntax not supported**

  The STOW-RS Service did not store the instance because it does not support the requested Transfer Syntax for the instance.

- **0110-Processing failure**

  The STOW-RS Service did not store the instance because of a general failure in processing the operation.

- **0122-Referenced SOP Class not supported**

  The STOW-RS Service did not store the instance because it does not support the requested SOP Class.

  Additional codes may be used for the Failure Reason (0008, 1197) to address the semantics of other errors. If multiple codes apply, the single most appropriate code is used.

3.8. WADO-WS Specification

This AE complies with Chapter 6.4 in PS3.18, specifications for WS access.

3.8.1. WADO-WS Retrieve Imaging Document Set

Table 3.58: WADO-WS Retrieve Imaging Document Set Specification

Parameter	Restrictions
Transfer Syntaxes Supported	Any transfer syntax supported by the hosting Enterprise Archive.
SOP Class Restrictions	Any SOP Class supported by the hosting Enterprise Archive.
Size restriction	Any size supported by the hosting Enterprise Archive.
Anonymization	Not Supported.

3.8.2. WADO-WS Retrieve Rendered Imaging Document Set

Table 3.59: WADO-WS Retrieve Rendered Imaging Documents Specification

Parameter	Restrictions
Transfer Syntaxes Supported	Any transfer syntax supported by the hosting Enterprise Archive.
SOP Class Restrictions	Any SOP Class supported by the hosting Enterprise Archive.

Parameter	Restrictions
Size restriction	Any size supported by the hosting Enterprise Archive.
Rendered formats available	application/dicom image/jpeg
Rows restrictions	Not supported.
Columns restrictions	Not supported.
Region restrictions	Not supported.
Windows Centers restrictions	Not supported.
Windows Width restrictions	Not supported.
Frame Number restrictions	Supported.
Image Quality restrictions	Must be in range 1-100 (values are converted and rounded to a scale of 1-10).
Anonymization	Not supported.
Annotation restrictions	Not supported.
Compression available	JPEG
Other restrictions	None

3.8.3. WADO-WS Retrieve Imaging Document Set Metadata

Table 3.60: WADO-WS Retrieve Imaging Document Set Metadata

Parameter	Restrictions
Anonymization	Not Supported.
Other restrictions	Value representations not currently returned include the following: OB, OW, UN, UT, OD, and OF.

3.8.4. Connection Policies

All standard WS connection policies apply. There are no extensions for WS options.

3.8.4.1. Number of Connections

The Enterprise Archive WADO Service is configurable to limit the number of simultaneous HTTP requests. The connection pool is shared among all services operating on the hosting server. A maximum number of simultaneous connections depend on the hardware and network where the application is installed.

3.8.4.2. Asynchronous Nature

The Enterprise Archive WADO-WS Service does not support WS asynchronous response.

3.9. WADO-URI Specification

This AE complies with Chapter 6 in PS3.18, specifications for URI access.

3.9.1. WADO-URI Retrieve Imaging Document Set

Table 3.61: WADO-URI Retrieve Imaging Documents Specification

Parameter	Restrictions
Transfer Syntaxes Supported	Any transfer syntax supported by the hosting Enterprise Archive.
SOP Class Restrictions	Any SOP Class supported by the hosting Enterprise Archive.
Size restriction	Any size supported by the hosting Enterprise Archive.
Anonymization	Not Supported.
Window Width restrictions	Not Supported.
Image Quality restrictions	Must be in range 1 – 100 (values are converted and rounded to a scale of 1-10).
Frame Number restrictions	Supported.
Anonymization	Not Supported.
Annotation restrictions	Not Supported.
Compression available	JPEG
Other restrictions	None

If the URI Retrieve specifies no transfer syntax that is supported by the archive, the SOP Instance will be returned using the Implicit VR Little Endian Transfer Syntax.

3.9.2. Connection Policies

All URI connections are limited to HTTP GET requests. The Enterprise Archive WADO Service ignores all unknown HTTP header parameters.

3.9.2.1. Number of Connections

The Enterprise Archive WADO HTTP Service is configurable to limit the number of simultaneous HTTP requests. The connection pool is shared among all services operating on the hosting server. A maximum number of simultaneous connections are dependent on the hardware and network where the application is installed.

3.9.2.2. Asynchronous Nature

The Enterprise Archive WADO URI Service does not support asynchronous response.

3.10. WADO-RS Specification

This AE complies with Chapter 6 in PS3.18, specifications for RS access.

3.10.1. WADO-RS Retrieve Study

Table 3.62: WADO-RS Retrieve Study

Options	Restrictions
Data Types Supported (Accept Type)	application/dicom application/octet stream image/dicom+jpeg image/rle image/dicom+jp2 video/mpeg
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	Any transfer syntax supported by the Enterprise Archive.
SOP Class restrictions	Restricted to SOP Classes supported by the Enterprise Archive.
Size restriction	Restricted to size supported by the Enterprise Archive.

3.10.2. WADO-RS Retrieve Series

Table 3.63: WADO-RS Retrieve Series

Options	Restrictions
Data Types Supported (Accept Type)	application/dicom application/octet stream image/dicom+jpeg image/rle image/dicom+jp2 video/mpeg
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	Any transfer syntax supported by the Enterprise Archive.
SOP Class restrictions	Restricted to SOP Classes supported by the Enterprise Archive.
Size restriction	Restricted to size supported by the Enterprise Archive.

3.10.3. WADO-RS Retrieve Instance

Table 3.64: WADO-RS Retrieve Instance

Options	Restrictions
Data Types Supported (Accept Type)	application/dicom application/octet stream image/dicom+jpeg image/rle image/dicom+jp2 video/mpeg
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	Any transfer syntax supported by the Enterprise Archive.
SOP Class restrictions	Restricted to SOP Classes supported by the Enterprise Archive.
Size restriction	Restricted to size supported by the Enterprise Archive.

3.10.4. WADO-RS Retrieve Frames

Table 3.65: WADO-RS Retrieve Frames

Options	Restrictions
Data Types Supported (Accept Type)	application/dicom application/octet stream image/dicom+jpeg image/rle image/dicom+jp2 video/mpeg
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	Any transfer syntax supported by the Enterprise Archive.
SOP Class restrictions	Restricted to SOP Classes supported by the Enterprise Archive.
Size restriction	Restricted to size supported by the Enterprise Archive.

3.10.5. WADO-RS Retrieve Metadata

Table 3.66: WADO-RS Retrieve Metadata

Options	Restrictions
Data Types Supported (Accept Type)	multipart/related; type=application/dicom+xml

Options	Restrictions
Accept-Encoding	Restricted to gzip, deflate, or identity (the use of no transformation whatsoever). SeeW3C RFC 2616 Protocol Parameters Section 3.5 for more information (http://www.w3.org/Protocols/rfc2616/rfc2616-sec3.html).
SOP Class restrictions	Restricted to SOP Classes supported by the Enterprise Archive.
Size restriction	Restricted to size supported by the Enterprise Archive.

3.10.6. WADO-RS Retrieve Bulk Data

Table 3.67: WADO-RS Retrieve Bulk Data

Options	Restrictions
Data Types Supported (Accept Type)	application/octet stream
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	Any transfer syntax supported by the Enterprise Archive.
SOP Class restrictions	Restricted to SOP Classes supported by the Enterprise Archive.
Size restriction	Restricted to size supported by the Enterprise Archive.

3.10.7. Connection Policies

All standard RS connection policies apply. There are no extensions for RS options.

3.10.7.1. Number of Connections

The Enterprise Archive WADO Service is configurable to limit the number of simultaneous HTTP requests. The connection pool is shared among all services operating on the hosting server. The maximum number of simultaneous connections depends on the hardware and network where the application is installed.

3.10.7.2. Asynchronous Nature

The Enterprise Archive WADO RS Service does not support asynchronous response.

3.10.7.3. Response Status

TBD.

3.10.7.4. WADO-WS Retrieve Rendered Imaging Document Set

Parameter	Restrictions
Transfer Syntaxes Supported	Any transfer syntax supported by the hosting Enterprise Archive.
SOP Class Restrictions	Any SOP Class supported by the hosting Enterprise Archive.
Size restriction	Any size supported by the hosting Enterprise Archive.
Rendered formats available	application/dicom image/jpeg
Rows restrictions	Not Supported.
Columns restrictions	Not Supported.
Region restrictions	Not Supported.
Window Center restrictions	Not Supported.
Window Width restrictions	Not Supported.
Frame Number restrictions	Supported.
Image Quality restrictions	Must be in range 1 - 100 (values are converted and rounded to a scale of 1-10).
Anonymization	Not Supported.
Annotation restrictions	Not Supported.
Compression available	JPEG
Other restrictions	None

3.10.7.5. WADO-WS Retrieve Imaging Document Set Metadata

Parameter	Restrictions
Anonymization	Not Supported.
Other restrictions	Value representations not currently returned include the following: OB, OW, UN, UT, OD, and OF.

3.10.7.6. Connection Policies

General

All standard WS connection policies apply. There are no extensions for WS options.

Number of Connections

The iConnect Enterprise Archive WADO Service is configurable to limit the number of simultaneous HTTP requests. The connection pool is shared among all services operating on the hosting server. The maximum number of simultaneous connections depends on the hardware and network where the application is installed.

Asynchronous Nature

iConnect Enterprise Archive WADO Service does not support WS asynchronous response.

Chapter 4. Encapsulated PDF IOD Creation

This section specifies the DICOM Encapsulated PDF objects that are created by the iConnect Enterprise Archive. These objects are created only when the iConnect Enterprise Archive is deployed as the archive for Merge Cardio PACS.

4.1. Encapsulated PDF IOD Implementation

This section defines the implementation of the Encapsulated PDF information object. It refers to the DICOM Standard, Part 3 (Information Object definition).

4.2. Encapsulated PDF IOD Entities

Refer to DICOM Standard, Part 3 (Information Object Definitions) for a description of the entities contained within this information object.

4.3. Encapsulated PDF IOD Module Table

TABLE 4.1 identifies the defined modules within the entities that compromise the DICOM Encapsulated PDF Information Object Definition. Modules are defined by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules and attributes that comprise this IOD.

Table 4.1: Modules

Information Entity	Module Name	Reference
Patient	Patient	PATIENT MODULE ATTRIBUTES
Study	General Study	GENERAL STUDY MODULE ATTRIBUTES
	Patient Study	PATIENT STUDY MODULE ATTRIBUTES
Series	General Series	GENERAL SERIES MODULE ATTRIBUTES
	Encapsulated Document Series	ENCAPSULATED DOCUMENT SERIES MODULE ATTRIBUTES
Equipment	General Equipment	GENERAL EQUIPMENT MODULE ATTRIBUTES
	SC Equipment	SC EQUIPMENT MODULE ATTRIBUTES
Encapsulated Document	Encapsulated Document	ENCAPSULATED DOCUMENT MODULE ATTRIBUTES
	SOP Common	SOP COMMON MODULE ATTRIBUTES

4.4. Information Module Definitions

Refer to the DICOM Standard, Part 3 for a description of each of the entities and modules contained within the Encapsulated PDF Information Object.

4.4.1. Patient Entity Module

Table 4.2: Patient Module Attributes

Attribute Name	Tag	Type	Implementation Description
Patient Name	(0010,0010)	2	
Patient ID	(0010,0020)	2	
Issuer of Patient ID	(0010,0021)	3	
Patient Birth Date	(0010,0030)	2	
Patient's Birth Time	(0010,0032)	3	
Patient Sex	(0010,0040)	2	

4.4.2. Study Entity Modules

Table 4.3: General Study Module Attributes

Attribute Name	Tag	Type	Implementation Description
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	
Study Time	(0008,0030)	2	
Accession Number	(0008,0050)	2	
Referring Physician's Name	(0008,0090)	2	
Study ID	(0020,0010)	2	
Study Description	(0008,1030)	3	
Name of Physician Reading Study	(0008,1060)	3	

Table 4.4: Patient Study Module Attributes

Attribute Name	Tag	Type	Attribute Description
Patient's Age	(0010,1010)	3	
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	

4.4.3. Series Entity Modules

Table 4.5: General Series Module Attributes

Attribute Name	Tag	Type	Implementation Description
Series Date	(0008,0021)	3	
Series Time	(0008,0031)	3	
Performing Physician's Name	(0008,1050)	3	

Table 4.6: Encapsulated Document Series Module Attributes

Attribute Name	Tag	Type	Implementation Description
Modality	(0008,0060)	1	
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Series Description	(0008,103E)	3	

4.4.4. Equipment Entity Modules

Table 4.7: General Equipment Module Attributes

Attribute Name	Tag	Type	Implementation Description
Manufacturer	(0008,0070)	2	Merge Healthcare
Institution Name	(0008,0080)	3	
Institution Address	(0008,0081)	3	

Table 4.8: SC Equipment Module Attributes

Attribute Name	Tag	Type	Implementation Description
Conversion Type	(0008,0064)	1	WSD

4.4.5. Encapsulated Document Modules

Table 4.9: Encapsulated Document Module Attributes

Attribute Name	Tag	Type	Implementation Description
Instance Number	(0020,0013)	1	
Content Date	(0008,0023)	2	

Attribute Name	Tag	Type	Implementation Description
Content Time	(0008,0033)	2	
Acquisition Date Time	(0008,002A)	2	
Burned in Annotation	(0028,0301)	1	YES
Document title	(0042,0010)	2	
Concept Name Code Sequence	(0040,A043)	2	
>Coding Scheme Designator	(0008,0102)	1C	LN
>Coding Value	(0008,0100)	1C	18748-4
>Code Meaning	(0008,0104)	1	Study report, Diagnostic imaging
Verification Flag	(0040,A493)	3	VERIFIED
MIME Type of Encapsulated Document	(0042,0012)	1	application/pdf
Encapsulated Document	(0042,0011)	1	

Table 4.10: SOP Common Module Attributes

Attribute Name	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	Not sent
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	(0008,0018)	1	

Chapter 5. Image Lifecycle Management

Image Lifecycle Management (ILM) is a set of features that perform actions on stored DICOM objects based on a configurable set of retention policies. Because of the destructive nature of the following features, they are equipped with configurable vetoers which block operations on the images based on their study date. These features are not triggered by interaction with another entity over a DICOM association. Instead, a repeating timed task is configured to perform the operation such as daily during off hours. iConnect Enterprise Archive supports Image Lifecycle Management retention policies such as the deletion of images or the conversion of images from lossless to lossy after a specified amount of time in conjunction with other criteria.

5.1. Policy Based Deletion

Based on a configurable set of criteria, iConnect Enterprise Archive can delete selected DICOM objects. Of the selection criteria, a time-based condition such as study date older than a specified number of days is standard. The deletion of the images is permanent with no option for recovery from the system. When iCEA is deployed with a Merge Cardio system or in Integrated Mode with a Merge PACS system, a notification of the deletion is sent to them using a proprietary web service. In addition, the deletion of the object can be propagated to other iCEAs so that the object is also deleted on the other archives.

5.2. Policy Based Conversion

Based on a configurable set of policies, iConnect Enterprise Archive converts selected images from lossless to lossy. The converted images have new SOP Instance UIDs but otherwise have the same demographic information as the original, including the same Study and Series Instance UIDs.

NOTE: It is a DICOM requirement that converting an image from lossless to lossy results in a new SOP Instance UID.

When the system confirms that the conversion is successful, the original (lossless) image is deleted from iConnect Enterprise Archive. It is iCEA's policy to only have a single copy of an image, either lossless or lossy, on the system at any time. The store of a lossless version of an image replaces the lossy copy on iConnect Enterprise Archive. When images are converted, notifications are sent to interested parties such as an integrated Merge PACS.

The original SOP Instance UID is retained in the database of the system. This retention allows for the ability to query iConnect Enterprise Archive for a SOP Instance UID of the converted image based on the SOP Instance UID of the original image. The private tag (0039,0100) can be used to specify the original SOP Instance UID in a DICOM find operation.

The store of an externally converted image can communicate the value of the original lossless SOP Instance UID by populating the private block group 23 with the private block tag “AMICAS0” and assigning element 01 with the original / lossless SOP Instance UID. For example:

```
(0023,0010) LO [AMICAS0]                                    # PrivateCreator

        (0023,1001) UI [1.2.840.113837.1458846527.89513.528.3643] # Unknown Tag
```

Chapter 6. Communication Profiles

This section describes the communication profiles.

6.1. Supported Communication Stacks (Parts 8,9)

iConnect Enterprise Archive 14.2 provides DICOM V3.0 TCP/IP Network Support as defined in PS3.8.

6.2. TCP/IP Stack

iConnect Enterprise Archive inherits its TCP/IP stack from the Java virtual machine, and, by default, the underlying platform on which the virtual machine is executing.

6.2.1. API

The API used to enable the TCP/IP stack for iConnect Enterprise Archive is the Java Socket API found in the java.net package of the Java Development Kit.

6.2.2. Physical Media Support

iConnect Enterprise Archive is indifferent to the physical medium over which TCP/IP executes. Physical media support is inherited from the particular platform that the Java virtual machine is executing on.

Chapter 7. Extensions/Specializations/ Privatizations

This section outlines the iConnect Enterprise Archive support for extensions, specializations, and private storage SOPs.

7.1. Standard Extended/Specialized/Private SOPs

iConnect Enterprise Archive supports Standard Extended, Specialized, and Private Storage SOPs as long as they conform to the Storage Service Class specification (PS3.4, Annex B).

iConnect Enterprise Archive 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).

No other Standard Extended, Specialized, and Private SOPs are supported by Clinical Content Management.

7.2. Private Transfer Syntaxes

Private transfer syntaxes are not supported by iConnect Enterprise Archive at installation. However, private transfer syntaxes can be developed and “plugged-in” to the archive using the EA Web.

Chapter 8. Configuration

The EA Web tool (a graphical user interface) is used for configuration and administration. This tool is remotely enabled through the use of Java Remote Method Invocation (RMI), allowing the system to be configured and administrated from any location on the network. Configurable parameters include, but are not limited to, system level debugging, known remote application entities, various security concerns, and supported service classes.

8.1. AE Title/Presentation Address Mapping

All AE Title/Presentation Address mapping may need to be present in multiple locations, depending on the Application Entity. In all cases, EA Web allows for the configuration of the AE Title.

8.2. Configurable Parameters

The amount of configuration the system allows is extensive.

In general, the following parameters are configurable for each component:

- Listening IP port number
- Application entity title
- Number of simultaneous associations
- Minimum and maximum PDU
- DICOM Part 10 file storage location
- Accepted DIMSE commands
- Accepted SOP Classes
- Remote AE list (AE title, hostname, port)
- Network timeout

A member of iCEA's support staff must perform configuration.

8.3. QIDO-RS Service

The Enterprise Archive QIDO-RS Service can be configured to respond on a single service endpoint. The WADL file to be used by clients is made available at the following location:

http://<servername:port>/<QIDO-RS service root>?_wadl

The Enterprise Archive QIDO-RS Services does not support the use of transport level security measures for URI or WS. TLS protected traffic can be configured using an external server/F5 and forwarding traffic to the unprotected HTTP port.

8.4. STOW-RS Service

The Enterprise Archive STOW-RS Service can be configured to respond on a single service endpoint. The WADL file to be used by clients is made available at the following location:

http://<servername:port>/<STOW-RS service root>?_wadl

The Enterprise Archive STOW-RS Services does not support the use of transport level security measures for URI or WS. TLS protected traffic can be configured using an external server/F5 and forwarding traffic to the unprotected HTTP port.

8.5. WADO Services

8.5.1. WADO URI Interface

The Enterprise Archive WADO URI Service can be configured to respond on a single port for either protected or unprotected HTTP traffic. TLS protected traffic can be configured using an external server/F5 and forwarding traffic to the unprotected HTTP port.

The Enterprise Archive WADO Services does not support the use of transport level security measures for URI or WS. TLS protected traffic can be configured using an external server/F5 and forwarding traffic to the unprotected HTTP port.

8.5.2. WADO-WS Interface

The Enterprise Archive WADO WS Service can be configured to respond on a single service endpoint. The WSDL file to be used by clients is made available at the following location:

http://<servername:port>/<WADO-WS service root>?wsdl

8.5.3. WADO-RS Interface

The Enterprise Archive WADO RS Service can be configured to respond on a single service endpoint. The WADL file to be used by clients is made available at the following location:

http://<servername:port>/<WADO-RS service root>?_wadl

Chapter 9. Support of Extended Character Sets

All AEs in iCEA support the following character sets:

Table 9.1: Supported Character Sets

Defined Terms	Description
ISO_IR 6	Default repertoire
ISO_IR 13	Japanese
ISO_IR 100	Latin alphabet No. 1
ISO_IR 101	Latin alphabet No. 2
ISO_IR 109	Latin alphabet No. 3
ISO_IR 110	Latin alphabet No. 4
ISO_IR 126	Cyrillic
ISO_IR 127	Arabic
ISO_IR 138	Greek
ISO_IR 144	Hebrew
ISO_IR 148	Latin alphabet No. 5
ISO_IR 166	Thai
ISO_IR 192	Unicode in UTF-8
ISO 2022 IR 6	Default repertoire
ISO 2022 IR 13	Japanese
ISO 2022 IR 58	Simplified Chinese
ISO 2022 IR 87	Japanese
ISO 2022 IR 100	Latin alphabet No. 1
ISO 2022 IR 101	Latin alphabet No. 2
ISO 2022 IR 109	Latin alphabet No. 3
ISO 2022 IR 110	Latin alphabet No. 4
ISO 2022 IR 126	Greek
ISO 2022 IR 127	Arabic
ISO 2022 IR 138	Hebrew

Defined Terms	Description
ISO 2022 IR 144	Cyrillic
ISO 2022 IR 148	Latin alphabet No. 4
ISO 2022 IR 149	Korean
ISO 2022 IR 159	Japanese
GBK	Guojia Biaozhun Kuozhan (Chinese)
GB18030	Official character set of the People's Republic of China

9.1. Support for Names with Multiple Component Groups

As required for many languages, the iCEA fully supports person names with multiple component groups.

iCEA can additionally configure a "default" name representation for use internally by the system for the following operations:

- Determining equivalent Patients
- Default display formatting in the administrative GUI

9.2. Configuration

iCEA can explicitly configure the "default" character set for each configured remote device. This configured character set is used in the following ways:

- When an object is received with no Specific Character Set attribute, the configured character set is assumed to be used in the objects. This configured character set will not override any character set explicitly defined in the objects (by the Specific Character Set attribute) unless configured to do so.
- When an object is sent to the remote system, the objects can be converted into the configured character set as needed.

The System Default character encoding is ISO_IR192 (UTF-8) but can be configured to another character encoding if desired.

9.3. Character Set Conversions

The internal encoding of character data in the iCEA is UTF-8. If a remote system sends or expects to receive a different encoding, iCEA must convert the data to/from the encoding that the character set remote system is using.

For received objects, iCEA reads the value of the Specific Character Set (0008,0005) and automatically converts the incoming character data from the specified encoding to UTF-8. If no value is specified for the Specific Character Set, iCEA uses the character encoding configured for that remote device. If the character encoding is not configured for that remote device, iCEA uses the system default when converting the incoming character data.

If an object is received with an unsupported character encoding. it is rejected (and not stored). There is the capability to define Specific Character Set aliases to handle implementations that incorrectly use a non-standard DICOM identifier (for example: “ISO-IR-100” instead of “ISO_IR 100”).

When sending objects, iCEA uses the encoding explicitly defined when the object was received. If an encoding is configured for the remote system, the characters are converted into that encoding. iCEA populates the Specific Character Set (0008,0005) with the appropriate value.

If this conversion fails to find an equivalent character in the destination encoding, it converts that character to a configurable “unknown” character or the universal “unknown character” symbol.

9.4. Query Support

Since the database only contains UTF-8 encoded characters, incoming queries are first converted to UTF-8 (if they are in another encoding) and then used in the query operation. This applies to queries performed by the Archive AE, Archive Proxy AE and Worklist Manager AE.

9.5. Character Set Display (Administrative GUI)

A known Java issue causes the Yen symbol (¥) to appear as a backslash character when converting to UTF-8 character encoding. As a result, the Yen symbol appears as a backslash character in the administrative GUI. When objects are sent out of the system, the backslash character is converted back to the Yen symbol resulting in no loss/corruption of data.

Appendix A. Glossary of Terms

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax

The information agreed to be exchanged between applications, generally equivalent to a Service/ Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

AE

Application Entity

AET

Application Entity Title

Application Entity (AE)

An end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title (AE Title/AET)

The externally known name of an Application Entity, used to identify a DICOM application together DICOM applications on the network.

Association

A network communication channel set up between Application Entities.

Attribute

A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation(0028,0004), Procedure Code Sequence (0008,1032).

HTTP

Hyper-Text Transport Protocol

Information Object Definition (IOD)

The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG)

A set of standardized image compression techniques, available for use by DICOM applications.

QIDO

Query by ID for DICOM Objects

RS

RESTful Service

Service Class Provider (SCP)

Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU)

Role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

Service/Object Pair Class (SOP Class)

The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair Instance (SOP Instance)

An information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific x-ray image.

SSL

Secure Socket Layer

STOW

Storage of DICOM Objects over the Web

Tag

A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210)[private data element]

TLS

Transport Layer Security

Transfer Syntax

The encoding used for exchange of DICOM information objects and messages. Examples: JPEGCompressed (images), little endian explicit value representation.

Unique Identifier (UID)

A globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

URI

Universal Resource Interface

Value Representation (VR)

The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

WADO

Web Access for DICOM Objects

WS

Web Service