CHANGE HEALTHCARE

DICOM Conformance Statement

Change Healthcare Cardiology ECG Management

DICOM Conformance Statement ECGM 14.1

Document ID: DCM-10030
Revision 2.0 | Release Number 14.1
Effective Date August 2018

Rx Only

Copyright and trademarks

Produced in Cork, Ireland

1. Conformance Statement Overview

This document contains DICOM conformance statements for Change Healthcare Cardiology ECG Management 14.1.

Change Healthcare Cardiology ECG Management includes a selection of DICOM-related functionality. The customer may choose which functionality is to be installed.

Change Healthcare Cardiology ECG Management provides the following network services:

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Secondary Capture Image Storage	Yes	Yes
Multi-Frame Single bit Secondary Capture Image Storage	Yes	Yes
Multi-Frame Grayscale Byte Secondary Capture Image Storage	Yes	Yes
Multi-Frame Grayscale Word Secondary Capture Image Storage	Yes	Yes
Multi-Frame True Color Secondary Capture Image Storage	Yes	Yes
12-lead ECG Waveform Storage	Yes	Yes
General ECG Waveform Storage	Yes	Yes
Ambulatory ECG Waveform Storage	Yes	Yes
Hemodynamic Waveform Storage	Yes	Yes
Cardiac Electrophysiology Waveform Storage	Yes	Yes
Waveform Storage – Trial (Retired*)*	Yes	Yes
Key Object Selection Document Storage	Yes	Yes
Storage Commitment Push Model	Yes	Yes
Basic Text SR Storage	Yes	Yes
Enhanced SR Storage	Yes	Yes
Comprehensive SR Storage	Yes	Yes
Procedure Log Storage	Yes	Yes
Encapsulated PDF Storage	Yes	Yes

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Query/Retrieve		
Patient Root Query/Retrieve Info Model – FIND	Yes	Yes
Study Root Query/Retrieve Info Model – FIND	Yes	Yes
Patient Root Query/Retrieve Info Model – MOVE	Yes	Yes
Study Root Query/Retrieve Info Model – MOVE	Yes	Yes
Workflow Management		
Modality Worklist Information Model - FIND	Yes	Yes
Modality Performed Procedure Step	Yes	Yes

2. Table of Contents

3. Introduction

3.1 Revision History

Revision	Revision Date	Summary of Changes
Rev. 1.0	August 2018	Initial release
Rev. 2.0	August 2018	Added “Produced in Cork, Ireland”

3.2 Audience

This document is written for the people that need to understand how Change Healthcare Cardiology ECG Management will integrate into their healthcare facility in the aspect of DICOM communication. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Change Healthcare Cardiology ECG Management and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability.

Note: The Digital Imaging and Communications in Medicine (DICOM) Standard is constantly evolving. This DICOM Conformance Statement describes Change Healthcare's conformance thereto at the time of writing. As the

DICOM Standard evolves according to users' request, Change Healthcare modifies its product accordingly. Revised versions of the DICOM Conformance Statement are issued periodically. The currently published version may not reflect all the latest modifications. Please contact Change Healthcare Support for more information. Change Healthcare reserves the right to make changes in its products to comply with evolving DICOM Standards and to update the DICOM Conformance Statement at reasonable intervals.

3.4 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects, each of which is called an *Abstract Syntax* for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called *Presentation Contexts*. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on *Roles* - which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly

acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

3.5 Abbreviations

AE	Application Entity
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
ECG	Electrocardiography
ECGM	Electrocardiography Management
IHE	Integrating the Healthcare Enterprise
IOCM	Imaging Object Change Management
IOD	Information Object Definition
JPEG	Joint Photographic Experts Group
KOS	Key Object Selection
MR	Magnetic Resonance Imaging
MWL	Modality Worklist
NM	Nuclear Medicine
O	Optional (Key Attribute)
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDU	Protocol Data Unit
R	Required (Key Attribute)
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SR	Structured Reporting
U	Unique (Key Attribute)
US	Ultrasound
VL	Visible Light
VR	Value Representation
XA	X-ray Angiography

3.6 References

- NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/
- IHE Radiology Technical Framwork IOCM Extention - https://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_Suppl_IOCM.pdf
- DatamedFT™ and DatamedWL™ DICOM Conformance Statement - http://datamed.com/docs/dicom_conformance_statement.pdf

4. Implementation Model

Change Healthcare Cardiology ECG Management provides:

- Image storage (SCU/SCP)
- Queries on image database (SCU/SCP)
- Retrieving images (SCU/SCP)
- Commitment for the storage of data (SCU/SCP)
- Getting Worklist (SCU)
- Providing Worklist (SCP)

4.1 Application Data Flow Diagram

Figure 1 – Change Healthcare Cardiology ECG Management 14.1 DICOM Network Data Flow Diagram

Figure 1-1 Send Instances to External System

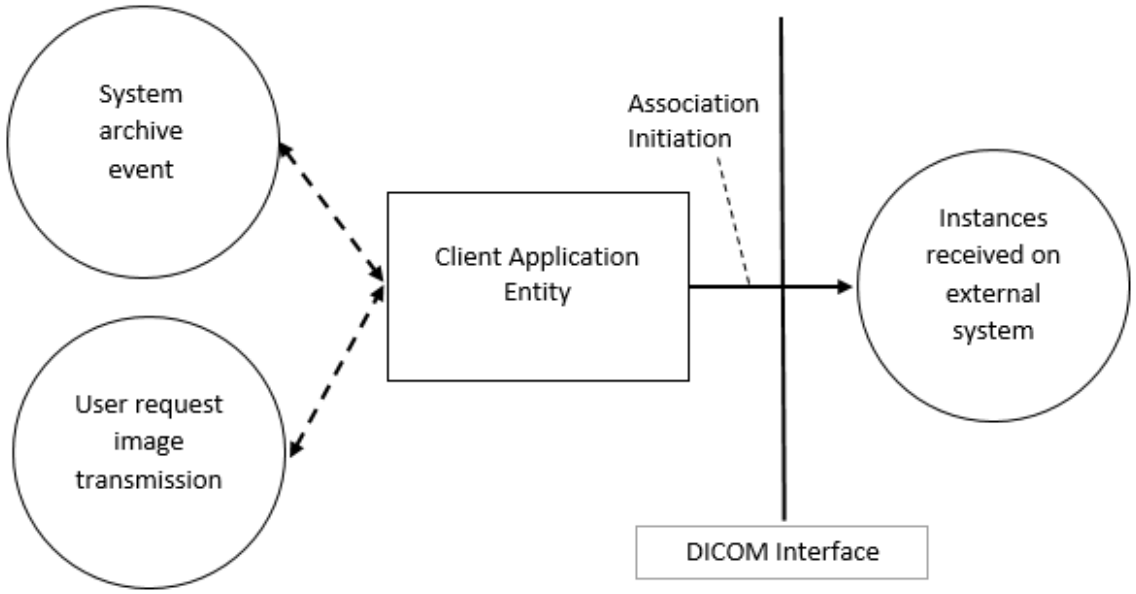


Figure 1-2 Receive Instances from External System

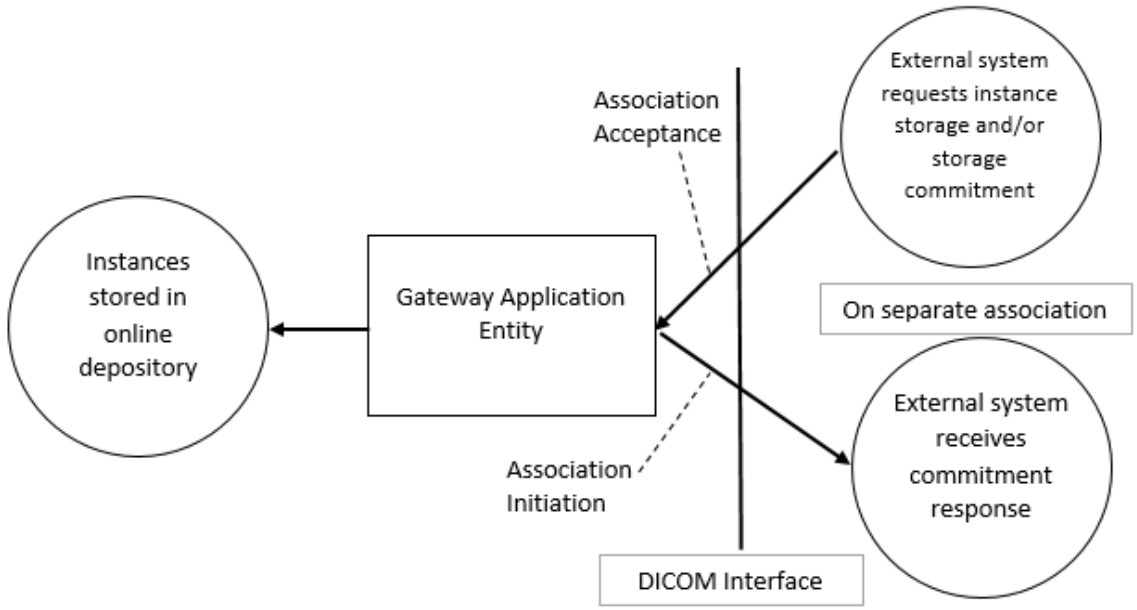


Figure 1-3 Issue Query/Retrieve Request

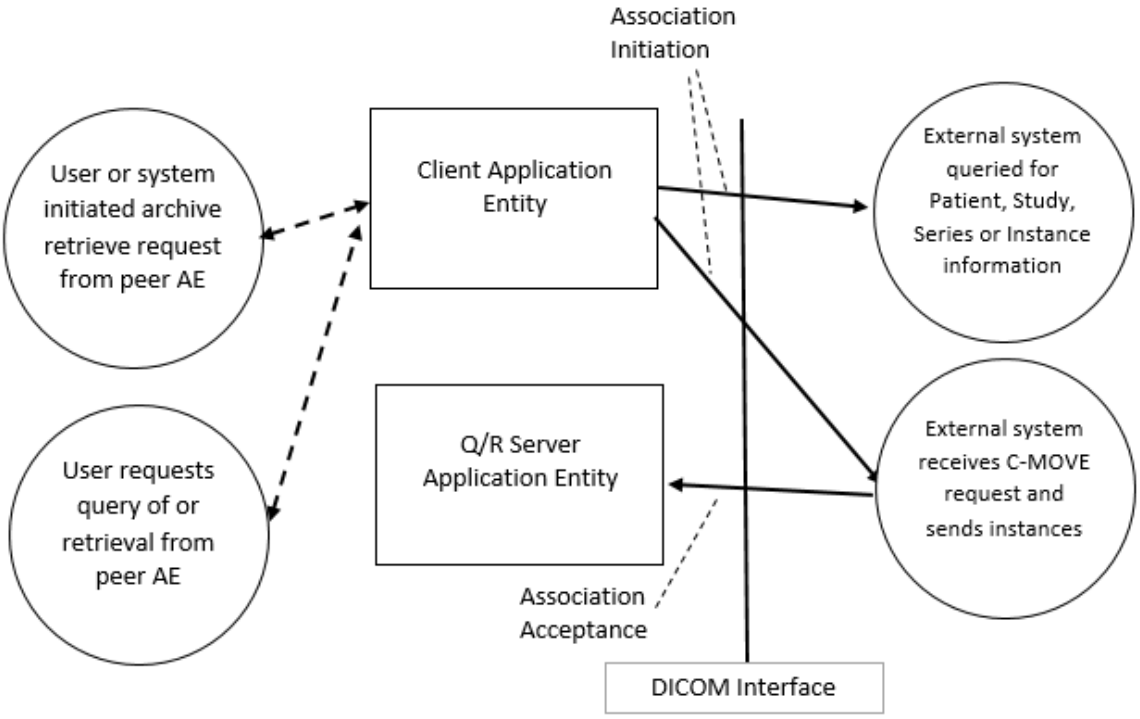


Figure 1-4 Get Modality Worklist

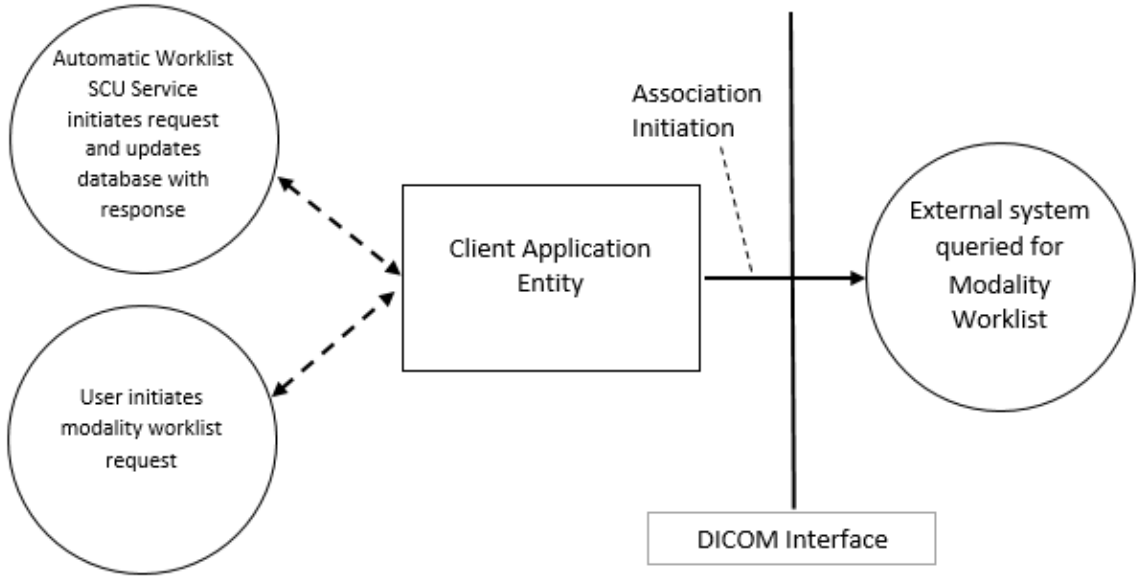


Figure 1-5 Respond to Query/Retrieve Requests

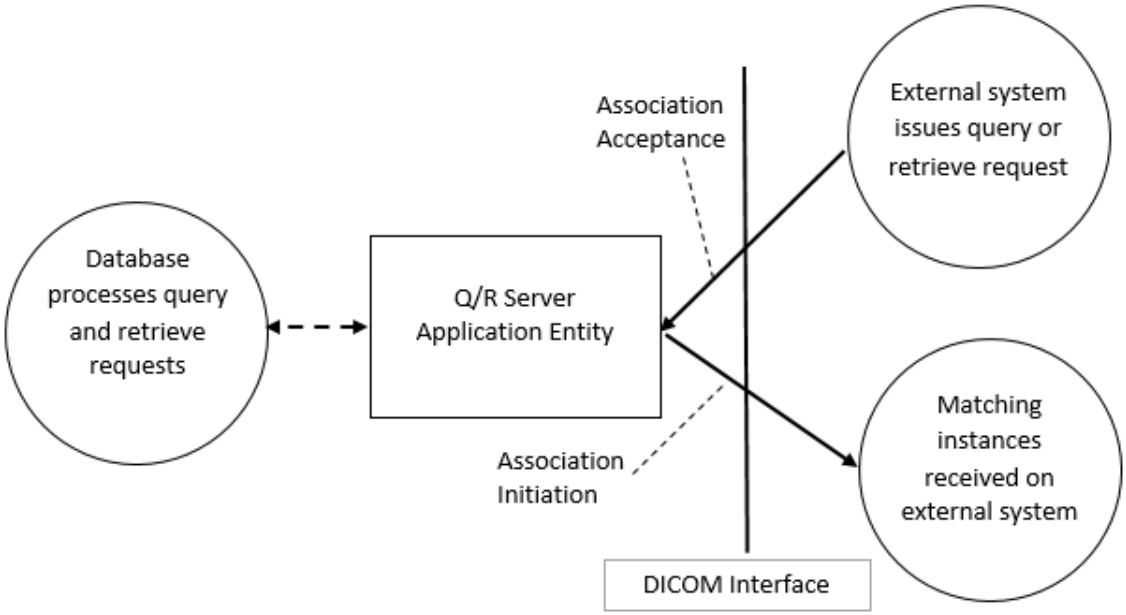


Figure 1-6 Respond to Modality Worklist Requests

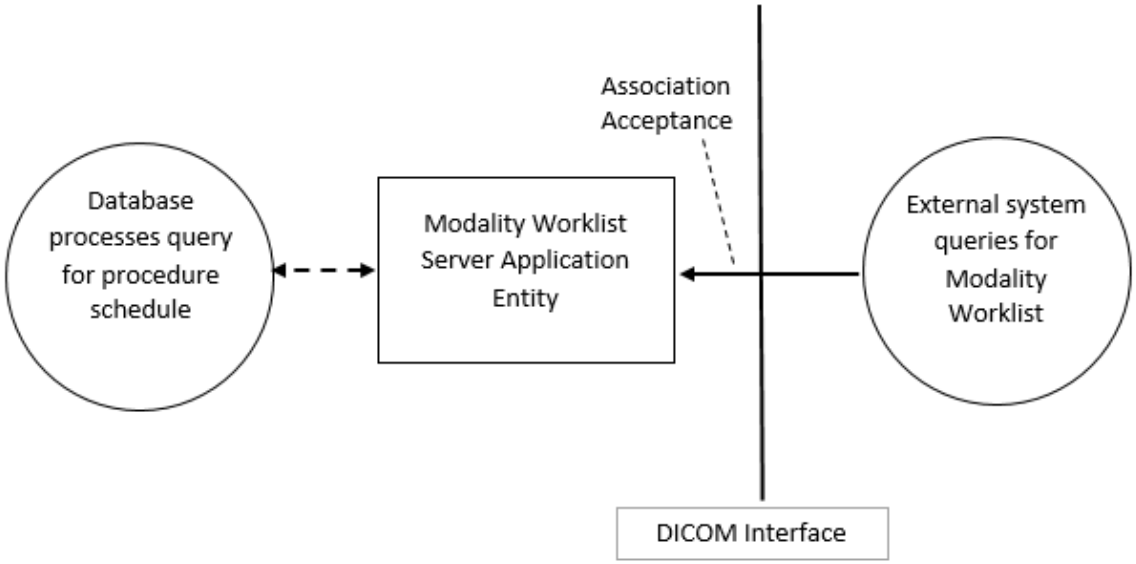


Figure 1-7 Get Storage Commitment – DICOM Archive Module

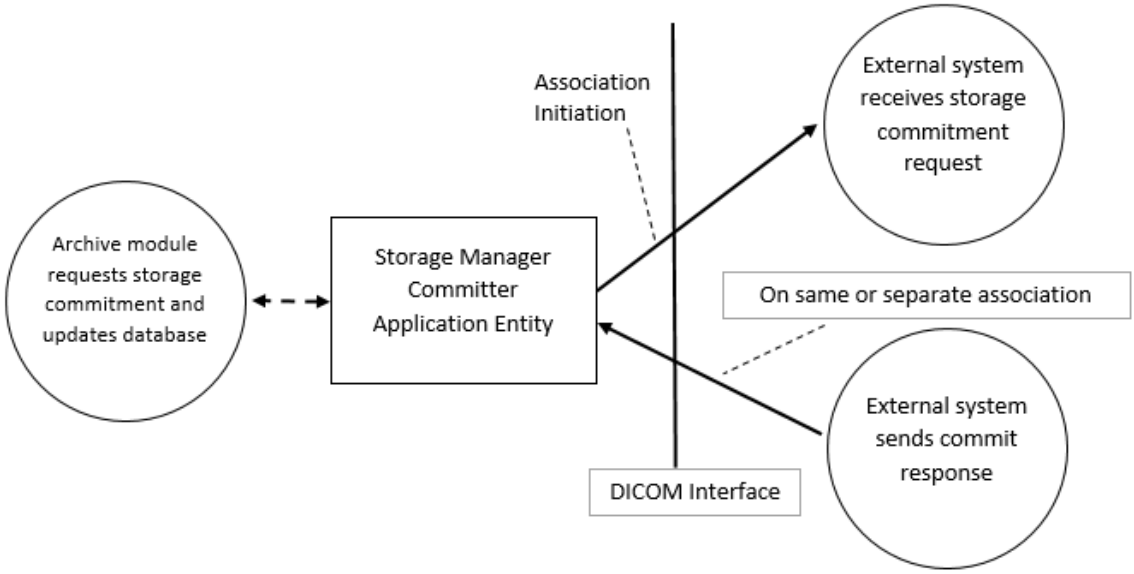


Figure 1-8 Get Storage Commitment – Synchronization Service

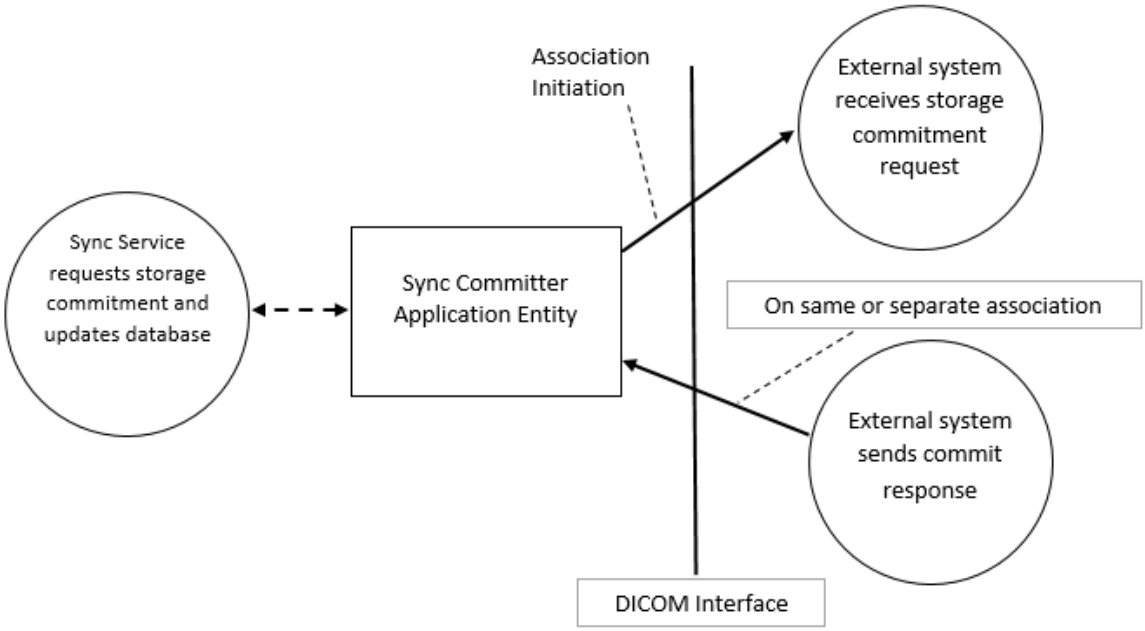
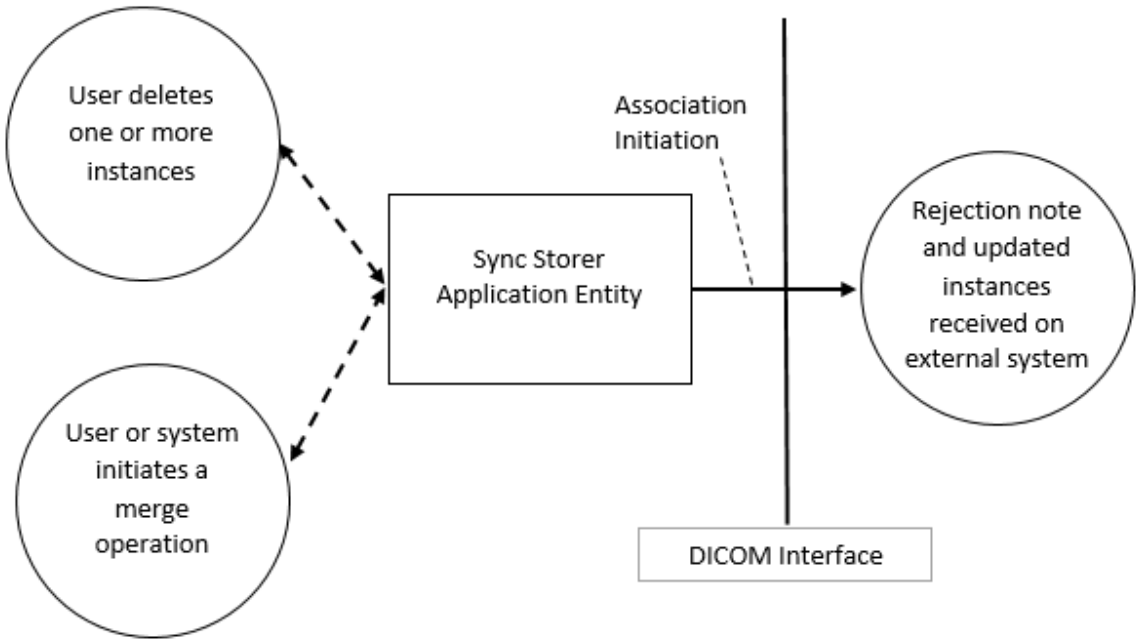


Figure 1-9 Send rejection notes and updates instances to external system (IOCM profile operations)



4.2 Functional Definition of Application Entities

4.2.1 Functional Definition of Client Application Entity

The Client AE acts as a multi-purpose SCU and implements the following Service Classes as SCU:

- Storage
- Query/Retrieve
- Modality Worklist

The Client AE can perform the following tasks:

- Send instances to a remote storage SCP AE, inititated by the archive storage manager service or the Change Healthcare Cardiology application.
- Query patient, study, series or instance level information, initiated by the Change Healthcare Cardiology application.
- Send a retrieve (C-MOVE) request to remote Query/Retrieve SCP AE, initated by the archive storage manager service or the Change Healthcare Cardiology application.
- Query for Modality Worklist from a remote MWL SCP AE, initated by the Automatic Worklist SCU service or the Change Healthcare Cardiology application.

4.2.2 Functional Definition of Query/Retrieve Server Application Entity

The Query/Retrieve Server AE implements the Query/Retrieve Service Class as an SCP. The Query/Retrieve Server AE handles requests from external devices to query the database for patient, study, series and instance level information. It can also handle C-MOVE Requests from remote AEs for the retrieval of Composite SOP Instances. The Query/Retrieve Server AE can act as an SCU of the Storage Service to transfer the requested Composite SOP Instances to the requested destination.

The Query/Retrieve Server AE can act as an SCP of the Storage Service Class to serve as a C-MOVE destination and recieve Composite SOP Instances that were requested by the Client AE.

4.2.3 Functional Definition of Gateway Application Entity

The Gateway AE acts as an SCP and implements the Storage Service Class operation. It can receive unsolicited instance storage requests from external DICOM storage SCUs. It also acts as an SCP for the Storage Commitment Push Model SOP Class.

Note: Some Change Healthcare Cardiology ECG Management implementations include the use of DatamedFT™ software in order to provide a Store SCP service for ECG carts. Please refer to DatamedFT™ and DatamedWL™ DICOM Conformance Statement in case Datamed software is installed at your facility.

4.2.4 Functional Definition of Storage Manager Committer Application Entity

The Storage Manager Committer AE implements the Storage Commitment Service Class as an SCU. When acting as an SCU, it issues a Storage Commitment Push Model N-ACTION request to a remote storage commitment SCP AE to explicitly request the remote storage commitment SCP AE to make the commitment for the safekeeping of the SOP instances mentioned in the N-ACTION request. The Storage Manager Committer AE can receive Storage Commitment Confirmation for composite SOP Instances from the Storage Commitment SCP AE on the same association or on a separate association.

4.2.5 Functional Definition of Modality Worklist Server Application Entity

The Modality Worklist Server AE implements the Modality Worklist SOP Class as an SCP. The Modality Worklist Server AE handles requests from external devices to query the database for procedure schedule.

Note: Some Change Healthcare Cardiology ECG Management implementations include the use of DatamedWL™ software in order to provide a Worklist SCP service for ECG carts. Please refer to DatamedFT™ and DatamedWL™ DICOM Conformance Statement in case Datamed software is installed at your facility.

4.2.6 Functional Definition of Sync Storer Application Entity

The Sync Storer AE acts as an SCU and implements the Storage Service Class operation. It can transmit rejection notification objects and corrected instances as part of the IHE IOCM profile.

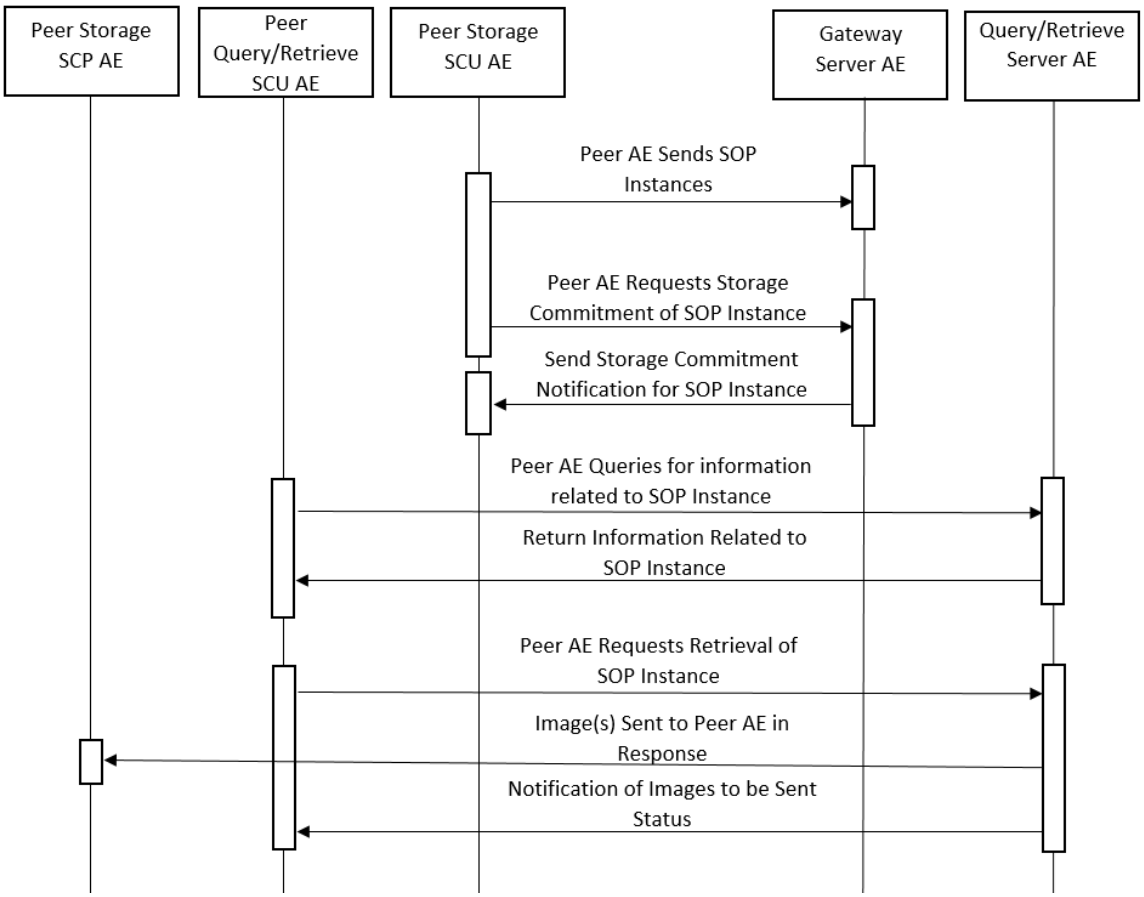
4.2.7 Functional Definition of Sync Comitter Application Entity

The Sync Comitter AE implements the Storage Commitment Service Class as an SCU. When acting as an SCU, it issues a Storage Commitment request to a remote storage commitment AE to to make the commitment for the safekeeping of the SOP instances mentioned in the request. The Sync Comitter AE can receive storage commitment confirmation for composite SOP Instances from the Storage Commitment SCP AE on the same association or on a separate association.

4.3 Sequencing of Real-World Activities

The below figure demonstrates Change Healthcare Cardiology ECG Management sequencing constraints.

Figure 2 – Change Healthcare Cardiology ECGM Sequencing Constraints



5. AE Specifications

5.1 Client AE Specification

5.1.1 SOP Classes

Client AE provides Standard Conformance to the following DICOM 3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification	1.2.840.10008.1.1	Yes	No
Transfer			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	No
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	No
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	No
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	No
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1	Yes	No
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Query/Retrieve			
Patient Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Study Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Patient Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Workflow Management			
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No

5.1.2 Association Policies

5.1.2.1 General

DICOM application context for Client AE:

Application Context Name	1.2.840.10008.3.1.1.1

Maximum PDU size is configurable (default is 16,384 bytes).

5.1.2.2 Number of Associations

Number of Association as Association Initiator:

Maximum number of simultaneous associations	Configurable

5.1.2.3 Asynchronous Nature

Asynchronous mode (multiple concurrent operations on one association) is not supported.

5.1.2.4 Implementation Identifying Information

DICOM Implementation Class and Version for Change Healthcare Cardiology ECG Management

Implementation Class UID	2.16.376.1.1.511752891.1

Implementation Version Name	MEDCON01MAR2012

5.1.3 Association Initiation Policy

Client AE attempts to initiate a new association in the following cases:

- To check the connection to the remote system
- To transfer (store) a series of images on the remote system
- To find several instances in the remote system
- To retrieve several instances from the remote system
- To get worklist modality worklist

Real-World Activity – Verification

Associated Real-World Activity

The associated Real-World Activity is an attempt to check whether remote AE is ready for DICOM dialog.

Proposed Presentation Contexts

For this Real-World Activity, the client AE will propose one of the Presentation Contexts listed in Table 1.

Table 1 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.1.3.1 Real-World Activity – Storing instances

Associated Real-World Activity

The associated Real-World Activity is an attempt to store a series of instances on a remote system.

The Client AE initiates an association for C-STORE in the following cases:

- The Change Healthcare Cardiology user has requested to send images to a specific modality/workstation
- Change Healthcare Cardiology storage manager service has requested to send instances to a specific DICOM archive destination.

Proposed Presentation Contexts

Each time an association is initiated, the Client AE proposes one or more Presentation Contexts to be used on that association, as shown in Table 2 on page 21.

Table 2 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See Note		Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See Note		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See Note		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
See Note		JPEG Lossless, Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None
See Note		JPEG Lossy Process 1	1.2.840.10008.1.2.4.50	SCU	None
See Note		RLE Lossless	1.2.840.10008.1.2.5	SCU	None

Note: The Abstract Syntax corresponds to the SOP Class UID for Series modality. The selection of these syntaxes can be found in Table 3.

Table 3 - Abstract Syntaxes

Abstract Syntax	
Name	**UID**
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Basic Text Structure Report	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structure Report	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive Structure Report	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

5.1.3.2 Real-World Activity – Finding Instances

Associated Real-World Activity

The associated Real-World Activity is an attempt to find instances in a remote system. The user of the Change Healthcare Cardiology application selects the query operation button on the user interface. The user can specify wild card or specific information for Patient Name, Patient ID, Patient Sex, Patient Birthdate, Study ID, Study UID, Study Accession Number, Study Date Range, Study Time Range, Referring Physician, Modalities in Study.

Wild card queries can result in an excessive number of responses. The user interface is able to restrict the number of patients displayed.

The user can cancel the current query operation by clicking the cancel button.

Client AE defaults to using Study Root Query Model when initiating query request. The query model used can be changed to Patient Root Query Model by changing a configuration parameter.

Multiple Sources Option

Change Healthcare Cardiology can be configured to access multiple sources with a single user request.

In the event an information source becomes unavailable, the Change Healthcare Cardiology application provides the information it received from other sources. In addition, Change Healthcare Cardiology informs the users that they are viewing potentially incomplete results. When a study-level or series-level query to multiple sources finds the study/series referenced in multiple places, the study/series is either duplicated or split across the systems. When the user queries of the study/series, the Change Healthcare Cardiology application collates the information, determines if the information is duplicated or split, and presents a consolidated view of the results.

Proposed Presentation Contexts

For this Real-World Activity, Client AE will propose one of the Presentation Contexts listed in Table 4.

Table 4- Proposed Presentation Contexts

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	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Study Root Query/Retrieve Information Model	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
– FIND					

5.1.3.3 Real-World Activity – Retrieving Instances

Associated Real-World Activity

The associated Real-World Activity is an attempt to retrieve instances from a remote system.

The user selects one or more instance, series or study within studies from a list presented as a result of a previous query operation. Clicking Retrieve initiates the move operation.

The user can cancel the current Retrieve operation by clicking Cancel.

Another associated activity is an attempt to retrieve instances referenced in Change Healthcare Cardiology Database from archive without a preceding query operation.

Multiple Sources Option

Change Healthcare Cardiology can be configured to access multiple sources with a single user retrieval request.

When Change Healthcare Cardiology performs a study-level or series-level query to multiple sources and finds the study/series referenced in multiple places, the study/series is either duplicated or the study/series is split across the systems. When the user requests a retrieval of the study/series, Change Healthcare Cardiology collates the information, determines whether the information is actually duplicated or split, and presents a consolidated view of results to the user.

Avoiding redundant retrieval is managed by checking whether a definite IOD has already been retrieved in the current session.

Proposed Presentation Contexts

For this Real-World Activity, Client AE will propose one of the Presentation Contexts listed in Table 5.

Table 5 - Proposed Presentation Contexts

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	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

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	Explicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.1.3.4 Real-World Activity – Automatically Getting Modality Worklist from Remote System

Associated Real World Activity

Change Healthcare Cardiology Automatic Worklist Service requests for Modality Worklist from the remote information system. The associated Real-World activity is a request to perform a worklist query based on pre-defined criteria. The association is closed when all data have been received from the remote DICOM network node. The client is also able to abort the association when an error occurs.

Proposed Presentation Contexts

Table 6 - Proposed Presentation Contexts

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU

SOP Specific Conformance – Modality Worklist

Dependent on user requested search type and worklist configuration, C-FIND request will contain elements of the following sets of matching key attributes:

Find by Scheduled Date, Station and Physician

Matching Key Attribute
(0040,0002) Scheduled Procedure Step Start Date
(0040,0006) Scheduled Performing Physician's Name
(0040,0010) Scheduled Station Name
(0040,0001) Scheduled Station AE Title

Find by Modality

Matching Key Attribute
(0008,0060) Modality

5.1.3.5 Real-World Activity – Manually Getting Modality Worklist from Remote System

Associated Real World Activity

User initiates requests for Modality Worklist from the remote information system using the Change Healthcare Cardiology application. The associated Real-World activity is a request to perform a worklist query based on pre-defined criteria. The association is closed when all data has been received from the remote DICOM network node. The client is also able to abort the association when an error occurs.

Proposed Presentation Contexts

Table 7 - Proposed Presentation Contexts

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU
Modality Worklist Information	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Model - FIND				
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU

SOP Specific Conformance – Modality Worklist

Dependent on user requested search type, C-FIND request will contain elements of the following sets of matching key attributes:

Find by Patient ID and Name

Matching Key Attribute
(0010,0020) Patient ID
(0010,0010) Patient's Name

5.1.4 Association Acceptance Policy

The Client AE does not accept associations.

5.2 Query/Retrieve AE Server Specification

5.2.1 SOP Classes

Query/Retrieve Server AE provides Standard Conformance to the following DICOM 3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification	1.2.840.10008.1.1	Yes	Yes
Transfer			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes

SOP Class Name	SOP Class UID	SCU	SCP
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	Yes
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1	Yes	Yes
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Query/Retrieve			
Patient Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Study Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Patient Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	No	Yes
Workflow Management			

SOP Class Name	SOP Class UID	SCU	SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	No	Yes

5.2.2 Association Policies

5.2.2.1 General

DICOM application context for Query/Retrieve Server AE:

Application Context Name	1.2.840.10008.3.1.1.1

Maximum PDU size is configurable for both SCU/SCP (default is 16,384 bytes).

5.2.2.2 Number of Associations

Number of Association as Association Initiator:

Maximum number of simultaneous associations	3 by default (Configurable)

Number of Associations as an Association Acceptor:

Maximum number of simultaneous associations	3 by default (Configurable)

5.2.2.3 Asynchronous Nature

Asynchronous mode (multiple concurrent operations on one association) is not supported.

5.2.2.4 Implementation Identifying Information

DICOM Implementation Class and Version for Query/Retrieve Server AE

Implementation Class UID	2.16.376.1.1.511752891.1
Implementation Version Name	MEDCON01MAR2012

5.2.3 Association Initiation Policy

Query/Retrieve Server AE attempts to initiate a new association in the following cases:

- To check the connection to the remote system
- To transfer (store) a series of images to a remote system

5.2.3.1 Real-World Activity – Verification

Associated Real-World Activity

The associated Real-World Activity is an attempt to check whether remote AE is ready for DICOM dialog.

Proposed Presentation Contexts

For this Real-World Activity, the Query/Retrieve Server AE will propose one of the Presentation Contexts listed in Table 8.

Table 8 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.2.3.2 Real-World Activity – Storing Instances

Associated Real-World Activity

The associated Real-World Activity is a retrieve (C-MOVE) request from a remote system.

Proposed Presentation Contexts

Each time an association is initiated, the Client AE proposes one or more Presentation Contexts to be used on that association, as shown in Table 9.

Table 9 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Note		Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See Note		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See Note		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
See Note		JPEG Lossless, Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None
See Note		JPEG Lossy Process 1	1.2.840.10008.1.2.4.50	SCU	None
See Note		RLE Lossless	1.2.840.10008.1.2.5	SCU	None

Note: The Abstract Syntax corresponds to the SOP Class UID for Series modality. The selection of these syntaxes can be found in Table 10.

Table 10 - Abstract Syntaxes

Abstract Syntax	
Name	**UID**
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Basic Text Structure Report	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structure Report	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive Structure Report	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

5.2.3.3 Real-World Activity – Providing Storage Commitment response

The associated Real-World Activity is an attempt to make the commitment for the safekeeping of the SOP instances. Query/Retrieve Server AE uses Storage Commitment SOP Class Push Model implementation in order to guarantee the safe storage of SOP instances.

Query/Retrieve Server AE always returns the N-EVENT-REPORT on a separate association. This association is opened with reverse role negotiation, that is, the Calling AE is the SCP and the Called AE is the SCU.

After an N-ACTION request containing the Study Component Sequence has been received, the Storage Commitment N-EVENT-REPORT is built and returned.

Proposed Presentation Contexts

For this Real-World Activity, Query/Retrieve Server AE will propose the Presentation Contexts listed in Table 11.

Table 11- Proposed Presentation Contexts

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	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.2.4 Association Acceptance Policy

Query/Retrieve Server AE accepts an association for finding and retrieving instances.

5.2.4.1 Real World Activity – Verification

Query/Retrieve Server AE accepts associations from nodes that wish to perform a verification operation.

Associated Real World Activity – Verification

The Real World Activity associated with the C-ECHO request is that an external node wishes to verify network or server operation without initiating any actual work.

Accepted Presentation Contexts

Table 12 shows the Presentation Contexts that may be accepted by Query/Retrieve Server AE for verification operations.

Table 12 - Acceptable Presentation Contexts for Query/Retrieve Server AE for Verification

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR	1.2.840.10008.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
		Big Endian			

SOP Specific Conformance for SOP Class Verification

Not Applicable.

Presentation Context Acceptance Criterion

Query/Retrieve Server AE will accept the verification SOP classes listed in Table 12 above. Query/Retrieve Server AE defines no limit on the number of presentation contexts accepted. If Query/Retrieve Server AE runs out of resources when trying to accept multiple presentation contexts, it will reject the association request.

Transfer Syntax Selection Policies

Query/Retrieve Server AE prefers Explicit Little Endian Transfer Syntax.

If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

1. Explicit Little Endian Transfer Syntax
2. Implicit Little Endian Transfer Syntax
3. Explicit Big Endian Transfer Syntax

5.2.4.2 Real-World Activity – Storing Instances

The Real-World Activity associated with the C-STORE operation is the storage of instances as a C-MOVE destination for the Client AE. Query/Retrieve Server AE will issue a failure status response if it is unable to store the instance.

The instances received by Query/Retrieve Server AE are stored in a temporary cache for viewing by the local cardiology application or to be copied into the online depository.

When Query/Retrieve Server AE receives the association request, it will allow the following activities to be performed during that association:

- Verification - Allow a remote DICOM device to verify that Query/Retrieve Server AE is active on the DICOM network.
- Storage Commitment - Receive the request for storage commitment.

Associated Real-World Activity

The Real-World activity associated with the C-STORE operation is the storage of the instance on the disk of the system upon which Query/Retrieve Server AE is running. Instances are stored by writing the data set of the C-STORE command to disk and adding the PS 3.10 header.

Query/Retrieve Server AE will issue a failure status response if it is unable to store the instance on disk or if the instance does not conform to the IOD of the SOP class under which it was transmitted.

Accepted Presentation Contexts

Any of the Presentation Contexts shown in Table 14 are acceptable to Query/Retrieve Server AE for receiving images.

Table 13 - Acceptable Presentation Contexts for Query/Retrieve Server AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Note	See Note	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
See Note	See Note	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
See Note	See Note	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
See Note	See Note	JPEG Lossless Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCP	None
See Note	See Note	JPEG Lossy Process 1	1.2.840.10008.1.2.4.50	SCP	None
See Note	See Note	RLE Lossless	1.2.840.10008.1.2.4.5	SCP	None

Note: The Abstract Syntax corresponds to the SOP Class UID for Series modality and can be one of the syntaxes in Table 14.

Table 14 - Abstract Syntaxes

Abstract Syntax	
Name	UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1

Abstract Syntax	
Name	**UID**
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Basic Text Structure Report	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structure Report	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive Structure Report	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

SOP Specific Conformance

5.2.4.2.1.1 SOP Specific Conformance to Storage SOP Classes

Query/Retrieve Server AE conforms to the SOPs of the Storage Service Class at Level 2 (Full). No elements are discarded or coerced by Query/Retrieve Server AE. In the event of a successful C-STORE operation, the Images have successfully been written to Change Healthcare Cardiology ECG Management system. They may be accessed by the cardiology system applications or through DICOM Query/Retrieve Model.

If Query/Retrieve Server AE returns one of the following status codes, then the C-STORE was unsuccessful.

Status	Action	Status	Description
A700	Refused	Out of resources	Indicates that there is not enough space to store the image.
A800		SOP Class not supported	Indicates that the SOP Class of the Image in the C-Store operation did not match the Abstract Syntax negotiated for the Presentation Context. This indicates a problem with the SCU of the Service Class.
A900	Failed	Data Set does not match SOP Class	Indicates that the Data Set does not encode an instance of the SOP Class specified. This indicates a problem with SCU of the Service Class.
C000	Unable to Process	Unable to understand	Indicates that Query/Retrieve Server AE cannot parse the Data Set into elements. This indicates a problem with the SCU.

5.2.4.2.1.2 Presentation Context Acceptance Criterion

Query/Retrieve Server AE defines no limit on the number of presentation contexts accepted.

If Query/Retrieve Server AE runs out of resources when trying to accept multiple presentation contexts, Query/Retrieve Server AE will reject the association request. Query/Retrieve Server AE does not check for duplicate presentation contexts and will accept duplicate presentation contexts.

5.2.4.2.1.3 Transfer Syntax Selection Policies

Query/Retrieve Server AE prefers Explicit Little Endian Transfer Syntax with compressed pixel data.

If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

1. JPEG Lossless, Hierarchical, First-Order Prediction Transfer Syntax
2. Explicit Little Endian Transfer Syntax
3. Implicit Little Endian Transfer Syntax
4. Explicit Big Endian Transfer Syntax

5.2.4.3 Real World Activity – Finding instances

Associated Real World Activity

The Associated Real-World Activity associated with the C-FIND operation is the finding of the instance in the Change Healthcare Cardiology system. Query/Retrieve Server AE will issue a failure status response if it is unable to find the instance. The search is performed by comparing the keys specified in request with corresponding keys of instaces in system.

Accepted Presentation Contexts

Any of the Presentation Contexts shown in Table 15 are acceptable to Query/Retrieve Server AE for finding images.

Table 15- Acceptable Presentation Contexts

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	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

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	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

SOP Specific Conformance for FIND SOP Classes

Query/Retrieve Server AE conforms to the SOPs of the Find Service Class at Level 2 (Full).

Table 16-Patient C-FIND Supported Elelements

Attribute Name	Tag	VR	Type	Matching
Patient Level				
Patient's Name	(0010,0010)	PN	R	*,U
Patient ID	(0010,0020)	LO	U	*,U
Issuer of Patient ID	(0010,0021)	LO	O	*,U
Patient’s Birth Date	(0010,0030)	DA	O	R,U
Patient’s Sex	(0010,0040)	CS	O	S,U
Study Level				
Study Date	(0008,0020)	DA	R	R,U
Study Time	(0008,0030)	TM	R	R,U
Accession Number	(0008,0050)	SH	R	*,U
Study Instance UID	(0020,000D)	UI	U	S,U
Study ID	(0020,0010)	SH	O	*,U
Modalities in Study (NOTE1)	(0008,0061)	CS	O	S,U
Referring Physician's Name	(0008,0090)	LO	O	*,U
Study Description	(0008,1030)	LO	O	*,U
Number of Study Related Series	(0020,1206)	IS	O	NONE
Number of Study Related Instances	(0020,1208)	IS	O	NONE

Attribute Name	Tag	VR	Type	Matching
Series Level				
Modality	(0008,0060)	CS	R	S,U
Series Instance UID	(0020,000E)	UI	U	S,U
Series Number	(0020,0011)	IS	R	*,U
Series Description	(0008,103E)	LO	O	*,U
Performing Physician's Name	(0008,1050)	PN	O	*,U
Instance Level				
Instance Number	(0020,0013)	IS	R	*,U
SOP Instance UID	(0008,0018)	UI	U	S,U
SOP Class UID	(0008,0016)	UI	O	NONE

Table 17 - Study Root C-FIND Supported Elements

Attribute Name	Tag	VR	Type	Matching
Study Level				
Study Date	(0008,0020)	DA	R	R,U
Study Time	(0008,0030)	TM	R	R,U
Accession Number	(0008,0050)	SH	R	*,U
Patient's Name	(0010,0010)	PN	R	*,U
Patient ID	(0010,0020)	LO	R	*,U
Study ID	(0020,0010)	SH	R	*,U
Study Instance UID	(0020,000D)	UI	U	S,U
Issuer of Patient ID	(0010,0021)	LO	O	*,U
Patient's Birth Date	(0010,0030)	DA	O	R,U
Patient's Sex	(0010,0040)	CS	O	S,U
Modalities in Study (NOTE1)	(0008,0061)	CS	O	S,U
Referring Physician's Name	(0008,0090)	LO	O	*,U
Study Description	(0008,1030)	LO	O	*,U
Number of Study Related Series	(0020,1206)	IS	O	NONE
Number of Study Related Instances	(0020,1208)	IS	O	NONE
Series Level				
Modality	(0008,0060)	CS	R	S,U
Series Number	(0020,0011)	IS	R	*,U
Series Instance UID	(0020,000E)	UI	U	S,U

Attribute Name	Tag	VR	Type	Matching
Series Description	(0008,103E)	LO	O	*,U
Performing Physician's Name	(0008,1050)	PN	O	*,U
Number of Series Related Instances	(0020,1209)	IS	O	NONE
Instance Level				
Instance Number	(0020,0013)	IS	R	*,U
SOP Instance UID	(0008,0018)	UI	U	S,U
SOP Class UID	(0008,0016)	UI	O	NONE

The Key Types Symbols for the Query/Retrieve Information Models:

U – Unique Key Attribute

R – Required Key Attribute

O – Optional Key Attribute

The types of Matching supported by the Query/Retrieve Server AE:

S - indicates Single Value Matching is supported.

R - indicates Range Matching is supported.

* - indicates Wildcard Matching is supported.

U - indicates Universal Matching is supported.

NOTE1 – "Modalities in Study" attribute also supports matching a list of single values, delimited by backslash ("\"). Each value in the list of the request may generate a match.

The Query/Retrieve Server AE searches the Change Healthcare Cardiology ECG Managment Database for the requested Information Objects described in the C-FIND identifier and returns a response for each match. Possible response status values are listed in the following table:

Status	Action	Status	Description
A700	Refused	Out of resources	Indicates that there is not enough space to store the image
A900	Failed	Data Set does not match SOP Class	Indicates that the Data Set does not encode an instance of the SOP Class specified. This indicates a problem with SCU of the Service Class

Status	Action	Status	Description
C000	Unable to Process	Unable to understand	Indicates that Query/Retrieve Server AE cannot parse the Data Set into elements. This indicates a problem with the SCU
FE00	Cancel		Terminated due to Cancel Request
0000	Success		Matching completed
FF00	Pending		Matches are continuing

The attribute (0000,0902) contains a descriptive message to explain error returns.

Presentation Context Acceptance Criterion

Query/Retrieve Server AE defines no limit on the number of presentation contexts accepted.

If Query/Retrieve Server AE runs out of resources when trying to accept multiple presentation contexts, Query/Retrieve Server AE will reject the association request. Query/Retrieve Server AE does not check for duplicate presentation contexts and will accept duplicate presentation contexts.

Transfer Syntax Selection Policy

The Query/Retrieve Server AE Application Entity conforms to the DICOM Patient Root Query/Retrieve and DICOM Study Root Query/Retrieve Service Class as an SCP for the Abstract Syntaxes listed in Table 15.

Query/Retrieve Server AE prefers Explicit Little Endian Transfer Syntax.

If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

1. Explicit Little Endian Transfer Syntax
2. Implicit Little Endian Transfer Syntax
3. Explicit Big Endian Transfer Syntax

5.2.4.4 Real World Activity – Retrieving

Associated Real World Activity

The Real-World Activity associated with the C-MOVE operation is retrieving of the instance from the Change Healthcare Cardiology system by a remote system. Query/Retrieve Server AE will issue a failure status response if it is unable to retrieve the instance.

Accepted Presentation Contexts

Any of the Presentation Contexts shown in Table 18 are acceptable to Query/Retrieve Server AE for retrieving images.

Table 18 - Acceptable Presentation Contexts

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	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

A response is returned for each match found in the Change Healthcare Cardiology ECG Management database.

SOP Specific Conformance for MOVE SOP Classes

Query/Retrieve Server AE conforms to the SOPs of the Move Service Class at Level 2 (Full). Possible response status values are listed in the following table.

Status Code	Action	Status
A700	Refused	Out of resources
A702		Unable to perform sub-operation
A801		Move destination unknown
A900	Failed	Data Set does not match SOP Class
C000		Unable to Process
FE00	Cancel	Terminated due to Cancel Request

Status Code	Action	Status
0000	Success	Sub-operations completed
B000	Warning	Sub-operations completed – 1 or more failures
FF00	Pending	Matches are continuing

The attribute (0000,0902) contains a descriptive message to explain error returns.

Presentation Context Acceptance Criterion

Query/Retrieve Server AE defines no limit on the number of presentation contexts accepted.

If Query/Retrieve Server AE runs out of resources when trying to accept multiple presentation contexts, Query/Retrieve Server AE will reject the association request. Query/Retrieve Server AE does not check for duplicate presentation contexts and will accept duplicate presentation contexts.

Transfer Syntax Selection Policy

Query/Retrieve Server AE prefers Explicit Little Endian Transfer Syntax.

If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

1. Explicit Little Endian Transfer Syntax
2. Implicit Little Endian Transfer Syntax
3. Explicit Big Endian Transfer Syntax

5.2.4.5 Real-World Activity – Storage Commitment

Associated Real-World Activity

The associated Real-World Activity is an attempt to make the commitment for the safekeeping of the SOP instances. Query/Retrieve Server AE uses Storage Commitment SOP Class Push Model implementation in order to guarantee the safe storage of SOP instances.

Query/Retrieve Server AE always returns the N-EVENT-REPORT on a separate association. This association is opened with reverse role negotiation, that is, the Calling AE is the SCP and the Called AE is the SCU.

After an N-ACTION request containing the Study Component Sequence has been received, the Storage Commitment N-EVENT-REPORT is built and returned.

Proposed Presentation Contexts

For this Real-World Activity, Query/Retrieve Server AE will propose the Presentation Contexts listed in Table 19.

Table 19- Proposed Presentation Contexts

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	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.2	SCU	None

5.3 Gateway AE Specification

Note: Some Change Healthcare Cardiology ECG Management implementations include the use of DatamedFT™ and DatamedWL™ software in order to provide a Store SCP service for ECG carts. Please refer to DatamedFT™ and DatamedWL™ DICOM Conformance Statement in case Datamed software is installed at your facility.

5.3.1 SOP Classes

Gateway AE provides Standard Conformance to the following DICOM 3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification SOP Class	1.2.840.10008.1.1	No	Yes
Transfer			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1	No	Yes
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	No	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Workflow Management			
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	No	Yes

5.3.2 Association Policies

5.3.2.1 General

DICOM application context for Gateway AE :

Application Context Name	1.2.840.10008.3.1.1.1

Maximum PDU size is configurable (default is 16,384 bytes).

5.3.2.2 Number of Associations

Number of Associations as an Association Acceptor:

Maximum number of simultaneous associations	1 by default (configurable)

5.3.2.3 Asynchronous Nature

Asynchronous mode (multiple concurrent operations on one association) is not supported.

5.3.2.4 Implementation Identifying Information

DICOM Implementation Class and Version for Gateway AE

Implementation Class UID	2.16.376.1.1.511752891.1

Implementation Version Name	MEDCON01MAR2012

5.3.3 Association Initiation Policy

5.3.3.1 Real-World Activity – Verification

Associated Real-World Activity

The associated Real-World Activity is an attempt to check whether remote AE is ready for DICOM dialog.

Proposed Presentation Contexts

For this Real-World Activity, the client AE will propose one of the Presentation Contexts listed in Table 20.

Table 20 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.3.3.2 Real-World Activity – Send Storage Commitment Response

Associated Real-World Activity

The associated Real-World Activity is an attempt to make the commitment for the safekeeping of the SOP instances. Gateway AE uses Storage Commitment SOP Class Push Model implementation in order to guarantee the safe storage of SOP instances.

After an N-ACTION request containing the Study Component Sequence has been received, the Storage Commitment N-EVENT-REPORT is built and returned.

Depending on configuration, Gateway AE may return the N-EVENT-REPORT on a separate association. This association is opened with reverse role negotiation, that is, the Calling AE is the SCP and the Called AE is the SCU.

Proposed Presentation Contexts

For this Real-World Activity, Query/Retrieve Server AE will propose the Presentation Contexts listed in Table 21.

Table 21- Proposed Presentation Contexts

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	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.3.4 Association Acceptance Policy

Gateway AE accepts an association for storing images and for storage commitment requests.

5.3.4.1 Real World Activity – Verification

Gateway AE accepts associations from nodes that wish to perform a verification operation.

Associated Real World Activity – Verification

The Real World Activity associated with the C-ECHO request is that an external node wishes to verify network or server operation without initiating any actual work.

Accepted Presentation Contexts

Table 22 shows the Presentation Contexts that may be accepted by Gateway AE for verification operations.

Table 22 - Acceptable Presentation Contexts for Gateway AE for Verification

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

SOP Specific Conformance for SOP Class Verification

Not Applicable.

Presentation Context Acceptance Criterion

Gateway AE will accept the verification SOP classes listed in Table 22 above. Gateway AE defines no limit on the number of presentation contexts accepted. If Gateway AE runs out of resources when trying to accept multiple presentation contexts, it will reject the association request.

Transfer Syntax Selection Policies

Gateway AE prefers Explicit Little Endian Transfer Syntax.

If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

1. Explicit Little Endian Transfer Syntax
2. Implicit Little Endian Transfer Syntax
3. Explicit Big Endian Transfer Syntax

5.3.4.2 Real-World Activity – Storing Instances

The Real-World Activity associated with the C-STORE operation is the storage of the instance in the Change Healthcare Cardiology ECG Management system. Gateway AE will issue a failure status response if it is unable to store the instace.

When Gateway AE receives the association request, it will allow the following activities to be performed during that association:

- Verification - Allow a remote DICOM device to verify that Gateway AE is active on the DICOM network
- Storage Commitment - Receive the request for storage commitment.

Associated Real-World Activity

The Real-World activity associated with the C-STORE operation is the storage of the instance on the disk of the system upon which Gateway AE is running. Instances are stored by writing the data set of the C-STORE command to disk and adding the PS 3.10 header.

Gateway AE will issue a failure status response if it is unable to store the instance on disk or if the instance does not conform to the IOD of the SOP class under which it was transmitted.

Accpeted Presentation Contexts

Any of the Presentation Contexts shown in Table 23 are acceptable to Gateway AE for receiving instances.

Table 23 - Acceptable Presentation Contexts for Gateway AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Note	See Note	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
See Note	See Note	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
See Note	See Note	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
See Note	See Note	JPEG Lossless Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCP	None
See Note	See Note	JPEG Lossy Process 1	1.2.840.10008.1.2.4.50	SCP	None
See Note	See Note	RLE Lossless	1.2.840.10008.1.2.4.5	SCP	None

Note: The Abstract Syntax corresponds to the SOP Class UID for Series modality and can be one of the syntaxes listed on Table 24.

Table 24- Abstract Syntaxes

Abstract Syntax	
Name	UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59

Abstract Syntax	
Name	**UID**
Basic Text Structure Report	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structure Report	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive Structure Report	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

SOP Specific Conformance

5.3.4.2.1.1 SOP Specific Conformance to Storage SOP Classes

Gateway AE conforms to the SOPs of the Storage Service Class at Level 2 (Full). No elements are discarded or coerced by Gateway AE. In the event of a successful C-STORE operation, the instances have successfully been written to Change Healthcare Cardiology ECG Management system. They may be accessed by the Change Healthcare applications or through DICOM Query/Retrieve Model.

If Gateway AE returns one of the following status codes, then the C-STORE was unsuccessful.

Status	Action	Status	Description
A700	Refused	Out of resources	Indicates that there is not enough space to store the image.
A800		SOP Class not supported	Indicates that the SOP Class of the instance in the C-Store operation did not match the Abstract Syntax negotiated for the Presentation Context. This indicates a problem with the SCU of the Service Class.
A900	Failed	Data Set does not match SOP Class	Indicates that the Data Set does not encode an instance of the SOP Class specified. This indicates a problem with SCU of the Service Class.
C000	Unable to Process	Unable to understand	Indicates that the AE cannot parse the Data Set into elements. This indicates a problem with the SCU.

5.3.4.2.1.2 Presentation Context Acceptance Criterion

Gateway AE defines no limit on the number of presentation contexts accepted.

If Gateway AE runs out of resources when trying to accept multiple presentation contexts, Gateway AE will reject the association request. Gateway AE does not check for duplicate presentation contexts and will accept duplicate presentation contexts.

5.3.4.2.1.3 Transfer Syntax Selection Policies

If offered a choice of Transfer Syntaxes in a Presentation Context, Gateway AE will apply the following priorities to the choice of Transfer Syntax:

1. JPEG Lossless, Hierarchical, First-Order Prediction Transfer Syntax
2. Explicit Little Endian Transfer Syntax
3. Implicit Little Endian Transfer Syntax
4. Explicit Big Endian Transfer Syntax

The associated Real-World Activity is an attempt to make the commitment for the safekeeping of the SOP instances. Gateway AE uses Storage Commitment SOP Class Push Model implementation in order to guarantee the safe storage of SOP instances.

Depeding on configuration, Gateway AE may return the N-EVENT-REPORT on a separate association or the same association. This association is opened with reverse role negotiation, that is, the Calling AE is the SCP and the Called AE is the SCU.

After an N-ACTION request containing the Study Component Sequence has been received, the Storage Commitment N-EVENT-REPORT is built and returned to requester.

5.4 Storage Manager Committer AE Specification

5.4.1 SOP Classes

Storage Manager Committer AE provides Standard Conformance to the following DICOM 3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification SOP Class	1.2.840.10008.1.1	Yes	No
Workflow Management			
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No

5.4.2 Association Policies

5.4.2.1 General

DICOM application context for Storage Manager Committer AE:

Application Context Name	1.2.840.10008.3.1.1.1

Maximum PDU size is configurable (default is 16,384 bytes).

5.4.2.2 Number of Associations

Number of Association as Association Initiator:

Maximum number of simultaneous associations	1

Number of Associations as an Association Acceptor:

Maximum number of simultaneous associations	1

5.4.2.3 Asynchronous Nature

Asynchronous mode (multiple concurrent operations on one association) is not supported.

5.4.2.4 Implementation Identifying Information

DICOM Implementation Class and Version for Storage Manager Committer AE:

Implementation Class UID	2.16.376.1.1.511752891.1
Implementation Version Name	MEDCON01MAR2012

5.4.3 Association Initiation Policy

5.4.3.1 Real-World Activity – Verification

Associated Real-World Activity

The associated Real-World Activity is an attempt to check whether remote AE is ready for DICOM dialog.

Proposed Presentation Contexts

For this Real-World Activity, the Storage Manager Committer AE will propose one of the Presentation Contexts listed in Table 25.

Table 25 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.4.3.2 Real-World Activity – Getting Storage Commitment from a Remote System

Associated Real-World Activity

Storage Manager Committer AE requests Storage Commitment from the remote DICOM Archive solution after sending instances to the remote DICOM Archive and receiving a response confirming the instances were archived.

Proposed Presentation Contexts

For this Real-World Activity, the Storage Manager Committer AE will propose one of the Presentation Contexts listed in Table 26.

Table 26 -Proposed Presentation Contexts

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU

5.4.4 Association Acceptance Policy

5.4.4.1 Real-World Activity – Receive Storage Commitment Response

Associated Real-World Activity

The associated Real-World Activity is receiving a storage commitment response on a separate association than the storage commitment request.

Accepted Presentation Contexts

Table 27 shows the Presentation Contexts that may be accepted by Storage Manager Committer AE for receiving Storage Commitment Response.

Table 27 - Acceptable Presentation Contexts by Storage Manager Committer AE for receiving Storage Commitment Response

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU

5.5 Modality Worklist Server AE Specification

Note: Some Change Healthcare Cardiology ECG Management implementations include the use of DatamedWL™ software in order to provide a Worklist SCP service for ECG carts. Please refer to DatamedFT™ and DatamedWL™ DICOM Conformance Statement in case Datamed software is installed at your facility.

5.5.1 SOP Classes

Modality Worklist Server AE provides Standard Conformance to the following DICOM 3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification SOP Class	1.2.840.10008.1.1	No	Yes
Workflow Management			
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	No	Yes

5.5.2 Association Policies

5.5.2.1 General

DICOM application context for Modality Worklist Server AE:

Application Context Name	1.2.840.10008.3.1.1.1

Maximum PDU size is configurable (default is 16,384 bytes).

5.5.2.2 Number of Associations

Number of Associations as an Association Acceptor:

Maximum number of simultaneous	3 by default (configurable)

associations	

5.5.2.3 Asynchronous Nature

Asynchronous mode (multiple concurrent operations on one association) is not supported.

5.5.2.4 Implementation Identifying Information

DICOM Implementation Class and Version for Modality Worklist Server AE:

Implementation Class UID	2.16.376.1.1.511752891.1
Implementation Version Name	MEDCON01MAR2012

5.5.3 Association Initiation Policy

The Modality Worklist Server AE does not initiate associations.

5.5.4 Association Acceptance Policy

Modality Worklist Server AE accepts an association for verification and providing modality worklist.

5.5.4.1 Real World Activity – Verification

Modality Worklist Server AE accepts associations from nodes that wish to perform a verification operation on Change Healthcare Cardiology.

Associated Real World Activity – Verification

The Real World Activity associated with the C-ECHO request is that an external node wishes to verify network or server operation without initiating any actual work.

Accepted Presentation Contexts

Table 28 shows the Presentation Contexts that may be accepted by Modality Worklist Server AE for verification operations.

Table 28 - Acceptable Presentation Contexts by Modality Worklist Server AE for Verification

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

SOP Specific Conformance for SOP Class Verification

Not Applicable.

Presentation Context Acceptance Criterion

Modality Worklist Server AE will accept the verification SOP classes listed in Table 28 above. Modality Worklist Server AE defines no limit on the number of presentation contexts accepted. If Modality Worklist Server AE runs out of resources when trying to accept multiple presentation contexts, Modality Worklist Server AE will reject the association request.

Transfer Syntax Selection Policies

Modality Worklist Server AE prefers Explicit Little Endian Transfer Syntax.

If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

1. Explicit Little Endian Transfer Syntax
2. Implicit Little Endian Transfer Syntax
3. Explicit Big Endian Transfer Syntax

5.5.4.2 Real-World Activity – Providing Modality Worklist

Associated Real World Activity – Providing Modality worklist

The Real World Activity associated is that an external system wishes to query for modality worklist.

Modality Worklist Server AE will wait for an association as an SCP for the Modality Worklist Service Class. When a C-FIND request is received, a search is done in Change Healthcare Cardiology ECG Management database for the data with the requested attributes, and a list of found attributes is returned to the remote requester. The Modality Worklist Server AE accepts a number of associations, which is configured at the time of system initialization.

Accepted Presentation Contexts

Any of the Presentation Contexts shown in Table 29 are acceptable by Modality Worklist Server AE for providing modality worklist.

Table 29- Accepted Presentation Contexts

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP

SOP Specific Conformance for Modality Worklist SOP Class

Modality Worklist Server AE supports attribute matching as defined by the Modality Worklist Information Model.

If the requesting station is associated (by AE title) to a certain facility in the Change Healthcare Cardiology Management system, the results sent back to the station will be filtered by its associated facility.

The supported Return Key Attributes are listed in the following table.

Description	Tag	Matching Key Type	Return Key Type
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	0040,0100	R	1
>Scheduled Station AE Title	0040,0001	R	1
>Scheduled Procedure Step Start Date	0040,0002	R	1
>Scheduled Procedure Step Start Time	0040,0003	R	1
>Modality	0008,0060	R	1
>Scheduled Performing Physician's Name	0040,0006	R	2
>Scheduled Procedure Step Description	0040,0007	O	1C
>Scheduled Station Name	0040,0010	O	2
>Scheduled Procedure Step	0040,0009	O	1

Description	Tag	Matching Key Type	Return Key Type
ID			
>Scheduled Procedure Step Location	0040,0011	O	2
>Scheduled Action Item Code Sequence	0040,0008	O	1C
>>Code Value	0008,0100	O	1C
>>Coding Scheme Designator	0040,0102	O	1C
>>Pre-Medication	0040,0012	O	2C
>Scheduled Procedure Step Status	0040,0020	O	3
Requested Procedure			
Requested Procedure ID	0040,1001	O	1
Requested Procedure Description	0032,1060	O	1C
Requested Procedure Code Sequence	0032,1064	O	1C
>Code Value	0008,0100	O	1C
>Coding Scheme Designator	0008,0102	O	1C
Study Instance UID	0020,000D	O	1
Referenced Study Sequence	0008,1110	O	2
>Referenced SOP Class UID	0008,1150	O	1C
>Referenced SOP Instance UID	0008,1155	O	1C
Requested Procedure Priority	0040,1003	O	2

Description	Tag	Matching Key Type	Return Key Type
Imaging Service Request			
Accession Number	0008,0050	O	2
Scheduled Procedure Step			
Requesting Physician	0032,1032	O	2
Referring Physician's Name	0008,0090	O	2
Visit Identification			
Admission ID	0038,0010	O	2
Current Patient Location	0038,0300	O	2
Patient Identification			
Patient's Name	0010,0010	R	1
Patient ID	0010,0020	R	1
Patient Demographics			
Patients Birth Date	0010,0030	O	2
Patient's Sex	0010,0040	O	2
Patient's Weight	0010,1030	O	2
Confidentiality constraint on patient data	0040,3001	O	2
Patient Medical			
Patient State	0038,0500	O	2
Pregnancy Status	0010,21C0	O	2
Medical Alerts	0010,2000	O	2
Contrast Allergies	0010,2110	O	2
Special Needs	0038,0050	O	2
All other Attributes from the Patient Medical Module		O	3

5.6 Sync Storer AE Specification

5.6.1 SOP Classes

Sync Storer AE provides Standard Conformance to the following DICOM 3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification SOP Class	1.2.840.10008.1.1	Yes	No
Transfer			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	No
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	No
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	No
Waveform Storage – Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1	Yes	No
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	No
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No

5.6.2 Association Policies

5.6.2.1 General

DICOM application context for Sync Storer AE:

Application Context Name	1.2.840.10008.3.1.1.1

Maximum PDU size is configurable (default is 16,384 bytes)

5.6.2.2 Number of Associations

Number of Association as Association Initiator:

Maximum number of simultaneous associations	10 by default. Configurable from 1 to 10.

5.6.2.3 Asynchronous Nature

Asynchronous mode (multiple concurrent operations on one association) is not supported.

5.6.2.4 Implementation Identifying Information

DICOM Implementation Class and Version for Sync Storer AE:

Implementation Class UID	2.16.376.1.1.511752891.1
Implementation Version Name	MEDCON01MAR2012

5.6.3 Association Initiation Policy

Sync Storer AE attempts to initiate a new association in the following cases:

- To check the connection to the remote system
- To synchronize DICOM archive upon instance deletion and provide corrected instances as part of the IOCM profile.

5.6.3.1 Real-World Activity – Verification

Associated Real-World Activity

The associated Real-World Activity is an attempt to check whether remote AE is ready for DICOM dialog.

Proposed Presentation Contexts

For this Real-World Activity, the client AE will propose one of the Presentation Contexts listed in Table 30.

Table 30 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.6.3.2 Real-World Activity – Synchronize DICOM Archive (IOCM activity)

Description and Sequencing of Activities

Sync Storer AE can export DICOM Key Object Selection (KOS) objects as a rejection note to a DICOM Archive as a result of an internal "Delete Image" event.

- Delete Images:
  Deleting images (or instances) triggers the creation of an outbound delete Instances KOS.
- Merge or Move Study:
  When moving or merging a study, Change Healthcare Cardiology will send a DICOM KOS to notify the DICOM archive on instance deletion from the source study and will send the relevant corrected instances associated to the destination study.

Proposed Presentation Contexts

Each time an association is initiated, the Sync Storer AE proposes one or more Presentation Contexts to be used on that association, as shown in Table 31.

Table 31 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Note		Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See Note		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See Note		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
See Note		JPEG Lossless, Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None
See Note		JPEG Lossy Process 1	1.2.840.10008.1.2.4.50	SCU	None
See Note		RLE Lossless	1.2.840.10008.1.2.5	SCU	None

Note: The Abstract Syntax corresponds to the SOP Class UID for Series modality. The selection of these syntaxes can be found in Table 32

Table 32 - Abstract Syntaxes

Abstract Syntax	
Name	**UID**
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-Frame Single bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Basic Text Structure Report	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structure Report	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive Structure Report	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

SOP Specific Conformance – Storage SOP Classes

See more information about rejection note contents in 9.1.1 - Rejection Note Key Object Selection (KOS) Object Contents.

5.6.4 Association Acceptance Policy

Sync Storer AE does not accept associations.

5.7 Sync Committer AE Specification

5.7.1 SOP Classes

Sync Committer AE provides Standard Conformance to the following DICOM 3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No
Workflow Management			
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No

5.7.2 Association Policies

5.7.2.1 General

DICOM application context for Sync Committer AE:

Application Context Name	1.2.840.10008.3.1.1.1

Maximum PDU size is configurable (default is 16,384 bytes).

5.7.2.2 Number of Associations

Number of Association as Association Initiator:

Maximum number of simultaneous associations	1

Number of Associations as an Association Acceptor:

Maximum number of simultaneous associations	Unlimited

5.7.2.3 Asynchronous Nature

Asynchronous mode (multiple concurrent operations on one association) is not supported.

5.7.2.4 Implementation Identifying Information

DICOM Implementation Class and Version for Sync Committer AE:

Implementation Class UID	2.16.376.1.1.511752891.1
Implementation Version Name	MEDCON01MAR2012

5.7.3 Association Initiation Policy

5.7.3.1 Real-World Activity – Verification

Associated Real-World Activity

The associated Real-World Activity is an attempt to check whether remote AE is ready for DICOM dialog.

Proposed Presentation Contexts

For this Real-World Activity, the Sync Committer AE will propose one of the Presentation Contexts listed in Table 33.

Table 33 - Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification	1.2.840.10008.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

5.7.3.2 Real-World Activity – Getting Storage Commitment from a Remote System

Associated Real-World Activity

Sync Committer AE requests Storage Commitment from the remote DICOM Archive solution after sending instances or DICOM KOS object to the remote DICOM Archive and receiving a response confirming the instances were archived.

The storage commitment response may be received on the same association or on a separate association.

Proposed Presentation Contexts

For this Real-World Activity, the Sync Committer AE will propose one of the Presentation Contexts listed inTable 34.

Table 34 -Proposed Presentation Contexts

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU

5.7.4 Association Acceptance Policy

5.7.4.1 Real-World Activity – Receive Storage Commitment Response

Associated Real-World Activity

The associated Real-World Activity is receiving a storage commitment response on a separate association than the storage commitment request.

Accepted Presenation Contexts

Table 35 shows the Presentation Contexts that may be accepted by Sync Committer AE for receiving Storage Commitment Response.

Table 35 - Acceptable Presentation Contexts by Storage Manager Committer AE for receiving Storage Commitment Response

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Storage	1.2.840.10008.1.20.1	Implicit VR	1.2.840.10008.1.2	SCU

Presentation Context Table				
Abstract Syntax		Transfer Syntax		Role
Name	UID	Name	UID	
Commitment Push Model		Little Endian		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU

6. Communication Profiles

6.1 TCP/IP Stack

Change Healthcare Cardiology ECG Management provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

6.1.1 TCP/IP API

Change Healthcare Cardiology ECG Management AEs inherits their TCP/IP stack from the computer system upon which it executes.

7. Extensions/Specializations/Privatization

Change Healthcare Cardiology ECG Management supports all the private tags on Level 2. Change Healthcare private tags are listed in Table 36.

Table 36- Change Healthcare Private Attributes

Data Element Tag	Name	Value Representation	Remark
(000D,0010)	Private Attributes Identification Code	LO	MEDCON
(000D,1000)	Patient TCS Location ID	SH	
(000D,1001)	Study TCS Location ID	SH	
(000D,1002)	Instance TCS Location ID	SH	
(000D,1003)	Instance TCS ID	SH	
(000D,1004)	Instance TCS Location ID	SH	
(000D,1005)	Patient TCS ID	SH	
(000D,1006)	Related File	LO	
(000D,1007)	Additional Patient ID	LO	
(000D,1021)	Patient Creation Date	DA	
(000D,1022)	Patient Creation Time	TM	
(000D,1038)	Instance Description	LO	
(000D,1062)	TCS Document File	LO	
(000D,1063)	Annotation Note	SH	When exists in Changing Information Sequence (000D,1302) item, contains date and time of update
(000D,1076)	Annotation Creation Date	DA	
(000D,1077)	Annotation Creation Time	TM	
(000D,1082)	Instance Creation Date	DA	
(000D,1083)	Instance Creation Time	TM	
(000D,1090)	TCS Document Type	US	Internal enumerator for document type

(000D,1095)	Referenced Instance Sequence	SQ	1 item
(000D,1096)	Procedure Type Code	LO	
(000D,1097)	Patient Optional ID	LO	
(000D,1098)	Patient NHS number	LO	
(000D,1099)	Patient NHS status	LO	
(000D,0011)	Private Attributes Identification Code	LO	MEDCON
(000D,1101)	Patient Name	OW	
(000D,1102)	Patient ID	OW	
(000D,1103)	Patient Additional ID	OW	
(000D,1104)	Patient Optional ID	OW	
(000D,1105)	Series Description	OW	
(000D,1106)	Series Optional ID	OW	
(000D,1107)	Referring Physicians Name	OW	
(000D,1108)	Performing Physicians Name	OW	Names are Delimited by "\"
(000D,1109)	Instance Name	OW	
(000D,1110)	Instance Description	LO	
(000D,0012)	Private Attributes Identification Code	LO	MEDCON WRAPPED REPORT or MEDCON WRAPPED ANNOTATION
(000D,1202)	MMI Type	SH	Encapsulated document extension
(000D,1203)	Encapsulated Document Sequence	SQ	1 or more items
(000D,1204)	Encapsulated Document	OB	
(000D, 1205)	Encapsulated Document Length	UL	
(000D,0013)	Private Attributes Identification Code	LO	MEDCON

(000D,1301)	Hostname	LO	Internal use in Modality Worklist
(000D,1302)	Changing Information Sequence	SQ	1 or more items containing elements befor update
(000D,1303)	Calling AE Title	LO	Internal use in Modality Worklist

Elements from (000D,1101) – (000D,1110) are used for recording the UNICODE version of the relevant standard and private elements (if required).

Elements from (000D,1202) – (000D, 1205) are used to encapsulate non-DICOM files.

Element (000D, 1302) is used to save sequence of elements changed when a DICOM file is updated. All elements represent internal information used for media exchange between Change Healthcare Cardiology systems.

8. Configuration

Change Healthcare Cardiology ECG Management maintains configuration data in registry and configuration files as well as in the database. All parameters of DICOM services (including AE Title and TCP Listen Port) are configurable. Configuration may be performed by the Change Healthcare Cardiology Administration utility or manually.

The Change Healthcare Cardiology ECG Management AEs uses registry and configuration files that contain information used to validate association attempts from Local and Remote Application entities. The Change Healthcare Cardiology AEs then listens for association requests on the configured port.

The following configuration parameters are available for all Change Healthcare Cardiology ECG Management AEs:

- SCPs:
    - AE Title
    - Maximum PDU Size (Default: 16384)
    - Listening Port
- SCUs:
    - AE Title
    - Maximum PDU Size (Default: 16384)

An association request for Storage Services from a Remote Application Entity causes the Change Healthcare Cardiology ECG Management Gateway AE to validate the request according to the configuration parameters set at execution time. The Remote Application Entity then sends the Information Object Instance.

If the data is not currently stored, the Change Healthcare Cardiology ECG Management Gateway AE saves the received Information Object Instance on its database and in a predefined backup directory on the hard disk. The data remains in that directory until it is removed by the Change Healthcare Cardiology Quota Manager service based on the quota configuration.

The Change Healthcare Cardiology ECG Management Query/Retrieve Server AE searches the local database for the instance(s) specified. If the request was C-FIND, then a response is returned for each match. If the request was C-MOVE, then a sub association is created for the C-STORE operation with the destination Application Entity specified in the C-MOVE message.

9. Annexes

9.1 IOD Contents

9.1.1 Rejection Note Key Object Selection (KOS) Object Contents

With DICOM storage Synchoronization Service set as active, image deletion involves a creation of a rejection note KOS object according to the IOCM profile.

Table 37 below contains a list of DICOM elements of KOS file intended for flagging one or more images, waveforms, or other composite SOP Instances deleted by applications. The reason of deleting is defined as 'Incorrect Modality Worklist Entry' for Merge and Delete operations performed by client.

The following abbrevations are used in table 39:

AUTO – Value is generated automatically
USER – Value is sourced from user input
EMPTY – Attribute is sent without a value
VNAP – Value not always present

Table 37 – Rejection note elements

(Group, Element)	VR	Meaning	Value	Comments
(0008,0012)	DA	Instance Creation Date	AUTO	
(0008,0013)	TM	Instance Creation Time	AUTO	
(0008,0016)	UI	SOP Class UID	1.2.840.10008.5.1.4.1.1.88.59	Key Object Selection Document
(0008,0018)	UI	SOP Instance UID	AUTO	
(0008,0021)	DA	Series Date	AUTO	
(0008,0023)	DA	Content Date	AUTO	
(0008,0031)	TM	Series Time	AUTO	
(0008,0033)	TM	Content Time	AUTO	
(0008,0050)	SH	Accession Number	USER; VNAP	
(0008,0060)	CS	Modality	KO	
(0008,0070)	LO	Manufacturer	EMPTY	
(0010,0010)	PN	Patient's Name	USER	
(0010,0020)	LO	Patient ID	USER	
(0010,0021)	LO	Issuer of Patient ID	USER	
(0010,0030)	DA	Patient's Birth Date	USER	
(0010,0040)	CS	Patient's Sex	enumeration: M,F,O; USER	
(0020,000D)	UI	Study Instance UID	USER	
(0020,000E)	UI	Series Instance UID	USER	
(0020,0011)	IS	Series Number	1	
(0020,0013)	IS	Instance Number	1	
(0040,A040)	CS	Value Type	CONTAINER	

(Group, Element)	VR	Meaning	Value	Comments
(0040,A043)	SQ	Concept Name Code Sequence		Sequence with 1 item
>(0008,0100)	SH	Code Value	113038	
>(0008,0102)	SH	Coding Scheme Designator	DCM	
>(0008,0104)	LO	Code Meaning	Incorrect Modality Worklist Entry	
(0040,A050)	CS	Continuity Of Content	SEPARATE	
(0040,A375)	SQ	Current Requested Procedure Evidence Sequence		
>(0008,1115)	SQ	Referenced Series Sequence	USER	Sequence with 1 or more items
>>(0008,1199)	SQ	Referenced SOP Sequence	USER	Sequence with 1 or more items
>>>(0008,1150)	UI	Referenced SOP Class UID	USER	
>>>(0008,1155)	UI	Referenced SOP Instance UID	USER	
>>(0020,000E)	UI	Series Instance UID	USER	
>(0020,000D)	UI	Study Instance UID	USER	
(0040,A504)	SQ	Content Template Sequence	USER	Sequence with 1 item
>(0008,0105)	CS	Mapping Resource	DCMR	
>(0040,DB00)	CS	Template Identifier	2010	
(0040,A730)	SQ	Content Sequence	USER	Sequence with 1 item
>(0008,1199)	SQ	Referenced SOP Sequence	USER	Sequence with 1 or more items
>>(0008,1150)	UI	Referenced SOP Class UID	USER	
>>(0008,1155)	UI	Referenced SOP Instance UID	USER	
>(0040,A010)	CS	Relationship Type	CONTAINS	
>(0040,A040)	CS	Value Type	enumeration: IMAGE, WAVEFORM, COMPOSITE;	COMPOSITE type used for Structure Report, Encapsulated Document (PDF), Encapsulated non-DICOM documents , any other supported documents differ from IMAGE and

(Group, Element)	VR	Meaning	Value	Comments
				WAVEFORM.

10. Contact and Support Information

10.1 Support information

For technical support or any service related to your product, call the toll-free number for your region listed at https://iwcrm.changehealthcare.com. Standard coverage may include software support, hardware support, and software updates as covered in the support maintenance agreement.