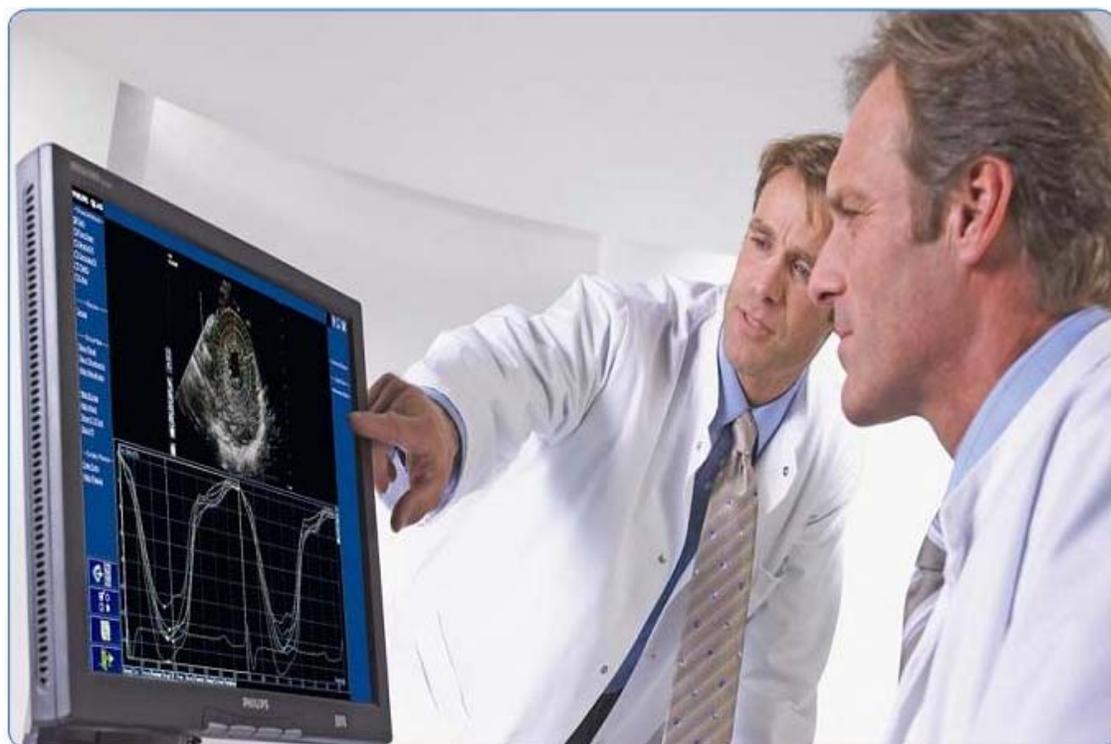# DICOM Conformance Statement

Q-Station R2.0

00028700000006 Rev. A

2012-08-07

Issued by:

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1. DICOM Conformance Statement Overview

Q-Station 2.0 is interoperable with systems providing a DICOM interface. Clinical users can select patient image data for basic viewing, post processing, data transfer or print. Q-Station 2.0 stores medical data in its local storage. The local storage has a limited capacity and is not intended for long term archiving purposes.

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	UID			
Other				
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes	N/A
Query/Retrieve				
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	No	N/A
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No	N/A
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No	N/A
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No	N/A
Transfer				
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes	N/A
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes	N/A
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes	N/A
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes	N/A
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes	N/A
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	N/A
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes	N/A
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes	N/A
Private 3D Presentation State	1.3.46.670589.2.5.1.1	Yes	Yes	N/A
Workflow Management				
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No	N/A
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No	N/A

A table of Supported Media Storage Application Profiles (with roles) is provided.

Table 2: Media Services

Media Storage Application Profile	File-set Creator (FSC)	File-set Updater (FSU)	File-set Reader (FSR)
Compact Disk-Recordable			
General Purpose CD-R Interchange	Yes	No	Yes
DVD			
General Purpose DVD Interchange with JPEG	Yes	No	Yes
USB			
General Purpose USB Media Interchange with JPEG	Yes	Yes	Yes

2. Table of Contents

3. Introduction

The introduction specifies product and relevant disclaimers as well as any general information that the vendor feels is appropriate.

3.1.   Revision History

The revision history provides dates and differences of the different releases.

Table 3: Revision History

Document Version	Date of Issue	Status	Description
00	02-July-2012	Draft	Initial version

3.2.   Audience

This Conformance Statement is intended for:
- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3.   Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.
This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
      It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
      Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and

incompatibilty (in case of media).
    The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

Table 4: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
AE	Application Entity
ANSI	American National Standard Institute
AP	Application Profile
BOT	Basic Offset Table
CD	Compact Disc
CD-R	CD-Recordable
CD-M	CD-Medical
CR	Computed Radiography
CT	Computed Tomography
DCR	Dynamic Cardio Review
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DX	Digital X-Ray
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
GUI	Graphic User Interface
HIS	Hospital Information System
HL7	Health Level Seven
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
ISIS	Information System - Imaging System
MOD	Magneto-Optical Disk
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
PDU	Protocol Data Unit
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RT	Radiotherapy
RWA	Real-World Activity
SC	Secondary Capture
SCM	Study Component Management
SCP	Service Class Provider
SCU	Service Class User

Abbreviation/Term	Explanation
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
US	Ultrasound
USMF	Ultrasound Multi-frame
WLM	Worklist Management
XA	X-Ray Angiographic

3.5. References

[DICOM]   Digital Imaging and Communications in Medicine, Parts 1 - 18 (NEMA PS 3.1- PS 3.18),
          National Electrical Manufacturers Association (NEMA)
          Publication Sales 1300 N. 17th Street, Suite 1752 Rosslyn, Virginia. 22209, United States
          of America
          Internet: http://medical.nema.org/
          Note that at any point in time the official standard consists of the most recent yearly
          edition of the base standard (currently 2009) plus all the supplements and correction
          items that have been approved as Final Text.

4. Networking

This section contains the networking related services (vs. the media related ones).

4.1.   Implementation model

The implementation model consists of three sections:
- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

4.1.1.   Application Data Flow

The Q-Station 2.0 9.1 implements one network application entity: the Q-Station 2.0 Network AE.

The following figure shows the networking application data flow as a functional overview of the application entity. On the left the local Real-World Activities are presented, whereas on the right the remote Real-World Activities are presented.
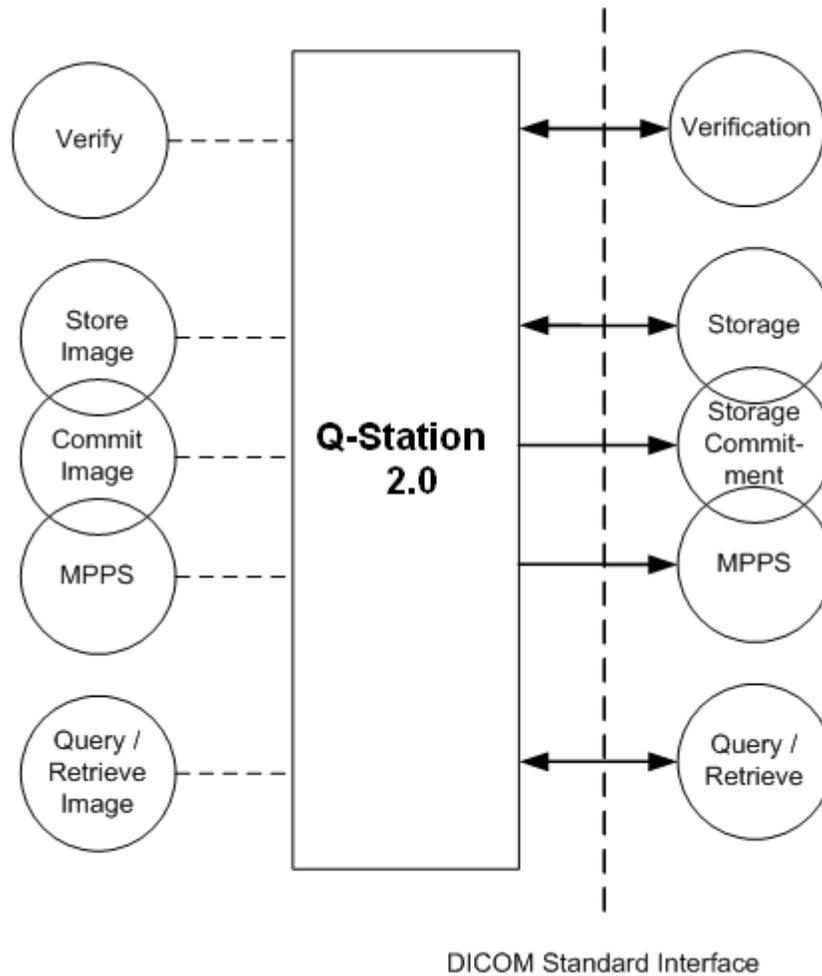
Figure 1: Application Data Flow Diagram

The Q-Station 2.0 9.1 incorporates the following functionality:

- Import images to a local database;
- Export (and commit) images from the local database to a network DICOM node;
- Send Modality Performed Procedure Step (MPPS) messages to a network DICOM node;
- Query and retrieve images from a remote DICOM node;
- Query and retrieve images from the local database;
-.

4.1.2. Functional Definition of AE's

This section contains a functional definition for each individual local Application Entity.

4.1.2.1. Functional Definition of Q-Station Network AE

Q-Station 2.0 incorporates the following functionality:

- The Q-Station 2.0 Network AE can verify application level communication by using the Verification service both as SCU and SCP (Verify).

- The Q-Station 2.0 Network AE can store images by using the Storage service both as SCU and SCP (Store Image).
- The Q-Station 2.0 Network AE can commit images by using the Storage Commitment service as SCU (Commit Image).
- The Q-Station 2.0 Network AE can find and move images by using the Query/Retrieve service both as SCU and SCP (Query/Retrieve Image).
- The Q-Station 2.0 Network AE can send MPPS N-Create and N-Set messages at the opening and closing of a study once configured.

4.1.3.   Sequencing of Real World Activities
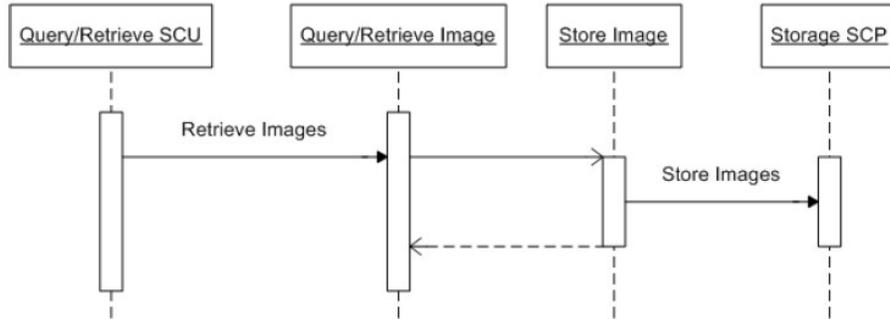
Figure 2: Sequencing of Retrieve
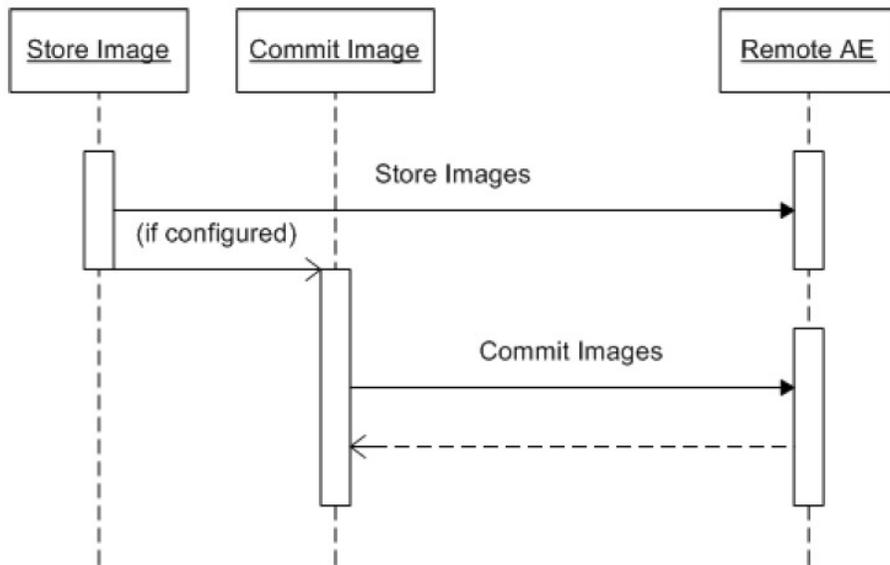
Figure 3: Sequencing of Storage Commitment

4.2.   AE Specifications

This section in the DICOM Conformance Statement is a set of Application Entity specifications. There are as many of these subsections as there are different AE's in the implementation.

4.2.1.   Q-Station Network AE

Detail of this specific Application Entity is specified in this section.

4.2.1.1.   SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 5: SOP Classes for Q-Station Network AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Private 3D Presentation State	1.3.46.670589.2.5.1.1	Yes	Yes

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.1.2.   Association Policies

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.1.2.1.   General

The DICOM standard application context is specified below.

Table 6: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2.   Number of Associations

The number of simultaneous associations that an Application Entity may support as an Initiator or Acceptor is specified here.

Table 7: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	Configurable

Table 8: Number of associations as an Association Acceptor for this AE

Description	Value
Maximum number of simultaneous associations	Configurable

4.2.1.2.3.   Asynchronous Nature

The implementation supports negotiation of multiple outstanding transactions, along with the maximum number of outstanding transactions supported.

The Q-Station 2.0 Network AE does not support asynchronous operations and will not perform asynchronous window negotiation. The only exceptions are for reports from Storage Commitment and Print Management operations.

Table 9: Asynchronous nature as an Association Initiator for this AE

Description	Value
Maximum number of outstanding asynchronous transactions	Not applicable

4.2.1.2.4.   Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

Table 10: DICOM Implementation Class and Version for Q-Station Network AE

Implementation Class UID	1.3.46.670589.5.2.10
Implementation Version Name	10.1.0.0

4.2.1.2.5.   Communication Failure Handling

The behavior of the AE during communication failure is summarized in the next table.

Table 11: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association setup fails, the reason is logged and reported to the user.

4.2.1.3.   Association Initiation Policy

The Application Entity will respond to a received Association rejection as shown in the next table.

Table 12: Association Rejection response

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent,1: REJECT_SOURCE_dul_user,1: REJECT_REASON_no_reason_given)

Result	Source	Reason/Diagnosis	Behavior
		2 - application-context-name-not supported	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 1: REJECT_SOURCE_dul_user, 2: REJECT_REASON_application_context_not_support)
		3 - calling-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 1: REJECT_SOURCE_dul_user, 3: REJECT_REASON_calling_aetitle_not_recognized)
		7 - called-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 1: REJECT_SOURCE_dul_user, 7: REJECT_REASON_called_aetitle_not_recognized)
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	Association is not established. The following error is logged. Error: UserRecoverable: impl.dicom.access.PEER: Associationrejected by peer (1: REJECT_RESULT_permanent, 2: REJECT_SOURCE_dul_provider (acse), 1: REJECT_REASON_no_reason_given)
		2 - protocol-version-not-supported	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 2: REJECT_SOURCE_dul_provider (acse), 2: REJECT_REASON_application_context_not_support)
	3 - DICOM UL service-provider(Presentation related function)	1 - temporary-congestion	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 3: REJECT_SOURCE_dul_provider (presentation), 1: REJECT_REASON_no_reason_given)
		2 - local-limit-exceeded	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 3: REJECT_SOURCE_dul_provider (presentation), 2: REJECT_REASON_application_context_not_support)
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 1: REJECT_REASON_no_reason_given)
		2 - application-context-name-not-supported	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 2: REJECT_REASON_application_context_not_support)
		3 - calling-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 3: REJECT_REASON_calling_aetitle_not_recognized)
		7 - called-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 7: REJECT_REASON_called_aetitle_not_recognized)
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 2: REJECT_SOURCE_dul_provider (acse), 1: REJECT_REASON_no_reason_given)
		2 - protocol-version-not-supported	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 2: REJECT_SOURCE_dul_provider (acse), 2: REJECT_REASON_application_context_not_support)
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 3: REJECT_SOURCE_dul_provider (presentation), 1: REJECT_REASON_no_reason_given)

Result	Source	Reason/Diagnosis	Behavior
		2 - local-limit-exceeded	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 3: REJECT_SOURCE_dul_provider (presentation), 2: REJECT_REASON_application_context_not_support)

The behavior of the AE on receiving an Association abort is summarized in the next table.

Table 13: Association Abort Handling

Source	Reason/Diagnosis	Behavior when received	Sent when
0 - DICOM UL service-user (initiated abort)	0- reason-not-specified	When received, the Q-Station 2.0 terminates the connection with the following log: Association ABORTED by peer (0: ABORT_SOURCE_dul_user, 0: ABORT_REASON_not_specified).	• N-EVENT-REPORT for printing received with status FAILURE. • Abort is issued to an executing job that utilizes this network connection (ExportNetwork/ ArchiveNetwork/DICOMCopy/DICOMMove) • Any other problem than ones specified for Q-Station 2.0 Network AE SCU in the rows below. (Examples: Problem while decoding the DICOM stream, SCU was unable to send the Response to SCP, Error writing to SCU stream).
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 0: ABORT_REASON_not_specified)	• There are problems in SCU/SCP role negotiation. • Any other problem than ones specified for Q-Station 2.0 Network AE SCU in the rows below. (Example: Problem while decoding the DICOM stream).
	1 - unrecognized-PDU	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 1: ABORT_REASON_unrecognized_pdu).	An unrecognized PDU type is received[4].
	2 - unexpected-PDU	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 2: ABORT_REASON_unexpected_pdu).	The received PDU type is not expected in the current state of connection[5].
	4 - unrecognized-PDU-parameter	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 4: ABORT_REASON_unrecognized_pdu_parameter).	An unrecognized Associate PDU item is received[1].
	5 - unexpected-PDU-parameter	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 5: ABORT_REASON_unexpected_pdu_parameter).	• One of the Associate PDU items is received more than once[2]. • One of the Associate PDU items is received unexpectedly[2].

Source	Reason/Diagnosis	Behavior when received	Sent when
	6 - invalid-PDU-parameter-value	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 6: ABORT_REASON_invalid_pdu_parameter).	• One of the Associate PDU items is received more than once[3]. • One of the Associate PDU items is not received[3]. • There is mismatch in the application context names between the SCU and the SCP. • Illegal Asynchronous Operations Window invoke value is received. • Illegal Asynchronous Operations Window perform value is received. • Unknown presentation context id is received. • Unknown abstract syntax is received. • The length or the format of a received PDU item is invalid.

Notes:

1. Associate PDU items that are recognized:
 - 0x10 APPLICATION CONTEXT
 - 0x20 PRESENTATION CONTEXT (RQ)
 - 0x21 PRESENTATION CONTEXT (AC)
 - 0x30 ABSTRACT SYNTAX
 - 0x40 TRANSFER SYNTAX
 - 0x50 USER INFO
 - 0x51 MAXIMUM LENGTH
 - 0x52 IMPLEMENTATION CLASS UID
 - 0x53 ASYNCHRONOUS OPERATIONS WINDOW
 - 0x54 SCP/SCU ROLE SELECTION
 - 0x55 IMPLEMENTATION VERSION NAME
 - 0x56 SOP CLASS EXTENDED NEGOTIATION

2. Associate PDU items for Unexpected-PDU parameterReceived more than once:
 - 0x10 APPLICATION CONTEXT (SCU, SCP)
 - 0x30 ABSTRACT SYNTAX (SCU, SCP)
 - 0x40 TRANSFER SYNTAX (SCU)
Received unexpectedly:
 - 0x20 PRESENTATION CONTEXT (RQ) (SCU)

3. Associate PDU items for Invalid-PDU parameter value:
Received more than once (SCU, SCP):
 - 0x50 USER INFO
 - 0x51 MAXIMUM LENGTH
 - 0x52 IMPLEMENTATION CLASS UID
 - 0x53 ASYNCHRONOUS OPERATIONS WINDOW
 - 0x55 IMPLEMENTATION VERSION NAME
 Received illegally:
 - 0x21 PRESENTATION CONTEXT (AC) (SCP)
PDU items not received:
 - 0x10 APPLICATION CONTEXT (SCU, SCP)
 - 0x20 PRESENTATION CONTEXT (RQ) (SCP)
 - 0x21 PRESENTATION CONTEXT (AC) (SCU)
 - 0x50 USER INFO (SCU, SCP)
 - 0x30 ABSTRACT SYNTAX (SCU)

- 0x40 TRANSFER SYNTAX (SCU)
- 0x51 MAXIMUM LENGTH (SCU, SCP)
- 0x52 IMPLEMENTATION CLASS UID (SCU)

4. PDU types that are recognized:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

5. Expected PDU's for following states:
 STATE_IDLE:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
 STATE_ASSOCIATED:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x06 A-RELEASE-RP
 STATE_ASSOCIATING (SCU):
- 0x01 A-ASSOCIATE-RQ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
 STATE_RELEASING:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
 STATE_WAIT_FOR_ASSOCIATE (SCP):
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT
 STATE_WAIT_FOR_FINISH:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
 STATE_WAIT_FOR_DISCONNECT:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
 STATE_TIMED_OUT:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC

- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

Table 14: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.

4.2.1.3.1.　(Real-World) Activity – Verification as SCU

4.2.1.3.1.1.　Description and Sequencing of Activities

The Q-Station 2.0 Network AE implements the Verification service class / Verification SOP class to verify application level communication.
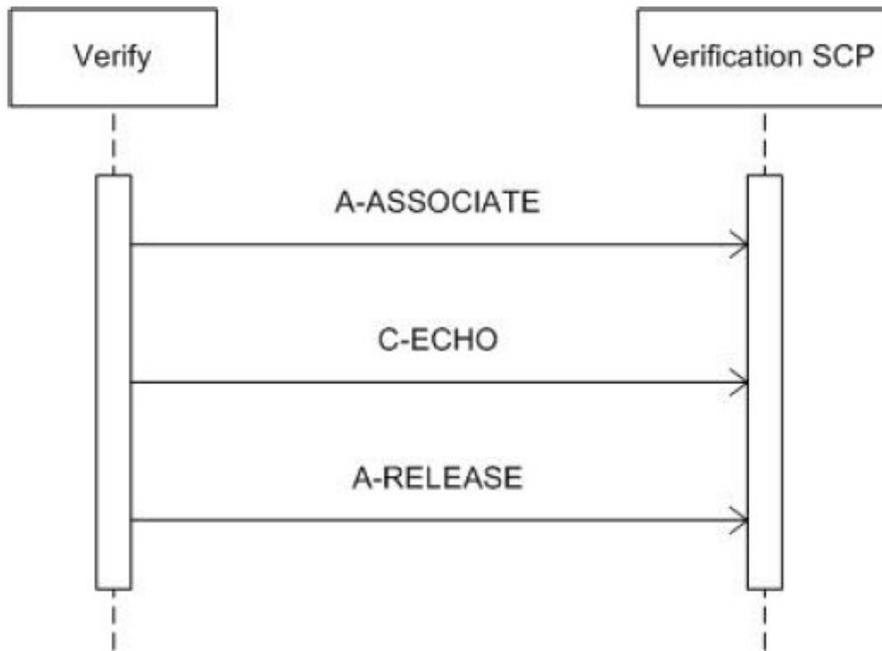
Figure 4: Data Flow Diagram – Verification as SCU

4.2.1.3.1.2.　Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 15: Proposed Presentation Contexts for (Real-World) Activity – Verification as SCU

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

4.2.1.3.1.3. SOP Specific Conformance for Verification SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

The Q-Station 2.0 Network AE provides standard conformance to the DICOM Verification service class.

4.2.1.3.1.3.1. Dataset Specific Conformance for Verification C-ECHO SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 16: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Confirmation	The SCP has successfully returned a verification response

4.2.1.3.2. (Real-World) Activity – Modality Performed Procedure Step as SCU

4.2.1.3.2.1.   Description and Sequencing of Activities
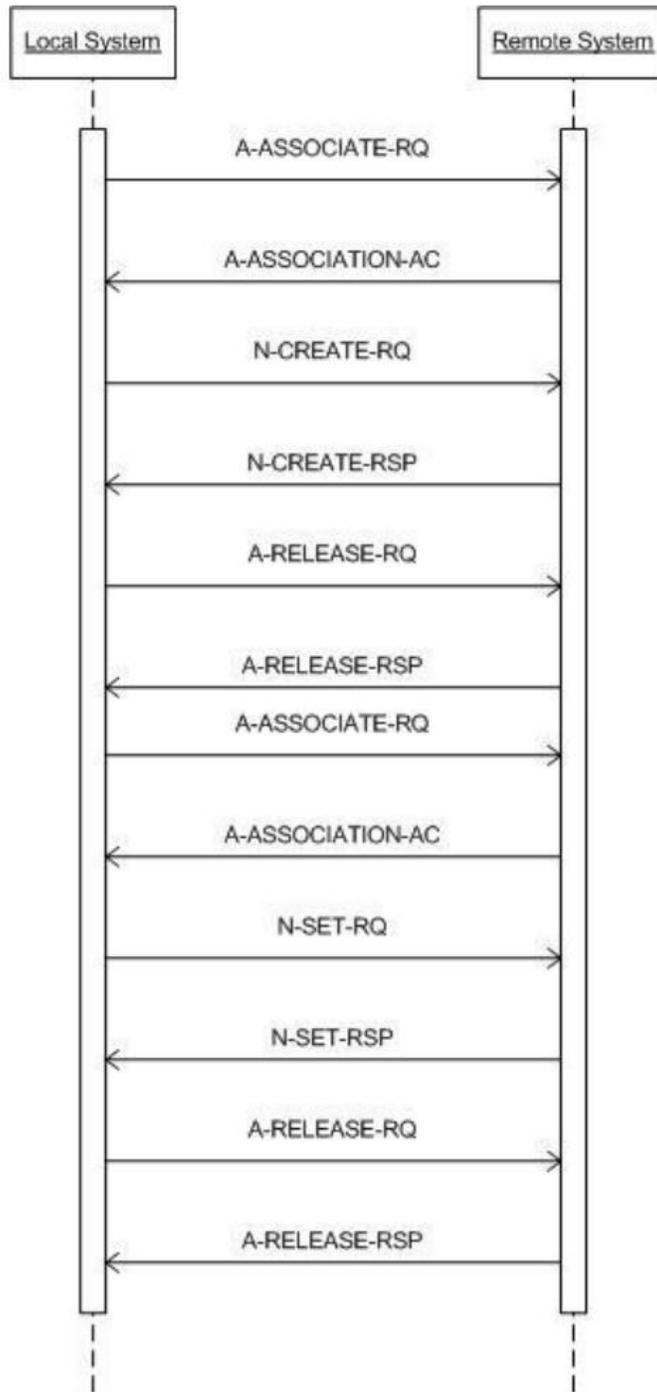
Figure 5: Data Flow Diagram - Modality Performed Procedure Step as SCU

4.2.1.3.2.2.   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 17: Proposed Presentation Contexts for (Real-World) Activity – Modality Performed Procedure Step As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.1.3.2.3.   SOP Specific Conformance for Modality Performed Procedure Step SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.2.3.1.   Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

Table 18: Modality Performed Procedure Step for N-CREATE -RQ

Attribute Name	Tag	Comment
Image Acquisition Results Module		
Modality	(0008,0060)	NA
Study ID	(0020,0010)	NA
Performed Protocol Code Sequence	(0040,0260)	NA
Performed Series Sequence	(0040,0340)	NA
>Retrieve AETitle	(0008,0054)	NA
>Series Description	(0008,103E)	NA
>Performing Physicians Name	(0008,1050)	NA
>Operators Name	(0008,1070)	NA
>Referenced Image Sequence	(0008,1140)	NA
>>Referenced SOP Class UID	(0008,1150)	NA
>>Referenced SOP Instance UID	(0008,1155)	NA
>Protocol Name	(0018,1030)	NA
>Series Instance UID	(0020,000E)	NA
>Referenced Non Image Composite SOP Instance Sequence	(0040,0220)	NA
Performed Procedure Step Information Module		
Procedure Code Sequence	(0008,1032)	NA
Performed Station AETitle	(0040,0241)	NA
Performed Station Name	(0040,0242)	NA
Performed Location	(0040,0243)	NA
Performed Procedure Step Start Date	(0040,0244)	NA
Performed Procedure Step Start Time	(0040,0245)	NA
Performed Procedure Step End Date	(0040,0250)	NA
Performed Procedure Step End Time	(0040,0251)	NA
Performed Procedure Step Status	(0040,0252)	NA
Performed Procedure Step ID	(0040,0253)	NA
Performed Procedure Step Description	(0040,0254)	NA

Attribute Name	Tag	Comment
Image Acquisition Results Module		
Performed Procedure Type Description	(0040,0255)	NA
Performed Procedure Step Relationship Module		
Referenced Patient Sequence	(0008,1120)	NA
Patient's Name	(0010,0010)	NA
Patient ID	(0010,0020)	NA
Patient's Birth Date	(0010,0030)	NA
Patient's Sex	(0010,0040)	NA
Scheduled Step Attributes Sequence	(0040,0270)	NA
>Accession Number	(0008,0050)	NA
>Referenced Study Sequence	(0008,1110)	NA
>Study Instance UID	(0020,000D)	NA
>Requested Procedure Description	(0032,1060)	NA
>Scheduled Procedure Step Description	(0040,0007)	NA
>Scheduled Protocol Code Sequence	(0040,0008)	NA
>Scheduled Procedure Step ID	(0040,0009)	NA
>Requested ProcedureID	(0040,1001)	NA

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 19: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g The SCU has successfully returned all matching information

4.2.1.3.2.3.2. Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-SET-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

Table 20: Modality Performed Procedure Step for N-SET -RQ

Attribute Name	Tag	Comment
Performed Procedure Step Information Module		
Performed Procedure Step End Date	(0040,0250)	NA
Performed Procedure Step End Time	(0040,0251)	NA
Performed Procedure Step Status	(0040,0252)	NA
Image Acquisition Results Module		
Performed Series Sequence	(0040,0340)	NA
>Retrieve AETitle	(0008,0054)	NA
>Series Description	(0008,103E)	NA
>Performing Physicians Name	(0008,1050)	NA
>Operators Name	(0008,1070)	NA
>Referenced Image Sequence	(0008,1140)	NA
>>Referenced SOP Class UID	(0008,1150)	NA
>>Referenced SOP Instance UID	(0008,1155)	NA
>Protocol Name	(0018,1030)	NA

Attribute Name	Tag	Comment
Performed Procedure Step Information Module		
>Series Instance UID	(0020,000E)	NA
>Referenced Non Image Composite SOP Instance Sequence	(0040,0220)	NA

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 21: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g The SCU has successfully returned all matching information

4.2.1.3.3.   (Real-World) Activity – FIND as SCU

4.2.1.3.3.1.   Description and Sequencing of Activities

Q-Station 2.0 Network AE accepts associations from systems that wish to query the Q-Station 2.0 database using the C-FIND command.
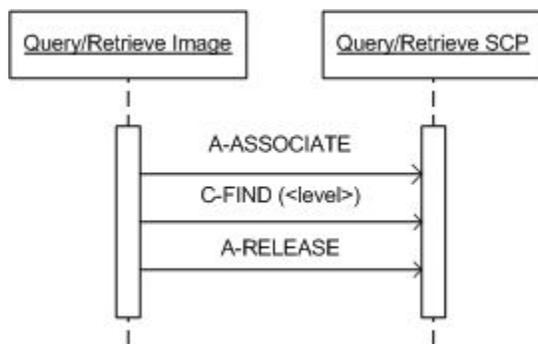
Figure 6: Data Flow Diagram – FIND as SCU

4.2.1.3.3.2.   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 22: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.3.3.3.   SOP Specific Conformance for Patient Root QR Information Model - FIND SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

The Q-Station 2.0 Network AE provides standard conformance to the DICOM Query/Retrieve service class. Optional keys are supported, depending on the data repository table that the remote system respectively the system integrator proposes. Relational queries are not supported. The Q-Station 2.0 Network AE generates a C-FIND response for each match with an identifier containing the values of all known attributes identified by the requested key fields. All such responses will have a status of Pending, indicating that the process of matching is not complete. When the process of matching is complete a C-FIND response is sent with a status of success and no identifier. A Refused or Failed response to a C-FIND request indicates that the Q-Station 2.0 is unable to process the request.

The SCU may cancel the C-FIND service by issuing a C-FIND-CANCEL request at any time during the processing of the C-FIND service. The Q-Station 2.0 will interrupt all matching and return a status of Cancelled.

4.2.1.3.3.3.1.   Dataset Specific Conformance for Patient Root QR Information Model - FIND SOP Class C-FIND-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

Table 23: Supported Query Keys for Patient Root Information Model

Patient Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Query/Retrieve Level	0008,0052	CS	Single Value	
Q/R Patient level				
Patient ID	0010,0020	LO	Single Value,Universal,WildCard	
Patient's Name	0010,0010	PN	Single Value,Universal,WildCard	

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 24: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete – No final identifier is supplied	Successful completion of the query.
Failure	A700	Refused – Out of resources	Not enough resources; exception during evaluation of query.
	C000	Failed – Unable to process	Any other exception generated while evaluating the query.
Cancel	FE00	Matching terminated due to Cancel request	Query has been cancelled.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	Optional keys supported.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	Optional keys not supported.

4.2.1.3.3.4.   SOP Specific Conformance for PatientStudy Only QR Info. Model - FIND SOP Class (Retired)

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.3.4.1.　　Dataset Specific Conformance for PatientStudy Only QR Info. Model - FIND SOP Class C-FIND-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 25: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g The SCU has successfully returned all matching information

4.2.1.3.3.5.　　SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class
This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.3.5.1.　　Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

Table 26: Supported Query Keys for Study Root Information Model

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Query/Retrieve Level	0008,0052	CS	Single Value	
Q/R Study level				
Accession Number	0008,0050	SH	Single Value,Universal,WildCard	
Modalities in Study	0008,0061	CS	Single Value,Universal	
Patient ID	0010,0020	LO	Single Value,Universal,WildCard	
Patient's Name	0010,0010	PN	Single Value,Universal,WildCard	
Referring Physician's Name	0008,0090	PN	Single Value,Universal,WildCard	
Study Date	0008,0020	DA	Range,Single Value,Universal	
Study ID	0020,0010	SH	Single Value,Universal,WildCard	
Study Instance UID	0020,000D	UI	Single Value	

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 27: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete – No final identifier is supplied	Successful completion of the query.
Failure	A700	Refused – Out of resources	Not enough resources; exception during evaluation of query.
	C000	Failed – Unable to process	Any other exception generated while evaluating the query.
Cancel	FE00	Matching terminated due to Cancel request	Query has been cancelled.

Service Status	Error Code	Further Meaning	Behavior
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	Optional keys supported.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	Optional keys not supported.

4.2.1.3.4.   (Real-World) Activity – MOVE as SCU

4.2.1.3.4.1.   Description and Sequencing of Activities

Q-Station 2.0 accepts associations from systems that wish to retrieve images from the Q-Station 2.0 database using the C-MOVE command.
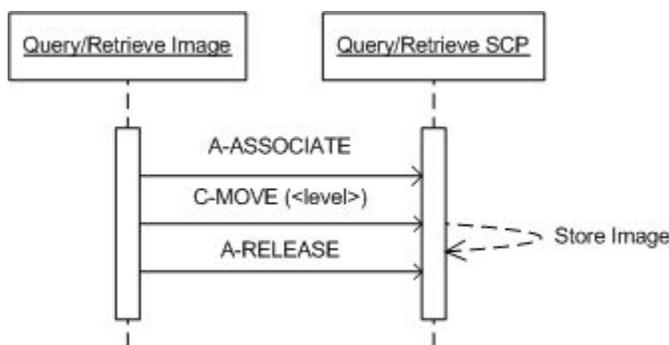
Figure 7: Data Flow Diagram – MOVE as SCU

4.2.1.3.4.2.   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 28: Proposed Presentation Contexts for (Real-World) Activity – MOVE As SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.3.4.3.   SOP Specific Conformance for Patient Root QR Information Model - MOVE SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

During the processing of the C-STORE sub-operations Q-Station 2.0 optionally generates responses to the C-MOVE with status equal to pending. These C-MOVE responses indicate a number of remaining C-STORE sub-operations and the number of CSTORE sub-operations returning the status of Success, Warning, and Failed. When the number of remaining C-STORE sub-operations reaches zero, the Q-Station 2.0 generates a final response with the status of equal to Success, Warning, Failed, or Refused. This response may indicate the number of C-STORE sub-operations returning the status of Success, Warning, and Failed.

The SCU may cancel the C-MOVE service by issuing a C-MOVE-CANCEL request at any time during the processing of the C-MOVE. The Q-Station 2.0 terminates all incomplete CSTORE sub-operations and returns a status of Cancelled.

4.2.1.3.4.3.1. Dataset Specific Conformance for Patient Root QR Information Model - MOVE SOP Class C-MOVE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

Table 29: Identifiers for MOVE Patient Root Information Model as SCU

Patient Root Information Model			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	
Q/R Patient level			
Patient ID	0010,0020	LO	
Q/R Study level			
Patient ID	0010,0020	LO	
Study Instance UID	0020,000D	UI	
Q/R Series level			
Patient ID	0010,0020	LO	
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	
Q/R Image level			
Patient ID	0010,0020	LO	
Series Instance UID	0020,000E	UI	
SOP Instance UID	0008,0018	UI	
Study Instance UID	0020,000D	UI	

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 30: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No failures	Successful completion of the retrieve; also storage warnings may have occurred.
Failure	A701	Refused – Out of resources - Unable to calculate number of matches	Storage status Refused: Out of resources.
	A801	Refused – Move destination unknown	Move destination is unknown.
	C000	Failed – Unable to process	Any other exception generated during the move.
Warning	B000	Sub-operations complete – One or more failures	Warning: One or more SOP instances have been successfully stored and the remaining have failed. Also in case of storage status Refused: SOP class not supported.
Cancel	FE00	Sub-operations terminated due to Cancel indication	Move request has been cancelled.
Pending	FF00	Sub-operations are continuing	Move pending.

4.2.1.3.4.4.   SOP Specific Conformance for PatientStudy Only QR Info. Model - MOVE SOP Class (Retired)

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.4.4.1.   Dataset Specific Conformance for PatientStudy Only QR Info. Model - MOVE SOP Class C-MOVE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 31: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g The SCU has successfully returned all matching information

4.2.1.3.4.5.   SOP Specific Conformance for Study Root QR Information Model - MOVE SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.4.5.1.   Dataset Specific Conformance for Study Root QR Information Model - MOVE SOP Class C-MOVE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

Table 32: Identifiers for MOVE Study Root Information Model as SCU

Study Root Information Model			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	
Q/R Study level			
Study Instance UID	0020,000D	UI	
Q/R Series level			
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	
Q/R Image level			
Series Instance UID	0020,000E	UI	
SOP Instance UID	0008,0018	UI	
Study Instance UID	0020,000D	UI	

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 33: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No failures	Successful completion of the retrieve; also storage warnings may have occurred.
Failure	A701	Refused – Out of resources - Unable to calculate number of matches	Storage status Refused: Out of resources.
	A801	Refused – Move destination unknown	Move destination is unknown.
	C000	Failed – Unable to process	Any other exception generated during the move.

Service Status	Error Code	Further Meaning	Behavior
Warning	B000	Sub-operations complete – One or more failures	Warning: One or more SOP instances have been successfully stored and the remaining have failed. Also in case of storage status Refused: SOP class not supported.
Cancel	FE00	Sub-operations terminated due to Cancel indication	Move request has been cancelled.
Pending	FF00	Sub-operations are continuing	Move pending.

4.2.1.3.5.   (Real-World) Activity – Image Export

4.2.1.3.5.1.   Description and Sequencing of Activities

The Q-Station 2.0 implements the Storage service class as part of the Q-Station 2.0 to store selected images at an archive or other storage SCP. All actual selected images are exported using one and the same association. The Q-Station 2.0 waits for synchronous report until, after a configurable time passed, it will release the association.
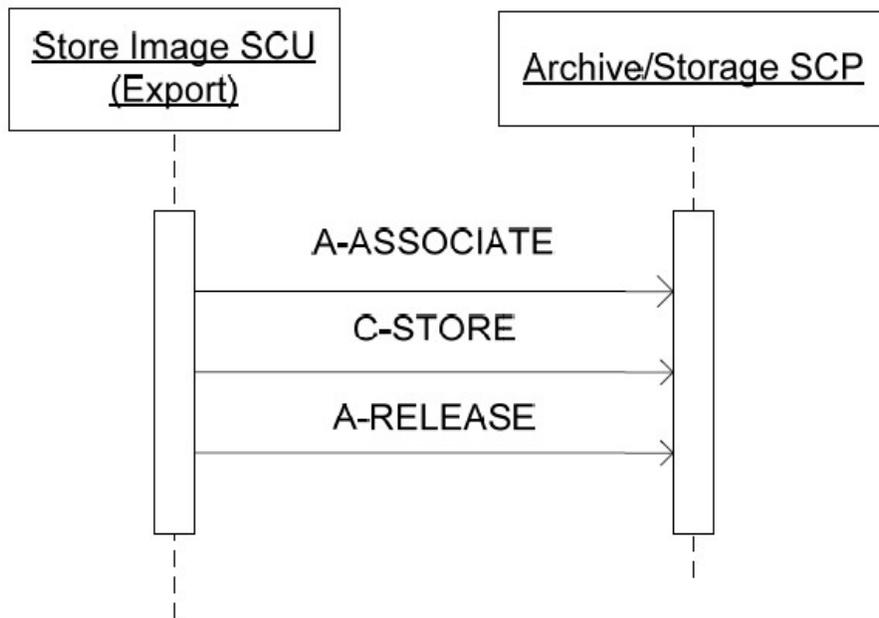

Figure 8: Data Flow Diagram – Store Image – Storage as SCU

4.2.1.3.5.2.   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 34: Proposed Presentation Contexts for (Real-World) Activity – Image Export

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Private 3D Presentation State	1.3.46.670589.2.5.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		

4.2.1.3.5.3.   SOP Specific Conformance for Storage SOP Classes

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

 The Q-Station 2.0 can be configured to stop the transfer of data when the Q-Station 2.0 receives an unsuccessful store response. Furthermore the Q-Station 2.0 can be configured in such a way that images can be converted to Secondary Captures.

The Q-Station 2.0 will transmit all optional or private image attributes. Also the Q-Station 2.0 can create attributes that are not in the image: these new attributes are exported along with the image (e.g. when the SCP does not support presentation state objects). The object supplier shall be responsible for the presence of DICOM UIDs. The export job will transparently exchange this UID when the image is exported in 'DICOM 2000' format (i.e. separate Presentation State).

The following choices are supported concerning the export of private objects:
 - The object can be exported as a private SOP class instance.
 - The object is not exported at all.

Following remarks hold for the standard DICOM SOP Classes:

- The Q-Station 2.0 supports the following Photometric Interpretations for non-compressed images:
- MONOCHROME1,
- MONOCHROME2,
- PALETTE COLOR,
- RGB, YBR_FULL,
- YBR_FULL_422,
- YBR_PARTIAL_422,
- YBR_ICT,
- YBR_RCT.

- The Q-Station 2.0 can convert Transfer Syntaxes from internal to external values. So Q-Station 2.0 can convert from internally JPEG compressed/uncompressed pixel data to external JPEG compressed/uncompressed pixel data.

- JPEG Lossless (NH-FOP) compresses all bits denoted by the attribute DICOM_BITS_ALLOCATED. Therefore, any overlays encoded in the pixel data are also encoded and decoded.

- In case of both source (internal) and target compressed pixel data, decompression of the source pixel data and compression to the target pixel data only takes place in the following cases:
 1.) The source and target compression formats are different; or:
 2.) The source pixel data is multi-frame without a BOT.

- The BOT in compressed pixel data is filled if:
 1.) This is explicitly configured; or:
 2.) Group length attributes are configured.

Q-Station 2.0 allows import of mixed series: a series containing a maximum of 2 Secondary Capture images in addition to images from another SOP class.

4.2.1.3.5.3.1. Dataset Specific Conformance for C-STORE-RQ

Detail regarding the Dataset Specific response behavior will be reported in this section.
This includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 35: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful stored	Progress of the export job is updated and connection is retained for the next store. If the store of all the SOP instances is completed then the connection is released.
Failure	A7xx	Refused: Out of Resources	Error is logged and the export job fails. Connection is released.
	A9xx	Error: Data Set does not match SOP Class	Error is logged and the export job fails. Connection is released.
	Cxxx	Error: cannot understand	Error is logged and the export job fails. Connection is released.
Warning	B000	Coercion of Data Elements	Warning is logged and the export job continues. Connection is not released.
	B007	Data Set does not match SOP Class	Warning is logged and the export job continues. Connection is not released.
	B006	Elements Discarded	Warning is logged and the export job continues. Connection is not released.

4.2.1.3.6. (Real-World) Activity – Storage Commitment Push Model AS SCU

4.2.1.3.6.1. Description and Sequencing of Activities

It accepts a storage commitment notification (N-EVENT-REPORT) from systems that send them.
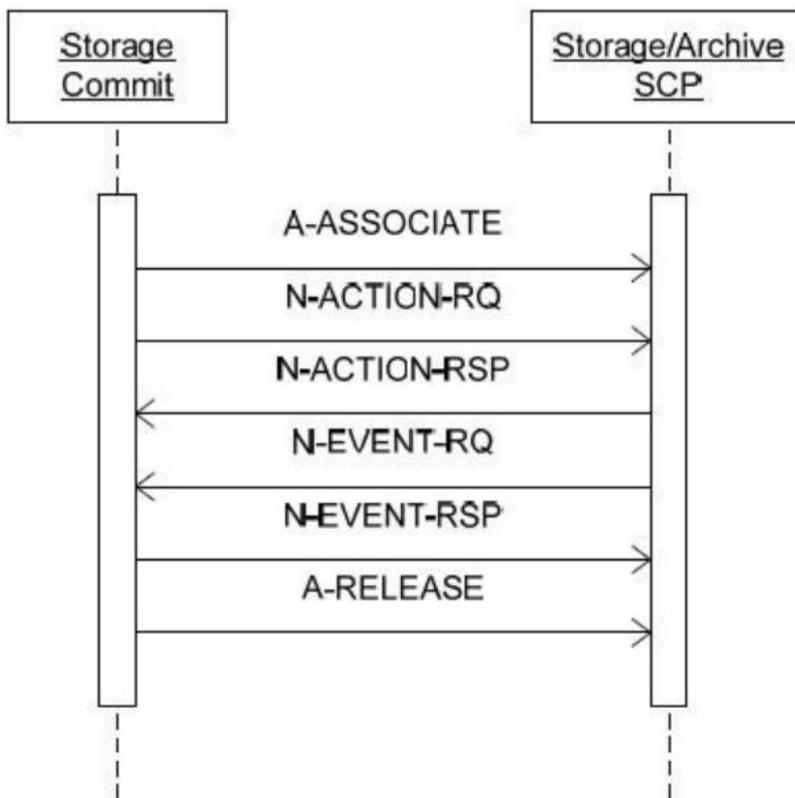
Figure 9: Data Flow Diagram - Commit Image (synchronous)
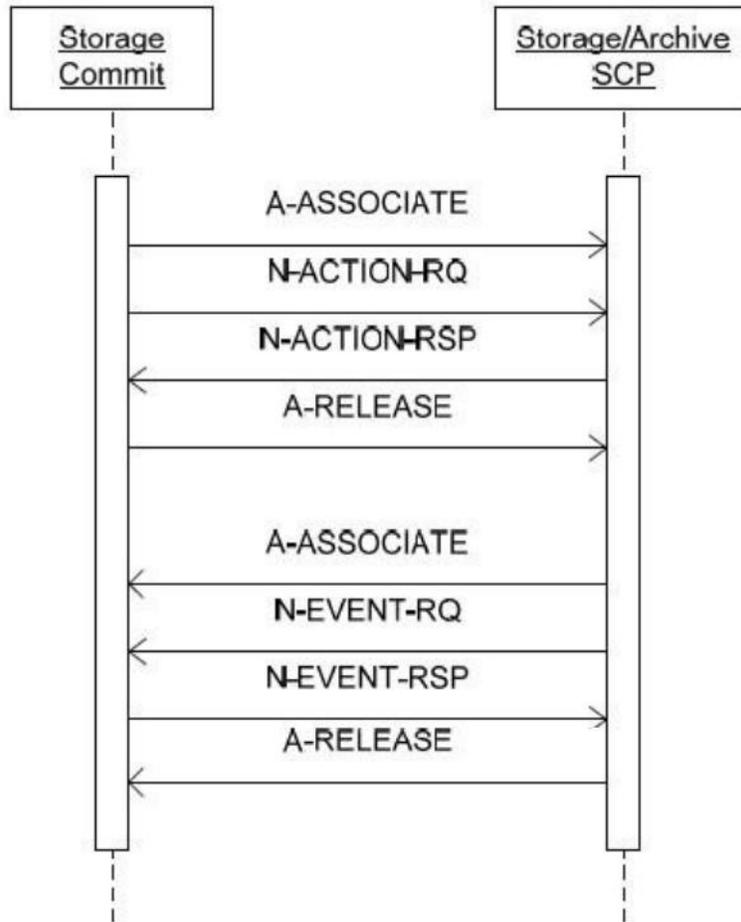
Figure 10: Data Flow Diagram - Commit Image (asynchronous)

4.2.1.3.6.2.   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 36: Proposed Presentation Contexts for (Real-World) Activity – Storage Commitment Push Model AS SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.1.3.6.3.   SOP Specific Conformance for Storage Commitment Push Model SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.6.3.1.   Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-EVENT-REPORT-SCP

Detail regarding the Dataset Specific response behavior will be reported in this section.

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 37: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g The SCU has successfully returned all matching information

4.2.1.3.6.3.2.   Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-ACTION-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

Table 38: Storage Commitment Attribute for N-ACTION-RQ

Attribute Name	Tag	Comment
Storage Commitment Module		
Transaction UID	(0008,1195)	NA
Referenced SOP Sequence	(0008,1199)	NA
Referenced SOP Class UID	>(0008,1150)	NA
Referenced SOP Instance UID	>(0008,1155)	NA

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 39: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g The SCU has successfully returned all matching information
Error			
Failed			
Refused			
Warning			
Pending			
Cancel			

4.2.1.4.   Association Acceptance Policy

The Q-Station 2.0 Network AE accepts associations for the following purposes:
- To allow remote applications to verify application level communication.
- To allow remote applications to store images in the Q-Station 2.0 database.
- To allow remote applications to commit images in the Q-Station 2.0 database.
- To allow remote applications to query the Q-Station 2.0 database.
- To allow remote applications to retrieve images from the Q-Station 2.0 database.
- To allow remote applications to send storage commit reports to Q-Station 2.0 as SCU.

The Q-Station 2.0 Network AE rejects association requests from unknown applications, i.e. applications that offer an unknown "calling AE title". An application is known if and only if it is defined per configuration of the Q-Station 2.0 system. The Q-Station 2.0 Network AE also rejects association requests from applications that do not address the Q-Station 2.0 Network AE, i.e. that offer a wrong "called AE title". The Q-Station 2.0 AE title is defined during configuration of Q-Station 2.0.

The Application Entity may reject Association attempts as shown in the table below.

Table 40: Association Reject Reasons

Result	Source	Reason/Diagnosis	Behavior
1 - rejected permanent	1 - DICOM UL service-user	1 - no-reason-given	Association is not established due to any problem other than that specified for Q-Station 2.0 SCP in the rows below. (Example: Problem while decoding the DICOM stream).
		2 - application-context-name-not-supported	An application context name other than 1.2.840.10008.3.1.1.1 is requested by the SCU during association.
		3 - calling-AE-title-not-recognized	The configuration does not contain a repository having the Calling AE Title as per the association request; There is a problem in configuration (related to composing the configuration from the SCU and the SCP configuration).
		7 - called-AE-title-not-recognized	The called AE Title in the association request does not match the AE Title as per the configuration.
	2 - DICOM UL service provider (ACSE related function)	1 - no-reason-given	Not used.
		2 - protocol-version-not-supported	Not used.
	3 - DICOM UL service provider (Presentation related function)	1 - temporary-congestion	Not used.
		2 - local-limit-exceeded	Not used.
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	Not used.
		2 - application-context-name-not-supported	Not used.
		3 - calling-AE-title-not-recognized	Not used.
		7 - called-AE-title-not-recognized	Not used.
	2 - DICOM UL service provider (ACSE related function)	1 - no-reason-given	Maximum number of associations is exceeded and an association request is received.
		2 - protocol-version-not-supported	Not used.
	3 - DICOM UL service provider (Presentation related function)	1 - temporary-congestion	Not used.
		2 - local-limit-exceeded	Not used.

The behavior of the AE for sending an Association abort is summarized in next table.

Table 41: Association Abort Policies

Source	Reason/Diagnosis	Behavior when received	Sent when
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (0: ABORT_SOURCE_dul_user, 0: ABORT_REASON_not_specified).	Association times out due to inactivity; Any other problem than ones specified for Q-Station 2.0 SCP in the rows below. (Examples: Problem while decoding the DICOM stream, Invalid request, Echo/Find/Move/N-Action SCP was unable to send the Response to SCU, Error writing to SCU stream).
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 0: ABORT_REASON_not_specified)	Import fails (Import SCP Performer returns fail status)
	1 - unrecognized-PDU	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 1: ABORT_REASON_unrecognized_pdu).	An unrecognized PDU type is received[4].
	2 - unexpected-PDU	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 2: ABORT_REASON_unexpected_pdu).	The received PDU type is not expected in the current state of connection[5].
	4 - unrecognized-PDU parameter	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 4: ABORT_REASON _unrecognized_pdu_parameter).	An unrecognized Associate PDU item is received[1].
	5 - unexpected-PDU parameter	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 5: ABORT_REASON _unexpected_pdu_parameter).	One of the Associate PDU items is received more than once[2]; One of the Associate PDU items is received unexpectedly[2].
	6 - invalid-PDU-parameter value	When received, the Q-Station 2.0 Network AE terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 6: ABORT_REASON _invalid_pdu_parameter).	One of the Associate PDU items is received more than once[3]; One of the Associate PDU items is not received[3]; Empty Called AE Title String (space-only) is received; Empty Calling AE Title String (space-only) is received; Unknown abstract syntax is received; The length or the format of the received PDU item is invalid.

Notes:

1. Associate PDU items that are recognized:
- 0x10 APPLICATION CONTEXT
- 0x20 PRESENTATION CONTEXT (RQ)
- 0x21 PRESENTATION CONTEXT (AC)
- 0x30 ABSTRACT SYNTAX
- 0x40 TRANSFER SYNTAX
- 0x50 USER INFO
- 0x51 MAXIMUM LENGTH
- 0x52 IMPLEMENTATION CLASS UID
- 0x53 ASYNCHRONOUS OPERATIONS WINDOW

- 0x54 SCP/SCU ROLE SELECTION
- 0x55 IMPLEMENTATION VERSION NAME
- 0x56 SOP CLASS EXTENDED NEGOTIATION

2. Associate PDU items for Unexpected-PDU parameterReceived more than once:
- 0x10 APPLICATION CONTEXT (SCU, SCP)
- 0x30 ABSTRACT SYNTAX (SCU, SCP)
- 0x40 TRANSFER SYNTAX (SCU)
Received unexpectedly:
- 0x20 PRESENTATION CONTEXT (RQ) (SCU)

3. Associate PDU items for Invalid-PDU parameter value:
Received more than once (SCU, SCP):
- 0x50 USER INFO
- 0x51 MAXIMUM LENGTH
- 0x52 IMPLEMENTATION CLASS UID
- 0x53 ASYNCHRONOUS OPERATIONS WINDOW
- 0x55 IMPLEMENTATION VERSION NAME
Received illegally:
- 0x21 PRESENTATION CONTEXT (AC) (SCP)
PDU items not received:
- 0x10 APPLICATION CONTEXT (SCU, SCP)
- 0x20 PRESENTATION CONTEXT (RQ) (SCP)
- 0x21 PRESENTATION CONTEXT (AC) (SCU)
- 0x50 USER INFO (SCU, SCP)
- 0x30 ABSTRACT SYNTAX (SCU)
- 0x40 TRANSFER SYNTAX (SCU)
- 0x51 MAXIMUM LENGTH (SCU, SCP)
- 0x52 IMPLEMENTATION CLASS UID (SCU)

4. PDU types that are recognized:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

5. Expected PDU's for following states:
STATE_IDLE:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
STATE_ASSOCIATED:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x06 A-RELEASE-RP
STATE_ASSOCIATING (SCU):
- 0x01 A-ASSOCIATE-RQ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ

- 0x06 A-RELEASE-RP
STATE_RELEASING:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
STATE_WAIT_FOR_ASSOCIATE (SCP):
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT
STATE_WAIT_FOR_FINISH:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
STATE_WAIT_FOR_DISCONNECT:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
STATE_TIMED_OUT:
- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

4.2.1.4.1.   (Real-World) Activity – Verification as SCP

4.2.1.4.1.1.   Description and Sequencing of Activities

The Q-Station 2.0 accepts Associations from configured systems that wish to verify application level communication using the C-ECHO command.
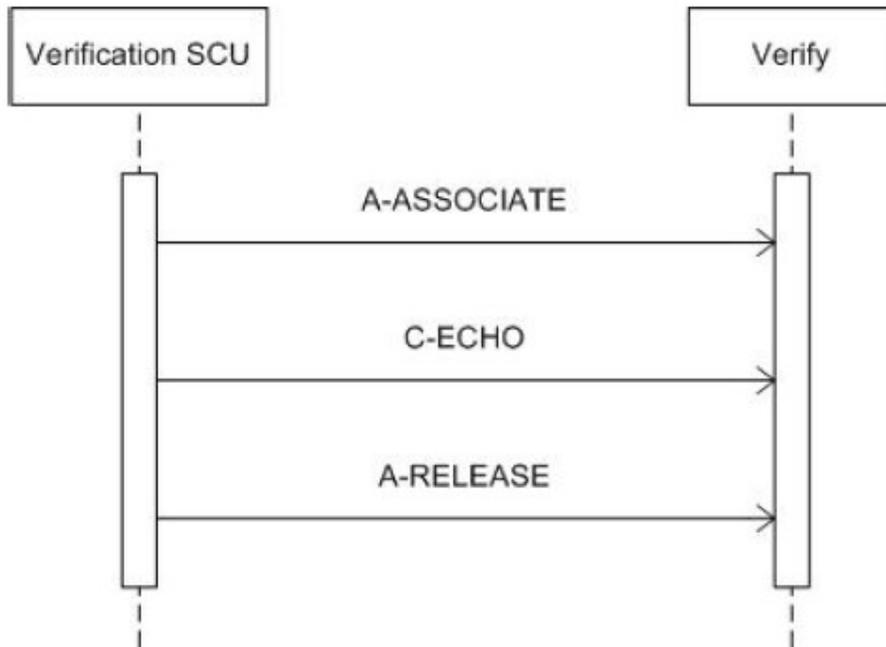
Figure 11: Data Flow Diagram – Verify

4.2.1.4.1.2.   Accepted Presentation Contexts

The presentation contexts are defined in the next table.

Table 42: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP

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

The Q-Station 2.0 accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that multiple proposed presentation contexts with the same SOP class but different transfer syntaxes are accepted by the Q-Station 2.0 as far as those transfer syntaxes are part of the acceptable transfer syntaxes. There is no check for duplicate contexts and these are therefore accepted.

4.2.1.4.1.3.   SOP Specific Conformance for Verification SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.4.1.3.1.   Dataset Specific Conformance for Verification C-ECHO SCP

Detail regarding the Dataset Specific response behavior will be reported in this section.

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 43: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Confirmation	Confirm the verification request.

4.2.1.4.2.   (Real-World) Activity – Image Import

4.2.1.4.2.1.   Description and Sequencing of Activities

The Q-Station 2.0 accepts associations from configured systems that wish to store images in the Q-Station 2.0 database using the C-STORE command.
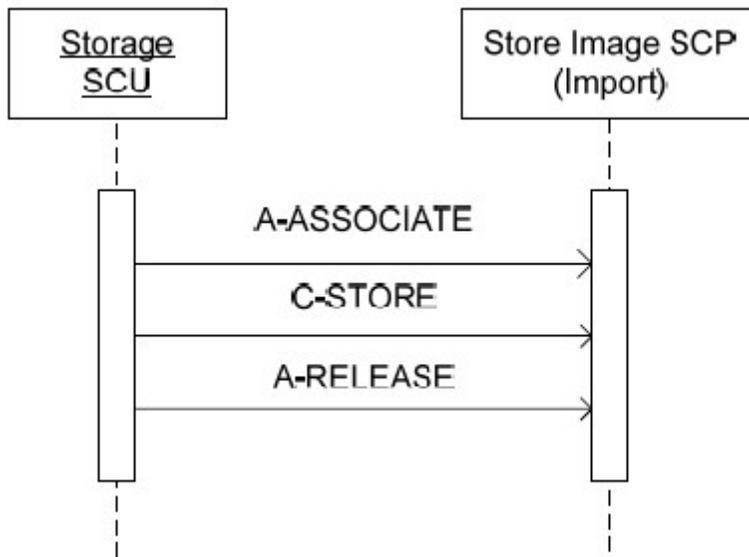
Figure 12: Data Flow Diagram – Store Image – Storage as SCP

4.2.1.4.2.2.   Accepted Presentation Contexts

The presentation contexts are defined in the next table.

Table 44: Acceptable Presentation Contexts for (Real-World) Activity – Image Import

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Private 3D Presentation State	1.3.46.670589.2.5.1.1	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 List	UID List		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		

Note: ILE is preferred transfer syntax.

The Q-Station 2.0 accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that multiple proposed presentation contexts with the same SOP class but different transfer syntaxes are accepted by the Q-Station 2.0 as far as those transfer syntaxes are part of the acceptable transfer syntaxes. There is no check for duplicate contexts and these are therefore accepted.

4.2.1.4.2.3. SOP Specific Conformance for Storage SOP Classes

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

The Q-Station 2.0 will only accept associations from configured systems. The Q-Station 2.0 may provide level 2 (full) conformances, depending on the implemented database.

Remarks:

- Pixel data will be stored in configurable transfer syntax. This implies that transfer syntax conversions might take place during import. Compressed pixel data is always decompressed and afterwards converted to the "configurable transfer syntax".

- A non-empty BOT may be present in imported JPEG encoded pixel data.

- When importing an image a default Presentation State object may be created as specified in Table 58. In case a default Presentation State object is created (also for duplicate images), the following rules apply:

- If a private Presentation State is present in the image the default Presentation State is always created based upon the private Presentation State.
- For multi-frame images with one frame it is configurable if a Presentation State should be created for every image in the series or only one Presentation State for the whole series.

Table 45: Conditions for creating Default Presentation State Object

Accepted association contains PR SOP class	Private PR is present in imported image	Default PR object created
Yes	Yes / No	No
No	Yes	Yes
No	No	No

- Value Representation 'UN' (Unknown) is supported, and shall be used for any attributes not known to Q-Station 2.0 and received per implicit transfer (ILE).

- Attribute values from images may be copied into related Presentation States and vice versa.

- Images must contain the minimum set of attributes prescribed by DICOM. Otherwise the default behavior is that the image is rejected and the association aborted.

4.2.1.4.2.3.1. Dataset Specific Conformance for C-STORE-RSP

Detail regarding the Dataset Specific response behavior will be reported in this section.

This includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 46: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful command	Successful completion of the store request.
Failure	A700	Refused: out of resources	Not enough resources available to do a store.
	C000	Error: cannot understand	Any other exception generated during the store.

4.3. Network Interfaces

4.3.1. Physical Network Interfaces

The System provides only DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 of the standard.
TCP/IP is the only protocol stack supported.
Supported physical medium include:
IEEE 802.3-1995, 10BASE-T
IEEE 802.3-1995, 100BASE-TX (Fast Ethernet)
IEEE 802.3, 10/100/1000Mb/s Ethernet.

The TCP/IP Stack as supported by the underlying Operating System.
The API is the WinSock 2 interface as supported by the underlying Operating System.

4.3.2. Additional Protocols

No additional protocols are used.

4.4. Configuration

Any implementation's DICOM conformance may be dependent upon configuration, which takes place at the time of installation. Issues concerning configuration are addressed in this section.

4.4.1. AE Title/Presentation Address Mapping

An important installation issue is the translation from AE title to presentation address. How this is to be performed is described here.

4.4.1.1. Local AE Titles

The FieldService User Interface only allows one AE to be configured.

The following AE specific information must be available to configure a local AE:
- AE title.
- Hostname or IP address (or both). Use "localhost" (127.0.0.1) for the complete local system. If the AE should only be associated with a specific network adapter, don't specify the host name and use the IP address of this network adapter.
 - Port number (note that normally all local Q-Station 2.0 AE's will have a different port number).

4.4.1.2. Remote AE Title/Presentation Address Mapping

One or more remote AE's may be configured.

The following AE specific information must be available to configure a remote AE:
 - AE title.
 - Hostname or IP address (or both).
 - Port number.

4.4.2. Parameters

The specification of important operational parameters, their default value and range (if configurable) are specified here.

Table 47: Configuration Parameters Table

Parameter	Configurable	Default Value
General Parameter		
Time-out waiting for acceptance or rejection Response to an Association Open Request (Application Level timeout)	Yes	60 [s] (set 0 for no time-out)

Parameter	Configurable	Default Value
General Dimse level time-out values (Verification, Storage, Storage Commitment)	No	-
Time-out for response to TCP/IP connect request. (Low-level timeout)	OS	-
Time-out waiting for acceptance of a TCP/IP message over the network (Low-level timeout)	OS	-
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	OS	-
Any changes to default TCP/IP settings, such as configurable stack parameters.	OS	-
AE Specific Parameters		
Size constraint in maximum object size	No	-
Maximum PDU size the AE can send and receive	Yes	0
Association time-out SCP	Yes	0 (no time-out)
Association time-out SCU	Yes	0 (no time-out; set −1 for immediate time-out, or else value in [s])
AE specific DIMSE level time-out values	Yes	300 [s] (set 0 for no time-out)
Storage Commit Max Reply Waiting Time (after time-out the reply will be handled asynchronously)	Yes	60 [s] (set 0 for no time-out, −1 for immediate time-out)
Number of simultaneous associations by service and/or SOP class	No	1 per service/SOP class
SOP Class support	Yes	All supported SOP classes
Transfer Syntax support*	Yes	ELE - 1.2.840.10008.1.2.1
		EBE - 1.2.840.10008.1.2.2
		ILE - 1.2.840.10008.1.2
		JPEG Lossless (NH-FOP) - 1.2.840.10008.1.2.4.70
		JPEG Baseline - 1.2.840.10008.1.2.4.50
		JPEG Extended - 1.2.840.10008.1.2.4.51
		JPEG 2000 (Lossless Only) - 1.2.840.10008.1.2.4.90
		JPEG 2000 - 1.2.840.10008.1.2.4.91
		RLE - 1.2.840.10008.1.2.5
IsArchive	Yes	False

*Note:
Although it is possible to configure encapsulation transfer syntax for every SOP class, encapsulation transfer syntax is practically not applicable for SOP classes that contain no data to be encoded and such transfer syntax should therefore be omitted.
 Also note that the order of the specified transfer syntaxes for a SOP class or AE in the configuration determines the preference order of proposed transfer syntaxes. Per default all transfer syntaxes are enabled.
 Take care that certain presentation context are not practical. Some transfer syntaxes may only be used on certain datasets, and should not be proposed for other datasets. E.g. never propose lossy JPEG compression for 16 bits images as this is not applicable.
 Currently JPEG Extended is applicable to 12 bits images only (process 4).

5. Media Interchange

5.1.   Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

5.1.1.   Application Data Flow Diagram

The Q-Station 2.0 implements one media application entity: the Q-Station 2.0.
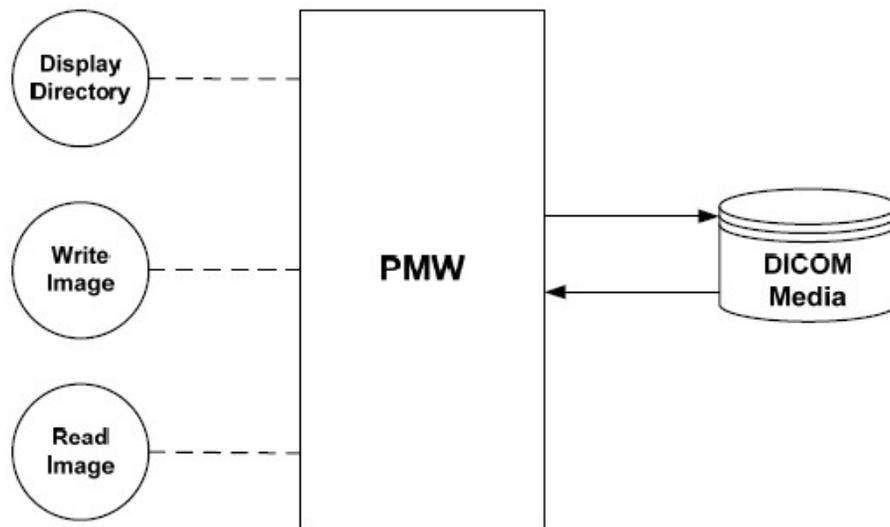
Figure 13: Application Data Flow Diagram

5.1.2.   Functional Definitions of AE's

The Q-Station 2.0 implements the following functions for DICOM media.

- Write a DICOM file-set onto the medium.
 - Create a DICOMDIR file.
 - Read the DICOMDIR file from the medium.
 - Read selected images from the medium.

5.1.3.   Sequencing of Real World Activities

Not applicable.

5.2.   AE Specifications

This section in the DICOM Conformance Statement specifies a set of Media Application Entities.

5.2.1.   Q-Station Media AE Media - Specification

This section contains general policies that apply to all of the Application Entities described in subsequent section.

The Q-Station 2.0 provides standard conformance to the DICOM interchange option of the media storage service class, and follows the specifications as defined in the DICOM standard – Media Storage and File Format for Data Interchange (PS 3.10) and Media Storage Application Profiles (PS 3.11).

The Q-Station 2.0 supports multi-patient and multi-session for CD-R media (both reading and writing). For one or more Application Profiles, the following table shows the Real-World Activities and the roles of each of these Real-World Activities.

Note:
Read File-set = Display Directory and Read Image
Create File-set = Write Image

Table 48: AE Q-Station Media AE related Application Profiles, RWA activities and roles

Supported Application Profile	Identifier	Real-World Activities	Roles
General Purpose CD-R Interchange	STD-GEN-CD	Create File-set	FSC
		Read File-set	FSR
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	Create File-set	FSC
		Read File-set	FSR
General Purpose USB Media Interchange with JPEG	STD-GEN-USB-JPEG	Update File-set	FSU
		Create File-set	FSC
		Read File-set	FSR

5.2.1.1.   File Meta Information for the Q-Station Media AE

Table 49: File Meta Information for the Q-Station Media AE

Implementation Class UID	1.3.46.670589.5.2.10
Implementation Version Name	10.1.0.0

5.2.1.2.   Real-World Activities

The AE specification contains a description of the Real-World Activities, which invoke the particular AE.

5.2.1.2.1.   RWA - Read File-set

This Media Application Entity has a File-set Reader functionality which is described here.

Display Directory

The Q-Station 2.0 will act as a FSR when reading the directory of the medium. This allows the System Integrator to see the results in an overview of the patients, studies, series presentation states and images.

The Q-Station 2.0 will not access DICOM media when either:
 - Patient ID is absent; or
 - Study Instance UID has no value; or
 - Series Instance UID has no value.

Read Images

The Q-Station 2.0 will act as a FSR when reading all/selected images from DICOM media.

5.2.1.2.1.1.   Media Storage Application Profile

Refer to the table in section 5.2.1.

5.2.1.2.1.1.1.   Options

Not applicable.

5.2.1.2.2.   RWA - Create File-set

This Media Application Entity has a File-set Creater functionality which is described here.

Write Images

The Q-Station 2.0 acts as an FSC when writing DICOM objects onto DICOM media. The Q-Station 2.0 can also store private attributes.

When the Q-Station 2.0 has to write objects to DICOM media, it can encounter the following situation.

The objects were previously received via C-STORE operations. Some attributes in the received images have a zero-length value (type 2 attributes). However, the Application Profile specifies some of these attributes as type 1: they must have a value. In such cases the Q-Station 2.0 supplies a value for the following attributes (if necessary):
 - Patient ID;
 - Study ID;
 - Series Number;
 - Instance number;
 - Study Date;
 - Study Time.

The mechanism of generating a value for Patient ID is to create a new value (i.e. Study Instance UID) for each new study written to the medium, even if this study belongs to a patient recorded earlier.

Study ID is assigned the value of the first Requested Procedure ID (0040,1001) encountered in the Request Attributes Sequence (0040,0275).

5.2.1.2.2.1.   Media Storage Application Profile

Refer to the table in section 5.2.1.

5.2.1.2.2.1.1.   Options

Not applicable.

5.2.1.2.3.   RWA - Update File-set

This Media Application Entity has a File-set Updater functionality which is described here.

5.2.1.2.3.1.   Media Storage Application Profile

The Application Profile that is used by this Media Application Entity is specified in this section.

5.2.1.2.3.1.1.   Options

The options used in the Application Profile are specified in detail in this section.
If there are no options used in the Application Profile, this section may be omitted by writing "Not applicable".

5.3.   Augmented and Private Application Profiles

This section is used for the description of Augmented and Private Application Profiles.

5.3.1.   Augmented Application Profiles

Any Augmented Application Profiles used by the Application Entity are described in this section. The rules governing the structure of an Augmented Application Profile are also described.

5.3.1.1.   Augmented Application Profile Descriptions

Each Augmented Application Profile has a section that describes the specific features of the Application Profile that make it Augmented.

5.3.1.1.1.   SOP Class Augmentations

The addition of Grayscale Softcopy Presentation State SOP class objects implies augmentation of the standard AP.

5.3.1.1.2.   Directory Augmentations

Instances of the private SOP classes may be written on the media. This requires a Directory Record Type (0004,1430) with the value "PRIVATE" and configuration of the required Private Record UID. This UID is used to define a non-standard type of Directory Record by reference to its position in a private extension to the DICOM Basic Directory IOD Information Model.

5.3.1.1.3.   Other Augmentations

Not applicable.

5.3.2.   Private Application Profiles

Not applicable.

5.4.   Media Configuration

In the following table an overview is given of some important configuration attributes related to the DICOM behaviour of Q-Station 2.0.

Table 50: Configuration Parameters table

Parameter	Configurable	Default Value
Transfer Syntax support*	Yes	ELE - 1.2.840.10008.1.2.1
		EBE - 1.2.840.10008.1.2.2
		ILE - 1.2.840.10008.1.2
		JPEG Lossless (NH-FOP) - 1.2.840.10008.1.2.4.70
		JPEG Baseline - 1.2.840.10008.1.2.4.50
		JPEG Extended - 1.2.840.10008.1.2.4.51
		JPEG 2000 (Lossless Only) - 1.2.840.10008.1.2.4.90
		JPEG 2000 - 1.2.840.10008.1.2.4.91
SOP Class	Yes	All transfer SOP classes in Q-Station 2.0

*Note: ELE is default, the other syntaxes are optional.

6. Support of Character Sets

Any support for character sets in Network and Media services is described here.

Table 51: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO 2022 IR 100	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/01	ISO-IR 100	G1	Supplementary set of ISO 8859
Latin alphabet No. 2	ISO 2022 IR 101	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/02	ISO-IR 101	G1	Supplementary set of ISO 8859
Latin alphabet No. 3	ISO 2022 IR 109	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/03	ISO-IR 109	G1	Supplementary set of ISO 8859
Latin alphabet No. 4	ISO 2022 IR 110	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/04	ISO-IR 110	G1	Supplementary set of ISO 8859
Greek	ISO 2022 IR 126	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/06	ISO-IR 126	G1	Supplementary set of ISO 8859
Arabic	ISO 2022 IR 127	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/07	ISO-IR 127	G1	Supplementary set of ISO 8859
Japanese	ISO 2022 IR 13	ESC 02/08 04/10	ISO-IR 14	G0	JIS X 0201: Romaji
		ESC 02/09 04/09	ISO-IR 13	G1	JIS X 0201: Katakana
Hebrew	ISO 2022 IR 138	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/08	ISO-IR 138	G1	Supplementary set of ISO 8859
Cyrillic	ISO 2022 IR 144	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/12	ISO-IR 144	G1	Supplementary set of ISO 8859
Latin alphabet No. 5	ISO 2022 IR 148	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/13	ISO-IR 148	G1	Supplementary set of ISO 8859
Thai	ISO 2022 IR 166	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 05/04	ISO-IR 166	G1	TIS 620-2533 (1990)
Default repertoire	ISO 2022 IR 6	-	ISO-IR 6	G0	ISO 646
		-	-	-	-

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859
Latin alphabet No. 2	ISO_IR 101	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 101	G1	Supplementary set of ISO 8859
Latin alphabet No. 3	ISO_IR 109	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 109	G1	Supplementary set of ISO 8859
Latin alphabet No. 4	ISO_IR 110	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 110	G1	Supplementary set of ISO 8859
Greek	ISO_IR 126	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 126	G1	Supplementary set of ISO 8859
Arabic	ISO_IR 127	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 127	G1	Supplementary set of ISO 8859
Japanese	ISO_IR 13	-	ISO-IR 14	G0	JIS X 0201: Romaji
		-	ISO-IR 13	G1	JIS X 0201: Katakana
Hebrew	ISO_IR 138	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 138	G1	Supplementary set of ISO 8859
Cyrillic	ISO_IR 144	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 144	G1	Supplementary set of ISO 8859
Latin alphabet No. 5	ISO_IR 148	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 148	G1	Supplementary set of ISO 8859
Thai	ISO_IR 166	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 166	G1	TIS 620-2533 (1990)

As can be seen in the table above, Q-Station 2.0 supports all character sets currently defined by DICOM except for the multi-byte character sets without code extensions.

The preferred character set can be configured. If not configured, the default character set shall be ISO-IR 100.

When an unsupported character set is received it shall be tried and decoded according the preferred character set.

Unsupported characters shall be displayed as "?".

7. Security

7.1. Security Profiles

The Q-Station 2.0 does not fully support DICOM security profiles. However, it does support security measures that will be used for secure authentication of a node and for the generation of audit records. The two Q-Station 2.0 components for security measures are:
 - Audit Trail Component

7.1.1. Audit Trail Component

The Audit Trail Component of Q-Station allows security officers in an institution to audit activities, to detect non-compliant behavior in the enterprise, and to facilitate detection of improper creation, access, modification and deletion of Protected Health Information (PHI), where PHI data is considered as information records (Registration, Order, Study/Procedure, Reports and to a lesser degree Images/Presentation States), and not the flow of information between the systems.

The messages are created and sent to a syslog server according to the syslog protocol. The time that is used will be the local time of the system. The syslog server is an element of the Hospital infrastructure.

7.2. Association Level Security

Q-Station 2.0 accepts associations only from known applications or an application whose "calling AE Title" is defined in its configuration file. Q-Station 2.0 will reject association requests from unknown applications, i.e. applications that offer an unknown "calling AE title". An application entity (AE) is known if – and only if – it is defined during configuration of Q-Station 2.0, which is done via the configuration application.

7.3. Application Level Security

If configured, Q-Station 2.0 supports security measures for:
 - generation of audit trail records;
 - access control and user authentication.

8. Annexes of application "Q-Station"

8.1. IOD Contents

8.1.1. Created SOP Instance

This section specifies each IOD created by this application.

Notes on Softcopy Presentation State IOD (Section 8.1.1.2)

Depending on the configuration, when the Q-Station 2.0 imports an image without presentation state object then it may extract and store presentation state object along with this image. The presentation state object will then be part of the same examination as the original image.

If private presentation state information exists then this will be used to create the presentation state object. Depending on the configuration Q-Station 2.0 may include this private presentation state information on export.

Section 8.1.1.2 specifies only those attributes that are created or modified to export a presentation state object. This presentation state object shall also export all relevant attributes (ref. [DICOM] on Grayscale Softcopy Presentation State IOD) as stored per original image.

Note that the Display Shutter, Overlay Plane and Softcopy VOI LUT modules are moved from the original image to the presentation state object, i.e. the original image will not have any Display Shutter, Overlay Plane and Softcopy VOI LUT data stored. If applicable (i.e. if presentation state is not supported per association/configuration) the image and removed modules may be merged again at export.

If composite images belonging to different series are sent (imported) within one association, then a separate presentation state and series is created for each different composite image series that contains single frame images. Multi-frame images are handled in a slightly different way, as for each separate MF image a presentation state is created. All presentation states that refer to MF images belonging to the same image series are put in the same presentation state series.

In addition, for multi-frame images it can be undesirable to create a presentation state object for each separate MF image during import. This will be the case for a series of X-Ray images that actually contains many X-Ray images that all exist of one single frame. For this reason it can be configured to generate a Presentation State either per image or per series.

This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.

Abbreviations used in the IOD tables for the column "Presence of Module" are:
ALWAYS   The module is always present
CONDITIONAL   The module is used under specified condition

Abbreviations used in the Module table for the column "Presence of Value" are:
ALWAYS   The attribute is always present with a value
EMPTY   The attribute is always present without any value (attribute sent zero length)
VNAP   The attribute is always present and its Value is Not Always Present
                (attribute sent zero length if no value is present)
ANAP   The attribute is present under specified condition – if present then it will always have a value
ANAPCV   The attribute is present under specified condition – if present then its Value is Not Always Present
                (attribute sent zero length if condition applies and no value is present)
ANAPEV   The attribute is present under specified condition – if present then it will not have any value

The abbreviations used in the Module table for the column "Source" are:

AUTO   The attribute value is generated automatically
CONFIG   The attribute value source is a configurable parameter
COPY   The attribute value source is another SOP instance
FIXED   The attribute value is hard-coded in the application
IMPLICIT   The attribute value source is a user-implicit setting
MPPS   The attribute value is the same as that use for Modality Performed Procedure Step
MWL   The attribute value source is a Modality Worklist
USER   The attribute value source is explicit user input

8.1.1.1.   List of created SOP Classes

Table 52: List of created SOP Classes

SOP Class Name	SOP Class UID
Media Storage Directory SOP Class	1.2.840.10008.1.3.10

8.1.2.   Usage of Attributes from Received IOD

The Q-Station 2.0 only accepts all valid DICOM IOD's specified in this document. Some SOP Classes will not be viewable because they are application dependant.

8.1.3.   Attribute Mapping

For the case of a DICOM image export without PR, the Presentation State information is applied to the image(s) and its attributes are sent out as DICOM composite images as described in Table 83. Three different export modes are possible.

Table 53: Mapping Rules for Exporting Q-Station 2.0 Images

Q-Station 2.0 Presentation State	DICOM without PR Standard Composite Image	DICOM without PR Standard Extended Composite Image	DICOM without PR Secondary Capture Image
Presentation State (Identification)	Discard	Add attributes as part of private sequence	Discard
Spatial Transformation	Do not apply; Discard	Do not apply; Add attributes as part of private sequence	Apply on Image
Displayed Area	Do not apply; Discard	Do not apply; Add attributes as part of private sequence	Apply on Image
Modality LUT	Modality LUT Module	Modality LUT Module; Add attributes as part of private sequence	Apply on Image
Presentation LUT	If linear into Presentation shape	If linear into Presentation shape; Add as part of private sequence	Apply on Image
VOI LUT	Into VOI LUT	Into VOI LUT; Add attributes as part of private sequence	VOI LUT Module
Display Shutter	Display Shutter Module	Display Shutter Module; Add attributes as part of private sequence	Not implemented
Overlay Plane	Overlay Plane Module	Overlay Plane Module	Apply on Image
Curve	Curve Module	Curve Module	Discard
Graphic Layer	Discard	Discard; Add attributes as part of private sequence	Apply on Image
Graphic Annotation	Converted into one, separate overlay; Graphic Layer is discarded	Converted into one, separate overlay; Add as part of private sequence	Apply on Image
Other additional or private attributes	Discard	Add as part of private sequence	Discard

8.1.4.   Coerced/Modified fields

Upon export of composite instances a de-normalization can take place by assembling data from the various entities in the hierarchy. The selection of the attributes takes place based upon what is present in the Q-Station 2.0 at the initiation of the export. A description is given in the following subsections per instance level.

Patient

If the patient ID attribute is absent during instance import (has no value – zero-length) the following mapping will take place.

1. When a Patient ID is absent and one of Patient's Name/Patient's Birth Date are absent then a new UID is generated for Patient ID. Otherwise Patient ID is generated by appending "EMPTYPatientID_" + <Patient's Name> + "_" + <Patient's Birth Date>. It will be ensured that all instances belonging to a particular study will get the same Patient ID.

2. For Storage SCP, when two or more SOP Instances have the same Patient ID and different values for Patient's Name/Patient's Birth Date, then a new Patient ID is created by appending "!" + <UID> to the Patient ID. The original Patient ID is added to the Other Patient IDs.

Study

During import, the value of Study ID attribute is determined as follows:

1. Retrieved from the composite image.
 2. If not present in the composite image, Study ID is assigned the value of the first Requested Procedure ID (0040,1001) encountered in the Request Attributes Sequence (0040,0275) in the composite image.
 3. Otherwise Study ID remains empty.

During Export, in the absence of Study attribute values, the Examination attributes will be taken as a best guess for the following Study attributes.

Table 54: Mapping of Study Attributes

Examination Attribute	Value	DICOM Attribute
Study Date (0008,0020)	Has value	Study date (0008,0020) is sent out
	Not present or has no value	Study date (0008,0020) is filled with Performed Procedure Step Start Date (0040,0244)
Study Time (0008,0030)	Has value	Study Time (0008,0030) is sent out
	Not present or has no value	Study Time (0008,0030) is filled with Performed Procedure Step Start Time (0040,0245)

This implies that upon export of each Examination, within the same Study, different values for these attributes may be sent out. The receiving station, e.g. a PACS system, will apply its own rules for guaranteeing consistency of its own database.

Examination

If all of the Performed Procedure Step attributes in the following table are missing from the composite image, then the mapping is as specified.

Table 55: Mapping of Examination attributes

Performed Procedure Step Attribute	Tag	Composite Image Attribute	Tag
Performed Procedure Step Start Date	0040,0244	Study Date	0008,0020
Performed Procedure Step Start Time	0040,0245	Study Time	0008,0030
Performed Procedure Step ID	0040,0253	Study ID	0020,0010
Performed Procedure Step Description	0040,0254	Study Description	0008,1030

Presentation State Handling

For backward compatibility between Q-Station 2.0 and DICOM without presentation states, upon export from a Q-Station 2.0 to DICOM without presentation states, a merge of image definition and image presentation data is required. In the Q-Station 2.0 model, for one single image multiple presentation states may exist. During export Q-Station 2.0 ensures that only one image is sent out by merging the most preferred presentation state data with the image. The most preferred presentation state is selected based on the presentation state label and the time of creation.

8.2.   Data Dictionary of Private Attributes

Not applicable.

8.3.   Coded Terminology and Templates

Q-Station 2.0 does not implement any specific support for coded terminology and templates.

8.3.1.   Context Groups

Not applicable.

8.3.2.   Template Specifications

Not applicable.

8.3.3.   Private code definitions

Not applicable.

8.4.   Grayscale Image consistency

Q-Station 2.0 does not implement any specific support for grayscale image consistency.

8.5.   ClassesStandard Extended/Specialized/Private SOPs

8.5.1.   Specialized SOP

Q-Station supports only one Private SOP Class, 1.3.46.670589.2.8.1.1, used only for storing of Draft Reports to DICOM Media. It is not used for network storage as only Approved reports may be exported via DICOM, and those are only in Encapsulated PDF.

8.6.   Private Transfer Syntaxes

Q-Station 2.0 does not support any private transfer syntaxes.