DICOM

Conformance Statement

Xcelera 2.2 L1 SP1

PHILIPS

Issued by:
Philips Medical Systems Nederland B.V.
HI-PII - Interoperability Competence Center

P.O. Box 10.000
5680 DA Best
The Netherlands

    Email: dicom@philips.com
    Internet: http://www.medical.philips.com/connectivity

Date: 21 June 2010

1. DICOM CONFORMANCE STATEMENT OVERVIEW

Xcelera is the Philips Cardiology multi-modality image and information management solution that allows images, information and reports to be reviewed, stored and distributed throughout the cardiology department and beyond. Xcelera is intended to: a) Review the high quality medical study data provided by modalities, and b) Serve as a permanent archive for such data. As such, the Xcelera system consists of a central image and database server and several connected viewer workspots capable of running various viewer applications (also called review station). The Xcelera is designed with the concerns for the system as: data integrity, performance, image quality, serviceability, and large number of users. Added with easy of use, privacy/confidentiality, flexibility and expandability. Data is imported from the image acquisition system through a vendor provided DICOM port. This port is provided as a safe and reliable way to access the clinical data. In addition to DICOM, Xcelera also maintains compatibility with the installed base of Philips Sonos US image acquisition system in supporting the proprietary DSR-TIFF format. The system also offers DICOM ports such that external systems (viewers, other PACS systems and etc) can access the data. Data can also be imported from and exported to CD or DVD. The primary point of user contact with the system is the viewer workspot, consisting of several clinical tools, e.g. for Cath, Echo, CT and MR, including 3-rd party tools like QLAB. These programs use the common Windows GUI metaphors for selecting items or entering information in the common patient and study search window. A network based on standard technology, connects the Xcelera server, the viewer workspots and external DICOM nodes, such as Cath labs, Ultrasound labs, EP labs and other acquisition systems, DICOM archives, DICOM viewers etc.

Table 1: Network Services – Standard SOP classes

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Other			
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Print Management			
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15	Yes	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Query/Retrieve			
Patient Root Query/Retrieve Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Patient Root Query/Retrieve Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Patient/Study Only Query/Retrieve Info. Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.3.1	No	Yes
Patient/Study Only Query/Retrieve Info. Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.3.2	No	Yes
Study Root Query/Retrieve Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes
Study Root Query/Retrieve Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes
Transfer			
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.1.9.1.2	Yes	Yes
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	Yes	Yes
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Ultrasound Multi-frame Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
X-Ray Angiographic Bi-Plane Image Storage SOP Class (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Yes	Yes
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
Workflow Management			
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	Yes

Table 2: Network Services – Private SOP classes

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Transfer			
3D Object new Storage (Private)	1.3.46.670589.5.0.2.1	Yes	Yes
3D Sub page Store - Private SOP	1.3.46.670589.2.5.1.1	Yes	Yes
3D Volume Storage new SOP Class (Private)	1.3.46.670589.5.0.1.1	Yes	Yes
Cardio Image Storage new SOP Class (Private)	1.3.46.670589.5.0.8.1	Yes	Yes
CT Synthetic Image Storage (Private)	1.3.46.670589.5.0.9	Yes	Yes
CX Synthetic Image Storage (Private)	1.3.46.670589.5.0.12	Yes	Yes
MR Cardio Analysis new Storage (Private)	1.3.46.670589.5.0.11.1	Yes	Yes
MR Synthetic Image Storage (Private)	1.3.46.670589.5.0.10	Yes	Yes
Perfusion (Private)	1.3.46.670589.5.0.13	Yes	Yes
Perfusion Image Storage (Private)	1.3.46.670589.5.0.14	Yes	Yes
Specialized PMS X-Ray Image Store	1.3.46.670589.2.3.1.1	Yes	Yes
Surface Storage new (Private)	1.3.46.670589.5.0.3.1	Yes	Yes
XA reconstructed X-ray SOP Class (private)	1.3.46.670589.2.4.1.1	Yes	Yes

The services can be specified as a SCU, SCP or as an Option, which means that it is either configurable or that it can be purchased separately.

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

Table 3: Media Services

Media Storage Application Profile	Write Files (FSC / FSU)	Read Files (FSR)
Magneto-Optical Disk		
Image Display (Ultrasound {SF|MF})	No / No	Yes
CT/MR Studies on {650MB|1.2GB|2.3GB|4.1GB} MOD	No / No	Yes
Compact Disk – Recordable		
Basic Cardiac X-Ray Angiographic Studies on CD-R	Yes / No	Yes
1024 X-Ray Angiographic Studies on CD-R	Yes / No	Yes
Image Display (Ultrasound {SF|MF})	Yes / No	Yes
General Purpose CD-R Interchange	Yes / No	Yes
CT/MR Studies on CD-R	Yes / No	Yes
DVD		
Image Display (Ultrasound {SF|MF})	Yes / No	Yes
CT/MR Studies on DVD	Yes / No	Yes
General Purpose Interchange on DVD	Yes / No	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 4: Revision History

Document Version	Date of Issue	Author	Description
00	26 August 2008	HI-PII-IOCC	Base: DICOM Conformance Statement Xcelere 2.2 L1 XBS 031-080139 Changes for Xcelera 2.2 SP1 Added Morpheus and pathfinder systems for DICOM SR import Added Japanese character set information in supported character set section Added created IODs for Ultrasound Analysis plug –in section. Comprehensive SR is created by ultrasound analysis plug-in application.
01	21 June 2010	HI-PII-IOCC	Update for Transfer Syntax Conversion Table

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 incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.
The word Philips in this document refers to Philips Medical Systems.

The following acronyms and abbreviations are used in this document.

AE	Application Entity
AE Title	Application Entity Title
ALWAYS	Always Present
ANAP	Attribute Not Always Present
ANSI	American National Standard Institute
AP	Application Profile
API	Application Programming Interface
AUTO	The attribute value is generated automatically
BMP	Bitmaps
BOT	Basic Offset Table
CD	Compact Disc
CD-R	CD-Recordable
CD-M	CD-Medical
CONFIG	The attribute value source is a configurable parameter
CR	Computed Radiography
CT	Computed Tomography
DCR	Dynamic Cardio Review
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DNS	Domain Name System
DSR	Digital Storage and Retrieval
DSR-TIFF	Digital Storage and Retrieval – the proprietary Philips Ultrasound image file format that predates DICOM
DVD	Digital Versatile Disc
DX	Digital X-Ray
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
EMPTY	Attribute is sent without a value
FIFO	First In First Out
FLOP	Floppy disk

FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
FTP	File Transfer Protocol
GUI	Graphic User Interface
HIS	Hospital Information System
HIPAA	Health Insurance Portability and Accountability Act.
HL7	Health Level Seven
HTML	HyperText Markup Language
ID/SC	Image Display/Spatial Calibration
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
IP-address	Internet Protocol address
ISIS	Information System – Imaging System
JPEG	Joint Photographic Experts Group
JPEG	Lossless FOP
	JPEG Lossless, Non-Hierarchical, First-Order Prediction (process 14 [Selection Value 1]): Default Transfer Syntax for Lossless JPEG Image Compression.
JPEG	Lossy Baseline
	JPEG Baseline (Process 1): Default Transfer Syntax for lossy JPEG 8 Bit Image Compression
MIME	Multipurpose Internet Mail Extension
MOD	Magneto-Optical Disk
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
NSF	National Science Foundation
PACS	Picture Archiving and Picture Communication System
PDU	Protocol Data Unit
PPP	Point to Point Protocol
Q/R	Query/Retrieve
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RLE	Run Length Encoding
RP	Response
RQ	Request
RT	Radiotherapy
RWA	Real-World Activity
SC	Secondary Capture
SCM	Study Component Management
SCP	Service Class Provider
SCU	Service Class User
SF/MF	Single Frames/Multi Frames
SOP	Service Object Pair
STD-GEN	General Purpose Image Exchange profile class
STD-US	Application profile for Ultrasound media storage application
STD-XABC	Application profile class for Basic Cardiac X-ray Angiographic clinical application
STD-XA1K	Application profile for 1024 X-ray Angiographic clinical application
TCP/IP	Transmission Control Protocol/Internet Protocol
TTL	Time to Live
UID	Unique Identifier
US	Ultrasound
USER	The attribute value source is from User input
USMF	Ultrasound Multi-frame
VNAP	Value not always present
WLM	Worklist Management
XA	X-Ray Angiographic

3.5.   References

[DICOM]   Digital Imaging and Communications in Medicine, Part 1 – 18
 (NEMA PS 3.1– PS 3.18),
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
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 2008) 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

As part of the implementation model, an application data flow diagram is included. This diagram represents all of the Application Entities present in an implementation, and graphically depicts the relationship of the AE's use of DICOM to Real-World Activities as well as any applicable user interaction.
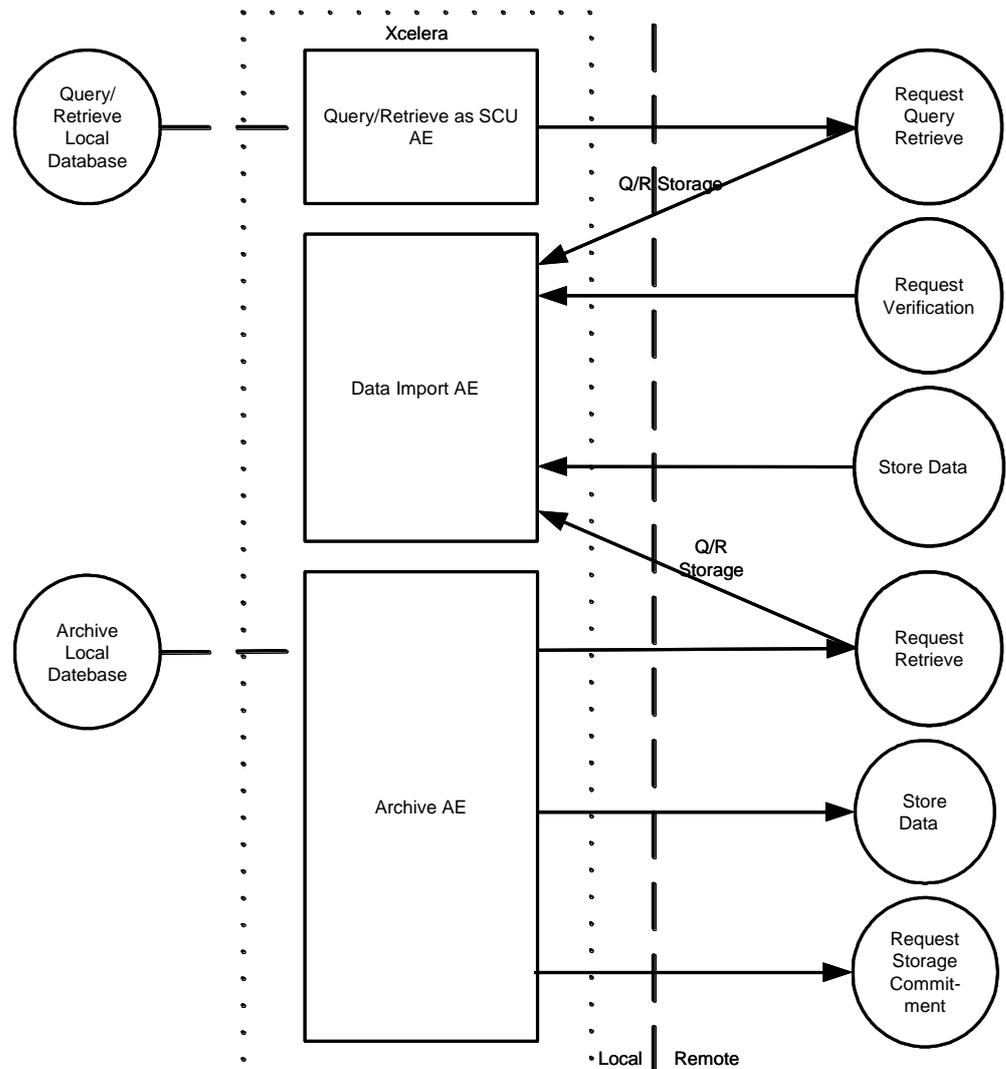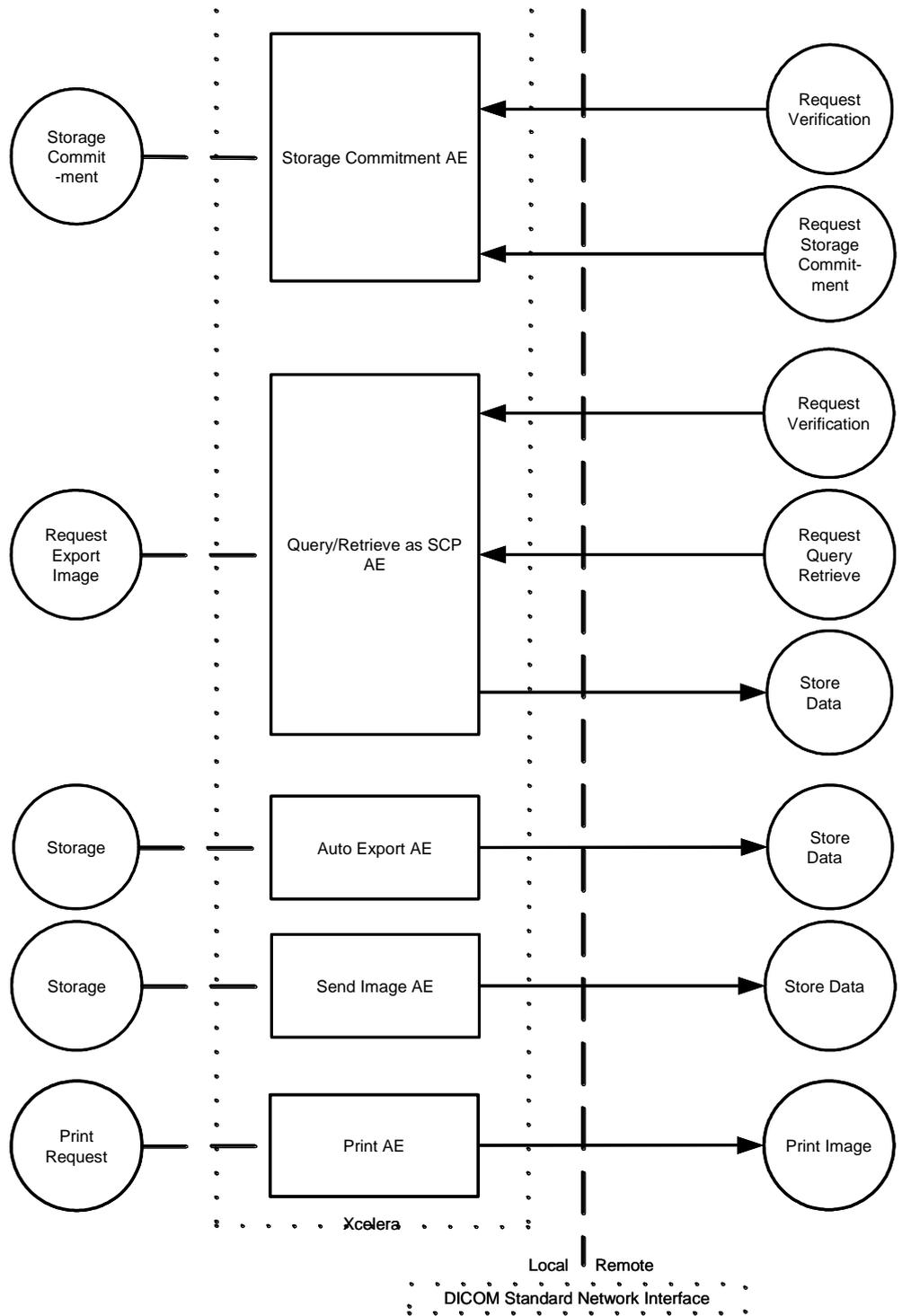
Figure 1: Application Data Flow Diagram

4.1.2. Functional Definition of AE's

This section contains a functional definition for each individual local Application Entity. This describes in general terms the functions to be performed by the AE, and the DICOM services used to accomplish these functions. In this sense, "DICOM services" refers not only to DICOM Service Classes, but also to lower level DICOM services, such as Association Services.

4.1.2.1. Functional Definition of Archive AE

The Archive AE handles the communication between Xcelera and the DICOM Archive. For storing images to an archive, an automatic function, Storage with Storage Commitment will be used. To pull the image from an archive, a C-MOVE with Study Instance UID handles this action. The study/image will be retrieved via the Import AE.

4.1.2.2. Functional Definition of Auto Export AE

On event, Xcelera (SCU) automatically initiates an association with a remote DICOM AE (SCP) to send a storage request and the applicable image data. (DICOM Storage Service Class)

4.1.2.3. Functional Definition of Print AE

The Print AE in Xcelera supports the functionality for basic grayscale print management, basic annotation box, and print job. On demand, Xcelera (SCU) initiates an association with a printer (SCP) and sends a create requests to the printer(DICOM Print Management SOP class).

4.1.2.4. Functional Definition of Query Retrieve as SCP AE

Xcelera Query/Retrieve as SCP AE consists of two functions. Xcelera (SCP) accepts an association from a remote DICOM AE (SCU) to receive a Query/Retrieve request. (DICOM Query/Retrieve Service Class). - When a retrieve of an image is requested, Xcelera sends that requested image through Store SCU AE (DICOM Storage Service Class)

4.1.2.5. Functional Definition of Query Retrieve as SCU AE

Xcelera (SCU) initiates an association with a remote DICOM AE (SCP) to send a Query/Retrieve request. (DICOM Storage Service Class).

4.1.2.6. Functional Definition of Send AE

When the Send function in Xcelera is addressed, Xcelera (SCU) initiates an association with a remote DICOM AE (SCP) to send a storage request and the applicable image data. (DICOM Storage Service Class)

4.1.2.7. Functional Definition of Storage Commitment AE

Xcelera (SCP) accepts an association from a remote DICOM AE (SCU) to receive a storage commitment request. After handling the requested storage commitment, Xcelera initiates an association with the SCU to report the status of the storage commitment (DICOM Storage Commitment Service Class)

4.1.2.8. Functional Definition of Xcelera Image Import AE

Xcelera (SCP) accepts an association with a remote DICOM AE (SCU) to receive a storage request and the applicable image data. (DICOM Storage Service Class)

4.1.3. Sequencing of Real World Activities

All Real-World Activities as specified in the Functional Definition of Application Entities may occur independently from each other.

4.2.   AE Specifications

The next 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. Archive AE

Archive AE is used for archiving the patient studies either in Xcelera Server (Xcelera DICOM Archive) or in external DICOM Archive.
Archive AE is intended to do the functioning of storing the patient studies in the DICOM Archive, Sending the Storage Commitment to the DICOM Archive and Retrieving studies from the DICOM Archive whenever they are needed. These functions are undertaken automatically.

Archive AE, for its functioning, makes use of following DICOM functions

- Verification as SCU, which uses C-ECHO service element
- Image Storage as SCU, which uses C-STORE as service element
- Storage Commitment as SCU, which uses N-ACTION, N-EVENT-REPORT service elements
- Retrieve as SCU, which uses C-MOVE as service element
- Depending on the configuration, patient study will be updated with the latest information in the DICOM Archive. (Refer Tables 20 and 21 for the list of updated patient and study attributes)

The separate AEs need to be configured for Storage, Storage Commitment and Fetch (Retrieve) functionalities.

These DICOM functions will be described in the subsections that follow.

4.2.1.1. SOP Classes

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

Table 5: Standard SOP Classes for Image Export

SOP Class Name	SOP Class UID	SCU	SCP
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Yes	No
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.1.9.1.2	Yes	No
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Yes	No
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	Yes	No
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Yes	No
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	No
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	Yes	No
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
Ultrasound Multi-frame Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	Yes	No
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
X-Ray Angiographic Bi-Plane Image Storage SOP Class (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Yes	No
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	Yes	No

Table 6: Private SOP Classes for Image Export

SOP Class Name	SOP Class UID	SCU	SCP
3D Object new Storage (Private)	1.3.46.670589.5.0.2.1	Yes	No
3D Subpage Store - Private SOP	1.3.46.670589.2.5.1.1	Yes	No
3D Volume Storage new SOP Class (Private)	1.3.46.670589.5.0.1.1	Yes	No
Cardio Image Storage new SOP Class (Private)	1.3.46.670589.5.0.8.1	Yes	No
CT Synthetic Image Storage (Private)	1.3.46.670589.5.0.9	Yes	No
CX Synthetic Image Storage (Private)	1.3.46.670589.5.0.12	Yes	No
MR Cardio Analysis new Storage (Private)	1.3.46.670589.5.0.11.1	Yes	No
MR Synthetic Image Storage (Private)	1.3.46.670589.5.0.10	Yes	No
Perfusion (Private)	1.3.46.670589.5.0.13	Yes	No
Perfusion Image Storage (Private)	1.3.46.670589.5.0.14	Yes	No
Specialized PMS X-Ray Image Store	1.3.46.670589.2.3.1.1	Yes	No
Surface Storage new (Private)	1.3.46.670589.5.0.3.1	Yes	No
XA reconstructed X-ray SOP Class (private)	1.3.46.670589.2.4.1.1	Yes	No

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 has specified.

Table 7: DICOM Application Context

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.

Table 8: Number of Associations as an Association Initiator for Archive AE

Maximum number of simultaneous associations	1

Table 9: Number of Associations as an Association Acceptor for Archive AE

Maximum number of simultaneous associations	Unlimited.

4.2.1.2.3. Asynchronous Nature

If the implementation supports negotiation of multiple outstanding transactions this is stated here, along with the maximum number of outstanding transactions supported.

Table 10: Asynchronous Nature as an Association Initiator for Archive AE

Maximum number of outstanding asynchronous transactions	Unlimited.

4.2.1.2.4.   *Implementation Identifying Information*

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

Table 11: DICOM Implementation Class UID and Version for Archive AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.1.2.5.   *Communication Failure Handling*

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

Table 12: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association closed and reason is logged.

4.2.1.3.   Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 13: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.

Result	Source	Reason/Diagnosis	Behavior
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 14: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 15: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notify the Remote AE, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	Notify the Remote AE, terminates the connection and logs the event.
	1 – unrecognized-PDU	Notify the Remote AE, terminates the connection and logs the event.
	2 – unexpected-PDU	Notify the Remote AE, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	Notify the Remote AE, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	Notify the Remote AE, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	Notify the Remote AE, terminates the connection and logs the event.

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

4.2.1.3.1.1. Description and Sequencing of Activities
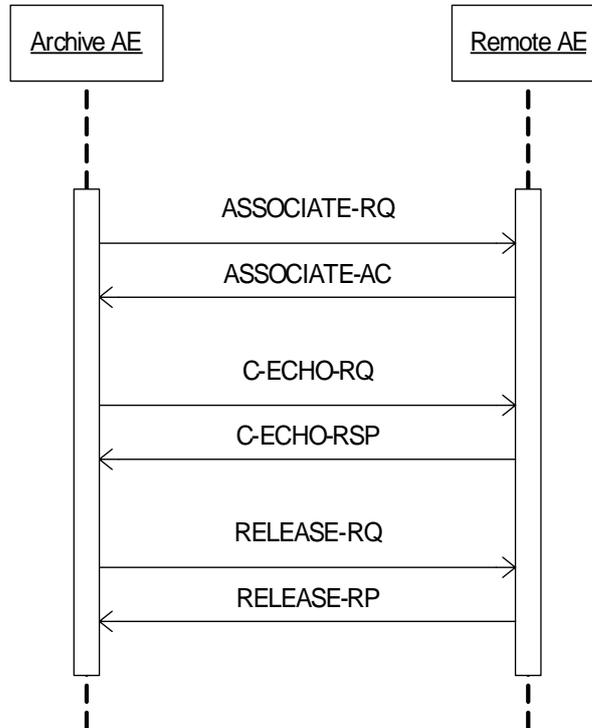
Figure 2: (Real World) Activity - Verification as SCU

The Archive AE sends associations to systems to verify application level communication using the C-ECHO command.

4.2.1.3.1.2. Proposed Presentation Contexts

The Archive AE proposes the following presentation contexts to the remote AE during the association request before sending the C-ECHO

Table 16: 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 Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.1.3.1.3. SOP Specific Conformance for Verification SOP Class

The Archive AE provides standard conformance to Verification SOP Class.

4.2.1.3.1.3.1.   Dataset Specific Conformance for Verification C-ECHO SCU

The status behavior is shown in the following table.

Table 17: C-ECHO-RQ Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Confirmation	Message in log file.

4.2.1.3.2.   (Real-World) Activity – Archive Storage SCU

4.2.1.3.2.1. Description and Sequencing of Activities
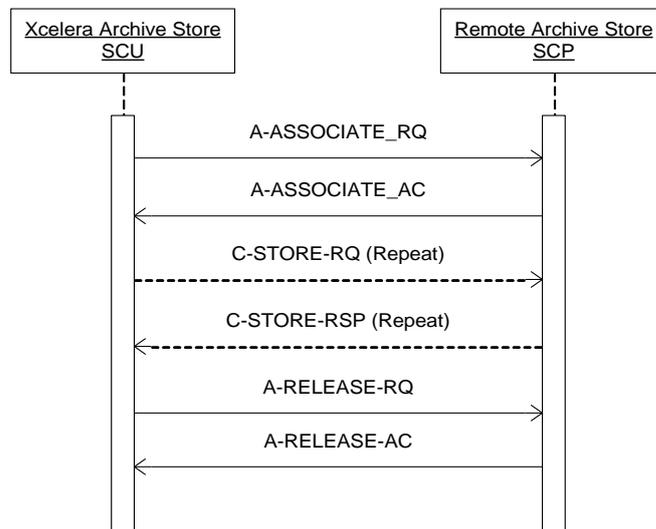
Figure 3: (Real World) Activity – Archive Storage SCU

Normal flow of events:

1. When the condition for Archiving of a study/studies are met (based on the Archive Configuration settings), Xcelera sets up a store connection and negotiates communication parameters with this Archive DICOM node. Connection setup is executed according to DICOM Store protocols, with Xcelera acting as DICOM Store SCU
2. After this connection is setup, Xcelera send study/studies to the external DICOM node. Upon completion of this, the connection is closed. Start and end of the connection and data transfer are logged.

4.2.1.3.2.2. Proposed Presentation Contexts

The presentation contexts proposed by Store Image AE for (Real-World) Activity – Store Image AE are defined in next table.

Table 18: Proposed Presentation Contexts for Image Export

- Standard SOP Classes

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.1.9.1.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian JPEG Baseline (Process 1) JPEG Lossless, Non-Hierarchical, FOP (Process 14) Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian Implicit VR Little Endian RLE Lossless JPEG Lossless, Non-Hierarchical, FOP (Process 14) Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.5 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian JPEG Baseline (Process 1) RLE Lossless	1.2.840.10008.1.2 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.5	SCU	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Ultrasound Multi-frame Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
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
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
X-Ray Angiographic Bi-Plane Image Storage SOP Class (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
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 Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
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 Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
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 Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

Table 19: Proposed Presentation Contexts for Image Export

- Private SOP Classes

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
3D Object new Storage (Private)	1.3.46.670589.5.0.2.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
3D Subpage Store - Private SOP	1.3.46.670589.2.5.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
3D Volume Storage new SOP Class (Private)	1.3.46.670589.5.0.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Cardio Image Storage new SOP Class (Private)	1.3.46.670589.5.0.8.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
CT Synthetic Image Storage (Private)	1.3.46.670589.5.0.9	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
CX Synthetic Image Storage (Private)	1.3.46.670589.5.0.12	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
MR Cardio Analysis new Storage (Private)	1.3.46.670589.5.0.11.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
MR Synthetic Image Storage (Private)	1.3.46.670589.5.0.10	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Perfusion (Private)	1.3.46.670589.5.0.13	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Perfusion Image Storage (Private)	1.3.46.670589.5.0.14	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Specialized PMS X-Ray Image Store	1.3.46.670589.2.3.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Surface Storage new (Private)	1.3.46.670589.5.0.3.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
XA reconstructed X-ray SOP Class (private)	1.3.46.670589.2.4.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.1.3.2.3. SOP Specific Conformance for Storage SOP Classes

The Archive storage SCU AE conforms to the SOP classes of the Storage Service Class at level 2 (full). No data elements are discarded or coerced by the Archive Storage SCU AE.

The list of updated patient and study attributes are mentioned in the tables below.

Table 20: List of updated Patient Attributes

Attribute	DICOM Tag	Example
Last Name	Part of Part of (0010,0010)	Sam
First name	Part of (0010,0010)	Ward
Middle name	Part of (0010,0010)	Emilia
Date of birth	(0010,0030)	23/02/1962
Sex	(0010,0040)	Female
Institution	(0010,0021)	MMC-V
MRN	(0010,0020)	47239498729 38
Alternate ID#	(0010,1000)	123-341-354-88
Title	Part of (0010,0010)	Ms.
Honorific	Part of (0010,0010)	B.A.
Address 1	Part of (0010,1040)	14-16 Uxbridge Road
Address 2 (if Address1 is empty)	Part of (0010,1040)	Ealing
City	Part of (0010,1040)	London
State/Province	(0010,2152)	
Postal code	Part of (0010,1040)	W5 2HL
Country	(0010,2150)	Great Britain
Race	(0010,2160)	Caucasian
Home phone	Part of (0010,2154)	020 8325 5745
Business phone	Part of (0010,2154)	
Mobile phone	Part of (0010,2154)	

Table 21: List of updated Study Attributes

Attribute	DICOM Tag	Example
Study Type	(0008,1030)	
Accession Number	(0008,0050)	
Body Part	(0018,0015)	
Protocol Name	(0018,1030)	
Reason for Study	(0008,1080)	
Performed By	(0008,1050)	
Reading Physician	(0008,1060)	
Ordering Physician	(0032,1032)	
Reviewer	(300E,0008)	
Referring Physician	(0008,0090)	

The behavior on successful and unsuccessful transfer of images is given in the table below.

Table 22: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success		0000	
Warning	Coercion of data elements	B000	Log; Continue
	Elements discarded	B006	Log; Continue

Service Status	Further Meaning	Error Code	Behavior
	Data set does not match SOP class	B007	Log; Continue
Error	Error – Processing failure	0110	Log;
	Error – Data set does not match SOP class	A900	Log;
	Error – Cannot understand	C000	Log;
Refused	Data set does not match SOP class	A700	Log;

Exceptions:

1. If, after setting up the connection, no data can be sent to the external DICOM node for 2 minutes, Xcelera will retry once and then it will abort the connection.
2. If an error occurs on Xcelera while setting up the connection, Xcelera aborts and reports error.
3. If an error occurs on the external DICOM node while setting up the connection, Xcelera will abort all actions related to that connection and report errors.
4. If no agreement between the two parties can be reached concerning communication parameters the connection will be closed and no data transfer will take place.
5. When a network error occurs during connection set up or during data transfer, Xcelera will abort all actions related to the connection.
6. If an error occurs on Xcelera during data transfer, Xcelera will notify the external DICOM node of this problem and after that close the connection.

Table 23: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is closed and the reason logged
Association aborted	he association is closed and the reason logged

4.2.1.3.3.   (Real-World) Activity – Storage Commitment SCU

4.2.1.3.3.1. Description and Sequencing of Activities
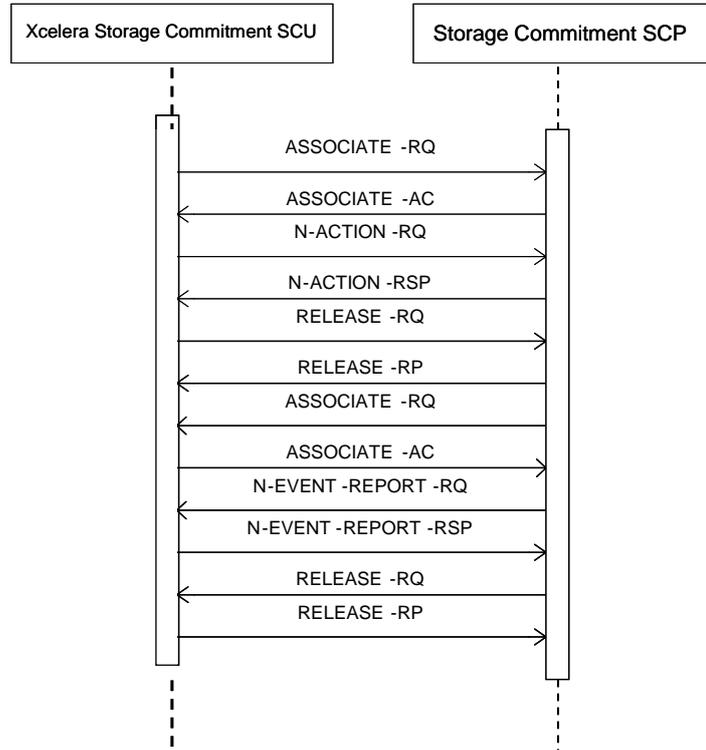
Figure 4: (Real World) Activity - Storage Commitment Push Model AS SCU

Normal Flow of events:

1. After the configured time, Xcelera will initiate a Storage Commit request for the study that it stored into the DICOM Archive.
2. When a successful response from the DICOM archive is received, for this study, Xcelera mark this study as correctly archived.

4.2.1.3.3.2. Proposed Presentation Contexts
The proposed presentation contexts are mentioned in the table below.

Table 24: 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		

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

The Archive AE (Storage Commitment) provides standard conformance to the Storage Commitment Push Model SOP Class.

4.2.1.3.3.3.1. Dataset Specific Conformance for Storage Commitment Push Model N-ACTION SCU

The DICOM command communication and response behavior is shown in the following tables

Table 25: N-ACTION-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The association will be released. The reason is logged.
Failure	xxxx	(any failure)	The reason is logged.

Table 26: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The association is released.
Association Time-out SCU	The association is released.
Association Aborted	The association is released.

Exceptions:

1. After setting up the connection, if no data can be sent to the external node for 60 seconds, Xcelera aborts the connection and reports an error.
2. An error occurs on the target node while setting up the connection. If the retries are unsuccessful, the system will mark the data for later archiving.
3. If an error or warning concerning data transfer is received from the target node during data transfer. If it is related to the data being send Xcelera tries to correct the cause of the error
4. When Xcelera can not setup connection with the DICOM Archive, Xcelera will retry for 3 times. If within these retries, if it is still not possible to setup the connection, the study will be re-archived, conforms its own retry mechanism and a warning will be reported.
5. When Xcelera does not receive a storage commit report within 72 hours, the study will be re-archived, conforms its won retry mechanism and a warning will be reported.

6. When the Xcelera receives a storage commit response other than successful, the study will be re-archived, conforms to its own retry mechanism and a warning will be reported.

4.2.1.3.3.3.2.   Dataset Specific Conformance for Storage Commitment Push Model N-EVENT-REPORT SCU

The DICOM command communication and response behavior is shown in the following tables.

Table 27: N-EVENT-REPORT-RSP Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The association will be released. The reason is logged.
Failure	xxxx	(any failure)	The reason is logged.

Table 28: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The association is released.
Association Time-out SCP	The association is released.
Association Aborted	The association is released.

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

4.2.1.3.4.1. Description and Sequencing of Activities
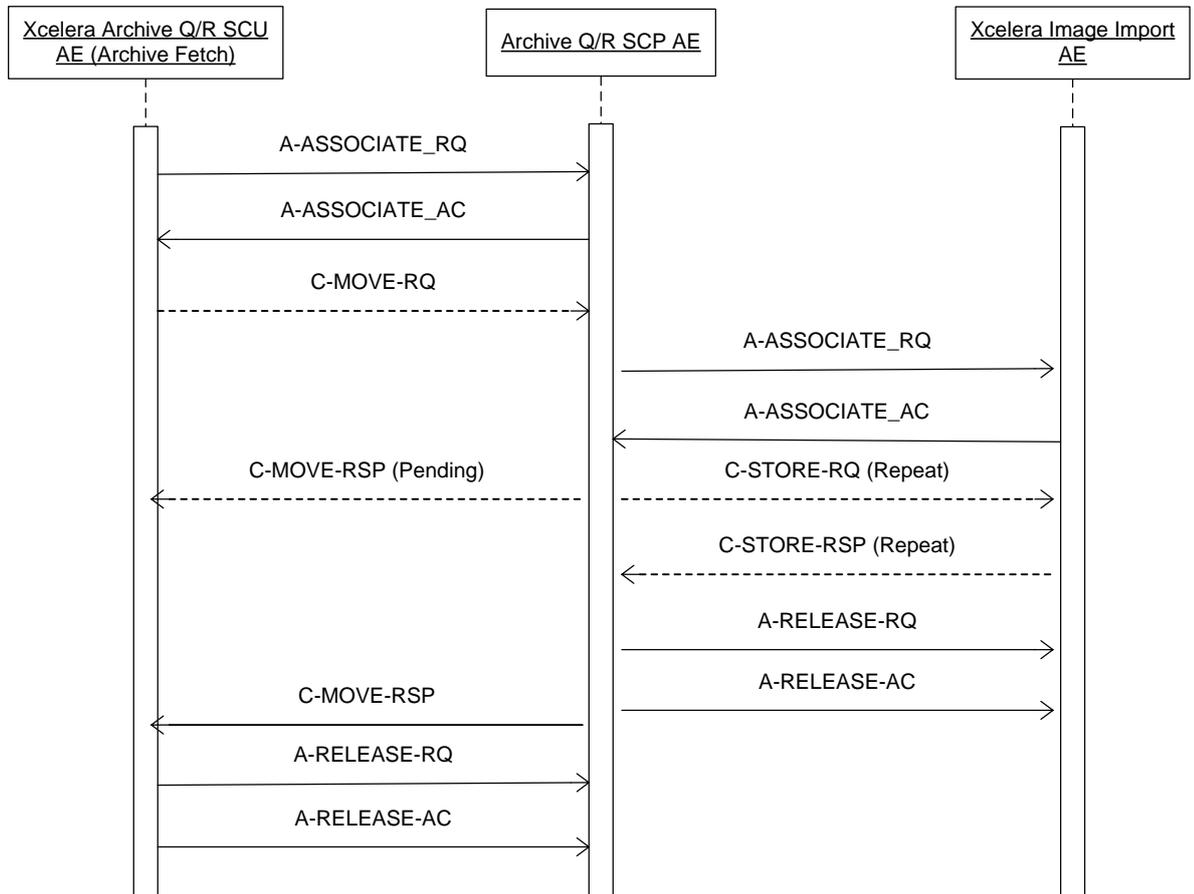
Figure 5: (Real World) Activity - MOVE As SCU (Archve Fetch)

Normal flow of events:

Steps in fetch from DICOM Archive:

1. Sends a DICOM C-MOVE (using Study UID from the database as identifier) request to the DICOM archive for each study to be fetched.
2. In response to the C-MOVE, DICOM Archive performs a C-STORE to Xcelera data Import AE.

4.2.1.3.4.2. Proposed Presentation Contexts

The presentation contexts proposed by Archive QR SCU AE for (Real-World) Activity – C-MOVE are defined in next table.

Table 29: 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		
Study Root Query/Retrieve 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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.1.3.4.3. SOP Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class

Only Study level queries are supported.

The Archive QR SCU AE supports queries based on the combination of the following (Study level) attributes and attribute matching types (as defined in [DICOM] PS 3.4).

Exceptions:

1. If after setting up the connection and sending the move request, if no data is received from the external DICOM node before a (user configurable) time out has passed, the QR SCU AE aborts the connection.
2. If an error occurs on the external DICOM node while setting up the connection, the QR SCU AE will abort all actions related to the connection and report errors.
3. If no agreement between the two parties can be reached concerning communication parameters the connection will be closed and no query communications will take place.
4. If an error occurs on the DICOM Archive server during query communications, the DICOM Archive server will abort the connection.

4.2.1.3.4.3.1. Dataset Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class SCU

All details regarding the C-MOVE response behavior to status codes are provided in next table

Table 30: Identifiers for MOVE SCU

Attribute Name	Tag	VR	Comment
Study Root Information Model			
Query/Retrieve Level	0008,0052	CS	
Q/R Study level (Study Root)			
Study Instance UID	0020,000D	UI	Universal Matching.

Table 31: C-MOVE-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Refused	A701	Out of resources – Unable to calculate number of matches	The Retrieve job is marked as Failed at the queue manager. The association is released. The reason is logged
	A702	Out of resources – Unable to perform sub-operations	The Retrieve job is marked as Failed at the queue manager. The association is released. The reason is logged

Service Status	Code	Further Meaning	Behavior
	A801	Destination unknown	The Retrieve job is marked as Failed at the queue manager. The association is released. The reason is logged
Failed	A900	Identifier does not match SOP class	The Retrieve job is marked as Failed at the queue manager. The association is released. The reason is logged
	Cxxx	Unable to process	The Retrieve job is marked as Failed at the queue manager. The association is released. The reason is logged
Warning	B000	Sub-operations complete – One or more failures	The Retrieve job is marked as Completed at the queue manager. The association is released. The reason is logged
Cancel	FE00	Sub-operations terminated due to Cancel indication	The Retrieve job is marked as Failed at the queue manager. The association is released. The reason is logged
Pending	FF00	Sub-operations are continuing	The Retrieve job continues.
Success	0000	Sub-operations complete – No failures	The Retrieve job is marked as Completed at the queue manager. The association is released.

Table 32: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	N/A
Association Aborted	The job fails. The reason is logged and reported to the user.

4.2.1.4. Association Acceptance Policy

The Archive AE is using the Image Import AE for SCP functionality.

4.2.2. Auto Export AE

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

4.2.2.1. SOP Classes

For supported SOP Classes by Auto Export AE, refer to Table 5 and Table 6

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

4.2.2.2. Association Policies

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

4.2.2.2.1. General

The DICOM standard application context has specified.

Table 33: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2. Number of Associations

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

Table 34: Number of Associations as an Association Initiator for Auto Export AE

Maximum number of simultaneous associations	Limited by system resource.

4.2.2.2.3. Implementation Identifying Information

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

Table 35: DICOM Implementation Class UID and Version for Auto Export AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.2.2.4. Communication Failure Handling

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

Table 36: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association closed and the reason is logged.

4.2.2.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 37: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 38: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 39: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notify the Remote AE, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	Notify the Remote AE, terminates the connection and logs the event.
	1 – unrecognized-PDU	Notify the Remote AE, terminates the connection and logs the event.
	2 – unexpected-PDU	Notify the Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notify the Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notify the Remote AE, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	Notify the Remote AE, terminates the connection and logs the event.

4.2.2.3.1. (Real-World) Activity – Image Export

4.2.2.3.1.1. Description and Sequencing of Activities
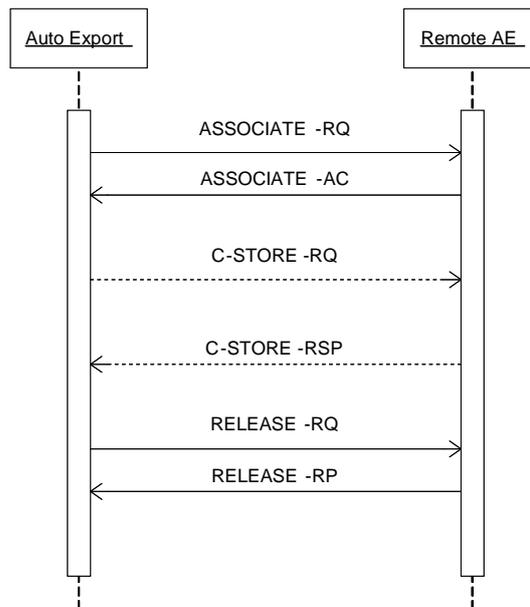
Figure 6: (Real World) Activity - Data Export

Normal flow of events:

1. Xcelera sets up a connection with the target DICOM node and negotiates communications parameters. If the two parties cannot agree on transfer using the data format stored on the server, Xcelera will negotiate an alternative DICOM transfer syntax and create a converted copy of the study data to be transferred.
2. Then Xcelera transfers data (complete study or SC only) to the target DICOM node Depending on configuration setting, Xcelera auto forwards studies

completely, or only new deltas such as photo files or new images coming from an acquisition system.
3. Upon completion of this transfer, the connection is closed. Connection set up and connection release, and data transfer takes place according to the DICOM Store protocol defined as part of the DICOM 3.0 standard

4.2.2.3.1.2. Proposed Presentation Contexts

For the proposed presentation contexts refer to Tables 18 and 19

4.2.2.3.1.3. SOP Specific Conformance for Storage SOP Classes

The behavior on successful and unsuccessful transfer of images is given in the table below.

Table 40: Auto Export AE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	
Warning	Coercion of data elements	B000	Log; Continue
	Elements discarded	B006	Log; Continue
	Data set does not match SOP class	B007	Log; Continue
Error	Error – Processing failure	0110	Log; Release association; Release application; Retry to send the images
	Error – Data set does not match SOP class	A900	Log; Release association; Release application; Retry to send the images.
	Error – Cannot understand	C000	Log; Release association; Release application; Retry to send the images.
Refused	Refused – Out of resources	A700	Log; Release association; Release application; Retry to send the images.

Exceptions:

1. If, after setting up the connection, no data can be sent to the external node for 60 seconds, Xcelera aborts the connection.
2. If an error occurs on Xcelera while setting up the connection, Xcelera aborts the connection.
3. If an error occurs on the target node while setting up the connection. If the retries are unsuccessful, the system will mark the data for later.
4. If an error occurs on Xcelera during image conversion or image transfer, Xcelera will abort the auto forward. A final error will be reported.
5. If an error occurs on the target node during data transfer, results the connection to be aborted Xcelera will report this error.
6. An error or warning concerning data transfer is received from the target node during data transfer. If it is related to the data being send, Xcelera tries to correct the cause of the error (e.g. by redoing the conversion). All information available on the error or warning will be reported.
7. Only the DICOM instances of the services where both parties agreed upon are forwarded, this will be reported.

During DICOM based auto-forward, transfer negotiations may indicate that the original format of the data is not accepted by the target node. In such cases, the DICOM ARCHIVVE server will try to apply one of the transfer syntax conversions indicated by '+', in order to get to transfer syntax that is supported by the external system.

Table 41: Transfer Syntax Conversion

Source Syntax	Destination Syntax		
	ILE	**ELE**	**EBE**
ILE	-	+	+
ELE	+	-	+
EBE	+	+	-
JPEG Baseline	-	-	-
JPEG Lossless FOP Non-Hierarchical 14	+	+	+
RLE	+	+	+

Table 42: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is closed and the reason is logged
Association aborted	The association is closed and the reason is logged

4.2.3. Query Retrieve as SCP AE

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

4.2.3.1. SOP Classes

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

Table 43: SOP Classes for Query Retrieve as SCP AE – Standard SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Yes	No
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.1.9.1.2	Yes	No
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Yes	No
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	Yes	No
Patient Root Query/Retrieve Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Patient Root Query/Retrieve Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Patient/Study Only Query/Retrieve Info. Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.3.1	No	Yes
Patient/Study Only Query/Retrieve Info. Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.3.2	No	Yes
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Yes	No
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	No
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Study Root Query/Retrieve Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Study Root Query/Retrieve Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	No	Yes
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	Yes	No
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
Ultrasound Multi-frame Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	Yes	No
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
Verification SOP Class	1.2.840.10008.1.1	No	Yes
X-Ray Angiographic Bi-Plane Image Storage SOP Class (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Yes	No
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	Yes	No

Table 44: SOP Classes for Query Retrieve as SCP AE – Private SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
3D Object new Storage (Private)	1.3.46.670589.5.0.2.1	Yes	No
3D Subpage Store - Private SOP	1.3.46.670589.2.5.1.1	Yes	No
3D Volume Storage new SOP Class (Private)	1.3.46.670589.5.0.1.1	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Cardio Image Storage new SOP Class (Private)	1.3.46.670589.5.0.8.1	Yes	No
CT Synthetic Image Storage (Private)	1.3.46.670589.5.0.9	Yes	No
CX Synthetic Image Storage (Private)	1.3.46.670589.5.0.12	Yes	No
MR Cardio Analysis new Storage (Private)	1.3.46.670589.5.0.11.1	Yes	No
MR Synthetic Image Storage (Private)	1.3.46.670589.5.0.10	Yes	No
Perfusion (Private)	1.3.46.670589.5.0.13	Yes	No
Perfusion Image Storage (Private)	1.3.46.670589.5.0.14	Yes	No
Specialized PMS X-Ray Image Store	1.3.46.670589.2.3.1.1	Yes	No
Surface Storage new (Private)	1.3.46.670589.5.0.3.1	Yes	No
XA reconstructed X-ray SOP Class (private)	1.3.46.670589.2.4.1.1	Yes	No

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

4.2.3.2. Association Policies

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

4.2.3.2.1. General

The DICOM standard application context has specified.

Table 45: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.3.2.2. Number of Associations

The number of associations that Query Retrieve SCP AE can handle is up to 10. For the verification service at least one association can be handled simultaneously. The Query Retrieve SCP AE will only accept DICOM associations from other DICOM nodes whose AE titles are listed in the Xcelera configuration files. The storage part of the Query Retrieve SCP function can handle maximum of 5 associations simultaneously.

Table 46: Number of Associations as an Association Initiator for Query Retrieve as SCP AE (C-STORE)

Maximum number of simultaneous associations	5

Table 47: Number of Associations as an Association Acceptor for Query Retrieve as SCP AE (C-FIND)

Maximum number of simultaneous associations	5

Table 48: Number of Associations as an Association Acceptor for Query Retrieve as SCP AE (C-MOVE)

Maximum number of simultaneous associations	5

Table 49: Number of Associations as an Association Acceptor for Query Retrieve as SCP AE (C-ECHO)

Maximum number of simultaneous associations	1

4.2.3.2.3.   Implementation Identifying Information

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

Table 50: DICOM Implementation Class UID and Version for Query Retrieve as SCP AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.3.2.4.   Communication Failure Handling

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

Table 51: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association is released and the reason is logged.

4.2.3.3. Overview of Query Retrieve SCP AE
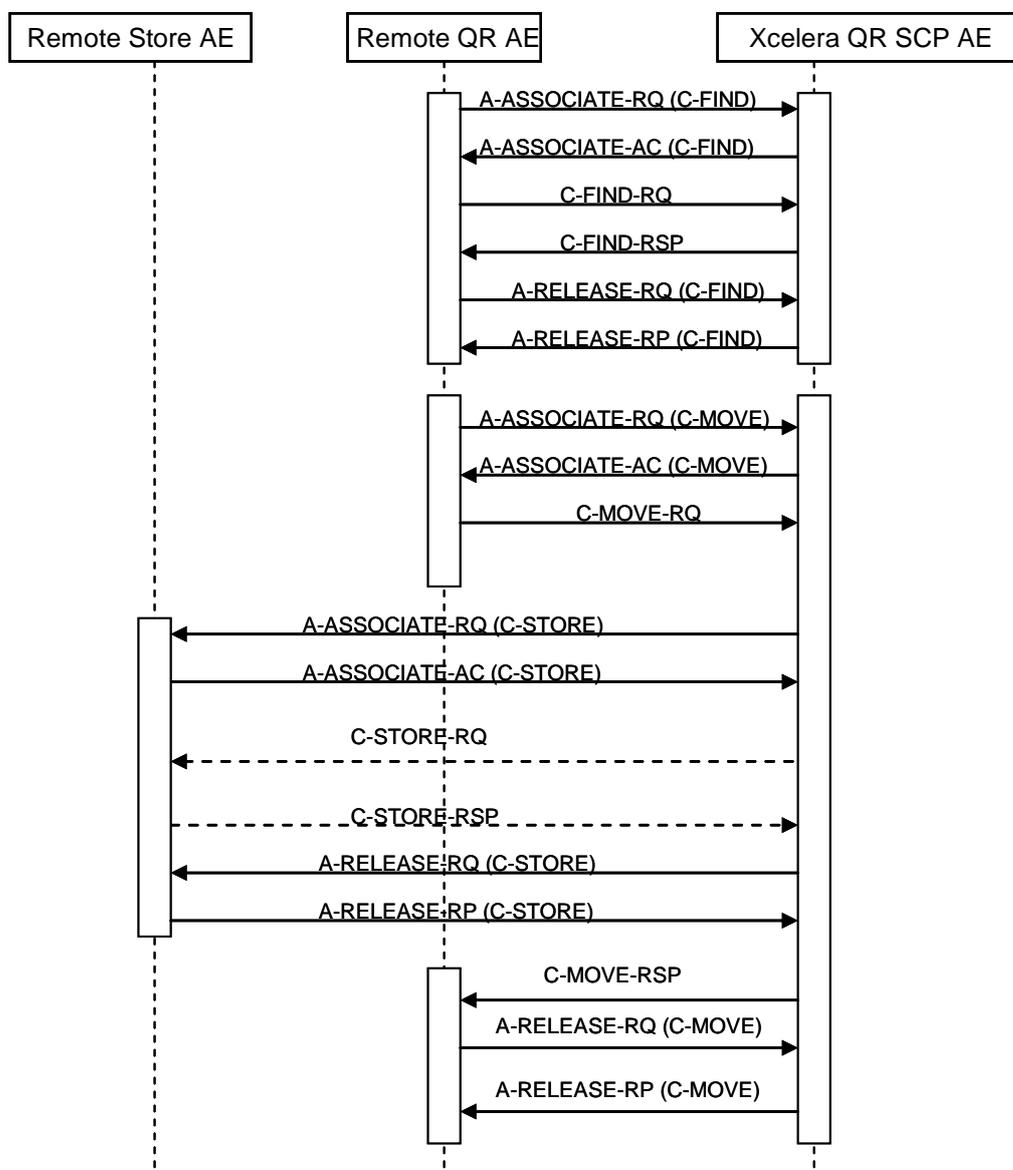
Figure 7: (Real World) Activity - Image Export

Normal Flow of events:

1. Xcelera accepts the set up request of the remote node. Once the connection has been set up Xcelera receives the query request. In response Xcelera will send (0 of more) queues in the result. The connection will be closed.
2. A new connection will be set up for the retrieve request. If request was successful an association with the store remote node will be set up.
3. The requested data will be send to the store remote node
4. Connection with the store remote node and the request retrieve node will be closed.
5. Patient Study data will be updated with the latest information. (Refer tables 20 and 21 for the list of updated patient and study attributes)

4.2.3.4. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 52: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 53: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.

| Source	Reason/Diagnosis	Behavior
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 54: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

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

4.2.3.4.1.1. Description and Sequencing of Activities

The Query/Retrieve as SCP AE accepts associations from systems that wish to verify application level communication using the C-ECHO command.

4.2.3.4.1.2. Accepted Presentation Contexts

The accepted presentation contexts are shown the next table.

Table 55: 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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.3.4.1.3. SOP Specific Conformance for Verification SOP Class

The Query/Retrieve as SCP AE provides standard conformance. to Verification SOP Class

The Query/Retrieve as SCP (C-ECHO) accepts all contexts in the intersection of the proposed and acceptable Presentation Context. This means that the Query/Retrieve as SCP AE will accept multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes, so there will be no checks for duplicate Presentation Contexts.

4.2.3.4.1.3.1.   Dataset Specific Conformance for Verification C-ECHO SCP

The command communication behavior is shown in next table.

Table 56: C-ECHO-RSP Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Confirmation	Message in log file.

4.2.3.4.2.   (Real-World) Activity – FIND as SCP

Xcelera allows the clinical user to query and retrieve data from other systems in the DICOM network. In communications with other nodes, Xcelera operates as a DICOM Query/Retrieve SCP and DICOM Store SCU, which are compatible with DICOM Query/Retrieve SCU and Store SCP provided by other products.

4.2.3.4.2.1. Description and Sequencing of Activities

Query/Retrieve as SCP AE accepts associations from systems that wish to query Xcelera database using the C-FIND command.

4.2.3.4.2.2. Accepted Presentation Contexts

The Query/Retrieve as SCP AE will accept the presentation contexts as given in the next table.

Table 57: Acceptable Presentation Contexts for (Real-World) Activity – FIND As SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Patient/Study Only Query/Retrieve Info. Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.3.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None

4.2.3.4.2.3. SOP Specific Conformance for Patient Root Query/Retrieve Information Model - FIND SOP Class

The Query/Retrieve as SCP provides standard conformance.

The Query/Retrieve as SCP accepts all contexts in the intersection of the proposed and acceptable Presentation Context. This means that the Query/Retrieve as SCP will accept multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes, so there will be no checks for duplicate Presentation Contexts.

If the C-FIND query is such that more than 1000 matches are found the Query/Retrieve SCP will return an error "out of resources" indicating there are more matches than the system can handle.

If a wildcards are used in a C-FIND, all matching records and all null records are returned by Xcelera.

4.2.3.4.2.3.1.   Dataset Specific Conformance for Patient Root Q/R Information Model - FIND SOP Class SCP

The behavior of an Application Entity is summarized as shown in next table. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

Table 58: Supported Query Keys for Patient Root Q/R Information Model

Attribute Name	Tag	VR	Type Of Matching	Comment
Query/Retrieve Level	0008,0052	CS		Patient, Study, Series
Specific Character Set	0008,0005	CS		
Q/R Image level				
SOP Instance UID	0008,0018	UI	Single Value, Universal, List Of UID	
Instance Number	0020,0013	IS		
Q/R Patient level				
Patient ID	0010,0020	LO	Single Value, Universal, Wildcard	
Patient's Name	0010,0010	PN	Single Value, Universal, Wildcard	Wildcard matching not case sensitive
Patient's Birth Date	0010,0030	DA	Single Value, Range, Universal	Optional Attribute
Patient's Sex	0010,0040	CS	Single Value, Universal	Optional Attribute
Q/R Series level				
Series Instance UID	0020,000E	UI		
Modality	0008,0060	CS	Single Value, Universal	
Series Number	0020,0011	IS	Single Value, Universal, List Of UID	
Q/R Study level (Patient Root)				
Study Instance UID	0020,000D	UI	Single Value, Universal ,List Of UID	
Study Date	0008,0020	DA	Single Value, Range, Universal	
Study Time	0008,0030	TM	Single Value, Universal	
Accession Number	0008,0050	SH	Single Value, Universal	
Study ID	0020,0010	SH	Single Value, Universal, Wildcard	
Referring Physician's Name	0008,0090	PN	Single Value, Universal	Optional Attribute

Attribute Name	Tag	VR	Type Of Matching	Comment
Performing Physician's Name	0008,1050	PN		
Body Part Examined	0018,0015	CS	Single Value, Universal	Optional Attribute
Protocol Name	0018,1030	LO	Single Value, Universal	Optional Attribute

Table 59: Query/Retrieve as SCP C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	No final identifier is supplied
Failed	Invalid dataset	A900	Related fields (0000,0901) (0000,0902)
Pending	Current match is supplied	FF00	Matches are continuing; Current match is supplied and any Optional Keys were supported in the same manner as Required Keys. (Related fields: identifier)
	Warning	FF01	Matches are continuing; Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier (Related fields: identifier).
Refused	Out of resources	A700	Related fields (0000,0902)

If a query returns more than 1000 results, the system sends an "out of resources" messages back to the client instead or returning query results.

Table 60: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged
Association aborted	The association is released and the reason is logged.

4.2.3.4.2.4. SOP Specific Conformance for Patient/Study Only Query/Retrieve Info. Model - FIND SOP Class

The Xcelera Query/Retrieve SCP AE provides standard conformance to the Patient/ Study only Q/R Information model

4.2.3.4.2.4.1. Dataset Specific Conformance for Patient/Study Only Q/R Information Model - FIND SOP Class SCP

The supported Query keys and the DICOM command communication behavior are shown in the following tables.

Table 61: Supported Query Keys for Patient/Study only Q/R Information Model

Attribute Name	Tag	VR	Type Of Matching	Comment
Query/Retrieve Level	0008,0052	CS		Patient, Study
Specific Character Set	0008,0005	CS		
Q/R Patient level				
Patient ID	0010,0020	LO	Single Value, Universal, Wildcard	
Patient's Name	0010,0010	PN	Single Value, Universal, Wildcard	Wildcard matching not case sensitive
Patient's Birth Date	0010,0030	DA	Single Value, Range, Universal	
Patient's Sex	0010,0040	CS	Single Value, Universal	
Q/R Study level (Patient Root)				
Study Instance UID	0020,000D	UI	Single Value, Universal, List Of UID	
Study Date	0008,0020	DA	Single Value, Range, Universal	
Study Time	0008,0030	TM	Single Value, Universal	
Accession Number	0008,0050	SH	Single Value, Universal	

Attribute Name	Tag	VR	Type Of Matching	Comment
Study ID	0020,0010	SH	Single Value, Universal, Wildcard	
Referring Physician's Name	0008,0090	PN	Single Value ,Universal	
Performing Physician's Name	0008,1050	PN		
Body Part Examined	0018,0015	CS	Single Value, Universal	
Protocol Name	0018,1030	LO	Single Value, Universal	

Table 62: C-FIND-RSP Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Matching is complete	The C-FIND request handling is completed, no more C-FIND responses are sent.
Refused	A700	Out of Resources	N/A
Failed	A900	Identifier does not match SOP class	N/A
	C000	Unable to process	The C-FIND request cannot be parsed. ViewForum R6.3 logs the reason.
Cancel	FE00	Matching terminated due to Cancel Request	The C-FIND request is canceled, no more C-FIND responses are sent.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The C-FIND responses are continuing.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The C-FIND responses are continuing.

Table 63: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The query fails in case of association setup. The reason is logged.
Reply Time-out	The query fails and association is aborted The reason is logged

4.2.3.4.2.5. SOP Specific Conformance for Study Root Query/Retrieve Information Model - FIND SOP Class

The Xcelera Query/Retrieve SCP AE provides standard conformance to the Study Root Q/R Information model

4.2.3.4.2.5.1. Dataset Specific Conformance for Study Root Q/R Information Model - FIND SOP Class SCP

The supported Query keys and the DICOM command communication behavior are shown in the following tables.

Table 64: Supported Query Keys for Study Root Q/R Information Model

Attribute Name	Tag	VR	Type Of Matching	Comment
Query/Retrieve Level	0008,0052	CS		On Patient, Study and Series level
Specific Character Set	0008,0005	CS		
Q/R Image level				
SOP Instance UID	0008,0018	UI	Single Value, Universal, List Of UID	
Instance Number	0020,0013	IS	Single Value, Universal	
Q/R Series level				
Series Instance UID	0020,000E	UI	Single Value, Universal, List Of UID	
Modality	0008,0060	CS	Single Value, Universal	
Series Number	0020,0011	IS	Single Value, Universal	
Q/R Study level (Study Root)				
Study Instance UID	0020,000D	UI	Single Value, Universal, List Of UID	
Study Date	0008,0020	DA	Single Value, Range, Universal	
Study Time	0008,0030	TM	Single Value, Universal	
Accession Number	0008,0050	SH	Single Value, Universal	
Patient's Name	0010,0010	PN	Single Value, Universal, Wildcard	Wildcard matching not case sensitive
Patient ID	0010,0020	LO	Single Value	
Study ID	0020,0010	SH	Single Value, Universal Wildcard	
Referring Physician's Name	0008,0090	PN	Single Value, Universal	
Patient's Birth Date	0010,0030	DA	Single Value, Universal, Wildcard	
Patient's Sex	0010,0040	CS	Single Value, Universal	
Performing Physician's Name	0008,1050	PN		
Body Part Examined	0018,0015	CS	Single Value, Universal	
Protocol Name	0018,1030	LO	Single Value, Universal	

Table 65: C-FIND-RSP Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Matching is complete	The C-FIND request handling is completed, no more C-FIND responses are sent.
Refused	A700	Out of Resources	N/A
Failed	A900	Identifier does not match SOP class	N/A
	C000	Unable to process	The C-FIND request cannot be parsed. ViewForum R6.3 logs the reason.
Cancel	FE00	Matching terminated due to Cancel Request	The C-FIND request is canceled, no more C-FIND responses are sent.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The C-FIND responses are continuing.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The C-FIND responses are continuing.

Table 66: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The query fails in case of association setup. The reason is logged.
Reply Time-out	The query fails and association is aborted The reason is logged

4.2.3.4.3. (Real-World) Activity – MOVE As SCP

4.2.3.4.3.1. Description and Sequencing of Activities

The Query/Retrieve as SCP AE accepts associations from systems that wish to retrieve images from Xcelera database using the C-MOVE service.
The Query/Retrieve as SCP AE accepts all contexts in the intersection of the proposed and acceptable Presentation Context. This means that the Query/Retrieve as SCP AE will accept multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes, so there will be no checks for duplicate Presentation Contexts

4.2.3.4.3.2. Accepted Presentation Contexts

The Query/Retrieve as SCP AE will accept the presentation contexts as given in the next table.

Table 67: Acceptable Presentation Contexts for (Real-World) Activity – MOVE As SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Patient/Study Only Query/Retrieve Info. Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.3.2	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None

4.2.3.4.3.3. SOP Specific Conformance for Patient Root Query/Retrieve Information Model - MOVE SOP Class

The Xcelera Query/Retrieve as SCP AE provides standard conformance to Patient Root Q/R Information Model – MOVE SOP Class.

The Query/Retrieve as SCP AE supports all Query/Retrieve SOP classes. A C-STORE association is built after the C-MOVE request. The Query/Retrieve as SCP AE does not send intermediate C-MOVE responses with status pending.

4.2.3.4.3.3.1. Dataset Specific Conformance for Patient Root Q/R Information Model - MOVE SOP Class SCP

The behavior of successful and unsuccessful Query/Retrieve as SCP AE is given in the table below.

Table 68: Identifiers for MOVE SCP

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

Table 69: Query/Retrieve as SCP C-MOVE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Sub-operations complete	0000	No final identifier is supplied Related fields (0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations complete	B000	One or more failures Related fields (0000,1020) (0000,1022) (0000,1023)
Failed	Invalid dataset	A900	Related fields (0000,0901) (0000,0902)
	Unable to process	C001	Related fields (0000,0901) (0000,0902).
Pending	Sub-operations are continuing	FF00	The move job continues

Table 70: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The query fails in case of association setup. The reason is logged.
Reply Time-out	The query fails and association is aborted The reason is logged

4.2.3.4.3.4. SOP Specific Conformance for Patient/Study Only Query/Retrieve Info. Model - MOVE SOP Class

The Xcelera Query/Retrieve as SCP AE provides standard conformance to Patient/Study Only Q/R Information Model – MOVE SOP Class.

4.2.3.4.3.4.1. Dataset Specific Conformance for Patient/Study Only Q/R Information Model - MOVE SOP Class SCP

The behavior of successful and unsuccessful Query/Retrieve as SCP AE is given in the table below.

Table 71: Identifiers for MOVE SCP

Attribute Name	Tag	VR	Comment
Patient/Study Only Information Model			
Query/Retrieve Level	0008,0052	CS	
Q/R Patient level			
Patient ID	0010,0020	LO	
Q/R Study level (Patient Root)			
Study Instance UID	0020,000D	UI	

Table 72: C-MOVE-RSP Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Sub-operations complete	0000	No final identifier is supplied Related fields (0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations complete	B000	One or more failures Related fields (0000,1020) (0000,1022) (0000,1023)
Failed	Invalid dataset	A900	Related fields (0000,0901) (0000,0902)
	Unable to process	C001	Related fields (0000,0901) (0000,0902).

Table 73: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The query fails in case of association setup. The reason is logged.
Reply Time-out	The query fails and association is aborted The reason is logged

4.2.3.4.3.5. SOP Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class

The Xcelera Query/Retrieve as SCP AE provides standard conformance to Study Root Q/R Information Model – MOVE SOP Class.

4.2.3.4.3.5.1. Dataset Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class SCP

The behavior of successful and unsuccessful Query/Retrieve as SCP AE is given in the table below.

Table 74: Identifiers for MOVE SCP

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

Attribute Name	Tag	VR	Comment
Q/R Study level (Study Root)			
Study Instance UID	0020,000D	UI	

Table 75: C-MOVE-RSP Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Sub-operations complete	0000	No final identifier is supplied Related fields (0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations complete	B000	One or more failures Related fields (0000,1020) (0000,1022) (0000,1023)
Failed	Invalid dataset	A900	Related fields (0000,0901) (0000,0902)
	Unable to process	C001	Related fields (0000,0901) (0000,0902).

Table 76: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The query fails in case of association setup. The reason is logged.
Reply Time-out	The query fails and association is aborted The reason is logged

4.2.3.4.4.   (Real-World) Activity – Store_SCU

4.2.3.4.4.1. Description and Sequencing of Activities

After the C-MOVE request the Query/Retrieve as SCP (C-STORE) will only export the requested images.

4.2.3.4.4.2. Proposed Presentation Contexts

For the proposed presentation contexts refer to Tables 18 and 19

4.2.3.4.4.3. SOP Specific Conformance for Storage SOP Classes

Not mentioned SOP classes are also supported, but only with the stored transfer syntax. This implies that not mentioned SOP classes are handled in such manner that what comes in will be sent out.

- The DICOM Store SCU sends the same attribute values that were received
- The DICOM Store SCU updates the patient study with the latest information.
- The DICOM Store SCU supports all transfer syntaxes that are supported by DICOM import.
- The DICOM Store SCU supports conversion of transfer syntax (must be prepared to do a conversion from the transfer syntax in which the data is stored to the transfer syntax which is negotiated with the remote DICOM Store SOP Specific Conformance for SOP Classes
- Only the DICOM instances of services where both parties agreed upon are stored, this will be reported

The behavior on successful and unsuccessful transfer of images is given in the table below.

Service Status	Error Code	Further Meaning	Behavior
Success	0000		
Warning	B000		Log; Continue.
	B006		Log; Continue.
	B007		Log; Continue.
Error	0110		Log; Continue
	A900		Log; Continue.
	C000		Log; Continue.
Refused	A700		Log; Continue.

Table 77: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association released and the reason is logged
Association aborted	The association released and the reason is logged

Exceptions:

1. If, after setting up the connection, no data can be sent to the external DICOM node for 2 minutes, Xcelera will retry once and then it will abort the connection and reports error
2. If an error occurs on Xcelera while setting up the connection, Xcelera will abort the connection and reports an error
3. If an error occurs on the external DICOM node while setting up the connection, Xcelera will abort all actions related to that connection and reports an error.
4. If no agreement between the two parties can be reached concerning communication parameters the connection will be closed and no data transfer will take place. Xcelera reports an error.
5. When a network error occurs during connection set up or during data transfer, Xcelera will abort all actions related to the connection and reports and error.

4.2.3.5. **Association Acceptance Policy**

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 78: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 79: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 80: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

4.2.4. Query Retrieve as SCU AE

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

4.2.4.1. SOP Classes

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

Table 81: SOP Classes for Query Retrieve as SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

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

4.2.4.2. Association Policies

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

4.2.4.2.1. General

The DICOM standard application context has specified.

Table 82: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.4.2.2. Number of Associations

The number of associations for the Query Retrieve SCU service that may be simultaneously active is 5

Table 83: Number of Associations as an Association Initiator for Query Retrieve as SCU AE

Maximum number of simultaneous associations	5

4.2.4.2.3. Implementation Identifying Information

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

Table 84: DICOM Implementation Class UID and Version for Query Retrieve as SCU AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.4.2.4. *Communication Failure Handling*

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

Table 85: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association is released and the reason is logged

4.2.4.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 86: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 87: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.

Source	Reason/Diagnosis	Behavior
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 88: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

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

4.2.4.3.1.1. Description and Sequencing of Activities

The Query/Retrieve as SCU AE initiates associations to other systems that support the Study Root Query/Retrieve C-FIND service.
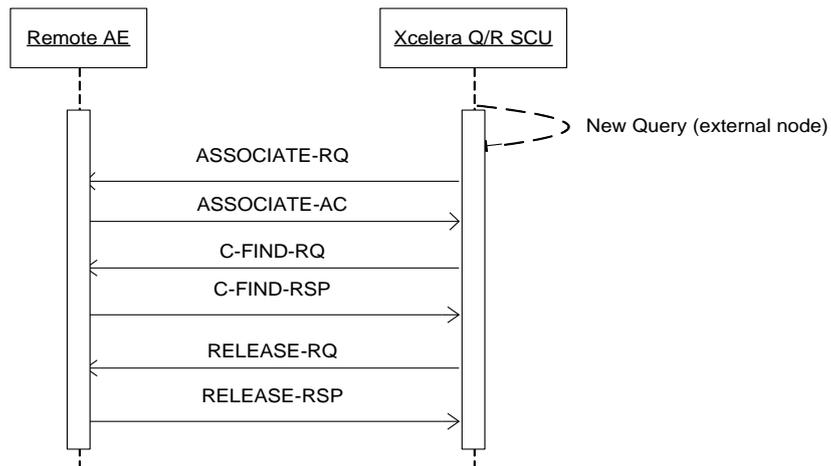
Figure 8: (Real World) Activity - FIND As SCU

Normal flow of events for C-FIND

1. Xcelera sets up a connection with the selected external DICOM node.
2. Once the connection has been set up and all communication parameters have been negotiated, Xcelera sends out the query information to the external DICOM node.
3. In response, the external DICOM node returns (0 or more) query results in the form of a list of studies that meet the search criteria entered earlier by the clinical user.
4. The connection will be closed by Xcelera.

Normal flow of events for C-MOVE

1. Xcelera sets up a request connection with the external DICOM node that provided the query results, and negotiates communication parameters.
2. Xcelera sends a retrieve request to the external DICOM node. The external DICOM node sets up a store connection with the Store SCP. Connection set up take place and is only accepted by the Store SCP, if the Query/Retrieve SCU has an open retrieve connection with the external DICOM node. Meanwhile it is possible to send C-MOVE-RSP PENDING to the Xcelera server.
3. The external DICOM node sends over the requested DICOM image data.
4. The connection will be closed by Xcelera.
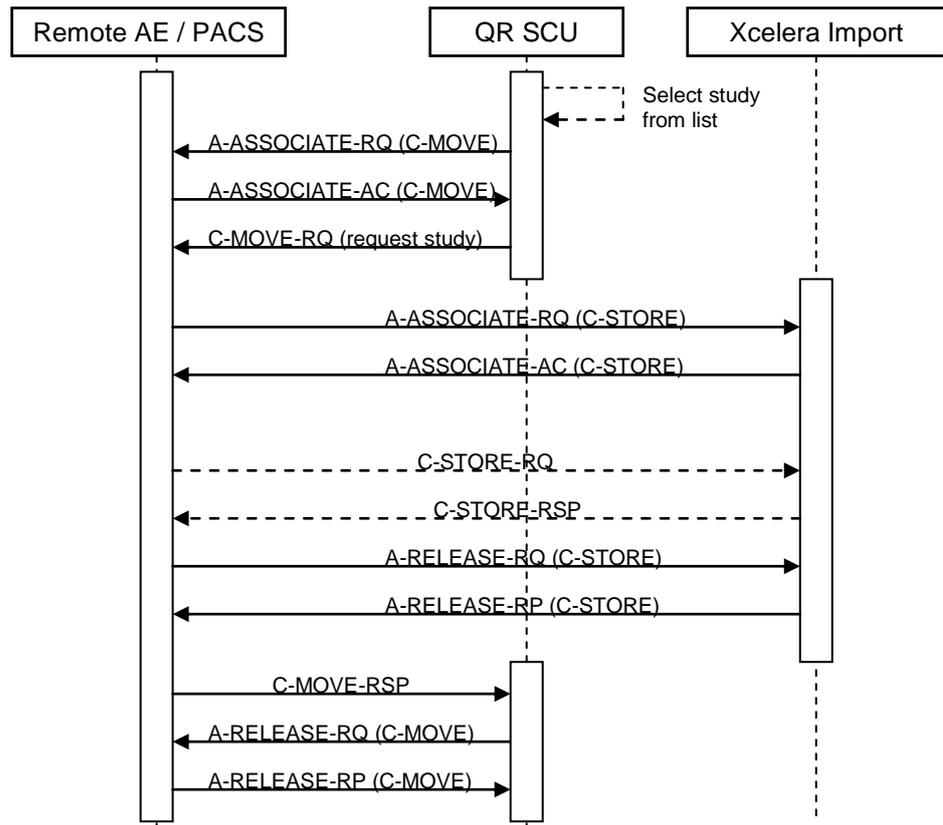
Figure 9: Flow diagram Retrieve DICOM image data from external DICOM node.

4.2.4.3.1.2. Proposed Presentation Contexts

The proposed presentation contexts are shown in next table.

Table 89: 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**		
Study Root Query/Retrieve 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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.4.3.1.3. SOP Specific Conformance for Study Root Query/Retrieve Information Model - FIND SOP Class

Only Study level queries are supported.

The Query/Retrieve as SCU AE supports queries based on the combination of the following (Study level) attributes and attribute matching types (as defined in [DICOM] PS 3.4).

4.2.4.3.1.3.1. Dataset Specific Conformance for Study Root Q/R Information Model - FIND SOP Class SCU

The Requested Query Keys and command communication behavior are shown in the following tables.

Table 90: Requested Query Keys for Study Root Q/R Information Model

Attribute Name	Tag	VR	Type Of Matching	Comment
Query/Retrieve Level	0008,0052	CS		
Specific Character Set	0008,0005	CS		
Q/R Study level (Study Root)				
Study Instance UID	0020,000D	UI	Universal Matching.	
Study Date	0008,0020	DA	Universal Matching. Range Matching	
Accession Number	0008,0050	SH	Universal Matching Wild Card Matching Single Value Matching	
Patient's Name	0010,0010	PN	Universal Matching Wild Card Matching (refer .Note).	
Patient ID	0010,0020	LO	Universal Matching Wild Card Matching Single Value Matching	
Modalities in Study	0008,0061	CS	Universal Matching	
Patient's Birth Date	0010,0030	DA	Universal Matching Single Value Matching	
Patient's Sex	0010,0040	CS	Universal Matching Single Value Matching	
Q/R Series level				
Study Instance UID	0020,000D	UI	Single value	
Series Instance UID	0020,000E	UI	Universal	
Series Number	0020,0011	IS		
Number of Series Related Instances	0020,1209	IS		
Q/R Image level				
Study Instance UID	0020,000D	UI	Single value	
Series Instance UID	0020,000E	UI	Single value	
SOP Instance UID	0008,0018	UI		
Instance Number	0020,0013	IS		

Note The Patient's Name key attribute matching type is implicitly converted from Single Value matching to Wild Card matching by adding a Wild Card "" character at the end of its value.*

Table 91: C-FIND-RQ Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	
Refused	Refused – Out of resources	A700	Log; Release association.
Failed	Error – Identifier does not match SOP class	A900	Log; Release association.
	Error – Unable to process	C001	Log; Release association.
Cancel	Matching terminated due to cancel request	FE00	Log; Release association.

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

Table 92: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged
Association aborted	The association is released and the reason is logged

4.2.4.3.2.   (Real-World) Activity – MOVE As SCU

4.2.4.3.2.1. Description and Sequencing of Activities

The Query/Retrieve as SCU AE initiates associations to other systems that support the Study Root Query/Retrieve C-MOVE service.

4.2.4.3.2.2. Proposed Presentation Contexts

The proposed presentation contexts are shown in next table.

Table 93: 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		
Study Root Query/Retrieve 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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.4.3.2.3. SOP Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class

Only Study level queries are supported.
The Query/Retrieve as SCU AE supports queries based on the combination of the following (Study level) attributes and attribute matching types (as defined in [DICOM] PS 3.4).

4.2.4.3.2.3.1. Dataset Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class SCU

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in next table

Table 94: Identifiers for MOVE SCU

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

Service Status	Further Meaning	Error Code	Behavior
Success	Sub-operations complete – no failures	0000	
Refused	Refused – Out of resources	A700	Log; Release association.
Failed	Error – Identifier does not match SOP class	A900	Log; Release association.
	Error – Unable to process	C001	Log; Release association.
Warning	Sub-operations complete – one or more failures	B000	The SCP has retrieved all requested images. Release association
Cancel	Sub-operations terminated due to cancel request	FE00	Log; Release association.
Pending	Sub-operations are continuing	FF00	Continue
		FF01	Continue

Exceptions:

1. The maximum number of parallel query/retrieve is reached. The request is queued by FIFO order.
2. At any point in time, an error occurs in the network or on the external DICOM node, Xcelera will close the connection and report an error
3. If an error occurs during data transfer, Xcelera will close the connection and report an error
4. If an error occurs on de external DICOM node while setting up the connection, Xcelera will abort all actions related to that connection and report an error.

Table 95: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged
Association aborted	The association is released and the reason is logged

4.2.4.4. Association acceptance policy

The Query/Retrieve SCU AE doesn't accept any associations from other DICOM node

4.2.5. Send AE

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

4.2.5.1. SOP Classes

For the supported SOP Classes refer to the tables 5 and 6

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

4.2.5.2. Association Policies

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

4.2.5.2.1. General

The DICOM standard application context has specified.

Table 96: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.5.2.2. Number of Associations

For Xcelera the maximum number of associations limited by the availability of the system resources. The license number of the external DICOM nodes is one of these limits.

Table 97: Number of Associations as an Association Initiator for Send AE

Maximum number of simultaneous associations	5

4.2.5.2.3. Implementation Identifying Information

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

Table 98: DICOM Implementation Class UID and Version for Send AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.5.2.4. Communication Failure Handling

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

Table 99: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association is closed and the reason is logged

4.2.5.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 100: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 101: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 102: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

4.2.5.3.1. (Real-World) Activity – Image Export

4.2.5.3.1.1. Description and Sequencing of Activities
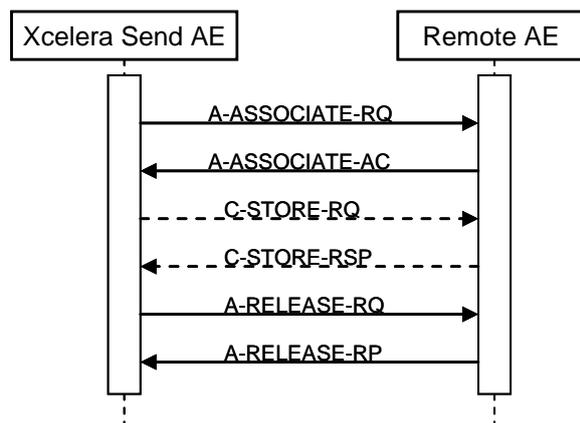
Figure 10: (Real World) Activity - Image Export

Normal flow of events:

1. The user selects one or more studies from the list of studies being displayed.
2. After selection of the external DICOM node, Xcelera sets up a store connection and negotiates communications parameters with this external DICOM node. Connection set up is executed according to the DICOM Store protocols, with Xcelera acting as a DICOM Store SCU.
3. After this connection is set up, Xcelera sends the user selected study to the external DICOM node. Upon completion of this, the connection is closed. Start and end of the connection and data transfer are logged.
4. Patient Study data will be updated with the latest information. (Refer tables 20 and 21 for the list of updated patient and study attributes)

4.2.5.3.1.2. Proposed Presentation Contexts

For the proposed presentation contexts refer to table 18 and 19

4.2.5.3.1.3. SOP Specific Conformance for Storage SOP Classes

The Send Image AE conforms to the SOP classes of the Storage Service Class at level 2 (full). No data elements are discarded or coerced by the Send Image AE.

4.2.5.3.1.4. Data set Specific behaviour for Storage SOP Classes

The behavior on successful and unsuccessful transfer of images is given in the table below.

Table 103: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success		0000	
Warning	Coercion of data elements	B000	Log; Continue
	Elements discarded	B006	Log; Continue
	Data set does not match SOP class	B007	Log; Continue
Error	Error – Processing failure	0110	Log; Continue
	Error – Data set does not match SOP class	A900	Log; Continue
	Error – Cannot understand	C000	Log; Continue
Refused	Data set does not match SOP class	A700	Log; Continue

Exceptions:

1. The clinical user cancels the 'Send' request. If the request is already active, the store connection will be closed and the no more data will be sent. If the request is not active yet, no connection will be initiated and no data will be sent.
2. If, after setting up the connection, no data can be sent to the external DICOM node for 2 minutes, Xcelera will retry once and than it will abort the connection. Xcelera reports an error.
3. If an error occurs on Xcelera while setting up the connection, Xcelera aborts and reports an error
4. If an error occurs on the external DICOM node while setting up the connection, Xcelera will abort all actions related to that connection. Xcelera reports an error
5. If no agreement between the two parties can be reached concerning communication parameters the connection will be closed and no data transfer will take place. Xcelera reports an error.
6. When a network error occurs during connection set up or during data transfer, Xcelera will abort all actions related to the connection and reports an error.
7. If an error occurs on Xcelera during data transfer, Xcelera will notify the external DICOM node of this problem and after that close the connection. Xcelera reports an error.
8. If an error occurs on the external DICOM node during data transfer, this causes the connection to be aborted. Xcelera reports an error.

Note:

1.   If Institution Name is present in private DICOM object data it is taken from there (this only applies for CD import) If not - step 2.
2.   If HIS is present and "resolve institution from HIS configured", then it is taken from HIS. If not - step 3.
3.   If DICOM tag - Issuer of Patient ID (0010, 0021) in the Patient Identification Module - is not empty, Institution Name is taken from there. If not - step 4.

4.   Institution Name is taken from the configuration data - default institution per AE_TITLE defined in the Service Tool (DICOM import page).

Table 104: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is closed and the reason is logged.
Association aborted	The association is closed and the reason is logged.

4.2.5.4. Association Acceptance Policy

The Send AE doesn't accept any associations.

4.2.6. Storage Commitment AE

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

4.2.6.1. SOP Classes

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

Table 105: SOP Classes for Storage Commitment AE

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

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

4.2.6.2. Association Policies

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

4.2.6.2.1. General

The DICOM standard application context has specified.

Table 106: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.6.2.2. Number of Associations

For the verification service only one can be handled at a time.

Table 107: Number of Associations as an Association Initiator for Storage Commitment AE

Maximum number of simultaneous associations	Limit of system resource.

4.2.6.2.3. Asynchronous Nature

If the implementation supports negotiation of multiple outstanding transactions this is stated here, along with the maximum number of outstanding transactions supported.

Table 108: Asynchronous Nature as an Association Initiator for Storage Commitment AE

Maximum number of outstanding asynchronous transactions	Limit of system resource.

4.2.6.2.4. Implementation Identifying Information

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

Table 109: DICOM Implementation Class UID and Version for Storage Commitment AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.6.2.5.   Communication Failure Handling

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

Table 110: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association is closed and the reason is logged.

4.2.6.3.   Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 111: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 112: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.

Source	Reason/Diagnosis	Behavior
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 113: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

4.2.6.4. Association Acceptance Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 114: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 115: DICOM Association Abort Handling

| Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 116: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

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

4.2.6.4.1.1. Description and Sequencing of Activities

The Storage Commitment AE as SCP AE accepts associations from systems that wish to verify application level communication using the C-ECHO command.

4.2.6.4.1.2. Accepted Presentation Contexts

The accepted presentation contexts are shown the next table.

Table 117: 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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.6.4.1.3. SOP Specific Conformance for Verification SOP Class

The Storage Commitment AE provides standard conformance to the verification SOP class

4.2.6.4.1.3.1. Dataset Specific Conformance for Verification C-ECHO SCP

The command communication behavior is shown in next table.

Table 118: C-ECHO-RSP Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Confirmation	Message in log file.

4.2.6.4.2.   (Real-World) Activity – Storage Commitment Push Model AS SCP

4.2.6.4.2.1. Description and Sequencing of Activities

Xcelera will support DICOM Storage commitment as SCP, only for asynchronous workflow. The C-STORE, N-ACTION and N-EVENT-REPORT will be handled in a separate association.
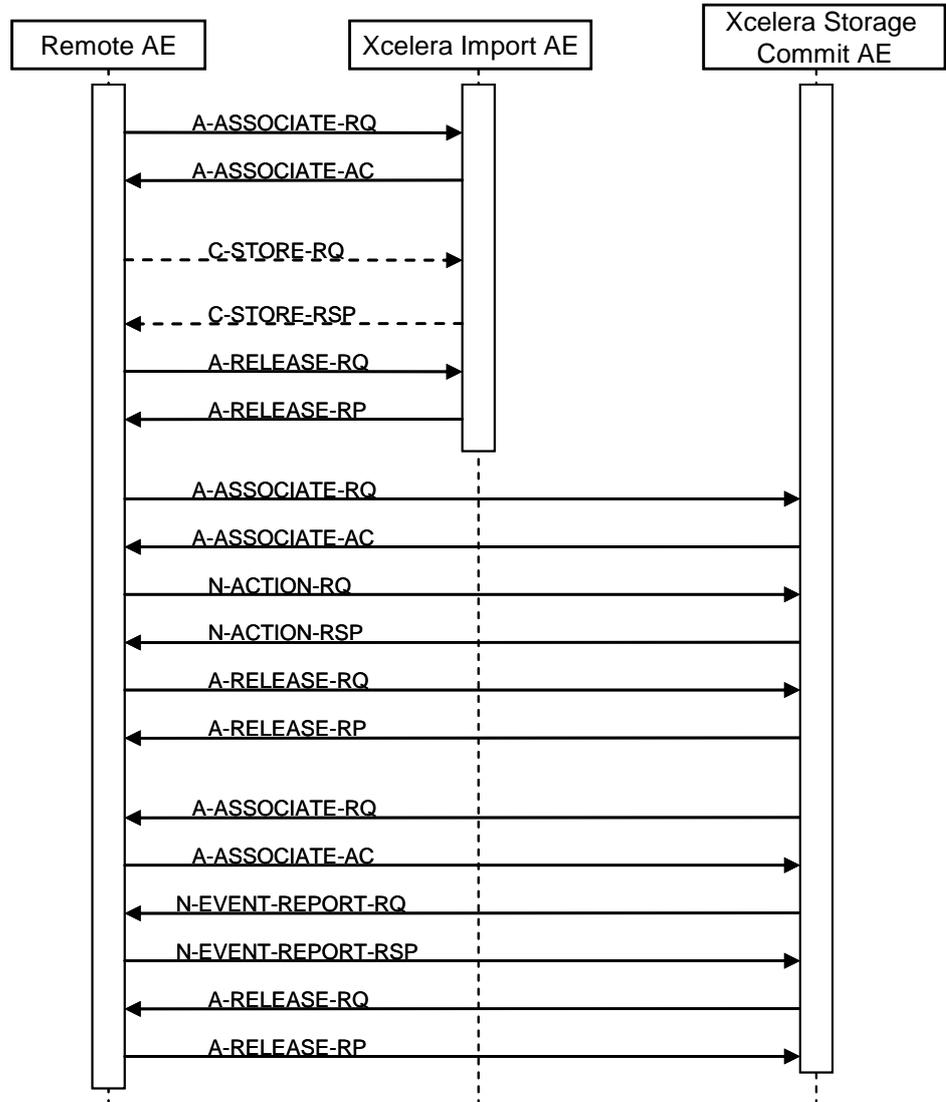
Figure 11: (Real World) Activity - Storage Commitment Push Model as SCP

Normal Flow of Events:

1. The external DICOM node set up storage commit request connection and negotiates communication parameters with the Xcelera server.
2. After the connection is setup, the external DICOM node sends a storage commit request for the data, where the responsibility has to be taken over by the Xcelera server.
3. The Xcelera server responds to the external DICOM node that the request is correctly received.
4. The external DICOM node will close the connection.

When the data is correctly archived (archived and verified)

1. The Xcelera server set up storage commit response connection and negotiates communication parameters with the external DICOM node that made the request.
2. After the connection is setup, the Xcelera server sends the storage commit response, for the request it received, to the external DICOM node.
3. The Xcelera server will close the connection.

4.2.6.4.2.2. Accepted Presentation Contexts

The presentation contexts proposed by Storage Commitment AE for (Real-World) Activity – Storage Commitment AE are defined in next table.

Table 119: Acceptable Presentation Contexts for (Real-World) Activity – Storage Commitment Push Model AS SCP

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 Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None

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

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in next table.

4.2.6.4.2.3.1. Dataset Specific Conformance for Storage Commitment Push Model N-EVENT-REPORT SCP

The Storage Commitment AE accepts all contexts in the intersection of the proposed and acceptable Presentation Context. This means that the Storage Commitment AE will accept multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes, so there will be no checks for duplicate Presentation Contexts.

Table 120: N-EVENT-REPORT-RQ Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	
Error	Processing Failure	0110	Send Notification; Log

Table 121: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is closed and the reason is logged.
Association aborted	The association is closed and the reason is logged.

4.2.6.4.2.3.2. Dataset Specific Conformance for Storage Commitment Push Model N-ACTION SCP

The DICOM command communication behavior for N-ACTION is shown in the following tables.

Table 122: N-ACTION-RSP Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Operation complete	Continues with waiting for storage commitment.
Failure	xxxx	(any failure)	The reason is logged.

Table 123: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The reason is logged.
Reply Time-out	The association is released. Continues with waiting for storage commitment.
Association Time-out SCU	The association is released. Continues with waiting for storage commitment
Association aborted	Continues with waiting for storage commitment.

Exceptions:

1. Not correctly archived within the verify delay + 72 hours, Xcelera responds with a failure.
2. All instances in the request have to be correctly archived, when one of them fails, the response will be reported with failure.
3. If no agreement between the two parties can be reached concerning (DICOM) communication parameters the connection will be closed and no data transfer will take place.
4. Xcelera will close the connection if no data is received within 2 minutes after the setup.
5. If a network error occurs during set up of a connection or during data transfer, this is reported. Xcelera will abort the connection and data transfer will not be completed.
6. If an error occurs on Xcelera during data transfer, Xcelera will notify the external DICOM node of this problem and after that close the connection. Xcelera reports an error.
7. If an error occurs on the external DICOM node during data transfer, this causes the connection to be aborted. Xcelera reports an error.

4.2.7. Xcelera Image Import AE

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

4.2.7.1. SOP Classes

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

Table 124: SOP Classes for Xcelera Image Import AE – Standard SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	No	Yes
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.1.9.1.2	No	Yes
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	No	Yes
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	No	Yes
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	No	Yes
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	No	Yes
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Ultrasound Multi-frame Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	No	Yes
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
Verification SOP Class	1.2.840.10008.1.1	No	Yes
X-Ray Angiographic Bi-Plane Image Storage SOP Class (Retired)	1.2.840.10008.5.1.4.1.1.12.3	No	Yes
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	No	Yes

Table 125: SOP Classes for Xcelera Image Import AE – Private SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
3D Object new Storage (Private)	1.3.46.670589.5.0.2.1	No	Yes
3D Subpage Store - Private SOP	1.3.46.670589.2.5.1.1	No	Yes
3D Volume Storage new SOP Class (Private)	1.3.46.670589.5.0.1.1	No	Yes
Cardio Image Storage new SOP Class (Private)	1.3.46.670589.5.0.8.1	No	Yes
CT Synthetic Image Storage (Private)	1.3.46.670589.5.0.9	No	Yes
CX Synthetic Image Storage (Private)	1.3.46.670589.5.0.12	No	Yes
MR Cardio Analysis new Storage (Private)	1.3.46.670589.5.0.11.1	No	Yes
MR Synthetic Image Storage (Private)	1.3.46.670589.5.0.10	No	Yes
Perfusion (Private)	1.3.46.670589.5.0.13	No	Yes
Perfusion Image Storage (Private)	1.3.46.670589.5.0.14	No	Yes
Specialized PMS X-Ray Image Store	1.3.46.670589.2.3.1.1	No	Yes
Surface Storage new (Private)	1.3.46.670589.5.0.3.1	No	Yes
XA reconstructed X-ray SOP Class (private)	1.3.46.670589.2.4.1.1	No	Yes

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

4.2.7.2. Association Policies

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

4.2.7.2.1. General

The DICOM standard application context has specified.

Table 126: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.7.2.2. Number of Associations

For the verification service only one association can be handled at time.

Table 127: Number of Associations as an Association Acceptor for Xcelera Image Import AE

Maximum number of simultaneous associations	Limit of system resources.

4.2.7.2.3. Implementation Identifying Information

The following table gives the implementation class UID and implementation version name of the application entity.

Table 128: DICOM Implementation Class UID and Version for Xcelera Image Import AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.7.2.4. Communication Failure Handling

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

Table 129: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association is released and the reason is logged.

4.2.7.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table
The Image Import AE doesn't initiate any associations

4.2.7.4. Association Acceptance Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 130: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 131: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 132: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

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

4.2.7.4.1.1. Description and Sequencing of Activities
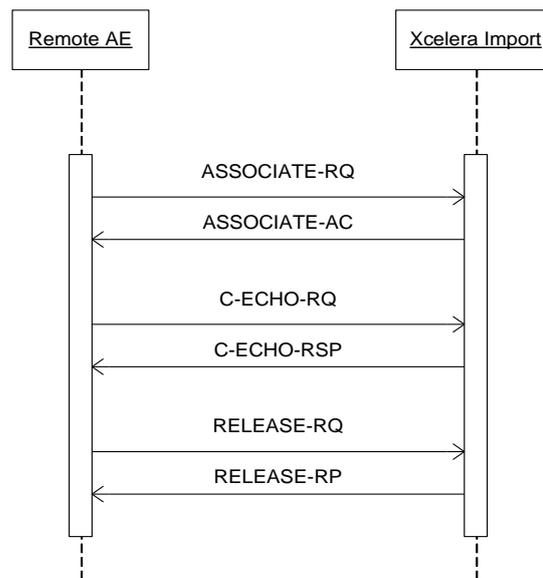
Figure 12: (Real World) Activity - Verification as SCP

The Import Image AE accepts associations from systems that wish to verify application level communication using the C-ECHO command.

4.2.7.4.1.2. Accepted Presentation Contexts

Table 133: 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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The Import Image AE accepts all contexts in the intersection of the proposed and acceptable Presentation Context. This means that the Import Image AE will accept multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes, so there will be no checks for duplicate Presentation Contexts

The Import Image AE will accept the presentation context as given in the next table

4.2.7.4.1.3. SOP Specific Conformance for Verification SOP Class

The Import Image AE provides standard conformance

4.2.7.4.1.3.1.   Dataset Specific Conformance for Verification C-ECHO SCP

The C-ECHO behavior is shown in next table

Table 134: C-ECHO-RSP Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Confirmation	Message in log file.

4.2.7.4.2. (Real-World) Activity – Data Import

4.2.7.4.2.1. Description and Sequencing of Activities
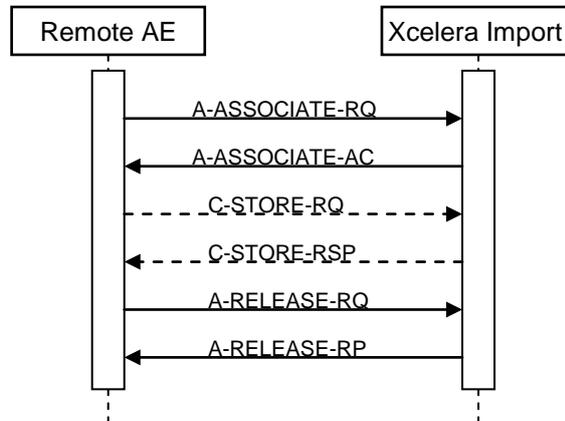
Figure 13: (Real World) Activity - Image Import

A remote system sets up an association with Xcelera. Xcelera verifies that the remote system is configured as an allowed SCU, and that the maximum number of associations is not already reached. If suitable, Xcelera will accept the association with a preferred presentation context. Then the remote system may transfer its image data to Xcelera. When the complete image has been received, Xcelera will send a C-STORE response to notify the remote system that the transfer is completed successfully and the remote system may release the association.

Import Image AE may reject association attempts as shown in table below. The Result, Source and Reason columns represent the values returned in the appropriate fields of an ASSOCIATE-RJ PDU.

4.2.7.4.2.2. Accepted Presentation Contexts

The proposed presentation contexts are shown in next table.

Table 135: Acceptable Presentation Contexts for Image Import – Standard SOP Classes

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**	**Role**	
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
General ECG Waveform	1.2.840.10008.5.1.1.9.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
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 Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		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		
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
		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 Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
Ultrasound Multi-frame Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
		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	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
X-Ray Angiographic Bi-Plane Image Storage SOP Class (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		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		
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Table 136: Acceptable Presentation Contexts for Image Import – Private SOP Classes

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
3D Object new Storage (Private)	1.3.46.670589.5.0.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
3D Subpage Store - Private SOP	1.3.46.670589.2.5.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
3D Volume Storage new SOP Class (Private)	1.3.46.670589.5.0.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Cardio Image Storage new SOP Class (Private)	1.3.46.670589.5.0.8.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CT Synthetic Image Storage (Private)	1.3.46.670589.5.0.9	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
CX Synthetic Image Storage (Private)	1.3.46.670589.5.0.12	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
MR Cardio Analysis new Storage (Private)	1.3.46.670589.5.0.11.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
MR Synthetic Image Storage (Private)	1.3.46.670589.5.0.10	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Perfusion (Private)	1.3.46.670589.5.0.13	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Perfusion Image Storage (Private)	1.3.46.670589.5.0.14	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Specialized PMS X-Ray Image Store	1.3.46.670589.2.3.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
Surface Storage new (Private)	1.3.46.670589.5.0.3.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None
XA reconstructed X-ray SOP Class (private)	1.3.46.670589.2.4.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None

The Import Image AE accepts all Presentation contexts listed in the above table. This means that the Import Image AE will accept multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes, so there will be no checks for duplicate Presentation Contexts.

4.2.7.4.2.3. SOP Specific Conformance for Storage SOP Classes

Xcelera conforms to the SOP's of the Storage Service Class. Xcelera discards no data elements.

The images received by Xcelera are merged on Study UID and Series UID.
For ultrasound images only the Image Information Entity level is supported.

The following are the restrictions and exceptions for the normal behavior of the Image Import AE

1. Xcelera accepts connection from an external DICOM node as the system is licensed.
2. Xcelera try to notify the external DICOM node about the reason for not accepting the connection and will be reported.
3. If no agreement between the two parties can be reached concerning (DICOM) communication parameters the connection will be closed and no data transfer will take place and this will be reported.
4. Xcelera will close the connection if no data is received within 2 minutes after the setup and will be reported.

5. If a network error occurs during set up of a connection or during data transfer, this is reported. Xcelera will abort the connection and data transfer will not be completed.
6. By errors during data transfer Xcelera will notify the external DICOM node and closed the connection and will be reported.
7. Missing or empty mandatory DICOM Data. If Type 1 DICOM composite-object attributes are missing or empty then the system will:
   a. Discard all data received for the associated object,
   b. Return an appropriate DICOM error message to the DICOM image system making the store request,
8. If an object received has the same DICOM SOP Instance UID as an object already stored on Xcelera, Xcelera will do either of the following:

- If the already stored object has the same UID's on instance, study and series level as the new one, Xcelera will replace the stored object with the new object. This will not be communicated to the DICOM image system, which will thus perceive this as a normal store

OR

- Depending on the configuration setting "Send Study after Finalized State or Time our Expired" on the Archive page of the service tool, the following will be done. When the study has the status "finalize" and has the same requirements as the previous bullet point, the study will be discarded and will be communicated to the external DICOM node with the status "C-STORE_WARNING_ELEMENTS_DISCARDED"

- If the already stored object has a different study or series UID as the new one; Xcelera will discard the object and send an error to the DICOM image system. The connection will remain open in order to allow the DICOM image system to recover from this error

Importing of

Xcelera Image Import AE supports the DICOM Structured Reports from any DICOM nodes. But it uses the DICOM SR objects for displaying and reporting of the measurement values of the Adult Echocardiography Report from the following systems only.
- *Philips iE33 Release 1.1 and later*
- *Philips HD11 Release 1.1 and 1.2*
- *Philips Morpheus Release 1.0*
- *Philips Pathfinder Release 1.0*
- *GE Vivid 7 revision 4 and later*
- *GE Vivid I revision 4 and later*
- Siemens Acuson Sequoia version 12.1 and later

Table 137: C-STORE-RSP Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Successful	0000	
Refused	Remote is not Licensed		Log; Abort association
Error	Abort by remote System		Log
	Time-out reached		Log; Abort association
	Internal error Xcelera	0110	Send notification; Log; Abort association
	Invalid dataset	A900	Send notification; Log

Table 138: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	Time-out for reception is set fixed to 2 minutes.

4.2.8. Print AE

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

4.2.8.1. SOP Classes

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

Table 139: SOP Classes for Print AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15	Yes	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No

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

4.2.8.2. Association Policies

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

4.2.8.2.1. General

The DICOM standard application context has specified.

Table 140: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.8.2.2. Number of Associations

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

Table 141: Number of Associations as an Association Initiator for Print AE

Maximum number of simultaneous associations	1

4.2.8.2.3. Implementation Identifying Information

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

Table 142: DICOM Implementation Class UID and Version for Print AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R2.2.L1

4.2.8.2.4. Communication Failure Handling

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

Table 143: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association is closed and the reason is logged

4.2.8.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 144: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – application-context-name-not-supported	The user is informed. Details are logged in central log file.
		3 – calling-AE-title-not-recognized	The user is informed. Details are logged in central log file.
		7 – called-AE-title-not-recognized	The user is informed. Details are logged in central log file.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is informed. Details are logged in central log file.
		2 – protocol-version-not-supported	The user is informed. Details are logged in central log file.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is informed. Details are logged in central log file.
		2 – local-limit-exceeded	The user is informed. Details are logged in central log file.

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

Table 145: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, terminates the connection and logs the event.
2 – DICOM UL service-provider	0 – reason-not-specified	When received, terminates the connection and logs the event.
	1 – unrecognized-PDU	When received, terminates the connection and logs the event.
	2 – unexpected-PDU	When received, terminates the connection and logs the event.
	4 – unrecognized-PDU parameter	When received, terminates the connection and logs the event.

Source	Reason/Diagnosis	Behavior
	5 – unexpected-PDU parameter	When received, terminates the connection and logs the event.
	6 – invalid-PDU-parameter value	When received, terminates the connection and logs the event.

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

Table 146: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
2 – DICOM UL service-provider	0 – reason-not-specified	Notifies Remote AE, terminates the connection and logs the event
	1 – unrecognized-PDU	Notifies Remote AE, terminates the connection and logs the event
	2 – unexpected-PDU	Notifies Remote AE, terminates the connection and logs the event
	4 – unrecognized-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	5 – unexpected-PDU parameter	Notifies Remote AE, terminates the connection and logs the event
	6 – invalid-PDU-parameter value	Notifies Remote AE, terminates the connection and logs the event

4.2.8.3.1. (Real-World) Activity – Print Management as SCU

4.2.8.3.1.1. Description and Sequencing of Activities
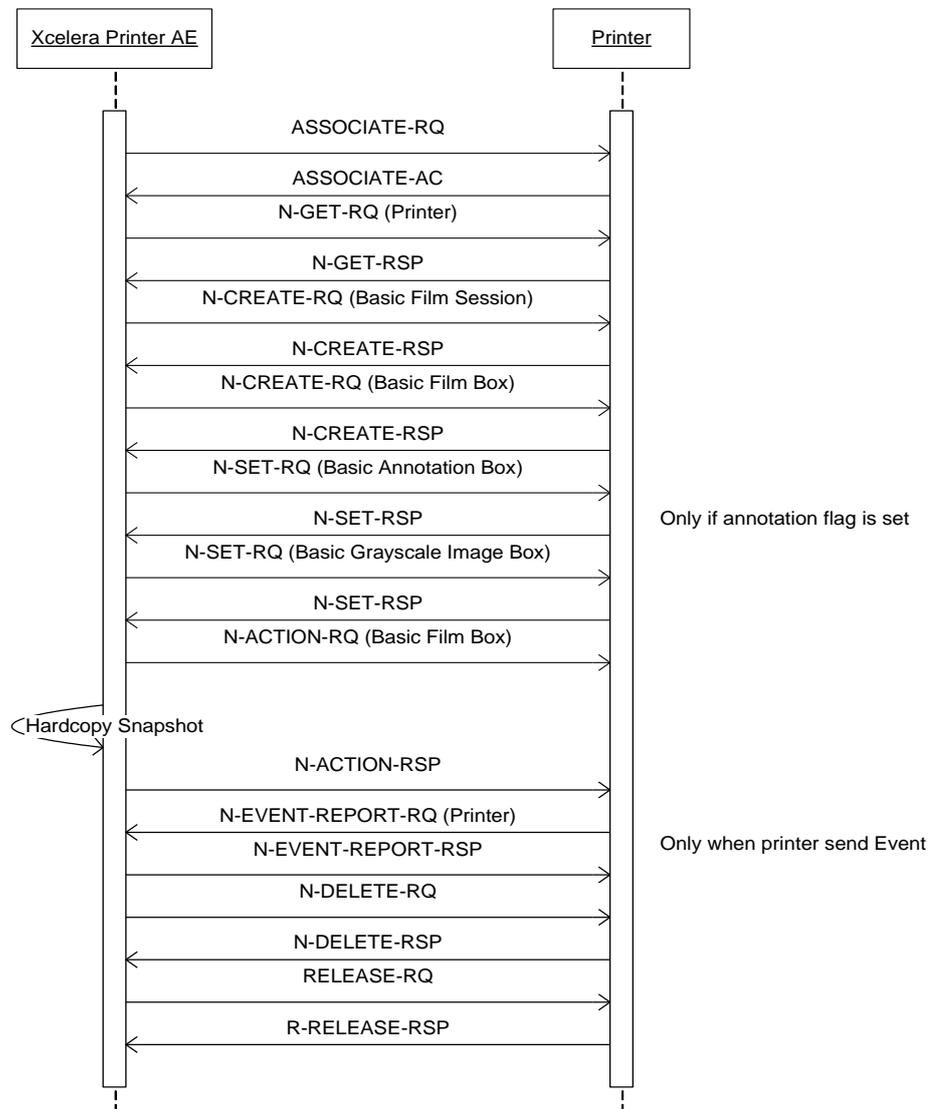
Figure 14: (Real World) Activity - Print Management As SCU

Normal Flow of Event:

1. After the print job is selected a connection with the printer will be made.
2. The Xcelera send the job with or without annotation to the printer.
3. The printer prints its job and sends a successful response back to Xcelera.
4. Xcelera reports the success on the screen.

4.2.8.3.1.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the

presentation contexts proposed by Print AE for (Real-World) Activity – Print AE are defined in next table.

Table 147: Proposed Presentation Contexts for (Real-World) Activity – Print Management As SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Print Job SOP Class	1.2.840.10008.5.1.1.14	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9			SCU	None
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
>Printer SOP Class	1.2.840.10008.5.1.1.16	Explicit VR Big Endian Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.8.3.1.3. Common SOP Specific Conformance for all Print SOP Classes

Exceptions:

The print job cannot be completed by the printer:

1. Printer errors are handling in the same way as given in the next table.
2. DICOM transfer errors to the printer are treated as normal DICOM transfer errors and are recorded appropriately.
3. The printer can use the Basic Annotation Box SOP Class when the annotation flag is set. A control on the SOP Classes during setup of the Association is used to check of the printer known this SOP Class.

Table 148: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success		0000	
Warning/Failure		<>0000	Log; Continue
Error		<>0000	Log; Abort

4.2.8.3.1.4. SOP Specific Conformance for Printer SOP Class

The Print AE conforms to the Printer SOP Class. No data elements are discarded or coerced by the Print AE

The following DIMSE service elements are supported:

- N-GET
- N-EVENT-REPORT

The following table lists the supported attributes for the N-GET DIMSE.

Table 149: Printer SOP Class - N-GET-RQ - Printer Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	0008,0070	LO		ALWAYS	AUTO
Manufacturer Model Name	0008,1090	LO		ALWAYS	AUTO
Device Serial Number	0018,1000	LO		ALWAYS	AUTO
Software Versions	0018,1020	LO		ALWAYS	AUTO
Date of Last Calibration	0018,1200	DA		ALWAYS	AUTO
Time of Last Calibration	0018,1201	TM		ALWAYS	AUTO
Printer Status	2110,0010	CS		ALWAYS	AUTO
Printer Status Info	2110,0020	CS		ALWAYS	AUTO
Printer Name	2110,0030	LO		ALWAYS	AUTO

4.2.8.3.1.4.1. Dataset Specific Conformance for Printer N-EVENT-REPORT SCU

Xcelera does not respond to N-EVENT-REPORT from the Printer.

Note:
N-EVENT-REPORT is an asynchronous message from the printer in situations such as no film supply, low cartridge, print door opened, etc.
Xcelera does not handle this and responds with either ABORT or releasing the association. On the User Interface the Print Job is displayed as failed and the user needs to resend the image.

4.2.8.3.1.5. SOP Specific Conformance for Basic Film Session SOP Class

The Print AE of the Xcelera system provides standard conformance to this SOP Class.

4.2.8.3.1.5.1. Dataset Specific Conformance for Basic Film Session N-CREATE SCU

The DIMSE and command communication behavior is shown in the following tables.

Table 150: N-CREATE-RQ Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Film Session successfully created	0000	The print job continues.
Warning	Memory Allocation not supported	B600	The print job continues and the warning is logged.

Table 151: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	Print job Fails
Reply Time-out	The association is rejected
Association Time-out SCU	The association is released.
Association aborted	The Print job is marked as failed. The reason is logged and reported to the user.

4.2.8.3.1.6. SOP Specific Conformance for Basic Film Box SOP Class

The Print AE conforms to the Basic Film Box SOP Class. No data elements are discarded or coerced by the Print AE.

The following DIMSE service elements are supported:

- N-CREATE
- N-ACTION

The following table lists the supported attributes for the N-CREATE DIMSE.

Table 152: Basic Film Box Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Display Format	2010,0010	ST	1: STANDARD 2: 1,1; 1,2; 2,1; 2,2; 2,3; 3,2; 3,3; 3,4; 3,5; 4,4; 4,5; 4,6	ALWAYS	AUTO
Annotation Display Format ID	2010,0030	CS	ANNOTATION	ALWAYS	AUTO
Film Orientation	2010,0040	CS	PORTRAIT; LANDSCAPE	ALWAYS	AUTO
Referenced Film Session Sequence	2010,0500	SQ		ALWAYS	AUTO
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO

4.2.8.3.1.6.1.   Dataset Specific Conformance for Basic Film Box N-CREATE SCU

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

Table 153: N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film Box successfully created	0000	The print job continues.
Warning	Requested Min Density or Max Density outside of Printer's operating Range	B605	The print job continues and the warning is logged.
Failure	There is an existing Film Box that has not been printed	C616	The print job is marked as failed and the reason is logged.

Table 154: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	Print job Fails
Reply Time-out	The association is rejected
Association Time-out SCU	The association is released.
Association aborted	The Print job is marked as failed. The reason is logged and reported to the user.

4.2.8.3.1.6.2. Dataset Specific Conformance for Basic Film Box N-ACTION SCU

The following table lists the supported attributes for the N-ACTION DIMSE.

Table 155: Basic Film Box SOP Class - N-ACTION RQ - Sop Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	0008,0005	CS		ALWAYS	AUTO
SOP Class UID	0008,0016	UI		ALWAYS	AUTO
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO

Table 156: N-ACTION-RQ Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Film accepted for printing	0000	The print job continues.
Warning	Film Box SOP Instance Hierarchy does not contain Image Box SOP Instances	B603	The print job continues and the warning is logged and reported to the user.
	Image Size is larger than Image Box Size – The Image has been de-magnified	B604	The print job continues and the warning is logged and reported to the user.
	Image Size is larger than Image Box Size – The Image has been cropped to fit	B609	The print job continues and the warning is logged and reported to the user.
	Image Size or combined Print Image Size is larger than Image Box Size – The Image or combined Print Image has been decimated to fit	B60A	The print job continues and the warning is logged and reported to the user.
Failure	Unable to create Print Job SOP Instance – Print Queue is full	C602	The print job is marked as failed and the reason is logged and reported to the user.
	Image Size is larger than Image Box Size	C603	The print job is marked as failed and the reason is logged and reported to the user.
	Combined Print Image Size is larger than Image Box Size	C613	The print job is marked as failed and the reason is logged and reported to the user.

Table 157: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	Print job Fails
Reply Time-out	The association is rejected
Association Time-out SCU	The association is released.

Exception	Behavior
Association aborted	The Print job is marked as failed. The reason is logged and reported to the user.

4.2.8.3.1.7. SOP Specific Conformance for Basic Annotation Box SOP Class

The following table lists the supported attributes for the N-SET DIMSE

Table 158: Basic Annotation Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Annotation Position	2030,0010	US		ALWAYS	AUTO	
Text String	2030,0020	LO		ALWAYS	AUTO	Contains Patient's Name (0010,0010)

Table 159: N-SET-RQ Status Response

Attribute Name	Tag	VR	Value	Presence of Value	Source
Annotation Position	2030,0010	US	1	ALWAYS	AUTO
Text String	2030,0020	LO	Contains Patient's Name (0010,0010)	ALWAYS	AUTO

Table 160: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is closed and the reason is logged
Association aborted	The association is closed and the reason is logged

4.2.8.3.1.8. SOP Specific Conformance for Basic Grayscale Image Box SOP Class

The Print AE conforms to the Basic Grayscale Image Box SOP Class. No data elements are discarded or coerced by the Print AE.

The following DIMSE service element is supported:
N-SET

The following table lists the supported attributes for the N-SET DIMSE.

Table 161: Basic Grayscale Image Box SOP Class - N-SET-RQ - Pixel Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Position	2020,0010	US		ALWAYS	AUTO
Requested Decimate/Crop Behavior	2020,0040	CS	DECIMATE	ALWAYS	AUTO
Preformatted Grayscale Image Sequence	2020,0110	SQ		ALWAYS	AUTO
>Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO
>Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO
>Planar Configuration	0028,0006	US	Additional attribute	ANAP	Config
>Rows	0028,0010	US		ALWAYS	AUTO
>Columns	0028,0011	US		ALWAYS	AUTO
>Pixel Aspect Ratio	0028,0034	IS	1\1	ALWAYS	AUTO
>Bits Allocated	0028,0100	US	8	ALWAYS	AUTO

>Bits Stored	0028,0101	US	8		ALWAYS	AUTO
>High Bit	0028,0102	US	7		ALWAYS	AUTO
>Pixel Representation	0028,0103	US	0		ALWAYS	AUTO
>Window Center	0028,1050	DS	Additional attribute		ANAP	Config
>Window Width	0028,1051	DS	Additional attribute		ANAP	Config
>Pixel Data	7FE0,0010	OW			ALWAYS	AUTO

4.2.8.3.1.8.1.   Dataset Specific Conformance for Basic Grayscale Image Box N-SET SCU

The command communication and response behavior is shown in the next table.

Table 162: N-SET-RQ Status Response

Service Status	Further Meaning	Error Code	Behavior
Success	Image successfully stored in Image Box	0000	The print job continues.
Warning	Image Size is larger than Image Box Size – The Image has been de-magnified	B604	The print job continues and the warning is logged and reported to the user.
	Requested Min Density or Max Density outside of Printer's operating Range	B605	The print job continues and the warning is logged and reported to the user.
	Image Size is larger than Image Box Size – The Image has been cropped to fit	B609	The print job continues and the warning is logged and reported to the user.
	Image Size or combined Print Image Size is larger than Image Box Size – The Image or combined Print Image has been decimated to fit	B60A	The print job continues and the warning is logged and reported to the user.
Error	Image Size is larger than Image Box Size	C603	The print job is marked as failed and the reason is logged and reported to the user
	Insufficient Memory in Printer to store the Image	C605	The print job is marked as failed and the reason is logged and reported to the user
	Combined Print Image Size is larger than Image Box Size	C613	The print job is marked as failed and the reason is logged and reported to the user

Table 163: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	Print job Fails
Reply Time-out	The association is rejected
Association Time-out SCU	The association is released.
Association aborted	The Print job is marked as failed. The reason is logged and reported to the user.

4.2.8.4. Association Acceptance Policy

The Print AE doesn't accept any associations.

4.3. Network Interfaces

4.3.1. Physical Network Interfaces

TCP/IP is the only protocol stack supported.
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.

The following physical media are supported.

- IEEE 802.3-1995 100BASE-TX (Fast Ethernet)
- IEEE 802.3-1995 10BASE-TX
- IEEE 802.3 1000BASE-X (Fiber Optic Gigabit Ethernet)

4.3.2. Additional Protocols

Xcelera operates according to DICOM protocols, in the application layer of standardized communications networks. From this perspective the system supports a number of protocol stacks and physical network media. The system supports DICOM protocols on top of the TCP/IP version 4.
A PPP Connection over dial-up line in the same network is possible..

4.4. Configuration

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

4.4.1. AE Title/Presentation Address Mapping

In Xcelera the local Network and Media AE titles as well as the IP Address and the TCP listen port associated with these AE are configurable. The different AE's in Xcelera can be configured to use the same AE title.

Xcelera only accepts associations of AE Titles that are configured in Xcelera.

Due to variety of network configurations that exist worldwide, no performance guaranties can be given with respect to the time it takes to complete the execution of a job.

4.4.1.1. Local AE Titles

The local AE title mapping and configuration is specified as following:

Table 164: Local AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
Imaging Import AE	INTURISPRO_SCP	104
Send Images AE	SEND_SCU	NA
Auto Export AE	INTURISPRO_SCU	104
Storage Commitment AE	STCO_SCP	4000
Query/Retrieve as SCU AE	QR_SCU	NA
Query/Retrieve as SCP AE	QR_SCP	7000
Print AE	VIEWER_PRINT_SCU	104
Archive AE	Configurable	Configurable

4.4.1.2. Remote AE Title/Presentation Address Mapping

Configuration of remote host names and port numbers is specified here.

Table 165: Remote AE Title Configuration Table

Application Entity Configuration	Description
Data Import AE	Import AE Title Hostname IP-address Listen Port Allowed AE Title Processing delay Archive data (yes/no) TTL (Time To Live) When not archiving
Auto Export AE	SCP AE Title SCU AE Title Server IP Address Port number Server Name Server description Server path Username Password Jpeg Quality Factor
Send Images AE	AE Title Send queue TTL (Days) Client AE Title Hostname IP-address Port number Logical name
Storage Commitment AE	AE Title Listen port Hostname Allowed AE Title Port number
Query/Retrieve as SCU AE	Q/R SCU AE Title Q/R SCU Dicom Timeout Q/R SCU Retrieve Timeout Store SCU AE Title Q/R SCP AE Title Hostname, IP-Address Port number Logical name
Query/Retrieve as SCP AE	Q/R SCP AE Title Listen Port Store SCU AE Title Allowed Client SCU AE Title Store SCP AE Title Hostname IP-address Port number
Print AE	AE Title IP-address Hostname

Application Entity Configuration	Description
Archive AE	Store SCU AE Title Archive Hostname Archive IP-address Archive Store SCU AE Title Archive Store SCP AE Title Archive SCP port number Archive Q/R SCP Hostname Archive Q/R SCP IP-Address Archive Q/R AE Title Archive Q/R port number Fetch Move SCU AE Title Archive Storage Commit SCP hostname Archive Storage Commit IP-Address Archive Storage Commit SCP AE Title Archive Storage Commit port number Read only (yes/no) Fetch Time out Server Path User Name

4.4.2. Parameters

The specification of important operational parameters and, if configurable, their default value and range is specified here. The parameters that apply to all Application Entities should be specified in a "General Parameters" section while those specific to particular Application Entities should be specified in separate sections specific to each AE. The following table is used.

Table 166: Configuration Parameters table

Parameter	Configurable YES/NO	Default Value
General Parameter		
Max PDU Receive Size	No	28 Kbytes
Max PDU Send Size	No	28 Kbytes
Time-out for completion of a TCP/IP connect request (Low-level timeout).	No	60 seconds
Time-out awaiting a Response to a DIMSE Request (Low-level timeout).	No	60 seconds
Time-out for waiting for data between TCP/IP-packets (Low-level timeout).	No	60 seconds
Storage Parameters		
Storage SCU time-out waiting for a response to a C-STORE RQ	No	60 seconds
Time out for reception	No	2 minutes
Maximum number of simultaneously initiated Associations by the Storage AE	No	10
Supported Transfer Syntaxes (separately configurable for each remote AE	No	
Query/Retrieve Parameters (SCU and SCP)		
Maximum PDU size	No	28 Kbytes
Maximum Number of simultaneous Associations (SCU)	No	1 (C-ECHO), 5 (C-STORE), 5 (C-FIND) 1 (Printer) 1 (Archiving)
Q/R SCU DICOM Timeout (SCU)	Yes {300-1500}	450 seconds
Q/R SCU Retrieve Timeout (SCU)	Yes {1..7}	1 days
Q/R best case query response time (SCP)	No	2 seconds
Q/R worst case query response time (SCP)	No	10 seconds

Parameter	Configurable YES/NO	Default Value
Storage Commitment Parameters		
Maximum time to wait for cases to be archived	Yes	Maximum 8 hours
Maximum number of times for retrying sending a response – with one hours interval	Yes	Maximum 72 times
Print Parameters		
Maximum number of simultaneous Associations	No	1
Maximum numbers of connected printers	No	5

Additional configuration parameters such as hardware options for e.g. a printer is specified as well.

5. MEDIA INTERCHANGE

5.1.   Implementation Model

The Media AE provides standard conformance for the DICOM Media Storage and File Format (PS 3.10) and the Media Storage Application Profiles (PS 3.11).

5.1.1. Application Data Flow Diagram

As part of the implementation model, an application data flow diagram is included. This diagram represents all of the Application Entities present in an implementation and graphically depicts the relationship of the AE's use of DICOM to Real-World Activities.
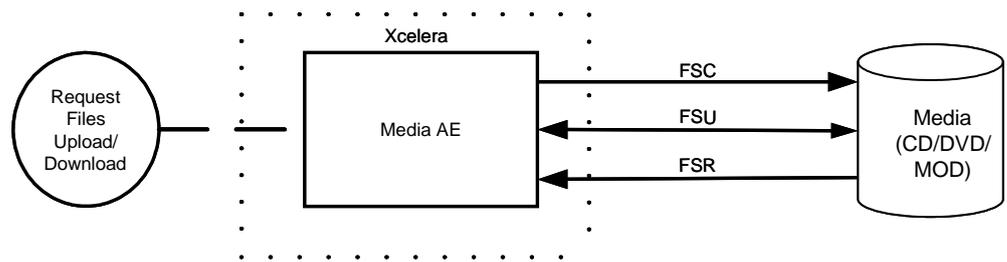
Figure 15: Application Data Flow Diagram

Note:
DICOM FSU with DVD is not possible

5.1.2. Functional Definitions of AE's

5.1.2.1. Functional Definition of Xcelera Media AE

The Media AE in an Xcelera supports the following functions for CD-R, MOD, DVD.

- Read the DICOMDIR File from the medium (representing the directory of the DICOM File(s) as recorded on the medium). This information may be displayed as an ordered list of icon images and, if present, with pertinent identifying information (patient name, etc.).
- Read the selected image from the medium and display it on the monitor of the View Station. This information is displayed as an ordered list of frames of the selected image or as a dynamic review of the selected image.

And for CD-R, DVD

- Initialize the medium.
- Write a DICOM File-set onto the medium.
- Create a DICOMDIR File.
- Extend the DICOM File-set and update the DICOMDIR File accordingly. (DICOM Media Storage Service Class).

Note:
It is not possible to finalize the DVDs from Xcelera. Because of this the studies written on DVD by Xcelera can only be read by Xcelera.

5.1.3. Sequencing of Real World Activities

Table 167: Conformance Supported Application Profiles

| Application Profile Identifier | Presentation Context Table | | | |
| | Abstract Syntax | | Transfer Syntax | |
	Name	UID	Name List	UID List
STD-XABC-CD	X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless FOP	1.2.840.10008.1.2.4.70
STD-XA1K-CD	X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless FOP	1.2.840.10008.1.2.4.70
	Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ELE	1.2.840.10008.1.2.1
STD-US-ID-SF-CD STD-US-ID-SF-MOD* STD-US-ID-SF-DVD	Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	ELE JPEG Lossy Baseline RLE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.5
STD-US-ID-MF-CD STD-US-ID-MF-MOD* STD-US-ID-MF-DVD	Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	ELE JPEG Lossy Baseline RLE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.5
STD-GEN-CD/ DVD	Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	ELE	1.2.840.10008.1.2.1
	CT Image Storage	1.2.840.10008.5.1.4.1.1.2		
	Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20		
	X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1		
	X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2		
	Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1		
	MR Image Storage	1.2.840.10008.5.1.4.1.1.4		
	Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1		
	Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7		
ALL	Media Storage Directory Storage	1.2.840.10008.1.3.10	ELE	1.2.840.10008.1.2.1

.

5.1.4. File Meta Information for Implementation Class and Version

The Application Entity title is registered in the DICOM File Meta Information header and is supported by the CD/DVD-writer (CD write option) acting as FSC/FSU.

Table 168: DICOM Implementation Class UID and Version for Media AE

Implementation Class UID	1.3.46.670589.16.14.2.2.1
Implementation Version Name	Xcelera R.2.2.L1

5.2.   AE Specifications

5.2.1. Media AE - Specification

If applicable, this section contains a description of sequencing of Real-World Activities that the AE's require.

Depending on the study size, the viewer can write one or more complete studies to one or more CD's. Furthermore one viewer can review and upload:

- Multi-patient CDs and DVDs;
- Multi-study CDs and DVDs;
- Multi-CD studies.

The supported Application Profiles, their Roles and the Service Class (SC) options, all defined in DICOM terminology, are listed in next table.

Table 169: Supported Application Profiles

Application Profile	Identifier	Real World Activity	Role	SC Option
CT/MR Studies on {650MB|1.2GB|2.3GB|4.1GB} MOD	STD-CTMR-MOD*	Read image(s) from CD	FSR	Interchange
CT/MR Studies on CD-R	STD-CTMR-CD	Write image(s) to CD-R	FSC	Interchange
		Read image(s) from CD-R	FSR	Interchange
		Read/Write image(s) from/to CD-R	FSU	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	Write image(s) to DVD	FSC	Interchange
		Read image(s) from DVD	FSR	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Write image(s) to CD-R	FSC	Interchange
		Read image(s) from CD-R	FSR	Interchange
		Read/Write image(s) from/to CD-R	FSU	Interchange
General Purpose Interchange on DVD-RAM Media	STD-GEN-DVD	Write image(s) to DVD	FSC	Interchange
		Read image(s) from DVD	FSR	Interchange
Basic cardiac X-Ray Angiographic Studies on CD-R media	STD-XABC-CD	Write image(s) to CD-R	FSC	Interchange
		Read image(s) from CD-R	FSR	Interchange
		Read/Write image(s) from/to CD-R	FSU	Interchange
1024 X-Ray Angiographic Studies on CD-R Media	STD-XA1K-CD	Write image(s) to CD-R	FSC	Interchange
		Read image(s) from CD	FSR	Interchange
		Read/Write image(s) from/to CD-R	FSU	Interchange
Image Display (Ultrasound {SF|MF})	STD-US-ID-MF-CDR	Write image(s) to CD-R	FSC	Interchange
		Read image(s) from CD-R	FSR	Interchange
		Read/Write image(s) from/to CD-R	FSU	Interchange
	STD-US-ID-SF-CDR	Write image(s) to CD-R	FSC	Interchange
		Read image(s) from CD	FSR	Interchange
		Read/Write image(s) from/to CD-R	FSU	Interchange
	STD-US-ID-MF-MOD*	Read image(s) from MOD	FSR	Interchange
	STD-US-ID-SF-MOD*	Read image(s) from MOD	FSR	Interchange
	STD-US-ID-SF-DVD	Write image(s) to DVD	FSC	Interchange
		Read image(s) from DVD	FSR	Interchange
	STD-US-ID-MF-DVD	Write image(s) to DVD	FSC	Interchange
		Read image(s) from DVD	FSR	Interchange

* The supported MOD (FSR) Application Profiles include all Application Profiles where MOD* is MOD12, MOD23, MOD41, MOD128, MOD230, MOD540 or MOD650.

5.2.1.1. File Meta Information for the Media AE

The Application Entity title is registered in the DICOM File Meta Information header and is supported by the CD/DVD-writer (CD write option) acting as FSC/FSU.

Application Entity Title   = "Harmony"
Implementation Class UID   = 1.3.46.670589.16.14.2.2.1
Implementation Version Name   = "Xcelera R2.2.L1"

5.2.1.2. Real-World Activities

5.2.1.2.1. Real World Activities DICOM Recording

For the Real World Activities DICOM Recording the Media AE will write the SOP instances as provided by the RWA to the record able DICOM medium and a corresponding DICOMDIR is created.

5.2.1.2.1.1. Media Storage Application Profile

See table below for an overview of the support of the Application Profiles.

Table 170: Supported Application Profiles

Application Profile	Identifier	Real World Activity	Role	SC Option
CT/MR Studies on CD-R	STD-CTMR-CD	Write image(s) to CD-R	FSC	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	Write image(s) to CD-R	FSC	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Write image(s) to CD-R	FSC	Interchange
General Purpose Interchange on DVD Media	STD-GEN-DVD	Write image(s) to DVD-RAM	FSC	Interchange
Basic cardiac X-Ray Angiographic Studies on CD-R media	STD-XABC-CD	Write image(s) to CD-R	FSC	Interchange
1024 X-Ray Angiographic Studies on CD-R Media	STD-XA1K-CD	Write image(s) to CD-R	FSC	Interchange
Image Display (Ultrasound {SF|MF})	STD-US-ID-MF-CDR	Write image(s) to CD-R	FSC	Interchange
	STD-US-ID-SF-CDR	Write image(s) to CD-R	FSC	Interchange
	STD-US-ID-SF-DVD	Write image(s) to DVD	FSC	Interchange
	STD-US-ID-MF-DVD	Write image(s) to DVD	FSC	Interchange

The following table presents an overview of the defined Photometric Interpretation and Transfer Syntax pairs for the Ultrasound Application Profiles (STD-US-xx-SF/MF…).

Table 171: Defined Photometric Interpretation and Transfer Syntax Pairs

Photometric Interpretation Value	Transfer Syntax	
	Name	**UID**
MONOCHROME2	ELE RLE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.5
RGB	ELE RLE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.5
PALETTE COLOR	ELE RLE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.5
YBR_FULL	RLE	1.2.840.10008.1.2.5
YBR_FULL_422	ELE JPEG Lossy Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50
YBR_PARTIAL_422	ELE JPEG Lossy Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50

5.2.1.2.1.2. Options

In the DICOMDIR file a Basic Directory IOD is present, containing PATIENT, STUDY, SERIES and IMAGE directory record types.

The DICOM standard specifies certain attributes of the DICOMDIR as mandatory. However, these attributes may not be mandatory for the related SOP class IOD. For those attributes the following default values apply.

Table 172: **Default Values in DICOMDIR**

Attribute Name	Tag	VR	Notes
Study Date	0008,0020	DA	"17770101"
Study Time	0008,0030	TM	"00000"
Modality	0008,0060	CS	"OT"
Patient ID	0010,0020	LO	"UNKNOWN"
Study ID	0020,0010	SH	"UNKNOWN"
Series Number	0020,0011	IS	-1
Instance Number	0020,0013	IS	-1

Note that the STD-US, and STD-GEN, application profiles allow additional data elements at each directory level (ref. [DICOM] PS 3.11 Annex). In that context the optional attributes only apply to the STD-XABC and STD-XA1K application profiles.

The following tables describe the optional directory keys of the Media AE.

Table 173: Optional Keys

Attribute name	Tag	VR	Notes
Patient Keys			
Patient's Birth Date	0010,0030	DA	Explicit additional DICOMDIR key for Application Profiles STD-XABC-CD and STD-XA1K-CD (VT=2).
Patient's Sex	0010,0040	CS	Explicit additional DICOMDIR key for Application Profiles STD-XABC-CD and STD-XA1K-CD (VT=2).
Study Keys			
Referring Physician's Name	0008,0090	PN	-
Named of Physician Reading Study	0008,1060	PN	-
Series Keys			
Series Date	0008,0021	DA	-
Series Time	0008,0031	TM	-
Institution Name	0008,0080	LO	Implicit additional DICOMDIR key for STD-US, and STD-GEN, Application Profiles. Explicit additional DICOMDIR key for Application Profiles STD-XABC-CD and STD-XA1K-CD (VT=2).
Institution Address	0008,0081	ST	Implicit additional DICOMDIR key for STD-US, and STD-GEN, Application Profiles. Explicit additional DICOMDIR key for Application Profiles STD-XABC-CD and STD-XA1K-CD (VT=2).
Series Description	0008,103E	LO	-
Performing Physician's Name	0008,1050	PN	Explicit additional DICOMDIR key for Application Profiles STD-XABC-CD and STD-XA1K-CD (VT=2).
Body Part Examined	0018,0015	CS	-
Protocol Name	0018,1030	LO	-
Image Keys			
Image Type	0008,0008	CS	Explicit additional DICOMDIR key for Application Profiles STD-XABC-CD, STD-XA1K-CD and STD-GEN-CD (VT=1).
Content Date	0008,0023	DA	-
Content Time	0008,0033	TM	-

5.2.1.2.2. Real World Activities DICOM Reading

For Real World Activities DICOM Reading, the Media AE will act as an FSR using the Interchange option when reading the directory of the medium and when reading the requested images.

5.2.1.2.2.1. Media Storage Application Profile

See table below for an overview of the support of the Application Profiles.

Table 174: Supported Application Profiles

Application Profile	Identifier	Real World Activity	Role	SC Option
CT/MR Studies on {650MB|1.2GB|2.3GB|4.1GB} MOD	STD-CTMR-MOD*	Read image(s) from MOD	FSR	Interchange
CT/MR Studies on CD-R	STD-CTMR-CD	Read image(s) from CD	FSR	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	Read image(s) from DVD	FSR	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Read image(s) from CD	FSR	Interchange
General Purpose Interchange on DVD Media	STD-GEN-DVD	Read image(s) from DVD	FSR	Interchange
Basic cardiac X-Ray Angiographic Studies on CD-R media	STD-XABC-CD	Read image(s) from CD	FSR	Interchange
1024 X-Ray Angiographic Studies on CD-R Media	STD-XA1K-CD	Read image(s) from CD	FSR	Interchange
Image Display (Ultrasound {SF|MF})	STD-US-ID-MF-CDR	Read image(s) from CD	FSR	Interchange
	STD-US-ID-SF-CDR	Read image(s) from CD	FSR	Interchange
	STD-US-ID-MF-MOD*	Read image(s) from MOD	FSR	Interchange
	STD-US-ID-SF-MOD*	Read image(s) from MOD	FSR	Interchange
	STD-US-ID-SF-DVD	Read image(s) from DVD	FSR	Interchange
	STD-US-ID-MF-DVD	Read image(s) from DVD	FSR	Interchange

* The supported MOD (FSR) Application Profiles include all Application Profiles where MOD* is MOD12, MOD23, MOD128, MOD230, MOD540, or MOD650.

5.2.1.2.3. Real World Activities DICOM Update

For Real World Activities DICOM Reading, the Media AE will act as an FSU using the Interchange option when reading the directory of the medium and when reading the requested images.

5.2.1.2.3.1. Media Storage Application Profile

See table below for an overview of the support of the Application Profiles.

Table 175: Supported Application Profiles

Application Profile	Identifier	Real World Activity	Role	SC Option
CT/MR Studies on CD-R	STD-CTMR-CD	Read/Write image(s) from/to CD-R	FSU	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Read/Write image(s) from/to CD-R	FSU	Interchange
Basic cardiac X-Ray Angiographic Studies on CD-R media	STD-XABC-CD	Read/Write image(s) from/to CD-R	FSU	Interchange
1024 X-Ray Angiographic Studies on CD-R Media	STD-XA1K-CD	Read/Write image(s) from/to CD-R	FSU	Interchange
Image Display (Ultrasound {SF|MF})	STD-US-ID-MF-CDR	Read/Write image(s) from/to CD-R	FSU	Interchange
	STD-US-ID-SF-CDR	Read/Write image(s) from/to CD-R	FSU	Interchange

Exceptions:

- Less than 25MB of free space is available on the CD: in this case the Xcelera system will notify the user through an error message and will request another CD to be inserted. Nothing will be recorded on the CD with limited free space.
- Not enough disk space is available to create the CD image. In this case, the writing process is aborted and the user is notified about the problem through an error message.
- Studies and additional files do not fit on a single CD. The Xcelera system will request an additional CD after filling the first one. The writing operation shall only be aborted
- No CD inserted into CD recorder or 'closed'/corrupt CD in CD-recorder. The system will report these errors.
- One or more of the studies selected for writing to CD consist (partly) of lossy compressed data. The system will notify the user of this, providing the option to cancel the operation. If the clinical user decides to create the CD anyway, a disclaimer text file will be added to the CD, indicating that the CD contains lossy compressed data.
- JPEG or RLE images of selected studies do not contain Basic Offset Table. The system will add such a table.
- Images of selected studies contain a format (DICOM SOP class) that is not supported by the viewing functions of the Inturis Suite viewer workspot. These images will be written to CD as a DICOM media file but only if no transfer syntax conversion is required, i.e. if they are stored on the system in ELE or JPEG non-hierarchical 14 format. If such a conversion is required, the clinical user will be notified, and no CD is written.
- The use case Merge Patients on CD was performed and there is not enough free space on the CD to add the new studies and additional files. In this case the Xcelera system will immediately request an empty CD, without adding any studies to the existing CD.

Note:
For DVD+RW and DVD-RW, it is not possible to support File Set Updation (FSU), because data on the media will be overwritten. A warning will be displayed on the user interface.

5.3. Augmented and Private Application Profiles

The Media AE supports no augmented Application Profiles.

5.3.1. Private Application Profiles

The Media AE does not support any private Application Profiles.

5.4. Media Configuration

N.A.

6. SUPPORT OF CHARACTER SETS

Any support for character sets beyond the default character repertoire in Network and Media services shall be described here.

Table 176: Supported DICOM Character Sets of Xcelera

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. 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
Japanese	ISO 2022 IR 13	ESC 02/0 9 04/09	ISO-IR 13	G1	JIS X 0201: Katakana
		ESC 02/08 04/10	ISO-IR 14	G1	JIS X 0201: Romaji
Japanese	ISO 2022 IR 87	ESC 02/04 04/02	ISO-IR 87	G0	JIS X 0208: Kanji
	ISO 2022 IR 159	ESC 02/04 02/08 04/04	ISO-IR 159	G0	JIS X 0212: Supplementary Kanji set

Note:

A PN type attribute containing Japanese characters can contain three component groups in the following format.

<Singly byte character>=<Ideographic character>=<Phonetic character>

Behavior of Xcelera during DICOM data import as SCP

When Xcelera imports DICOM data with PN type attributes with the above three component groups, then it uses the <Single byte character> component group for store in the internal data base.

In case <Single byte character> group is absent, then it uses <Ideographic character> group for store in the internal database

In case if both <Single byte character> and <Ideographic character> group are absent, then it uses <phonetic character> group for store in the internal database.

Behavior of Xcelera during DICOM data export as SCU

When Xcelera exports DICOM data, it uses the internally stored character group while exporting the PN type attributes.

That means if <Singly byte character> group is internally saved, then that is used for export and other two component groups are not exported.

And if the <Ideographic character> group is internally saved, then that is used for export and other two component groups are not exported.

And if the <Phonetic character> group is internally saved, then that is used for export and the other two component groups are not exported.

7. SECURITY

7.1. Security Profiles

7.1.1. Attribute Confidentiality Profiles

7.1.1.1. The Basic Application Level Confidentiality Profile

No instances of he Encrypted Attributes Data Set are created. No Transfer Syntaxes are supported for encoding/decoding of Encrypted Attributes Data Sets.

The table below lists the protected attributes when user selects anonymization of a patient record. The terms used to describe the replacement value can be read as below

Empty   The attribute will have a value of zero length.
User editableThe user can enter / edit the value for the attribute
User selectable   The user can select a predefined list of values for the attribute.
System   The system changeable

Table 177: Basic Application Level Confidentiality Profile Attributes

Attribute Name	Tag	VR	Replacement Value	Remarks
Patient's Name	0010,0010	PN	Empty / User editable	Free editable
Patient's Birth Date	0010,0030	DA	Empty User editable	Free editable
Patient's Sex	0010,0040	CS	Empty / User selectable	Possible values F, M, O
Patient's Age	0010,1010	AS	Empty / User editable	Free editable
Patient ID	0010,0020	LO	Empty / User editable	Free editable
Referring Physician's Name	0008,0090	PN	Empty / User editable	Free editable
Performing Physician's Name	0008,1050	PN	Empty User editable	Free editable
Institution Name	0008,0080	LO	Empty / User selectable	Possible values "Default Institution", "DICOM"
Study ID	0020, 0010	SH	Empty / User editable	Free editable
Accession Number	0008,0050	SH	Empty / User editable	Free editable
Study Instance UID	0020, 000D	UI	System	System automatically changes during anonymization
Series Instance UID	0020, 000E	UI	System	System automatically changes during anonymization

7.2. Association Level Security

Not Applicable

7.3. Application Level Security

Not Applicable

8. ANNEXES OF APPLICATION "XCELERA CATH VIEWER"

8.1.   IOD Contents

8.1.1. Created SOP Instance

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 178: List of created SOP Classes

SOP Class Name	SOP Class UID
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7

8.1.1.2. Secondary Capture Image Storage SOP Class

Table 179: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Equipment	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SOP Common Module	ALWAYS
Image	VOI LUT Module	CONDITIONAL

Table 180: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ANAP	COPY	
Patient ID	0010,0020	LO		ANAP	COPY	
Patient's Birth Date	0010,0030	DA		ANAP	COPY	
Patient's Sex	0010,0040	CS		ANAP	COPY	
Issuer of Patient ID	0010,0021	LO		ANAP	COPY	If Issuer of Patient ID is not present in the imported object, then "Default Institution" will be put by Xcelera 2.2. This is configurable.

Table 181: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		ANAP	COPY	
Study Time	0008,0030	TM		ANAP	COPY	
Accession Number	0008,0050	SH		ANAP	COPY	
Referring Physician's Name	0008,0090	PN		ANAP	COPY	
Study ID	0020,0010	SH		ANAP	COPY	

Table 182: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Instance UID	0020,000E	UI		ALWAYS	COPY	
Series Number	0020,0011	IS		ANAP	COPY	
Performing Physician's Name	0008,1050	PN		ANAP	COPY	

Table 183: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ANAP	AUTO	

Table 184: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS	WSD	ALWAYS	AUTO	
Modality	0008,0060	CS		ALWAYS	AUTO	

Table 185: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	COPY	
Patient Orientation	0020,0020	CS		ANAP	COPY	
Image Type	0008,0008	CS	DERIVED, SECONDARY	ALWAYS	AUTO	

Table 186: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	
High Bit	0028,0102	US	7	ALWAYS	AUTO	
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/ OB		ALWAYS	AUTO	
Pixel Aspect Ratio	0028,0034	IS		ALWAYS	AUTO	

Table 187: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Creator UID	0008,0014	UI		ANAPEV	AUTO	

Table 188: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ANAP	AUTO	
Window Width	0028,1051	DS		VNAP	AUTO	

8.1.2. Usage of Attributes from Received IOD

The following table lists the functionalities supported by the CathViewer Application.

Table 189: Functionalities

Functionality	Type1	Optional	Private
CathViewer	X		

8.1.2.1. Usage of the Functionality CathViewer

The following table lists the supported SOP classes by the CathViewer functionality.

Table 190: Supported SOP Classes for functionality Cath Viewer

SOP Class name	SOP Class UID
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1

Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
X-Ray Angiographic Bi-Plane Image Storage SOP Class (Retired)	1.2.840.10008.5.1.4.1.1.12.3
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing. SOP	1.2.840.10008.5.1.4.1.1.1.1.1

Note:
1. Cath viewer is not meant as an alternative viewer for CT/MR analysis
2. monochrome-1 images are not supported in the Cath viewer

8.1.3. Attribute Mapping

None

8.1.4. Coerced/Modified fields

None

8.2. Data Dictionary of Private Attributes

Not Applicable

8.3. Coded Terminology and Templates

Not Applicable.

8.4. Grayscale Image consistency

Not Applicable.

8.5. Standard Extended/Specialized/Private SOPs

None

8.6. Private Transfer Syntaxes

None.

9. ANNEXES OF APPLICATION "CATH ANALYSIS PACKAGE"

9.1. IOD Contents

9.1.1. Created SOP Instance

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

9.1.1.1. List of created SOP Classes

Table 191: List of created SOP Classes

SOP Class Name	SOP Class UID
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7

9.1.1.2.   Secondary Capture Image Storage SOP Class

Table 192: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Equipment	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SOP Common Module	ALWAYS
Image	VOI LUT Module	ALWAYS

Table 193: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Issuer of Patient ID	0010,0021	LO		ANAP	COPY	If Issuer of Patient ID is not present in the imported object, then "Default Institution" will be put by Xcelera 2.2. This is configurable.

Table 194: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	

Table 195: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Performing Physician's Name	0008,1050	PN		ANAP	AUTO	

Table 196: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	

Table 197: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS	WSD	ALWAYS	AUTO	
Modality	0008,0060	CS		ANAP	AUTO	

Table 198: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	
Patient Orientation	0020,0020	CS		ANAPCV	AUTO	
Image Type	0008,0008	CS	DERIVED, SECONDARY	ALWAYS	AUTO	

Table 199: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	O W/ OB		ALWAYS	AUTO	
Pixel Aspect Ratio	0028,0034	IS		ANAPEV	AUTO	

Table 200: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	

Table 201: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ALWAYS	AUTO	
Window Width	0028,1051	DS		ALWAYS	AUTO	

9.1.2. Usage of Attributes from Received IOD

Table 202: Functionalities

Functionality	Type1	Optional	Private
CAAS 2000	X		

9.1.2.1. Usage of the Functionality CAAS 2000

Table 203: Supported SOP Classes for functionality CAAS 2000

SOP Class name	SOP Class UID
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1

9.1.3. Attribute Mapping

None

9.1.4. Coerced/Modified fields

Not Applicable

9.2. Data Dictionary of Private Attributes

Not Applicable

9.3. Coded Terminology and Templates

Not Applicable

9.4. Grayscale Image consistency

Not Applicable

9.5. Standard Extended/Specialized/Private SOPs

Not Applicable

9.6. Private Transfer Syntaxes

Not Applicable

10. ANNEXES OF APPLICATION "XCELERA PLUGIN - ULTRASOUND VIEWER "

10.1. IOD Contents

10.1.1. Created SOP Instance

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

No new SOP instances are created from Ultrasound Viewer applications.

10.1.2. Usage of Attributes from Received IOD

The application Ultrasound Viewer has the following functionalities.

Table 204: Functionalities

Functionality	Type1	Optional	Private
Ultrasound viewer	X	X	

10.1.2.1. Usage of the Functionality Ultrasound viewer

The functionality Ultrasound Viewer supports the following SOP classes.

Table 205: Supported SOP Classes for functionality Ultrasound viewer

SOP Class name	SOP Class UID
3D Subpage Store - Private SOP	1.3.46.670589.2.5.1.1
Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.11
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1

The following tale lists the supported (required) attributes from the Ultrasound functionality.

Table 206: Supported Optional attributes of functionality Ultrasound viewer

Attribute Name	Tag	VR	Value	Comment
Study Date	0008,0020	DA		
Study Time	0008,0030	TM		
Accession Number	0008,0050	SH		
Study ID	0020,0010	SH		
Study Description	0008,1030	LO		
Manufacturer	0008,0070	LO		
Institution Name	0008,0080	LO		
Specific Character Set	0008,0005	CS		
SOP Class UID	0008,0016	UI		
SOP Instance UID	0008,0018	UI		
Instance Creation Date	0008,0012	DA		
Instance Creation Time	0008,0013	TM		
Instance Creator UID	0008,0014	UI		
Performed Procedure Step Start Date	0040,0244	DA		
Performed Procedure Step Start Time	0040,0245	TM		
Performed Procedure Step ID	0040,0253	SH		
Performed Procedure Step Description	0040,0254	LO		
Content Date	0008,0023	DA		
Content Time	0008,0033	TM		
Acquisition Date	0008,0022	DA		
Acquisition Time	0008,0032	TM		

10.1.3.   Attribute Mapping

None

10.1.4.   Coerced/Modified fields

None

10.2.   Data Dictionary of Private Attributes

None

10.3.   Grayscale Image consistency

Not Applicable

10.4.   Standard Extended/Specialized/Private SOPs

None.

10.5.   Private Transfer Syntaxes

None.

11. ANNEXES OF APPLICATION "ULTRASOUND ANALYSIS PACKAGE"

11.1.   IOD Contents

11.1.1.   Created SOP Instance

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

11.1.1.1.   List of created SOP Classes

Table 207: List of created SOP Classes

SOP Class Name	SOP Class UID
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1

11.1.1.2. Comprehensive SR SOP Class

Table 208: IOD of Created Comprehensive SR SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	
Series	SR Document Series Module	
Document	SR Document Content Module	
Document	SR Document General Module	
Study	General Study Module	
Equipment	General Equipment Module	

Table 209: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP		
Patient ID	0010,0020	LO		VNAP		
Patient's Birth Date	0010,0030	DA		VNAP		
Patient's Sex	0010,0040	CS		VNAP		
Issuer of Patient ID	0010,0021	LO		ANAPCV		

Table 210: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS		
Study Date	0008,0020	DA		VNAP		
Study Time	0008,0030	TM		VNAP		
Accession Number	0008,0050	SH		VNAP		
Referring Physician's Name	0008,0090	PN		VNAP		
Study ID	0020,0010	SH		VNAP		
Study Description	0008,1030	LO		ANAPCV		

Table 211: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		VNAP		
Manufacturer's Model Name	0008,1090	LO		ANAPCV		
Software Version(s)	0018,1020	LO		ANAPCV		

Table 212: SR Document Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS		
Series Instance UID	0020,000E	UI		ALWAYS		
Series Number	0020,0011	IS		ALWAYS		
Referenced Performed Procedure Step Sequence	0008,1111	SQ		VNAP		
>Referenced SOP Class UID	0008,1150	UI		ANAP		
>Referenced SOP Instance UID	0008,1155	UI		ANAP		

Table 213: SR Document General Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS		
Content Time	0008,0033	TM		ALWAYS		
Instance Number	0020,0013	IS		ALWAYS		
Completion Flag	0040,A491	CS		ALWAYS		
Verification Flag	0040,A493	CS		ALWAYS		

Table 214: SR Document Content Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Template Sequence	(0040, A504)	SQ		ALWAYS	AUTO	
>Template Identifier	(0040,DB00)	CS		ALWAYS	AUTO	The Root Content Item identifies. 5200 (Echo)
>Mapping Resource	(0008,0105)	CS	DCMR	ALWAYS	AUTO	
Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO	
>Relationship Type	(0040,A010)	CS		ALWAYS	AUTO	Template ID 5200 for Adult Echo
Document Relationship Macro Table				ANAP	AUTO	Template ID 5200 for Adult Echo
Document Content Macro				ALWAYS	AUTO	Template ID 5200 for Adult Echo
Value Type	0040,A040	CS	CONTAINER	ALWAYS	AUTO	
Concept Name Code Sequence	0040,A043	SQ				
>Code Value	0008,0100	SH	125200	ALWAYS	AUTO	
>Coding Scheme Designator	0008,0102	SH	DCM			
>Coding Scheme Version	0008,0103	SH				
>Code Meaning	0008,0104	LO	"Adult Echocardiography Procedure Report"			
Continuity of Content	(0040,A050)	CS	SEPARATE	ALWAYS	AUTO	
Numeric Measurement Macro						Template ID 5200 for Adult Echo
Code Macro						Template ID 5200 for Adult Echo

11.1.1.3.   Ultrasound Image Storage SOP Class

Table 215: IOD of Created Ultrasound Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	
Study	General Study Module	
Series	General Series Module	
Equipment	General Equipment Module	
Image	General Image Module	
Image	Image Pixel Module	
Image	US Image Module	
Image	SOP Common Module	
Image	VOI LUT Module	
	Additional Module	

Table 216: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO	
Patient ID	0010,0020	LO		ALWAYS	AUTO	
Patient's Birth Date	0010,0030	DA		ALWAYS	AUTO	
Patient's Sex	0010,0040	CS		ALWAYS	AUTO	
Issuer of Patient ID	0010,0021	LO		ANAP	AUTO	

Table 217: General Study Module

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

Table 218: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Protocol Name	0018,1030	LO		ANAP	AUTO	

Table 219: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	QLAB	ANAP	AUTO	
Software Version(s)	0018,1020	LO	453561365271	ANAP	AUTO	

Table 220: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	
Content Date	0008,0023	DA		ANAPCV	AUTO	
Content Time	0008,0033	TM		ANAPCV	AUTO	
Derivation Description	0008,2111	ST	QLab Clip	ANAP	AUTO	
Burned In Annotation	0028,0301	CS		ANAP	AUTO	
Lossy Image Compression Ratio	0028,2112	DS		ANAP	AUTO	
Source Image Sequence	0008,2112	SQ		ANAP	AUTO	

Table 221: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/ OB		ALWAYS	AUTO	

Table 222: US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	3	ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	YBR_FULL_422	ALWAYS	AUTO	
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	
High Bit	0028,0102	US	7	ALWAYS	AUTO	
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS	01	ANAP	AUTO	
Image Type	0008,0008	CS	Derived, Secomdary	VNAP	AUTO	

Table 223: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ANAP	AUTO	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.6.1	ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	

Table 224: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ANAP	AUTO	
Window Width	0028,1051	DS		ANAP	AUTO	

Table 225: Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS	SYN	ALWAYS	AUTO	

11.1.2.   Usage of Attributes from Received IOD

Table 226: Functionalities

Functionality	Type1	Optional	Private
QLab	X		

11.1.2.1. Usage of the Functionality QLab

Table 227: Supported SOP Classes for functionality QLab

SOP Class name	SOP Class UID
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33

11.1.3.   Attribute Mapping
None

11.1.4.   Coerced/Modified fields
None

11.2. Data Dictionary of Private Attributes

Not Applicable.

11.3. Coded Terminology and Templates

Adult Echocardiography Structured Report is based on the Template ID 5200.

11.4. Grayscale Image consistency

Not Applicable

11.5. Standard Extended/Specialized/Private SOPs

Not Applicable

11.6. Private Transfer Syntaxes

Not Applicable

12. ANNEXES OF APPLICATION "XCELERA PLUGIN – NM VIEWER"

12.1. IOD Contents

12.1.1. Created SOP Instance

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

12.1.1.1. List of created SOP Classes

Table 228: List of created SOP Classes

SOP Class Name	SOP Class UID
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7

12.1.1.2. Secondary Capture Image Storage SOP Class

Table 229: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Equipment	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SOP Common Module	ALWAYS

Table 230: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	

Table 231: General Study Module

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

Table 232: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Series Description	0008,103E	LO		ANAP	AUTO	

Table 233: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		VNAP	COPY	
Institution Name	0008,0080	LO		ANAP	AUTO	
Station Name	0008,1010	SH		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO	
Software Version(s)	0018,1020	LO		ANAP	AUTO	AIM_DICOM_200

Table 234: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS	WSD	ALWAYS	AUTO	
Modality	0008,0060	CS	NM	ALWAYS	AUTO	
Secondary Capture Device Manufacturer	0018,1016	LO		ANAP	AUTO	
Secondary Capture Device Manufacturer's Model Name	0018,1018	LO		ANAP	AUTO	
Secondary Capture Device Software Version(s)	0018,1019	LO		ANAP	AUTO	
Digital Image Format Acquired	0018,1023	LO		ANAP	AUTO	

Table 235: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	COPY	
Content Date	0008,0023	DA		ANAPCV	COPY	
Content Time	0008,0033	TM		ANAPCV	COPY	
Image Type	0008,0008	CS		ANAP	AUTO	
Acquisition Date	0008,0022	DA		ANAP	COPY	
Acquisition Time	0008,0032	TM		ANAP	COPY	
Acquisition Number	0020,0012	IS		ANAP	COPY	
Image Comments	0020,4000	LT		ANAP	USER	
Derivation Description	0008,2111	ST		ANAP	AUTO	

Table 236: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	
Planar Configuration	0028,0006	US		ANAPCV	AUTO	

Table 237: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ANAP	AUTO	
Time of Secondary Capture	0018,1014	TM		ANAP	AUTO	

Table 238: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAPEV	AUTO	
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
Instance Creation Date	0008,0012	DA		ANAP	AUTO	
Instance Creation Time	0008,0013	TM		ANAP	AUTO	

SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

12.1.2.   Usage of Attributes from Received IOD

The AutoQuant application has the main functionality AutoQuant.

Table 239: Functionalities

Functionality	Type1	Optional	Private
AutoQuant	X		X

12.1.2.1. Usage of the Functionality AutoQuant

The functionality AutoQuant supports the following SOP classes.

Table 240: Supported SOP Classes for functionality AutoQuant

SOP Class name	SOP Class UID
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7

12.1.3.   Attribute Mapping

None

12.1.4.   Coerced/Modified fields

None

12.2.   Data Dictionary of Private Attributes

None

12.3.   Coded Terminology and Templates

Not Applicable

12.4.   Grayscale Image consistency

Not applicable

12.5.   Standard Extended/Specialized/Private SOPs

None

12.6.   Private Transfer Syntaxes

None

13. ANNEXES OF APPLICATION "XCELERA PLUGIN - VIEWFORUM"

13.1.   IOD Contents

13.1.1.   Created SOP Instance

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

Note:
ViewForum plugin does not support images with EBE transfer syntax.

13.1.1.1. List of created SOP Classes

Table 241: List of created SOP Classes

SOP Class Name	SOP Class UID
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1

X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2

13.1.1.2. Secondary Capture Image Storage SOP Class

Table 242: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Equipment	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SOP Common Module	ALWAYS

Table 243: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Patient's Birth Time	0010,0032	TM		ANAP	COPY	

Table 244: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	
Study Description	0008,1030	LO		ANAP	COPY	
Name of the Physician(s) Reading Study	0008,1060	PN		ANAP	AUTO /USER	

Table 245: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 246: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Series Description	0008,103E	LO		ANAP	AUTO	
Protocol Name	0018,1030	LO		ANAP	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	COPY	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Performed Procedure Step Start Time	0040,0245	TM		ANAP	COPY	
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY	
Performed Procedure Step Description	0040,0254	LO		ANAP	COPY	

Table 247: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO	
Institution Name	0008,0080	LO		VNAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	ViewForum	ALWAYS	AUTO	
Software Version(s)	0018,1020	LO	ViewForum 6.1, PMS5.2 MIMIT EVIIMDictionary	ALWAYS	AUTO	

Table 248: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS		ALWAYS	AUTO	
Modality	0008,0060	CS		ANAP	AUTO	

Table 249: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	COPY	
Content Date	0008,0023	DA		ANAPCV	COPY	
Content Time	0008,0033	TM		ANAPCV	COPY	
Image Type	0008,0008	CS		ANAP	COPY	
Patient Orientation	0020,0020	CS		ANAPCV	COPY	

Table 250: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	
Planar Configuration	0028,0006	US		ANAPEV	AUTO	

Table 251: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

13.1.1.3. Softcopy Presentation State Storage SOP Class

Table 252: IOD of Created Softcopy Presentation State Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Curve	Graphic Annotation Module	ALWAYS
Presentation State	Presentation State Identification Module	ALWAYS
Presentation State	Softcopy Presentation LUT Module	ALWAYS
Presentation State	Softcopy VOI LUT Module	ALWAYS
Presentation State	Presentation State Shutter Module	ALWAYS
Presentation State	Presentation State Relationship Module	ALWAYS
Curve	Displayed Area Module	ALWAYS
Curve	Graphic Layer Module	ALWAYS
Curve	Presentation Series Module	ALWAYS
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	SOP Common Module	ALWAYS
Image	Modality LUT Module	ALWAYS
	Additional Module	ALWAYS

Table 253: Graphic Annotation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Annotation Sequence	0070,0001	SQ		ALWAYS	AUTO	
>Graphic Layer	0070,0002	CS		ALWAYS	AUTO	
>Referenced Image Sequence	0008,1140	SQ		ANAPEV	AUTO	
>Text Object Sequence	0070,0008	SQ		ANAPEV	AUTO	
>>Unformatted Text Value	0070,0006	ST		ALWAYS	AUTO	
>>Anchor Point Annotation Units	0070,0004	CS		ANAPEV	AUTO	
>>Anchor Point	0070,0014	FL		ANAPEV	AUTO	
>>Anchor Point Visibility	0070,0015	CS		ANAPEV	AUTO	
>Graphic Object Sequence	0070,0009	SQ		ANAPEV	AUTO	
>>Graphic Data	0070,0022	FL		ALWAYS	AUTO	

Table 254: Presentation State Identification Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Content Label	0070,0080	CS		ALWAYS	AUTO	
Presentation Creation Date	0070,0082	DA		ALWAYS	AUTO	
Presentation Creation Time	0070,0083	TM		ALWAYS	AUTO	
Content Description	0070,0081	LO		VNAP	AUTO	
Content Creator's Name	0070,0084	PN		VNAP	AUTO	

Table 255: Softcopy Presentation LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation LUT Shape	2050,0020	CS		ANAPEV	AUTO	

Table 256: Softcopy VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Softcopy VOI LUT Sequence	0028,3110	SQ		ALWAYS	AUTO	
>Window Center	0028,1050	DS		ANAPEV	AUTO	
>Window Width	0028,1051	DS		ANAPEV	AUTO	

Table 257: Presentation State Shutter Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Presentation Value	0018,1622	US		ANAPEV	AUTO	

Table 258: Presentation State Relationship Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Series Sequence	0008,1115	SQ		ALWAYS	AUTO	
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
>Referenced Image Sequence	0008,1140	SQ		ALWAYS	AUTO	
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	

Table 259: Displayed Area Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Displayed Area Selection Sequence	0070,005A	SQ		ALWAYS	AUTO	
>Displayed Area Top Left Hand Corner	0070,0052	SL		ALWAYS	AUTO	
>Displayed Area Bottom Right Hand Corner	0070,0053	SL		ALWAYS	AUTO	
>Presentation Size Mode	0070,0100	CS		ALWAYS	AUTO	
>Presentation Pixel Spacing	0070,0101	DS		ANAPEV	AUTO	

Table 260: Graphic Layer Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Layer Sequence	0070,0060	SQ		ALWAYS	AUTO	
>Graphic Layer	0070,0002	CS		ALWAYS	AUTO	
>Graphic Layer Order	0070,0062	IS		ALWAYS	AUTO	
>Graphic Layer Description	0070,0068	LO		ANAP	AUTO	

Table 261: Presentation Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	

Table 262: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Patient's Birth Time	0010,0032	TM		ANAP	COPY	

Table 263: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	
Study Description	0008,1030	LO		ANAP	COPY	
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	COPY	

Table 264: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 265: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	

Table 266: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	ViewForum	ANAP	AUTO	
Software Version(s)	0018,1020	LO	ViewForum 6.1, PMS5.2 MIMIT EVIIMDictionary	ANAP	AUTO	

Table 267: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

Table 268: Modality LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rescale Intercept	0028,1052	DS		ANAPEV	AUTO	
Rescale Slope	0028,1053	DS		ANAPEV	AUTO	
Rescale Type	0028,1054	LO		ANAPEV	AUTO	

Table 269: Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Performed Station Name	0040,0242	SH		ALWAYS	AUTO	
Performed Procedure Type Description	0040,0255	LO		ALWAYS	AUTO	

13.1.1.4. Computed Radiography Image Storage SOP Class

Table 270: IOD of Created Computed Radiography Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	CR Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SOP Common Module	ALWAYS
	Additional Module	ALWAYS

Table 271: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Patient's Birth Time	0010,0032	TM		ANAP	COPY	

Table 272: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	
Study Description	0008,1030	LO		ANAP	COPY	
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	USER	

Table 273: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 274: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	

Series Number	0020,0011	IS		VNAP	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Series Description	0008,103E	LO		ANAP	AUTO	
Protocol Name	0018,1030	LO		ANAP	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	

Table 275: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	ViewForum	ALWAYS	AUTO	
Software Version(s)	0018,1020	LO	ViewForum 6.1, PMS5.2 MIMIT EVIIMDictionary	ALWAYS	AUTO	

Table 276: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	
Content Date	0008,0023	DA		ANAPCV	AUTO	
Content Time	0008,0033	TM		ANAPCV	AUTO	
Image Type	0008,0008	CS	ORIGINAL, SECONDARY	ANAP	AUTO	

Table 277: CR Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Distance Source to Detector	0018,1110	DS		ANAP	AUTO	

Table 278: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 279: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

Table 280: Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Radiation Setting	0018,1155	CS		ALWAYS	COPY	
Number of Frames	0028,0008	IS		ALWAYS	AUTO	
Frame Increment Pointer	0028,0009	AT		ALWAYS	AUTO	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
Pixel Intensity Relationship	0028,1040	CS		ALWAYS	AUTO	
Performed Station Name	0040,0242	SH		ALWAYS	AUTO	
Performed Procedure Type Description	0040,0255	LO		ALWAYS	AUTO	

13.1.1.5. CT Image Storage SOP Class

Table 281: IOD of Created CT Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	Image Plane Module	ALWAYS
Image	General Image Module	ALWAYS
Image	CT Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SOP Common Module	ALWAYS
	Additional Module	ALWAYS

Table 282: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Patient's Birth Time	0010,0032	TM		ANAP	COPY	

Table 283: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	
Study Description	0008,1030	LO		ANAP	COPY	
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	COPY	
Procedure Code Sequence	0008,1032	SQ		ANAP	COPY	
>Code Value	0008,0100	SH		ALWAYS	COPY	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	
>Coding Scheme Version	0008,0103	SH		ANAPEV	COPY	

Table 284: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP	COPY	
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 285: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	COPY	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Patient Position	0018,5100	CS		ANAPCV	AUTO	
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	AUTO	
Protocol Name	0018,1030	LO		ANAP	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	AUTO	
>Code Value	0008,0100	SH		ALWAYS	AUTO	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	

Table 286: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	
Position Reference Indicator	0020,1040	LO		VNAP	AUTO	

Table 287: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	ViewForum	ANAP	AUTO	
Software Version(s)	0018,1020	LO	ViewForum 6.1, PMS5.2 MIMIT EVIIMDictionary	ANAP	AUTO	

Table 288: Image Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Position (Patient)	0020,0032	DS		ALWAYS	COPY	
Image Orientation (Patient)	0020,0037	DS		ALWAYS	COPY	
Pixel Spacing	0028,0030	DS		ALWAYS	COPY	
Slice Thickness	0018,0050	DS		VNAP	COPY	

Table 289: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	

Content Date	0008,0023	DA		ANAPCV	AUTO	
Content Time	0008,0033	TM		ANAPCV	AUTO	
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	

Table 290: CT Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL, PRIMARY, AXIAL, HELIX	ALWAYS	AUTO	
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	
Rescale Slope	0028,1053	DS		ALWAYS	AUTO	

Table 291: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/ OB		ALWAYS	AUTO	

Table 292: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

Table 293: Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Medical Alerts	0010,2000	LO		ALWAYS	AUTO	
Performed Station Name	0040,0242	SH		ALWAYS	AUTO	
Performed Procedure Type Description	0040,0255	LO		ALWAYS	AUTO	

13.1.1.6. MR Image Storage SOP Class

Table 294: IOD of Created MR Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	Image Plane Module	ALWAYS
Image	General Image Module	ALWAYS
Image	MR Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS

Image		SOP Common Module	ALWAYS
Image		VOI LUT Module	ALWAYS
		Additional Module	

Table 295: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Patient's Birth Time	0010,0032	TM		ANAP	COPY	

Table 296: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	
Study Description	0008,1030	LO		ANAP	COPY	
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	AUTO	

Table 297: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 298: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Patient Position	0018,5100	CS		ANAPCV	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Series Description	0008,103E	LO		ANAP	AUTO	
Protocol Name	0018,1030	LO		ANAP	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	

Table 299: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	
Position Reference Indicator	0020,1040	LO		VNAP	AUTO	

Table 300: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	ViewForum	ALWAYS	AUTO	
Software Version(s)	0018,1020	LO	ViewForum 6.1, PMS5.2 MIMIT EVIIMDictionary	ALWAYS	AUTO	

Table 301: Image Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Position (Patient)	0020,0032	DS		ALWAYS	AUTO	
Image Orientation (Patient)	0020,0037	DS		ALWAYS	AUTO	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
Slice Thickness	0018,0050	DS		VNAP	AUTO	

Table 302: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	
Content Date	0008,0023	DA		ANAPCV	AUTO	
Content Time	0008,0033	TM		ANAPCV	AUTO	

Table 303: MR Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL, SECONDARY	ALWAYS	AUTO	
Scanning Sequence	0018,0020	CS		ALWAYS	AUTO	
Sequence Variant	0018,0021	CS		ALWAYS	AUTO	
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Scan Options	0018,0022	CS		VNAP	AUTO	
MR Acquisition Type	0018,0023	CS		VNAP	AUTO	
Echo Time	0018,0081	DS		VNAP	AUTO	
Echo Train Length	0018,0091	IS		VNAP	AUTO	

Table 304: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	
Planar Configuration	0028,0006	US		ANAPEV	AUTO	

Table 305: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

Table 306: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ANAPEV	AUTO	
Window Width	0028,1051	DS		ANAPEV	AUTO	

Table 307: Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	
Rescale Slope	0028,1053	DS		ALWAYS	AUTO	
Rescale Type	0028,1054	LO		ALWAYS	AUTO	
Performed Station Name	0040,0242	SH		ALWAYS	AUTO	
Performed Procedure Type Description	0040,0255	LO		ALWAYS	AUTO	

13.1.1.7. X-Ray Angiographic Image Storage SOP Class

Table 308: IOD of Created X-Ray Angiographic Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	X-ray Image Module	ALWAYS
Image	X-Ray Acquisition Module	ALWAYS
Image	XA Positioner Module	ALWAYS
Image	SOP Common Module	ALWAYS
	Additional Module	ALWAYS

Table 309: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Patient's Birth Time	0010,0032	TM		ANAP	COPY	

Table 310: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	
Study Description	0008,1030	LO		ANAP	COPY	
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	COPY	

Table 311: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Size	0010,1020	DS		ANAP	COPY	
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 312: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Series Description	0008,103E	LO		ANAP	AUTO	
Protocol Name	0018,1030	LO		ANAP	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ANAPEV	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ANAPEV	AUTO	
Request Attributes Sequence	0040,0275	SQ		ANAP	AUTO	
>Scheduled Procedure Step ID	0040,0009	SH		ANAPEV	AUTO	
>Requested Procedure ID	0040,1001	SH		ANAPEV	AUTO	
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	AUTO	

Table 313: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	ViewForum	ANAP	AUTO	
Software Version(s)	0018,1020	LO	ViewForum 6.1, PMS5.2 MIMIT EVIIMDictionary	ANAP	AUTO	

Table 314: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	
Content Date	0008,0023	DA		ANAPCV	AUTO	
Content Time	0008,0033	TM		ANAPCV	AUTO	

Table 315: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/ OB		ALWAYS	AUTO	

Table 316: X-ray Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL, PRIMARY, BIPLANE A	ALWAYS	AUTO	
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Intensity Relationship	0028,1040	CS		ALWAYS	AUTO	

Table 317: X-Ray Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Radiation Setting	0018,1155	CS		ALWAYS	COPY	
KVP	0018,0060	DS		VNAP	COPY	

Table 318: XA Positioner Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Detector	0018,1110	DS		ANAP	COPY	

Table 319: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

Table 320: Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Performed Station Name	0040,0242	SH		ALWAYS	AUTO	
Performed Procedure Type Description	0040,0255	LO		ALWAYS	AUTO	

13.1.1.8. X-Ray Radiofluoroscopic Image Storage SOP Class

Table 321: IOD of Created X-Ray Radiofluoroscopic Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	X-ray Image Module	ALWAYS
Image	X-Ray Acquisition Module	ALWAYS
Image	SOP Common Module	ALWAYS
	Additional Module	ALWAYS

Table 322: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	
Patient's Birth Time	0010,0032	TM		ANAP	COPY	

Table 323: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study ID	0020,0010	SH		VNAP	COPY	
Study Description	0008,1030	LO		ANAP	COPY	
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	COPY	

Table 324: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 325: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Protocol Name	0018,1030	LO		ANAP	AUTO	
4	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	

Table 326: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	ViewForum	ANAP	AUTO	
Software Version(s)	0018,1020	LO	ViewForum 6.1, PMS5.2 MIMIT EVIIMDictionary	ANAP	AUTO	

Table 327: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	

				Presence of Value	Source	Comment
Content Date	0008,0023	DA		ANAPCV	AUTO	
Content Time	0008,0033	TM		ANAPCV	AUTO	

Table 328: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 329: X-ray Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	DERIVED, PRIMARY, SINGLE PLANE	ALWAYS	AUTO	
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Intensity Relationship	0028,1040	CS		ALWAYS	AUTO	

Table 330: X-Ray Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Radiation Setting	0018,1155	CS		ALWAYS	COPY	
KVP	0018,0060	DS		VNAP	COPY	

Table 331: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ANAPEV	AUTO	
SOP Instance UID	0008,0018	UI		ANAPEV	AUTO	

Table 332: Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Performed Station Name	0040,0242	SH		ALWAYS	AUTO	
Performed Procedure Type Description	0040,0255	LO		ALWAYS	AUTO	

13.1.2.   Usage of Attributes from Received IOD

The following table gives the supported functionalities from the ViewForum Plug-in application.

Table 333: Functionalities

Functionality	Type1	Optional	Private
IVE	X		

13.1.2.1. Usage of the Functionality IVE

The following table lists the supported SOP classes from the functionality IVE.

Table 334: Supported SOP Classes for functionality IVE

SOP Class name	SOP Class UID
3D Object new Storage (Private)	1.3.46.670589.5.0.2.1
3D Volume Storage new SOP Class (Private)	1.3.46.670589.5.0.1.1
Cardio Image Storage new SOP Class (Private)	1.3.46.670589.5.0.8.1
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
CT Synthetic Image Storage (Private)	1.3.46.670589.5.0.9
CX Synthetic Image Storage (Private)	1.3.46.670589.5.0.12
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1
MR Cardio Analysis new Storage (Private)	1.3.46.670589.5.0.11.1
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
MR Synthetic Image Storage (Private)	1.3.46.670589.5.0.10
Perfusion (Private)	1.3.46.670589.5.0.13
Perfusion Image Storage (Private)	1.3.46.670589.5.0.14
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Surface Storage new (Private)	1.3.46.670589.5.0.3.1
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2
XA reconstructed X-ray SOP Class (private)	1.3.46.670589.2.4.1.1

Note:
ViewForum plugin does not support images with EBE transfer syntax.

13.1.3.   Attribute Mapping

None

13.1.4.   Coerced/Modified fields

If not available at import then ViewForum R6.3 will create the additional attributes as listed in the table below.

Table 335: Additional Attributes for Image Imports

Attribute Name	Tag	VR	Generated Value
Performed Procedure Step Start Date	0040,0244	DA	Copied from (0008, 0020) Study Date.
Performed Procedure Step Start Time	0040,0245	TM	Copied from (0008, 0030) Study Time.
Performed Procedure Step ID	0040,0253	SH	Copied from (0020, 0010) Study ID.
Performed Procedure Step Description	0040,0254	LO	Copied from (0008, 1030) Study Description.

13.2.   Data Dictionary of Private Attributes

Not Applicable

13.3.   Coded Terminology and Templates

Not Applicable.

13.4.   Grayscale Image consistency

Not Applicable

13.5.   Standard Extended/Specialized/Private SOPs

Not Applicable

13.6.   Private Transfer Syntaxes

Not Applicable